

# Stage 3 Fire Strategy Report

## High Cross

Version	Status	Date Issued	Comment	Prepared by	Reviewed by	Verified by
01	Draft	15.05.2020	-	EP	AC	AC
<b>02</b>	Final	03.07.2020	Updated to latest design	EP	AC	AC
03	Issued	23.11.2021	Updated to latest design	EP	AT	AT

## LIST OF AMENDMENTS

The table below lists the amendments made within the body of this report during the different versions. It should be noted that only the main changes are illustrated and therefore, it is recommended that the whole report is studied.

Version 3 (V3)		
Section	Page	Amendment reference
2.2	5	Table 1 updated.
2.2	5 to 7	Figure 2 to 6 updated.
3	8 to 10	Deviations table updated.
4.2	11	Reference to external sounders updated.
4.3	11 to 12	Table 3 updated.
4.5	13 to 14	Reference to shop and commercial accommodation updated.
4.6	14 to 15	Reference to assembly and recreation accommodation updated.
4.7	15 to 16	Reference to office accommodation updated.
4.8	16	Reference to ancillary accommodation updated.
4.9	18	Table 8 updated.
5.3	22	Table 11 updated.
7.5	31 to 32	Reference to firefighting lobby ventilation updated.
App A	36	Reference to drawings updated.

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## **1 INTRODUCTION**

### **1.1 SCOPE**

FCS-Live have been appointed to produce a Stage 3 Fire Strategy report for the project known as High Cross, Tottenham Hale, London, N15 4QN.

The Stage 3 Fire Strategy is intended for discussion between the design team and to assist the design team in gaining approval in principle from the Building Control Body.

This report is based on the guidance illustrated in Approved Document B – Volume 2: 2019 (ADB).

This report follows the main sections of ADB; however, in specific areas fire engineering has been utilised to justify deviations from the guidance. Such deviations are presented in each section as appropriate. These justifications are subject to approval by the Approving Authorities and until then should be registered as approvals risk items.

The design team should ensure that the contents of this report are fully incorporated in the building design.

This report should form part of the information handed over to the end user, as per Regulation 38 of The Building Regulations 2010 (as amended in 2018).

### **1.2 PRIMARY LEGISLATION**

The primary fire legislation applicable to this development is as follows.

- The Building Regulations 2010 (as amended in 2018): Pre-occupation;
- The Regulatory Reform (Fire Safety) Order 2005: Post-occupation;
- Construction (Design and Management) Regulations 2015;

#### **The Building Regulations: 2010 (as amended in 2018)**

Approved Document B – Volume 2: 2019 is guidance approved and issued by the Secretary of State for the purpose of providing practical guidance with respect of the requirements of Schedule 1 and Regulation 7 of The Building Regulations 2010 (as amended in 2018).

Responsibility for deciding if the requirements of the Regulations have been met, rests with the Building Control body.

#### **Regulatory Reform (Fire Safety) Order 2005**

The Regulatory Reform (Fire Safety) Order 2005 (FSO) is a primary piece of legislation relating to fire safety in existing, non-domestic premises and the common areas of residential buildings and is enforced by the local Fire Authority.

Responsibility for ensuring that the requirements of the Order are met, rests with the 'Responsible Person', who must undertake (or cause to undertake) a risk assessment for the purpose of identifying the fire precautions required.

#### **Construction, Design and Management Regulations 2015**

UK projects are subject to the requirements of the Construction (Design and Management) Regulations 2015 (CDM).

Where any conclusions or recommendations contained within this report specify materials, products, or forms of construction, these will have been assessed in accordance with CDM - Regulations 11 and 18 (duties for designers).

If these involve significant residual risks or health and safety critical assumptions, this information will be made available to the principal designer. Where the architect or other consultants use all or part of this report to specify works, they are assumed to be competent in alerting the client, principal designer, designers, contractors and building occupier of issues arising under the CDM.

### **Statutory Consultation**

During the Building Regulations application process, the Building Control body is required by law to consult with the Fire Authority. The purpose of this consultation is to give the Fire Authority an opportunity to make observations, with respect to The Building Regulations 2010 (as amended in 2018), and to provide an opportunity to make the applicant aware of action that may have to be taken in order to meet the requirements of the FSO.

If the Fire Authority require physical changes to be made to the building, in order to meet the requirements of the FSO, the Building Control body has a legal responsibility to pass on all comments and recommendations to the applicant/responsible person. The applicant should take note of all comments and where necessary, implement these into the buildings design.

## **1.3 FIRE SAFETY OBJECTIVES**

This report aims to satisfy the following statutory fire safety objectives.

### **Occupants' life safety**

The occupants must be able to escape the building without being exposed to hazardous or untenable conditions. This shall be satisfied by meeting the Functional Requirements B1 to B3 of The Building Regulations 2010 (as amended in 2018).

### **Protection of adjoining buildings**

Structures must not collapse onto adjacent property and fire spread by radiation shall not occur. This shall be satisfied by meeting the Functional Requirement B4 of The Building Regulations 2010 (as amended in 2018).

### **Firefighters' life safety**

Firefighters must be given a reasonable vehicular access to allow time to rescue any remaining occupants before hazardous conditions develop or structure collapse occurs. This shall be satisfied by meeting the Functional Requirement B5 of The Building Regulations 2010 (as amended in 2018).

## **1.4 SOURCES OF INFORMATION**

This report is based on the drawings referenced in Appendix A.

## **1.5 LIMITATIONS AND ASSUMPTIONS**

This report is based on the following assumptions and limitations.

- This report is based on the information provided by ROAR Architects and Purpose Group and the drawings listed in Appendix A;
- The description of the works which have been covered by the report are listed in §1.1;
- It has been assumed that all other parts of the building design are in accordance with The Building Regulations 2010 (as amended in 2018);
- It is assumed that the completed development will be used as defined (under the specific purpose groups and level of fire risk attached to these uses). Any change to the use or level of fire risk within the development and its surroundings will require further assessment and potentially a new fire strategy report to achieve compliance;
- The development is to be managed, operated, and maintained in accordance with the guidance provided in each relevant section of this report;

## 2 INTRODUCTION

### 2.1 SITE LOCATION

The site is located at Tottenham Hale, London, N15 4QN, as shown in the figure below.

