bennett associates
fire safety consultants

Taylor Wimpey

Design Fire Safety Strategy



Address:

217 High Street, Yiewsley, Hillingdon London

Prepared by:

Paul Molloy, BEng (Hons) MIFireE

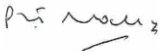
February 2020

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1. Quality Assurance

Issue	Reason	Date	Prepared by	Signature	Authorised by	Signature
1.0	First Issue for comments	14th February 2020	Paul Molloy BEng (Hons) MIFireE		Tony Bennett GIFireE	
2.0	Second Issue incorporating revised drawings and comments 26.02.2020	27th February 2020	Paul Molloy BEng (Hons) MIFireE		Tony Bennett GIFireE	

Notes

This document is provided for the purpose of enabling Taylor Wimpey West London to demonstrate compliance with the appropriate fire safety performance levels required by the relevant building and its use as described herein. It should not be manipulated, abridged or otherwise presented without the formal written consent of the author.

2. Executive Summary

This report has been commissioned by Taylor Wimpey West London to produce a design fire safety strategy for their development proposals at 217 High Street, Yiewsley, Hillingdon, London, consisting of the erection of 5 and 6 storey buildings to provide a 10,000 square foot D1 Health facility and 235 residential apartments with associated parking, communal podium garden, landscaping, pedestrian and cycle canal link and external works following the demolition of the existing buildings on site at 217 High Street, Yiewsley.

The report has been developed to document the fire safety provisions in the design stage of the building; the strategy document therefore sets out the general fire safety philosophy for the premises as a whole.

This strategy document should be used to provide a benchmark reference for fire safety matters, and these must be considered whenever carrying out alterations or extensions to the building or making other significant changes to its use or occupancy profile, and when undertaking fire risk assessments.

The document only considers life safety issues; any additional requirements regarding property protection are outside the scope of this document.

There is an inherent risk in all fire safety designs, including those that are code compliant and where fire engineering has been used to develop the fire strategy, however on-going fire safety management and fire risk assessment along with regular reviews with enforcing/ approving authorities should enable this risk to be kept to a minimum.

3. Introduction

The fire strategy report documents the fire safety arrangements and features within the proposed new building at 217 High Street, Yiewsley, Hillingdon, London. The strategy outlines the critical fire safety features within the building so that these measures are not unintentionally altered, as part of the ongoing design, and benchmarks the fire safety provision should any further alterations or extensions be proposed.

3.1. Scope and Purpose

The report applies only to this address and is intended to provide the relevant persons such as building developers, owners and occupiers with all the necessary fire safety information; such that when refurbishments, alterations or other changes take place they are fully aware of the critical fire safety features within the building so that they can ensure that these measures are not unintentionally altered.

3.2. Limitations

The opinions and findings noted in the report are made based upon the information provided as part of the planning submission including the suite of plans and documents.

3.3. Site Description

The proposed development aims to provide a better public space, accommodation and a community based D1 Health Facility within Yiewsley in the Borough of Hillingdon. Consisting of the erection of 5 and 6 storey buildings to provide a 10,000 square foot D1 Health facility and 235 residential apartments with associated parking, communal podium garden, landscaping, pedestrian and cycle canal link and external works following the demolition of the existing buildings on site at 217 High Street, Yiewsley.

The massing of the development staggers the proposed buildings into two distinct parts, which are completely independent of each other. There are three main blocks referred to in the design, Block A is independent of B and C, and includes the D1 Health Facility at ground floor level, with residential accommodation above, over four floors, and served by two independent stair cores.
Block B is situated to the northern side of the development and provides residential accommodation over six floors. This block is served by two independent stair cores.
Block C is situated at the southern side of the development and consists of residential accommodation over six floors and is served by two independent stair cores. The residential

units will be designed with a protected hallway, with the exception of the studio units which will be designed to ensure maximum travel distances are not exceeded.
Blocks B and C residential accommodation complete "the square" at first floor level only. A carpark is provided at ground and first floor level between blocks B and C, with a communal podium garden space provided at second floor level.
Ancillary accommodation is provided for the residential part of the buildings, with cycle storage, refuse stores, plant rooms and generator rooms.

In addition to the carpark, further parking spaces are provided adjacent to the D1 Health facility and to the south eastern side of the development. An access road is provided around the perimeter of the building to allow fire service access as well as refuse collections.

Each of the six stair cores are provided with a lift, it is proposed to have a firefighting lift installed in Block C core A. Although this is not a requirement as the height to the top floor of the buildings is less than 18 metres.

The D1 health facility is assessed as shell only within the scope of this document, a detailed fire strategy will be provided when internal layouts are confirmed, this will be assessed under HTM 05-02 Fire Code: Guidance in support of the functional provisions (Fire Safety in the Design of Healthcare Premises).

3.3.1. Ground floor

The ground floor of Block A consists of the community based D1 health facility, this is independent from the residential units above. The ground floor provides access to the accommodation situated on the upper floors through two stair cores, with lifts serving each core and ancillary accommodation consisting of cycle storage and bin stores.

Blocks B and C have the entrance to the carpark situated on the east side of the development, with residential accommodation provided to the remaining three sides, the carpark is lobby protected from the residential accommodation. There is access to the four stair cores provided with lifts serving each core and ancillary accommodation consisting of plant rooms, generator room, cycle storage and bin stores.

