Report

Project	254 Kilburn High Road
Report Title	Fire Strategy
Our Ref	DL6837/R1 Issue 2

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Report No. DL6837/R1
Issue No. Issue 2
Issue Date. 27 February 2020

	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5	Issue 6
Date	31/01/2020	27/02/2020				
By	JL	JL				
Checked	PM	PM				
Approved	PM	PM				

Contents

1.0 INTRODUCTION

1.1 Description of project

The project is a new build 7-storey residential apartment building with commercial units at ground floor, located off Kilburn High Road in London. The apartments are divided into three separate blocks although there is some connection between the blocks at various levels.

Ground floor comprises commercial units with no internal connection to the residential blocks and plant space. Flats are from Level 01 to 06.

The top floor of the blocks is 60.3 - 42.325 = 17.975m above ground, see section view below.

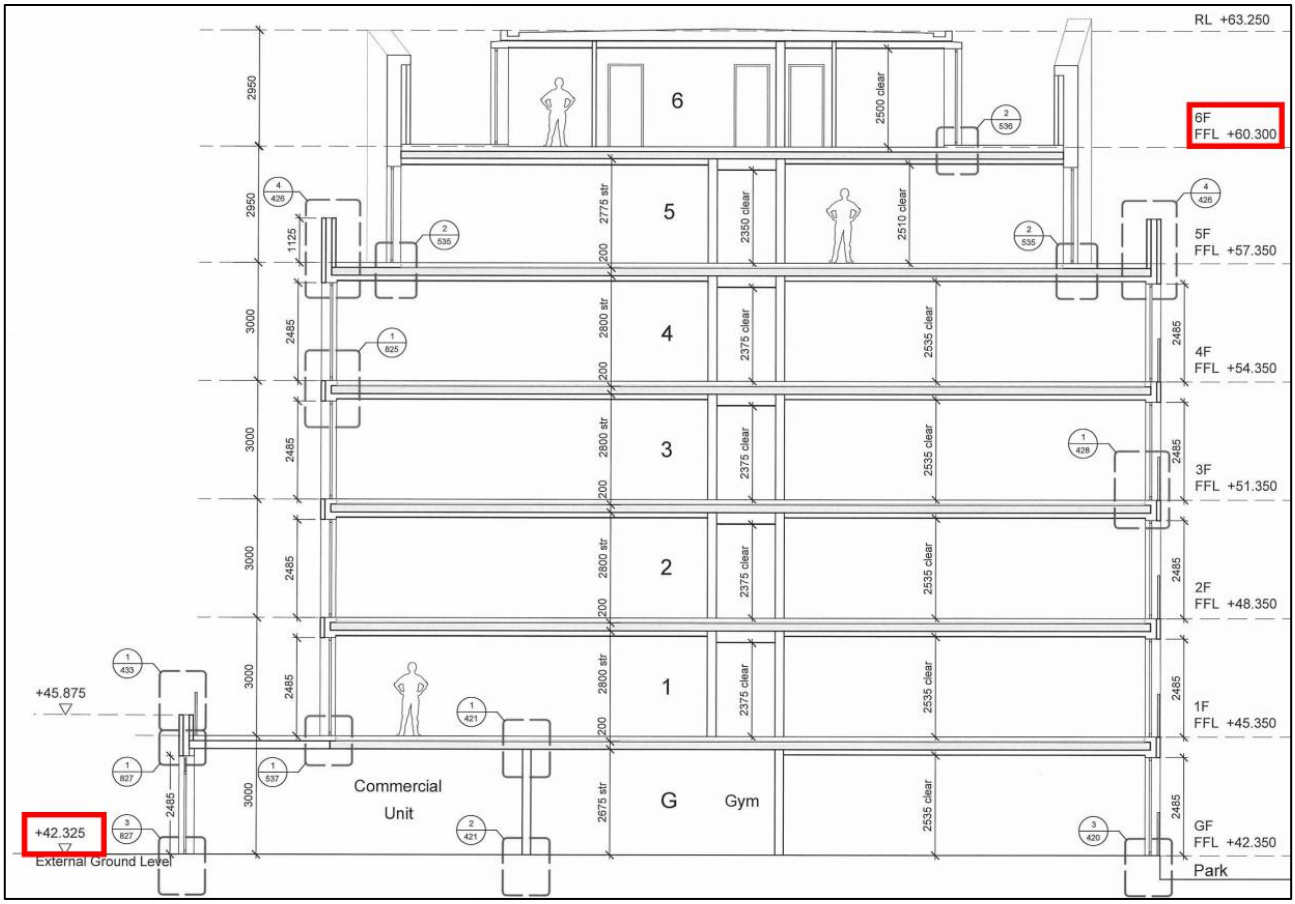

Figure 1: Section view

1.2 Relevant Guidance

The building was designed, and construction work started, prior to the changes to the regulations and guidance in 2018/19.

The following guidance documents are relevant to this project:

- Building Regulations *Approved Document B Volume 2, 2006 edition (incorporating the 2007, 2010 and 2014 amendments)*
- BS 9991 *Fire safety in the design, management and use of residential buildings – Code of practice*

1.3 Building Control Approvals

Quadrant Building Control provided an Initial Notice in March 2017 which was updated in June 2017.

1.4 Purpose of this Report

JGA were appointed at the end of 2019 to document the Fire Strategy for the building and to provide guidance to the team as the project nears completion.

There are a few aspects of the design that did not comply with Building Regulations guidance. A series of options were explored with the design team and client. Fire engineering solutions have been developed to address these issues. These are summarised below and discussed in more detail in relevant sections in this report:

- Additional cross-corridor doors to support small extensions in travel distances in all three blocks.
- An additional permanently vented lobby to support the plant room connecting directly to the residential reception of Blocks A and B.
- An assessment of the top storey flat in Block C opening directly into the staircase.
- A detailed assessment of firefighter access to the three blocks to support the restricted fire vehicle access to the site.

2.0 SPRINKLERS

Building Regulations guidance recommends that sprinklers are provided in apartment buildings that have floors more than 30m above ground. The top floor of 254 Kilburn High Road is approximately 17.975m.

Sprinklers have been provided in flats at Levels 03 and 04 in Block B to support extended travel distances in the corridors. The sprinkler system will be designed in line with the recommendations of BS 9251.

No other areas on the site are sprinklered.

3.0 FLATS

3.1 Evacuation strategy

The flats will operate a defend-in-place strategy. In the event of a fire in any flat, only the fire alarm sounders in that flat will activate. The building does not have a common fire alarm system.

3.2 Automatic fire detection and alarm

Smoke alarms will be fitted in each flat. These will be designed to at least an LD3 standard in line with guidance from BS 5839-6.

In the duplex flat accessed at Level 05 in Block C there will be smoke alarms in all habitable rooms and a heat alarm in the kitchen.

3.3 Flat layouts

All flats have an entrance hallway. These will be designed as a protected hallway achieving 30 minutes fire resistance. Travel distances within the hallways are within 9m, in line with code guidance. At typical flat layout is highlighted in Figure 2.

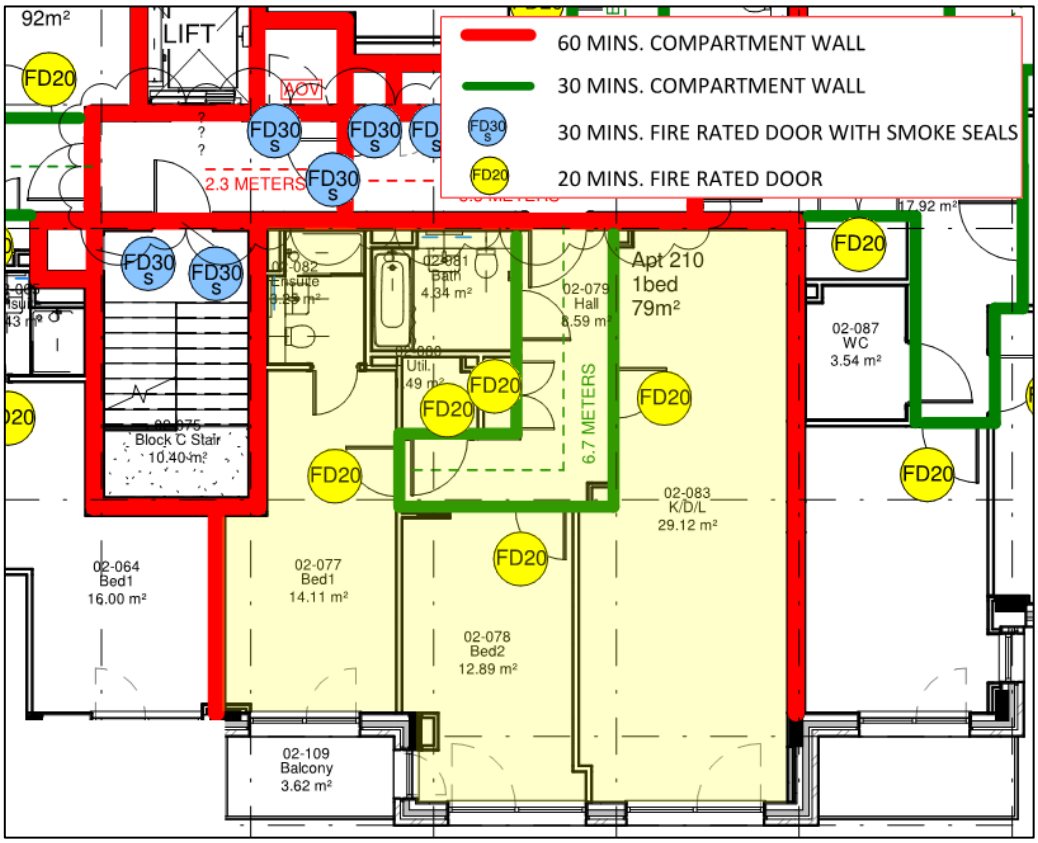

Figure 2: Typical flat layout

3.4 Duplex

There is one duplex flat between Levels 04 and 05 in Block C, accessed at Level 05. In line with guidance in ADB Section 3.21(d), the staircase is located within the protected hallway (30 minutes fire resistance) and smoke alarms will be provided in all habitable rooms. The kitchen will also be fitted with a heat alarm. The internal layout of the duplex flat is shown in Figure 3.

