

Outline Fire Strategy Report to Support the Fire Statement

Kenneth Robbins House – Residential Apartments

Project Title:	Kenneth Robbins House – Residential Apartments
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Type of building work(s):	Refurbishment – Residential Apartments
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Comments based on:	BS 9991:2015 and AD B
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1 Introduction

AM Pyro Consulting has been appointed by Baily Garner to provide fire engineering services for the refurbishment of Kenneth Robbins House that is located in Haringey, London N17 0QA. This report supplements a previous fire statement that was completed for the building.

The project will consist of a complete refurbishment of the tower block which will include the residential apartments and appropriate fire safety upgrades.

This report is aimed at providing an adequate level of life safety within the completed scheme. Any additional requirements aimed at property protection and/or extreme events will not be discussed in this report as they are beyond the scope of Building Regulations 2010.

The structure of this report follows the general format of Part B of the Building Regulations 2010 (i.e., sections B1 to B5).

1.1 Guidance

For the building, compliance with the above requirements will be achieved by the application of British Standard 9991:2015 (including BS 9999:2017 and Approved Document B where appropriate) and supplementing this with fire engineering solutions when necessary to ensure that the key fire safety objectives for the design are achieved.

This legislation is primarily concerned with life safety and property protection is not specifically considered although the fire protection provisions to be provided for the building will offer some degree of property protection.

Furthermore, other issues such as insurer's requirements, cultural heritage, environmental, or continuity issues have not been specifically addressed or included within the development of the fire safety strategy.

1.2 Building Description

The Kenneth Robbins House building is a seventeen-storey tower block with a height of approximately 45.1 m (from ground floor level to the topmost occupied floor level). On the ground floor level there are 2 x community centres, 3 x staff offices, ancillary areas and several communal areas. The floor levels 1-16 of the building comprise of residential apartments. The ground, first, fifteenth and sixteenth floor levels are served by three stairways while the remaining floor levels (2-14) will be served by two protected stairways. All floor levels are served by two lifts which are located in the centre of the building. Due to the height of the building, all floor levels will be served by a firefighting shaft (fire-fighting stair and fire-fighting lift), an automatic sprinkler system and a dry riser main.

The following figures illustrate the existing plans of the development:



Figure 1: Ground Floor Plan

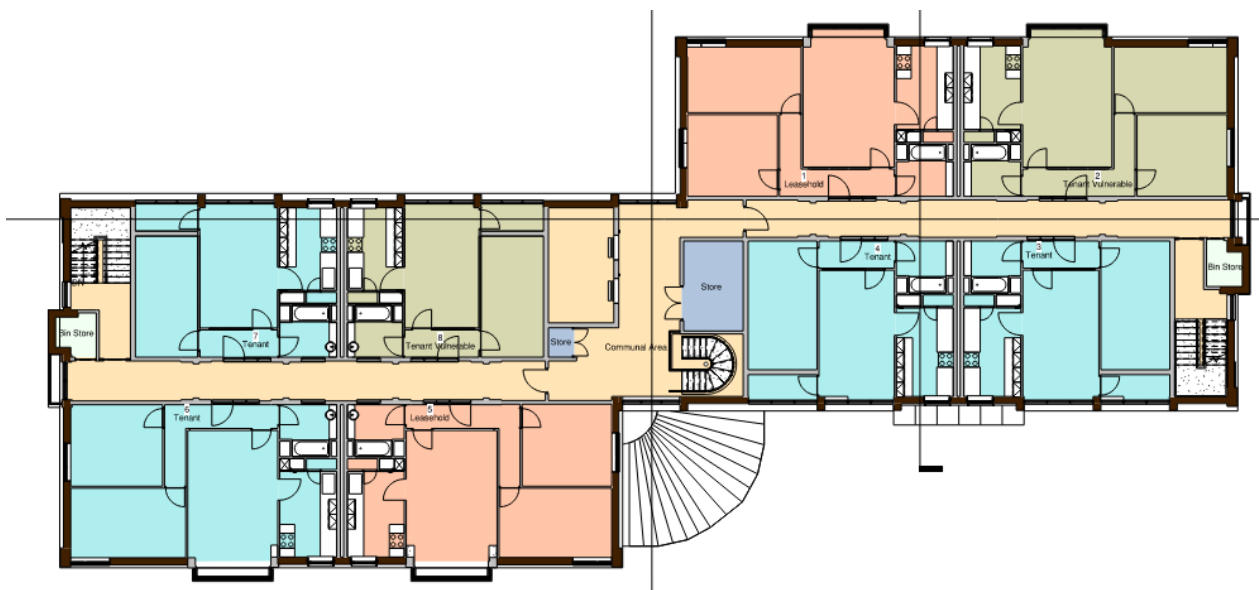


Figure 2: First Floor Plan

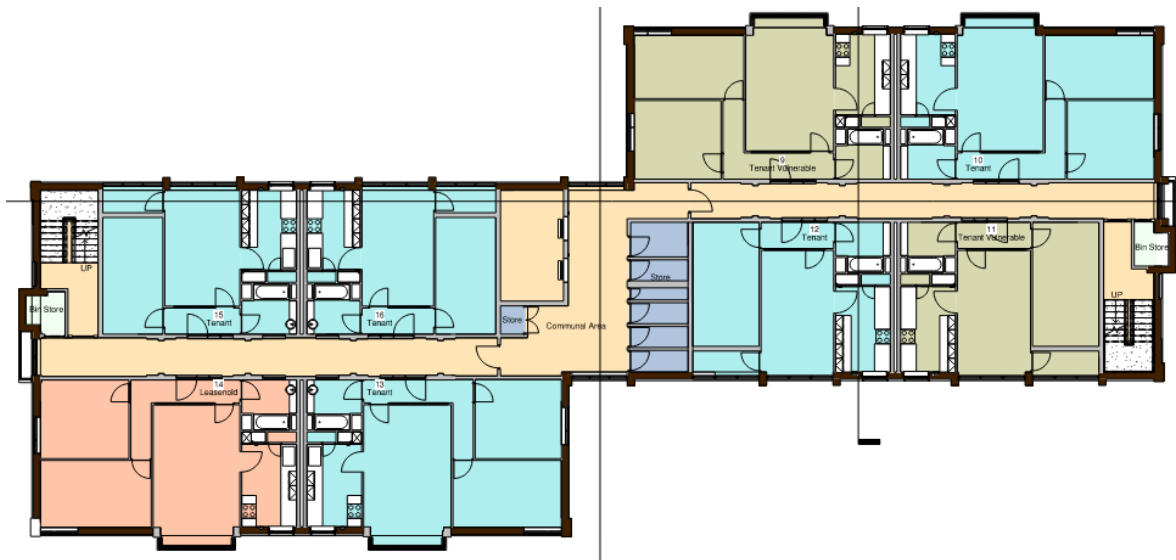


Figure 3: Second Floor Plan

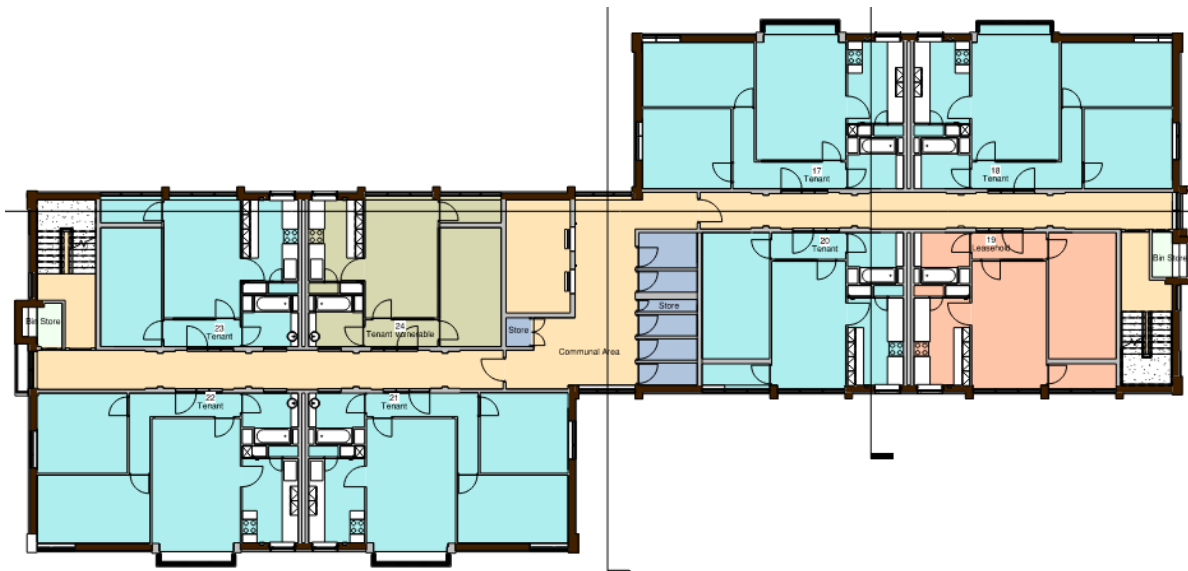


Figure 4: Third Floor Plan

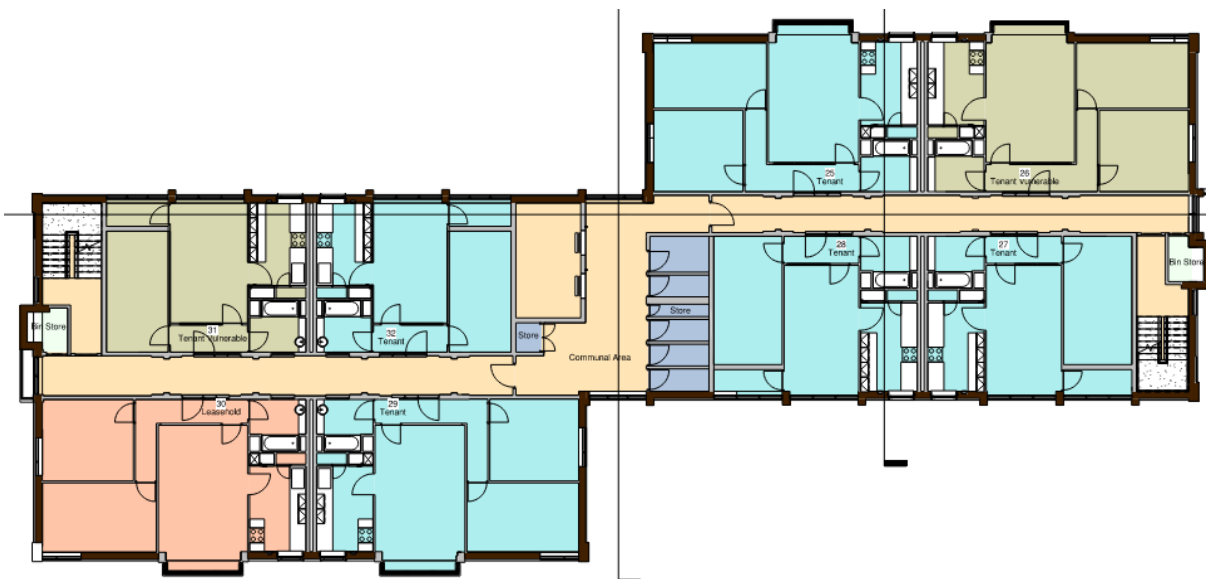


Figure 5: Fourth Floor Plan

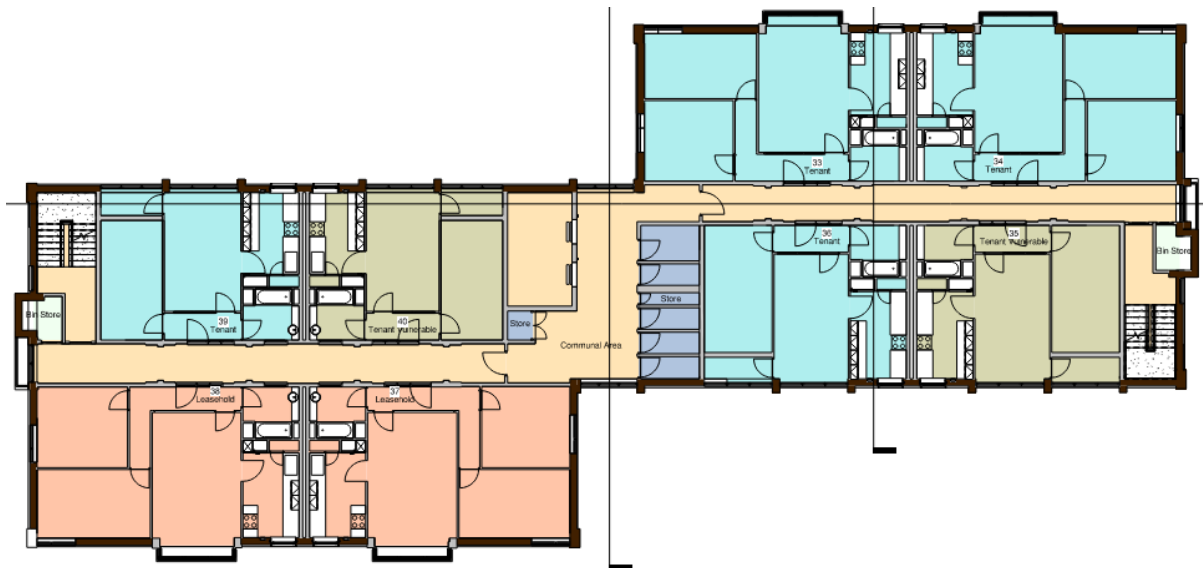


Figure 6: Fifth Floor Plan

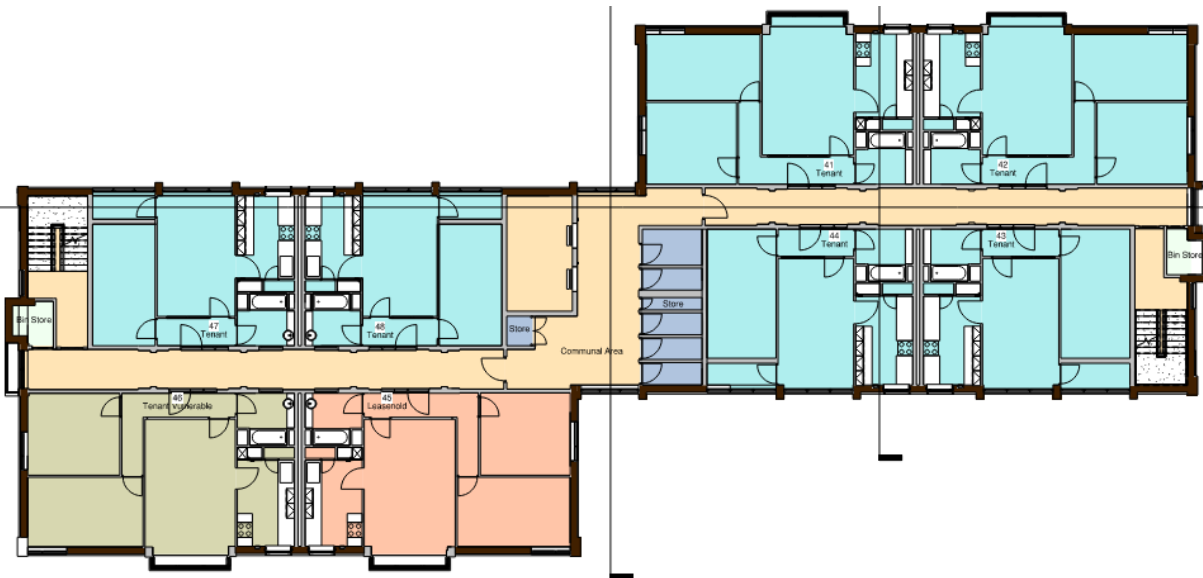


Figure 7: Sixth Floor Plan

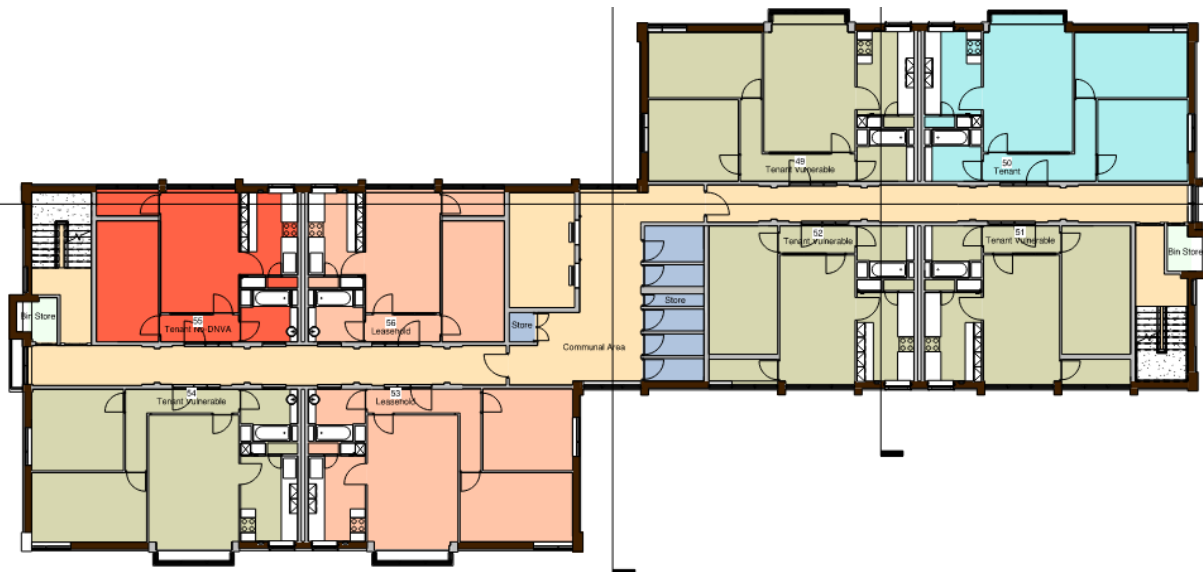


Figure 8: Seventh Floor Plan

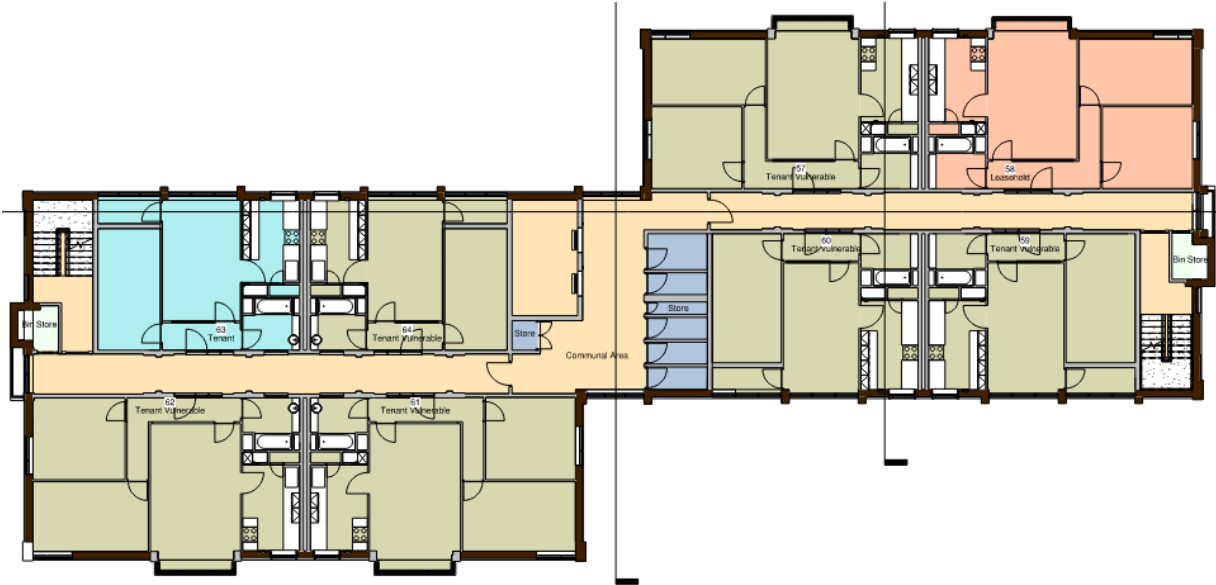


Figure 9: Eighth Floor Plan