3.3.2.Level 1

The floor layouts proposed on level one consist of residential apartments. All accommodation provided on this level will have access to a single protected stair, the layout is such that residential accommodation is provided on all four sides of Blocks B and C.

A carpark is situated within the confines of Blocks B and C, this carpark is lobby protected from the residential accommodation.

3.3.3. Level 2

The floor layouts proposed on level one consist of residential apartments. All accommodation provided on this level will have access to a single protected stair, the layout is such that residential accommodation is provided on the north and south elevations of Blocks B and C.

A landscaped communal podium garden space is available on this level, which is accessed from the four protected corridors serving the stair cores of blocks B and C. Residents from Block A will also have access to the podium garden space which will normally be accessed via core B-B and C-B. This space will be available for recreation purposes of all residents of this development.

3.3.4. Levels 3 and 4

The floor layout proposed on levels 3 and 4. All accommodation provided on this level will have access to a single protected stair, the layout is such that residential accommodation is provided on the north and south elevations of Blocks B and C.

3.3.5. Level 5

The floor layout proposed on level 5, Block A is roof only with access provided to access plant via vertical ladders, other accommodation provided on this level will have access to a single protected stair, the layout is such that residential accommodation is provided on the north and south elevations of Blocks B and C.

3.3.6. Rooftop

The roof of the buildings B and C will have plant equipment provided, which will require servicing and maintenance. Access to the roof will be via vertical ladders, with more than one means of escape provided to each accessible roof location.

3.3.7. Apartment layouts

The studio apartments are designed in an open plan arrangement. The distance from the entrance door to the furthest point in the studio arrangement is less than nine metres.