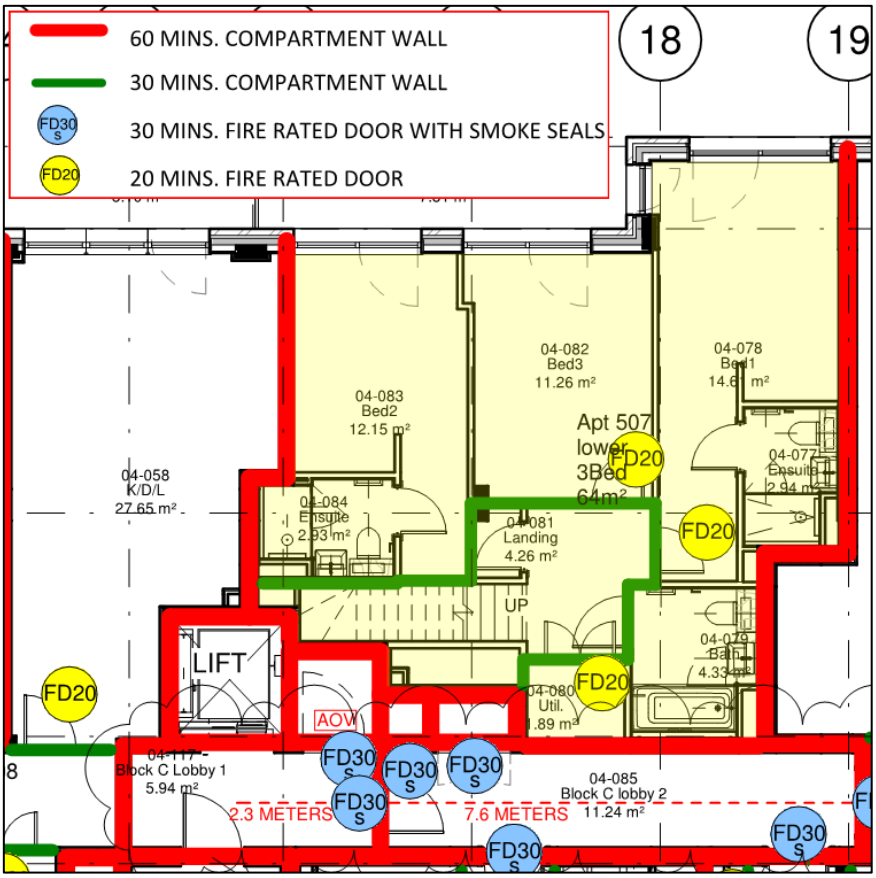

Figure 3: Duplex internal layout

3.5 Balconies

Flats will be provided with balconies. These will be constructed from non-combustible materials. There are some balconies that sit directly above a room within the flat below. Where this happens the floor of the balcony will be a compartment floor in order to maintain compartmentation between levels.

Privacy screens will separate shared balconies. Where the flats sharing the balcony have directly opposing windows the dividing screen will achieve 30 minutes fire resistance. An example is shown in Figure 4.

Guidance recommends that balconies should have clear visibility into the adjoining room. This is to ensure occupants are aware of a fire in the room through which they will need to escape. Where this isn't the case the alternative would be to design the flats' smoke alarms such that they are audible on the balcony.

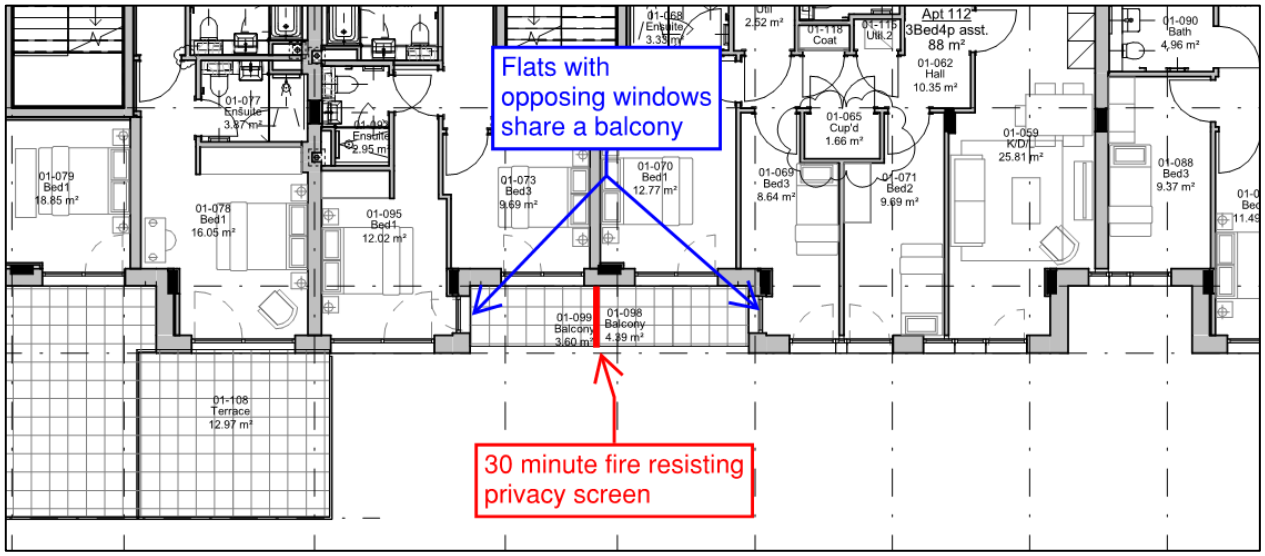

Figure 4: Flats with opposing windows

4.0 RESIDENTIAL COMMON AREAS

4.1 Travel distance and corridor smoke venting

4.1.1 Guidance

All residential corridors require a means of venting smoke. This can be via an AOV to outside or a natural smoke shaft. An AOV is also required at the head of the stair.

Travel distances in corridors should be limited to 7.5m in single-stair buildings. This can be increased to 15m where flats are sprinklered. Travel distances are measured from the flat entrance door to the stair door.

Alternatively, if there is a sterile smoke vented lift lobby separated from the rest of the corridor by fire doors, then the travel distance can be measured to that lobby. In this case, the distance within the stair lobby is not specifically limited.

This is shown in Figure 2 below which is an extract from BS 9991.