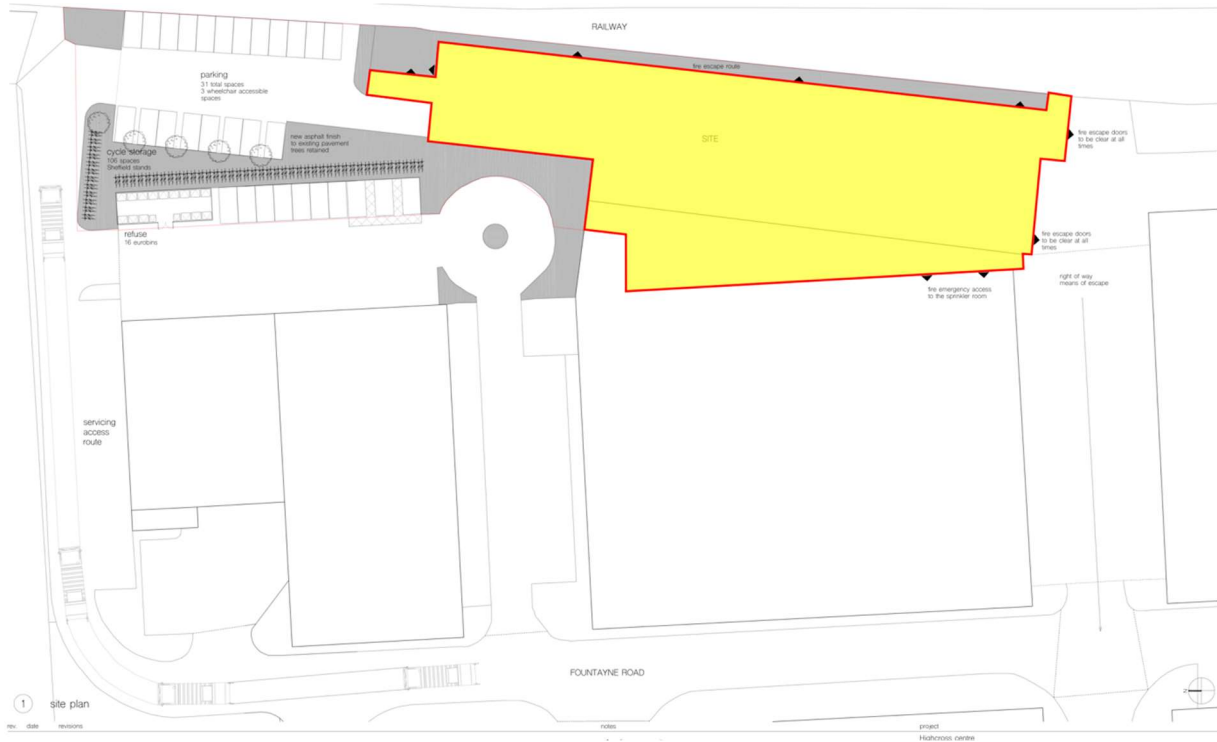


Figure 1: Site location plan

### 2.2 BUILDING DESCRIPTION

The proposed development will include the refurbishment of an existing building (warehouse type), which spans Ground to 6<sup>th</sup> floor level and is served internally by three protected staircases (i.e., Core 01 to 03).

It will be a 'mixed-use' building and will include various accommodations. The description of the type of accommodation per floor level, as well as the purpose group (as per ADB) they fit into, is detailed in the table below.



Floor	Accommodation	Purpose group	Served by	Height <sup>A)</sup>
Ground <sup>B)</sup>	Café/Bar	Shop and commercial	N/A	29.5m
	Various types of uses (e.g., conferences, fashion shows, events, film shoots)	Assembly and recreation		
	Storage, Smoking shelter, Gas storage, Cycle storage	Ancillary		
1 <sup>st</sup>	Climbing centre <sup>C)</sup>	Assembly and recreation	Core 01, 02, 03	
	Reception/Cafe	Shop and commercial		
	Cleaner's cup'd, WC, Changing facilities, Storage	Ancillary		
2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup>	Office	Office	Core 01, 02, 03	
5 <sup>th</sup>	Office/Music studios	Office	Core 01, 02, 03	
6 <sup>th</sup> (roof)	Rooftop bar/Community garden	Shop and commercial	Core 01, 02, 03	

**Note <sup>A)</sup>:** The height is measured from Ground floor to the floor slab of the top floor level. The aforementioned height has been confirmed by the Architect to be 29.5m.

**Note <sup>B)</sup>:** It should be noted that this floor level will also be utilised as a multi-functional event space, with the ability to be used as two separate spaces split by the middle partition, or as a whole floor. The day-to-day uses of the aforementioned floor level will be as described in the table above. The whole concept of the floor is to be flexible to accommodate the above types of use, taking into the account the single and combined use of the floor.

**Note <sup>C)</sup>:** This has been confirmed by the client, to be already built and occupied.

Table 1: Type of accommodation/Floor level(s)

The figures below indicate the layout of all floor levels, as well as the location of Core 01, 02 and 03.