Figure 1: typical studio apartment layout

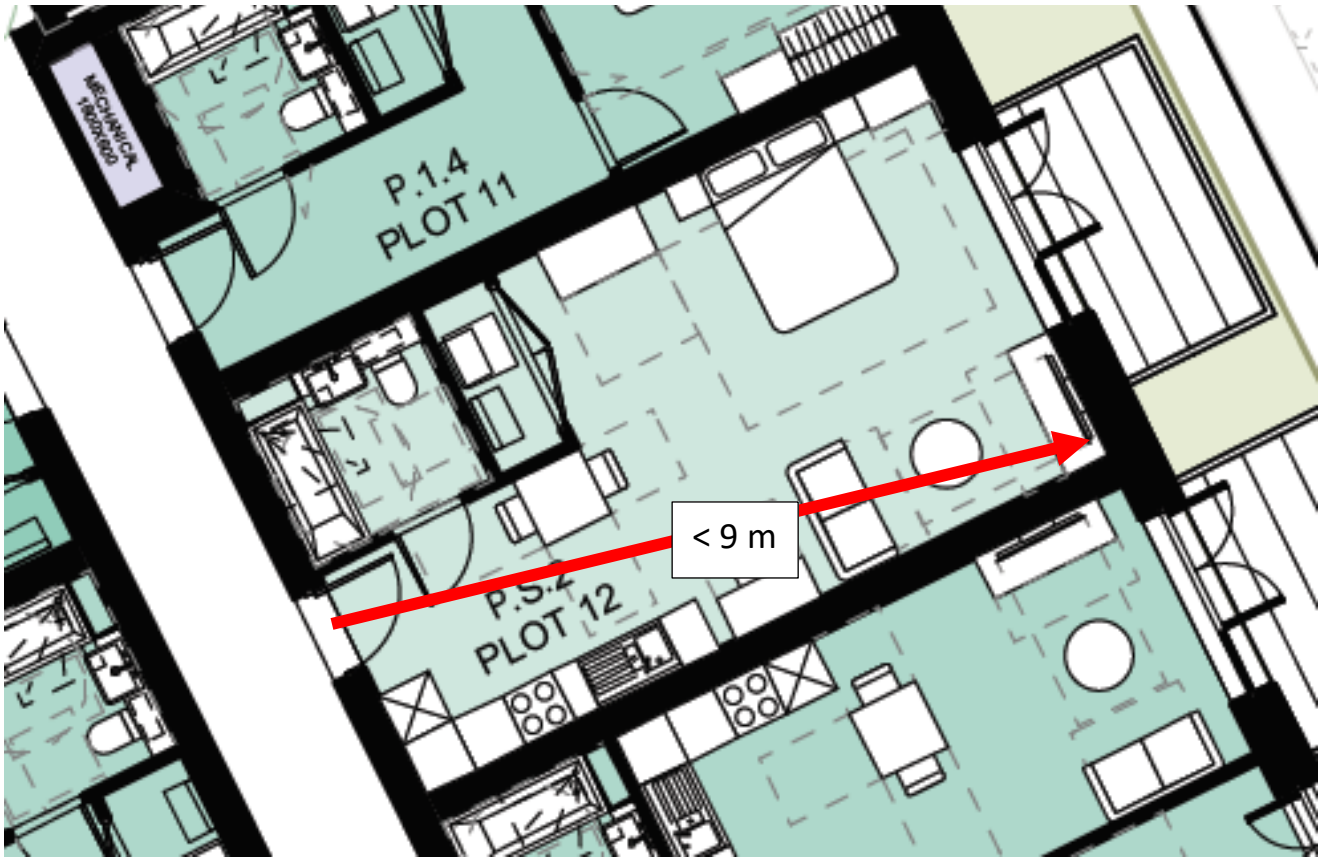


Figure 2: typical one-bedroom apartment layout



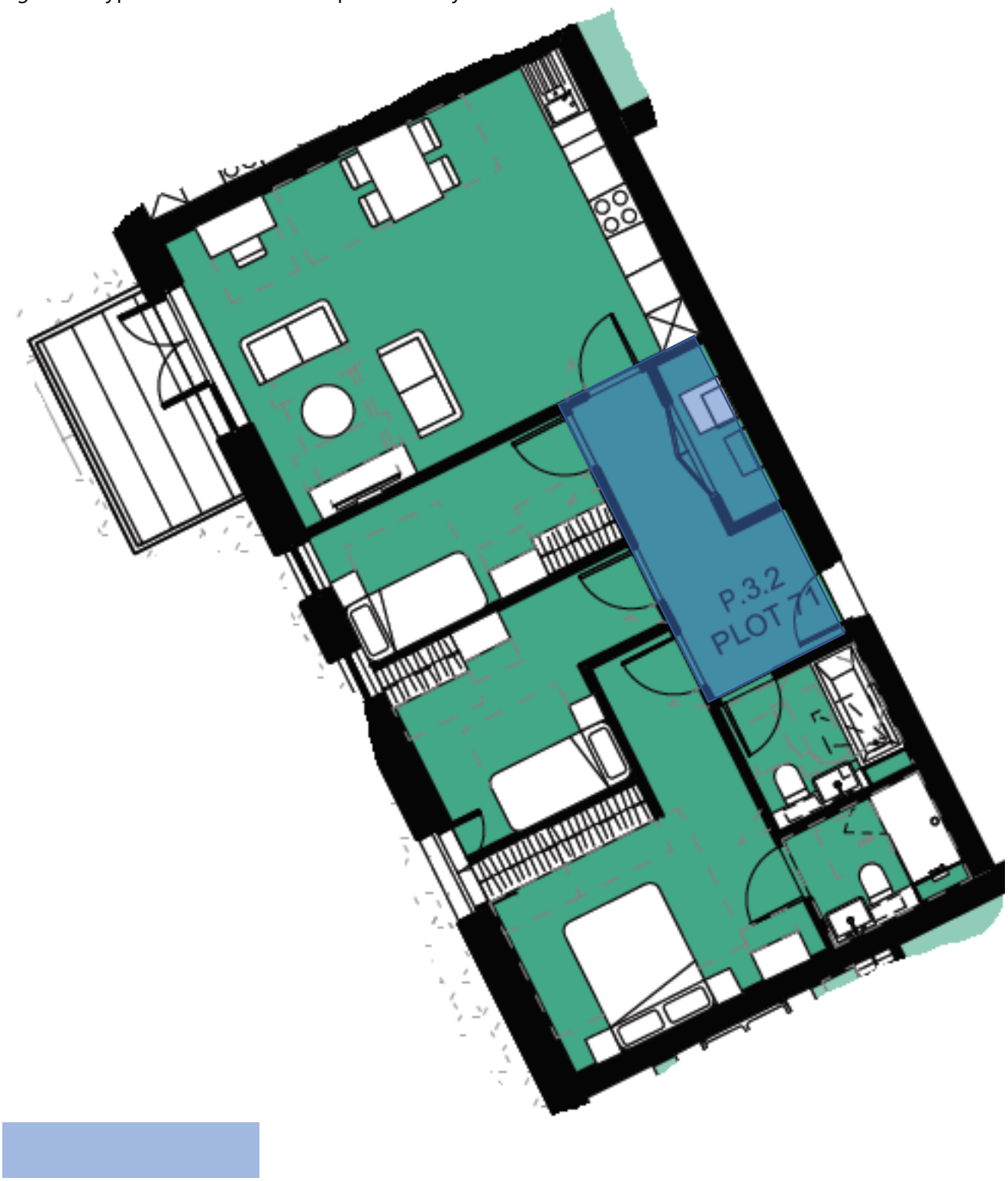
The protected entrance hall provides 30 minutes protection and is less than 9 metres in length in accord with diagram 3.2 of ADB.

Figure 3: typical two-bedroom apartment layout



The protected entrance hall provides 30 minutes protection and is less than 9 metres in length in accord with diagram 3.2 of ADB.

Figure 4: typical three-bedroom apartment layout



The protected entrance hall provides 30 minutes protection and is less than 9 metres in length in accord with diagram 3.2 of ADB.

4. Legislation

4.1. Building Regulations

Building Regulations require a building owner to provide adequate levels of life safety to the building by providing suitable:

i. Means of escape
ii. Means of warning occupants of a fire
iii. Limiting internal fire spread
iv. Limiting external fire spread, and protection to adjacent property from fire
v. Access and facilities for Fire Service operations.

For flats and apartments this is normally achieved by following the guidance in Approved Document B (ADB)[1]. Other documents are available and consist of a three-tier approach guidance; simple premises normally follow the guidance documented within (ADB), while other approaches are also acceptable as detailed in BS 9991 Code of Practice for Fire Safety in the Design, Management and Use of Residential Buildings[2], where the buildings are more complex in design.

Alternatively, where more innovative solutions and fire safety concepts are involved, fire engineering may be used following the principles in BS 7974[3] in order to demonstrate an equivalent or better level of life safety is provided in the building(s). This development utilises the principles set out in ADB, BS 9991 Code of Practice for Fire Safety in the Design, Management and Use of Residential Buildings, and reference is made to the Local Government Association Document; Fire Safety in Purpose Built Blocks of Flats[4].