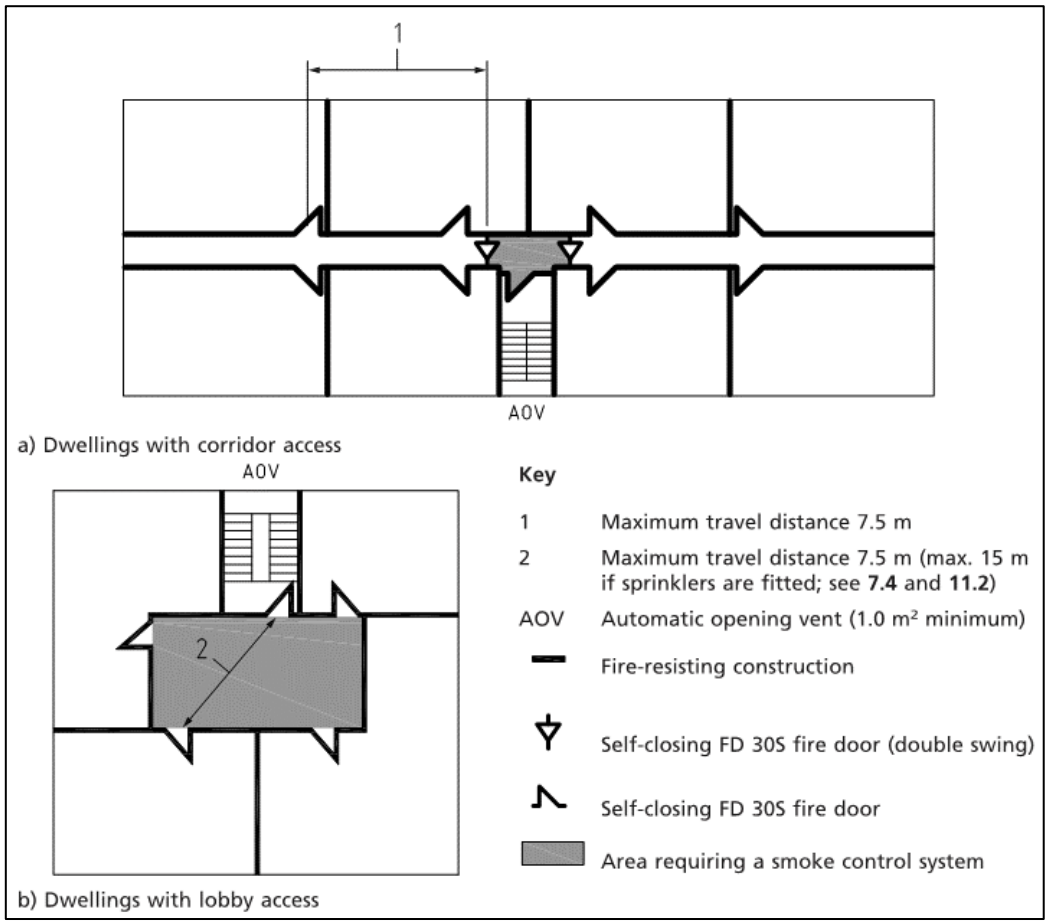

Figure 5: Travel distances in residential corridors

4.1.2 Corridor smoke venting at 254 Kilburn High Road

There is a 1.5m^2 smoke shaft in the corridors of all three blocks from ground to fifth floors.

These smoke shafts do not serve sixth floor. Smoke venting at sixth floor is provided by an AOV (1.5 m^2) located in the ceiling of the lobby in each block which opens to vent smoke directly to outside air above the roof.

There is also a 1m^2 AOV at the head of each residential stair.

4.1.3 Travel distances in Block A

Travel distances in Block A are summarised in Table 1

Level	Distance of furthest flat from stair
01	7.0m
02	7.9m
03	7.9m
04	7.9m
05	4.8m
06	2.5m

Table 1: Travel distances Block A

The escape distance from one flat at each of levels 2, 3 and 4 marginally exceeds the benchmark 7.5 m. To support this, a fire engineered solution has been developed based on providing cross-corridor doors in the common corridors such that travel distances in the unvented section of each corridor (i.e. from the flat door to the smoke vented stair lobby) are less than 7.5m. This reduces the distance occupants would have to walk in a smoke-filled section of corridor. This is shown for Level 02 in the figure below.

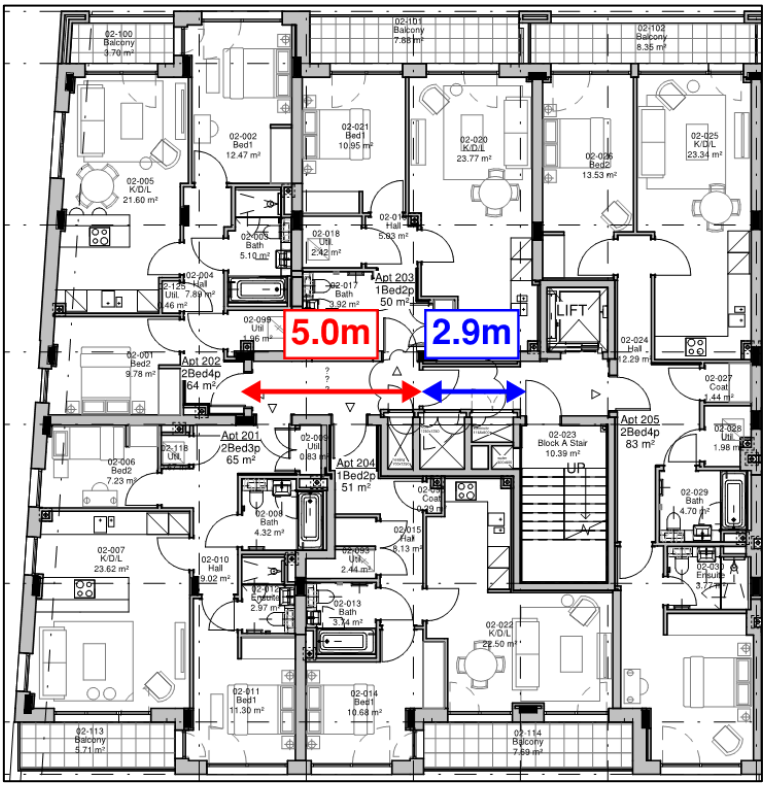

Figure 6: Block A travel distance (Level 02)

All other flats are within 7.5m of the stair and so comply with recommended limits.

4.1.4 Travel distances in Block B

Travel distances in Block B are summarised in Table 2.

Level	Distance of furthest flat from stair
01	8.8m
02	8.8m
03	14.3m
04	11.4m
05	6.7m
06	2.6m

Table 2: Travel distances Block B

The travel distance at Levels 1 and 2 is 1.3 m above the 7.5 m benchmark. To support this, cross-corridor fire doors have been provided following the same solution as proposed for Block A. In this case the maximum distance that occupants would have to travel in any section of smoke filled corridor would be 5.3 m. The layout of Level 02 is shown below.

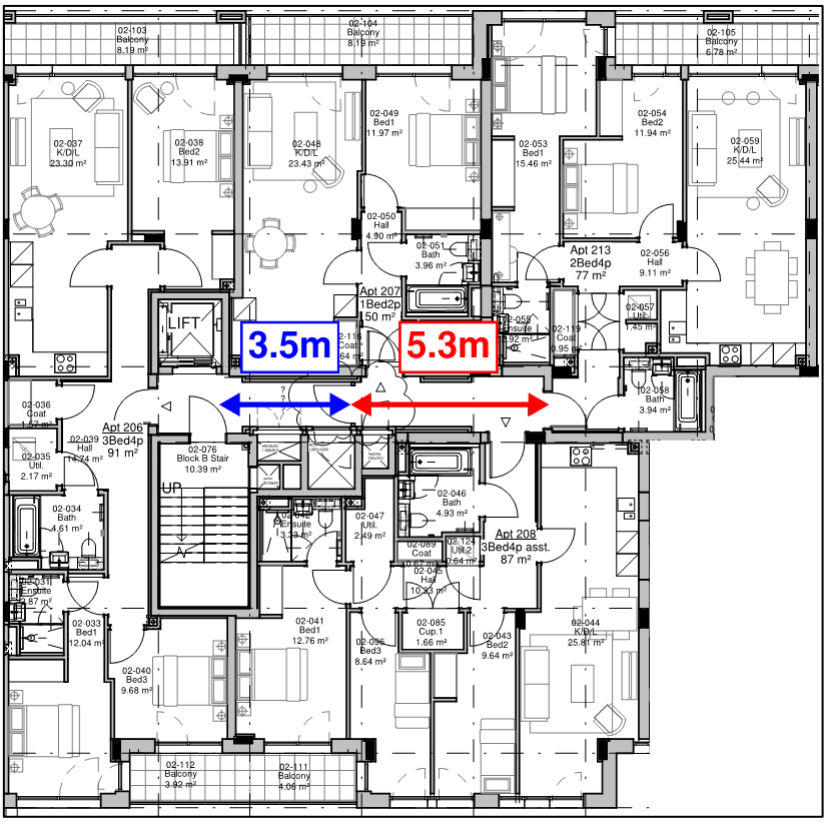

Figure 7: Block B travel distance (Level 02)

All flats at Levels 3 and 4 in Block B are sprinklered. Guidance permits travel distances of up to 15m when flats are sprinklered. Therefore, the corridor travel distance on both floors is in line with code guidance.

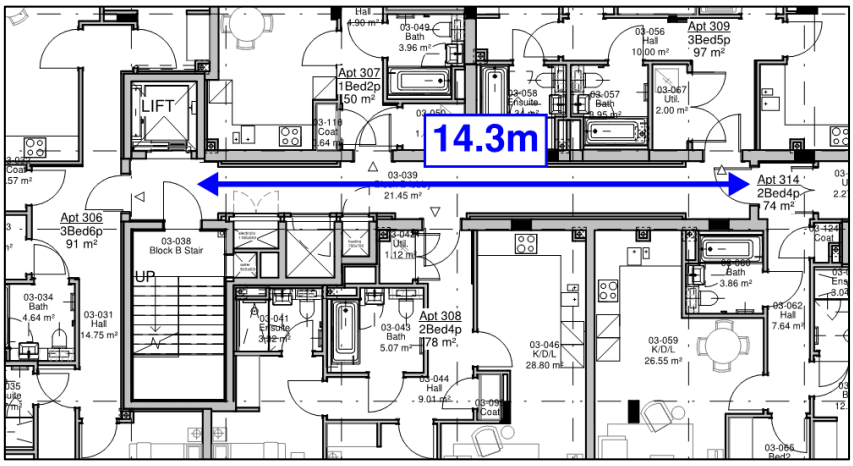

Figure 8: Block B travel distance (Level 03)

Blocks B and C are connected at Level 05, so occupants can escape via either stair. The stairs will be separated by a cross-corridor fire door approximately midway between the stairs. Travel distances comply with Building Regulations guidance.