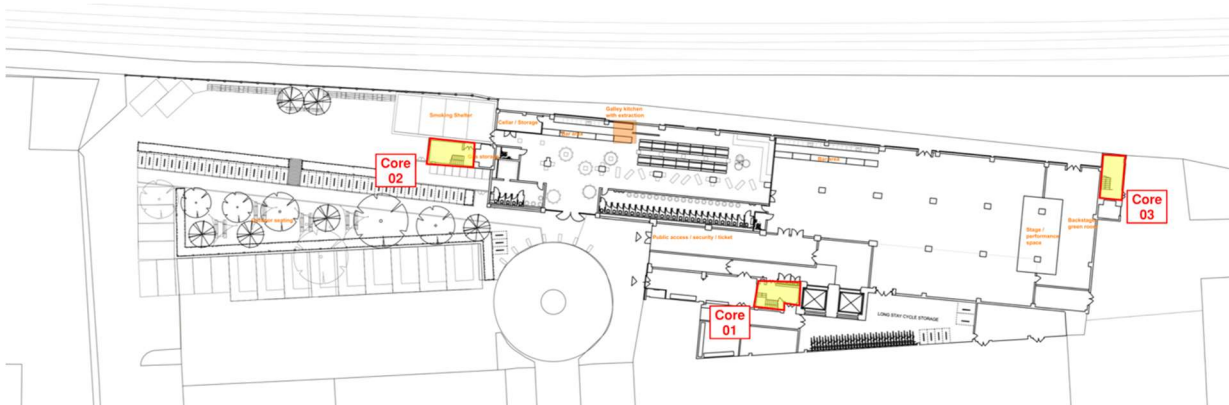


Figure 2: Ground floor level

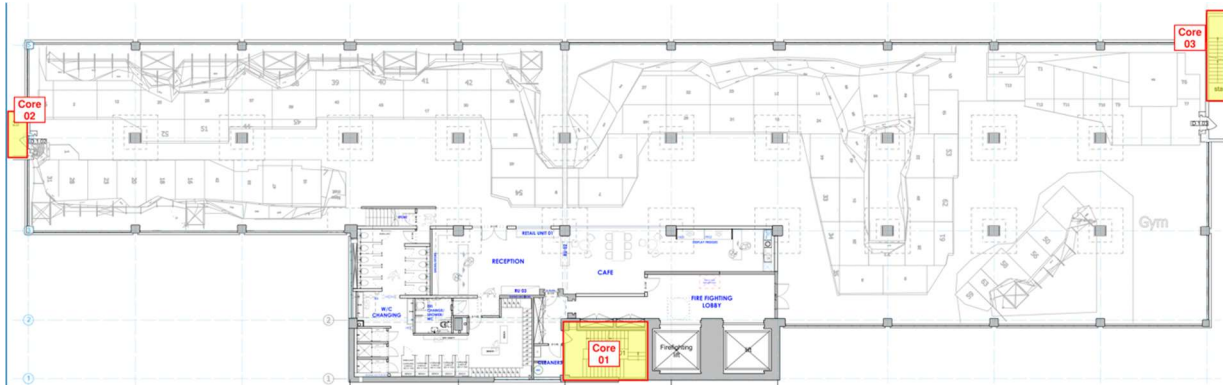


Figure 3: 1<sup>st</sup> floor level

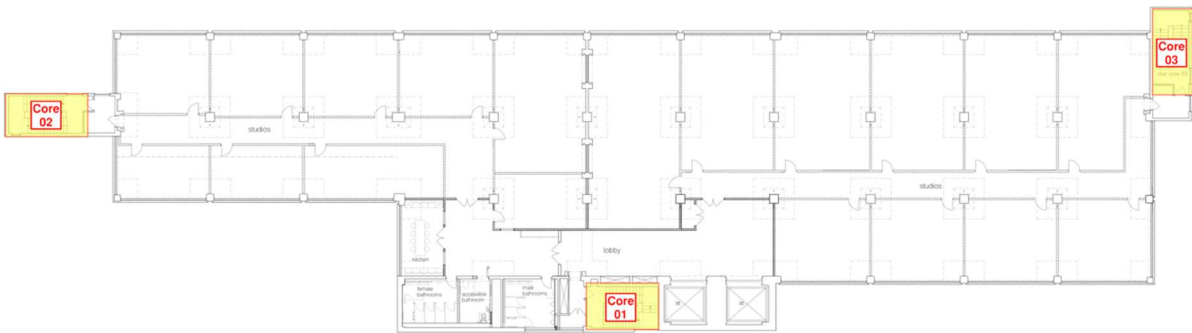


Figure 4: 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> floor level

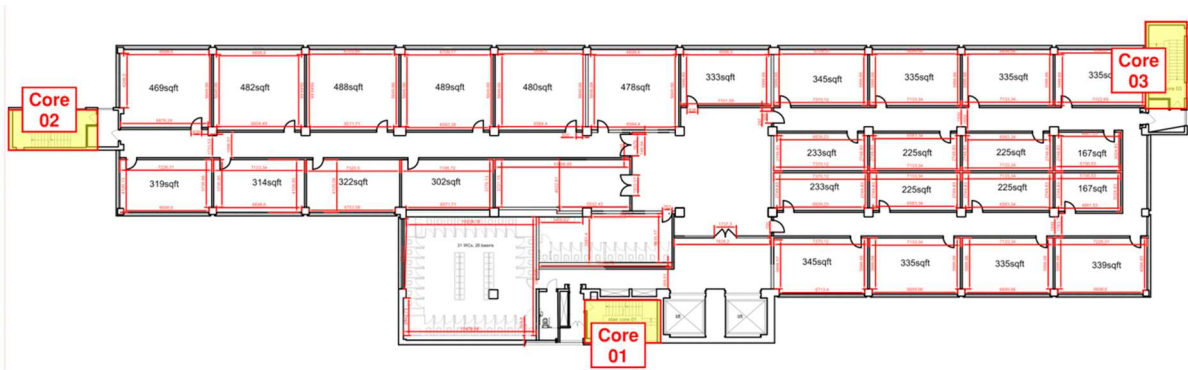


Figure 5: 5<sup>th</sup> floor level



Figure 6: 6<sup>th</sup> floor level

### 3 VARIATIONS TO STANDARD GUIDANCE

The table below lists the deviations from the guidance of ADB, in addition to the analysis methodology proposed for the fire engineering justification.

The following actions should be registered as risk items until agreed with the Approving Authorities.

Clause/Recommendation	Deviation/Justification
<p>As per ADB, different purpose groups/ accommodations should not share means of escape.</p>	<p>It is noted that the building will comprise of different purpose groups/accommodations. Typically, these should not share the same means of escape. However, this is not the case in this building, as Core 01, 02 and 03 are utilised as means of escape from the upper floor levels (i.e., 1<sup>st</sup> to 6<sup>th</sup>).</p> <p>This is considered acceptable based on the following provisions incorporated in the design.</p> <ul style="list-style-type: none"> <li>• The building will follow a simultaneous evacuation procedure;</li> <li>• An enhanced fire alarm and detection system will be provided, designed to an L2 standard, in accordance with BS 5839-1;</li> <li>• Different purpose groups/ accommodations will be enclosed in fire-rated construction;</li> <li>• Different occupancies will not escape through separate occupancies;</li> </ul>
<p>As per ADB, the travel distance within a shop or commercial use premises should be limited to 18m where escape is only available in a single direction and the position of internal layout/fittings/furniture/etc. is known.</p>	<p>It should be noted that both cases (i.e., as presented in Table 1 of this report) in regard to the use of Ground floor level are assessed (i.e., as individual uses (shop/commercial and assembly/recreation) and as a single use (assembly/recreation)).</p> <p>The travel distances within the shop and commercial accommodation on Ground floor level are not within the recommendations <sup>A)</sup> stated in Table 4 and therefore, further consideration is required. It is advised that an alternative final exit is introduced on east façade.</p> <p><b>Note <sup>A)</sup>:</b> It should be noted that the travel distance requirements are achieved only when considering the additional escape available via the adjacent assembly and recreation accommodation (i.e., in addition to the double doors leading directly to the outside from the shop and commercial accommodation). However, as different purpose</p>