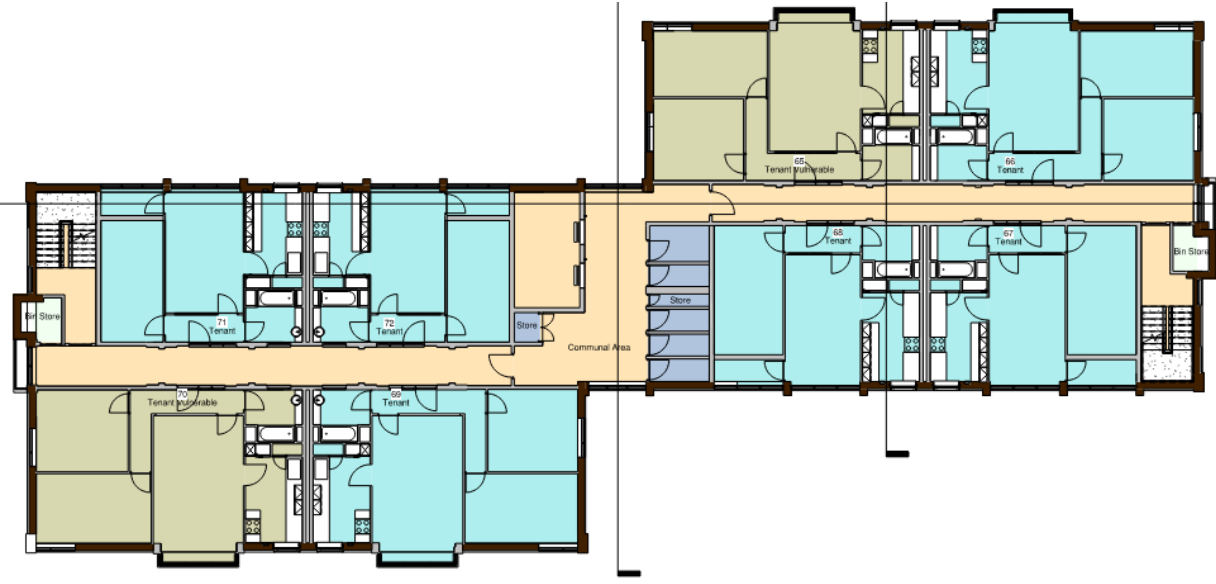


Figure 10: Ninth Floor Plan

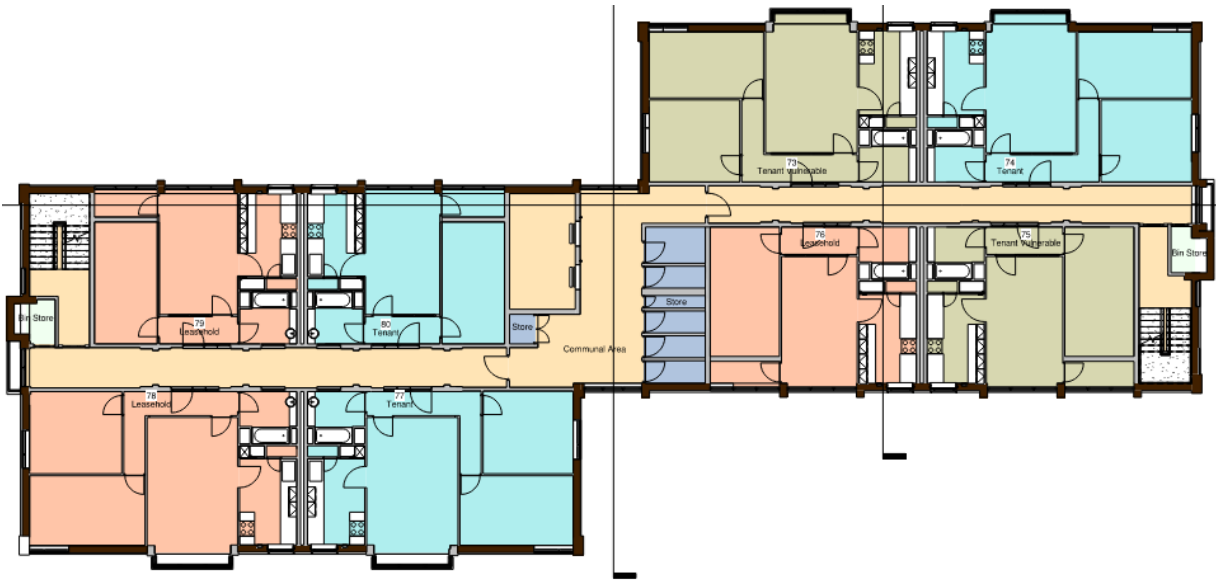


Figure 11: Tenth Floor Plan

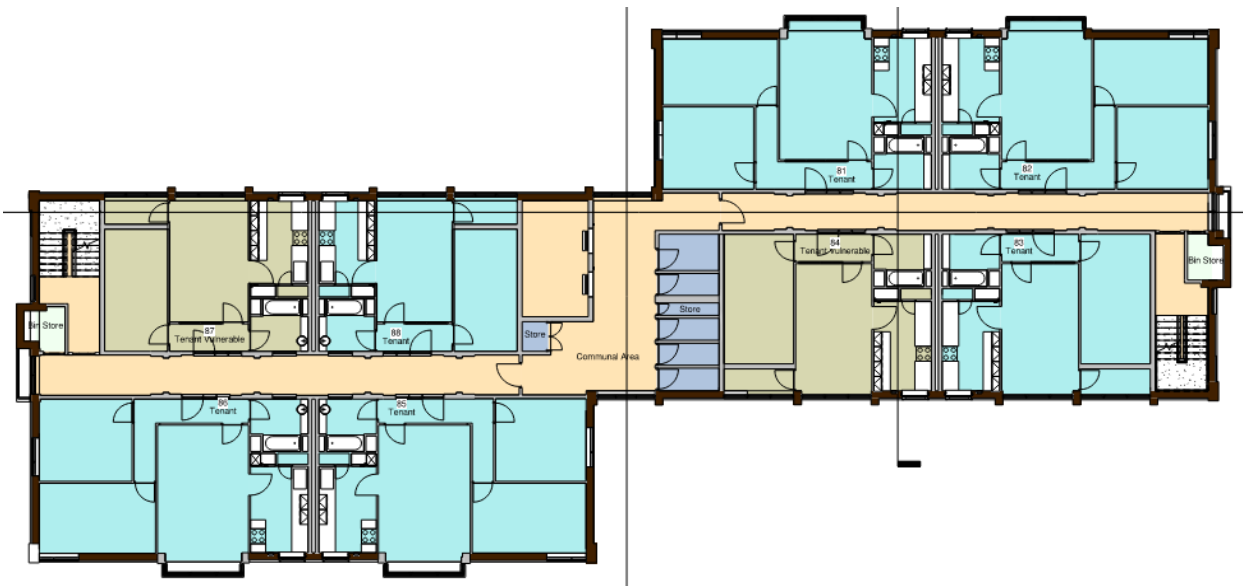


Figure 12: Eleventh Floor Plan

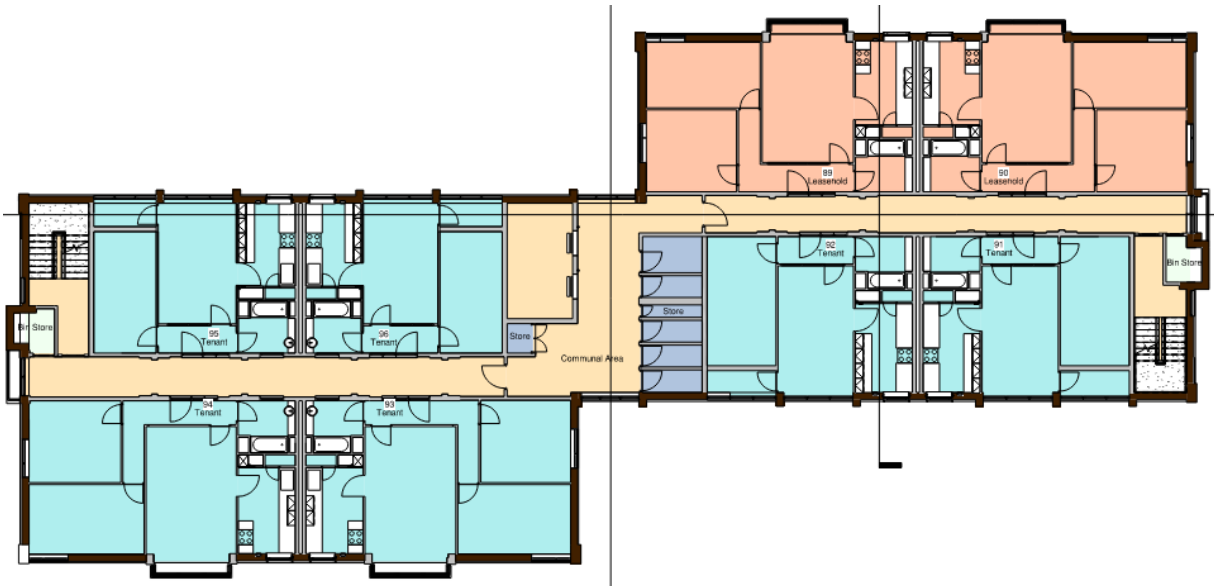


Figure 13: Twelfth Floor Plan

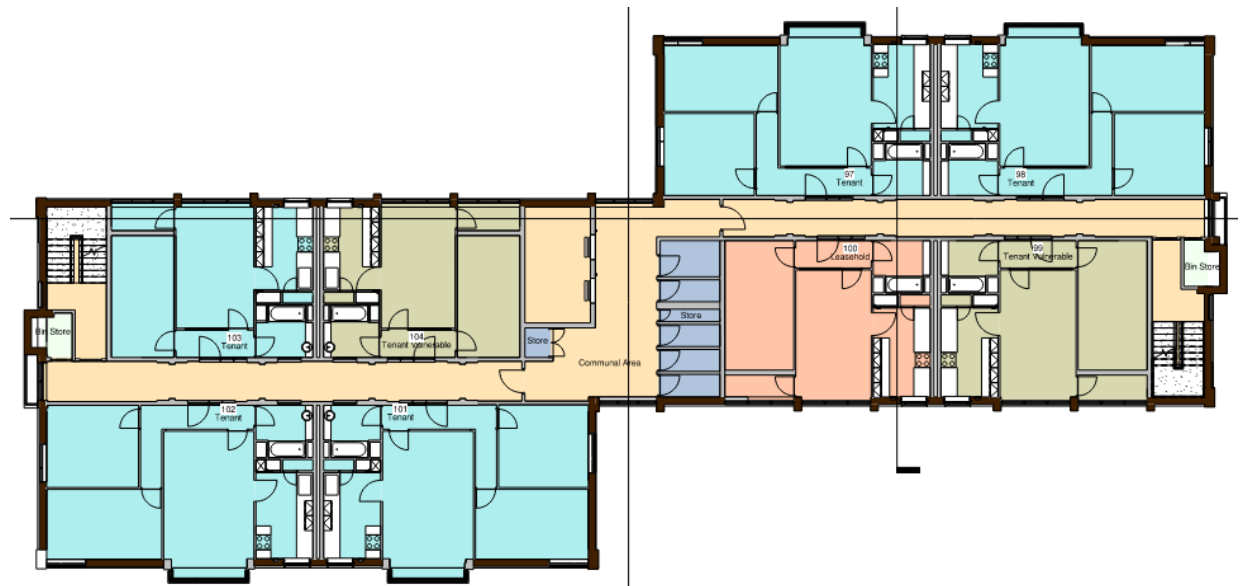


Figure 14: Thirteenth Floor Plan

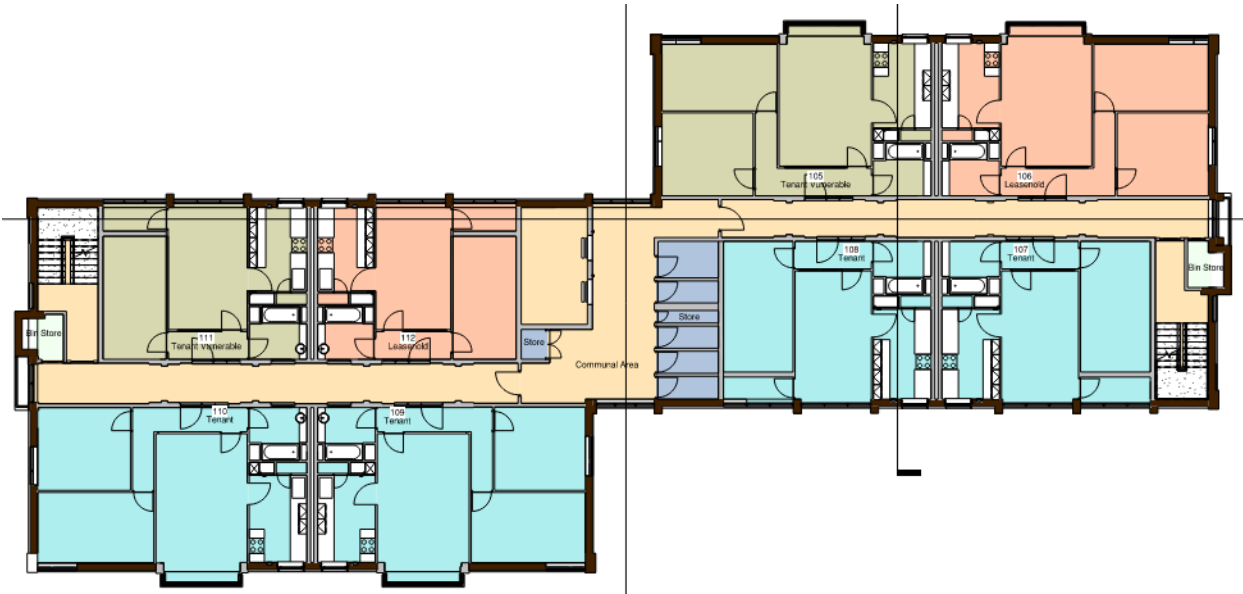


Figure 15: Fourteenth Floor Plan

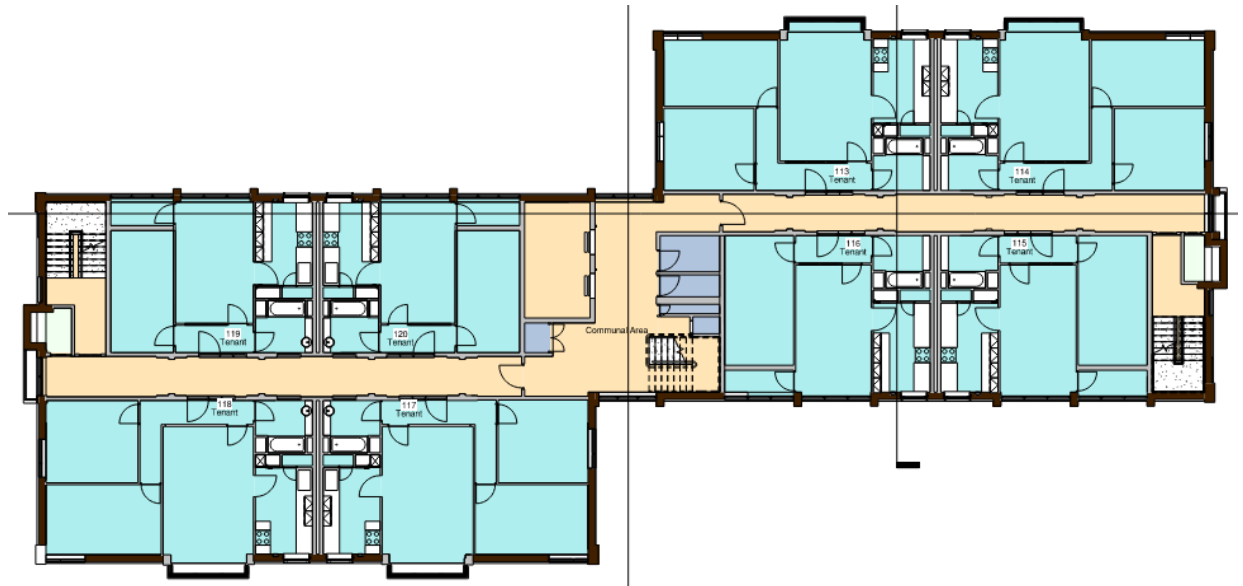


Figure 16: Fifteenth Floor Plan

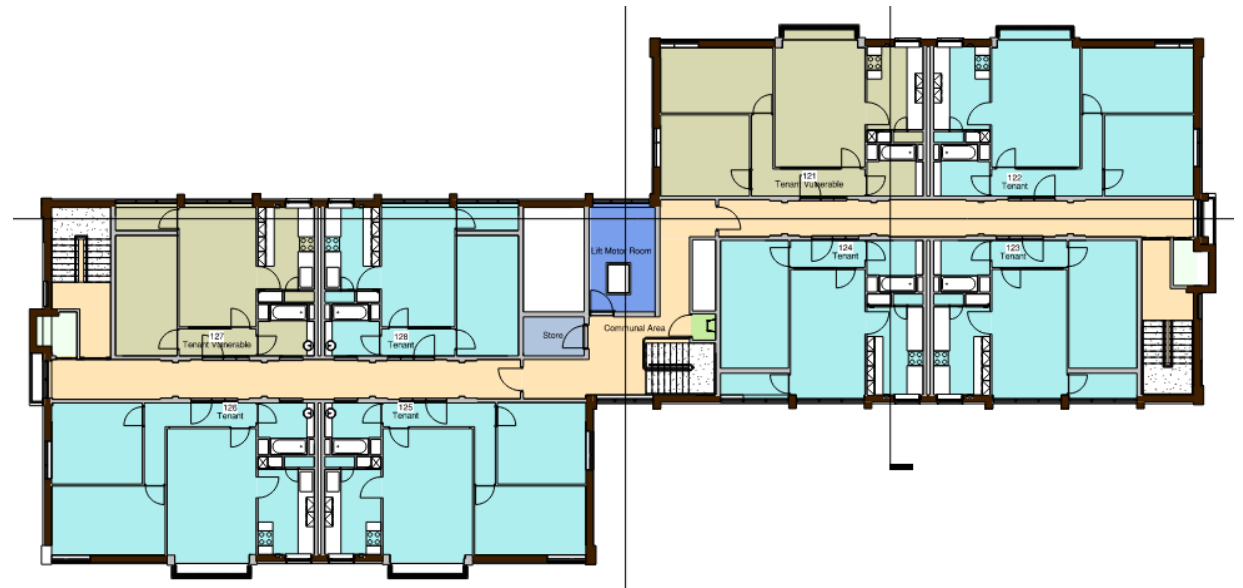


Figure 17: Sixteenth Floor Plan