4.1.1. Building Regulations Purpose Group

The building is used as a residential dwelling and is classified as Residential (Flat) 1(a) and Assembly and Recreation (5) (Health Centres and Surgeries), in accordance with the Building Regulations, Approved Document B: Classification of purpose groups Table 0.1

4.2. Regulatory Reform (Fire Safety) Order 2005

Upon occupation of the building "The Regulatory Reform (Fire Safety) Order 2005" (RR(FS)O 2005) requires the "Responsible Person" to undertake a fire risk assessment to ensure adequate fire precautions are provided and maintained by introducing a comprehensive and robust fire safety management system. In the case of flats and apartments the RR(FS)O 2005

applies only to the common parts. In the case of retail units, the requirement for a fire risk assessment applies to the whole of the premises.

5. Supporting Drawings

Table 1 provides a summary of the drawing information supplied that should be read as part of this fire strategy.

Table 1: 217 High Street, Yiewsley, Hillingdon, London. Drawings

Drawing Title	Drawing Number	Date	Rev
Ground Floor Plan	HSY-ASA-ZZ-GF-DR-A-200	Feb 20	R3
First Floor Plan	HSY-ASA-ZZ-01-DR-A-201	Feb 20	R2
Second Floor Plan	HSY-ASA-ZZ-02-DR-A-202	Feb 20	R2
Third Floor Plan	HSY-ASA-ZZ-03-DR-A-203	Feb 20	R2
Fourth Floor Plan	HSY-ASA-ZZ-04-DR-A-204	Feb 20	R2
Fifth Floor Plan	HSY-ASA-ZZ-05-DR-A-205	Feb 20	R2
Roof Plan	HSY-ASA-ZZ-RP-DR-A-206	Feb 20	R2
Elevations	HSY-ASA - BC-XX-DR-A-402	Feb 20	R3
Schedule	A3318 700	Feb 20	P15
Façade Development Sketchbook	A3318	Jan 20	-
Fire Notes	A3318 191010	Oct 19	-

6. Additional Fire Protection Measures

6.1. Sprinklers

A fire suppression system will be installed throughout the residential part of the building and will comply with BS 9251[5]. The D1 health facility should be assessed separately, as should other ancillary parts of the buildings and if it is decided to incorporate sprinkler protection to an appropriate standard, this should not be less than the requirements of the residential system.

6.2. Mechanical Smoke Extract

Smoke shafts are provided to clear the corridors of the products of combustion. Following suggested consultation and the advice of a M&E consultant it is recommended that the provision consists of mechanical extract which will compensate for the extended travel distances in parts of Block C. The carpark will be likely to require mechanical extraction, after consultation and the advice of a M&E consultant to determine the design of the smoke extract system complies with BS 7346-7[6]. Consideration should be given to providing the carpark with a sprinkler system, to limit the fire size, and protect the means of escape from the podium garden as part of the wider escape strategy when details of the ventilation system are available.

6.3. Benefits of additional protection measures

The provision of sprinklers will serve to ensure a fire is confined to the room of origin. The provision of a smoke control system will ensure the escape routes are kept relatively free from the products of combustion. This will assist both the residents in making an escape, and firefighters in dealing with a fire.

As the development has the benefit of both sprinkler protection and smoke control, this will allow for additional travel distances to be provided. This will result in any dead-end conditions travel distances being increased from 7.5 metres to 15 metres.

The sprinkler provision also compensates for the open plan layout of the studio apartments, allowing more design freedom.

7. Emergency Escape Strategy

7.1. Emergency Evacuation Principle

7.1.1. Stay Put Policy - Flats

The escape strategy adopted for this building is based on a "stay put" policy. A stay put policy involves the following approach:

- When a fire occurs in 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 this area makes their way out of the building and summon 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.

- The Stay Put Policy applies to the flats only. The evacuation strategy for the D1 Health Facility should be determined following fit out and the outcome of the fire risk assessment, it is expected this will result in an immediate evacuation.

7.1.2. Evacuation Strategy

The fire compartmentation between flats is analogous to the party wall separation between adjoining houses, which prevents fire spreading from one house to another. It also enshrines the principle that a person's actions should not endanger their neighbours.

The fire compartmentation provided to the flat is one hour, and they have a 30-minute fire protected kitchen within the unit, this is to ensure that a fire should be contained within the flat of origin.

7.1.3. Simultaneous Evacuation Policy – D1 Health Facility and Podium Garden

It is expected there will be a simultaneous evacuation policy adopted for the D1 Health facility and communal garden space on the podium. These will be determined following fit out and fire risk assessments.

7.1.4. Evacuation of Mobility Impaired Persons

An important Aspect of modern building design is the evacuation of mobility impaired persons. Refuge spaces will be provided in each of the stair cores, and a communications system installed.

The evacuation strategy for the residential buildings is based on a stay put procedure. This will negate the need to evacuate significant numbers of mobility impaired persons.

The provision of the refuge spaces is only for the use of mobility impaired persons evacuating from their affected dwelling.

The lifts should be suitable for the evacuation of mobility impaired persons in the unaffected stair core. The cause and effect should reflect this.

