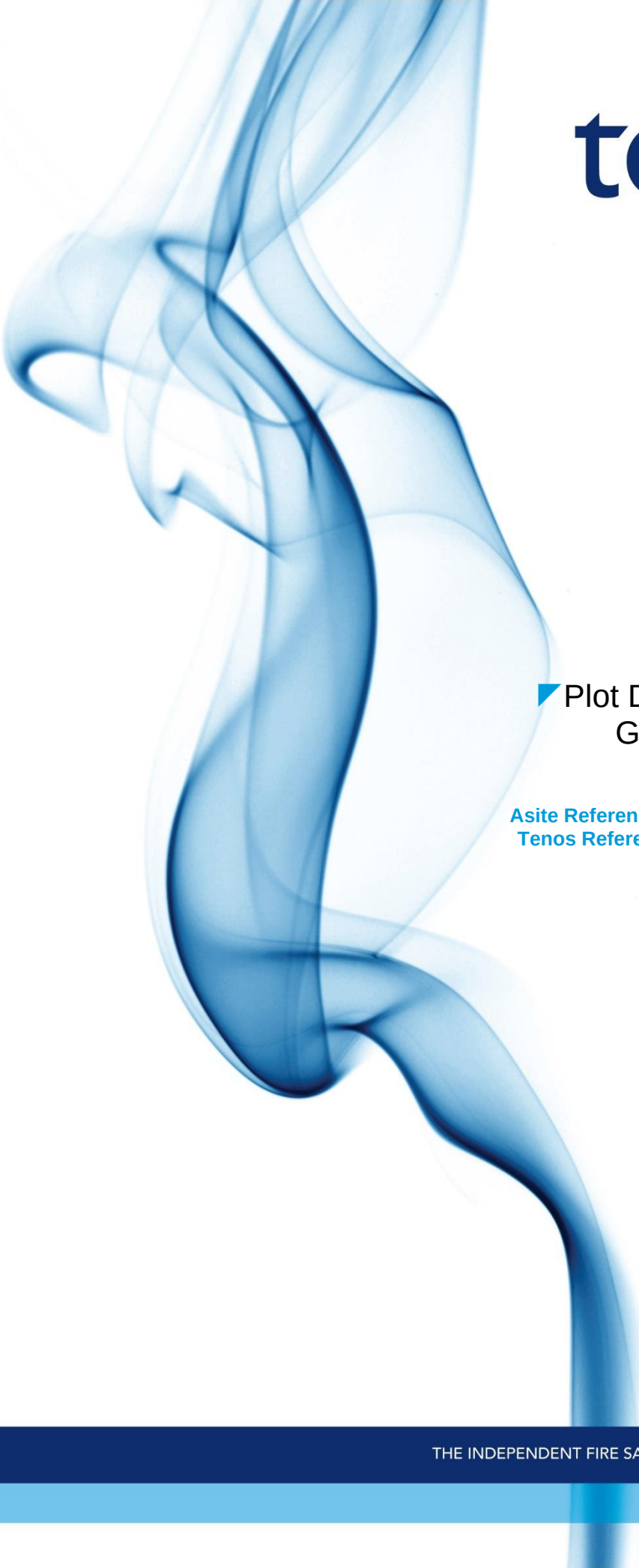




# tenos

Plot D Residential Tower  
Great Jackson Street  
Manchester

Asite Reference: Z1-TEN-A180-Rp-XX-0004  
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## Fire Strategy Report

for:

Renaker  
1<sup>st</sup> Floor, NQ Building  
47 Bengal Street  
Ancoats  
Manchester  
M4 6BB

## Issue and amendment record

| Issue | Date       | Author                  | Checked by | Amendment details                                                               |
|-------|------------|-------------------------|------------|---------------------------------------------------------------------------------|
| 01    | 08/11/2023 | H. Parkes<br>D. McMahon | M. Bell    | First issue for design team information and comment                             |
| 02    | 18/12/2023 | H. Parkes<br>D. McMahon | M. Bell    | Updated to include additional protected lobbies at restaurant level (Level 70). |
| 03    | 21/12/2023 | H. Parkes<br>D. McMahon | M. Bell    | Minor non-technical amendment to paragraph 2.9                                  |
|       |            |                         |            |                                                                                 |
|       |            |                         |            |                                                                                 |
|       |            |                         |            |                                                                                 |

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In preparing this fire strategy report it has been assumed that all aspects of the design and construction will, unless stated otherwise in this report, be in accordance with the recommendations of Approved Document B, applicable British Standards and codes of practice.

This report relates only to statutory requirements when the building is completed. Additional fire safety measures may be appropriate during construction or for insurance, loss prevention or environmental protection purposes.

The terminology “will” or “will be” as used in this report represents the recommendation/ understanding of Tenos Ltd regarding the proposed design, construction or management of the facility. The validity of this report is dependent upon these items being implemented as described.

This report relates to a project that is subject to third party approval. It must be ensured that the contents of this report are agreed with all relevant approval bodies prior to implementation.

## Contents:

|    |                                              |    |
|----|----------------------------------------------|----|
| 1  | ▼ Introduction                               | 4  |
| 2  | ▼ Brief description of the building          | 5  |
| 3  | ▼ Statutory requirements                     | 10 |
| 4  | ▼ Means of warning and escape                | 12 |
| 5  | ▼ Internal fire spread (linings)             | 31 |
| 6  | ▼ Internal fire spread (structure)           | 32 |
| 7  | ▼ External fire spread                       | 41 |
| 8  | ▼ Access and facilities for the Fire Service | 46 |
| 9  | ▼ Regulatory Reform (Fire Safety) Order      | 50 |
| 10 | ▼ Conclusions                                | 52 |
| 11 | ▼ References                                 | 53 |

## Annexes:

|    |                                                                     |    |
|----|---------------------------------------------------------------------|----|
| A1 | ▼ Annex A1 - Drawings and information                               | 56 |
| A2 | ▼ Annex A2 - Fire protection systems                                | 57 |
| A3 | ▼ Annex A3 - Boundary distance calculations                         | 61 |
| A4 | ▼ Annex A4 - Relevant Buildings: Combustibility of external walls   | 65 |
| A5 | ▼ Annex A5 - Minutes of Statutory Authorities initial design review | 68 |

# 1 Introduction

- 1.1 This report presents the RIBA Stage 3 outline fire safety strategy for the Plot D Residential Tower development in Manchester.
- 1.2 The strategy sets out the measures that are proposed to satisfy the functional requirements of the Building Regulations 2010<sup>11.1</sup>.
- 1.3 This strategy does not in itself demonstrate compliance with the Regulatory Reform (Fire Safety) Order 2005<sup>11.2</sup>. To comply with the requirements of the Order a preliminary fire risk assessment should be undertaken prior to occupation. This should be updated after occupation to identify any additional risks that may have been introduced. Subject to a suitable and sufficient fire risk assessment, additional physical fire safety measures should not be required unless high hazard materials or processes are introduced.
- 1.4 Legislation is concerned only with protecting the health and safety of people in and around a building and is not specifically intended to provide protection against damage or consequent financial losses. Whilst measures for life safety will often provide an element of property protection, it is recommended that consideration be given to a separate study regarding the limitation of direct and indirect losses that could occur as a result of fire damage.
- 1.5 The fire strategy report is a statement of why the building needs to be safe from fire and how that safety will be achieved. It sets out the scope of the fire safety considerations and the design objectives, which in this instance are driven by a statutory obligation to protect people in and around the building. It explains the combination of measures that will provide this protection, in other words the assumed fire safety management arrangements and the physical fire precautions (such as means of escape and protection systems). These have been determined through reference to codes and guidance documents, consideration of risk (i.e. hazards and consequences) and review of the building's performance requirements (i.e. what it needs to do and look like). The fire strategy report substantiates the preferred approach and in so doing provides the basis for its approval.
- 1.6 The fire strategy report is not a system design document, nor a detailed design specification. It is a statement of intent that signposts the fire protection measures (e.g. escape stairs) and their associated performance requirements (e.g. 120 minutes fire resistance). Detailed design (e.g. material and product specifications, fire alarm system, etc.) and implementation of the strategy rests with the relevant design disciplines (e.g. architect, structural engineer, mechanical and electrical engineer, etc.) and, ultimately, the building user. Reference should be made to Approved Document B<sup>11.3</sup>, applicable British Standards, and other guidance in relation to all specifications and system design. Any query regarding the intent, recommendations or interpretation of the fire strategy should be referred to Tenos.
- 1.7 This fire safety strategy has been developed on the basis of the drawings and other design information listed in Annex A1 and will be subject to further development at future detailed design stages.
- 1.8 Minutes of an initial fire strategy design review meeting with Building Control and the Fire Service (Greater Manchester high-rise team) are included within Annex A5, which has informed design decisions of the fire strategy set out within this report.

## 2 Brief description of the building

### General layout and construction

- 2.1 The Plot D development site is bound by Melbourne Street to the North-West, Great Jackson Street to the North-East, Mancunian Way to the South, Plot G of the Great Jackson Street Framework to the East, and Crown Street Phase 2 of the Great Jackson Street Framework to the West.
- 2.2 The development site will consist of a single residential tower (referred to as the Plot D building) and an adjacent independent low-rise office building, for which the fire safety design is covered in a separate fire strategy report.
- 2.3 The Plot D building will consist of 71 above-ground levels and three basement levels, with the roof being 208.1m above external ground level and the lowest basement level being 8.9m below external ground level.
- 2.4 As the building will have a top finished floor that is more than 50m above Fire Service access level, the following fire safety provisions will be included:
  - Sprinkler systems designed in accordance with BS EN 12845 (2015+A1:2019) and BS 9251 (2021).
  - 120 minutes structural fire resistance.
  - Evacuation lifts.
  - A ventilated firefighting stair, firefighting lift and wet fire main, with the common stair/lift lobby acting as the ventilated firefighting lobby.
  - Mechanical smoke extract systems to ventilate the stair/lift lobbies and protect the stairs against the ingress of smoke at all levels above and below Ground floor.
- 2.5 Although the lowest basement level will be less than 10m below external ground level, the firefighting stair will continue down to serve the basement levels (but not the firefighting lift).
- 2.6 The building will contain 642 flats, provided as a mix of 1, 2, and 3 bed units, and will generally comprise:
  - three levels of basement residents' parking and ancillary plant spaces;
  - a two-storey 'podium' formed by the larger footprint of the Ground and Level 01 floors providing the residential entrance space, a separate restaurant entrance, ancillary accommodation and residents' amenity accommodation;
  - level 01 residents' roof terrace with greening;
  - level 02 residents' paved roof terrace (double height);
  - residential flats from Level 04 to Level 66;
  - residents' amenity accommodation, including pool, gym and lounges at Levels 67 to 69; and
  - public restaurant at Level 70.
- 2.7 The roof level will accommodate a limited area of roof-top plant and the lift motor room, which will be accessible from the firefighting stair.
- 2.8 Pedestrian access to the basement levels will be provided via a dedicated lift entered from within the Ground floor entrance space and vehicle access to the basement levels will be provided by means of a secure vehicle and cyclist entry point from the site access road off Melbourne Street and Great Jackson Street.

- 2.9 The building will be arranged around two adjacent, but separated, stair and lift cores at the centre of the building footprint, which will house four evacuation lifts and one firefighting lift. In addition, two dedicated restaurant access lifts will be provided, which will be entered from the Ground floor restaurant reception space and will serve the restaurant (i.e. Level 70) only.
- 2.10 The main structural frame, cores, and floors of the building will be of reinforced concrete construction and the external walls will be a unitised curtain walling system (glazed and metal).
- 2.11 Fire service vehicle access and parking will be provided via the surrounding public highways (Great Jackson Street and Melbourne Street) and site roads, with access into the building possible via the main building entrance and the access door into the firefighting shaft.

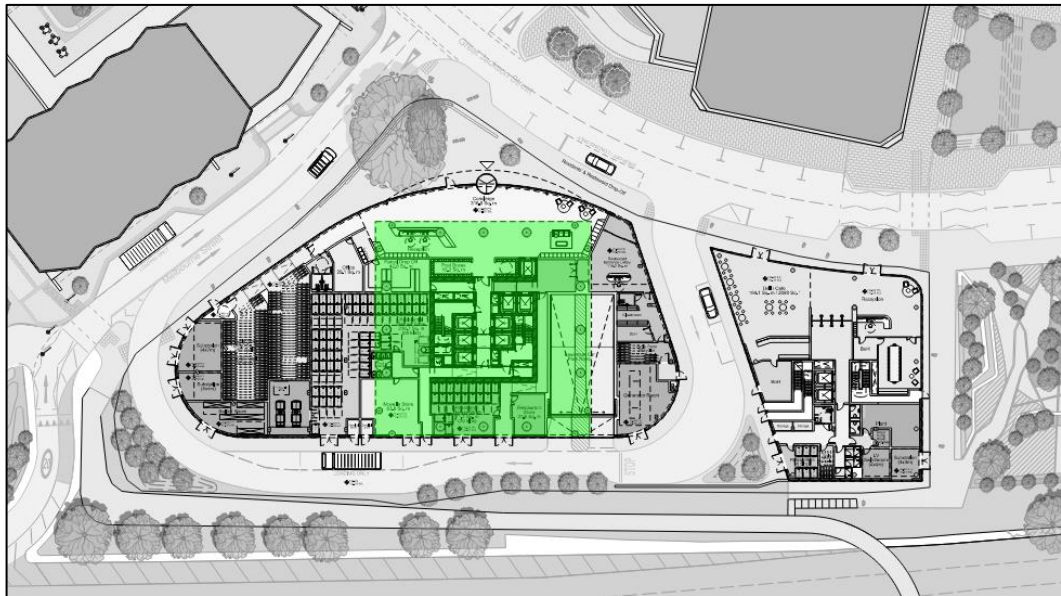


Figure 2.1 – Ground floor plan of building with tower footprint above highlighted green

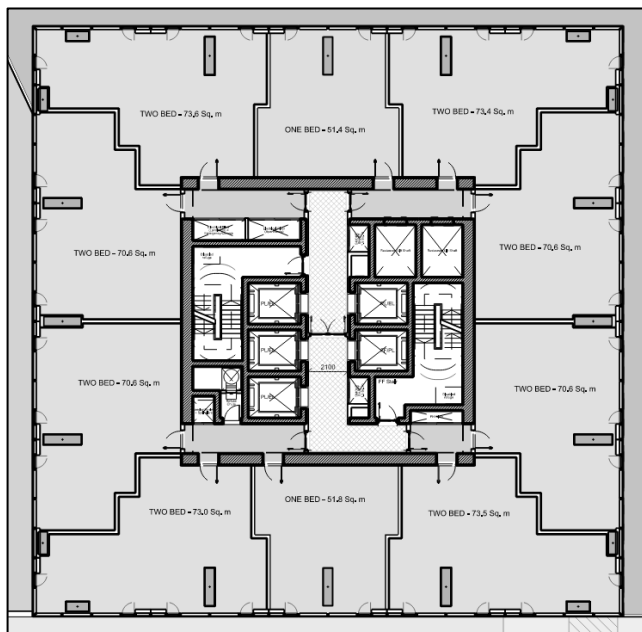


Figure 2.2 – Plan of a typical residential floor (internal arrangements not shown)

## Use and classification

- 2.12** The main use of the building will be residential, which will be designed in accordance with the guidance of BS 9991 and will operate under a 'stay put' evacuation strategy.
- 2.13** Non-residential accommodation (i.e. residents' amenity accommodation, ancillary accommodation, and the top floor restaurant) will be designed in accordance with the guidance of BS 9999 and will operate under a staged simultaneous evacuation strategy.
- 2.14** For the non-residential accommodation, the occupancy type and fire growth rate combine to create a risk profile in accordance with BS 9999. The egress widths and travel distance limits have been designed according to the relevant risk profile, as shown in Table 2.1 below.
- 2.15** The fire growth rate indicated is on the basis of sprinklers (i.e. reduced by one level), unless otherwise stated.

**Table 2.1 – Risk profiles**

| Building Accommodation      | Occupancy Characteristic | Fire Growth Rate* | Sprinklers | Risk profile | BS 9999 Supplementary Guidance     |
|-----------------------------|--------------------------|-------------------|------------|--------------|------------------------------------|
| Basement Car Park           | Awake and familiar       | Slow              | Yes        | A1***        | Egress widths and travel distances |
| Residents' amenities        | Awake and familiar       | Slow              | Yes        | A1           | Egress widths and travel distances |
| Restaurant                  | Awake and unfamiliar     | Medium            | Yes        | B2           | Egress widths and travel distances |
| Plant rooms (higher risk)** | Awake and familiar       | Medium            | Yes        | A2           | Egress widths and travel distances |
| Plant rooms (High voltage)  | Awake and familiar       | High              | No*        | A3           | Egress widths and travel distances |
| Plant rooms (lower risk)    | Awake and familiar       | Slow              | Yes        | A1           | Egress widths and travel distances |

*Note \* : high voltage plant rooms (i.e. generator room, switch gear and substations) will not be sprinklered meaning these areas are an A3 risk profile.*

*Note \*\* : Special fire hazard as defined in BS 9999 Table 29 as a place in which the contents present a higher fire risk, such as oil-filled transformer and switch gear rooms, boiler rooms, storage spaces for fuel or other highly flammable substances and rooms housing a fixed internal combustion engine.*

*Note \*\*\* : Use of the car park from time to time by visitors would not, in our opinion alter the risk profile to B.*

## Occupancy

- 2.16 For the purposes of means of escape design, evacuation of the flats is considered on a flat-by-flat basis due to the 'stay put' evacuation strategy (i.e. limited to occupants of one flat).
- 2.17 However, the maximum number of occupants within each non-residential area of the building has been assessed on the basis of the floor space factors in Table 2.2 below, which utilises the floor space factors recommended in Table D1 of ADB.

**Table 2.2 - Calculated occupancy of non-residential areas**

| Area                      | Floor Area (m <sup>2</sup> ) | Floor Space factor (m <sup>2</sup> /person) | Occupancy (persons) |
|---------------------------|------------------------------|---------------------------------------------|---------------------|
| <b>Basement floor</b>     |                              |                                             |                     |
| B1                        | N/A                          | N/A                                         | 77*                 |
| B2                        | N/A                          | N/A                                         | 67*                 |
| B3                        | N/A                          | N/A                                         | 70*                 |
| <b>Total Basement</b>     |                              |                                             | <b>214</b>          |
| <b>Ground floor</b>       |                              |                                             |                     |
| Office                    | 29                           | 6                                           | 5                   |
| Reception/ Concierge      | 316                          | N/A                                         | 2**                 |
| Restaurant lobby          | 114                          | N/A                                         | 5***                |
| <b>Total Ground floor</b> |                              |                                             | <b>12</b>           |
| <b>Level 1</b>            |                              |                                             |                     |
| Co-working space          | 128                          | 6                                           | 22                  |
| Outside terrace           | 675                          | N/A                                         | 60****              |
| Flexible use space        | 191                          | 2                                           | 92                  |
| Staff room                | 36                           | 1                                           | 15**                |
| Storage rooms             | 171                          | 30                                          | 6                   |
| <b>Total Level 1</b>      |                              |                                             | <b>173</b>          |
| <b>Level 2</b>            |                              |                                             |                     |
| Outside terrace           | 678                          | N/A                                         | 60****              |
| <b>Total Level 2</b>      |                              |                                             | <b>60</b>           |

| Area                         | Floor Area (m <sup>2</sup> ) | Floor Space factor (m <sup>2</sup> /person) | Occupancy (persons) |
|------------------------------|------------------------------|---------------------------------------------|---------------------|
| <b>Level 67</b>              |                              |                                             |                     |
| Gym                          | 178                          | 7                                           | 25                  |
| Lounge                       | 79                           | 2                                           | 40                  |
| Private Dining 1             | 31                           | N/A                                         | 10**                |
| Private Dining 2             | 31                           | N/A                                         | 10**                |
| <b>Total Level 67</b>        |                              |                                             | <b>87</b>           |
| <b>Level 68</b>              |                              |                                             |                     |
| Pool                         | 307                          | 7                                           | 44                  |
| Reception                    | 80                           | N/A                                         | 6**                 |
| Studio                       | 94                           | 7                                           | 14                  |
| <b>Total Level 68</b>        |                              |                                             | <b>64</b>           |
| <b>Level 69</b>              |                              |                                             |                     |
| Gym                          | 295                          | 7                                           | 43                  |
| <b>Total Level 69</b>        |                              |                                             | <b>43</b>           |
| <b>Level 70 (Restaurant)</b> |                              |                                             |                     |
| Restaurant/ Kitchens         | 768                          | N/A                                         | 220****             |
| <b>Total Level 70</b>        |                              |                                             | <b>220</b>          |

\* Occupancy based on 1 person per parking space. Assumption is considered reasonable given this is a residential car park so it is unlikely all parking spaces will be occupied simultaneously by ambulant persons

\*\* Occupancy assumed as number of chairs

\*\*\* Occupancy assumed as number of chairs at reception plus 4 guests waiting

\*\*\*\* Occupancy based on 150 covers plus 70 staff and waiting covers

## 3 Statutory requirements

### Building Regulations

#### Part B – Fire safety

- 3.1 The building will be subject to the provisions of the Building Regulations 2010<sup>11.1</sup>, which are the primary basis for statutory control of building design in England and Wales.
- 3.2 For fire safety, the functional requirements of the Building Regulations are set out under the following headings:
-  Requirement B1 - Means of warning and escape
  -  Requirement B2 - Internal fire spread (linings)
  -  Requirement B3 - Internal fire spread (structure)
  -  Requirement B4 - External fire spread
  -  Requirement B5 - Access and facilities for the fire service.
- 3.3 For ease of reference this report addresses each of these requirements in order.