	groups should not share means of escape, the aforementioned exit is not considered acceptable.
A place of high fire hazard should be enclosed in fire-resisting construction.	It is noted that a galley (open-plan) kitchen will be introduced to the shop and commercial accommodation on Ground floor level. As a kitchen is considered a high fire hazard area, it is either recommended that the kitchen is enclosed in 30-minute fire-rated construction or it is provided with a localised fire suppression system.
A place of high fire hazard should be enclosed in fire-resisting construction.	<p>It is noted that, as stated by the client, there is potential for food vendors to operate on 6<sup>th</sup> floor level, utilising gas cooking. On the basis that this is an open-air area, this is considered acceptable; however, it should be noted that the cooking facilities are kept away from the routes of escape.</p> <p>Further to the above, as stated by the client, there is potential for a canopy stretch tent to be installed to allow full year use. In this case, the area will be considered to be designed with open opposing sides providing sufficient ventilation and thus, will still be treated as an open-air area, subject to the above comments. However, a more detailed design will need to be provided, indicating the exact area of enclosure, in addition to the openings/ventilation provisions and satisfactory flame retardant properties of the 'roof tent' material are known and recorded. The area will be further assessed within the fire risk assessment regime.</p>
As per ADB, the travel distance within an office accommodation should be limited to 12m where escape is only available in a single direction and the position of internal layout/fittings/furniture/etc. is not known.	<p>The travel distances within the office accommodation on 2<sup>nd</sup> to 4<sup>th</sup> floor level are within the recommendations stated in Table 4, except within one room, where the travel distance is extended to 15.3m.</p> <p>It is advised that following the fit-out design, the aforementioned travel distance is kept to below 18m.</p>
As per ADB, the travel distance within an ancillary accommodation should be limited to 12m where escape is only available in a single direction and the position of internal layout/fittings/furniture/etc. is not known.	The travel distances within the ancillary accommodation on all floor levels are within the recommendations stated in Table 4, except within the smoking shelter on Ground floor level. It is advised that the travel distance within the aforementioned room is kept to below 18m, following the fit-out.

As per ADB, rooms that contain flammable/combustible materials should not open directly into the firefighting lobby.	<p>Typically, rooms that contain flammable/combustible materials should not open directly into the firefighting lobby. This is not achieved in this building, as various rooms (e.g., comms cup'd.) open into the firefighting lobby.</p> <p>To justify this deviation, the firefighting lobby of Core 01 will be provided with smoke control (as described in §7 of this report).</p>
The occupancy exit(s) provision should satisfy the requirements stated in ADB.	Please look at the comments in Table 8.
As per Section 17.5 of ADB, for a building with a height that exceeds 18m and includes a storey with an area that exceeds 900m <sup>2</sup> , a minimum of two firefighting shafts should be provided.	<p>On the basis that the building is existing and also considering the following provisions, it is considered acceptable to only include one firefighting shaft (incl. a firefighting lift).</p> <ul style="list-style-type: none"> <li>• All parts of the floor plate will be within 60m of the dry riser outlet;</li> <li>• Core 02 and 03 will also be provided with dry rising mains in accordance with BS 9990;</li> </ul>
The firefighting lobby smoke control design should follow the provisions stated in BS 9999.	Please refer and note Section 7.5 of this strategy report and the associated Design Note (document reference: "High Cross_V1_Design Note (Smoke Ventilation)").

## 4 MEANS OF WARNING AND ESCAPE

### 4.1 EVACUATION PHILOSOPHY

The evacuation strategy for the whole building (i.e., shop and commercial, assembly and recreation, office, and ancillary accommodations) will be simultaneous on activation of the fire alarm in any area.

### 4.2 AUTOMATIC FIRE DETECTION AND ALARM

A summary of the fire alarm and detection systems is shown in the table below.

Accommodation	Detection and alarm category designed in accordance with BS 5839: Part 1		
	Minimum level	Proposed level	Comments
Shop and commercial	M	L2	Detection/Alarm system
Assembly and recreation	M	L2	Detection/Alarm system
Office	M	L2	Detection/Alarm system
Ancillary	M	L2	Detection/Alarm system

Table 2: Fire alarm and detection systems

The fire alarm and automatic fire detection system within the **shop and commercial accommodation** will be designed in accordance with BS 5839-Part 1 to a category L2 Standard.

The fire alarm and automatic fire detection system within the **assembly and recreation accommodation** will be designed in accordance with BS 5839-Part 1 to a category L2 Standard.

The fire alarm and automatic fire detection system within the **office accommodation** will be designed in accordance with BS 5839-Part 1 to a category L2 Standard.

The fire alarm and automatic fire detection system within the **ancillary accommodation** will be designed in accordance with BS 5839-Part 1 to a category L2 Standard.

The 6<sup>th</sup> floor level will be provided with external sounders, designed in accordance with BS5839-1.

#### **Fire Alarm Systems (Voice messaging system)**

Fire Alarm Systems (Voice messaging system) are not required in this development and compliance is achieved with a standard cause and effect fire alarm.

### 4.3 CAUSE AND EFFECT

The cause and effect principles are summarised in the table below.

Accommodation (use)	Cause	Effect
Shop and commercial	Smoke detector activates	<ul style="list-style-type: none"> <li>Alarm signal sound throughout the building;</li> <li>Smoke control (firefighting) system will activate;</li> <li>Lifts will return to ground level;</li> </ul>
Assembly and recreation	Smoke detector activates	<ul style="list-style-type: none"> <li>Alarm signal sound throughout the building;</li> <li>Smoke control (firefighting) system will activate;</li> <li>Lifts will return to ground level;</li> </ul>
Office	Smoke detector activates	<ul style="list-style-type: none"> <li>Alarm signal sound throughout the building;</li> <li>Smoke control (firefighting) system will activate;</li> <li>Lifts will return to ground level;</li> </ul>
Ancillary	Smoke detector activates	<ul style="list-style-type: none"> <li>Alarm signal sound throughout the building;</li> <li>Smoke control (firefighting) system will activate;</li> <li>Lifts will return to ground level;</li> </ul>

Table 3: Cause and effect

The above is only an indicative cause and effect matrix, presented in order to assist the design team. A detailed cause and effect design will be developed by the specialist M&E contractor.

#### 4.4 TRAVEL DISTANCES

Travel distances for the different parts of the building should be in accordance with the guidance stated in ADB, presented below.