4.1.5 Travel distances in Block C

Travel distances in Block C are summarised in Table 3

Level	Distance of furthest flat from stair
01	8.1m
02	8.1m
03	10m
04	10m
05	4.0m
06	*See Section 4.2*

Table 3: Travel distances Block C

The travel distance at Levels 1 and 2 is approximately 600 mm above the benchmark 7.5 m. The same solution has been adopted for Block C with an additional cross corridor fire door to limit the length of corridor that could be affected by smoke. The layout of Level 02 is shown below.

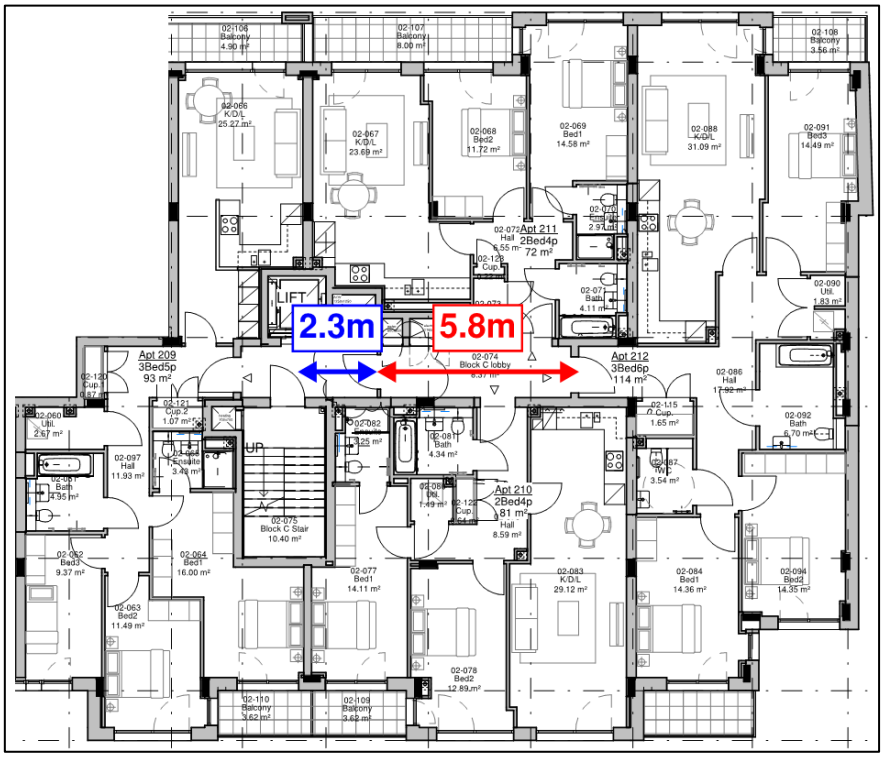

Figure 9: Block C travel distance (Level 02)

At Levels 3 and 4 there are no flat opening directly into the lift lobby, as shown in Figure 10. Travel distances can therefore be measured to the door into the lift lobby and the arrangement is compliant with Building Regulations guidance.

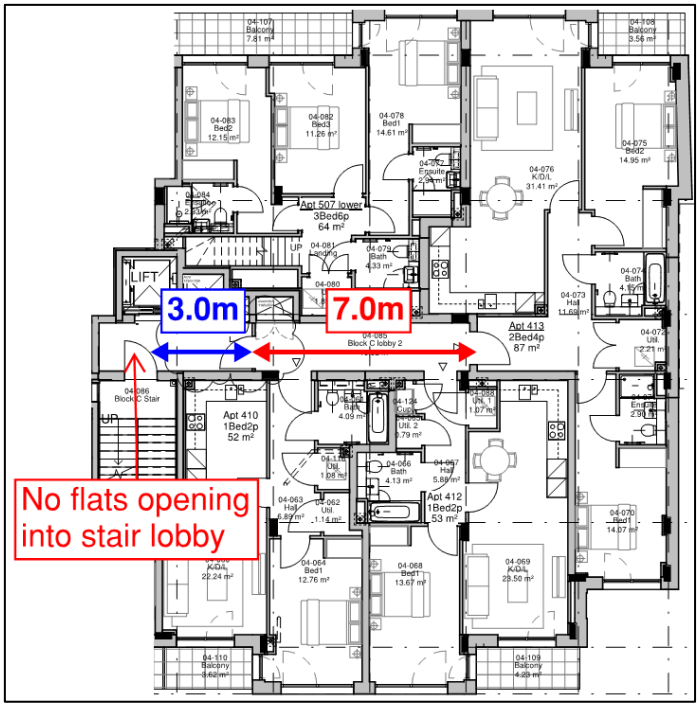

Figure 10: Block C travel distance (Levels 04 and 05)

Blocks B and C are connected at Level 05, so occupants can escape via either stair. The stairs will be separated by a cross-corridor fire door approximately midway between the stairs.

4.2 Block C, Level 06

The flat at Level 06 in Block C opens directly into the stair via a small private lobby. This does not strictly comply with code guidance but is considered reasonable based on the following:

- The lobby immediately outside the stair has an AOV in the ceiling.
- The lift is provided with a second door located immediately in front of it providing the equivalent of a lobby separation to the internal corridor.
- The flat is on the top floor, so a fire in that flat is unlikely to affect occupants at the lower levels.

The AOV in the ceiling of the lobby is within the flat demise. The management of the building will, however, need to have access to the AOV for testing and maintenance and will need to make suitable arrangements with the tenant for regular access.

4.3 Cleaners sinks in stairs

There are small cleaners' cupboards beneath the stairs at ground floor. These are accessed directly from the stair enclosure. This does not comply with Building Regulations guidance but is considered reasonable on the basis that the cupboards will be fire separated from the stair and locked shut when not in use.

The use of the space will be restricted to a sink and associated plumbing. It is essential that management ensure these spaces are closely monitored and that they are not used for the storage of any combustible materials.

4.4 Risers in stairs

There are heating and water risers accessed directly from the stair in all three blocks. This does not comply with the recommendations of code guidance. However, these risers will only contain pipes carrying hot and cold water and therefore present minimal fire risk. The risers will be enclosed in fire resisting construction and accessed through fire doors which are locked shut. On this basis it is considered reasonable for these risers to be accessed from the stair.

4.5 Final exits from stairs

4.5.1 Blocks A and B

The stairs in Blocks A and B both discharge through a shared entrance lobby.

The reception lobby will contain some furniture and there will be a direct connection to the plant room. A fire engineered solution has been developed to reduce the risk of a plant room fire on the final exit route. The plant room will be separated from the final exit corridor route by a two fire rated lobbies. The lobby closest to the reception will be provided with a 0.4m^2 permanent smoke vent ducted to the elevation. This is considered adequate to protect the final escape route from smoke caused by a fire in the plant room.

Furniture in the reception will be heavily restricted, and should only use non-combustible materials such as glass, metal and stone.

The mail room will only comprise fire rated post boxes. The small staff lobby separating the staff toilet will not be used for storage of coats, umbrellas etc.

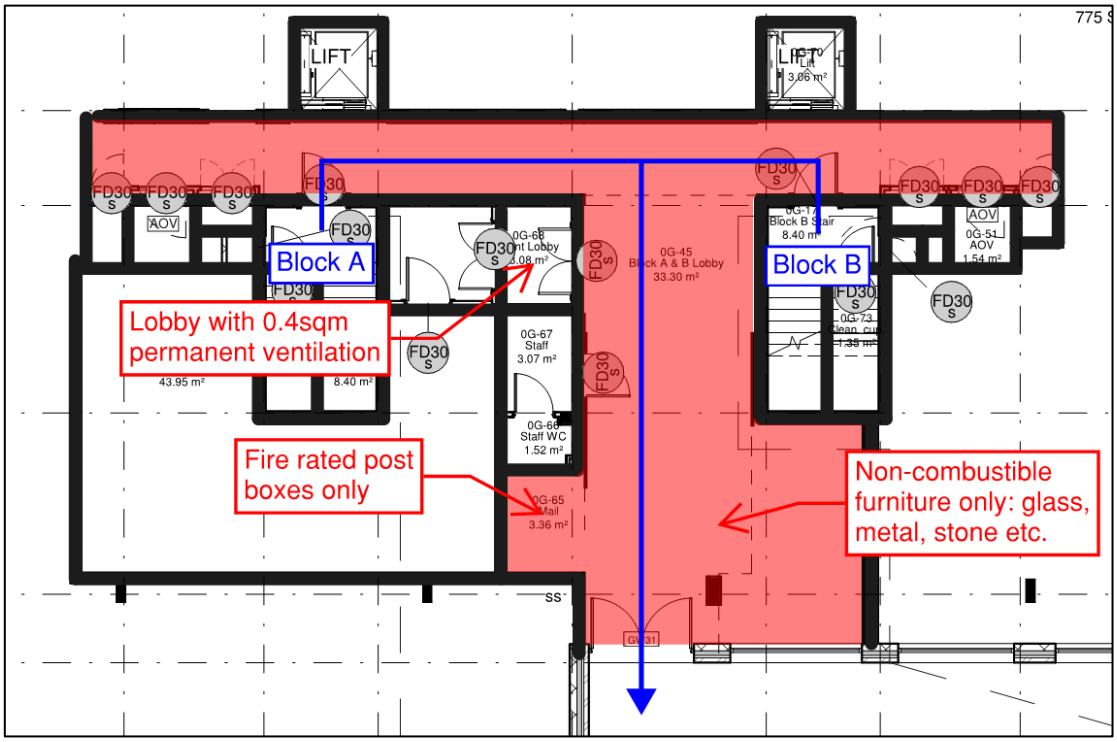

Figure 11: Final escape from Blocks A and B

4.5.2 Block C

The stair in Block C discharges through a dedicated entrance lobby. There are no connections to other accommodation from this reception.