#### Standard guidance

- 3.4 Guidance on compliance with the requirements of Part B of the Building Regulations for residential accommodation is provided in Volume 1 of Approved Document B<sup>11.4</sup> (ADB Vol.1) and guidance for non-domestic premises is presented in Volume 2 of Approved Document B<sup>11.3</sup> (ADB Vol.2). It is not required to follow these documents and in the case of this building, BS 9991<sup>11.6</sup> has been used in residential areas and BS 9999<sup>11.5</sup> in non-residential areas.
- 3.5 There is no obligation to adopt the recommendations given in ADB, or other guidance documents, if the functional requirements of the Regulations are met in some other way. However, any alternative approach to compliance with the guidance should nonetheless clearly demonstrate that the requirements of the regulations have been fulfilled by some other acceptable means or method. (NB - this approach does not apply to the requirements of Regulation 7 concerning external fire spread in 'relevant buildings', which should be applied in full).

#### Regulation 7 – 'Relevant buildings'

- 3.6 The building will contain one or more dwellings more than 18m above ground level so is classified as a relevant building.

### Regulatory Reform (Fire Safety) Order

- 3.7 Responsibility for compliance with the Regulatory Reform (Fire Safety) Order 2005 (FSO)<sup>11.2</sup> will rest with the "Responsible Person". In a workplace, the Responsible Person will usually be the employer together with persons who may have control of other parts of the premises. In other cases, the person(s) who has control of the premises will be the Responsible Person.

- 3.8 The FSO places specific duties on the Responsible Person such as carrying out a risk assessment and providing first-aid firefighting equipment. The main requirements of the FSO are outlined in Section 9 of this report and more detailed guidance is available in a series of Fire Safety Risk Assessment Guides published by H M Government<sup>11.9</sup>.
- 3.9 Where building work and fire protection measures comply with the current Building Regulations in respect of fire safety and a suitable and sufficient fire risk assessment has been undertaken, additional physical measures should not normally be required under the FSO unless high-hazard materials or processes are introduced into the building.

### Licensing Act 2003

- 3.10 As it is assumed that the Level 70 restaurant will be used for the consumption or sale by retail of alcohol it will be subject to the provisions of the Licensing Act 2003. It will, therefore, be necessary for the occupier to make an application to the local authority for a licence, which may require additional fire safety measures.

## 4 Means of warning and escape

### Evacuation strategy overview

#### Residential flats

- 4.1 The individual flats will operate under the principle of a 'stay put' strategy as is conventional for a residential building. In the event of activation of fire detection within a flat, the alarm will be raised within the affected flat only.
- 4.2 Activation of detection within the communal areas (corridors and lobbies) at the residential levels will only activate the smoke ventilation provisions and will not instigate an evacuation from any flats.
- 4.3 Activation of fire detection elsewhere within the building will not raise the alarm within any flat.
- 4.4 This 'stay put' strategy is based on the extensive compartmentation and provision of sprinklers throughout the building, which acts to reduce the number of occupants who would need to be immediately evacuated in the event of a fire.
- 4.5 Evacuation of additional floors may be initiated by the Fire Service utilising the evacuation alert system.

#### Amenity and ancillary accommodation

- 4.6 It is proposed that the residents' amenity accommodation and the ancillary accommodation within the building will operate a staged simultaneous evacuation, as outlined below.

#### Basement car park

- 4.7 The three-storey basement will be separated from the floors above by means of a compartment floor at ground level and will be served by the main stair core and a dedicated secondary escape stair.
- 4.8 Activation of the fire detection system in any area of the basement will initiate a simultaneous evacuation of all three basement floors.
- 4.9 This will then be followed by the simultaneous evacuation of Ground floor, Level 1 and Level 2 after a pre-set period of time (e.g. 3 minutes) to ensure occupants on the floor of fire origin are prioritised during evacuation (i.e. 'staged simultaneous' evacuation) . Evacuation of other floors may be initiated by the Fire Service utilising the evacuation alert system as necessary and appropriate.

#### Ground floor, Level 1, and Level 2

- 4.10 Residential amenities and ancillary accommodation present on Ground floor, Level 1 and Level 2 include the main entrance, residents' lounges, co-working spaces and external terraces. Activation of the fire detection system in any area of accommodation at these floors will initiate simultaneous evacuation of these three floors.

- 4.11 This will then be followed by the simultaneous evacuation of the three basement floors after a pre-set period of time (e.g. 3 minutes) to ensure occupants on the floor of fire origin are prioritised during evacuation (i.e. 'staged simultaneous' evacuation). Evacuation of other floors may be initiated by the Fire Service utilising the evacuation alert system as necessary and appropriate.

#### Levels 67 to 70

- 4.12 Residential amenities and ancillary accommodation present on Levels 67 to 69 include residents' lounges, a gym, meeting rooms and a swimming pool. Level 70 is a restaurant open to members of the general public. Activation of the fire detection system in any area of the accommodation at these floors will initiate simultaneous evacuation of these four floors following an investigation period. Activation of the system in the common corridors or lobbies will initiate simultaneous evacuation of these floors without an investigation period.
- 4.13 Evacuation of other floors may be initiated by the Fire Service utilising the evacuation alert system.
- 4.14 Detection of fire within any other area of the building will not automatically instigate the evacuation of the accommodation at Levels 67 to 70.

#### Roof-top plant

- 4.15 It is proposed that the roof-top plant (i.e. Level 71) will be evacuated in the event of detection in plant spaces or communal spaces at non-residential levels (levels ground, 1, 2 and 67 to 70)

#### Shared escape stairs

- 4.16 The development includes shared means of escape serving the commercial unit (restaurant) and flats, which is a deviation from the design guidance of BS 9991.
- 4.17 Our interpretation of this guidance is that it is intended to prevent a fire in a non-residential area impacting on the means of escape stairs serving a residential area, such as in a multi-level mixed-use development with non-residential uses below the residential use.
- 4.18 However, in the case of Plot D, the commercial unit (restaurant) will be located at the top of the building. It is our view that there is very limited potential for a fire in this area to impact on the means of escape provisions from the flats below and that, with the proposed fire safety measures (e.g. fire separation and smoke control) described below, that this arrangement suitably mitigates the risk that the guidance quoted seeks to address and is considered to meet the functional fire safety requirements of the Building Regulations.
- 4.19 The restaurant level will be located on the top storey of the development with 3 amenity floors separating it from the residents' flats. At every level in the building, the stairs and lifts are approached via ventilated protected lobbies and an automatic opening vent is provided at the head of each stair.
- 4.20 Additional ventilated lobbies will be provided at the entrance to the firefighting and alternative stair at restaurant level as shown in Figure 4.1. The lobbies will minimise the risk of smoke ingress from a fire in restaurant to the firefighting/stair access lobby, which will also be ventilated, which will protect the stairs serving residential levels below. The vent in both lobbies will open direct to roof level with 1.5m<sup>2</sup> free area.
- 4.21 In the above context, it is considered highly unlikely that smoke spread from a fire on the uppermost level would reach the residential levels below so as to impact on the means of escape arrangements.

- 4.22 On the basis of the above provisions, we consider that the fire safety design minimises the potential for a fire in the restaurant area to impact on the means of escape arrangements from the residential areas and that this arrangement suitably mitigates the risk that the guidance in BS 9991 seeks to address.

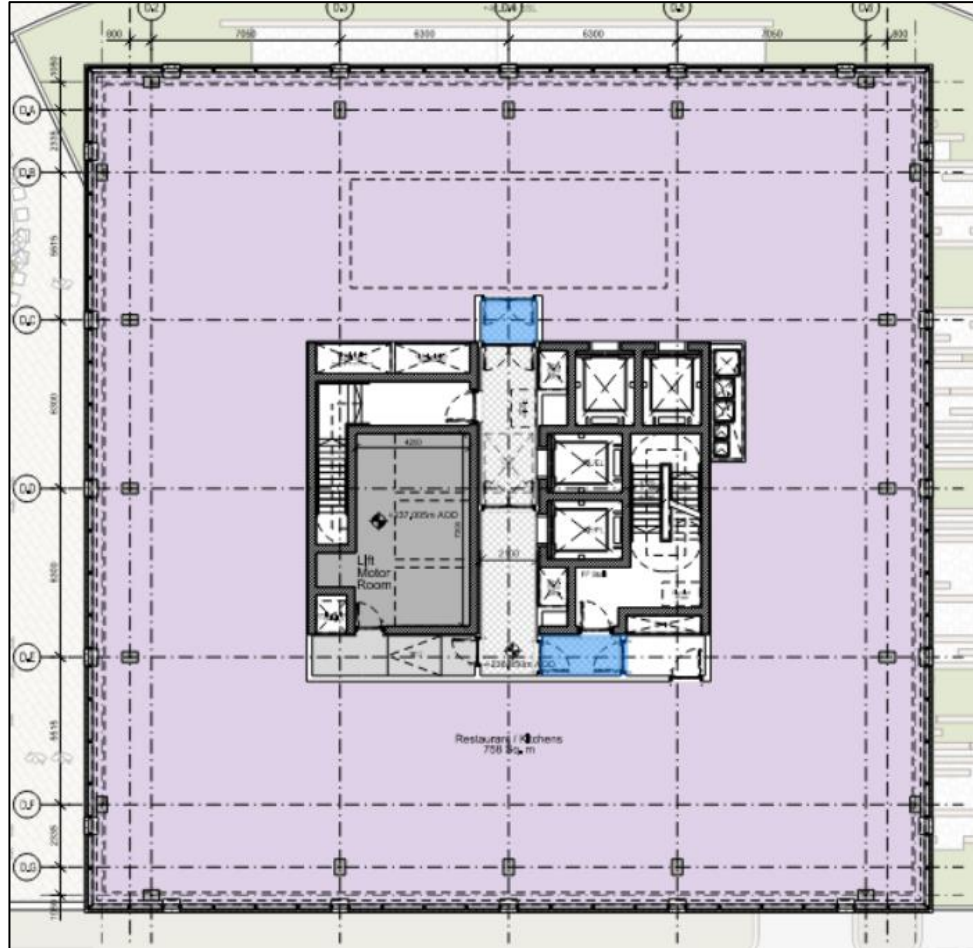


Figure 4.1 - Level 70 Restaurant additional ventilated lobbies highlighted blue

## Fire detection and alarm systems

### Residential flats

- 4.23 All flats within the building will be single-storey and will be provided with an internal protected entrance hall.
- 4.24 Each flat will be provided with an independent fire detection and alarm system, with no interconnection between flats, due to the risk of the flat detectors or sounders being disabled following persistent false alarm activations. In the event of activation, the system will produce an alarm signal within the flat of fire origin only.

- 4.25 All flats at Levels 4 to 65 will be provided with a Grade D1 Category LD2 automatic fire detection and alarm system in accordance with BS 5839-6<sup>11.11</sup>. This system will comprise of inter-linked mains-powered smoke alarms and/or heat alarms with an integral standby power supply, located within the flat entrance hall and within rooms that present a high fire risk (i.e. kitchen and the living room).
- 4.26 At Level 66, two of the larger penthouse flat types will be provided with secondary escape. To mitigate the possibility of occupants blocking secondary exit with furniture it is proposed that each of these flats will be provided with Grade D1 Category LD1 automatic fire detection and alarm system in accordance with BS 5839-6<sup>11.11</sup>. This system will comprise of inter-linked mains-powered smoke alarms and/or heat alarms with an integral standby power supply located throughout the flat, incorporating detectors in all circulation areas that form part of the escape routes and in all rooms and areas, other than those with negligible sources of ignition (e.g. bathrooms).
- 4.27 The remaining flats at Level 66 will be provided with a Grade D1 Category LD2 automatic fire detection and alarm system in accordance with BS 5839-6<sup>11.11</sup>, as per the flats at Levels 4 to 65.

### Common corridors and lobbies

- 4.28 Automatic smoke detection, complying with the recommendations of BS 5839-1<sup>11.10</sup> to a Category L5 standard, will be provided within the common corridors accessing the flats and the common lobbies accessing the stairs/lifts in order to initiate the operation of the smoke ventilation provisions (see paragraphs 4.41 to 4.44), but will not raise a common alarm (i.e. no manual call points or sounders connected).
- 4.29 The communal detection system will also be extended into the access lobbies of the refuse chute accessed from the common corridors, in order to alert management to a potential incident and activate the relevant smoke control provision in the common corridors.

### Non-residential areas

#### Amenity, ancillary and restaurant

- 4.30 Comprehensive automatic fire detection will be provided throughout the residential amenity and ancillary accommodation at Ground floor, Level 1, Level 2, and Levels 67 to 70, which will be designed in accordance BS 5839-1<sup>11.10</sup> to a Category L1 standard, including manual call points.
- 4.31 Whilst the cause and effect for the fire alarm systems will be subject to development at detailed design stage, it is proposed that the fire detection and alarm systems serving Levels 67 to 70 will be programmed to incorporate an investigation period, in order to limit the impact of false alarms. In the event of detection in protected escape routes, detection should initiate evacuation without an investigation period.
- 4.32 The fire detection within this accommodation will be linked to external sounders and beacons on the associated external roof terraces at Levels 1 and 2 in order to provide warning of fire to occupants of the terraces.
- 4.33 Similarly, external sounders and beacons will be provided within the Level 71 roof-top plant accommodation, which will be linked to detection within the communal circulation areas at every non-residential floor level (levels 1,2,67 to 71).

### Basement car park

- 4.34 Whilst the minimum requirement for compliance with guidance in the basement car parking levels is a manually operated fire alarm system (i.e. manual call points and sounders), on the basis of the proposed automatic smoke ventilation provisions to the car parking at these floors automatic fire detection will be provided throughout the basement levels, which will be used to activate fire alarm sounders throughout each of the three basement levels and initiate the smoke ventilation system in firefighting lobby and smoke extraction system in carpark areas.
- 4.35 The basement detection and alarm system will be designed in accordance with BS 5839-1<sup>11.10</sup>, to a Category L1 standard, including manual call points.

## Residential horizontal means of escape

### Internal planning of flats

- 4.36 The development will provide a mix of 1, 2 and 3 bedroom flats. The internal layout of these flats are subject to further development. However, all flats within the building will be single-storey and will be provided with an internal protected entrance hall.

### Standard protected entrance hall flats

- 4.37 The majority of flats within the building will be designed to comply with the guidance provided within BS 9991, as follows:
- Each flat will be accessed from the common corridor via an FD30S self-closing fire door.
  - Each flat will be provided with a 30 minute internal protected entrance hall, from which all habitable rooms are accessed.
  - All doors forming the protected entrance hall enclosure will be to a minimum of an FD30 standard, although none of the fire doors require self-closing devices
  - Travel distances within the protected entrance hall, measured from the flat entrance door to the door accessing the furthest habitable room will not exceed 9m.
  - Each flat will be provided with a minimum of Grade D1 Category LD2 fire detection and alarm system.
- 4.38 For flat ventilation systems that circulate air within the individual flat only, BS 9991 recommends that ventilation ductwork passing through the protected entrance hall should be appropriately fire stopped and any ductwork should be fire-resisting (e.g. rigid steel ductwork). However, an alternative solution of plastic ductwork with intumescent 'crush collars' where ducts penetrate the enclosing 30-minute walls is currently proposed, based on previous agreements with Building Control. On the basis that the ceiling will be constructed with imperforate construction with no penetrations, this should minimise smoke spread to the protected entrance hall in the period before the intumescent collars activate. The above is subject to further review of the proposed construction details and agreement with building control.
- 4.39 On the basis of the above and considering the provision of the Grade D1 Category LD2 automatic fire detection and alarm system and sprinklers, the internal planning of each such flat is considered to be consistent with the functional requirements of the Building Regulations.

### Larger flats with secondary escape

- 4.40 At Level 66, two of the larger penthouse flats will be provided with a protected entrance hall that accesses the main living/dining/kitchen space only. However, the three bedrooms will be accessed from a corridor that is separated from the main living/dining/kitchen space and a secondary escape is proposed from one of the bedrooms, such that occupants of the bedrooms are not required to pass through the main living/dining/kitchen space to escape.
- 4.41 Whilst not a conventional flat layout, the arrangement is considered to be reasonable, on the basis of the provision of a Grade D1 Category LD1 automatic fire detection and alarm system and sprinklers.
- 4.42 For flat ventilation systems that circulate air within the individual flat only, BS 9991 recommends that ventilation ductwork passing through the protected entrance hall should be appropriately fire stopped and any ductwork should be fire-resisting (e.g. rigid steel ductwork). However, an alternative solution of plastic ductwork with intumescent 'crush collars' where ducts penetrate the enclosing 30-minute walls is currently proposed, based on previous agreements with Building Control. On the basis that the ceiling will be constructed with imperforate construction with no penetrations, this should minimise smoke spread to the protected entrance hall in the period before the intumescent collars activate. The above is subject to further review of the proposed construction details and agreement with building control.

### Common corridors

- 4.43 All flats at each floor level are accessed from a section of protected common corridor (i.e. enclosed in 60-minute fire-resisting construction with FD30S fire doors) that provides access to the two protected escape stairs within the central core.
- 4.44 BS 9991 recommends that the maximum travel distance from a flat entrance door to an escape stair (or stair lobby) should be limited to 7.5m in a single direction and 30m where escape is possible in more than one direction.
- 4.45 Travel distances from each flat entrance door to a stair lobby will meet these limits.

### Common corridor smoke ventilation

- 4.46 In accordance with the guidance of BS 9991, no smoke ventilation measures will be provided within the sections of common corridor accessing the stair lobby where travel distances do not exceed 7.5m. Smoke ventilation will be provided to each stair/lift lobby, as described in 4.54.