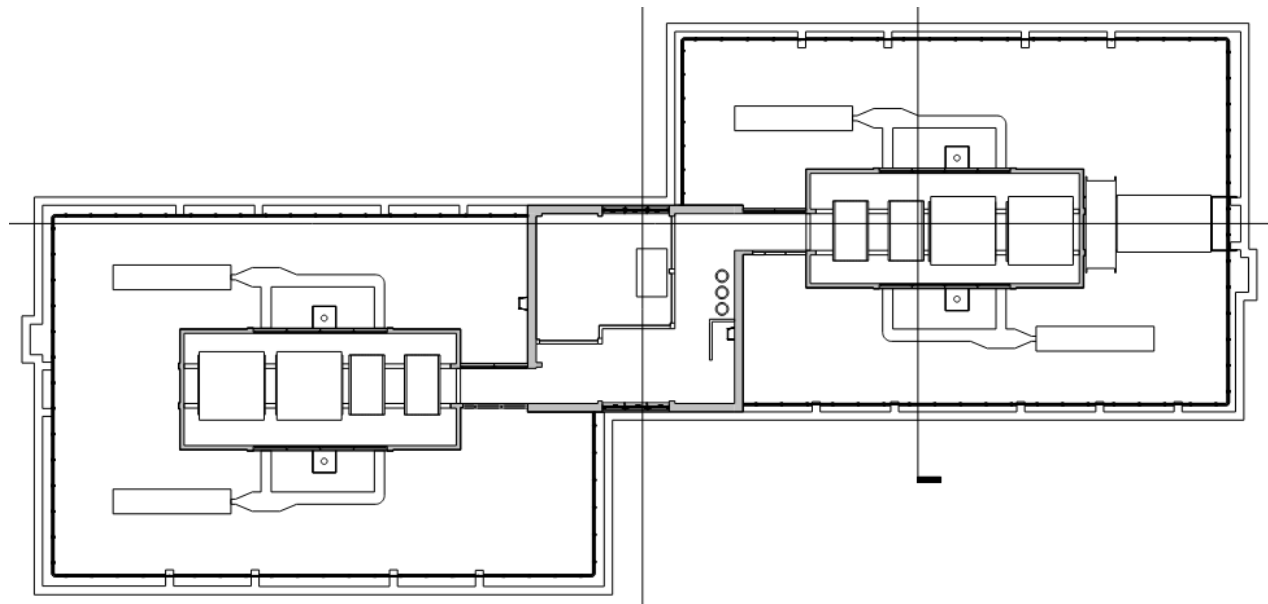


Figure 18: Roof Plan



Figure 19: Elevation – Section A-A & B-B

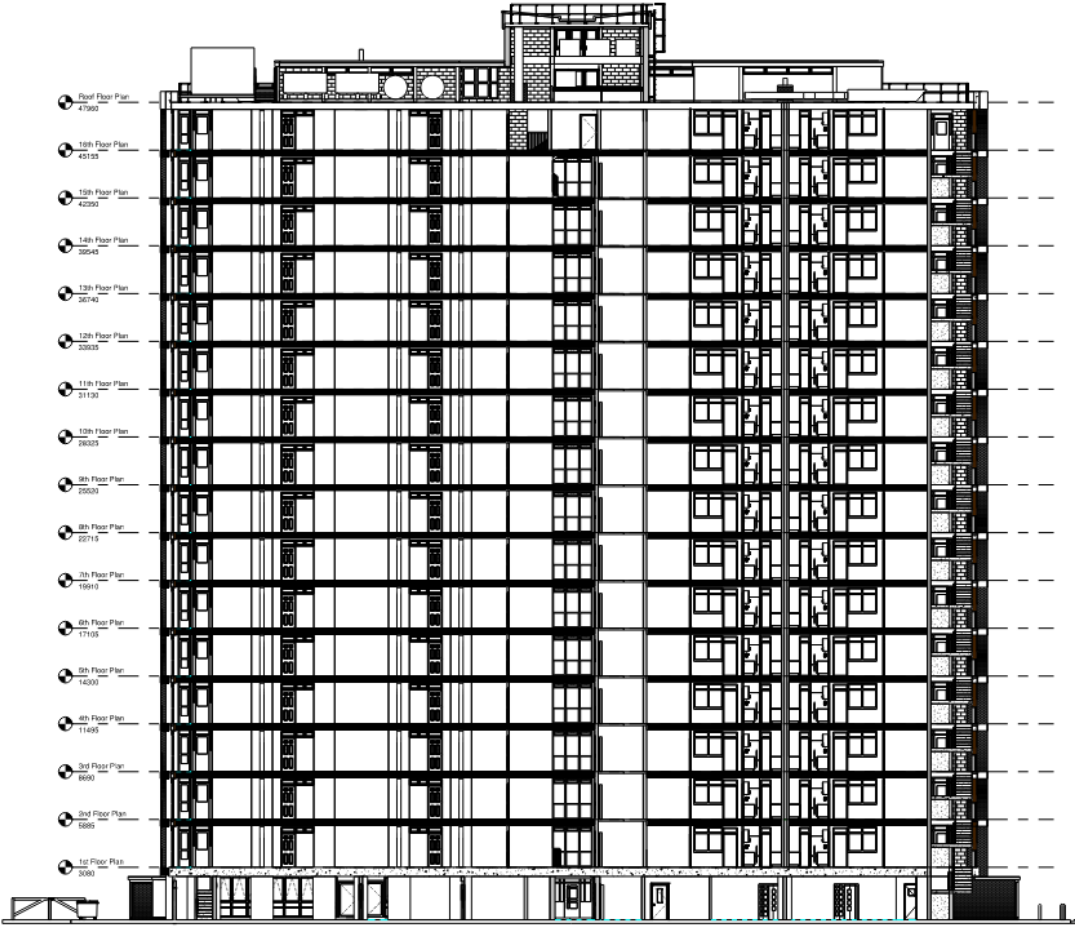


Figure 20: Elevation – Section C-C

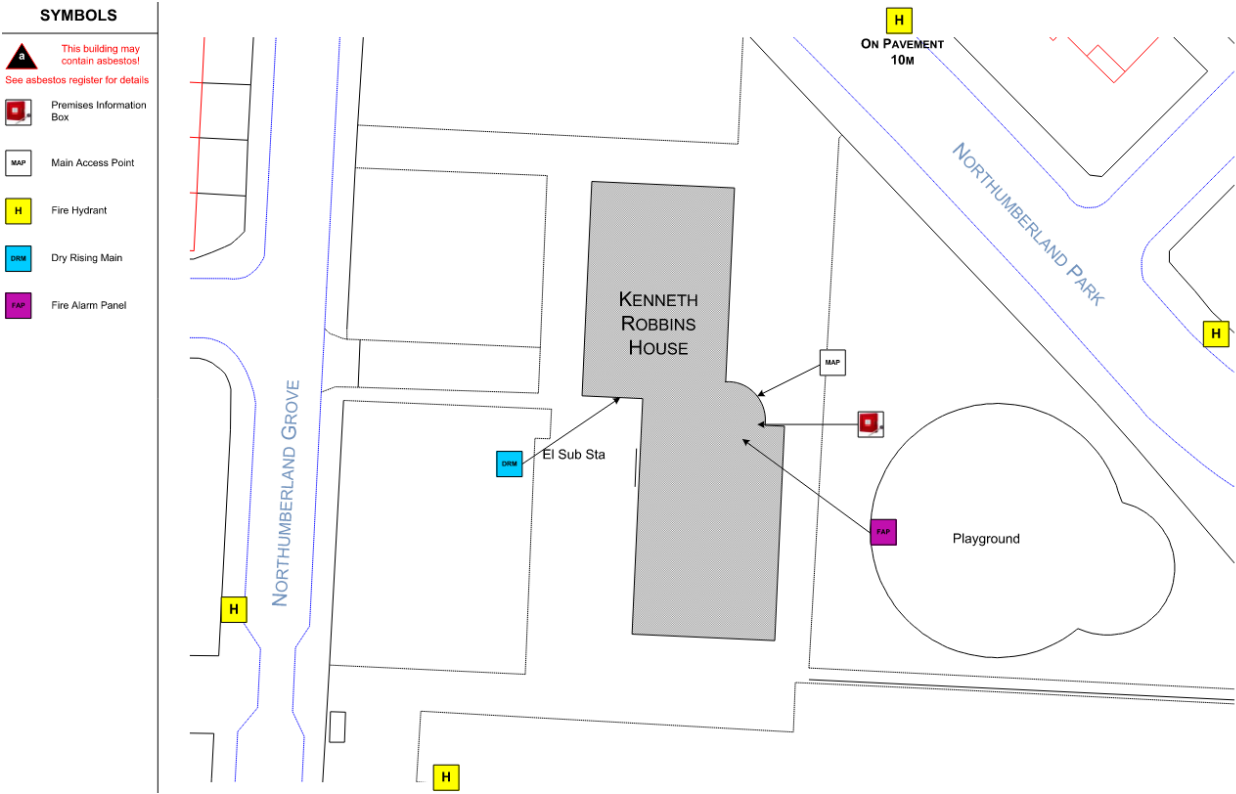


Figure 21: Existing Fire Strategy Drawings – Orientation Plan

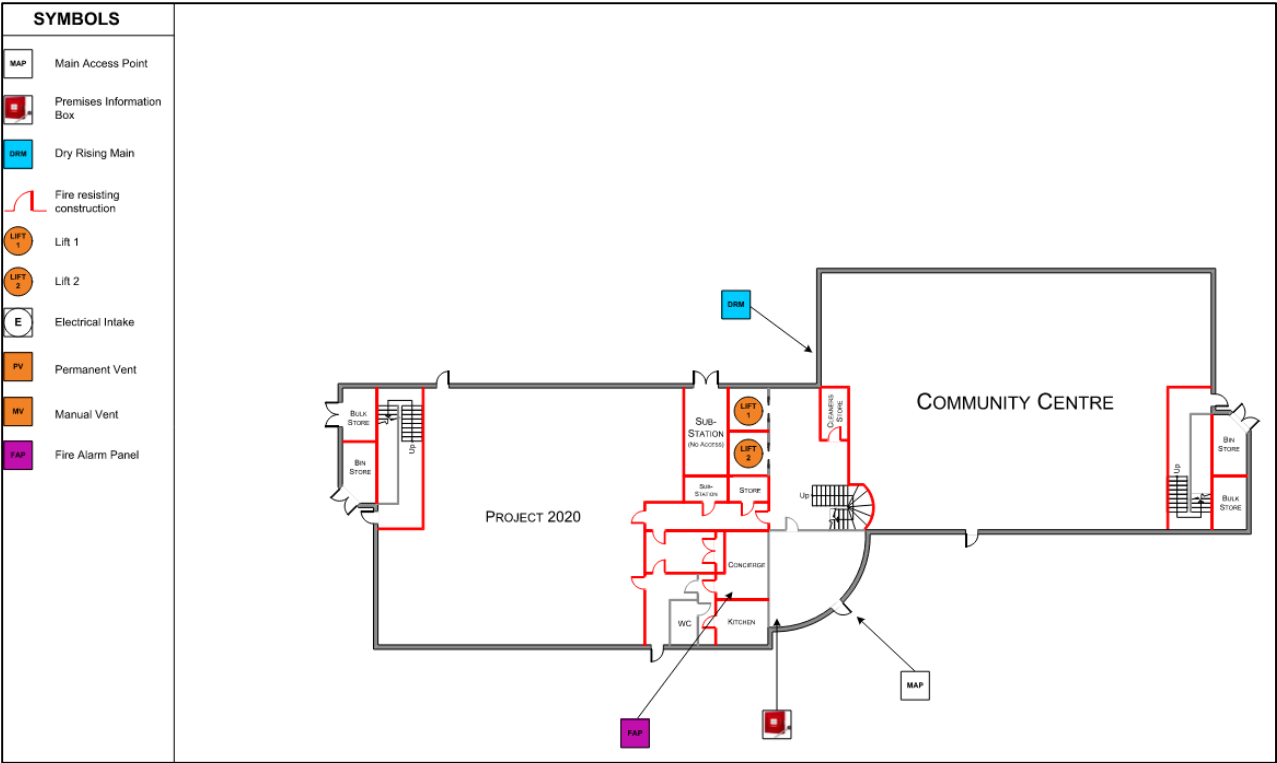


Figure 22: Existing Fire Strategy Drawings – Ground Floor

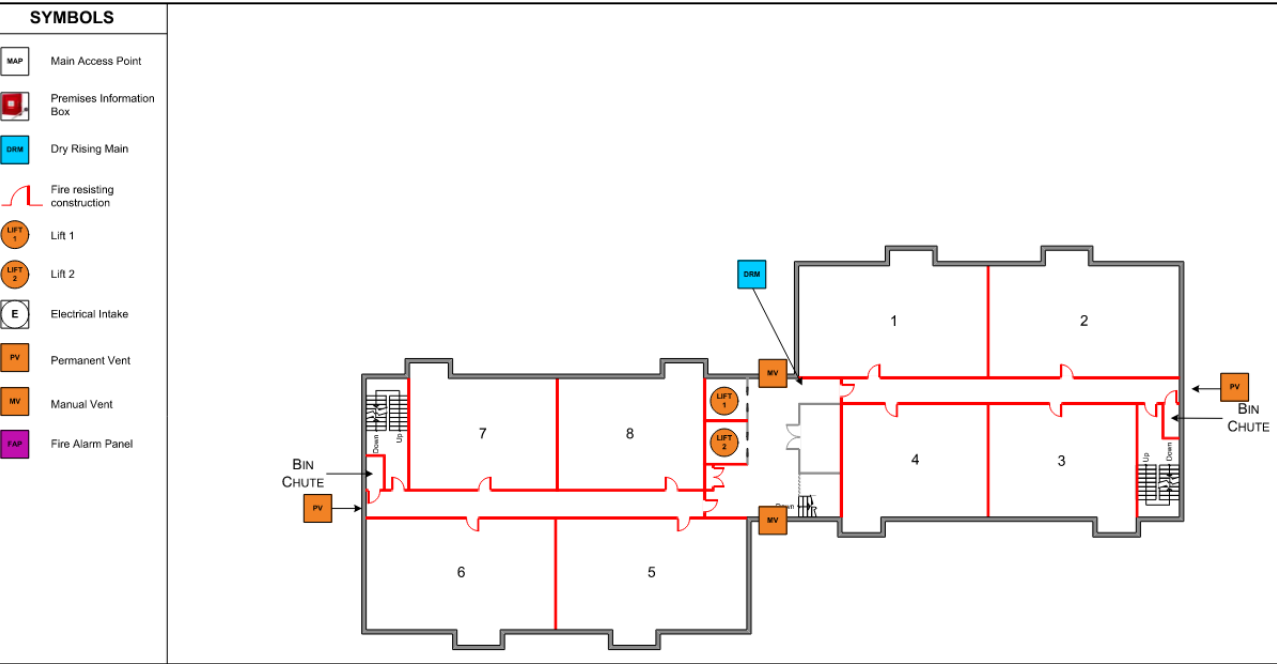


Figure 23: Existing Fire Strategy Drawings – First Floor

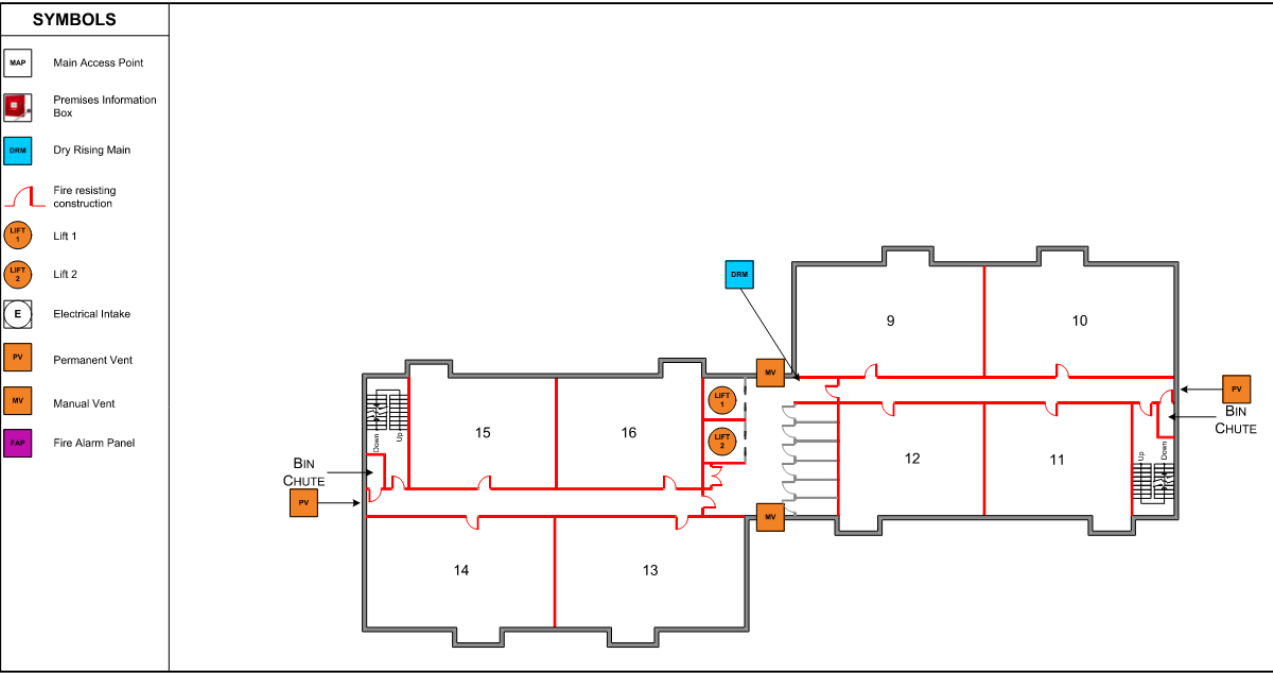


Figure 24: Existing Fire Strategy Drawings – Typical Floor Layout (2nd – 14th Floor)