Any post boxes in the reception will be fire rated. There will not be any combustible furniture allowed in reception.

This is shown in the figure below.

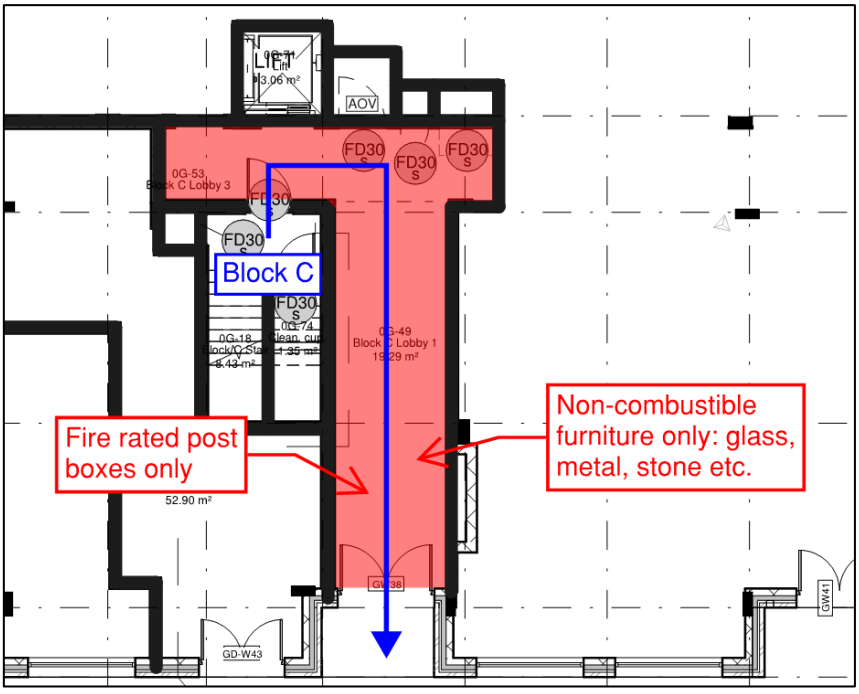

Figure 12: Final escape from Block C

4.6 Bike stores

The bike store is accessed directly from outside and does not connect with the residential areas.

4.7 Bin stores

The refuse store is accessed directly from outside and does not connect with the residential areas. It will be separated from the residential block by fire resisting construction.

5.0 STRUCTURE AND COMPARTMENTATION

5.1 Structural fire resistance

All structural elements of construction will be designed to achieve 60 minutes fire resistance.

5.2 Compartmentation

All floors will be compartment floors achieving 60 minutes fire resistance.

The residential and commercial uses will be separated by compartment walls and floors achieving 60 minutes fire resistance.

All stairs will be designed as protected shafts achieving 60 minutes fire resistance.

Each flat will be a separate fire compartment, separated from the corridor and from adjacent flats by 60 minutes fire resistance.

All service risers will be designed as protected shafts achieving 60 minutes fire resistance with FD30S doors.

The refuse store and the plant room will be enclosed in fire resisting construction achieving 60 minutes fire resistance.

Cleaners' cupboards and water risers will be separated from the stair by 60 minutes fire resisting walls and accessed through FD30S doors.

All penetrations for pipes and other services will be appropriate fire stopped and sealed as required to comply with the guidance in Section 10 of the Approved Document B

Wall between commercial units and walls between commercial units and the fallow area will achieve 1 hour fire resistance.

6.0 EXTERNAL WALLS

6.1 External wall materials

6.1.1 Guidance

The Building Regulations require that external walls are designed to adequately resist the spread of fire over the walls. For buildings more than 18m in height, guidance gives clear recommendations on how to achieve this. In particular, for new residential buildings designed today that are over 18m in height there is a ban on the use of combustible materials in the external walls.

However, for buildings less than 18m in height, combustible materials are not explicitly restricted.

6.1.2 Proposed wall build-up

The external walls are of a brickwork construction up to the fourth floor. Levels 5 and 6 have an aluminium cladding system.

The original design was to have a combustible insulation installed behind the brickwork and aluminium cladding. The design was then subsequently modified with the combustible insulation behind the aluminium cladding being replaced with a non-combustible mineral wool. The combustible insulation behind the brickwork has, however, been retained.

Current guidance and the guidance applicable at the time of construction do not preclude the use of combustible insulation. The removal of the combustible insulation at the top two levels is considered to be a sensible decision as the aluminium cladding is unlikely to offer any significant protection to the insulation from flames breaking out of a window. On the lower floors the insulation is protected from external fires by the brickwork.

It is understood that the external walls have been provided with cavity barriers and cavity closers around door and window openings in accordance with the guidance in the Approved Document B. Therefore, the proposals satisfy the recommendations of guidance and meet the functional requirements of the Building Regulations.

6.2 Extent of glazing and external fire spread across the site boundary

6.2.1 Principles

A building's elevations need to be sufficiently far enough away from the site boundary or the extent of openings, e.g. windows need to be restricted to minimise the risk of fire spread across that boundary. JGA have not seen any information or calculations for unprotected areas but presume that this has been addressed previously as part of the Building Regulations application.

6.2.2 Residential

In the absence of any information some initial thoughts are discussed below although detailed calculations have not been carried out.

Elevation A faces onto Kilburn Grange Park. This is a large public space and it is reasonable to assume it will not be developed in the future. On this basis the amount of glazing on elevation A is not restricted.

Elevation B faces onto the site boundary. The client has confirmed that all windows on this elevation are unopenable and achieve 60 minutes fire resistance for integrity and insulation.

Elevation C faces the rear of the properties that face onto the High Street. It is set back from the site boundary by approximately 6m at the closest point, as shown in Figure 13. This is sufficient for the elevation of the flats to be fully glazed.

Elevation D is a party wall and has no windows from ground to Level 04. There are windows on this elevation at Levels 05 and 06, though these are set back by approximately 7m and could be fully glazed.

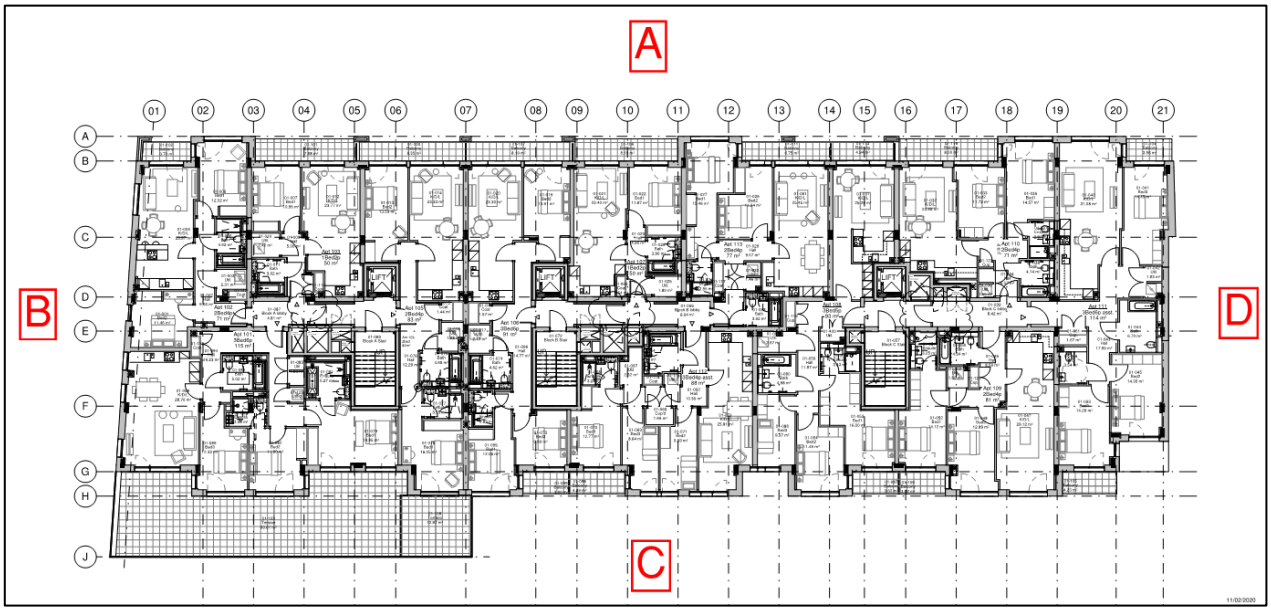

Figure 13: External residential elevations

6.2.3 Commercial

The elevations of the commercial units will need to be designed in accordance with Building Regulations guidance.