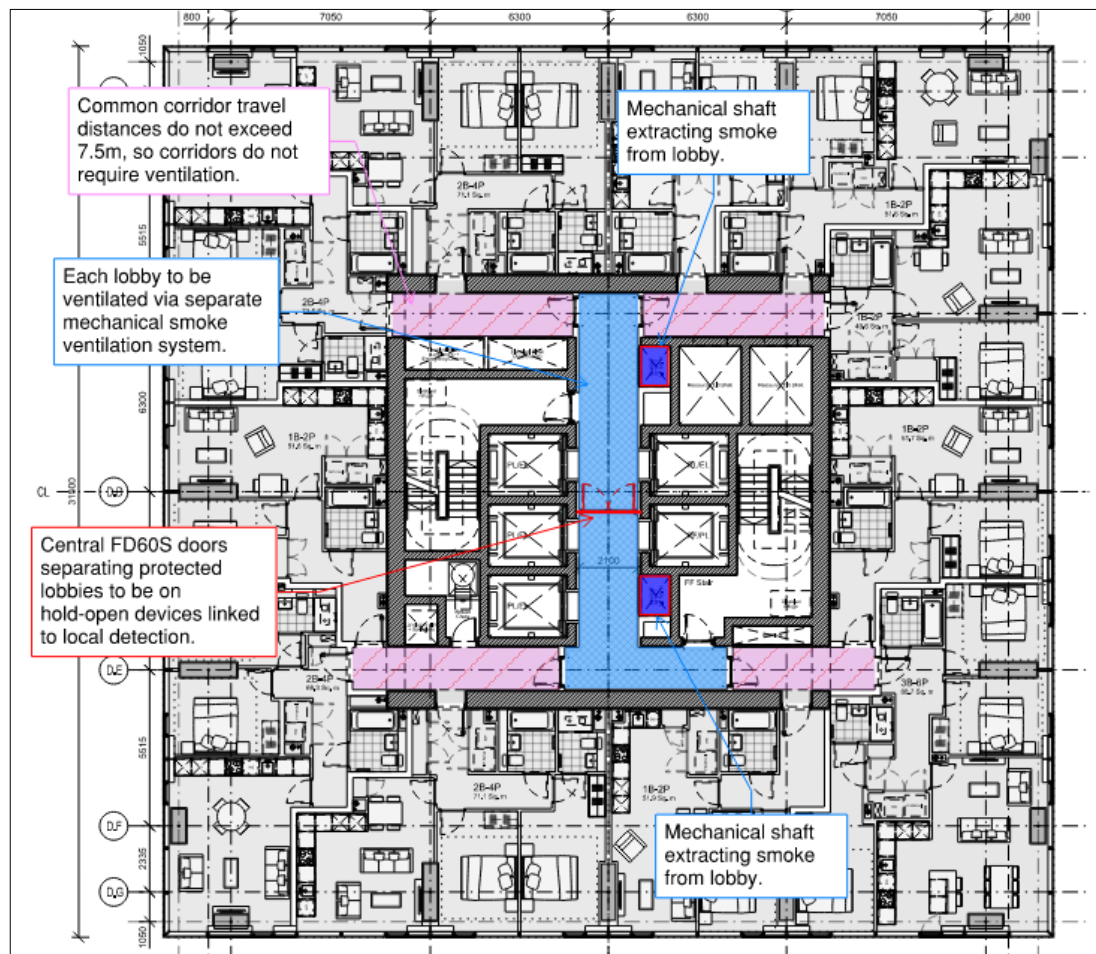
### Refuse chute

- 4.47 At each floor level, residents will be provided with access to a refuse chute that will be accessed from a section of common corridor via a protected lobby (minimum 60 minutes).
- 4.48 The refuse chute itself will be of fire-resisting construction (minimum 60 minutes) and will be enclosed within a protected shaft (minimum 120 minutes), with a fire-resisting access door/hatch at each floor level (minimum 60 minutes) and a horizontal fire shutter (minimum 120 minutes) at the base.
- 4.49 The refuse chute will be ventilated at its head and, as it is not possible to achieve 0.2m<sup>2</sup> of permanent natural ventilation to the protected lobbies accessing the chute, as required by BS 5906, the protected lobbies will be provided with a fire-resisting ducted mechanical smoke extract system.

- 4.50 The mechanical extract system will be used to provide general background ventilation to the protected lobbies and, therefore, will be provided with smoke detector actuated fire and smoke dampers at each level. The dampers will be configured to close on all but the fire floor upon activation of a smoke detector within the lobby at that level to provide continuing smoke extraction to that lobby.
- 4.51 The door accessing each protected lobby from the common corridor is proposed to be a modified FD60S fire door, by virtue of an increased threshold gap (10mm maximum) in order to provide make-up air to the mechanical refuse extract system. The door will continue to be smoke sealed around its sides. The increased threshold is at low level and refuse store is kept at negative pressure by mechanical ventilation therefore the risk of smoke spread from this lobby to the corridor is minimal
- 4.52 By virtue of the limited size of the refuse chute lobbies and the management of the building, it is considered unlikely that refuse would be allowed to build up within the lobbies. Notwithstanding, it is proposed to extend both the communal automatic fire detection and the sprinkler system into the refuse chute lobbies at each floor level, in order to detect and control a fire that may occur.
- 4.53 On this basis, the arrangement is considered to meet the functional requirements of the Building Regulations.

#### **Core arrangement**

- 4.54 Whilst the provision of two stairs is not a requirement of current design guidance, in order to provide resilience within the escape provisions and to enable separation between fire service personnel and evacuating occupants, the building will be provided with a two-stair central core arrangement as shown in Figure 4.1 below.



**Figure 4.2: Core arrangement and common corridors (mechanical smoke indicated)**

- 4.55** The design incorporates two protected escape stairs that are accessed from dedicated stair/lift lobbies. The stair/lift lobbies will be separated by means of self-closing FD60S fire doors that will be held-open under normal circumstances but will release to close in the event of smoke being detected in any section of common corridor or lobby on that floor.

#### Core smoke ventilation

- 4.56** Each of the stair/lift lobbies in the central core will be provided with smoke ventilation by means of a proprietary mechanical single-shaft smoke extract system (designed, validated and installed by a specialist sub-contractor) in accordance with the relevant parts of BS EN 12101 and each stair is provided with a AOV at the head of the stair enclosure. AOV of fire fighting stair to provide 0.7m<sup>2</sup> aerodynamic free area and AOV to protected stair to be 1.0m<sup>2</sup>.
- 4.57** The mechanical smoke extract shaft serving a lobby will be activated by smoke detection within the lobby and/or the associated common corridors accessing the lobby (i.e. the system in each half of the floor activates independently but can work simultaneously).
- 4.58** Detailed design will be carried out by specialist sub-contractors. Each extract shaft system will incorporate pressure sensors and a fan inverter, so that extract rates can be ramped up and down to prevent excessive pressure differentials. Fan speeds are expected to comply with relevant parts of BS EN 12101-3.

- 4.59 The mechanical shaft systems serving the stair/lift lobbies at the above ground floors will continue down to serve the lobbies at the three basement floors. The basement car parking will also be provided with a mechanical smoke extract system (providing 10 air changes per hour) in accordance with BS 7346-7 and sprinklers.

### Services in common corridor and lobby ceilings

- 4.60 Section 50.3.1 of BS 9991 recommends that only services associated with the firefighting shaft, such as ventilation systems and lighting for the shaft, should pass through or be contained within the firefighting stair, however, it does not preclude services in the common corridors in residential buildings which act as the firefighting lobbies. There may be other restrictions on cabling in stairways (e.g. to comply with guidance in BS 7671).
- 4.61 Whilst Section 21.1 of BS 9991 recommends that, wherever practicable, services should not be run within common corridors (including the corridor access for fire-fighting shafts), in almost all conventional residential buildings this is considered to be unavoidable.
- 4.62 Therefore, it is Tenos' opinion that it is not unreasonable for lower risk services (e.g. power and data cabling, fire alarm cabling, sprinkler pipes, water pipes, and smoke ventilation system control cabling) to run above a corridor or lobby ceiling that is not fire-resisting, where the following conditions are met:
- Suspended ceiling fixings/supports/hangers are of non-combustible construction;
  - The surfaces of the materials/products used in the construction of the ceiling void achieve National Class 0 or European Class B-s3, d2;
  - Any combustible (e.g. plastic) pipework is limited to those containing water for the domestic water and sprinkler systems;
  - The reaction to fire (surface spread of flame) of any pipe insulation in the ceiling void is National Class 0 or European Class B-s3, d2;
  - All wiring is installed in metal conduit or supported on metal cable trays (not clipped to inverted cable trays);
  - Any other materials in the ceiling void are of 'limited combustibility' or European Class A2.
  - No services equipment is located in the ceilings (e.g. AHU's, distribution boards, etc).
- 4.63 This approach has been discussed and provisionally agreed with the Statutory Authorities (see Annex A5).

## Non-residential horizontal means of escape

### Travel distances

- 4.64 Travel distances to an exit within the non-residential areas will comply with the recommendations of BS 9999. Automatic fire detection and alarm is not a requirement of the minimum package of fire safety measures for the risk profiles in Table 4.1. Therefore, considering the provision of comprehensive L1 automatic detection and alarm a 15% increase has been applied in line with BS 9999 guidance.
- 4.65 The maximum travel distances recommended by BS 9999 for escape in a single direction and where escape is available in more than one direction (i.e. separated by at least 45°) are summarised in Table 4.1 below.
- 4.66 When the internal layout of a room/space is unknown, a direct distance should be measured as  $2/3^{\text{rd}}$  of the travel distance limit.

Table 4.1 - Maximum recommended travel distances

| Risk Profile | Area                                                  | Single direction | More than one direction |
|--------------|-------------------------------------------------------|------------------|-------------------------|
| A1           | Amenity accommodation                                 | 29.9m            | 74.75m                  |
| A1           | Basement carpark*                                     | 29.9m            | 74.75m                  |
| A2           | Lower risk plant                                      | 22.0m            | 55.0m                   |
| A3           | Higher risk plant and places of special fire hazard** | 9.0m             | 18.0m                   |
| B2           | Restaurant                                            | 23.0m            | 57.5m                   |
| N/A          | External terrace***                                   | 60.0m            | 100.0m                  |

Note \* : When determining the travel distance limits for the basement car parking in accordance with BS 9999, it has been considered that the provision of comprehensive L1 automatic detection (via CO or heat detection) will provide significant benefit over the minimum required standard of a manual system, which relies upon the fire alarm being manually activated if/when identified by an occupant (particularly when considering the anticipated limited/infrequent occupancy of the basement levels) and, therefore, a 15% increase has been applied in line with BS 9999 guidance.

Note \*\* : Special fire hazard as defined in section 3.9 BS 9999 is a place in which the contents present a higher fire risk, such as oil-filled transformer and switch gear rooms, boiler rooms, storage spaces for fuel or other highly flammable substances and rooms housing a fixed internal combustion engine. High voltage plant rooms (i.e. generator room, switch gear and substations) will not be sprinklered meaning these areas are an A3 risk profile giving a single direction travel distance of 9m and a multi direction travel distance of 18m in line with ADB.

Note \*\*\* : The travel distance limit recommendations from Approved Document B for external open air plant have been used for the external terraces, as no specific guidance is given in BS 9999.

#### Level 70 restaurant

4.67 The restaurant internal layout is unknown at this stage and will be subject to a separate Building Regulations submission for the fit-out design. Therefore, direct distance limits, taken as 2/3<sup>rd</sup> of the travel distance limits in Table 4.1 are applicable. On the basis that alternative access to the core will be possible at either end, direct distances meet recommended limits.

4.68 It is noted that the future restaurant fit-out design should ensure that all occupants have access to either end of the core (without passing through a kitchen or area of higher fire hazard), such that alternative escape is provided for all Level 70 occupants.

#### Level 69

4.69 Level 69 will accommodate residents' gym facilities, separated into two different rooms that overlook the double-height swimming pool at Level 68.

- 4.70 Occupants at this level are provided with access to a single exit into the main core and an open accommodation stair down to Level 68. When considering the core exit only, the travel distances will be within the recommended single direction limit in Table 4.1.

#### Level 68

- 4.71 Level 68 will accommodate residents' swimming pool, a fitness studio, changing areas, and a gym reception/lounge area. Occupants at this level are provided with access to the main core via two exits; one from the pool area and one from the gym reception/lounge area.
- 4.72 The travel distances will meet recommended limits in Table 4.1.

#### Level 67

- 4.73 Level 67 will accommodate a residents' lounge, private dining/meeting rooms, gym accommodation as well as the pool plant room. The gym, lounge/dining/meeting rooms access corridor and the pool plant room are each provided with a single exit into the main core.
- 4.74 The travel distances from each area will be within the recommended single direction limit limits in Table 4.1.

#### Level 2

- 4.75 Level 2 will comprise an external terrace and a series of storage rooms.
- 4.76 Terrace access and egress will be provided via a single door from the main core. The travel distances across the external terrace will meet the recommended limits stated in Table 4.1.
- 4.77 The Level 2 storage rooms will be accessed from the main core via lobbies/corridors. On the basis of the limited size of the storage rooms, travel distances will meet recommended single and multiple direction limits in Table 4.1.

#### Level 1

- 4.78 Level 1 will accommodate a residents' co-working space, an external terrace, staff lounge and changing areas, storage and flexible use space. There will be one direction of escape available from the terrace which passes through the co-working space. Extended escape distance at approximately 36m but on the basis that fire alarm will be provided to the area e.g. flashing beacons and sounders and that the escape route is in the open air the arrangements are considered reasonable, subject to agreement with building control.
- 4.79 Whilst the large storage room and residents' co-working space will be provided with two exits, the staff areas and smaller storage rooms will be provided with access to a single exit.
- 4.80 The travel distances at this floor level will meet the recommended single and multiple direction limits in Table 4.1.

#### Ground floor

- 4.81 Ground floor accommodates the main residential reception/concierge space, back of house staff offices and stores, plant rooms, refuse stores and the dedicated restaurant entrance.
- 4.82 The residential reception/concierge space, all plant rooms, the move in store, cycle store and refuse stores will be provided with a single exit direct to outside. Additionally, the residential reception/concierge space, the main residential refuse store, the restaurant refuse store, the move in store and cycle store will be provided with an alternative means escape.

- 4.83 In addition to the main entry/exit doors, the restaurant entrance will be provided with escape via a rear service corridor to outside.
- 4.84 On the basis of these escape provisions, the travel distances within the Ground floor accommodation will meet the recommended limits in Table 4.1.

#### Basement levels

- 4.85 The residents' car parking basement will be arranged across three floor levels and, in addition to a total of 214 car parking spaces, there will be cycle storage, storage rooms and plant rooms.
- 4.86 Occupants of the basement levels will be provided with access to the main core (which contains the firefighting stair and dedicated basement lift) and a secondary escape stair that serves the basement floors only.
- 4.87 On the basis that each stair can be accessed from all areas of each floor level, the travel distances at each basement floor level will meet the recommended single and multiple direction limits in Table 4.1.

#### Inner rooms

- 4.88 Non-residential ancillary accommodation forming inner rooms (e.g. first floor storage/BOH room accessed from the staff lounge) will have a low occupancy (less than 60 people), will be provided with automatic fire detection and alarm (to provide early warning of fire in the access room), and all accommodation will be sprinklered (which will act to limit fire growth).
- 4.89 On this basis, the inner rooms within the building will be consistent with ADB guidance and are considered to meet the functional requirements of the Building Regulations.

#### Number of exits

- 4.90 The number of exits serving a room or area should be suitable for the anticipated occupancy, based on the following:
- Up to 60 people – at least one exit
  - Up to 600 people – at least two exits
  - More than 600 people – at least three exits
- 4.91 On the basis of the anticipated occupancies noted in Table 2.2 above, the number of exits indicated from each room or area is considered sufficient. However, the clear width of the exits provided from any room or area should also be sufficient for the anticipated occupancy, as discussed below.

#### Exit widths

- 4.92 The clear width of exits serving a room or area should be suitable for the anticipated occupancy when assuming that the largest escape route may be discounted due to fire. This has been calculated in accordance with BS 9999.
- 4.93 For clear exit widths below 1050mm, the capacity should be calculated as follows:

$$n=500/m$$

*n is the number of persons safely accommodated by the door width;*

*m is the minimum door width / person of the relevant risk profile from Table 12 of BS 9999*

- 4.94 For clear widths 1,050mm and above, the capacity of the door is calculated by dividing the clear width by the minimum width per person of the relevant risk profile from Table 12 of BS 9999.
- 4.95 We recommend that a minimum clear width of 850mm is provided in order to enable unassisted escape by persons in wheelchairs.
- 4.96 Doors will be installed to open in the direction of escape, unless the number of people utilising the door for escape is fewer than 60.
- 4.97 As both stairs in the main core will be lobbied and the building will be sprinkler protected, it is not required to discount a stair within vertical escape capacity calculations, however, one storey exit (i.e. stair access door) is discounted when determining the horizontal exit capacity at each floor level.

#### Restaurant

- 4.98 At Level 70, it is proposed that each door accessing the main core and each stair access door, including the lobby doors, will be provided with a clear width of 1050mm.
- 4.99 When discounting one of the storey exit doors and using a BS 9999 width per person value of 4.1mm (i.e. for risk profile B2), the remaining 1050mm storey exit has an exit capacity of 256 persons. Therefore, as it is intended for the restaurant to accommodate 150 covers, the 1050mm storey exits provide sufficient capacity for the 150 covers, plus up to 106 additional staff and waiting customers.

#### Level 69

- 4.100 On the basis of a single exit door (850mm clear width) into the core at this level, the population of this floor is limited to 60 people, which is not expected to be exceeded given the limited size of the accommodation and its use as a gym.

#### Level 68

- 4.101 At Level 68, it is proposed that each door accessing the main core and each stair access door will be provided with a clear width of at least 850mm. It is noted that the double doors between the pool hall and main core are currently shown to open against the direction of escape, which limits their exit capacity to 60 persons and, therefore, it is recommended that the doors are reconfigured to open into the main core (i.e. in the direction of escape).

#### **Design Team Note: doors opening into the main core to open in direction of escape.**

- 4.102 On this basis, when discounting one of the storey exit doors and using a BS 9999 width per person value of 2.805mm (i.e. for risk profile risk profile of A1, with a 15% decrease to reflect L1 automatic detection), the remaining 850mm storey exit has an exit capacity of 178 persons. Given the size of the accommodation and its use as a pool hall and gym, this occupancy limit is not expected to be exceeded.

#### Level 67

- 4.103 At Level 67, there will be three doors providing access to the main core, however, the double doors to the top of the core will serve the pool plant room only which will have no permanent population. The remaining core access doors and stair access doors will be provided with a clear width of at least 850mm.

- 4.104 On this basis, when discounting one of the storey exit doors and using a BS 9999 width per person value of 2.805mm (i.e. for risk profile risk profile of A1, with a 15% decrease to reflect L1 automatic detection), the remaining 850mm storey exit has an exit capacity of 178 persons. It should be noted that, as there will be a single exit from the lounge/private dining area and a single exit from the gym area, the occupancy of each area should be limited under management control to 60 persons.

#### Level 2

- 4.105 At Level 02, the external terrace access and egress will be provided by a single door into the main core. Therefore, the occupancy of the terrace should be limited under management control to 60 persons. The stores are not considered to be a permanent occupancy but will be provided with access to the main core.

#### Level 1

- 4.106 At Level 1, there will be multiple doors providing access to the main core. However, the limiting factor will be the two stair access doors, which will be provided with a clear width of at least 850mm.
- 4.107 When discounting one of the storey exit doors and using a BS 9999 width per person value of 2.805mm (i.e. for risk profile risk profile of A1, with a 15% decrease to reflect L1 automatic detection), the remaining 850mm storey exit has an exit capacity of 178 persons.
- 4.108 It should be noted that as both terrace access/egress doors are associated with the same room and open against the direction of escape, the occupancy of the terrace should be limited under management control to 60 persons. As there is a single exit from the staff area and a single exit from the storage areas, the occupancy of each area will be limited to 60 persons. Therefore, the total floor occupancy should not exceed 178 persons, which should be enforced by management.

#### Ground floor

- 4.109 Due to the nature of the majority of accommodation at Ground floor (i.e. plant, concierge, refuse stores, and cycle store), the occupancy will be limited. Therefore, as multiple exit doors direct to outside are provided from the Ground floor accommodation, more than sufficient exit capacity will be provided.

#### Basement floors

- 4.110 At each basement floor, occupants will be provided with access to two 850mm wide storey exits that access the two escape stairs (albeit multiple core entry doors will provide access to the single stair within the main core).
- 4.111 When discounting one of the storey exit doors and using a BS 9999 width per person value of 2.805mm (i.e. for risk profile risk profile of A1, with a 15% decrease to reflect L1 automatic detection), the remaining 850mm storey exit has an exit capacity of 178 persons, which exceeds the maximum anticipated occupancy at each basement floor level of 77 persons and is therefore sufficient.

### Vertical means of escape

- 4.112 Every floor of the building will be served by two protected escape stairs, each with a clear width of 1200mm.

## Stair width

### Residential

- 4.113** For the residential flats, given that simultaneous evacuation is not required due to the 'stay put' strategy, the provision of stairs with clear width of 1200mm is more than adequate in terms of evacuation capacity. If a simultaneous evacuation is initiated by the fire and rescue service each stair will provide capacity for 705 persons. The guidance in BS 9999 only details the vertical capacity in stairs up to 10 stories and does not recommend extrapolation. For this reason the guidance in ADB has been referred to and in line with table 3.2 a stair of width 1200 serving 70 story's will have a vertical escape capacity of 3390, which is sufficient for anticipated occupancy of the 2891. This occupancy is based on each bedroom having a population of 2 persons and does not consider basement population as it is residential only.

### Upper Amenity and Restaurant (Levels 67 to 70)

- 4.114** Levels 67 to 70 (and roof level plant) will evacuate simultaneously in the event of fire detection at any of these floors. The highest BS 9999 risk profile of the four floors is the restaurant and kitchen, with a risk profile of B2. In accordance with BS 9999, the minimum width per person over four floors simultaneously evacuating is 2.9mm, such that each 1200mm stair has an escape capacity of 413 persons. Both stairs will be lobby protected and the building will be sprinklered, meaning there is no requirement to discount a stair, and, therefore, the total vertical escape capacity for these four floors is 826 persons. This significantly exceeds the anticipated total occupancy.