Accommodation (use)	Travel within	Maximum travel distance			
		Single Means of Escape		Alternative Means of Escape	
		Direct <sup>A)</sup>	Actual	Direct <sup>A)</sup>	Actual
Shop and commercial		12.0m	18.0m	30.0m	45.0m
Assembly and recreation	Areas with seating in rows	10.0m	15.0m	21.3m	32.0m
	Elsewhere	12.0m	18.0m	30.0m	45.0m
Office		12.0m	18.0m	30.0m	45.0m
Ancillary	Places of special fire hazard	6.00m	9.00m	12.0m	18.0m
	Escape route in open air	40.0m	60.0m	66.7m	100m
	Other	12.0m	18.0m	30.0m	45.0m

**Note <sup>A)</sup>:** Where the internal layout (i.e., internal fittings, furniture arrangement, etc.) is not known, the travel distance is assessed on a direct basis (i.e., 2/3<sup>rd</sup>s of the actual travel distance).

Table 4: Travel distance requirements



## 4.5 ESCAPE WITHIN THE SHOP AND COMMERCIAL ACCOMMODATION

### General

It is noted that the building will comprise of different purpose groups/accommodations. Typically, these should not share the same means of escape. However, this is not the case in this building, as Core 01, 02 and 03 are utilised as means of escape from the upper floor levels (i.e., 1<sup>st</sup> and 6<sup>th</sup>). This is considered acceptable based on the following provisions incorporated in the design.

- The building will follow a simultaneous evacuation procedure;
- An enhanced fire alarm and detection system will be provided, designed to an L2 standard, in accordance with BS 5839-1;
- Different purpose groups/accommodations will be enclosed in fire-rated construction;
- Different occupancies will not escape through separate occupancies;

This is subject to agreement with the Approving Authorities and until then should be registered as a risk.

### Ground floor level

It should be noted that both cases (i.e., as presented in Table 1 of this report) in regard to the use of Ground floor level are assessed (i.e., as individual uses (shop/commercial and assembly/recreation) and as a single use (assembly/recreation)).

The travel distances within the shop and commercial accommodation on this floor level are not within the recommendations <sup>A)</sup> stated in Table 4 and therefore, further consideration is required. It is advised that an alternative final exit is introduced on east façade.

**Note <sup>A)</sup>:** It should be noted that the travel distance requirements are achieved only when considering the additional escape available via the adjacent assembly and recreation accommodation (i.e., in addition to the double doors leading directly to the outside from the shop and commercial accommodation). However, as different purpose groups should not share means of escape, the aforementioned exit is not considered acceptable.

The shop and commercial accommodation does not exceed the limitations set in Table 8.1 of ADB (i.e., compartment size 2,000m<sup>2</sup>, where a sprinkler system is not provided) and therefore, no further comment or recommendation is made.

Inner room situations (i.e., room from which escape is possible only by passing through another room) will follow the design illustrated in Section 2.11 of ADB.

It is noted that a galley (open-plan) kitchen will be introduced to the examined accommodation. As a kitchen is considered a high fire hazard area, it is either recommended that the kitchen is enclosed in 30-minute fire-rated construction or it is provided with a localised fire suppression system. This is subject to agreement with the Approving Authorities and until then should be registered as a risk.

The wall separating the shop and commercial accommodation to the assembly and recreation accommodation, will be constructed as a compartment wall, achieving at least 90-minutes fire rating.

### 1<sup>st</sup> floor level

The travel distances within the shop and commercial accommodation on this floor level are within the recommendations stated in Table 4 and therefore, no further comment or recommendation is made.

The shop and commercial accommodation does not exceed the limitations set in Table 8.1 of ADB (i.e., compartment size 2,000m<sup>2</sup>, where a sprinkler system is not provided) and therefore, no further consideration is required.

Inner room situations (i.e., room from which escape is possible only by passing through another room) will follow the design illustrated in Section 2.11 of ADB.

### **6<sup>th</sup> floor level**

Although the current layout is not finalised (i.e., as stated by the client, this will be activated last and it is subject to design changes, but these will mainly be aesthetic changes) the travel distances within the shop and commercial accommodation on this floor level are within the recommendations stated in Table 4 and therefore, no further comment or recommendation is made.

It is noted that, as stated by the client, there is potential for food vendors to operate on this floor level, utilising gas cooking. On the basis that this is an open-air area, this is considered acceptable; however, it should be noted that the cooking facilities are kept away from the routes of escape. This is subject to agreement with the Approving Authorities and until then should be registered as an approvals risk.

Further to the above, as stated by the client, there is potential for a canopy stretch tent to be installed to allow full year use. In this case, the area will be considered to be designed with open opposing sides providing sufficient ventilation and thus, will still be treated as an open-air area, subject to the above comments. However, a more detailed design will need to be provided, indicating the exact area of enclosure, in addition to the openings/ventilation provisions and satisfactory flame retardant properties of the 'roof tent' material are known and recorded. The area will be further assessed within the fire risk assessment regime. This is subject to agreement with the Approving Authorities and until then should be registered as an approvals risk.

## **4.6 ESCAPE WITHIN THE ASSEMBLY AND RECREATION ACCOMMODATION**

### **General**

It is noted that the building will comprise of different purpose groups/accommodations. Typically, these should not share the same means of escape. However, this is not the case in this building, as Core 01, 02 and 03 are utilised as means of escape for the upper floor levels (i.e., 1<sup>st</sup>). This is considered acceptable based on the following provisions incorporated in the design.

- The building will follow a simultaneous evacuation procedure;
- An enhanced fire alarm and detection system will be provided, designed to an L2 standard, in accordance with BS 5839-1;
- Different purpose groups/accommodations will be enclosed in fire-rated construction;
- Different occupancies will not escape through separate occupancies;

This is subject to agreement with the Approving Authorities and until then should be registered as an approvals risk.

### **Ground floor level (as an individual unit, separate to the shop/commercial accommodation)**

The travel distances within the assembly and recreation accommodation on this floor level are within the recommendations stated in Table 4 <sup>A)</sup> and therefore, no further consideration is required. For the aforementioned assessment, it is assumed, although not illustrated in the current drawings, that escape in two directions will be available from the stage/performance space.

**Note <sup>A)</sup>:** As the worst-case scenario, the travel distances under category 'areas with seating in rows' (as these are illustrated in Table 4) have been utilised during the travel distance assessment.

The assembly and recreation accommodation has individual exits on this level and thus, no further comment or recommendation is made.

Inner room situations (i.e., room from which escape is possible only by passing through another room) will follow the design illustrated in Section 2.11 of ADB.

The walls separating the assembly and recreation accommodation to the Fire Service entrance will be constructed as a compartment wall, achieving at least 120-minutes fire rating. If glazing is fitted to the aforementioned compartment wall, it will follow the provisions stated in Section 3.32 (e) of ADB and will achieve the same fire rating as the wall it forms into (Integrity only).

The assembly and recreation accommodation does not exceed the limitations set in Table 8.1 of ADB (i.e., compartment size 2,000m<sup>2</sup>, where a sprinkler system is not provided) and therefore, no further comment or recommendation is made.