7.0 PROVISIONS FOR FIREFIGHTING

7.1 Fire vehicle access

Access to the site is via a small access road off Kilburn High Road. There is not sufficient space to turn a fire appliance within the site, so vehicle access is limited by the reversing distance from Kilburn High Road. A fire vehicle would need to reverse approximately 22m to give a clear sightline to the dry fire main inlets. The distance from the fire appliance parking position to the dry fire main inlets is less than 12m. This is shown indicatively in the figure below.

This requires fire vehicles to reverse slightly further than the recommended maximum of 20m. However, slight extensions in reversing distance are not uncommon on tight inner-city sites.

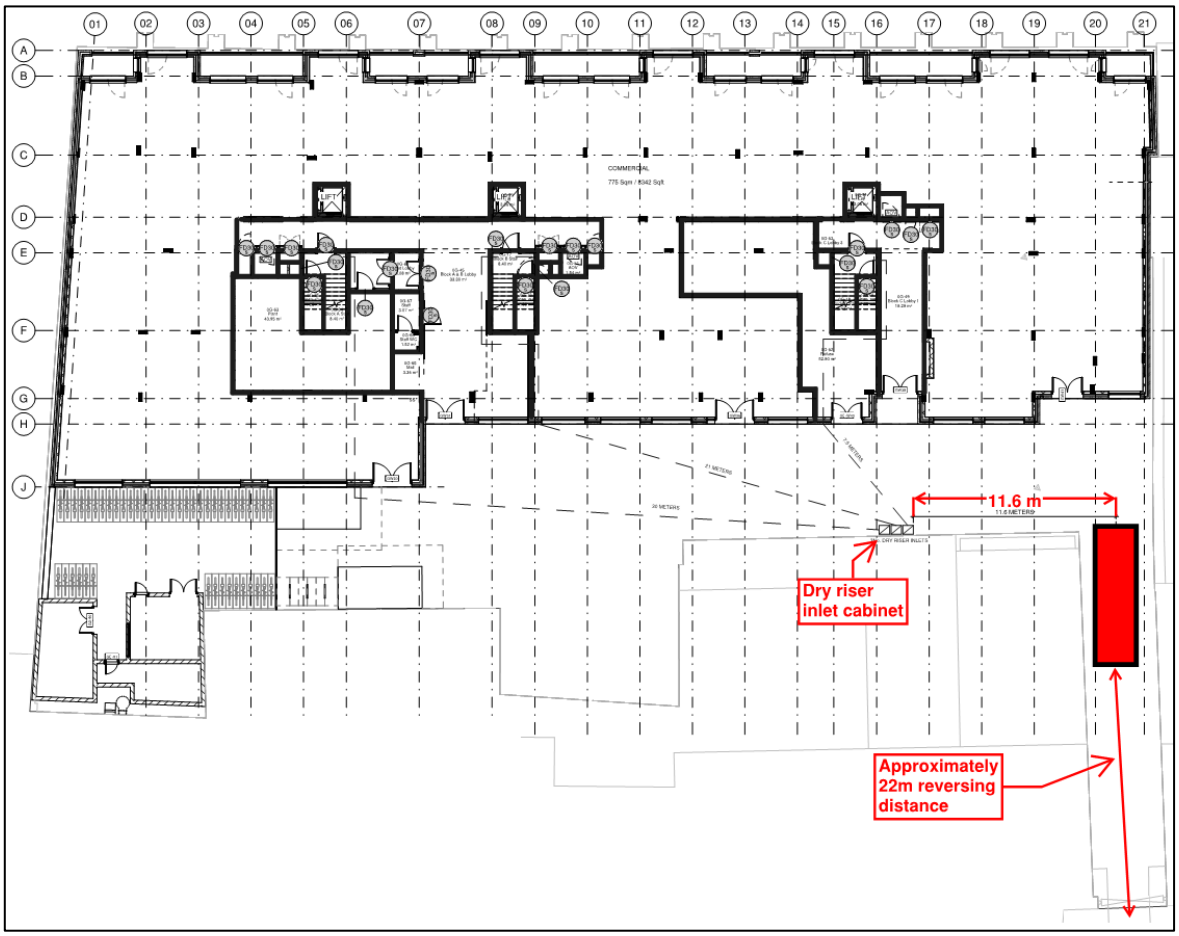

Figure 14: Fire vehicle access

7.2 Dry fire mains

Each block is fitted with a dry fire main with an outlet within the stair enclosure at every level. This is sufficient to provide 45m hose coverage to every flat, in line with code guidance.

Inlets for the fire mains for all three blocks will be within a single locked cupboard next to the site entrance. Although this arrangement is not specifically precluded in guidance, the Fire Brigade raised the following concerns:

- Concerns over the horizontal pipework
- Wayfinding
- Distance that firefighters need to travel

JGA were commissioned to review the firefighting provisions and produced a report concluding that the proposed provisions achieve a reasonable standard. This report is given in Appendix A

8.0 COMMERCIAL UNITS

The ground floor is currently largely allocated to commercial but the client intends to put in a separate planning application to turn half of the ground floor into additional apartments. Therefore, the use of the building at this level is likely to change in the near future.

8.1 Current layout

8.1.1 Fire Fighter Access

Fire vehicle access to the ground floor is restricted to the access route directly off of Kilburn High Road. This layout means that firefighter access is limited particularly to the retail furthest from the fire vehicle parking position. Hose cover would be well beyond the usual permitted hose cover limits.

There are potential solutions to overcome this, but they would become redundant once the client implements their preferred design to have additional apartments at ground floor. Therefore, the strategy is for the retail furthest from the fire vehicle parking position to remain fallow until such time as it is redeveloped. The area indicated in red below would be secured and will not contain any combustible material.

8.1.2 Escape

The retail indicated in green could be occupied prior to the proposed redevelopment of the ground floor. The smaller space between Blocks B and C entrances can work with a single escape route through the front of the unit following the guidance for small premises.

The area of the largest unit is approximately 323m^2, giving an occupancy of approximately 160. This unit will have escape routes to the car park and an alternative into the park. Both exits will achieve at least 1050mm clear width.

Figure 15: Commercial units

8.2 Future conversion to flats

Should the ground floor convert to flats in the future, hose coverage would be provided to the ground floor from the dry fire main outlet in the residential stairs. The new ground floor layout would be subject to a separate review and fire strategy.

9.0 FIRE SAFETY MANAGEMENT

9.1 General

Once the building is occupied, it is the responsibility of the management to ensure that all fire safety systems are tested and maintained to ensure their continuous effectiveness. The management should: -

- Be aware of all the fire safety features provided and their purpose
- Ensure a competent person is present in the building during all occupied times
- Liaise with and seek the advice of the fire authority

9.2 Staff

Staff should be trained by competent persons. The training should be at regular intervals and should ensure that all staff know what to do if a fire is discovered; the correct response on hearing a fire alarm, and the correct escape procedures from every part of the building.

A management structure should be provided to ensure that in the case of fire staff are aware of their responsibilities, which should be clearly defined. A chain of command should be provided with clear lines of responsibility, authority and accountability.

9.3 Fire Safety Manual

Before a building is occupied, a fire safety manual should be completed. The purpose of the manual is to clearly define the nature of the fire safety systems provided for the building. It should include: -

- An explanation of the overall fire safety strategy
- Evacuation procedures
- Design documentation to describe the use of each fire safety system
- Staff roles in the event of a fire: their responsibility, authority and accountability
- A detailed maintenance routine

The Fire Safety Manual should be reviewed periodically and when any alterations are made to the building. Details of the suggested contents of the fire safety manual are provided in Appendix G of the Approved Document B and Annex H of BS 9999 Code of practice for fire safety in the design management and use of buildings.

9.4 Maintenance and Housekeeping

It is the role of management to ensure that maintenance is carried out in accordance with the relevant British Standards, so that all fire safety systems are operational in the event of a fire. It is also important that good housekeeping practices are followed. The building management should be aware of any hazardous substances or practices within the building, which increase the risk of fire.

9.5 The Regulatory Reform (Fire Safety) Order 2005

This Order places a duty on the 'responsible person' to ensure, 'as far as is reasonably practical' the safety of his employees and to take such general fire precautions as may be reasonably required to ensure that the premises are safe [i.e. for non-employees].

Under the Order, there is a requirement to carry out and continually update an assessment of the risk of fire to people in and around the premises/building, and to assess and maintain the measures to reduce those risks to an acceptable level. Where there are five or more employees, the risk assessment must be recorded.

A Fire Risk Assessment should be carried out:-

1. On completion of the building fit out, and strictly before first occupation of the building.
2. Regularly, particularly where any changes occur such as changes in the use of the building, the number or nature of occupants, or building works.
3. We would recommend that a fire risk assessment is carried out at least annually.