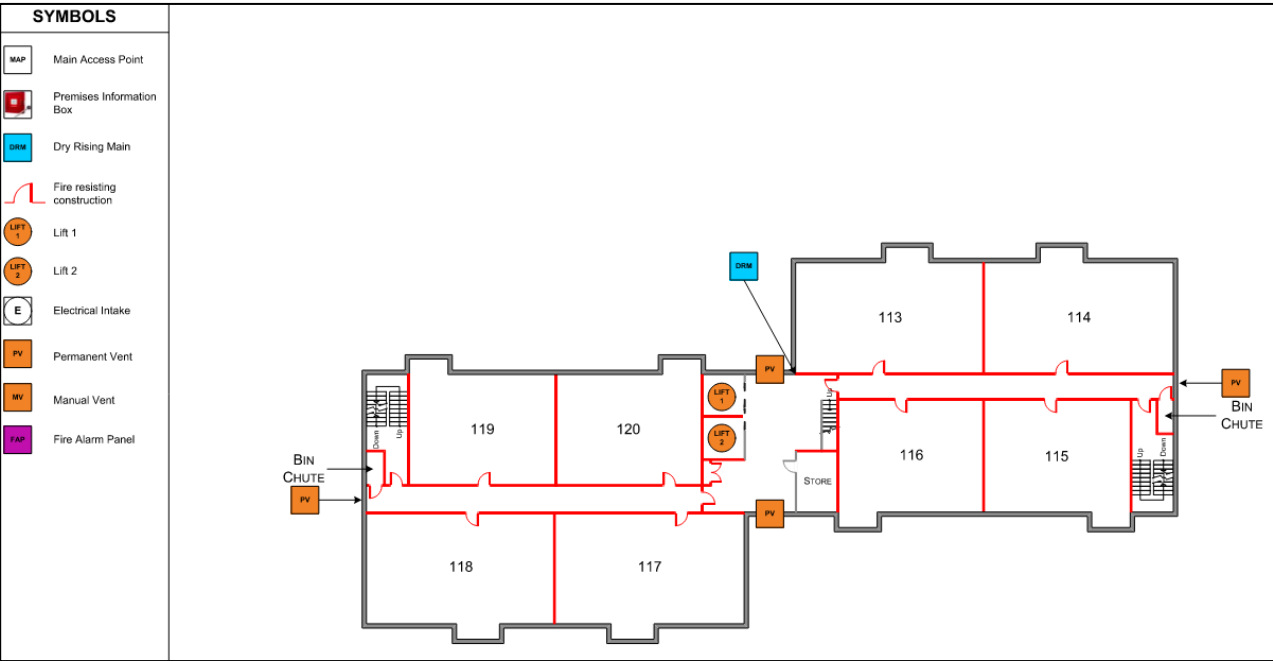


Figure 25: Existing Fire Strategy Drawings – Fifteenth Floor

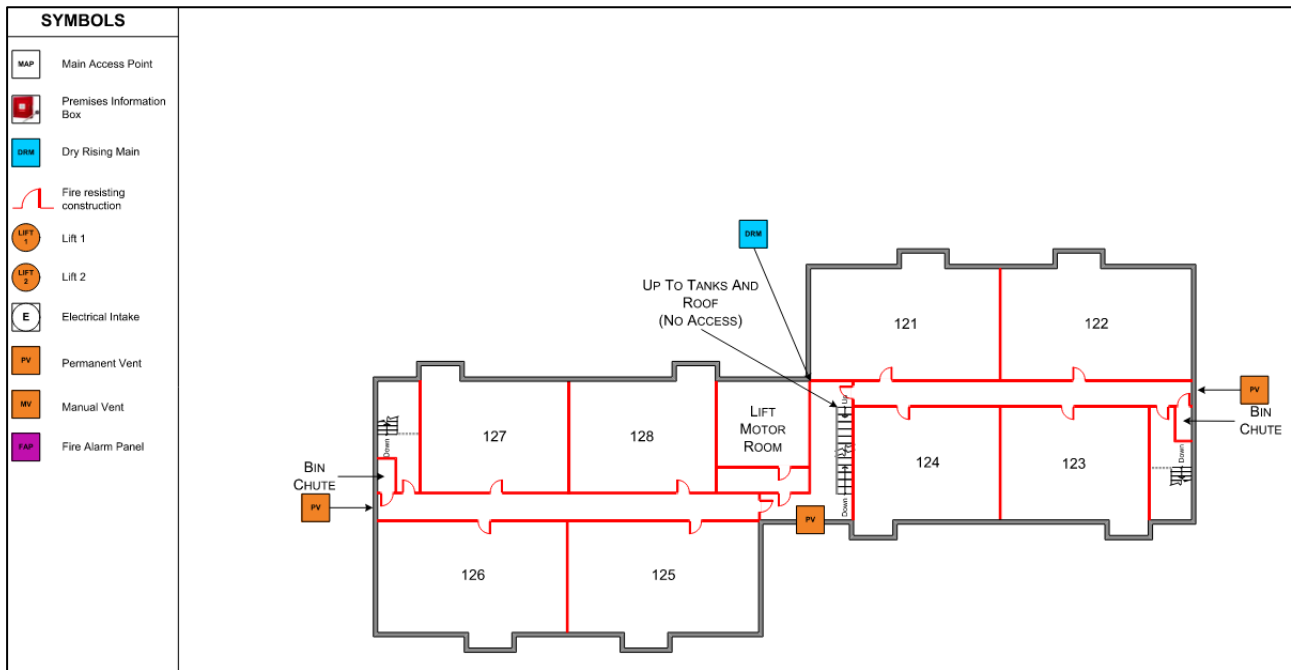


Figure 26: Existing Fire Strategy Drawings – Sixteenth Floor

1.2.1. Drawings

This report is based on the drawings provided by Potter Raper architects and the existing fire strategy drawings provided by Gerda. The existing floor plans prepared by Potter Raper architects are displayed in Table 1:

Table 1: Drawing Reference

Drawing Number	Date	Description
LA964-PR-KR-00-DR-B-EB100	April 2022	Ground Floor Plan
LA964-PR-KR-01-DR-B-EB101	April 2022	First Floor Plan
LA964-PR-KR-02-DR-B-EB102	April 2022	Second Floor Plan
LA964-PR-KR-03-DR-B-EB103	April 2022	Third Floor Plan
LA964-PR-KR-04-DR-B-EB104	April 2022	Fourth Floor Plan
LA964-PR-KR-05-DR-B-EB105	April 2022	Fifth Floor Plan
LA964-PR-KR-06-DR-B-EB106	April 2022	Sixth Floor Plan
LA964-PR-KR-07-DR-B-EB107	April 2022	Seventh Floor Plan
LA964-PR-KR-08-DR-B-EB108	April 2022	Eight Floor Plan
LA964-PR-KR-09-DR-B-EB109	April 2022	Ninth Floor Plan
LA964-PR-KR-10-DR-B-EB110	April 2022	Tenth Floor Plan
LA964-PR-KR-11-DR-B-EB111	April 2022	Eleventh Floor Plan
LA964-PR-KR-12-DR-B-EB112	April 2022	Twelfth Floor Plan
LA964-PR-KR-13-DR-B-EB113	April 2022	Thirteenth Floor Plan
LA964-PR-KR-14-DR-B-EB114	April 2022	Fourteenth Floor Plan
LA964-PR-KR-15-DR-B-EB115	April 2022	Fifteenth Floor Plan
LA964-PR-KR-16-DR-B-EB116	April 2022	Sixteenth Floor Plan
LA964-PR-KR-R1-DR-B-EB117	April 2022	Roof Plan
LA964-PR-KR-XX-DR-A-ED300	April 2022	Elevation: Section A-A & B-B
LA964-PR-KR-XX-DR-A-ED301	April 2022	Elevation: Section C-C

2 Means of Escape and Warning

2.1 Evacuation Philosophy

The evacuation strategy will be 'stay put' meaning that only the apartment on fire will evacuate and all the other areas will remain in place. Residents may feel the need to evacuate but this will be on their own accord. The 'stay put' policy will be supported by the compartment and fire resisting construction. The evacuation strategy for the communal areas i.e., community centres on ground floor, will be simultaneous.

2.2 Fire Detection and Alarm Systems

2.2.1. Alarm Systems

For all the residential apartments a category LD1 (Grade D1) fire alarm and detection system in accordance with BS 5839: Part 6 will be installed and maintained. For the common areas of the residential parts of the building a category L5 system (BS 5839: Part 1) will be provided. The purpose of the system is to activate the ventilation on the affected fire areas. All non-residential areas will be provided with an L2 system (BS 5839: Part 1).

2.2.2. Automatic Water Fire Suppression System (AWFSS)

Due to the height of the topmost occupied floor level, an automatic category 4 sprinkler system will be provided throughout residential areas in accordance with BS 9251 (2021 edition). All non-residential areas will also be required to be covered by a suppression system to a BS EN 12845 standard.

2.2.3. Cause and Effect Matrix

The cause-and-effect matrix will be subject to detailed design from the AFDA designer and installer.

2.3 Means of Escape – Residential Areas

2.3.1. Apartments

The existing layout of all apartments follows the guidance of clause 9.4 of BS 9991:2015 for the maximum travel distance of 9m within the protected hallway. The following figure from BS 9991:2015 shows the design of an apartment with a protected entrance hall:

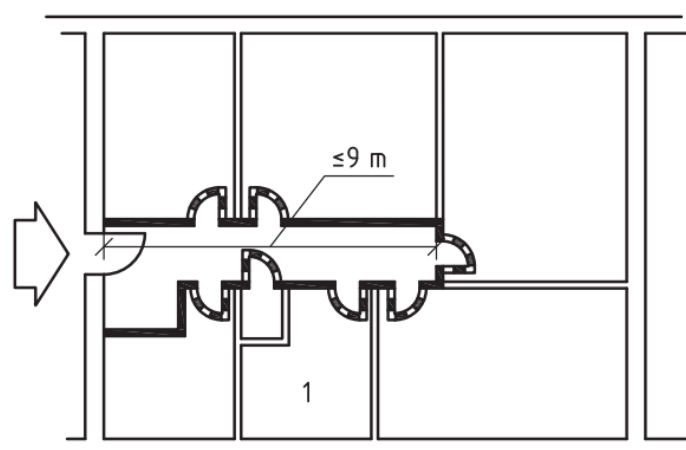


Figure 27: Apartment with Protected Entrance Hall

The design of the apartments for the residential apartments will meet the required recommendations of BS 9991: 2015. The current maximum travel distance in a protected hallway within an apartment is 4.65m and is in line with the travel distance requirement of 9m. The below figure illustrates an example of one of the apartments:

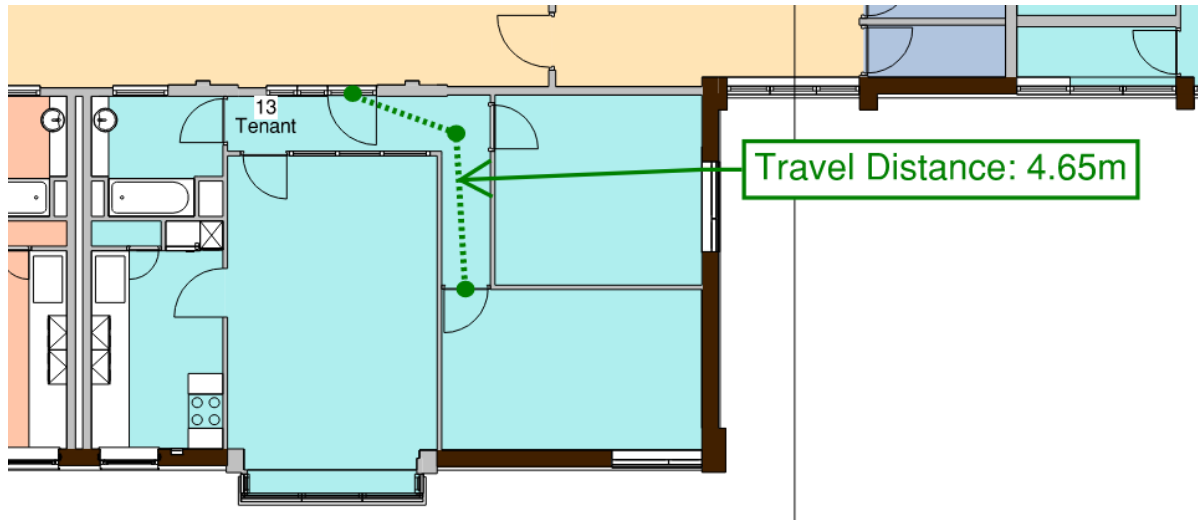


Figure 28: Typical Residential Apartment – Travel Distance in Entrance Hall

2.3.2. Escape From Common Areas

The tower block is provided with common corridor access that lead to protected stairways. From ground floor to first floor level and fifteenth floor to sixteenth-floor level, there are three available stairways (one central stairway and two stairways at each end of the common corridors of the floor levels). From the second floor to the fourteenth-floor level, there are two available stairways that are located at each end of the common corridors.

The maximum travel distance for escape from the common corridors is 30m (indicated '1' in below figure) or 60m if a sprinkler system is installed:

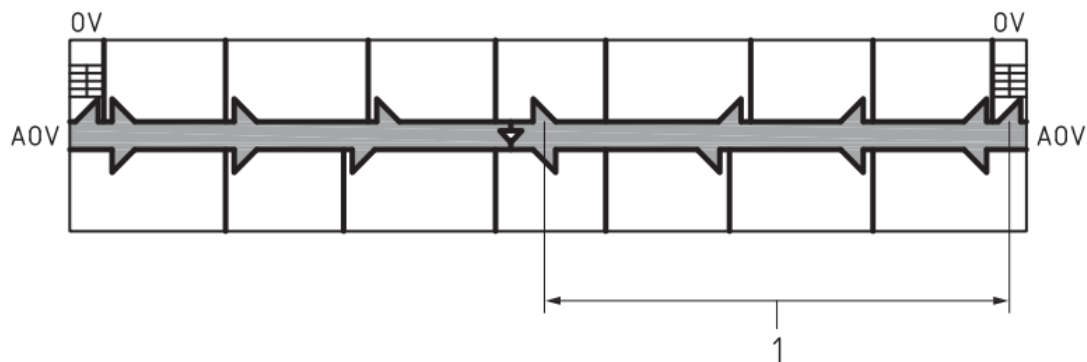


Figure 29: BS 9991 – Dwellings with Corridor Access in Multi Stair Buildings

The following figure shows the layout in the residential areas and the total travel distances of 17.50m and 18.00m within the common corridors on the 2nd floor. This is within the recommended travel distance limit of 30m (or 60m for a building with a suppression system installed).

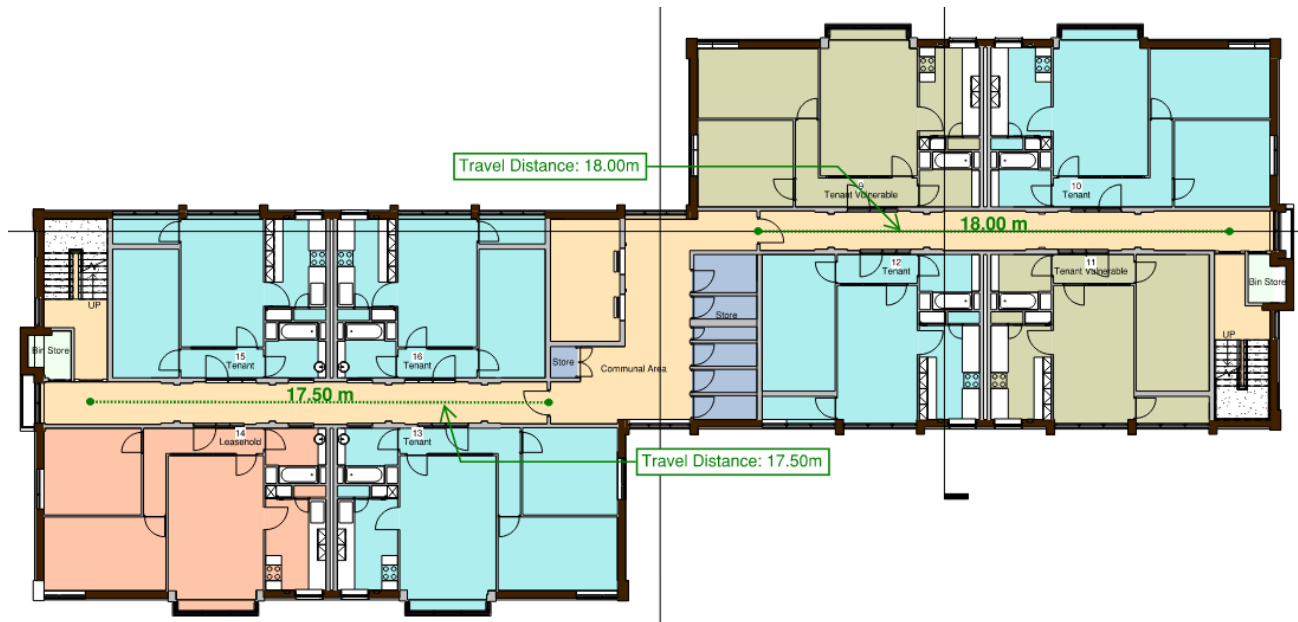


Figure 30: Common Corridor – Travel Distances

2.3.3. Smoke Control

The tower block currently has two openable vents in the lift lobby area that is in the centre of the building and permanent ventilation at each end of the common corridors. The recommendation for the lift lobby area and the common corridors will be the integration of AOVs having a minimum free area of 1m^2 .