#### **Ground floor level (as a single unit, including the shop/commercial accommodation)**

The travel distances within the assembly and recreation accommodation on this floor level are within the recommendations stated in Table 4 <sup>A)</sup> and therefore, no further comment or recommendation is made. For the aforementioned assessment, it is assumed, although not illustrated in the current drawings, that escape in two directions will be available from the stage/performance space.

**Note <sup>A)</sup>:** As the worst-case scenario, the travel distances under category 'elsewhere' (as these are illustrated in Table 4) have been utilised during the travel distance assessment.

The assembly and recreation accommodation has individual exits on this level and thus, no further comment or recommendation is made.

Inner room situations (i.e., room from which escape is possible only by passing through another room) will follow the design illustrated in Section 2.11 of ADB.

It is noted that a galley (open-plan) kitchen will be introduced to the examined accommodation. As a kitchen is considered a high hazard area, it is either recommended that the kitchen is enclosed in 30-minute fire-rated construction or it is provided with a localised water suppression system. This is subject to agreement with the Approving Authorities and until then should be registered as an approvals risk.

The walls separating the assembly and recreation accommodation to the Fire Service entrance will be constructed as a compartment wall, achieving at least 120-minutes fire rating. If glazing is fitted to the aforementioned compartment wall, it will follow the provisions stated in Section 3.32 (e) of ADB and will achieve the same fire rating as the wall it forms into (integrity only).

The assembly and recreation accommodation does not exceed the limitations set in Table 8.1 of ADB (i.e., compartment size 2,000m<sup>2</sup>, where a sprinkler system is not provided) and therefore, no further comment or recommendation is made.

#### **1<sup>st</sup> floor level**

The travel distances within the assembly and recreation accommodation on this floor level are within the recommendations stated in Table 4 <sup>A)</sup> and therefore, no further comment or recommendation is made.

**Note <sup>A)</sup>:** As the worst-case scenario, the travel distances under category 'elsewhere' (as these are illustrated in Table 4) have been utilised during the travel distance assessment.

The assembly and recreation accommodation shares exits on this level (i.e., Core 01, 02 and 03) and thus, the provisions stated in Section 4.6 (General) of this report apply.

Inner room situations (i.e., room from which escape is possible only by passing through another room) will follow the design illustrated in Section 2.11 of ADB.

The assembly and recreation accommodation does not exceed the limitations set in Table 8.1 of ADB (i.e., compartment size 2,000m<sup>2</sup>, where a sprinkler system is not provided) and therefore, no further comment or recommendation is made.

## **4.7 ESCAPE WITHIN THE OFFICE ACCOMMODATION**

### **General**

It is noted that the building will comprise of different purpose groups/accommodations. Typically, these should not share the same means of escape. However, this is not the case in this building, as Core 01, 02 and 03 are utilised as means of escape for the upper floor levels (i.e., 2<sup>nd</sup> to 5<sup>th</sup>). This is considered acceptable based on the following provisions incorporated in the design.

- The building will follow a simultaneous evacuation procedure;
- An enhanced fire alarm and detection system will be provided, designed to an L2 standard, in accordance with BS 5839-1;
- Different purpose groups/accommodations will be enclosed in fire-rated construction;
- Different occupancies will not escape through separate occupancies;

This is subject to agreement with the Approving Authorities and until then should be registered as an approvals risk.

### **2<sup>nd</sup> to 4<sup>th</sup> floor level**

The travel distances within the office accommodation on this floor level are within the recommendations stated in Table 4, except within one room, where the travel distance is extended to 15.3m. It is advised that following the fit-out design, the aforementioned travel distance is kept to below 18m.

The office accommodation shares exits on this level (i.e., Core 01, 02 and 03) and thus, the provisions stated in Section 4.7 (General) of this report apply.

Inner room situations (i.e., room from which escape is possible only by passing through another room) will follow the design illustrated in Section 2.11 of ADB.

It is advised that the wall separating the two zones comprising of office accommodations is constructed as a compartment wall, achieving at least 90-minutes fire rating.

### **5<sup>th</sup> floor level**

The travel distances within the office accommodation on this floor level are within the recommendations stated in Table 4 and thus, no further consideration is required.

The office accommodation shares exits on this level (i.e., Core 01, 02 and 03) and thus, the provisions stated in Section 4.7 (General) of this report apply.

Inner room situations (i.e., room from which escape is possible only by passing through another room) will follow the design illustrated in Section 2.11 of ADB.

It is recommended that the corridors serving the office accommodation are enclosed in fire-rated construction, as these connect storey exits and thus, should be provided with cross-corridor fire doors. It is understood that no dead-end access routes are included in the current design. This is also required if utilised by different occupancies.

#### 4.8 ESCAPE WITHIN THE ANCILLARY ACCOMMODATION

##### Ground to 5<sup>th</sup> floor level

The travel distances within the ancillary accommodation on all floor levels are within the recommendations stated in Table 4, except within the smoking shelter on Ground floor level. It is advised that the travel distance within the aforementioned room is kept to below 18m, following the fit-out.

It is noted that kitchen rooms are provided on 1<sup>st</sup> to 4<sup>th</sup> floor level. These will be enclosed in fire-rated construction, achieving at least 30-minutes fire rating.

It should be noted that the firefighting lobby of Core 01 should be kept sterile and free of combustible materials at all times.

Typically, rooms that contain flammable/combustible materials should not open directly into the firefighting lobby. This is not achieved in this building, as various rooms (e.g., comms cup'd, etc.) open into the firefighting lobby. To justify this deviation, the firefighting lobby of Core 01 will be provided with smoke control (as described in Section 7 of this report).

#### 4.9 WIDTH OF ESCAPE ROUTES/EXITS

##### General

Where the expected occupancy to be accommodated exceeds 60 people, then the door should open towards the direction of escape.

The building should be designed based on the minimum number of routes/exits and widths presented in the tables below.

Maximum number of persons	Minimum number of escape routes/exits
60	1
600	2
More than 600	3

Table 5: Minimum number of escape routes/exits

Maximum number of persons	Minimum width of escape routes/exits
60	750mm
110	850mm
220	1050mm
More than 220	5mm per person

Table 6: Minimum widths

##### Occupancy and escape routes/exits assessment

The table below presents the occupancy load factors (OLF) utilised, in accordance with ADB. Where the occupancy is illustrated in the drawings or where the occupancy is provided by the client, this figure is used instead.