8. Fire Warning

8.1. Automatic Fire Detection and Alarm

Each apartment is fitted with an automatic fire detection system complying with BS 5839-part 6[7]. Grade D1/D2, Category LD2, which incorporates a smoke detector in the circulation spaces that forms part of the escape route, and a heat detector in the kitchen area that presents a high risk of fire to occupants.

NB BS 5839-6 2019 identifies that smoke detectors should be installed in the principal habitable room(s) (i.e. the lounge), where the room is the lounge/ kitchen it is recommended that the smoke detector is not provided in this case as it is likely to lead to false alarms from cooking, which could lead to the occupiers disabling the fire alarm system.

8.2. Fire Detection in Common Areas

A BS 5839-part 1[8] system will be provided in the common areas. Smoke detectors are to be provided at each level in the common staircases and corridors, these are provided to operate the smoke extract system. Additional heat detectors are to be fitted within the refuse stores, cycle stores and plant rooms and will be linked to the main common alarm system. Manual call points are to be fitted at the accesses to the communal podium level.

The system will be designed so that all areas of the common parts have sounders which can be operated by the fire and rescue service (on an override switch) to evacuate stair core by stair core if necessary. The remote areas will also have sounders fitted so roof spaces and the podium area can be evacuated if necessary.

An appropriate cause and effect will be developed for the building.

8.3. Maintenance

The Automatic Fire Detection system fitted within the common space should be inspected and tested by a competent person as part of the operation of mechanical extract system at intervals not exceeding six months. Occupiers should be encouraged to test their fire alarm system regularly and clean the detectors periodically.

9. Means of Escape

9.1. Maximum occupancy figures – residential

The development is to be provided with 235 flats and is made up of: studio flats designed to accommodate one person, one-bedroom flats designed to accommodate two people, two-bedroom flats designed to accommodate either three or four people and three-bedroom flats designed to accommodate either four or six people. This would be the maximum expected occupancies for each flat type. The make-up of the occupancy is outlined in the table below.

Table 2: Occupancy figures Residential

Accommodation Type	Number of units	Occupancy	Persons accommodated	Cumulative Total
Studio	12	1	12	12
1 Bedroom	62	2	124	136
2 Bedroom	63	3	189	325
2 Bedroom	70	4	280	605
3 Bedroom	19	4	76	681
3 Bedroom	9	6	54	735
Total	**235**			**735**

The figures highlighted in the table above show the maximum occupancy figures if all flats are occupied to the optimum numbers. The means of escape are such that there is only one stair available to each flat, and there is a stay put strategy in place for the residential parts of the buildings; the numbers are to be used for the communal spaces only.

9.2. Travel distances – Flats

The additional fire protection measures allow corridor distances of 15 metres in one direction. The development is designed so that single directions are not normally greater than 15 metres. There are two examples of units where the 15 metres travel distance is exceeded, this is in units 156 and 203, which are both located in block C and at first floor level. These two units are less than 4.5 metres above ground floor level and will be provided with emergency escape windows.

Figure 5: Maximum normal single direction travel distance less than 15 metres



9.3. Travel distances – Podium Garden Space

The maximum travel distance from the podium is circa 25 metres and four exits are available, this area is in open air. The exits lead directly into the relevant stair core.

9.4. Travel distance Roof Spaces

The travel distances from the accessible roof will be limited by having two accessible points and will be in accord with Table 2.1 of ADB, which states in open air a single direction of 60 metres or 100 metres where an alternative is provided.

9.5. Stair sizes

The stairs provided in the development are a minimum width of 1100mm. This will allow for the evacuation of 260 persons per stair, based on a simultaneous evacuation over two floors. Assuming one stair from the podium garden is unavailable, results in a stair capacity of 780. This is in excess of the maximum possible numbers assuming all residents were using the podium garden simultaneously, which is 735 persons.

Normally a stay put evacuation strategy will be adopted over the remaining floors, the stair sizes are only relevant for the podium garden space and over two floors.

10. Emergency Lighting

The proposed layouts will be provided with emergency lighting throughout and installed to comply with BS 5266[9].

Generally emergency lighting should be provided to give adequate luminance near each exit door and where it is necessary to emphasise potential danger as outlined below:

i. Exit doors intended to be used in an emergency
ii. Near stairs so each flight of stairs receives direct light
iii. Near any change in level
iv. Mandatory emergency exits and safety signs
v. Changes of direction
vi. Intersection of corridors
vii. Outside each final exit
viii. Near firefighting and first aid equipment

Emergency lighting should be inspected and tested on a monthly basis by the end user and subjected to a discharge test on an annual basis by a competent engineer.

11. Emergency Escape Signage

Fire escape signs are required for this development as there are alternative stairs serving parts of the development, therefore residents and visitors should have clear indications as to their escape routes, by way of directional signs.

'Fire Door Keep Locked' signs should be provided to the service riser doors situated within the common areas.

Fire Action Notices should be provided to advise on the fire precautions inherent within the building and what to do in the event of a fire, and reinforce the stay put policy.

All signs should conform to BS 5499[10].

The signage required in the D1 Health Facility should be determined after fit-out and a suitable fire risk assessment.

12. Manual Fire-Fighting Equipment

Manual fire extinguishers are not necessary in the common parts of blocks of flats. Such equipment should only be used by those trained in its use. It is not considered practicable for residents to receive such training.

Additionally, the provision of such equipment in the common parts could encourage occupants to enter the common part of the building to get the equipment and return to their apartment to fight the fire; such a procedure is inappropriate.