The stairways that are located at each end of the building and serve all the upper floors currently have no ventilation. The stairways will require ventilation in the form of openable vents (OVs) at each floor level (or automatic opening vents (AOVs) located at the head of the stair. The OVs will have a minimum free area of 1.0m^2 fitted in the stairways or an AOV that is sited at as high a level as is practicable on the top storey of the stairway, having a minimum free area of 1.0m^2 .

2.3.4. Vertical Means of Escape

2.3.4.1. Escape Width

The minimum exit width for all exits must be 750mm.

For the purposes of this report, the width of a doorway is the clear width of the opening between the door leaf and frame (or projecting building hardware or the width between two opening door leaves in the case of double doors) assuming that the door leaf is free to open 90 degrees or more.

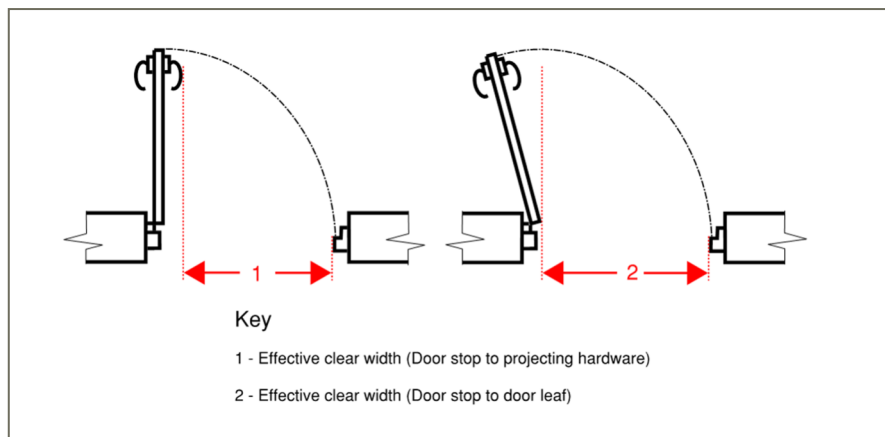


Figure 31: Clear Exit Width

The width of an escape route is the width at 1500mm above the pitch line when defined by the walls or the minimum width of passage available between any fixed obstruction (handrails fixed to the wall are ignored if less than 100mm).

All doors used for escape are to be provided with appropriate ironmongery for escape and should not be locked during material times.

2.3.4.2. Stair Width

The building escape strategy is based around the 'stay put' policy for all residential floor levels. However, the unobstructed width of each common stair should be not less than 750mm.

Note: Handrails and strings that do not intrude more than 100mm into these widths may be discounted when calculating the common stair width.

2.4. Means of Escape – Communal Areas

2.4.1. Travel Distances

The ground floor level of the tower block consists of several community rooms, staff areas and ancillary rooms. The largest room on the ground floor is a community centre which has two available escape exits. From the most remote point in the room, the travel distances are 14.60m and 8.10m to each exit which is within the guidance of BS 9999:2017.

BS 9999:2017 recommends the maximum travel distances within normal fire risk areas are 18m for a single escape route and 45m where there is more than one route provided.

The following figure shows the travel distances within the largest community centre on the ground floor level:

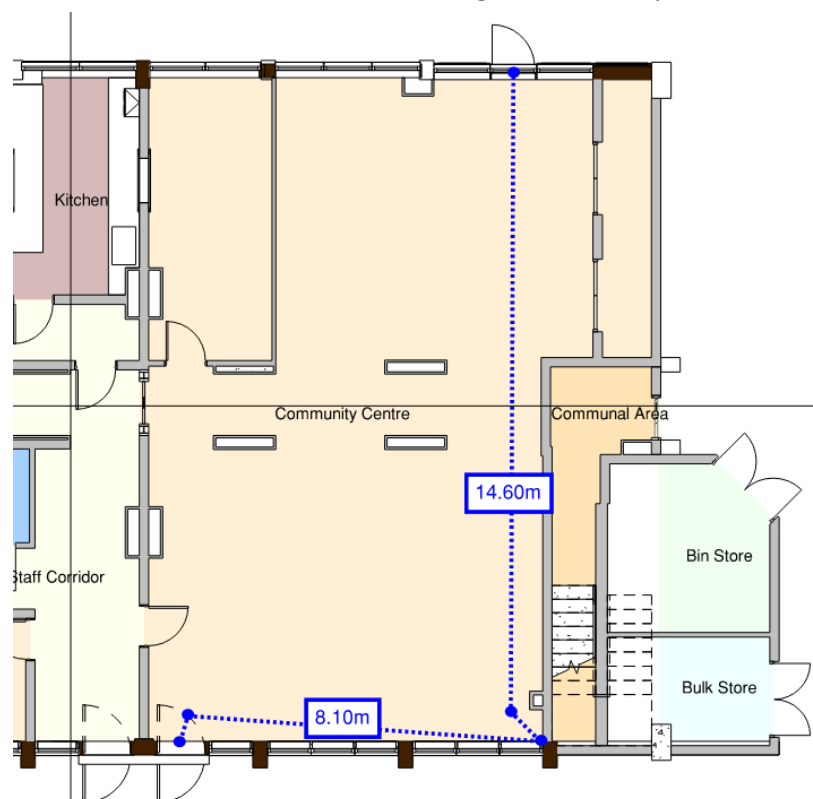


Figure 32: Travel Distances – Community Centre

2.5. Door Fastening Devices

A simple door fastening device must be provided on escape routes where the doors are required to have lockable devices. The mechanism must be easily operated from the inside (i.e., side of escape route).

Any secure doors provided with electromagnetically mains (or otherwise) powered locks must return to the unlocked position: Further recommendation on the failsafe of such devices is shown below:

- On loss of mains power or system error;
- Upon activation of the AFDA system;
- If a manual door release unit is activated (Type A) conforming to BS EN 54-11: 2001+A1 positioned at the door on the side approached by occupants making their evacuation. On circumstances where doors provide a means of escape in both directions the door fastening device must be installed on both sides of the door.

2.6 Emergency Lighting and Fire Exit Signage

Every escape route should be distinctively and conspicuously marked by emergency exit signage complying with the recommendations of BS ISO 3864: Part 1 and the Health and Safety (safety sign and signals) Regulations 1996. In general, signs containing symbols or pictograms that conform to BS ISO 3864: Part 1 satisfies these regulations.

‘Fire door keep shut’, or ‘Fire door keep locked shut’ signage should be provided to both sides of fire doors, except cupboard or riser doors which should be on the outside. Any held open fire doors should have automatic fire door keep clear signage.

The design and installation of the emergency escape lighting should be in accordance with BS 5266: Part 1.

2.7. Emergency Power – Life Safety Systems

All emergency power systems within the building must be designed and installed in accordance with the relevant standard. As a rule, all life safety systems (emergency lights, suppression systems, detection systems, ventilation systems, fire/smoke dampers and firefighting lift) must be provided with alternative power supplies, in case of a power cut in the building mains. A standby power generator or an uninterrupted power supply (UPS) is recommended in the design (in accordance with BS 8519). Any power and control cabling – used as part of the life safety systems – must be of the category and fire survival time recommended by BS 8519.

2.8. Means of Escape for Persons with Mobility Impairments (MIPs)

2.8.1. Residential Parts

Disable refuge areas are not required in the residential parts of the building due to the ‘stay put’ policy and sufficient compartment construction between the various building areas. However, if required, the evacuation of people with mobility impairments from the upper floor levels will be assisted using firefighting lifts which can also be used as evac-lifts. All areas from ground floor level will be provided with level access to the outside.

3 Internal Fire Spread (Linings)

The interior wall and ceiling surfaces in a building may have a significant influence on how fast a fire may develop. Building Regulations requires that internal linings shall adequately resist the spread of flame over their surfaces and, if ignited, have either, a heat release rate or a rate of fire growth, which is reasonable in the circumstances.

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.

The surface finishes should satisfy the following classifications shown in Table 2 below, when tested under the European Classifications (in accordance with BS EN 13501-1:2002).

Table 2: Wall and Ceiling Linings Classification

Location	European Class
Small room of area not exceeding 4m ² for residential accommodation and 30m ² for non-residential accommodation	D-s3, d2
Other rooms and circulation spaces within dwellings	C-s3, d2
Circulation spaces within the common areas	B-s3, d2

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

The surface linings of the walls and ceilings should generally conform to the classification recommended above for the appropriate location. However, parts of walls in rooms may be of a lower class but not lower than Class 3 (or European Class D-s3, d2) provided that the floor area of those parts in any one room does not exceed one half of the floor area of the room, subject to a maximum of 20m² in residential accommodation and 60m² non-residential accommodation.

4 Internal Fire Spread (Structure)

4.1 Load Bearing Elements of Structure

All elements of structure will have to be provided with 120 minutes fire resistance. Elements of structure include, but are not limited to:

- A member forming part of a structural frame or any other beam or column or supporting element;
- A load bearing wall or load bearing part of a wall (internal or external);
- A compartment wall or floor;
- Any part of structure forming a floor;
- An external wall structure supporting fire protected elements for the prevention of external fire spread;
- Structure supporting roof top plant areas, i.e., heavy plant.

The period of fire resistance refers to the performance achieved by the structural elements when tested in accordance with the appropriate parts of BS 476: Parts 21-24 for load bearing elements of structure.

Elements of structure that support the roof only will not require any period of fire resistance.

Rooms of special fire hazard (such as plant rooms etc.) to be enclosed within 60 minutes fire resisting construction.

4.1.2. Compartment Construction and Internal Fire Resistance

In circumstances where one element of structure supports another element of structure the fire resistance of the supporting structural component will not be less than the minimum period of fire resistance of the other element (regardless of the fact that it may not be a load bearing structural element).

Elements of structure that support the roof only will not require any period of fire resistance, unless they roof itself forms part of a means of escape route or functions as a floor, e.g., carrying heavy plant equipment or acting as a car park, or as part of a portal frame structure where the roof and the supporting stanchions form a single structural element.

The below table illustrates the required fire resistance within different parts of the building:

Table 3: Fire Resistance Requirements

Part of the Building	Minimum provisions when tested to the relevant part of BS 476 (minutes)			Method of Exposure
	Load bearing capacity	Integrity	Insulation	
Structural (Frame, Beam or Columns)	120	N/A	N/A	Exposed faces
Load Bearing Wall	120	N/A	N/A	Each side separately
Floors (all floors of the building) Compartment Floors	120	120	120	From underside
Compartment Walls (between different uses)	120	120	120	Each side separately
Roofs Any part forming an escape route	30	30	30	From underside
External Walls				
➤ Any part <1000mm from the relevant boundary ⁽¹⁾	120	120	120	Each side separately
➤ Any part >1000mm from the relevant boundary ⁽¹⁾	120	30	15	From inside the building
➤ Any part adjacent to an external escape route	30	30	30	From inside the building
Protected shafts				
➤ Smoke shafts	120	120	120	Each side separately
➤ Lift shafts	120	120	120	
➤ Services risers	120	120	120	
Fire-Fighting shafts				
➤ Access route	120	120	120	Each side separately
➤ Fire-fighting stairs	120	120	120	
➤ Fire-fighting lift shafts	120	120	120	
➤ Separation within the fire-fighting shaft	60	60	60	
Enclosure Residential Apartments	60	60	60	Each side separately
Fire Resisting Construction Ancillary accommodation	60			Each side separately
Cavity Barriers	N/A	30	15	Each side separately

The required compartment construction for the apartments is 60 minutes fire resistance for the compartment walls and 30 minutes for the hallways. The following figure illustrates the recommended fire resistance for the compartmentation of the apartments.

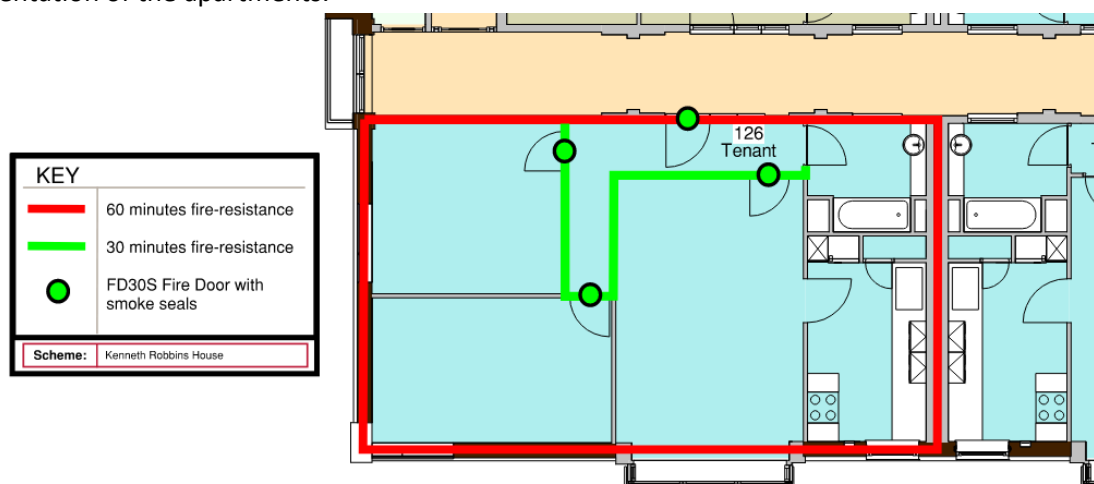


Figure 33: Compartmentation – Typical Apartment Layout

4.2. Junctions of Compartment Construction

4.2.1. Junction of compartment walls and floors with other walls

The guidance of BS 9991 and BS 9999 has been followed in this technical note which means that where a compartment floor or a compartment floor meets another wall, or in cases where it meets an external wall then the junction will be provided with the same fire resistance.