### Lower Amenity (Levels 1 and 2)

- 4.115** Levels 1 and 2 will evacuate simultaneously, along with the ground floor in the event of fire detection at any of these floors. Both these floors will be used exclusively by residents and staff and will have a BS 9999 risk profile of A1. In accordance with BS 9999, the minimum width per person over two floors simultaneously evacuating is 3.4mm, such that each 1200mm stair has an escape capacity of 352 persons. Both stairs will be lobby protected and the building will be sprinklered, meaning there is no requirement to discount a stair, and, therefore, the total vertical escape capacity for these two floors will be 704 persons. This significantly exceeds the anticipated total occupancy.

### Basement Car Parking

- 4.116** All three basement floors will evacuate simultaneously in the event of fire detection at any of these floors. The BS 9999 risk profile for the basement is considered to be A1. In accordance with BS 9999, the minimum width per person over three floors simultaneously evacuating is 2.95mm, such that each 1200mm stair will have an escape capacity of 406 persons. As the basement floors are sprinklered, there is no requirements to discount a stair and, therefore, the total vertical escape capacity is 812 persons. This significantly exceeds the anticipated total occupancy.

## Escape stairs

- 4.117** Each of the escape stairs will be provided as a protected shaft enclosed in construction having a fire resistance of at least 120 minutes.
- 4.118** The space within the stair enclosures will not be used for any other accommodation and should be managed such that they remain 'fire sterile'.

- 4.119 In order that the sprinkler coverage may reasonably be omitted from the stair enclosures, the 120 minute stair enclosures should only contain materials conforming to BS EN 13501-1:2018, Class B-s3 or better for construction materials and B(fl) or better for flooring, including sub categories such as d0, d1, d2 for construction materials and s1 and s2 for flooring, surface spread of flame. This is in line with the guidance of BS 9251:2021.
- 4.120 The secondary basement escape stair discharging direct to outside at Ground floor will be located within the footprint of the adjacent office building at Ground floor but will be entirely separated from the office building by means of imperforate 120 minute construction (i.e. no doors or service penetrations).

### Final exits

- 4.121 The Ground floor final exit doors from the stairs will provide a clear width at least equal to the width of the stair that they serve (e.g. 1200mm), which will be of sufficient width to accommodate the number of persons expected to use them.
- 4.122 Final exit doors will be sited to ensure rapid dispersal from the building and will be located away from openings to hazardous rooms (e.g. refuse rooms) and smoke ventilation outlets.

## General means of escape provisions

### Doors protecting escape routes

- 4.123 All fire doors protecting escape routes will be provided with smoke seals (i.e. they will be designated FD30S, FD60S, or as appropriate to the level of fire resistance required for the door).
- 4.124 Where doors are hung to swing in both directions and where they are used to sub-divide lobbies/corridors they will be provided with vision panels.

### Height of escape routes

- 4.125 All escape routes will have a clear headroom of at least 2000mm with no projections below this height, except for doorways.

### Design of ramps and stairs

- 4.126 All ramps on escape routes will meet the provisions of Approved Document M<sup>11.7</sup>(ADM).
- 4.127 it should be noted that there may then be additional requirements for accessibility contained in ADM that fall outside the scope of this report.

### Onward escape routes

- 4.128 The width of all onward escape routes around and away from the building should maintain the aggregate clear width of the final exits leading into them and will not be obstructed or reduced in width by elements such as landscaping, etc.
- 4.129 The onward escape routes from the building should not require occupants to pass within 1800mm of unprotected areas of building façade (i.e. external façade not providing 30 minutes fire resistance).

## Lifts

### Level 70

- 4.130** The Level 70 restaurant will be served by two dedicated lifts that are entered from the Ground floor restaurant entrance and will only serve the restaurant. In addition, within the main core, the firefighting lift will serve all floors of the building, including Level 70, as will one of the evacuation lifts, which may be used as part of the managed evacuation of any disabled restaurant occupants.

### Level 69

- 4.131** The Level 69 gym will be served by the firefighting lift and one evacuation lift within the main core.

### Levels 1 to 68

- 4.132** Levels 1 to 68 of the building will be served by five lifts within the main core; namely, the firefighting lift and four evacuation lifts. These lifts will terminate and discharge at Ground floor where direct exit is available from the core to the rear of the building.

### Basement Car Parking

- 4.133** The basement levels will be served by a single dedicated basement lift that will be accessed from the residential entrance space at Ground floor but will be entered via protected lobby at each basement level. As the basement will be less than 10m below external ground level, there is no requirement for the firefighting lift to continue down to serve the basement levels.

## Lighting of escape routes

- 4.134** All common escape routes will be provided with adequate artificial lighting, and lighting on escape stairs will be on a separate circuit from that supplying any other part of the escape route.
- 4.135** All escape routes, underground or windowless accommodation, internal corridors greater than 30m in length, open-plan areas of more than 60m<sup>2</sup>, toilet accommodation with a floor area greater than 8m<sup>2</sup>, electricity and generator rooms, and switch/battery rooms for emergency lighting are to be provided with emergency lighting.
- 4.136** Emergency escape lighting will be provided in accordance with BS 5266-1<sup>11.14</sup> and will be capable of operating for a duration of 3 hours via standby battery.

## Exit signs

- 4.137** Every escape route (other than those in ordinary use) will be marked by emergency exit signs complying with BS 5499-1<sup>11.15</sup>. Emergency exit signs will be located to meet the requirements of the Health and Safety (Safety Signs and Signals) Regulations<sup>11.18</sup> and the Regulatory Reform (Fire Safety) Order<sup>11.2</sup>.
- 4.138** BS 9991 recommends that each level of the firefighting stair should be numerically signed at the stair landing level of each floor. Furthermore, in line with the May 2020 amendments to Approved Document B Volume 1 for residential buildings more than 11m in height, it is proposed that the building will be provided with floor identification signs located on every landing of each protected escape stair, which are supplemented by flat indicator signs that provide information relating to the flats accessed on each storey (with directional arrows where flats are in more than one direction from the stair), to assist Fire Service wayfinding.

## Mechanical ventilation and air conditioning systems

- 4.139 The mechanical ventilation systems in the non-residential areas will be designed so that they do not assist in transferring fire and smoke through the building in such a manner as to put protected escape routes at risk.
- 4.140 Where ductwork penetrates fire-resisting walls it will be provided with fire dampers or suitable fire-resisting enclosures in accordance with the recommendations of Section 6 of BS 9991 and Section 32.5 of BS 9999.
- 4.141 Motorised fire and smoke dampers will be provided in ductwork that penetrates the protected corridor zones (e.g. above cross corridor doors).
- 4.142 The individual residential flats will be ventilated by a self-contained mechanical ventilation heat recovery system (MVHR) with no ductwork passing through the party walls of the flat.

## Access control measures

- 4.143 Measures designed to restrict access into or within the building for security purposes will not adversely affect the escape provisions. Where a door on an escape route needs to be secured when the building is occupied it will be capable of being readily operated, without a key, from the side approached by persons making their escape in accordance with BS 7273-4.

### Level 70 Restaurant

- 4.144 At Level 70 access to the main core will be restricted, other than for escape purposes, it is proposed that doors from the restaurant into the main core will have magnetic lock devices, which will release on activation of;
- Fire detection at Level 70 (on 'first knock') or
  - operation of a panic exit device in accordance with BS EN 1125 (push bar) or
  - activation of green emergency break-glass local override devices

## Provisions for persons who are unable to evacuate independently

- 4.145 This section of the report describes the building features and fire protection measures that will be provided to enable the safe evacuation of persons who are unable to evacuate independently from the building. In all cases, fire safety management procedures should be developed for the evacuation of such occupants, which includes the preparation of Personal Emergency Evacuation Plans (PEEPs) for employees, residents or regular building users who may need assistance.

## Horizontal non-ambulant evacuation

- 4.146 A compartment wall that has 60 minutes fire resistance will be provided to separate a flat from any other and between any flat and the common corridor. As such, it should only initially be necessary to evacuate the flat of fire origin and so occupants of flats in the vicinity of the flat of fire origin (that are unable to evacuate independently) may remain in their dwelling.
- 4.147 Should flats in proximity to the flat of fire origin require evacuation, the protected common corridors have been constructed such that no person should have to travel more than 7.5m from a flat entrance door along a corridor before reaching a fire door accessing a protected stair/lift lobby, which will be of at least 60 minute FR construction.

- 4.148 At Ground floor, level or ramped access will be provided to enable wheelchair users to reach a final exit. At upper floors, level access will be provided to enable wheelchair users to reach a protected refuge within the main core.

## Vertical non-ambulant evacuation

### Evacuation lifts

- 4.149 Four evacuation lifts will be provided within the main core of the building (two per lobby), for the evacuation of residents from Levels 1 to 68. One of these evacuation lifts will serve Levels 69 and 70, in addition to the firefighting lift, for the evacuation of residents in the gym at Level 69 and restaurant occupants at Level 70.
- 4.150 Evacuation lifts should be operated under the control of someone who is trained and/or authorized in the use of the lift and should be detailed in management plan.

### Refuge spaces

- 4.151 In addition to the protected lift lobbies, a disabled refuge space will be located within each escape stair at every floor level.
- 4.152 Each refuge space has an area accessible to a wheelchair of minimum dimensions 900mm by 1400mm, in which a wheelchair user can await assistance, located such that it does not obstruct the flow of other people escaping.
- 4.153 The refuge space in the protected escape stair will be provided with an emergency voice communication system that will enable communication between staff and the refuge space.
- 4.154 Procedures for the managed evacuation of disabled occupants from these refuges and the use of the evacuation will need to be developed and implemented by the building management.
- 4.155 On the basis of the above provisions, it is considered that adequate physical fire precautions will be provided for persons who are not able to evacuate independently.

## 5 Internal fire spread (linings)

### Linings

- 5.1 The wall and ceiling linings throughout the building will comply with either the European or national classifications as per Table 33 of BS 9999:2017 and summarised in Table 5.1.

**Table 5.1 - Classification of wall and ceiling linings**

| Location                                                                                                                           | European class<br>(BS EN 13501-1) | National class<br>(BS 476) <sup>Note 1</sup> |
|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------|
| Walls and ceilings in rooms up to 30m <sup>2</sup> in non-residential areas and up to 4m <sup>2</sup> in residential accommodation | D-s3, d2                          | 3                                            |
| Walls and ceilings in other rooms                                                                                                  | C-s3, d2                          | 1                                            |
| Circulation spaces                                                                                                                 | B-s3, d2                          | 0 <sup>Note 2</sup>                          |

*Note: Linings which can be effectively tested for "surface and spread of flame" are rated for performance by reference to the method specified in BS 476:1987, under which materials or products are classified 1, 2, 3 or 4, with Class 1 being the highest. Class 0 is better than Class 1. It is not identified in any BS test standard. A Class 0 product is either :*

- composed throughout of materials of limited combustibility; or
- a material having Class 1 surface spread of flame and which has a fire propagation index (I) of not more than 12 and a sub-index (I<sub>1</sub>) of not more than 6.

*The fire propagation index is established by reference to the method specified in BS 476-6.*

*European classifications are described in BS EN 13501-1:2007<sup>11.41</sup> + A1*

- A) Recommendations are given in Clause 33 for linings of concealed voids
- B) The national classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class, unless they have been tested accordingly.
- C) When a classification includes "s3, d2" this means that there is no limit set for smoke production and/or flaming droplets/particles
- D) Large rooms such as open plan offices, shops display areas and factories need not be regarded as circulation spaces even though there are circulation routes in the.

- 5.2 Various exceptions and modifications can apply, and reference should be made to Section 34 of BS 9999:2017 and Section 20 of BS 9991:2015 for detailed guidance.

- 5.3 There is an ongoing consultation regarding the use of the National Classifications and the European Classifications set out are predominantly used in the latest versions of the Approved Documents. However, these acknowledge the National surface spread of flame classification system set out in previous editions, which can still be used as transposed above.

### Plastic rooflights, glazing

- 5.4 Any plastic rooflights will comply with the recommendations of section 18.6.2 of BS 9991.
- 5.5 Glazing will comply with recommendations of section 22 of BS 9991.

## 6 Internal fire spread (structure)

### Sprinkler protection

- 6.1 The building will be provided with sprinklers throughout, by means of residential and commercial systems.
- 6.2 Two separate commercial sprinkler systems will be provided within the building in accordance with BS EN 12845:2015+A1:2019. The first system will serve the basement floors and the lower ancillary accommodation areas (i.e. Ground floor and Levels 1 and 2) and the second system will serve the top-floor restaurant and amenity accommodation at the upper floors (i.e. Levels 67 to 70).
- 6.3 In line with initial discussions with the Statutory Authorities, the commercial systems will be designed to meet the requirements of BS EN 12845, as referenced in guidance documents, but not the additional requirements of the LPC property protection standards.
- 6.4 The Level 70 restaurant kitchen will not be provided with a gas supply, but if provision is to be made for deep fat frying it is recommended that an appropriate in-hood extinguishing medium (e.g. ANSUL) is provided to supplement the sprinkler system.
- 6.5 A residential sprinkler system will be provided to protect the residential levels (i.e. Levels 3 to 66), in accordance with BS 9251:2021. Table 1 of BS 9251 recommends the provision of a Category 4 system within residential buildings more than 18m in height, which requires a minimum duration of supply of 60 minutes.
- 6.6 Section 5.4 of BS 9251:2021 recommends that sprinkler protection should be provided in all parts of the building, including circulation areas. However, sprinkler protection may be omitted from the following areas:
- bathrooms and shower rooms with a floor area less than 5m<sup>2</sup>, with linings conforming to BS EN 13501-1:2018, Class A1, A2-s3, d2 and B-s3, d2, and which are not prepared for white goods such as washing machines, dryers, electric showers or water heaters;
  - enclosed staircases containing only materials conforming to BS EN 13501-1:2018, Class B-s3 or better for construction materials and B(fl) or better for flooring including sub-categories such as d0, d1, d2 for construction materials and s1 and s2 for flooring, surface spread of flame and constructed as a fire-resistant separation;
  - ceiling voids;
  - enclosed vertical shafts (e.g. lifts or service shafts) containing only materials conforming to BS EN 13501-1:2018, Class B-s3 or better for construction materials and B(fl) or better for flooring (including sub-categories such as d0, d1, d2 for construction materials and s1 and s2 for flooring) surface spread of flame and constructed as a fire-resistant separation;
  - cupboards and pantries with a floor area of less than 2m<sup>2</sup> or where the least dimension does not exceed 1 m which are not prepared for consumer units or electrical equipment (excluding a single light);
  - uninhabited loft/roof voids;
  - water closet (WC) with a floor area less than 5m<sup>2</sup>, with linings conforming to BS EN 13501-1:2018 Class A1, A2-s3, d2 and B-s3, d2 and which are not prepared for white goods such as washing machines, dryers, electric showers or water heaters;
  - external balconies permanently open to the outside.
- 6.7 The detailed design of the automatic suppression systems will be undertaken by the specialist sub-contractor/designer.

## Loadbearing elements of structure

- 6.8** The provision of 120-minutes structural fire resistance has been considered reasonable on the basis of reinforced concrete construction, Regulation 7 compliant external walls, sprinklers throughout and the high level of compartmentation at each residential floor level. Furthermore, Table 4 of BS 9991 indicates the appropriate standard of fire resistance for all load-bearing elements of structure to be 120 minutes. This approach has been provisionally discussed and agreed with the Statutory Authorities (see Annex A5).
- 6.9** Structural elements that support only the roof and that do not fulfil any other structural role (e.g. providing bracing to the structural frame) do not normally need to be fire-resisting. However, where the roof structure supports heavy items of plant and/or a rooftop escape route those elements of structure will be fire-resisting.
- 6.10** Therefore, the structure supporting the roof-top plant area and access/egress route from the access hatch to this area and terrace areas will require 120 minutes fire resistance.

## Compartmentation

- 6.11** All floors will be constructed as compartment floors with a fire resistance rating of 120 minutes.
- 6.12** The accommodation stair between levels 67 and 68 will require a 120 minute fire curtain to maintain compartmentation.
- 6.13** In order to support the 'stay put' evacuation strategy, each flat will form a separate 60-minute compartment, separated from adjacent flats and other accommodation by means of 120 minute compartment floors and 60 minute compartment walls.
- 6.14** Compartmentation requirements are summarised in Table 6.1 below.

**Table 6.1 – Compartmentation requirements**

| Areas                                                  | Minimum period of fire resistance |
|--------------------------------------------------------|-----------------------------------|
| Compartment floors                                     | 120 minutes                       |
| Between flats at the same level                        | 60 minutes                        |
| Between flats and common corridor                      | 60 minutes                        |
| Separating non-residential from residential            | 120 minutes                       |
| Enclosing stores (including refuse store)              | 120 minutes                       |
| Protected shafts (e.g. service risers and lift shafts) | 120 minutes                       |
| Protected stair enclosures                             | 120 minutes                       |
| Smoke shafts                                           | 120 minutes                       |
| Flat protected entrance hall enclosures                | 30 minutes                        |
| Places of special fire hazard*                         | See note                          |

*Note\* - for exhaustive list for minimum period of fire resistance for places of special fire hazards please refer to table 29 of BS 9999*

- 6.15 Where walls common to two rooms/areas require differing periods of fire resistance, the higher period of fire resistance applies.

### Construction of compartment walls and floors

- 6.16 Compartment walls will extend to the soffit of the structural slab above (i.e. go from slab to slab). Allowance will be made for structural movement and flexible fire stopping will be provided at the junctions between fire-resisting elements.
- 6.17 Where a compartment wall meets with the roof, the junction will be fire-stopped, and the segment of roof spanning the wall will be constructed with a zone of roof covering 1500mm either side of a compartment to a B<sub>ROOF</sub>(t4) standard when tested in accordance with BS EN 13501-5<sup>11.44</sup> on a deck of material of Class A2-s3, d2 or better (to BS EN 13501-1<sup>11.41</sup>).
- 6.18 Where a compartment wall or floor meets an external wall, the junction will be fire stopped with suitable materials (e.g. mineral fibre or a proprietary fire stopping system) providing the same period of fire resistance as the compartment wall or floor.

### Fire doors

- 6.19 Doors in compartment and fire-resisting walls will generally have the same fire resistance as the wall in which they are installed and will need to be smoke sealed where they also support the means of escape. Doors to protected shafts will provide at least half the fire resistance required for the shaft (subject to a minimum of 30 minutes) with the exception of smoke shafts where doors/hatches should match the period of fire resistance of the shaft.
- 6.20 Table 6.2 summarises the requirements for fire doors. Where the suffix 'S' is present it indicates that the door is to be provided with smoke seals in accordance with BS 476-31.
- 6.21 All doors will be certified in accordance with BS 476-22<sup>11.37</sup> or BS EN 1634-1.

**Table 6.2: Fire door requirements**

| Door serving                                     | Fire resistance (integrity)<br>BS 474-22 (EN1634-1) |
|--------------------------------------------------|-----------------------------------------------------|
| Door between flat and common corridor            | FD30S (E30S <sub>a</sub> )                          |
| Door forming protected entrance hall in flat     | FD30 (E30)                                          |
| Door between protected shaft and common corridor | FD60S (E60S <sub>a</sub> )                          |
| Door between smoke shaft and common corridor     | FD120S (E120S <sub>a</sub> )                        |
| Stair door                                       | FD60S (E60S <sub>a</sub> )                          |
| Lift door                                        | FD60 (E60)                                          |
| Other doors accessing common corridor            | FD60S (E60S <sub>a</sub> )                          |
| Service riser doors                              | FD60S (E60S <sub>a</sub> )                          |

| Door serving                                   | Fire resistance (integrity)<br>BS 474-22 (EN1634-1)                              |
|------------------------------------------------|----------------------------------------------------------------------------------|
| Plant room doors*                              | FD120 (E120) or<br>FD120S (E120S <sub>a</sub> ) if accessed<br>from escape route |
| Refuse store doors (including lobby door)      | FD120S (E120S <sub>a</sub> )                                                     |
| Doors accessing places of special fire hazard* | N/A                                                                              |

*Note\* - Doors accessing places of special fire hazard should match period of fire resistance required for places of special fire hazards in table 29 of BS 9999*

### Places of special fire hazard

- 6.22** For exhaustive list for minimum period of fire resistance for places of special fire hazards please refer to table 29 of BS 9999
- 6.23** The areas listed below are designated as places of special fire hazard and will be enclosed within 30 minute fire-resisting construction (walls, floors and doors); penetrating services will be fire stopped and provided with fusible-link fire dampers as appropriate.
- Transformer and switchgear rooms for low voltage equipment;
  - boiler rooms;
  - kitchens;
  - storage of areas greater than 1m<sup>2</sup> but not greater than 450m<sup>2</sup>;
- 6.24** In addition the following areas are deemed higher risk and will require robust solid non combustible construction have minimum fire standard of fire resistance not less than 120 minutes
- Car parks within the building
  - Boiler rooms
  - Fuel storage spaces
  - Transformer and switch gear rooms for equipment above low voltage
  - Any electrical substation or enclosure containing any distribution board, generator, powered smoke control plant, pressurization plant, communication equipment, and any other equipment associated with life safety and fire protection systems

### Refuse storage

- 6.25** In addition to doors direct to outside, the Ground floor refuse storage rooms will be accessible internally but will not be situated within a protected stairway or protected stair lobby.
- 6.26** The refuse storage rooms will be enclosed in construction providing a minimum of 120 minutes fire resistance and will be accessed by means of a protected lobby provided with 0.2m<sup>2</sup> of permanent natural ventilation to outside (or mechanical alternative).
- 6.27** An automatic horizontal fire shutter (120 minutes) will be provided at slab level over the residential refuse store, which will operate to separate the refuse store from the chute above in the event of a fire in the store.