Unit	Occupancy load factor
Shop and commercial	2.0m <sup>2</sup> per person
Assembly and recreation	1.0m <sup>2</sup> per person
Office	6.0m <sup>2</sup> per person
Plant room, Storage	30.0m <sup>2</sup> per person

Table 7: Occupancy load factors

The table below presents the occupancy and escape routes/exits assessment.

Floor level	Total occupancy per floor	Minimum required exit widths <sup>A)</sup>	Available exit widths <sup>A)</sup>
Ground (shop/commercial - individual)	164 (based on OLF)	1x 1,050mm, or 1x 850mm	1x 2,030mm Comment <sup>1)</sup>
Ground (assembly/recreation - individual)	612 <sup>B)</sup> (based on OLF)	3x 1,050mm 1x 850mm	2x 1,700mm Comment <sup>2)</sup>
Ground (assembly/recreation – entire floor)	1500 (provided by the client)	14x 850mm, or 7x 1,050mm	1x 2,030mm 1x 1,700mm Comment <sup>3)</sup>
1 <sup>st</sup>	180 (based on OLF)	2x 850mm	2x 850mm
2 <sup>nd</sup> , 3 <sup>rd</sup> & 4 <sup>th</sup>	180 (based on OLF)	2x 850mm	2x 850mm
5 <sup>th</sup>	160 (based on OLF)	2x 850mm	2x 850mm
6 <sup>th</sup>	750 (provided by the client)	2x 1,805mm	N/A Comment <sup>4)</sup>

**Note <sup>A)</sup>:** Following discounting the largest storey exit.

**Note <sup>B)</sup>:** Excluding the stage and backstage green room, where the occupancy is expected to be limited.

**Comment <sup>1)</sup>:** Currently, on the basis that escape is not allowed via the adjacent assembly/recreation accommodation, only 1x 2,030mm door is provided directly to the outside. This is not considered sufficient to satisfy the expected occupancy. Therefore, it is advised that an additional 1x 1,050mm door is introduced to the east of building.

**Comment <sup>2)</sup>:** Currently, on the basis that escape is not allowed via the adjacent assembly/recreation accommodation, 4x 1,700mm doors are provided that lead directly to the outside or into the public access corridor. However, 2x 1,700mm are located adjacent to each other and therefore, both are discounted as the worst-case scenario. Considering that the 1x 1700mm door will only be available to the occupants in the backstage green room, only 1x 1,700mm door is left to accommodate 750 occupants. This is not considered sufficient to satisfy the expected occupancy, as it can only accommodate 350 occupants. Therefore, it is proposed that 2x 1,050mm doors are introduced to the east of the building. It should be noted that alternative escape routes (i.e., exits in this instance) should be in direction 45 degrees or more apart. The exact design/positioning of the aforementioned doors will be carried out by the specialist contractor (e.g., architect). The above are subject to further review/confirmation once the layouts have been updated.

**Comment <sup>3)</sup>:** Currently, on the basis that escape is allowed via the adjacent assembly/recreation accommodation, 4x 1,700mm and 1x 2,030mm doors are provided that lead directly to the outside or into the public access corridor. However, 2x 1,700mm are located adjacent to each other and therefore, both are discounted as the worst-case scenario. Considering that the 1x 1700mm door will only be available to the occupants in the backstage green room, only 1x 1,700mm and 1x 2,030mm door is left to accommodate 1500 occupants. In addition to the two aforementioned exits, the proposed 2x 1,050mm doors recommended to be introduced in Comment <sup>2)</sup> and the 1x 1,050mm door recommended to be introduced in Comment <sup>1)</sup> above are taken into

consideration. On that basis, the 1x 1,700mm, 1x 2,030mm door and 3x 1,050mm can accommodate 1,426 occupants. This is not considered sufficient to satisfy the expected occupancy. Therefore, it is proposed that an additional 1x 850mm door is introduced to lead into the public access corridor. It should be noted that alternative escape routes (i.e., exits in this instance) should be in direction 45 degrees or more apart. The exact design/positioning of the aforementioned doors will be carried out by the specialist contractor (e.g., architect). The above are subject to further review/confirmation once the layouts have been updated.

**Comment 4):** Currently, the layouts do not illustrate any storey exits. It is understood that all cores (i.e., Core 01, 02 and 03) will be extended to cover this floor level. Following discounting of the largest storey exit, in order to accommodate 750 occupants, 2x 1,805mm doors should be introduced. However, this is not achievable as the stairs should be at least as wide as the doors opening onto them. On that basis, it is advised that all storey exits are designed to 1,200mm doors (i.e., 3x 1,200mm). This is considered sufficient to accommodate 750 occupants. On the basis that the 6<sup>th</sup> floor level will be designed as open to air, it is considered acceptable not to discount a storey exit. This is subject to agreement with the Approving Authorities and until then should be registered as a risk.

Table 8: Occupancy and escape routes/exits assessment

#### 4.10 WIDTH OF ESCAPE STAIRS

##### General

The stairs should be at least as wide as the exits opening onto them.

The final exit route from the stairs and the final exit door from the stairs should be at least as wide as the stairs.

The stairs should maintain their width throughout the building.

Where the means of escape and the Fire Service access are shared, a minimum of 500mm should additionally be introduced to the route.

##### Staircase width assessment

Core 01, 02 and 03 are measured to approximately 1200mm.

As per ADB, each staircase can accommodate 465 people over six floors (discounting is not applied as the staircases are approached via a protected lobby).

On this basis all Cores are considered sufficient and therefore, no further consideration is required.

#### 4.11 AUTOMATIC FIRE SUPPRESSION

There is no requirement for a building of this size and type to be provided with an automatic water suppression system.

However, it has been confirmed by the client that the existing sprinkler system will be upgraded and utilised; Although, it will not achieve the specifications of a BS EN 12845 system, it is considered an improvement to the overall fire safety of the development.

#### 4.12 EMERGENCY LIGHTING

Emergency lighting will be provided throughout the development in accordance with the recommendations of BS5266-Parts 1 and 7 and will be included in the following areas.

Areas requiring escape lighting	Escape lighting duration required
Premises used as sleeping accommodation (if any)	3 hours maintained to all escape routes/corridors/stairs
Access rooms	3 hours maintained

Open-plan areas greater than 60m <sup>2</sup>	3 hours maintained
Areas outside the building leading to a place of safety	3 hours maintained

Table 9: Emergency lighting

Emergency lighting shall be provided on all escape routes. The installation shall also comply with the Codes of Practice for Emergency Lighting BS 5266 Part 1.

#### 4.13 ESCAPE ROUTE SIGNAGE

Escape signage will be provided above storey exits and final exit doors from the common areas within the accommodation.