4.2.2. Junction of compartment walls and roofs

The following figure demonstrates the principle of junctions between walls and roofs (Figure 30 from BS 9999):

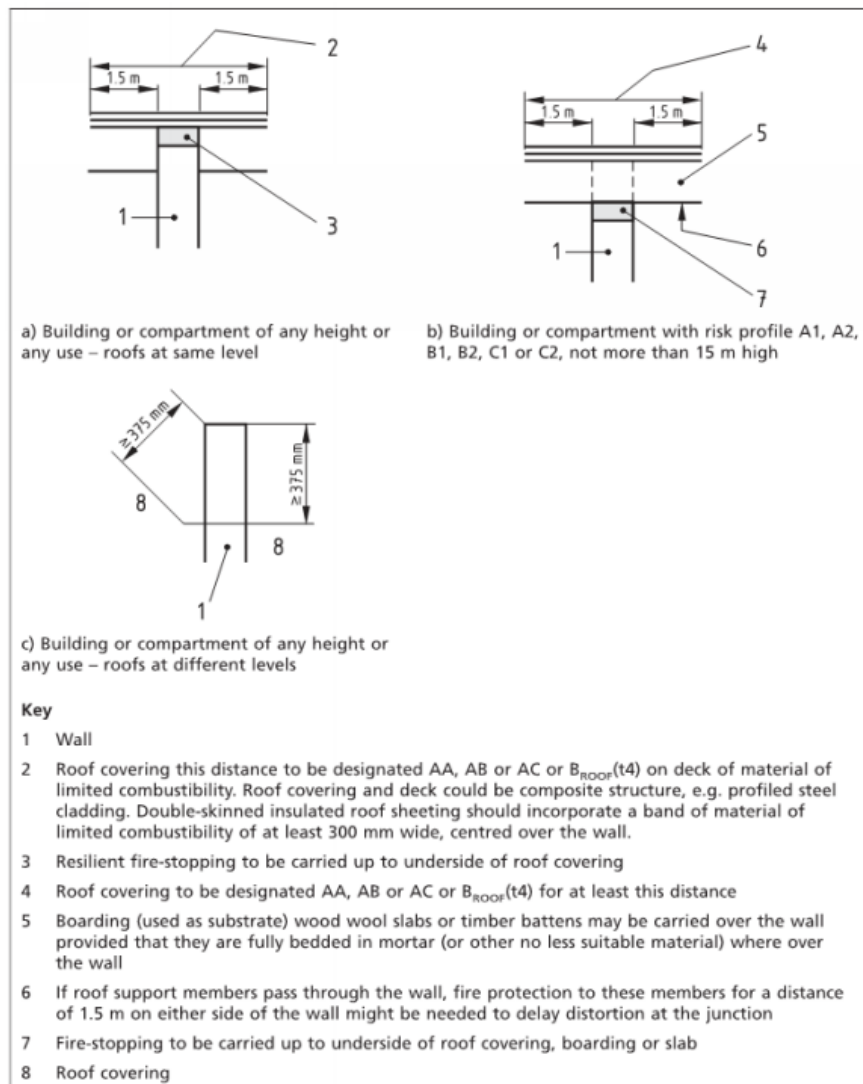


Figure 34: Junction of Compartment Wall and Roof

4.3. Fire Doors

Fire doors should be provided to all fire resisting enclosures in accordance with BS 476: Part 22 and specified with 'smoke seals' in accordance with the recommendations of BS 476: Part 31.

Fire doors within fire resisting compartment walls should achieve the same level of fire resistance as the wall itself, although fire doors to the protected stairs and any service risers may be half the fire resistance of the wall.

Doors to storerooms, risers, cupboards, and plant rooms that are normally locked shut should be fitted with self-closing devices. In the case of an emergency, any hold open devices should release the door on activation of fire alarm systems.

Fire doors are designated by reference to their recommended performance (in minutes) for integrity only, and whether they need to retard the passage of smoke at ambient temperature. For example, the reference FD30 is a door that should achieve not less than 30 minutes fire integrity. The addition of an S to the reference to form FD30S means that the door will require smoke seals. An overview of the fire door requirements is tabulated below:

Table 4: Fire Door Requirements

Position of door	Minimum fire resistance of door in terms of integrity
Protected entrance halls/stair landings in residential apartments	FD30
Apartment entrance doors	FD30S (self-closing)
Protected lift doors	Half the fire resistance of the wall for which it forms part of
Fire-fighting stair doors	FD60S (self-closing)
Fire-fighting lift doors	FD60
Service riser doors	Half the fire resistance of the wall for which it forms part of
Smoke shaft doors	Half the fire resistance of the wall for which it forms part of
Ancillary Accommodation	The same fire resistance of the wall for which it forms part of

Note: Rooms housing life safety systems should include FD120 or two FD60 doors entering the room.

4.4. Concealed Spaces

Concealed spaces or cavities in the construction of the building provide a ready route for smoke and flame spread, especially in voids above and below ceilings/floors. As the smoke or flames would be concealed it presents a greater danger. For more information on concealed spaces see Clause 19 from BS 9991:2015.

Compartment walls should be carried up to compartment floors or the roof. It is therefore not appropriate to complete a line of compartment construction by fitting cavity barriers above the compartment wall.

Cavity barriers should therefore be provided to sub-divide the cavities to restrict the spread of smoke and flame spread and should be provided in the following areas;

- Around openings and to close off edges of cavities Note 1;
- At the junction between an external cavity wall and any wall, floor or door assembly which forms a fire resisting barrier (fire stopping);

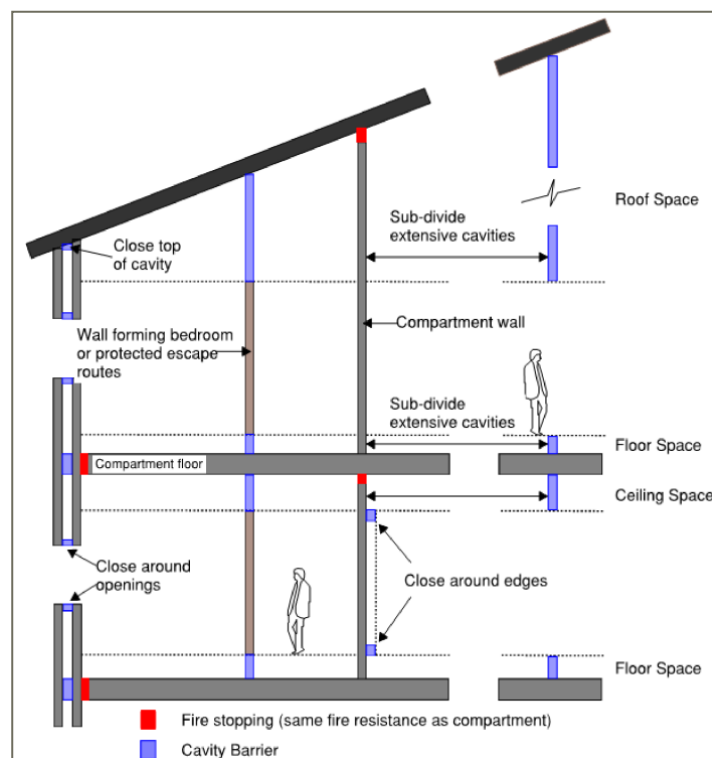


Figure 35: Junction of Compartment Wall and Roof

Note 1: Where Steel Framing Systems (SFS) is used, if the steel supports the structure, fire stopping (to the same fire resistance as the elements of structure) should be in place of cavity barriers around openings and to close top of cavities.

A cavity that exists above or below partitions between bedrooms because the enclosures are not carried to full storey height or (in the case of the top storey) to the underside of the roof covering should;

- Fitted with cavity barriers on the line of the partitions (as indicated within the figure above); or
- For cavities above the partitions, enclosed on the lower side by a fire resisting ceiling which extends throughout the building, compartment or separated part.

Note: For more information see Clause 19.1.2 from BS 9991.

Where a single room exceeds 20m in any direction, cavity barriers within the ceiling void (and within any floor voids) need only to be placed on the line of enclosing walls/partitions of any room and where services penetrate any fire-resisting floors to avoid vertical and horizontal voids meeting, provided that:

Every cavity barrier should be constructed to at least 30 minutes fire resistance. It may be formed by any construction provided for another purpose if it meets the provisions for cavity barriers. Cavity barriers in a stud wall or provided around openings should follow the guidance from Clause 19.2 from BS 9991.

The cavity barriers wherever possible be tightly fitted to a rigid construction and mechanically fixed in position. Where this is not possible the junction should be fire stopped.

- The cavity barriers are no more than 30m apart; and
- The surface of the material/product exposed in the cavity being Class C-s3, d2 or better (European Class).

4.5. Protection of Openings and Fire Stopping

If the fire separating element is to be successful, every joint or imperfection fit, or opening to allow services to pass through the element, should be adequately protected by sealing or fire stopping so that the fire resistance of the element is not impaired. Fire stopping should achieve the same fire resistance as the wall/floor it is fitted.

Pipes that pass through a fire separating element, should meet one of the following provisions;

- Proprietary seals - Provide a proprietary sealing system which has been shown by test to maintain the fire resistance of the wall, floor or cavity barrier;
- Restricted pipe diameter - Where a proprietary sealing system is not used, fire stopping may be used around the pipe, keeping the opening as small as possible. The nominal internal diameter of the pipe should not be more than the relevant dimension given in the table below:

Table 5: Maximum Nominal Diameter of Pipes Passing Through Elements

Situation	Pipe Material and Maximum Nominal Internal Diameter (mm)			
	Non-Combustible Material	Lead, Aluminium, uPVC, Fibre Cement	Aluminium, Alloy,	Any Other Material
Structure (but not a wall separating the existing and proposed building) enclosing a protected shaft which is not a stairway or lift shaft	160mm	110mm		40mm
Compartment Wall or compartment floor between flats	160mm	160 (Stack pipe) ^{Note 1} 110 (Branch pipe) ^{Note 2}		40mm
Any other situation	160mm	40mm		40mm

Note: Any non-combustible material which, if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.

Note 1: UPVC pipes complying with BS 4514:2001 and uPVC pipes complying with BS 5255:1989.

Note 2: These diameters are only in relation to pipes forming part of an above-ground drainage system and enclosed as shown in Diagram 38 of Approved Document B Volume 2. In other cases, the maximum diameters against Situation 3 apply.

- **Sleeving** - A pipe of lead, aluminium, aluminium alloy, fibre-cement or uPVC, with a maximum nominal internal diameter of 160mm, may be used with a sleeving of non-combustible pipe. The opening in the structure should be as small as possible and provide fire stopping between the pipe and structure. The sleeve should extend be no less than 1000mm either side of the structure as indicated in Figure 36 below:

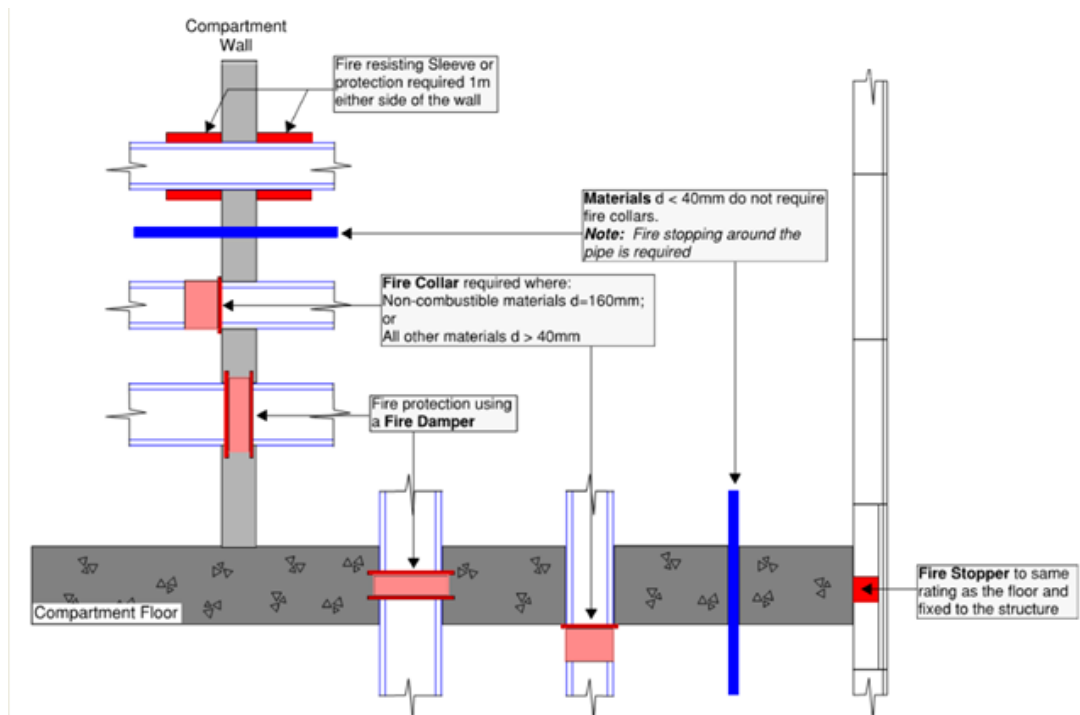


Figure 36: Protection of Openings and Fire Stopping

4.5.1. Ductwork

Where a ductwork system serves more than one part of a compartment or fire separated protected escape route, smoke detector operated fire dampers should be provided where ductwork enters each fire separated section of the escape route. For more information see Clause 21 of BS 9991:2015.

Any ductwork passing through a protected stairway, lobby or corridor without an opening into that area should be fire resisting.

BS 9991:2015 section 21.2 references out to BS 9999:2017 for more information on how to protect the ductwork and air transfer grills see Clause 32.5.2 of BS 9999:2017.

The requirements for each option are indicated below;

Method 1 – Thermally actuated fire dampers;

- Fire dampers that are thermally operated can be provided where ductwork goes through fire resisting construction;
- Fire dampers are not suitable for protected escape routes.

Note: Fire dampers should be tested to BS EN 1560:2010. They should have an E classification equal to or greater than 60 minutes.

Note: Method 1 is not suitable for ductwork serving kitchen extracts.

Method 2 - Fire resisting enclosures;

- The fire resisting enclosures should achieve the same fire resistance as the wall the ductwork penetrates which forms a compartment known as a protected shaft. This allows a multiplicity of services to be transferred together with the duct to traverse a number of compartments within the building without the need for further subdivisions. Fire dampers (thermally or actuated by AFD) will only be required where the ductwork enters or leaves the protected shaft.
- Method 2 can only be used on ductwork that passes through an escape route providing the ductwork does not serve the escape route it passes through.

Method 3 - Protection using fire resisting ductwork;

- The ductwork itself forms a protected shaft. The ductwork should achieve the same fire resistance as the wall the ductwork penetrates. The fire resistance can be achieved by the ductwork material itself, or through the application of a protective material.
- Method 3 can only be used on ductwork that passes through an escape route providing the ductwork does not serve the escape route it passes through.

Note: *The supporting hangers should be capable of supporting the ductwork for not less than the period of fire resistance of the ductwork.*

Method 4 – Automatically actuated fire and smoke dampers triggered by smoke detectors;

- Method 4 may be used for extract ductwork passing through the enclosures of protected escape routes, both where the ductwork does and does not serve the escape route.

Note: *Method 4 is not suitable for ductwork serving kitchen extracts.*

Note: *Fire and smoke dampers should be tested to BS EN 1560:2010. They should have an ES classification equal to or greater than 60 minutes.*

4.5.2. Air Transfer Grilles

Any air transfer grilles required as part of the ventilation system should not be provided within enclosures to protected stairs, protected lobbies and compartment walls and floors. Air transfer grilles located in any fire hazard rooms should be provided with both fire and smoke containment. Any transfer grilles fitted in fire doors will need to be accompanied by a test certificate provided by the door manufacturer. For more information see Clause 36 from BS 9991:2015.