## Protected shafts for services

- 6.28** Shafts for lifts, chutes, ducts and pipes that pass through compartment floors will be constructed as protected shafts.
- 6.29** All protected shafts conveying services will be enclosed in fire-resisting construction providing 120 minutes fire resistance. Doors or hatches into the shafts will be locked shut and will provide a fire resistance of at least 60 minutes. With the exception of smoke shafts where doors/hatches should match the period of fire resistance of the shaft
- 6.30** Any shafts used for conveying oil or gas should comply with the recommendations of Clauses 8.36 to 8.38 of ADB Vol.2.

## Refuse chutes

- 6.31** At each floor level, residents will be provided with access to a refuse chute that will be accessed from a section of common corridor via a protected lobby.
- 6.32** The refuse chute itself will be of fire-resisting construction (minimum 60 minute) and will be enclosed within a 120 minute protected shaft, with a 60 minute fire-resisting access door/hatch at each floor level and a 120 minute horizontal fire shutter at the base.
- 6.33** The door accessing each protected lobby from the common corridor is proposed to be a modified FD60S fire door, by virtue of an increased threshold gap (10mm maximum) in order to provide make-up air to the mechanical extract system. The door will continue to be smoke sealed around its sides. The increased threshold is at low level and refuse store is kept at negative pressure by mechanical ventilation therefore the risk of smoke spread from this lobby to the corridor is minimal. See 4.47 to 4.53 for further information on mechanical extract system
- 6.34** The arrangement is considered to meet the functional requirements of the Building Regulations, subject to formal agreement with Building Control.

## Concealed spaces (cavities)

- 6.35** To inhibit the unseen spread of fire and smoke, any concealed spaces or cavities in the construction will be sealed and sub-divided with cavity barriers.
- 6.36** Cavity barriers should be provided in accordance with Section 19 of BS 9991 and Section 33.1 of BS 9999. This includes cavity barriers:
- a) at the edges of cavities and around openings penetrating them (e.g. around windows and doors);
  - b) at the junctions between external cavity walls and compartment walls and floors;
  - c) at junctions between a cavity wall and every compartment wall or floor, or other wall or door assembly which forms a fire resisting barrier;
  - d) on protected escape routes, above and below any fire resisting construction that is not carried the full storey height;
  - e) above and below any fire doors provided in corridors to sub-divide escape corridors;

- f) in extensive cavities in the non-residential areas so that the maximum dimensions given in Table 32 of BS 9999:2017 are not exceeded.

- 6.37** Various exceptions and additions to the above can apply and therefore reference should be made to Section 19 of BS 9991 and Section 33.1 of BS 9999 for specific guidance.
- 6.38** With the exception of the areas described in 6.39 below, cavity barriers will be constructed of materials capable of providing a fire resistance of 30 minutes integrity and 15 minutes insulation.
- 6.39** Cavity barriers within a stud wall or partition, and around openings penetrating cavities (e.g. window openings in external cavity walls) may be formed of either:
- 0.5mm-thick steel;
  - 38mm-thick timber;
  - Mineral wool under compression when installed in the cavity; or
  - 12mm-thick calcium silicate, cement-based or gypsum-based board.

## Protection of openings and fire stopping

- 6.40** All penetrations through fire resisting separating elements (e.g. protected escape routes and compartment walls/floors) will be provided with fire doors, fire stopping, fire seals and fire/smoke dampers in accordance with the detailed recommendations of Section 32 of BS 9999. Some of the main provisions are summarised below.

### Fire stopping

- 6.41** Joints between fire-separating elements will be fire-stopped to maintain the fire resistance of those elements.
- 6.42** Openings through fire-separating elements should be minimised in both number and size. Where cables, conduits, ducts or pipes must pass through a fire resisting barrier the penetrations will be sealed with a proprietary sealing system that has been tested for the specific service / substrate materials and opening size and demonstrated to maintain the fire resistance of the fire-separating element.
- 6.43** It is strongly recommended that fire stopping works be carried out by a third-party UKAS-accredited installer.

### Protection of ventilation ductwork

- 6.44** Mechanical ventilation systems should not assist in transferring fire and smoke through the building in such a manner as to put protected escape routes at risk and should maintain the fire-resistance of the walls / floors through which they penetrate.
- 6.45** Where ductwork penetrates fire-resisting walls it will be provided with fire/smoke dampers or suitable fire-resisting enclosures, as appropriate.
- 6.46** Detailed guidance is provided in Section 32.5 of BS 9999 and this will need to be accounted for in the detailed ventilation system design undertaken by others, but some of the key provisions are outlined below.

### Ductwork penetrating protected stairways

- 6.47** If protected stairways are provided with day-to-day ventilation, a separate and dedicated ventilation system will be provided for each stair.

**6.48** Ventilation ductwork serving a protected stairway that passes through any other area will be fire resisting from the point where it leaves the protected stairway.

**6.49** Ventilation ductwork serving other areas (e.g. the accommodation or other parts of the escape route) which passes through a protected stairway will be fire resisting where it passes through the protected stairway.

#### Ductwork penetrating other protected escape routes

**6.50** ES classified fire and smoke dampers actuated by the smoke detection system will be provided where ductwork enters or leaves each section of the protected horizontal escape route it serves.

**6.51** Alternatively, for cases where ductwork passes through a protected horizontal escape route without ventilating that area, it will be fire resisting where it passes through the protected escape route.

#### Kitchen extract ductwork

**6.52** A separate and independent extraction system will be provided for the commercial kitchen and air extracted from this area will not be recirculated.

**6.53** The commercial kitchen extract ductwork will not be provided with fire/smoke dampers. Where a kitchen extract duct passes through another fire compartment the ductwork will be fire resisting or located within a dedicated fire resisting enclosure.

#### Ductwork passing through other fire-separating elements

**6.54** Where ductwork penetrates fire-separating elements (other than those described above), mechanical fire dampers will be provided, or the ductwork will be fire-resisting if it does not serve both compartments.

#### General provisions for fire / fire and smoke dampers

**6.55** Dampers will be classified to BS EN 13501-3<sup>11.43</sup> and conform to BS EN 15650<sup>11.40</sup>. Fire dampers will have the same period of fire resistance (integrity) as the wall or floor they penetrate, but in no case less than 60 minutes. In addition, ES classified fire and smoke dampers will resist smoke leakage for the same period.

**6.56** Fire dampers will generally be activated by means of a thermal device that will cause damper closure at a temperature of approximately 74°C.

**6.57** Motorised fire and smoke dampers will operate automatically in response to the smoke detection system. However, these dampers will also incorporate a thermally activated release device with a 74°C activation temperature.

**6.58** All dampers will be securely fixed within the thickness of the construction of the fire-separating element they penetrate.

**6.59** All dampers will be installed so as to allow inspection, testing and maintenance of the damper and actuator.

## Smoke Ventilation

### Main Core

- 6.60** As detailed in Sections 4.51 to 4.57 above, each of the stair/lift lobbies in the central core will be provided with smoke ventilation by means of a proprietary mechanical single-shaft smoke extract system (designed, validated and installed by a specialist sub-contractor) and each stair is provided with a AOV at the head of the stair enclosure. AOV of fire fighting stair to provide 0.7m<sup>2</sup> aerodynamic free area and AOV to protected stair to be 1.0m<sup>2</sup>.
- 6.61** The firefighting stair will continue down to serve the basement levels and smoke ventilation will be provided to the basement firefighting lobby by means of the two mechanical smoke ventilation shaft systems. The stair will break at ground level to provide separation between basement and upper floor levels.

### Restaurant

- 6.62** As discussed in section 4.2, the restaurant at Level 70 will be provided with additional lobbies to supplement the stair and lobby ventilation systems. The lobbies will be provided to the firefighting and alternative stairs to minimise the impact of smoke ingress from a fire in the restaurant on the stairs serving residential levels below. The vents will open direct to roof level with 1.5m<sup>2</sup> free area.

### Basement

- 6.63** The basement car park in each building will be provided a mechanical smoke extraction system (providing 10 air change per hour) and sprinklers.
- 6.64** It is proposed that basement plant rooms and ancillary rooms will not be provided with dedicated smoke ventilation provisions but will be provided with access doors directly from the ventilated car parking, such that smoke within these rooms may be ventilated via the car parking smoke ventilation system. As the plant rooms at basement are low risk (i.e. pumps and sprinkler tanks) this arrangement is considered reasonable.
- 6.65** The design, validation and installation of the car park smoke ventilation system will be undertaken by the specialist smoke ventilation sub-contractor. Fan speeds are to comply with BS EN 12101-3.

### Refuse stores and chute

#### Refuse stores

- 6.66** Ground floor refuse storage rooms will be enclosed in construction providing a minimum of 120 minutes fire resistance and will be accessed by means of a protected lobby provided with 0.2m<sup>2</sup> of permanent natural ventilation to outside (or mechanical alternative) in accordance with BS 5906.

#### Chutes

- 6.67** At each floor level, residents will be provided with access to a refuse chute that will be accessed from a section of common corridor via a protected lobby.

- 6.68** The refuse chute will be ventilated at its head and, as it is not possible to achieve 0.2m<sup>2</sup> of permanent natural ventilation to the protected lobbies accessing the chute, , as required by BS 5906, the protected lobbies will be provided with a fire-resisting ducted mechanical smoke extract system. The mechanical extract system will be used to provide general background ventilation to the lobbies via actuated fire and smoke dampers and the dampers will be configured to close on all but the fire floor upon activation of a smoke detector within the lobby at that level.
- 6.69** The door accessing each protected lobby from the common corridor is proposed to be a modified FD60S fire door, by virtue of an increased threshold gap (10mm maximum) in order to provide make-up air to the mechanical extract system. The door will continue to be smoke sealed around its sides. The increased threshold is at low level and refuse store is kept at negative pressure by mechanical ventilation therefore the risk of smoke spread from this lobby to the corridor is minimal.
- 6.70** By virtue of the limited size of the refuse chute lobbies and the management of the building, it is considered unlikely that refuse would be allowed to build up within the lobbies. Notwithstanding, it is proposed to extend both the communal automatic fire detection and the sprinkler system into the refuse chute lobbies at each floor level, in order to detect and control any fire that may occur.
- 6.71** On this basis, the arrangement is considered to meet the functional requirements of the Building Regulations, subject to formal agreement with Building Control.

## 7 External fire spread

- 7.1 The functional requirements in the Building Regulations for external fire spread address two key issues, namely:
- a) **fire spread over the walls** - control of the combustibility of external walls (i.e. materials) and the propensity for fire spread over surfaces and through cavities; and
  - b) **fire spread from one building to another** - control of the fire resistance of external walls and fire performance of roofs, having regard to the proximity of other buildings.
- 7.2 Given the recent updates to statutory guidance and the introduction of Regulation 7(1A) and 7(2), the recommendations in this section of the report will follow the guidance in Approved Document B rather than BS 9991:2015 and BS 9999:2017<sup>11.5</sup> which have not been updated to reflect the introduction of the Building Amendment Regulations 2018 and 2022.
- 7.3 It should be noted that the definition of 'external walls' introduced into the Building Regulations and Approved Document B in December 2018 also includes windows and doors within the wall, as well as any external decorative finishes.

### Fire spread over external walls

- 7.4 The building will be classed as a 'relevant building' under Regulation 7(4) of the Building Regulations as it will have a storey (not including roof-top plant areas or any storey consisting exclusively of plant rooms) at least 18m above ground level and will contain one or more dwellings.
- 7.5 Therefore, the statutory requirements under Regulations 7(2) and 7(3) of the Building Regulations will apply.
- 7.6 In summary, with the exception of permitted exceptions listed in Regulation 7 and Approved Document B, all materials forming part of an external wall, or specified attachment, will meet European Classification A2-s1, d0 or Class A1, when classified in accordance with BS EN 13501-1:2007+A1:2009.
- 7.7 Full details of the requirements under Regulation 7, as well as the additional considerations recommended by Approved Document B, are presented in Annex A4.

### Cavity barriers

- 7.8 To inhibit the unseen spread of fire and smoke, any concealed spaces or cavities in the construction will be sealed and sub-divided with cavity barriers.
- 7.9 Cavity barriers should be provided in accordance with Section 19 of BS 9991 and Section 33.1 of BS 9999. This includes cavity barriers:
- a) at the edges of cavities and around openings penetrating them;
  - b) at the junctions between external cavity walls and compartment walls and floors;
  - c) at junctions between a cavity wall and every compartment wall or floor, or other wall or door assembly which forms a fire resisting barrier;

- d) on protected escape routes, above and below any fire resisting construction that is not carried the full storey height;
- e) above and below any fire doors provided in corridors to sub-divide escape corridors;
- f) in extensive cavities in the non-residential areas so that the maximum dimensions given in Table 32 of BS 9999:2017 are not exceeded.

**7.10** Various exceptions and additions to the above can apply and therefore reference should be made to Section 19 of BS 9991 and Section 33.1 of BS 9999 for specific guidance.

**7.11** With the exception of the areas described in 6.39 below, cavity barriers will be constructed of materials capable of providing a fire resistance of 30 minutes integrity and 15 minutes insulation.

**7.12** Cavity barriers within a stud wall or partition, and around openings penetrating cavities (e.g. window openings in external cavity walls) may be formed of either:

- 0.5mm-thick steel;
- 38mm-thick timber;
- Mineral wool under compression when installed in the cavity; or
- 12mm-thick calcium silicate, cement-based or gypsum-based board.

## Fire spread to other buildings

### Space separation - relevant boundaries

**7.13** Due to the step-back of the building above Level 1, site boundaries have been measured for Ground and Level 1 and the upper floors separately.

**7.14** Each relevant boundary has been measured to the mid-point of the adjacent roads, as shown in Table 7.1 and Figure 7.1 below.

Table 7.1: Relevant boundaries

| Floor              | North  | East   | South  | West   |
|--------------------|--------|--------|--------|--------|
| Ground and Level 1 | 10.44m | 4.86m  | 32.03m | 20.02m |
| Level 3 and above  | 13.68m | 12.17m | 32.03m | 20.50m |

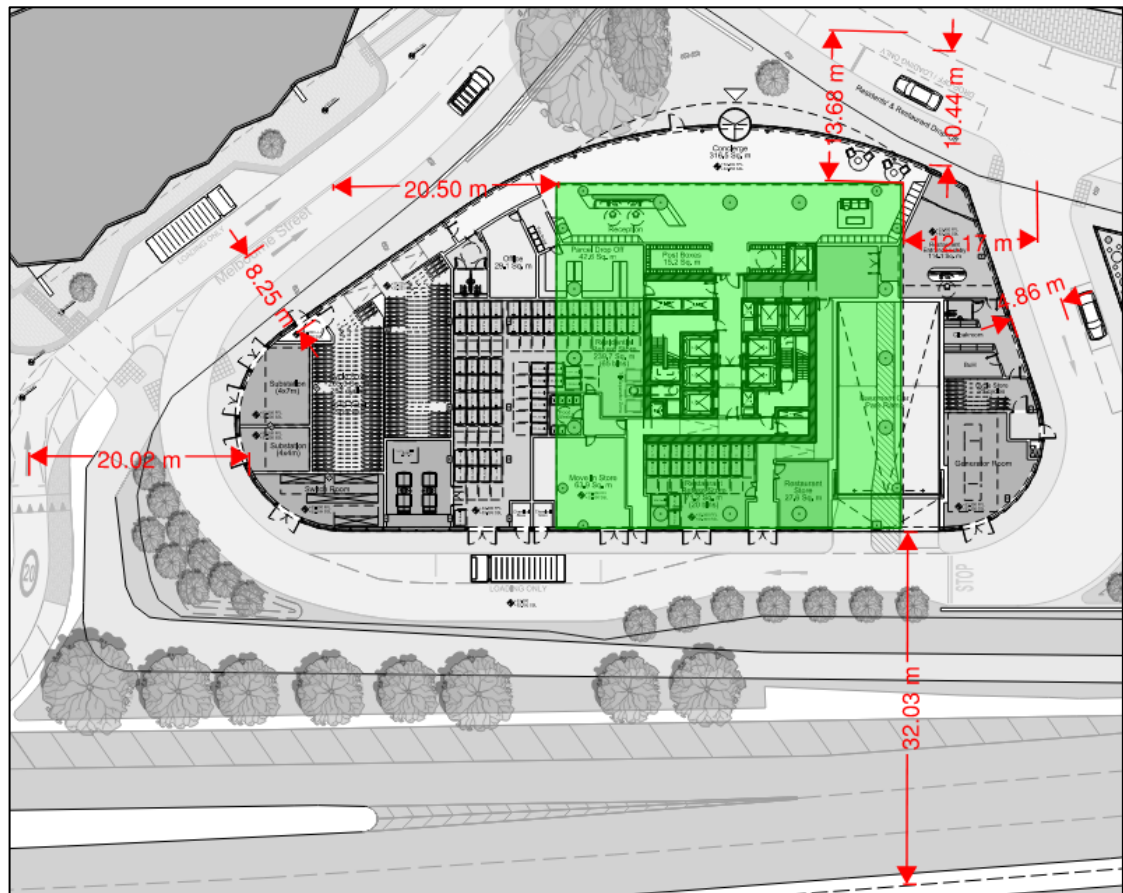


Figure 7.1 – Relevant boundaries

### Allowable unprotected areas

- 7.15 With the exception of the calculated allowable unprotected areas (UPA), the external walls will need to be fire resisting to meet with the provisions set out in 7.26 below (120 minutes integrity + 15 minutes insulation from inside to out).
- 7.16 The allowable UPA have been assessed using the enclosing rectangle method of BRE report BR 187 (*External fire spread. Building separation and boundary distances*)<sup>11.25</sup>.

- 7.17 The guidance in BR 187 provides two values for the emitter radiation intensity to be used for the assessment of UPA: 168kW/m<sup>2</sup> and 84kW/m<sup>2</sup> corresponding to a 'standard' and 'reduced' fire load density, respectively. BR 187 states that the appropriate value to use is given in the national building regulation guidance depending on the Purpose Group or class of the occupancy. However, the current edition of ADB no longer provides such recommendations. Therefore, the emitter radiation intensity adopted for the assessment has been based upon the values implicit in the calculation tables in BR 187 (i.e. 84kW/m<sup>2</sup> for the assembly, residential, office compartments and 168kW/m<sup>2</sup> for all other compartments).
- 7.18 As the building is sprinklered, the boundary distances may be doubled within the calculations, except for unsprinklered high voltage plant rooms (i.e. generator room, switch gear and substations).
- 7.19 It is our opinion that the residential and restaurant reception (ancillary to the residential use) areas can be considered to be 'reduced' fire load accommodation, on the basis that the fire load of the reception areas will be no worse than the residential apartments above. As such the 'reduced' fire load density has been used within the calculations for the reception areas.
- 7.20 External fire spread has been considered from each compartment individually. At residential floors this has been considered as individual flats. At amenity floors this has been considered for the following rooms/areas individually, to reflect compartmentation:
- Store rooms
  - Plants rooms
  - Reception areas
  - Amenities (co-working, gym, pool, etc)
- 7.21 The internal fit-out and compartmentation plans for the Level 70 restaurant are unknown at this stage, the calculations have assumed that the entire floor level will form a single large compartment.
- 7.22 The calculations have been based on each floor in the building being constructed as a fire-resisting compartment floor and the internal compartmentation described in Section 6 of this report.
- 7.23 Full details of the calculations for each elevation are contained within Annex A3
- 7.24 On the basis of the assumptions outlined above, the only areas of protected external wall required are associated with the Ground floor generator room, as described below.
- Ground floor generator room
- 7.25 The generator room will be located at Ground floor on the southeast elevation overlooking the adjacent office building.
- 7.26 The allowable unprotected area was calculated to be 38.0%. On this basis, the generator room external wall will be required to have 49.83m<sup>2</sup> of fire resisting construction within the external wall (120 minutes integrity + 15 minutes insulation from inside to out).