Other legal duties include: -

1. Keeping a record of the Fire Safety Arrangements. These are the preventative and protective measures for the building.
2. A person must be nominated for any special role identified in an emergency plan.
3. Employees must be consulted about nominations to perform special roles, and about any proposals for improving the fire precautions.
4. Other employers in the building must be informed about any significant risks, which might affect the safety of their employees, and there must be co-operation with them in measures to reduce the risk.
5. Those having control over the workplace have a responsibility to ensure compliance with the regulations in those parts of the building over which they have control.
6. A suitable and readily available method of calling the emergency services must be established.
7. Employees are required to co-operate in ensuring that the workplace is safe from fire.

The order also adopts 'Principles of Prevention'. These include:-

- Avoiding risks;
- Evaluating the risks which cannot be avoided;
- Combating the risks at source;
- Adapting to technical progress;
- Replacing the dangerous by the non-dangerous or less dangerous [particularly with respect to hazardous substances];
- Developing a coherent overall prevention policy which covers technology, organisation of work and the influence of factors relating to the working environment, and;
- Giving appropriate instructions to employees.

10.0 INFORMATION, LIMITATIONS AND ASSUMPTIONS

The information limitations and assumptions used in the preparation of this report are noted below: -

Drawings

This report is based on drawings issued to us. Dimensions have been taken from these drawings. The following drawings were used: -

- 20_200 - Ground Floor Plan
- 20_201 - First Floor Plan
- 20_202 - Second Floor Plan
- 20_203 - Third Floor Plan
- 20_204 - Fourth Floor Plan
- 20_205 - Fifth Floor Plan
- 20_206 - Sixth Floor Plan
- 20_207 - Roof Plan

Information

The following information was used for the preparation of this report: -

- 04prmt-gl - Fire vehicle access strategy
- D01 letter 254 Kilburn High Road d-job 1941030 nov19 – Fire Brigade letter

Survey (Existing Building)

This building has not been surveyed by Jeremy Gardner Associates.

Building Regulations

This report considers building regulations, which deal with life safety. Property protection and insurance issues are not addressed in this report. Guidance on property protection and insurance requirements can be found in the document *Approved Document B: Fire Safety (Volume 2) – Buildings other than dwellinghouses Incorporating Insurer's Requirements for Property Protection,* RIBA Publishing 2008.

Other Limitations

Complying with the recommendations of this report will not guarantee that a fire will not occur.

Unless otherwise described in this report, the fire strategy assumes that the building design, the mechanical and electrical systems, construction methods and materials specifications will comply with current Building Regulations guidance, and relevant British Standards and Codes of Practice. The design of mechanical and electrical systems such as fire alarm and sprinklers is a specialist area. Fire Strategy recommendations are given in this report, however, the design and specifications need to be developed at the appropriate stage in consultation with the specialist designers of these systems.

This report has been prepared for the sole benefit, use and information of Godfrey London and the liability of Jeremy Gardner Associates Limited, its directors and employees in respect of the information contained in the report will not extend to any third party.

APPENDIX A: 04PRMT-GL - FIRE VEHICLE ACCESS STRATEGY

Jeremy Gardner Associates

Technical Note

JGA
A JENSEN HUGHES COMPANY

254 KILBURN HIGH ROAD
FIRE VEHICLE ACCESS STRATEGY

DL6837/prm/01gl
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INTRODUCTION

The project is new build residential scheme located just off Kilburn High Road in North London. There are three residential buildings – Blocks A, B and C comprising ground and six upper floors. The top floor (level 6) is just under 18 m above ground level.

The ground floor site plan is given in Figure 1 below. The buildings are located behind the existing Kilburn High Road properties and reached through a gated access road from Kilburn High Road.

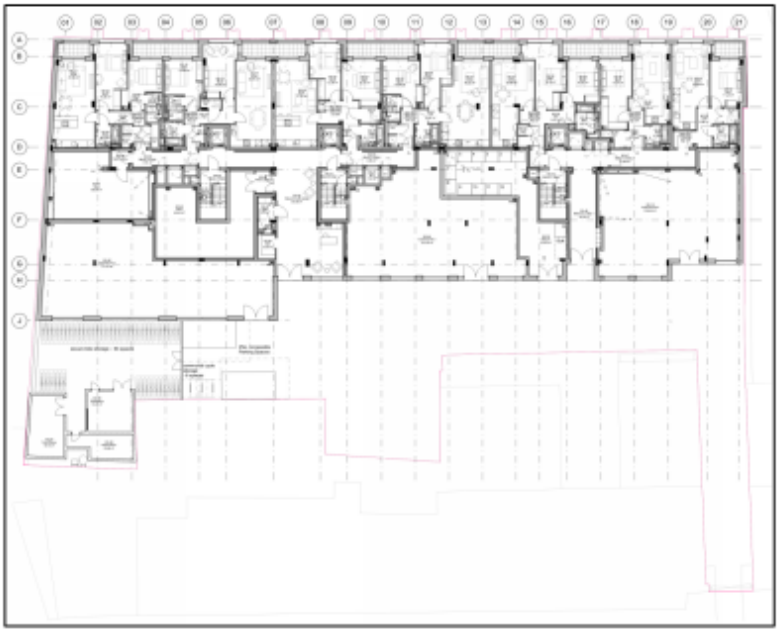

Figure 1 - Ground Floor Site Plan

The Fire Brigade have been consulted and have raised concerns with regards to the fire vehicle access arrangements to the site. These concerns are documented in the London Fire Brigade letter dated 12 November 2019.

JGA have recently been appointed to provide fire strategy advice on the scheme. The first task was to carry out a review of the fire vehicle access arrangements and fire fighting features provided within the building to establish if they satisfied the functional requirements of the Building Regulations. This report describes the findings of that assessment.

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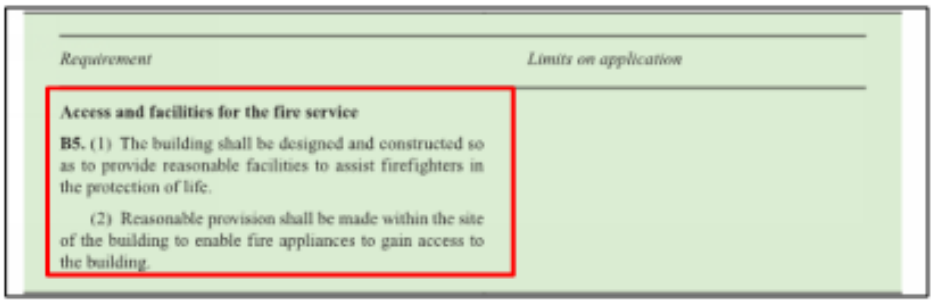
BUILDING REGULATIONS

The extract below from the Building Regulations Approved Document B sets out the requirements for access and facilities for the fire service.



Requirement	*Limits on application*
Access and facilities for the fire service **B5.** (1) The building shall be designed and constructed so as to provide reasonable facilities to assist firefighters in the protection of life. (2) Reasonable provision shall be made within the site of the building to enable fire appliances to gain access to the building.	

Figure 2. Building Regulations Requirements B5

GUIDANCE

The construction of the building is well advanced and has been on site for nearly two years. The initial notice for the building was accepted by the Local Authority on 9 March 2017. Consequently, the guidance in the Buildings Regulations Approved Document B Volume 2 2006 edition (incorporating the 2007, 2010 and 2013 amendments) is appropriate.

There are two standard options for fire fighting access to apartment buildings where all floors are less than 18 m above ground level. These are:

1) Provide vehicle access for a pump appliance to within 45 m of all points within each dwelling; or

2) Provide dry fire mains within the staircases. The dry fire main inlets need to be located within 18 m and in sight of the fire vehicle parking position. The guidance also notes that the inlets would typically be on the face of the building.

Fire vehicle access routes need to be designed for a pump appliance. Figure 3 is an extract from the Approved Document B and describes the relevant criteria for a pump appliance. The guidance recognises that long dead end access routes can be problematic and recommends that any dead ends are restricted to a maximum of 20 m.

Table 20 **Typical fire and rescue service vehicle access route specification**

Appliance type	Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonne)
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High reach	3.7	3.1	26.0	29.0	4.0	17.0

Notes:

1. Fire appliances are not standardised. Some fire services have appliances of greater weight or different size. In consultation with the Fire and Rescue Service, the Building Control Body may adopt other dimensions in such circumstances.

Figure 3. Fire vehicle access route specifications

2

PROPOSED ARRANGEMENTS FOR 254 KILBURN HIGH ROAD

The site can only be accessed via a gate from Kilburn High Road. Fire vehicles can drive through this gate and along the hardstanding as shown in Figure 4. There is insufficient space for fire vehicles to turn left and continue along the front elevation of the building. Therefore, they will have to park somewhere in the region indicated on Figure 4. The reversing distance would be approximately 22 m if the fire vehicle were to have clear visibility along the front face of the building and to the dry riser inlet cabinet.