Portable fire extinguishing appliances should be provided in areas where staff and contractors are likely to be working these should be provided following a fire risk assessment. Portable extinguishers should conform to BS EN 3[11].

The provision within the D1 health facility should be determined following fit out and a suitable fire risk assessment.

13. Internal Fire Spread

13.1. Linings

The choice of materials for walls and ceilings can significantly affect the spread of fire and its rate of growth, even though they are not likely to be the item ignited first. It is particularly important in circulation spaces where rapid fire spread is more likely to prevent the escape of occupants that surface linings are restricted by limiting the surface spread of flames and minimising heat release rates.

Table 4.1 of ADB outlines the requirement for internal linings in accordance with BS 476 or the European standard BS EN 13501-1 2002.

Table 3: Classification of Internal Linings

Location	European Class
Circulation spaces, including the common areas of blocks of flats	B-s3, d2
Other rooms (including garages) circulation spaces within a dwelling	C-s3, d2
Small rooms of maximum internal floor area of 4 m^2	D-s3, d2

14. Compartmentation

14.1. Provisions of compartmentation

Compartmentation is fundamental to containing a fire in one flat, and so allowing a ''stay put'' policy to operate. Modern construction methods can ensure compartmentation is achieved and maintained.

In buildings containing flats, the following should be constructed as compartment walls or compartment floors:

I. Every floor (unless it is within a flat, i.e. between one storey and another within one individual dwelling).
II. Every wall separating a flat from any other part of the building
III. Every wall enclosing a refuse storage chamber

This development is provided with one-hour compartmentation to the stair enclosures and compartmentation separating a flat from any other part of the building, additionally a thirty-minute fire resistance is provided to the protected entrance hallways. Any services passing through the fire compartment are to be suitably protected to maintain the appropriate fire resistance, as described below.

The carpark is to have a minimum of sixty minutes fire protection and the health facility will be subject to a minimum of sixty minutes fire protection from the residential parts of the building.

14.2. Protection of Openings and Fire Stopping

To ensure all fire separating elements are effective, every joint or imperfection of fit, or opening to allow services to pass through the element should be suitably fire stopped. Vertical service risers are to be enclosed in a fire protected shaft or fire stopped at each compartment floor level.

All openings for pipes, ducts, conduits or cables that pass through and / or any joints between fire separating elements should be appropriately fire stopped with consideration for any potential thermal movement of pipes and ducts.

Where non-rigid materials are adopted or unsupported spans of 100mm are adopted then the fire stopping material should be reinforced with materials of limited combustibility.

14.3. Openings for Pipes

Where services pass through a fire separating element, the following three fire stopping measures should be considered to evaluate the most appropriate fire protection measure:

- Proprietary Seals: provide a system such as an intumescent collar which has been tested to maintain the fire resistance of the wall, floor for a pipe of any diameter.
- Pipes with restricted diameter; if the pipe satisfies the requirement of the table below, the fire stopping can be made from cement mortar or intumescent mastic around the pipe.
- Sleeving: of lead, aluminium alloy, fibre cement or uPVC with dimensions as outlined in the Table below can be used.

Table 4: Maximum Diameter of Pipes Passing Through a Compartment

Situation	Non-combustible materials	Lead, Aluminium alloy, uPVC, fibre cement	Any other material
Structure enclosing a protected shaft which is not a stairway or lift shaft.	160mm	110mm	40mm
Compartment wall or compartment floor between clusters	160mm	160mm (stack pipe) 110mm (branch pipe)	40mm
Any other Situation	160mm	40mm	40mm

14.4. Cavity Barriers

Concealed spaces or cavities in the construction of a building provide a route for flame and smoke spread, particularly in the voids above and below the construction of walls, floors and in roof spaces. The provision of cavity barriers in the voids is intended to restrict the spread of fire.

Fire resistant cavity barriers should be installed in cavity spaces exceeding 20m in any direction, these barriers will offer a minimum of 30 minutes fire resistance integrity and 15 minutes fire resistance insulation.

Where a concealed space is an undivided area which exceeds 40m in either or both directions on plan there is no limit to the size of the cavity if; the room and the cavity together are compartmented from the rest of the building.

14.5. Construction and Fixing of Cavity Barriers

Cavity barriers should be constructed to provide a minimum of 30 minutes fire resistance (E30 E15 when exposed from each side separately). The barrier should be tightly fitted to a rigid construction and mechanically fixed in position. Cavity barriers in a stud wall partition or provided around openings can be constructed from:

i. Steel at least 0.5mm thick
ii. Timber at least 38mm thick
iii. Polythene sleeved mineral wool, or mineral wool slab installed under compression.
iv. Calcium silicate, cement based, or gypsum-based boards at least 12mm thick.

15. External Fire Spread

15.1. Space separation

The buildings are constructed to ensure a fire is unlikely to involve an adjacent building. This is achieved by restricting the unprotected area in an external wall.

15.2. External walls

External walls should be constructed to achieve the classification requirements outlined in Table 10.1 of ADB.

15.3. External fire spread over the external faces of buildings

External walls should be constructed using a material that does not support fire spread and therefore endanger people in or around the building.

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. Combustible materials should not be used in cladding systems and extensive cavities.