Table 7.2 – Requirement for fire resisting façade

| Elevation                              | Boundary distance (m) | Allowable UPA (%) | Area of protected elevation required (m <sup>2</sup> ) |
|----------------------------------------|-----------------------|-------------------|--------------------------------------------------------|
| South East<br>(Ground, Generator room) | 5.05                  | 38.02             | 49.83                                                  |

## Roof coverings

- 7.27 The minimum separation distance to any point on a relevant boundary (see above) is less than 6.0m and on this basis Table 36 of BS 9999 recommends that all roof covering materials should, as a minimum, comply with the European designation B<sub>ROOF</sub>(t4) when classified in accordance with BS EN 13501-5<sup>11.44</sup>.
- 7.28 However, in order to limit the risk associated with fire spread via the roof areas, it is recommended that the roof system build-up in each area of roof meets a B<sub>ROOF</sub>(t4) classification.
- 7.29 In addition to roof covering products/materials that meet this B<sub>ROOF</sub>(t4) classification, roof covering products/materials defined in *Commission Decision 2000/553/EC of 6 September 2000 implementing Council Directive 89/106/EEC* can be considered to fulfil all of the requirements for the 'external fire performance' characteristic without the need for testing.
- 7.30 The *Commission Decision 2000/553/EC of 6 September 2000 implementing Council Directive 89/106/EEC* document notes that non-rated roof covering products/materials that are fully covered by the below listed inorganic materials can be considered to fulfil all of the requirements for the 'external fire performance' characteristic without the need for testing:
- Loose laid gravel with a thickness of at least 50mm or a mass > 80kg/m<sup>2</sup> (aggregate size 4mm-32mm).
  - Sand/cement screed to a thickness of at least 30mm.
  - Cast stone or mineral slabs of at least 40mm thickness.
- 7.31 Furthermore, in line with initial discussions with the Fire Service and Building Control (see Annex A5), it is proposed that greening/trees/etc on the terraces will be provided at least 4m away from the façade of the tower. Greening/ trees/ etc should follow guidance in *Fire Performance of Green Roofs and Walls*, published by the Department for Communities and Local Government.

## Plastic rooflights

- 7.32 Any plastic rooflights will comply with the recommendations of Section 34 and Table 34 of BS 9999.

## 8 Access and facilities for the Fire Service

### Vehicle access

- 8.1 Fire Service vehicle access to the Plot D site will be provided via the surrounding public highways (Great Jackson Street and Melbourne Street) and site roads.
- 8.2 The design of Fire Service vehicle access routes and hard standings in the site will be in accordance with the recommendations of BS 9991 and BS 9999, however, the acceptability of the access routes should be formally agreed with the Fire Service.
- 8.3 Fire Service vehicle parking will be available directly adjacent to the building on the surrounding public highways and site roads and from these parking locations access into the building will be possible via the main building entrance (see green arrow in Figure 8.1 below), the access door into the firefighting shaft (see red arrow in Figure 8.1 below), and the wet fire main inlet valve (within 18m, located adjacent to the firefighting shaft access door).
- 8.4 The residential entrance will have a 24-hour concierge, so will be considered to be the main rendezvous point for Fire Service arrival.

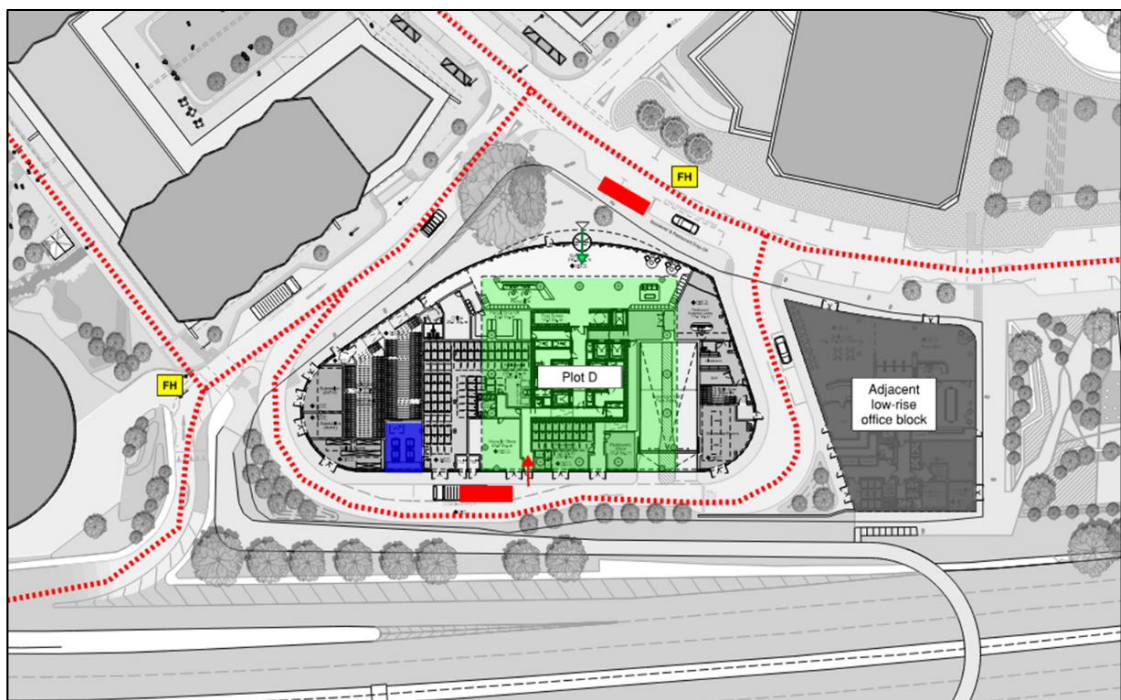


Figure 8.1 – Fire Service access

### Hydrants

- 8.5 Two existing fire hydrants will be located within 100m of the building fire service access points (see yellow FH labels in Figure 8.1 above), such that private on-site fire hydrants are not considered to be necessary.
- 8.6 Each fire hydrant should be sited in accordance with BS 9990<sup>11.30</sup>, and indicated by a plate affixed nearby in a conspicuous position in accordance with BS 3251<sup>11.31</sup>. The suitability of the public hydrants should be confirmed with local fire and rescue service.

## Design of firefighting shaft

- 8.7 As the height of the building will be more than 18m above Fire Service access level, a firefighting shaft will be provided to serve the above ground storeys.
- 8.8 The firefighting shaft serving the above ground storeys will be provided with the following:
- ▀ Ventilated firefighting stair
  - ▀ Ventilated firefighting (below ground) and residential common (above ground) lobbies acting as firefighting lobbies. At residential levels the common corridors function as the lobbies.
  - ▀ Firefighting lift
  - ▀ Wet rising main (within the firefighting stair)

**Design team note: at ground levels the firefighting stair is accessed via a fire service access corridor in line with paragraph 20.2.2 of BS 9999 the access corridor should be 500mm wider than the stair is services e.g. 1700mm**

- 8.9 The three storey basement will have a floor floors levels larger than 900m<sup>2</sup>, but the lowest level of basement will be less than 10m below Fire Service access level. Accordingly the basement does not require a firefighting shaft. However, the firefighting stair and lobbies will continue down to serve the basement floors with a break at ground, however, there is no requirement for the firefighting lift to serve the basement floors so the firefighting lift will terminate at Ground floor.
- 8.10 On the basis that it will be possible to reach all parts of each floor level within a 45m hose laying distance from the wet rising fire main outlet within the firefighting stair, it has been provisionally agreed with the Fire Service (see Annex A5) that a single firefighting shaft is sufficient and that a wet rising fire main will not be required within the secondary escape stair of the main core.
- 8.11 The firefighting stair and firefighting lift will each be enclosed in 120 minutes fire-resisting construction. Doors separating the stair from the sterile common lobbies acting as the firefighting lobbies will be to a self-closing FD60S standard and lift doors to an FD60 standard.
- 8.12 A wet rising fire main will be provided within the firefighting stair, with outlet valves located at each main landing level within the stair, including Ground floor.
- 8.13 The inlet valve for the wet fire main system will be provided within the façade of the building, adjacent to the firefighting shaft access door.
- 8.14 In order to aid Fire Service access to the basement levels and supplement the wet fire main system within the main core, it is proposed that the secondary escape stair serving the basement floors will be provided with a dry fire main located within the stair enclosure and inlet adjacent to the entry door at Ground floor.

## Smoke ventilation

- 8.15 As detailed in Sections 4.54 to 4.59 the sterile stair/lift lobbies forming the firefighting lobbies in the central core will be provided with smoke ventilation by means of a proprietary mechanical single-shaft smoke extract system. Each stair is provided with a AOV at the head of the stair enclosure. AOV of fire fighting stair to provide 0.7m<sup>2</sup> aerodynamic free area and AOV to protected stair to be 1.0m<sup>2</sup>.
- 8.16 The firefighting stair will continue down to serve the basement levels and smoke ventilation will be provided to the basement firefighting lobby by means of the mechanical smoke ventilation shaft system.

- 8.17 The car park areas in basement levels will be provided with a mechanical smoke extraction system providing 10 air change per hour and sprinklers.
- 8.18 The Ground floor smoke discharge point located remote from the stair discharge and Fire Service access routes (see blue highlight in Figure 8.1 above).
- 8.19 It is noted that the Fire Service has requested that, where possible, electric vehicle parking bays are located on the uppermost level of the basement and near to the car park smoke extract point.
- 8.20 The design, validation and installation of the smoke ventilation systems will be undertaken by the specialist smoke ventilation sub-contractors.

## Secondary power supply

- 8.21 A secondary power supply to all life safety systems will be provided by means of a dedicated back-up generator, located within a dedicated room accessed directly from outside at Ground floor.

## Fire Service information

- 8.22 In accordance with the latest recommendations of Approved Document B Volume 1, a secure information box will be provided within the Ground floor entrance reception space, for use by the Fire Service during an incident.
- 8.23 The content of the box should provide information relevant to the Fire Service during an incident, including:
- Contact details for the responsible persons.
  - Two copies of the building's floor plans that are A3 size and encapsulated/placed inside plastic wallets, which identify key fire-fighting equipment.
  - The Emergency Response Pack; comprising a log book for the purpose of recording events that occur that are relevant (e.g. system updates), details of any fixed firefighting installations not available for use and/or unresolved fire safety issues, a summary of information useful to the Fire Service on arrival at an incident, an orientation plan showing the location of the building in relation to surrounding buildings and other reference points (e.g. roads and fire hydrants), a simple layout plan showing water supplies for cor (e.g. fire hydrants and wet rising mains inlets and outlets) and other facilities of particular relevance to operational firefighting (e.g. firefighting and evacuation lifts), and a description of the evacuation strategies employed in the building (e.g. stay put for residential flats and simultaneous for non-residential).
- 8.24 The secure information box should be:
- Easily located and identified by firefighters.
  - Sized to accommodate all necessary information.
  - Secured to resist unauthorised access but readily accessible by firefighters.
  - Protected from the weather.
- 8.25 As requested by the Fire Service, the main fire alarm panel, Evacuation Alert system panel, and disabled refuge panel will be located within the Ground floor entrance reception space, with repeater panels for the fire alarm systems provided in the firefighting stair access corridor.

- 8.26** The building will be provided with floor identification signs located on every landing of each protected escape stair, which will be supplemented by flat indicator signs that provide information relating to the flats accessed on each residential floor (with directional arrows where flats are in more than one direction from the stair), to assist Fire Service wayfinding.

## 9 Regulatory Reform (Fire Safety) Order

- 9.1 On completion of the building, responsibility for compliance with the Regulatory Reform (Fire Safety) Order 2005 (FSO)<sup>11.2</sup> will rest with the Responsible Person. This section outlines some of the main requirements of the FSO for consideration by the Responsible Person.

### First aid firefighting equipment

- 9.2 Suitable portable fire extinguishers will need to be provided throughout the building. Guidance is available in BS 5306-8 (*Fire extinguishing installations and equipment on premises. Selection and positioning of portable fire extinguishers – Code of practice*)<sup>11.45</sup>.
- 9.3 Consideration should also be given to the provision of evacuation chairs or other measures to assist in the vertical evacuation of people with impaired mobility.

### Risk assessment

- 9.4 To comply with the FSO a fire risk assessment must be in place when the building is first occupied. It is therefore recommended that a preliminary risk assessment be carried out prior to occupation. This should then be updated after the building is occupied to identify any additional risks that may have been imported by the occupiers.
- 9.5 Guidance on the risk assessment process is given in a series of H M Government guides entitled Fire Safety Risk Assessment<sup>11.9</sup>. Unless hazardous materials or processes are introduced into a building complying with the Building Regulations it should not normally be necessary to provide additional physical fire safety measures over and above those required to satisfy Part B of the Building Regulations (other than portable fire extinguishers and evacuation aids).

### Fire safety management procedures

- 9.6 This fire safety strategy has been developed on the assumption that the building will be properly managed.
- 9.7 The fire strategy for all types buildings should be based upon a realistic in-use management regime and the design process should ensure compatibility between the fire protection provisions and management.
- 9.8 Procedures for the management of fire safety should be developed and documented in a fire safety manual. Guidance on fire safety management procedures is given in BS 5588-12 and a typical fire safety manual might include:
1. Fire safety policy statement
  2. Fire safety management structure
  3. Coordination with other parties (e.g. in a shared building)
  4. Emergency response
  5. Evacuation of people with special needs
  6. Contingency and salvage plans
  7. Emergency responsibilities of designated staff
  8. Summary of fire safety strategy and plans for the building
  9. Fire risk assessment
  10. Procedures for dissemination of information
  11. Selection and control of materials
  12. Maintenance and testing of fire safety equipment

13. Routine housekeeping (e.g. removal of combustible waste)
14. Fire safety training
15. Fire drills
16. Decoration, alteration and building work
17. Audit procedures and updating of the manual
18. Fire safety records
19. References.

**9.9** Procedures for the management of fire safety should be developed and documented in a fire safety manual. Guidance on fire safety management procedures is given in Section 9 of BS 9991 and Clause 9 and Annex H of BS 9999 and a typical fire safety manual might include:

1. Fire safety policy statement
2. Fire safety management structure
3. Coordination with other parties (e.g. in a shared building)
4. Emergency response
5. Evacuation of people with special needs
6. Contingency and salvage plans
7. Emergency responsibilities of designated staff
8. Summary of fire safety strategy and plans for the building
9. Fire risk assessment
10. Procedures for dissemination of information
11. Selection and control of materials
12. Maintenance and testing of fire safety equipment
13. Routine housekeeping (e.g. removal of combustible waste)
14. Fire safety training
15. Fire drills
16. Decoration, alteration and building work
17. Audit procedures and updating of the manual
18. Fire safety records
19. References.

**9.10** When the building is in use a suitable fire safety management regime should be established and any variations to the procedures should be the subject of a risk assessment.

## 10 Conclusions

- 10.1** On the basis of the fire safety strategy and recommendations presented in this report, it is our opinion that the building can satisfy the functional requirements of Part B (fire safety) of the Building Regulations, subject to development of the fire strategy at detailed design stages.
- 10.2** To comply with the Regulatory Reform (Fire Safety) Order, the building user(s) will need to implement suitable fire safety management procedures and carry out a fire risk assessment prior to and shortly after occupation (see Section 9). Subject to a suitable and sufficient fire risk assessment, additional physical fire safety measures should not be required unless high hazard materials or processes are introduced.
- 10.3** As the requirements of the Building Regulations and Fire Safety Order are set out in functional terms and can be interpreted in differing ways, it is essential that the recommendations of this report are agreed with the relevant approvals bodies prior to implementation.
- 10.4** Regulation 38 of the Building Regulations requires that fire safety information be given to the person responsible for the occupied building. Therefore, copies of the 'as built' fire strategy report and other relevant fire safety information should be issued to the responsible person.

## 11 References

- 11.1 The Building Regulations 2010 (as amended). SI 2010 No. 2214. The Stationery Office Limited. 2010
- 11.2 Regulatory Reform (Fire Safety) Order 2005. SI 2005 No. 1541. The Stationery Office Limited. 2005
- 11.3 The Building Regulations 2010, Approved Document B: Fire Safety – Volume 2: Buildings other than dwellings, 2019 edition incorporating 2020 and 2022 amendments. RIBA Books. 2020
- 11.4 The Building Regulations 2010, Approved Document B: Fire Safety – Volume 1: Dwellings, 2019 edition incorporating 2020 and 2022 amendments. RIBA Books. 2020
- 11.5 BS 9999:2017. Fire safety in the design, management and use of buildings – Code of practice
- 11.6 BS 9991:2015. Fire safety design in the design, management and use of residential buildings – Code of Practice.
- 11.7 The Building Regulations 2010, Approved Document M: Access to and use of buildings, 2015 edition incorporating 2016 amendments. The Stationery Office Limited. 2016
- 11.8 The Building Regulations 2010, Approved Document 7: Materials and workmanship, 2013 edition incorporating 2018 amendments. The Stationery Office Limited. 2018
- 11.9 Fire Safety Risk Assessment, Series of guides published by H M Government 2006
- 11.10 BS 5839-1:2017. Fire detection and fire alarm systems for buildings. Code of practice for system design, installation, commissioning and maintenance of systems in non-domestic premises (*Incorporating Corrigendum No. 1*)
- 11.11 BS 5839-6:2019+A1:2020. Fire detection and alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises.
- 11.12 BS 5839-9:2021. Fire detection and alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of emergency voice communication systems
- 11.13 BS EN 54-11:2001. Fire detection and fire alarm systems. Manual call points
- 11.14 BS 5266-1:2016. Emergency lighting. Code of practice for the emergency lighting of premises
- 11.15 BS ISO 3864-1:2011. Graphical symbols. Safety colours and safety signs. Design principles for safety signs and safety markings
- 11.16 BS 5499-4:2013. Graphical symbols and signs. Code of practice for escape route signing
- 11.17 BS 5499-5:2002. Safety signs, including fire safety signs. Signs with specific safety meanings
- 11.18 Health and Safety (Safety Signs and Signals) Regulations 1996. SI 1996 No. 341. The Stationery Office Limited. 1996
- 11.19 Safety Signs and Signals. The Health and Safety (Safety Signs and Signals) Regulations 1996. Guidance on Regulations. L64 (Third edition). Health and Safety Executive. 2015
- 11.20 BS 7176, Specification for resistance to ignition of upholstered furniture for non-domestic seating by testing composites.