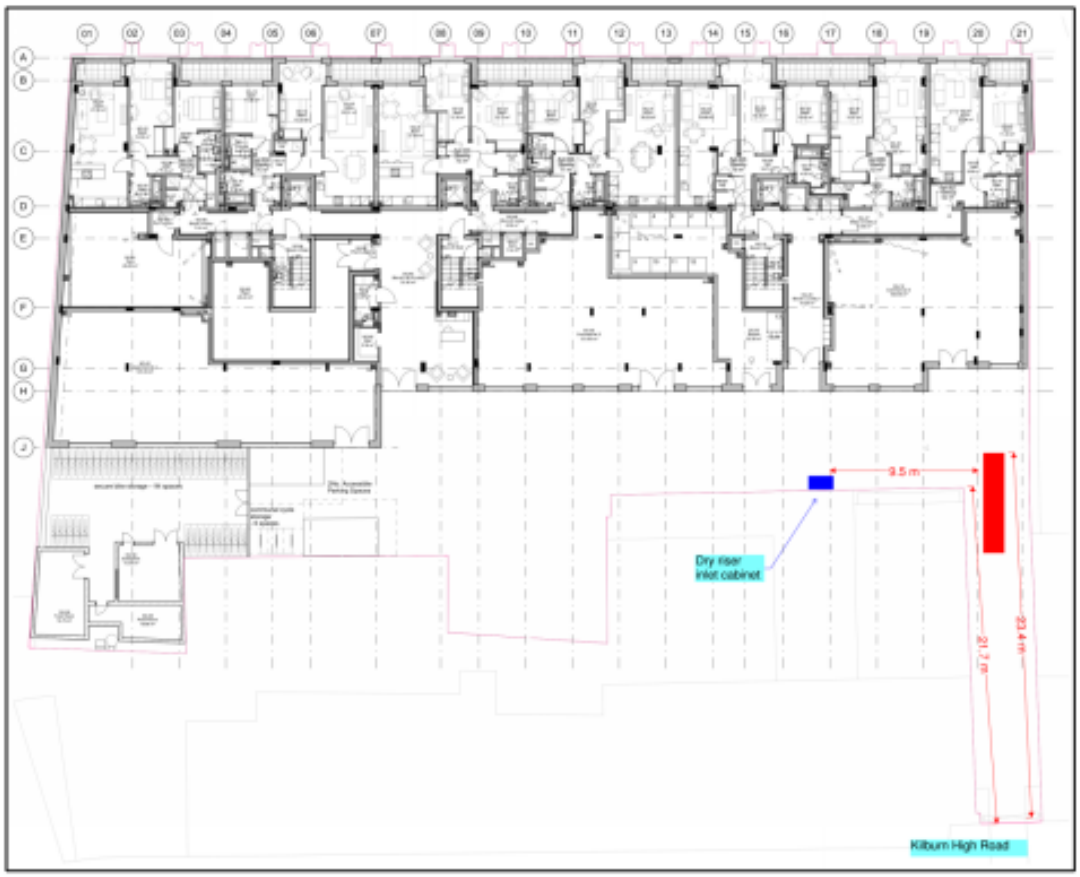


Figure 3 - Fire Vehicle Access and Dry Riser Inlet Connections

Dry risers have been provided in each of the stairs. The inlet connections for all three cores are located opposite the Building C entrance. The dry riser pipework and inlets have been constructed although the cabinet that will eventually enclose the inlet connections is yet to be constructed, see Figure 4.

The fire vehicle can park within 10 m of the dry riser inlet connections.

Figure 4 - Dry Riser Inlet Connections and Pipework

The dry riser pipework is routed underground to the elevation of the building where it will then pass into the building and to the staircases. Figure 5 below shows where the pipework comes into Building C.

Figure 5 - Dry Riser Pipework entering Building C

FIRE BRIGADE CONCERNS

The Fire Brigade have raised several concerns in their letter dated 12-11-19. These are:

- Concerns over the horizontal pipework
- Wayfinding
- Distance that fire fighters need to travel

4

EVALUATION OF THE ARRANGEMENTS

Fire Vehicle Access and Location of the Dry Riser Inlets

It is not unusual in tight inner city sites for the fire vehicle access to buildings to be restricted. It is relatively common in such instances to extend the dry riser pipework so that the inlet is brought closer to where the fire vehicles will park.

A fire vehicle can park within 10 m and in sight of the fire main inlet connections as shown in Figure 3. Therefore, this aspect satisfies Building Regulations guidance.

The reversing distance for the fire vehicle to clear the party wall to the adjacent building and have clear sight of the dry riser inlets is, however, 2m longer than would normally be permitted. On balance a small extension in the reversing distances is not considered to be a major problem especially given that the dry riser inlet connections will be close to the fire vehicle parking position.

Protection to the Dry Riser Pipework

It is recognised that exposed external pipework and connections are prone to vandalism and there have been instances of theft where the pipework and inlets have been stolen and sold for scrap metal. It is thought that this may be one of the London Fire Brigade's concerns with the proposed arrangement.

To resolve this it has been confirmed that the inlet connections are to be enclosed in a brickwork enclosure with a secure door providing access to the inlet connections. This essentially means that the dry riser inlet will be as secure as if it were installed on the face of the building.

The external pipework is distributed underground before rising out of the ground and entering the building (see Figure 5). The exposed pipework where it enters the building will also be protected by a similar brickwork enclosure to minimise the risk to that section of pipework.

Figure 6: Enclosure to pipework

Wayfinding

To assist fire fighter wayfinding it is recommended that clear signage is provided on the housing containing the dry riser inlets.

There are three cores and the fire main inlets for each of the cores are located within the same enclosure. These should be appropriately signed to identify which inlet serves which core. This could take the form of a plan identifying each dry riser connection and which core it serves. This information could also be consolidated within a premises information box to be contained within the reception areas of the relevant buildings.

Distance of Travel to the Residential Cores

There is nothing in Building Regulations guidance that specifically limits the distance between the fire vehicle parking position and the door into stair core. Therefore, it could be argued that the arrangement at 254 Kilburn High Road is code compliant.

However, if the dry riser inlet was located immediately adjacent to the building entrance then this would result in the distance being restricted to 18 m. Once in the building the maximum recommended distance from the entrance door to the stair is also restricted to 18 m. Therefore, the overall walking distance from the fire vehicle to the stair could reasonably be in the order of 36 m.

Block C is nearest to the fire vehicle parking position. The door into the building is approximately 12 m from the fire vehicle parking position. Fire fighters would then have to travel a further 11 m to reach the stair. These distances are within normal parameters and are compliant.

Blocks A and B are accessed via the same building entry point. The distance from the fire vehicle parking position to the entrance door is 36 m. Fire fighters would then have to walk another 15 m to the stair door in Block A. Block B is marginally closer. Therefore, the maximum overall distance to the stair is 51 m.

It is recognised that this requires more physical effort and work than should the overall distance be in the order of 36 m. However, this also needs to be considered in context of the penetration distances on the fire floor.

Clearly, the demands of travelling longer distances within the areas immediately affected by fire and smoke results in much greater stress on fire fighters. Therefore, it is thought that longer access distances in less demanding environments such as outside would be preferable to shorter distances outside and longer distances within the fire compartment itself.

Hose Cover and Penetration Distances on the Fire Floor

Residential buildings are permitted to have a hose cover of up to 45 m. This means that the horizontal distances that would need to be travelled could be up to 36 m + 45 m = 81 m and will be used as the basis for comparison.

The KHR buildings have relatively small floor plates. Hose cover distances for Block A (most remote building) on the upper floors measured from the dry riser are less than half the permitted maximum at 20 m. This means that the overall horizontal distance of travel in this case would be 51 m + 20 m = 71 m. Therefore, less than a code compliant arrangement.

For simplicity the vertical distance has been excluded from the assessment as that would be the same in both buildings.

OTHER CONSIDERATIONS

Dry Riser Hydraulic Performance

Although not directly raised as an issue, it is thought that an additional concern about the horizontal pipework may be that this could affect the hydraulic performance. Clearly, the dry risers would only work if they can deliver appropriate flow and pressure at all floors.

It is understood that hydraulic calculations have been carried out to inform the sizing of the pipework to ensure that the performance of this system is compliant. Further details can be provided by the designer of that system and we suggest they are issued to the LFB for review.

Premises information box

A premises information box will be provided in the buildings. This will contain all relevant fire safety information that will inform attending fire crews about the buildings, fire safety systems, etc that they can use to inform their emergency response plans. Advice on the content of this is given in the LFB Guidance Note – GN70.

CONCLUSION

There is a minor extension in fire vehicle reversing distance but it is considered that this is largely offset with the short distance between the dry riser inlets and the vehicle parking position.

The dry risers will be properly protected in a suitable enclosure. Therefore, the risk of vandalism is no worse than a building where the inlet is installed on the elevation of the building.

The dry riser pipework and breaching inlets and outlets have been designed to achieve the required flows and pressures to ensure adequate delivery of water at all floors.

The walking distance at ground outside the building is longer than would normally be expected. However, it is considered that this extra distance is offset by the fact that the distance fire fighters would need to travel on the fire floor where conditions are the most challenging is much less in the KHR building. Therefore, it is concluded that the proposals meet the functional requirements of the Building Regulations and provide reasonable facilities for fire fighters.

7

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