External wall surfaces near other buildings should not be readily ignitable, to avoid fire spread between buildings. External walls should therefore either meet the performance criteria given in BRE Report BR 135 [N1] for cladding systems using full scale test data from BS 8414-1 or BS 8414-2, or meet the recommendations as set out in BS 9991.

16. Fire Service Access and Facilities

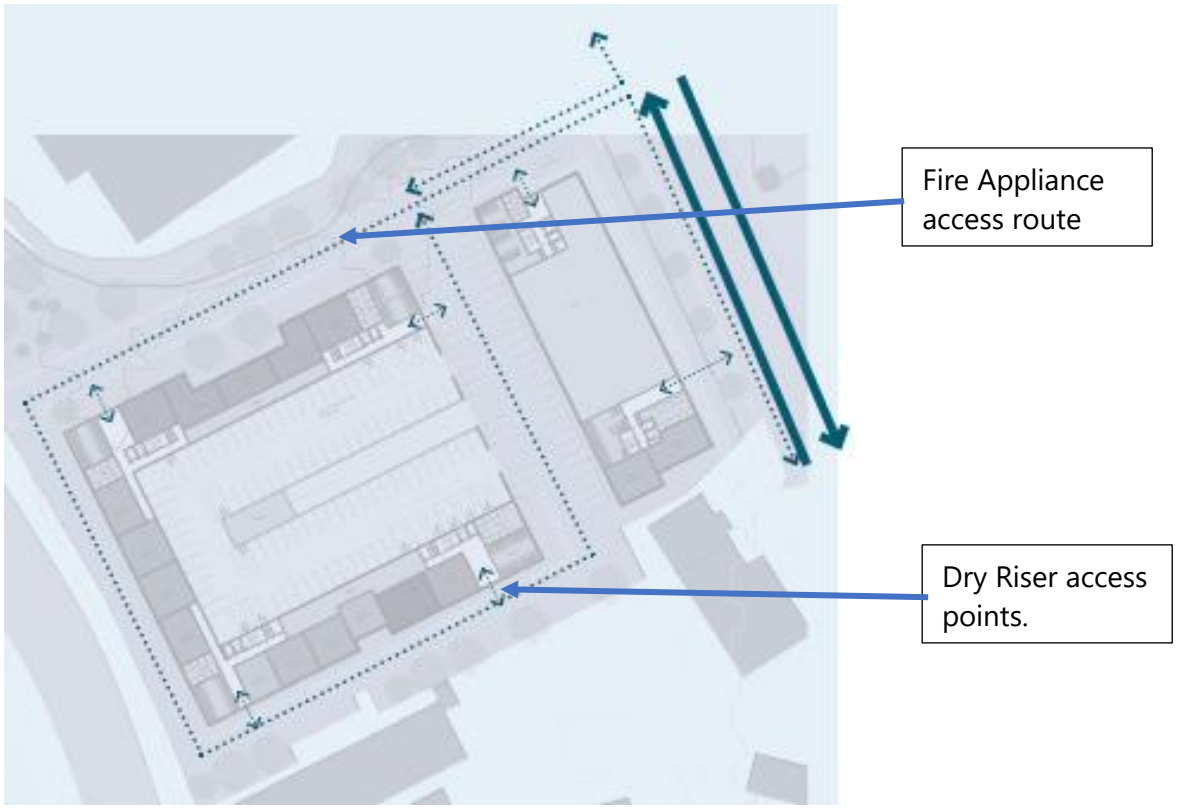
16.1. Firefighting access and provision

Firefighters need to be able to reach a fire quickly with their equipment. Safety and lives, both those of the Firefighters and of the occupants of the building, and the preservation of the building and its contents, can be jeopardized by delays in reaching the area of the fire. When designing new buildings and provisions for occupant evacuation, consideration should be given to the requirements for fire and rescue service access into and around buildings for firefighting purposes.

16.2. Fire Mains

Fire mains are to be provided in each of the stairs; the mains will be dry as the building height is less than 50 metres. Access for the fire service inlets into the dry risers will be provided from the perimeter road. The position of the appliance will be less than 18 metres from the riser inlet and will be in view of the inlet. The outlets at each level will result in hose lengths of less than 60 metres from any part of the building as sprinklers are provided. This is an overprovision as hose distances are less than 60 metres from the position of the fire appliance.

16.3. Access to Fire Main Inlets



16.4. Ventilation through smoke shafts

Ventilation is proposed to be provided via smoke shafts to assist in firefighting operations as well as keeping the stairs and corridors relatively clear of smoke and products of combustion. These are operated automatically by smoke detectors situated on each floor level, or by an override switch for use by the fire service situated at the entrance to the building. These vents should be tested monthly by operating the switches provided and should be inspected and serviced at least annually by a competent person using the smoke detectors to actuate them.

16.5. Location and access to external water supply

All premises should be provided with a supply of water for firefighting. Firefighters must lay out hose between the water supply and the fire appliance, so these distances should be kept to a minimum.
Hydrants should be located in positions that are near to building entry points (including entry points to firefighting shafts containing fire mains) and fire appliance parking positions as follows:

i. For buildings provided with dry fire mains, hydrants should be provided within 90 m of dry fire main inlets,
ii. For buildings not provided with fire mains (or where the building is fitted with a wet fire main), hydrants should be provided within 90 m of an entry point to the building and not more than 90 m apart.