- 11.21 BS 5867-2:2008, Fabrics for curtains, drapes and window blinds – Part 2: Flammability requirements – Specification.
- 11.22 BS EN 1125:2008. Building hardware. Panic exit devices operated by a horizontal bar, for use on escape routes. Requirements and test methods
- 11.23 BS EN 12101-2:2017. Smoke and heat control systems. Specification for natural smoke and heat exhaust ventilators
- 11.24 BS EN 12101-3:2015. Smoke and heat control systems. Specification for powered smoke and heat exhaust ventilators (Fans)
- 11.25 BRE Report (BR 187). External fire spread. Building separation and boundary distances, Second edition. Building Research Establishment. 2014
- 11.26 BRE report (BR 135). Fire performance of external thermal insulation for walls of multi-storey buildings, Third edition. Building Research Establishment. 2013
- 11.27 BS 8414-1:2015+A1:2017. Fire performance of external cladding systems. Test method for non-loadbearing external cladding systems applied to the masonry face of a building
- 11.28 BS 8414-2:2015+A1:2017. Fire performance of external cladding systems. Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame
- 11.29 Fire Performance of Green Roofs and Walls. ISBN: 978 1 4098 3997 2. Department for Communities and Local Government. August 2013
- 11.30 BS 9990:2015. Non automatic fire-fighting systems in buildings – Code of practice
- 11.31 BS 3251:1976. Specification. Indicator plates for fire hydrants and emergency water supplies
- 11.32 BS 476-3:2004. Fire tests on building materials and structures. Classification and method of test for external fire exposure to roofs (*incorporating Amendments Nos. 1 and 2*)
- 11.33 BS 476-4:1970. Fire tests on building materials and structures. Non-combustibility tests for materials
- 11.34 BS 476-8:1972. Fire tests on building materials and structures. Test methods and criteria for the fire resistance of elements of building construction (*withdrawn*)
- 11.35 BS 476-20:1987. Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles) (*Incorporating Amendment No. 1*)
- 11.36 BS 476-21:1987. Fire tests on building materials and structures. Method for determination of the fire resistance of loadbearing elements of construction
- 11.37 BS 476-22:1987. Fire tests on building materials and structures. Methods for determination of the fire resistance of non-loadbearing elements of construction
- 11.38 BS 476-23:1987. Fire tests on building materials and structures. Methods for determination of the contribution of components to the fire resistance of a structure (*Incorporating Amendment No. 1*)
- 11.39 BS 476-24:1987. Fire tests on building materials and structures. Method for determination of the fire resistance of ventilation ducts
- 11.40 BS EN 15650:2010. Ventilation for buildings. Fire dampers

- 11.41** BS EN 13501-1:2018. Fire classification of construction products and building elements. Classification using test data from reaction to fire tests.
- 11.42** BS EN 13501-2:2016. Fire classification of construction products and building elements. Classification using data from fire resistance tests, excluding ventilation services
- 11.43** BS EN 13501-3:2005+A1:2009. Fire classification of construction products and building elements. Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers
- 11.44** BS EN 13501-5:2016. Fire classification of construction products and building elements. Classification using data from external fire exposure to roofs tests
- 11.45** BS 5306-8:2012. Fire extinguishing installations and equipment on premises. Selection and positioning of portable fire extinguishers – Code of practice
- 11.46** BS 7273-4:2015. Code of Practice for the operation of fire protection measures. Actuation of release mechanisms for doors
- 11.47** BS EN 12845: 2015+A1:2019. Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance
- 11.48** BS 9251:2014. Fire sprinkler systems for domestic and residential occupancies. Code of practice
- 11.49** BS 9251:2021. Fire sprinkler systems for domestic and residential occupancies. Code of practice
- 11.50** BS 8519:2010. Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications – Code of practice

## Approved Document B – Note regarding technical specifications

Where guidance documents make reference to a named standard or other guidance document, the relevant version of the standard is the one listed at the end of the publication, even where this standard has been superseded or replaced.

Therefore, the British Standards and other guidance documents referenced by this report are generally those referenced by the current publication of the guidance (and not necessarily the most recent version of the standard / guidance document).

Newer versions may be used as a source of guidance provided that they continue to address the relevant requirements of the Building Regulations.

Whilst BS 9251:2014 is the edition of the standard referenced in ADB and BS 9991, sprinklers are provided specifically to offset the additional risk relating to a vulnerable user group (and as a supporting fire protection measure identified in this fire strategy) and, as such, we consider the use of BS 9251:2021 (i.e. the current standard) to be more appropriate.

## A1 Annex A1 - Drawings and information

A.1.1 The following information has been used in the preparation of this report:

### Drawings

**Table A1.1 - Drawings used in preparing this report**

| Reference                    | Title/ description                  | Rev. |
|------------------------------|-------------------------------------|------|
| 10419-Z1-SHP-G200-PL-B3-001  | GA basement level B1                | X07  |
| 10419-Z1-SHP-G200-PL-B2-001  | GA basement level B2                | X067 |
| 10419-Z1-SHP-G200-PL-B1-001  | GA basement level B3                | X03  |
| 10419-Z1-SHP-G200-PL-Grd-001 | GA ground                           | X07  |
| 10419-Z1-SHP-G200-PL-01-001  | GA level 01                         | X07  |
| 10419-Z1-SHP-G200-PL-02-001  | GA level 02                         | X07  |
| 10419-Z1-SHP-G200-PL-03-001  | GA level 03                         | X06  |
| 10419-Z1-SHP-G200-PL-XX-001  | GA typical residential level type 1 | X06  |
| 10419-Z1-SHP-G200-PL-XX-002  | GA typical residential level type 2 | X06  |
| 10419-Z1-SHP-G200-PL-XX-003  | GA typical residential level type 3 | X06  |
| 10419-Z1-SHP-G200-PL-66-001  | GA level 66 – Penthouse             | X05  |
| 10419-Z1-SHP-G200-PL-67-001  | GA level 67 – Amenity               | X06  |
| 10419-Z1-SHP-G200-PL-68-001  | GA level 68 – Amenity               | X05  |
| 10419-Z1-SHP-G200-PL-69-001  | GA level 69 – Amenity               | X05  |
| 10419-Z1-SHP-G200-PL-70-001  | GA level 70 – Restaurant            | X05  |
| 10419-Z1-SHP-G200-PL-RF-001  | GA – Roof                           | X05  |
| 10419-Z1-SHP-G200-EL-XX-001  | GA North elevation                  | X07  |
| 10419-Z1-SHP-G200-EL-XX-002  | GA East elevation                   | X07  |
| 10419-Z1-SHP-G200-EL-XX-003  | GA South elevation                  | X04  |
| 10419-Z1-SHP-G200-EL-XX-004  | GA West elevation                   | X03  |

## A2 Annex A2 - Fire protection systems

### Fire doors

- A.2.1** Fire doors should be specified in accordance with the recommendations of Section 32 of BS 9999 and Section 24 of BS 9991. For initial guidance some of the key recommendations are summarised below.
- A.2.2** All fire doors should satisfy the appropriate fire resistance criteria in accordance with BS 476-22<sup>11.37</sup> or BS EN 13501-2<sup>11.41</sup>. For example, doors satisfying these criteria for 30 minutes fire resistance would be designated FD30 or E30 respectively.
- A.2.3** Doors protecting escape routes also need to restrict smoke leakage. A suffix (S) is added to denote compliance with national tests for smoke leakage and (Sa) for compliance with the European system. For example, doors satisfying the smoke leakage criteria and providing 60 minutes fire resistance would be designated either FD60S or E60Sa.
- A.2.4** The test evidence used to substantiate the rating of a door should be checked to ensure that it is applicable to the whole installed assembly.

### Closers

- A.2.5** All fire doors should be fitted with self-closing devices or automatic release devices (including flat entrance doors), except for fire doors to cupboards and service shafts that will normally be kept locked shut and fire doors forming the protected entrance hall within a flat.
- A.2.6** Where fire doors serve protected stairways that are part of the primary circulation routes and where fire doors sub-divide corridors, the doors may be fitted with an automatic release mechanism.

### Automatic release and unlocking arrangements

- A.2.7** Where the fire strategy refers to electrical control arrangements that unlock, release or open doors in the event of fire, the design, installation, commissioning and maintenance of these arrangements should comply with the appropriate recommendations of BS 7273-4<sup>11.46</sup>.

### Signage

- A.2.8** Except for lift landing doors, all fire doors should be marked with the appropriate fire safety signs complying with BS 5499-5<sup>11.17</sup> according to whether the door is to be:
-  kept closed when not in use;
  -  kept locked when not in use;
  -  held open by an automatic release mechanism.
- A.2.9** Fire doors to cupboards and service ducts should be marked on the outside and all other fire doors should be marked on both sides.

### Fire-resisting construction

- A.2.10** The fire resistance performance of a building element in a fire resistance test is specified in terms of the following criteria:

- **Resistance to collapse** (loadbearing capacity). This applies only to loadbearing elements such as beams, columns, floors and loadbearing walls.
- **Resistance to fire penetration** (integrity). This applies to separating elements such as compartment walls and doors, and indicates the length of time taken before the element is penetrated by significant gaps or flames.
- **Resistance to heat transfer** (insulation). This indicates the length of time taken before a specified temperature is reached on the unexposed (cold) face of the element.

- A.2.11** A compartment floor would need to satisfy all three criteria for the specified period whereas a door is normally only assessed in terms of its integrity performance.
- A.2.12** Fire-resisting glazing must always satisfy the integrity criterion but does not always need to meet the insulation criterion.
- A.2.13** Glazing in compartment walls should satisfy both the integrity and insulation criteria for the specified period of fire resistance. However, where glazed screens provide protection to escape routes, uninsulated glazing may be acceptable in limited areas. Guidance on the use of uninsulated glazing protecting escape routes is given in Section 30.3 of BS 9999.
- A.2.14** The fire resistance of various forms of construction is classified in terms of European tests or National (British Standard) tests.
- A.2.15** In the European system products are classified in accordance with BS EN 13501-2<sup>11.41</sup>.
- A.2.16** Classification under the National system is based on BS 476: Parts 20 to 24<sup>11.35 - 11.39</sup>.

## Sprinklers

- A.2.17** The building will be provided with sprinklers throughout, as set out in Section 6 of this report.
- A.2.18** Sprinkler coverage to residential areas will be provided by means of a BS 9251:2021 system and sprinkler coverage to non-residential accommodation will be provided means of two separate BS EN 12845:2015+A1:2019 systems.
- A.2.19** Where the design of the system include variations from either of the above codes the sprinkler contractor may be unable to issue a certificate of conformity.

## Fire detection and alarm systems

- A.2.20** Non-residential fire detection and alarm systems should comply with BS 5839-1<sup>11.10</sup>.
- A.2.21** The extent of detector coverage is determined by the category of system. Life safety systems are subdivided into different system types depending upon the extent of detector coverage:
- L1 - Detectors installed throughout all areas of the building.
  - L2 - Includes areas covered by an L3 system plus full coverage of specified higher risk rooms.
  - L3 - Includes the areas covered by an L4 system plus additional detectors in the rooms opening onto escape routes adjacent to the doors onto those escape routes.
  - L4 - Detectors installed within all escape stairways, corridors and other areas forming common escape routes.
  - L5 - Systems in which the protected area(s) and/or location of detectors are designed to satisfy a specific fire safety objective (with coverage different from categories L1 to L4). The extent of coverage may be more or less than in the other categories.

- A.2.22** Detector spacing will vary according to room and ceiling geometry but typically under a flat ceiling smoke detectors should be located so that any point within a room is within 7.5m of a smoke detector or 5.3m of a heat detector.

## Emergency lighting

- A.2.23** Emergency lighting should be installed in accordance with the recommendations of BS 5266-1<sup>11.14</sup>.
- A.2.24** The primary purpose of emergency lighting is to illuminate escape routes and safety equipment.
- A.2.25** Specific recommendations are given in Table 8 of BS 9999 but an emergency lighting system would typically cover the following areas:
- exit doors;
  - escape routes;
  - areas immediately outside final exits; and external escape routes;
  - emergency escape signs;
  - stairways;
  - open plan areas of more than 60m;
  - changes in floor level;
  - windowless rooms;
  - all areas open to the public;
  - toilet accommodation over 8m<sup>2</sup>;
  - emergency control room;
  - electrical generator, switchgear and battery rooms.
- A.2.26** It is recommended that units with a standby power duration of 3 hours be utilised as this will often enable reoccupation of the building immediately after a power failure.

## Electrical power supplies

- A.2.27** Where it is essential for certain electrical equipment to continue to function during a fire, provisions should be made to ensure a secure supply on a protected circuit.
- A.2.28** Guidance on the selection and installation of protected circuits is given in BS 8519<sup>11.50</sup>, which makes reference to the performance recommendations in related standards, e.g. BS 5839-1 for fire alarm systems, BS 5266-1 for emergency lighting, and others.
- A.2.29** The key criteria for power supply systems to fire alarms, emergency lighting, fire extinguishing systems, sprinkler systems, smoke control systems, firefighting shaft systems, firefighting and evacuation lifts, motorised fire shutters, CCTV systems installed for monitoring means of escape, and data communications systems that link fire safety systems are outlined below but reference should be made to BS 8519 for detailed guidance.

## Protected circuits

- A.2.30** Protected circuits should meet the following criteria:
- Cables should:
    - at least meet the requirements of PH30 classification when tested in accordance with BS EN 50200:2015 (incorporating Annex E), or an equivalent standard;
    - be protected against exposure to the fire by:
      - only passing through routes of negligible fire load or;

- separation from any significant fire risk by a wall, partition or floor with a fire resistance not less than that required for the building;
- be protected from mechanical damage;  
be supported by non-combustible support systems.

- Protected circuits should be separate from any circuit provided for any other purpose.

## Secondary power supply

**A.2.31** A secondary power supply will be provided for all life safety systems, by means of an automatically starting generator and/or back-up batteries (where the power demand for a system is low).

**A.2.32** The secondary supply should provide power within 15 seconds of failure of the primary supply and be of sufficient capacity to maintain all life safety systems in operation for a minimum of 3 hours.

- The electrical power supply to life safety and fire protection equipment should be separate from all other circuits in the building so that the failure of other equipment does not render the installation inoperative.
- Each connection to the power supply should be via an isolating protective device reserved solely for the life safety and fire protection equipment and independent of any other main or sub-main circuit. Such isolating protective devices (with high-rupturing safety devices) should be clearly labelled and identified as to their purpose. They should be secured against unauthorized operation and should, except for maintenance, be kept locked on.
- The supply to these isolating protective devices should be independent of the main switch for the building and be appropriately labelled.
- The distribution should be so organised that the secondary supply remains live when the remainder of the building supplies are isolated in an emergency.
- The primary and secondary sources of power should be protected against fire and water damage. They should be separated from each other, so that a failure of one system does not affect the other.
- Cables, switchgear and other equipment transmitting the secondary power supply should be separated from those of the primary supply.
- Monitoring facilities should be provided to show that power is available up to the final control point, e.g. motor contactor, for all fire safety systems.

## Smoke control systems

**A.2.33** The components of any smoke ventilation system provided in support of the means of escape should comply with the appropriate part of BS EN 12101:

Part 1: Specification for smoke barriers - requirements and test methods;

Part 2: Specification for natural smoke and heat exhaust ventilators;

Part 3: Specification for powered smoke and heat exhaust ventilators;

Part 4: Natural smoke and heat exhaust ventilation systems -  
Installation and test methods.

**A.2.34** Secure power supplies should be provided for powered smoke ventilation systems (see A.2.27 et seq.).

## A3 Annex A3 - Boundary distance calculations

- A.3.1** For each elevation the calculation for the largest compartment is shown in the table below, as this would be most onerous condition.
- A.3.2** If the most onerous compartment for the elevation is found not to require any protected external wall, it is reasonably assumed that the smaller compartments on the same elevation with the same boundary distance will also be considered compliant.

| Elevation                                                     | Boundary distance (m) | Dimensions of elevation (m) | Allowable UPA (%) of elevation | Area of protected elevation required (m <sup>2</sup> ) |
|---------------------------------------------------------------|-----------------------|-----------------------------|--------------------------------|--------------------------------------------------------|
| Ground floor (Amenity and Ancillary)                          |                       |                             |                                |                                                        |
| North elevation (Residential reception double height space) # | 10.44*                | 36.64 x 7.64                | 100                            | 0                                                      |
| East elevation (Restaurant reception) #                       | 4.86*                 | 24.03 x 4                   | 100                            | 0                                                      |
| South East (Generator room)                                   | 4.86                  | 10.52 x 7.64                | 35.80                          | 51.6                                                   |
| South (Restaurant store)                                      | 32.03*                | 4.92 x 4                    | 100                            | 0                                                      |
| South west elevation (Switch room)                            | 43.21                 | 13 x 4                      | 100                            | 0                                                      |
| West (Substation)                                             | 20.02                 | 7 x 4                       | 100                            | 0                                                      |
| North west (Bike store)                                       | 8.25*                 | 13.85 x 4                   | 100                            | 0                                                      |
| Level 1 (Amenity)                                             |                       |                             |                                |                                                        |
| East Elevation (Store room/ flexi-use)                        | 4.86*                 | 11.56 x 3.86                | 100                            | 0                                                      |
| South Elevation (Store room)                                  | 32.03*                | 9.30 x 3.86                 | 100                            | 0                                                      |
| West Elevation (Co-working space)                             | 28.34*                | 16.60 x 3.86                | 100                            | 0                                                      |

| Typical residential floor type 1 |        |              |     |   |
|----------------------------------|--------|--------------|-----|---|
| North Elevation<br>(Two bed) #   | 13.95* | 12.18 x 2.85 | 100 | 0 |
| East elevation<br>(Three bed) #  | 12.17* | 10.70 x 2.85 | 100 | 0 |
| South elevation<br>(Two bed) #   | 32.03* | 12.30 x 2.85 | 100 | 0 |
| West elevation<br>(Two bed) #    | 20.50* | 10.76 x 2.85 | 100 | 0 |
| Typical residential floor type 2 |        |              |     |   |
| North elevation<br>(Two bed) #   | 13.95* | 10.60 x 2.85 | 100 | 0 |
| East elevation<br>(Three bed) #  | 12.17* | 12.30 x 2.85 | 100 | 0 |
| South elevation<br>(Two bed) #   | 32.03* | 10.60 x 2.85 | 100 | 0 |
| West elevation<br>(Two bed) #    | 20.50* | 12.30 x 2.85 | 100 | 0 |
| Typical residential floor type 3 |        |              |     |   |
| North elevation<br>(Two bed) #   | 13.95* | 10.92 x 2.85 | 100 | 0 |
| East elevation<br>(Three bed) #  | 12.17* | 12.30 x 2.85 | 100 | 0 |
| South elevation<br>(Two bed) #   | 32.03* | 10.92 x 2.85 | 100 | 0 |
| West elevation<br>(Two bed) #    | 20.50* | 12.30 x 2.85 | 100 | 0 |
| Level 66 (Penthouses)            |        |              |     |   |
| North elevation<br>(Two bed) #   | 13.95* | 15.45 x 3.5  | 100 | 0 |
| East elevation<br>(Three bed) #  | 12.17* | 18.43 x 3.5  | 100 | 0 |
| South elevation<br>(Three bed) # | 32.03* | 15.23 x 3.5  | 100 | 0 |

|                                                   |        |             |     |   |
|---------------------------------------------------|--------|-------------|-----|---|
| West elevation<br>(Three bed) #                   | 20.50* | 18.43 x 3.5 | 100 | 0 |
| Level 67 (Amenity)                                |        |             |     |   |
| North elevation<br>(Pool plant)                   | 13.95* | 15.45 x 3.5 | 100 | 0 |
| East elevation<br>(Gym)                           | 12.17* | 18.43 x 3.5 | 100 | 0 |
| South elevation<br>(Gym)                          | 32.03* | 15.23 x 3.5 | 100 | 0 |
| West elevation<br>(Pool plant)                    | 20.50* | 18.43 x 3.5 | 100 | 0 |
| Level 68 (Amenity)                                |        |             |     |   |
| North elevation<br>(Pool, double<br>height space) | 13.95* | 31.25 x 7   | 100 | 0 |
| East elevation<br>(Studio)                        | 12.17* | 21.44 x 3.5 | 100 | 0 |
| South elevation<br>(Reception/ lounge)            | 32.03* | 9.18 x 73.5 | 100 | 0 |
| West elevation<br>(Pool, double<br>height space)  | 20.50* | 18.43 x 7   | 100 | 0 |
| Level 69 (Amenity)                                |        |             |     |   |
| East elevation<br>(Studio)                        | 12.17* | 21.44 x 3.5 | 100 | 0 |
| South elevation<br>(Reception/ lounge)            | 32.03* | 9.18 x 3.5  | 100 | 0 |
| Level 70 (Restaurant)                             |        |             |     |   |
| North elevation                                   | 13.95* | 31.25 x 4.7 | 100 | 0 |
| East elevation                                    | 12.17* | 31.25 x 4.7 | 100 | 0 |
| South elevation                                   | 32.03* | 31.25 x 4.7 | 100 | 0 |
| West elevation                                    | 20.50* | 31.25 x 4.7 | 100 | 0 |

Notes:

# Reduced fire load for residential and reception using emitted radiation of 84 kW/m<sup>2</sup> as per BRE 187 Table 3

\* Site boundary distance doubled within calculations, as compartment is sprinklered.

## A4 Annex A4 - Relevant Buildings: Combustibility of external walls

### Regulation 7

#### Regulations 7(2) and 7(3)

**A.4.1** As described in section 7 of this report, the main building will be a 'relevant building' as defined under Regulation 7(4) of the Building Regulations.

**A.4.2** Building Regulations 7(1A), 7(2) and 7(3) state the following requirements for relevant buildings. These requirements are not functional and must be adhered to directly.

{Regulation 7(1A)} Building work shall be carried out so that relevant metal composite material does not become part of an external wall, or specified attachment, of any building.

{Regulation 7(2)} Subject to paragraph (3), building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or Class A1 (classified in accordance with the reaction to fire classification).