4.5.3. Voids over 800mm in depth (non-residential accommodation only)

Any building voids over 800mm in depth (in non-residential accommodation only), will need to be provided with fire and smoke detection.

5 External Fire Spread

5.1 Fire Spread Between Buildings

To prevent the risk of external fire spread to and from buildings opposite, the amount of unprotected area that is allowed on an elevation should be limited or the separating distance increased such that the risk is reduced. It is necessary to calculate the amount of unprotected area that is allowed on the building's façade using the enclosing rectangle method from BR 187 (Second Edition).

The relevant boundary is usually the site boundary, however where the boundary adjoins a space where further development is unlikely, such as a public road, the centre line of the road can be taken into account as the relevant boundary.

The building is an existing property and boundary distances have previously been confirmed so it is considered that for the purpose of the External Fire Spread analysis, no calculations will be deemed necessary. Furthermore, the provision of an automatic sprinkler system will ensure the risk of fire spread is mitigated.

5.2 Roof Coverings

Roof coverings refer to the external material layers, not the roof structure as a whole. The table below describes the separation distances according to the type of roof covering as described within Section 35.4.2 from BS 9999:2017.

Table 6: Roof Coverings Classification and Spacing

Designation of Covering of Roof or Part of Roof		Minimum Distance from any Point to Relevant Boundary			
National Class	European Class	Less than 6 m	At Least 6 m	At Least 12 m	At Least 20 m
AA, AB or AC	B _{ROOF} (t4)	Acceptable	Acceptable	Acceptable	Acceptable
BA, BB or BC	C _{ROOF} (t4)	Not acceptable	Acceptable	Acceptable	Acceptable
CA, CB or CC	D _{ROOF} (t4)	Not acceptable	Acceptable ⁽¹⁾⁽²⁾	Acceptable ⁽¹⁾	Acceptable
AD, BD (or CD ⁽²⁾)	E _{ROOF} (t4)	Not acceptable	Acceptable	Acceptable ⁽¹⁾	Acceptable
DA, DB, DC (or DD ⁽²⁾)	F _{ROOF} (t4)	Not acceptable	Not acceptable	Not acceptable	Acceptable ⁽¹⁾⁽²⁾

¹ Not acceptable on any buildings with a volume of more than 1500m³.

² Acceptable on buildings not listed in Note 1, if part of the roof is no more than 3m² in area and is at least 1500mm from any similar part, with the roof between the parts covered with a material of limited combustibility.

Note 1: When used in roof lights, a rigid thermoplastic sheet product made from polycarbonate or from unplasticized PVC, which achieves a Class 1 rating for surface spread of flame when tested in accordance with BS 476-7 or classified as C-s3, d2 in accordance with BS EN 13501-1:2007+A1, is deemed to have an AA designation.

The roof covering material surrounding a plastics roof light should be of limited combustibility for at least 3 m distance.

Note 2: The designation of external roof surfaces is defined in BS 476-3 or BS EN 13501-5.

Products may have upper and lower surfaces with different properties if they have double skins or are laminates of different materials, in which case the more onerous distance should be assumed.

Note 3: The method of classifying thermoplastic materials is given in 34.1.2 of BS 9999: 2017.

5.3 External Wall Construction

5.3.1 Spread of Flame Classification

All materials and products used in the external walls and building envelope must achieve A2-s1, d0 or A1 classification to BS EN 13501-1.

6. Fire-Fighting Provisions

6.1. Fire-Fighting Shaft

The finished floor level of the tower block is more than 18m and therefore the provision of firefighting shaft(s) is required for the development. The fire-fighting shaft(s) should be in accordance with BS 9991:2015 and include:

- A fire-fighting stair, with a minimum width of 1100mm, designed in accordance with BS 5395:1;
- A fire-fighting lift designed and installed in accordance with BS EN 81-72:2015;
- A ventilated fire-fighting lobby;

- A dry rising main designed and installed in accordance with BS 9900:2015, with outlets at all levels (including the roof).

The current siting of the firefighting lift(s) will not comply with the guidance of BS 9991:2015 due to no fire-fighting stair being situated within the maximum travel distance of 7.5m of the lift. The fire-fighting shaft requirements from Clause 50.3.2.2 and Figure 35 from BS 9991:2015 are shown below:

'The fire-fighting lift may open directly into the protected corridor or protected lobby, but the fire-fighting lift landing doors should not be placed more than 7.5 m from the fire-fighting stair and should not be located within the stair enclosure, even if the building is being refurbished'.

Extract from BS 9991:2015 (Clause 50.3.2.2)

Figure 35 Components of a residential fire-fighting shaft

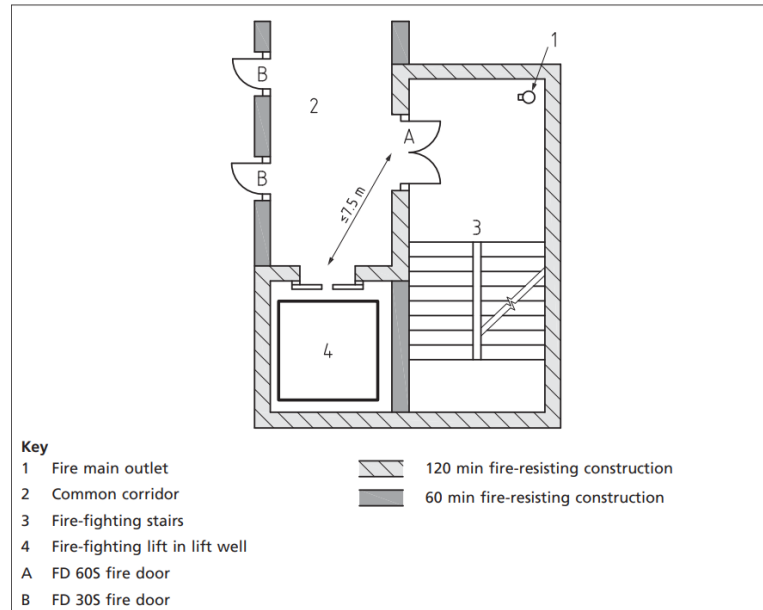


Figure 37: BS 9991 – Figure 35 (Components of Fire-Fighting Shaft)

The two recommendations which may provide a suitable solution for the fire-fighting shaft arrangement are as follows:

1. The central stairway that discontinues at first floor level would continue through the upper floors to connect to the existing stairway at the fifteenth-floor level (which continues to the roof level). This would provide an appropriate stair throughout all floors of the building to accompany the fire-fighting lift and fire-fighting shaft arrangement. The proposed fire-fighting stair enclosure would have to comply with the requirements of BS 9991:2015 and should be designed in accordance with BS 5395-1 to become a fire-fighting stair.

The below figure shows an example of the recommendation:

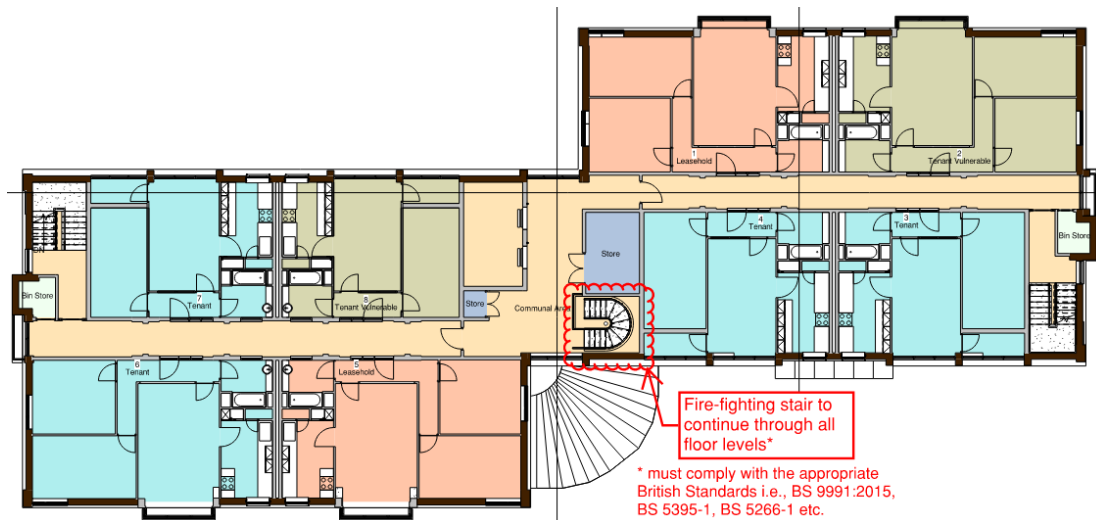


Figure 38: Example of Fire-Fighting Stair Location

2. The two existing stairways that are located at each end of the common corridors to be adapted into fire-fighting stairs. The travel distances to each stairway surpasses the maximum distance of 7.5m, however with two available stairs (and fire-fighting lift), this would provide alternative escape routes for Fire Service personnel. The fire-fighting stairs should be designed in accordance with BS 5395-1 and the emergency escape lighting within the stair enclosures should be provided in accordance with BS 5266-1. The fire-fighting stair enclosures should be provided with facilities for smoke control so that they remain relatively smoke-free (installation of OV's or AOV's).

6.2. Dry Risers

Dry risers have been included in the building with an inlet just outside the ground floor level (centre of the building). The outlets (landing valves) will be situated on the first floor and all the other upper levels respectively (including the roof). There have been provisions made for a firefighting appliance to be able to park within 18m from a dry riser inlet.

In addition, it should be noted that for the building the hose distances to all points do not exceed the 60m from the dry riser outlets.

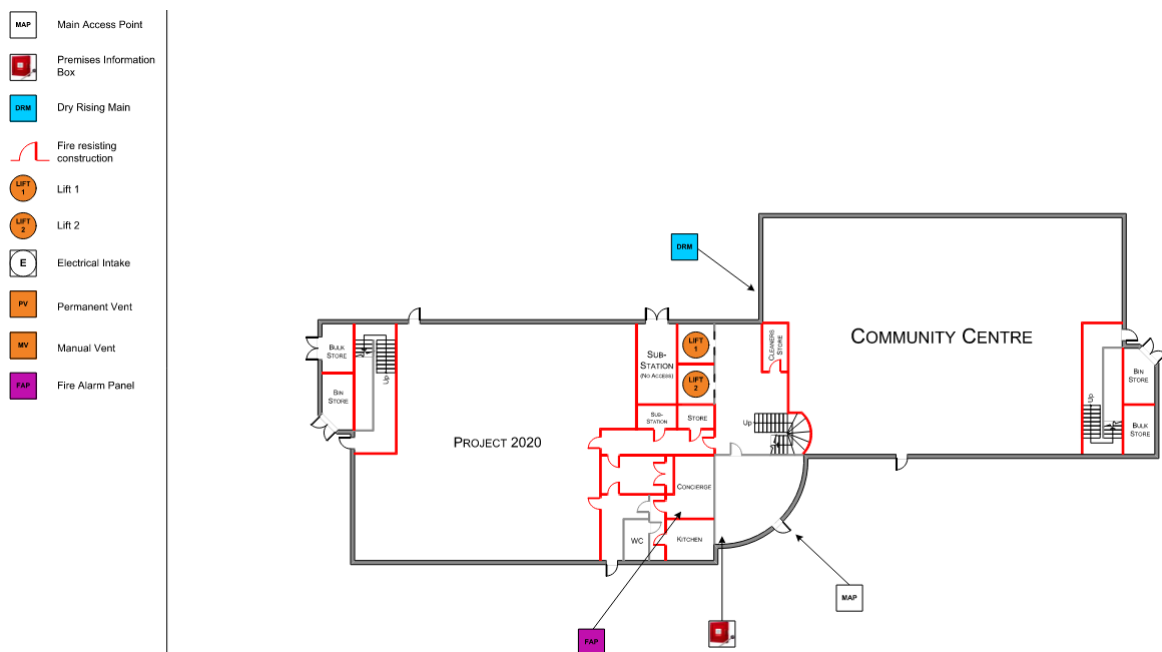


Figure 39: Dry Riser Location

6.2. Fire Service Access

Fire Service Vehicles can access via Northumberland Park, Northumberland Grove and the adjacent housing estate. There are also sufficient places for the fire appliances to park around the site on nearby public roads. The building access is illustrated in the figure below:

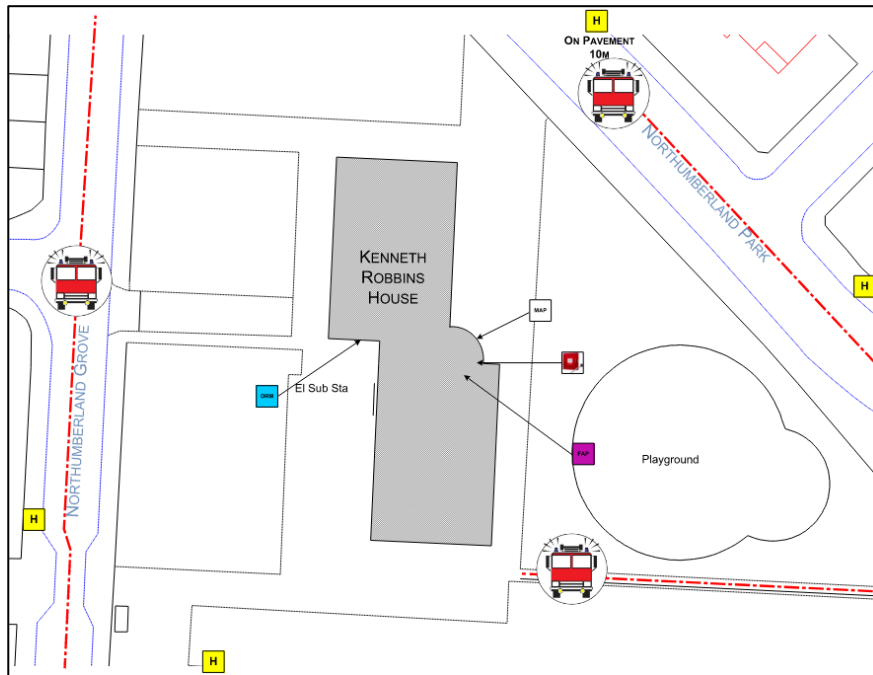


Figure 40: Fire Service Access

6.3 Fire Hydrants

A new private or an existing fire hydrant should be provided no more than 90m from an entrance of the building and no more than 90m from any other hydrant, in accordance with BS 9990.

There are four public hydrants that are located on Northumberland Park (two hydrants), Northumberland Grove (one hydrant) and the adjacent housing estate (one hydrant). All available hydrants are within 90m from a dry riser inlet at ground floor level. The fire hydrant locations are shown in the figure above (figure 40).

7 Conclusion

This outline fire strategy report relates to the refurbishment of Kenneth Robbins House, which is located Haringey in London, N17 0QA. The fire safety provisions of this report follow the guidance of BS 9991:2015 and the associated British Standards. The report has been prepared to support the gateway 1 fire statement provided for the scheme.