Water mains and hydrants should be capable of delivering a sufficient flow of water to enable effective firefighting to be undertaken. If the water supply takes the form of a static tank or dam, the capacity should be related to the size of the building and the risk involved. An unlimited and guaranteed natural water source providing the right quantities is also expected to be acceptable, subject to access and hardstanding for the fire appliances being provided.
The water supply should comprise one or a combination of the following:

i. hydrants provided by the water supply company on the street mains:
ii. private hydrants designed and installed in accordance with BS 9990, ideally forming part of a ring main system:
iii. a static or natural water supply.

All hydrants should have signage in accordance with BS 3251.

17. Fire Safety Management

17.1. Assessing Fire Safety Management

Managing fire safety is addressed in BS 9999[12] and PAS 7[13], the principles of fire safety management contained within BS 9999 and PAS 7 can be considered best practice for managing fire safety. The standard of fire safety management required for a building is a critical component to be considered when determining how an emergency event involving fire will be dealt with.

17.2. Considerations of Fire Safety Management

i. Ensure a suitable and sufficient fire risk assessment is undertaken by a competent person.
ii. Appoint a person to manage fire safety, although they will not likely to be on site on a day by day basis, they will be responsible for the general management, and should have the appropriate training.
iii. Engage with residents, outlining key messages on fire prevention, ensuring the security of the blocks. The use and storage of hazardous materials should be prohibited. What actions are required on the discovery of a fire and what "stay put" means. What they need to do to safeguard escape routes, ensuring doors close correctly and are not wedged, held or tied open. Keeping common parts clear of combustibles and obstructions. How they can test their fire alarm systems and assist the fire and rescue service by not parking in restricted areas. They also need to understand the procedure for reporting essential repairs. This information can be provided within a resident's handbook.
iv. Fire Action Notices are a useful method of summarising the actions in the event of a fire and reinforcing the "stay put" policy.
v. Controlling hazardous activities, the management should have procedures in place to ensure hazardous activities such as 'hot work' is controlled and a 'permit to work system' is adopted.
vi. Inspection testing and maintenance; fire safety systems should be regularly tested and inspected. This will include fire doors, means of escape is kept fire sterile, emergency lighting systems, fire alarm systems, fire dampers where fitted and automatic ventilation systems.
vii. Periodically inspect fire separating construction to ensure there are no breaches in fire compartmentation.
viii. Maintain records to demonstrate the fire precautions are been regularly inspected and maintained.

18. Environment

Many fires or emissions from combustion processes damage the environment. The contents of a building, and the activities carried on within any building catching fire are likely to cause pollution to a greater extent than products used in the fabric of the building itself.

Regarding accidental fires, the main area for consideration in respect to environmental impact of such fires is the loss of control of pollutants as a consequence, for example from smoke and firefighting water run-off.

Appropriate steps at the design stage of any building can minimize the impact of accidental fires on the environment and, whist the emphasis is likely to be on the potential contents of the building, it would be responsible to consider the effects of using combustible materials in the building specification.

19. Conclusion

The building as designed appears to satisfy the functional requirements of the Building Regulations 2010 (Fire Safety).

The building is to be designed and constructed to modern standards using modern methods of providing inherent fire resistance. This is based on providing appropriate fire resistance to achieve fire compartments. This should ensure any fire should be contained within the flat or room of origin. The provision of sprinklers throughout the development will assist in the containment of any fire, this coupled with a smoke management system will enable occupiers to remain safely within their flat or make their escape if that becomes necessary.

Therefore, the escape strategy adopted for this residential part of the building is based on a "stay put" policy. A stay put policy involves the following approach:

- When a fire occurs in 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 this area makes their way out of the building and summon 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.

- The D1 Health Facility and social areas will be evacuated as part of an immediate evacuation, of the affected area and a procedure will be developed as part of the fire risk assessment. The fire alarm system will have an appropriate cause and effect developed.

- Any alterations, in the design undertaken in the future should not compromise the inherent fire resistance provided. Any fixed fire protection measures should be subjected to routine testing and maintenance in accord with the manufacturer's recommendations or the relevant British Standard guidance where appropriate.

- The building should be subjected to a fire risk assessment by a competent person on occupation.

20. References

1. Communities and Local Government Approved Document B Volumes 1 and 2 Dwellings & Buildings Other than Dwelling Houses.
2. British Standards Institute 9991 Fire safety in the Design, Management and Use of Residential Buildings – Code of Practice.
3. British Standards Institute 7974 Application of Fire safety Principles to the Design of Buildings.
4. Local Government Group Fire Safety in Purpose Built Blocks of Flats.
5. British Standards Institute 9251 Fire sprinkler systems for domestic and residential occupancies. Code of practice.
6. British Standards Institute 7346 Components for Smoke control systems. Code of practice for planning, design, installation, commissioning and maintenance & covered carparks.
7. British Standards Institute 5839-6 Fire Detection and Fire Alarm Systems for Residential Buildings.
8. British Standards Institute 5839-1 Fire Detection and Fire Alarm Systems for Buildings.
9. British Standards Institute 5266 Emergency Lighting. Code of practice for the emergency lighting of premises.
10. British Standards Institute 5499 Safety signs. Code of practice for escape route signing.
11. British Standards Institute EN 3 Portable fire extinguishers.
12. British Standards Institute 9999 Fire safety in the Design, Management and Use of Buildings – Code of Practice.
13. British Standards Institute PAS 7 Fire risk Management – Specification.