{Regulation 7(3)} Paragraph (2) does not apply to—

*(a) cavity trays when used between two leaves of masonry;*

*(b) any part of a roof (other than any part of a roof which falls within paragraph (iv) of regulation 2(6)) if that part is connected to an external wall;*

*(c) door frames and doors;*

*(d) electrical installations;*

*(da) fire optic cables;*

*(e) insulation and water proofing materials used below ground level or up to 300mm above that level;*

*(f) intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;*

*(g) membranes;*

*(h) seals, gaskets, fixings, sealants and backer rods;*

*(ha) components associated with a solar shading device, excluding components whose primary function is to provide shade or deflect sunlight, such as the awning curtain or slats;*

*(i) thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or*

*(j) window frames and glass.*

*(k) materials which form the top horizontal floor layer of a balcony which are of European Classification A1fl or A2fl-sl (classified in accordance with the reaction to fire classification) provided that the entire layer has an impermeable substrate under it.*

## Approved Document B guidance: 'Regulation 7(2) and requirement B4'

**A.4.3** The guidance in Section 12 of Approved Document B under 'Regulation 7(2) and requirement B4' is as follows:

### Materials

Regulation 7(1)(a) requires that materials used in building work are appropriate for the circumstances in which they are used. Regulation 7(2) sets requirements in respect of external walls and specified attachments in relevant buildings.

**Note:** Guidance on Regulation 7(1) can be found in Approved Document 7<sup>11.8</sup>.

Regulation 7(2) applies to any building with a storey at least 18m above ground level (as measured in accordance with Diagram D6 in Appendix D [of ADB]) and which contains one or more dwellings; an institution; or a room for residential purposes (excluding any room in a hostel, hotel or a boarding house). It requires that all materials which become part of an external wall or specified attachment achieve Class A2-s1, d0 or Class A1, other than those exempted by Regulation 7(3).

**Note 1:** The above includes student accommodation, care homes, sheltered housing, hospitals and dormitories in boarding schools. See Regulation 7(4) for the definition of relevant buildings.

**Note 2:** The requirement in Regulation 7(2) is limited to materials achieving European classification Class A2-s1, d0 or Class A1.

External walls and specified attachments are defined in Regulation 2 and these definitions include any parts of the external wall as well as balconies, solar panels and sun shading.

Regulation 7(3) provides an exemption for certain components found in external walls and specified attachments.

### Additional considerations

The provisions of Regulation 7 apply in addition to requirement B4. Therefore, for buildings described in Regulation 7(4), the potential impact of any products incorporated into or onto the external walls and specified attachments should be carefully considered with regard to their number, size, orientation and position.

Particular attention is drawn to the following points.

- a) *Membranes used as part of the external wall construction above ground level should achieve a minimum classification of [European] Class B-s3, d0.*
- b) *Internal linings should comply with the guidance provided in Section 6 [of ADB].*
- c) *Any part of a roof should achieve the minimum performance as detailed in Section 14 [of ADB].*
- d) *As per Regulation 7(3), window frames and glass (including laminated glass) are exempted from Regulation 7(2). Window spandrel panels and infill panels must comply with Regulation 7(2).*
- e) *Thermal breaks are small elements used as part of the external wall construction to restrict thermal bridging. There is no minimum performance for these materials. However, they should not span two compartments and should be limited in size to the*

*minimum required to restrict the thermal bridging (the principal insulation layer is not to be regarded as a thermal break).*

- f) Regulation 7(2) only applies to specified attachments. Shop front signs and similar attachments are not covered by the requirements of Regulation 7(2), although attention is drawn to paragraph 12.16g [of ADB].*

*Whilst Regulation 7(2) applies to materials which become part of an external wall or specified attachment, consideration should be given to other attachments to the wall which could impact on the risk of fire spread over the wall.*

## A5 Annex A5 - Minutes of Statutory Authorities initial design review

Meeting minutes | TS220375-MM01-Issue01

### Meeting minutes

**tenos**

Meeting: Great Jackson Street, Crown Street Phase 3 and Plot D – Fire Safety Design Review      Date: 30/11/2022  
Time: 10.30am

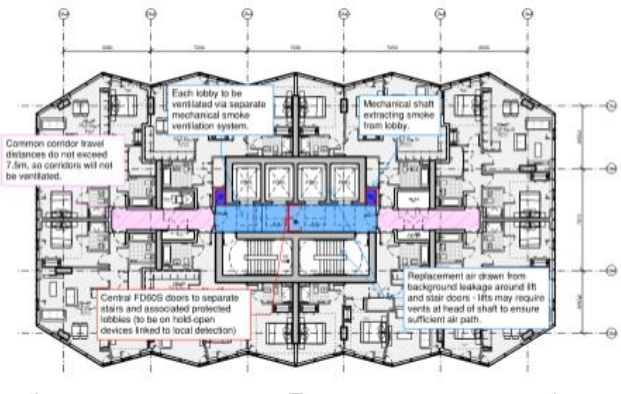
Location: SimpsonHaugh, 4 Riverside, Commercial St, Manchester

Attendees: Peter Devine & Neil Unsworth - GMFRS (High-rise Team)  
Alex Dowsett & Scott Bonner - MCC Building Control  
Dave Green & Andy Edwards - SimpsonHaugh  
Pete Mills & James Sidlow - Renaker  
Alec Storey & Hamish Parkes - Tenos

| Item No. | Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | <b>Development overview</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1.1      | DG provided an overview of the development that will comprise of two sites; CS3 site and Plot D site.<br>CS3 site will provide four residential towers - E1 & E2 @ 51 storeys and C7 & C8 @ 53 storeys.<br>Plot D site will provide a single residential tower (@ 71 storeys) and a lower-rise independent office building adjacent.<br><br>Each tower is to be served by two adjacent, but separated, stair cores.<br><br>DG confirmed that each residential tower (including its associated basement car park) will be designed to operate as an independent building (i.e. no sharing of services, generator, fire safety systems, etc).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>2</b> | <b>CS3 Site</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2.1      | DG provided latest design developments, confirming that each tower will comprise: <ul style="list-style-type: none"><li>• Ground floor - residential entrance, BOH/ancillary accommodation, and independent retail units</li><li>• Level 01 – Residents amenity accommodation only</li><li>• Level 02 – Four apartments within a 'recessed' floorplate</li><li>• Level 03+ – Typical apartment levels</li><li>• Three basement levels – Residents car parking and plant</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2.2      | AS outlined that the general fire strategy provisions proposed for each building have been developed with consideration of the current and draft BS 9991 guidance, based on each being >45m in height, as follows: <ul style="list-style-type: none"><li>• 120 minute structure (reinforced concrete).</li><li>• BS 9251 sprinkler system to residential apartments and corridors.</li><li>• BS EN 12845 sprinkler system serving basement and ancillary accommodation areas (NB – system to be design to BS EN, as referenced in guidance documents, rather than LPC property protection standards).</li><li>• Firefighting stair and lift serving upper floors, accessed from sterile lobby.</li><li>• Evacuation lifts serving upper floor, accessed from sterile lobby.</li><li>• Basement is less than 10m deep, so does not require firefighting lift to serve.</li><li>• Wet rising fire main.</li><li>• Mechanical smoke ventilation systems to protect cores and common corridors (see Section 3 below).</li><li>• Impulse jet fan mechanical smoke extract system to basement car parking levels.</li><li>• Evacuation Alert system.</li></ul> |

## Meeting minutes | TS220375-MM01-Issue01

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.3 | <p>MCC BC noted that, due to the height of the buildings (i.e. &gt;50m), key fire safety provisions should not be simply 'by the book' but should be fully considered and justified within the fire strategy report.</p> <p>AS noted that 120 minute structural fire resistance has been considered reasonable on the basis of reinforced concrete construction, Regulation 7 compliant external walls, sprinklers throughout, and high level of compartmentation at each apartment floor level - GMFRS and MCC BC stated provisional acceptance of this.</p>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2.4 | GMFRS agreed with proposal to provide protected corridor access to the firefighting shaft of each tower from the adjacent roadway, which will provide vehicle parking and access to the wet fire main inlet point. On this basis, Fire Service vehicle access will be to surrounding roadways only (i.e. not into site landscaping). Each tower is to have 24-hour concierge, so it is highly likely that the initial point of arrival for the Fire Service will be reception (from where the FF shaft can also be accessed).                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2.5 | DG confirmed that the 'undercroft' pedestrian route between each pair of towers (i.e. adjacent to the entrance reception spaces) will be covered by a roof at Level 02 but will be an 'external' space open at each end.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2.6 | GMFRS confirmed their preference for the main fire alarm panel, Evacuation Alert system panel, and disabled refuge panel in each building to be within the Ground floor entrance reception space. Repeater panels for the fire alarm systems should be provided in the firefighting stair access corridors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2.7 | GMFRS confirmed that they would not require a wet rising fire main within the secondary stair in each tower, on the basis that the hose distances from the wet fire main outlet within the firefighting stair to the most remote part of each floor does not exceed 60m.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2.8 | GMFRS noted requirement for Building Information Box for each tower and stated preference for a 'high rise information plaque' incorporating a typical floor plan to be provided at access level (details to be confirmed).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3   | <b>CS3 core/ventilation arrangement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3.1 | <p>Towers E1 and E2, which have a slightly larger footprint will share the same core, corridor and ventilation arrangement. The slightly smaller towers C7 and C8 will share same core, corridor and ventilation arrangement, which will differ to Blocks E1 and E2.</p> <p>Each tower is to be served by two adjacent, but separated, stair cores – typical floor level layouts for each tower were presented (see Figures 1 and 2 below).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3.2 | GMFRS and MCC BC confirmed that they will require the doors separating the lobbies of the adjacent stair cores in each building to be retained as currently shown (regardless of what the final recommendations of the updated BS 9991 are) and requested that these doors are provided with hold-open devices, linked to localised smoke detection, so that they are not 'damaged' through daily use (i.e. held open in all but fire conditions).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3.3 | <p>AS outlined ventilation provisions for towers C7 and C8 as follows:</p> <ul style="list-style-type: none"> <li>Each stair/lift lobby will be ventilated by means of a single mechanical smoke extract shaft, activated by smoke detection within the associated common corridor and lobby (i.e. system in each half of floor activates independently).</li> <li>Each extract shaft system will incorporate pressure sensors and a fan inverter, so that extract rates can be ramped up and down to prevent excessive pressure differentials.</li> <li>Replacement air to ventilated lobby will be drawn from leakage around stair and lift doors - AOV to be provided at head of stair and vents may be required to lift shafts to increase background leakage (TBC as part of system design).</li> <li>As the common corridor travel distances do not exceed 7.5m, they will not be ventilated, in line with BS 9991 guidance for ventilated sterile lobby arrangement.</li> </ul> |

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            | <p><b>Figure 1 – Towers C7 and C8 indicative core arrangement</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>3.4</p> | <p>AS outlined ventilation provisions for towers E1 and E2 as follows:</p> <ul style="list-style-type: none"> <li>As common corridor travel distances will exceed 7.5m (but not 15m), they will each be ventilated, by means of a single mechanical smoke extract shaft provided at the end of common corridor (i.e. remote from the stair core).</li> <li>Each stair/lift lobby will be provided with a single mechanical air inlet shaft, which will provide replacement air for the corridor extract shaft and maintain a net air flow away from stair core.</li> <li>The door between the stair/lift lobby and common corridor will open into the corridor to enable self-balancing of pressure differentials (i.e. door may be pulled open slightly), if necessary (TBC as part of system design).</li> <li>AOV to be provided at head of stair.</li> <li>Ventilation provisions will be activated by smoke detection within the associated common corridor and lobby (i.e. system in each half of floor activates independently).</li> </ul> |
|            | <p><b>Figure 2 – Towers E1 and E1 indicative core arrangement</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>3.5</p> | <p>GMFRS confirmed acceptance of ventilation proposals on the basis that the mechanical smoke ventilation system designs will be demonstrated to not create adverse pressure</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | differentials (that may result in door opening difficulties) and will be modelled to demonstrate continued operation when subject to adverse wind conditions. CFD modelling and cold-smoke testing will be provided by the specialist designer/sub-contractor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3.5      | MCC BC noted their preference for a pressurisation system in high-rise buildings, but acknowledged that the proposals as presented appear to comply with the draft BS 9991 guidance. Cross-reference to the final issue of the new BS 9991 (when released) would be required to ensure the solution is still compliant.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3.6      | MCC BC and GMFRS agreed that cables laid in metal cable trays (installed facing upwards to support cables) and water and sprinkler pipework may reasonably be run within the ceiling void of the sprinklered common corridors and sterile lobbies without the need for fire-resisting ceilings, but no pieces of plant equipment (e.g. air-handling units) should be housed in these ceiling voids.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3.7      | MCC BC requested that studio apartments (i.e. without an internal protected entrance hall) are provided with upgraded entrance doors (i.e. FD60S) and kitchen cooking equipment is located remote from escape route through apartment (i.e. as per draft BS 9991 guidance).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3.8      | DG noted that each CS3 building will be provided with a third escape stair that serves the Level 01 amenity accommodation only (and discharges direct to outside at Ground floor), in order to achieve compliant travel distances and provide adequate escape width for the proposed occupancy within this accommodation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>4</b> | <b>CS3 basement car park</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 4.1      | <p>AS outlined that each tower will have a three storey basement providing residents car parking, cycle storage and plant (i.e. sprinkler, wet riser and domestic water tanks) and will be served by a single stair (firefighting stair) and single dedicated basement access lift (NB - as the lowest basement level is less than 10m in depth the firefighting lift will not continue down to serve the basement levels).</p> <p>Basement levels will be sprinklered and the car parking will be ventilated by means of an impulse jet fan mechanical smoke extract system (plant/ancillary rooms accessed from the car parking to be accessed directly to enable smoke ventilation via the car park system).</p> <p>The basement of each tower is completely independent with 120 minute compartment walls between each tower basement.</p> |
| 4.2      | AS noted that it has been considered reasonable for escape calculations for basement levels to be based on 1 person per parking space, given that this is a residential car park only. On this basis, the occupancy at each basement level will be less than 60 persons.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 4.3      | <p>GMFRS requested that consideration be given to the location of EV parking bays.</p> <p>GMFRS stated a preference for EV parking bays to be located away from the stair core, to be outside of the tower footprint above, to be adjacent to the smoke extract point, and to be at the uppermost basement level, where possible.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4.4      | Discussion was had with regards to the locating the dedicated basement lift in each building adjacent to the main core, such that the protected lobbies are connected, in order to assist with disabled evacuation from the basement levels.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>5</b> | <b>Plot D site</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 5.1      | <p>AE provided an overview of the Plot D site, which will comprise of the residential tower and the adjacent office building.</p> <p>The Plot D tower will comprise:</p> <ul style="list-style-type: none"> <li>• Ground floor - residential entrance, BOH/ancillary accommodation, and independent restaurant entrance</li> <li>• Level 01 – Residents amenity accommodation, including roof terrace</li> <li>• Level 02 – Core and upper roof terrace only</li> </ul>                                                                                                                                                                                                                                                                                                                                                                        |

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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|     | <ul style="list-style-type: none"> <li>Level 03 – Core only (double height space over upper roof terrace)</li> <li>Levels 04-66 – Typical apartment levels</li> <li>Levels 67-69 – Residents amenity accommodation (including gym and pool)</li> <li>Level 70 – Restaurant (open to the general public)</li> <li>Three basement levels – Residents car parking and plant</li> </ul> <p>The office building will comprise:</p> <ul style="list-style-type: none"> <li>Ground floor – Office entrance, BOH/ancillary accommodation, and cafe</li> <li>Level 01 – Office and roof terrace</li> <li>Level 02 – Office</li> <li>Level 03 – Office</li> <li>Level 04 – Office and roof terrace</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 5.2 | MCC BC requested that consideration be given to materials and contents of terraces/podium roofs as plan develop, but advised that greening/trees/etc can be placed on the podium roofs provided they are at least 4m away from the tower façade.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 5.3 | <p>AS noted that the general fire strategy provisions proposed for the Plot D residential tower aligns with towers C7 and C8 of the CS3 site, as follows:</p> <ul style="list-style-type: none"> <li>120 minute structure (reinforced concrete).</li> <li>BS 9251 sprinkler system to residential apartments and corridors.</li> <li>Two separate BS EN 12845 sprinkler systems will be provided – the first to serve basement and lower ancillary accommodation areas and the second to serve the top-floor restaurant and amenity accommodation at the upper floors (NB – systems to be design to BS EN, as referenced in guidance documents, rather than LPC property protection standards).</li> <li>Firefighting stair and lift serving upper floors, accessed from sterile lobby.</li> <li>Evacuation lifts serving upper floor, accessed from sterile lobby.</li> <li>Basement is less than 10m deep, so does not require firefighting lift to serve.</li> <li>Wet rising fire main.</li> <li>Mechanical smoke ventilation systems to protect cores.</li> <li>Impulse jet fan mechanical smoke extract system to basement car parking levels.</li> <li>Evacuation Alert system.</li> </ul> |
| 5.4 | <p>AS outlined that the residential levels ventilation provisions for the Plot D tower will align with towers C7 and C8 of the CS3 site, as follows (and Figure 3 below):</p> <ul style="list-style-type: none"> <li>Each stair/lift lobby will be ventilated by means of a single mechanical smoke extract shaft, activated by smoke detection within the associated common corridor and lobby (i.e. system in each half of floor activates independently).</li> <li>Each extract shaft system will incorporate pressure sensors and a fan inverter, so that extract rates can be ramped up and down to prevent excessive pressure differentials.</li> <li>Replacement air to ventilated lobby will be drawn from leakage around stair and lift doors - AOV to be provided at head of stair and vents may be required to lift shafts to increase background leakage (TBC as part of system design).</li> <li>As the common corridor travel distances do not exceed 7.5m, they will not be ventilated, in line with BS 9991 guidance for ventilated sterile lobby arrangement.</li> </ul>                                                                                                         |

## Meeting minutes | TS220375-MM01-Issue01

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|          | GMFRS and MCC BC questioned how restaurant occupancies would be limited to meet exit capacity limits, noting that a conventional restaurant floor space factor could infer a much higher potential occupancy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|          | MCC BC raised the question of security measures to prevent members of public leaving restaurant and entering residential corridors.<br><br>GMFRS suggested that consideration be given the use of CCTV within stair/lift lobbies at each floor level to assist with security and provide additional means of identifying fire incidents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>7</b> | <b>Plot D basement car park</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 7.1      | AS outlined that the Plot D tower will sit above a three storey basement providing residents car parking, cycle storage and plant (i.e. sprinkler, wet riser and domestic water tanks) and will be served by the firefighting stair within the main core (with multiple lobby access points), a secondary escape stair (not indicated at the time of meeting, but now included, which discharges direct to outside at Ground floor), and a single dedicated basement access lift (NB - as the lowest basement level is less than 10m in depth the firefighting lift will not continue down to serve the basement levels).<br><br>Basement levels will be sprinklered and the car parking will be ventilated by means of an impulse jet fan mechanical smoke extract system (plant/ancillary rooms accessed from the car parking to be accessed directly to enable smoke ventilation via the car park system). |
| 7.2      | AS noted that it has been considered reasonable for escape calculations for basement levels to be based on 1 person per parking space, given that this is a residential car park only. On this basis, the occupancy at each basement level will be less than 80 persons.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 7.3      | GMFRS requested that consideration be given to the location of EV parking bays.<br><br>GMFRS stated a preference for EV parking bays to be located away from the stair core, to be outside of the tower footprint above, to be adjacent to the smoke extract point, and to be at the uppermost basement level, where possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>8</b> | <b>Plot D office</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 8.1      | AE provided an overview of the independent five-storey office building adjacent to the Plot D tower. It was noted that the height of the building was subject to review as currently marginally over 18m.<br><br>The office building will be served by a main stair and lift core and a secondary escape stair, which will both discharge to outside at Ground floor (either directly or via a protected corridor).<br><br>Whilst located above the Plot D basement, the office building will not connect to the basement and will not share any provisions/services.                                                                                                                                                                                                                                                                                                                                         |
| 8.2      | AS noted that, as the office building is under 30m and unconnected to the Plot D basement, it is not intended for it to be sprinklered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 8.3      | <u>Post-meeting Note:</u><br>Plans for the office building have been amended and the top finished floor level of the building is now below 18m. As such, in accordance with Building Regulations guidance, there is no longer a requirement for a firefighting shaft and associated secondary power supply back-up generator, plus the building structure now only requires 60 minutes fire-resistance.<br><br>The secondary basement escape stair discharging direct to outside at Ground floor will be located within the footprint of the office building but will be entirely separated from the office building accommodation by means of impermeable 120 minute construction.                                                                                                                                                                                                                           |

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