Emergency escape signage will be required to meet the requirements of the Regulatory Reform (Fire Safety) Order 2005. Such signage will meet the recommendations of BS5499-Part 4 and will be located as follows (except for escape routes which are in ordinary use).

- All designated escape routes or escape routes across open areas will be provided with signage, especially stairs and other changes in level and direction;
- The position of all doors and other exits sited on escape routes, including storey exits and final exits will be identified by signs;
- Where an escape route from a room is not conspicuous or confusion could occur, the route will be indicated by a sign, including intermediate signs where necessary;
- All changes of direction in corridors, stairways and open spaces forming part of an escape route will be marked with intermediate signs. Each intermediate door or junction will be similarly signed;

It is recommended that the final signage provision is agreed with the Approving Authorities prior to occupation of the building.

#### Other Signage

Fire resisting doors, fire exit doors and escape routes in and around the building will be provided with signage meeting the recommendations of BS5499-Part 5.

#### 4.14 OCCUPANTS WITH A DISABILITY OR IMPAIRMENT

##### Ground floor level

Escape is available directly to the outside and therefore, no further consideration is required.

##### 1<sup>st</sup> to 6<sup>th</sup> floor level

As escape is not direct to the outside on these floor levels, a refuge point will be provided within the staircase lobby of Core 02 and 03, as well as within the firefighting lobby of Core 01.

Each refuge space will be contained within a protected area achieving at least 30-minutes fire resistance (with FD30S doors) and should always lead to a suitable escape route.

Each refuge will be at least 1400mm x 900mm in area and located outside the general escape route.

In accordance with ADB, the refuge will be signed and contain a means for occupants to communicate with the building management that they need assistance (EVC system as per BS5839-9).



A management strategy will be developed for the accommodation by the owner/building management and will incorporate details of how the building complies with the requirements of The Equality Act 2010. The management strategy should include information on staff training, how occupants with a disability will be evacuated in the event of a fire and identify key roles in ensuring that they are assisted in a fire situation.

## 5 INTERNAL FIRE SPREAD

### 5.1 INTERNAL LININGS

The wall and ceilings should meet the recommendations presented in the table below.

Location	Class of lining	
	National class <sup>*</sup>	European class <sup>#</sup>
Small rooms of area up to: <ul style="list-style-type: none"> <li>• 30m<sup>2</sup> in non-residential accommodation.</li> </ul>	3	D-s3, d2
Other rooms	1	C-s3, d2
Circulation spaces	0	B-s3, d2

Table 10: Wall and ceiling linings

Note<sup>\*</sup>: National Classifications are based on tests in BS 746 Part 4, 6 and 7.

Note<sup>#</sup>: The European classifications are described in BS EN 13501-1.

The class of linings recommended in the table above can be downgraded (but not less than Class 3 or D-s3, d2) in walls of rooms, providing the total area of those parts in any one room does not exceed one half of the floor area of the room and subject to a maximum of 60m<sup>2</sup> in non-residential accommodation.

It should be noted that the reduction in classification does not apply to circulation routes/escape routes but small rooms outside of these areas.

### 5.2 ELEMENTS OF STRUCTURE

Where one element of structure supports or gives stability to another, the supporting element should have no less fire resistance than the other element. The measures also provide for elements of structure that are common to more than one building or compartment and these should be constructed to the relevant provisions. Any elements of structure which only support themselves or a roof do not require any fire resistance.

Elements of the structure are based on the height of the top floor level within the building.

The height of the building is measured to be less than 30m, but over 18m from ground floor and Fire Service access level.

Based on the above, the minimum period of fire resistance for all elements of structure is to be 90 minutes (as the building will not be fitted with a sprinkler system, designed in accordance with BS EN 12845).

Including, but not limited to, structural frame, load bearing walls, protected shafts and any space that connects compartments such as stairs and service shafts should be considered a protected shaft and should be constructed accordingly. Openings within a protected shaft (doors, etc.) will be fire resistant to at least half the recommended rating of the shaft in which they are located.

### 5.3 FIRE RESISTANCE

#### General

Places of special fire hazard (oil-filled transformer room, switch gear room, boiler room, storage space for fuel or other highly flammable substances) within the building will be enclosed into fire resisting construction affording at least 30 minutes of fire resistance.

Openings in compartment walls will be limited to the passage of service ducts and access doors fitted with smoke seals. Where service ducts pass through compartment walls these will be provided with a fire and smoke damper. All openings will be provided with a period of fire resistance which is half to the wall they are provided within, and the fire doors are to be locked closed.

As per ADB §8.11 (e), since the building includes also shop and commercial accommodation, every wall/floor dividing the building into separate occupancies (spaces used by different organisations, whether they fall within the same purpose group or not), will be constructed as compartment walls/floor, achieving at least 90-minutes fire rating.

The entrance for the Fire Service on ground floor, as well as the firefighting lobby will be enclosed in fire-rated construction, achieving at least 120-minutes fire rating. The aforementioned areas will be kept sterile and free of combustible materials.

### **Fire resistance/Fire door assessment**

The elements within the building will follow the follow recommendations, in regard to the fire resistance.

Element	Fire resistance	Fire door
Firefighting stair (Core 01)	120 minutes	FD60S
Firefighting lift		FD60
Entrance for the Fire Service		FD60S
Elements of structure	90 minutes	N/A
Compartment walls/floors (as specified above)		N/A
Protected stairs (Core 02, 03)		FD60S
Places of special hazard	30 minutes	FD30S
Office corridors separating staircases		FD30S
Kitchen		FD30S

Table 11: Fire resistance/Fire door requirements

### **5.4 FIRE STOPPING**

Any openings for services (exceeding a dimension set out in the table below) breaching compartment walls will be fire stopped (unless protected throughout their entire length with fire resisting material).

This is to prevent the passage of fire and assist in retarding the movement of smoke. Joints between elements of structures that serve as barriers to fire will be fire-stopped to prevent the passage of fire and smoke.

Situation	Pipe material and maximum nominal internal diameter (mm)		
	Non-combustible material	Lead, Aluminium, Aluminium alloy, uPVC, Fibre cement	Any other material
Structure (but not a wall separating buildings) enclosing a protected shaft which is not a staircase or a lift shaft	160	110	40
Compartment Wall or Compartment floor	160	160 (stack pipe) 110 (branch pipe)	40
Any other situation	160	40	40

Table 12: Permitted pipe penetration details

The figure below illustrates typical fire stopping details. It is only indicative and is presented in order to assist the design team. A detailed fire stopping design will be developed by the specialist contractor.

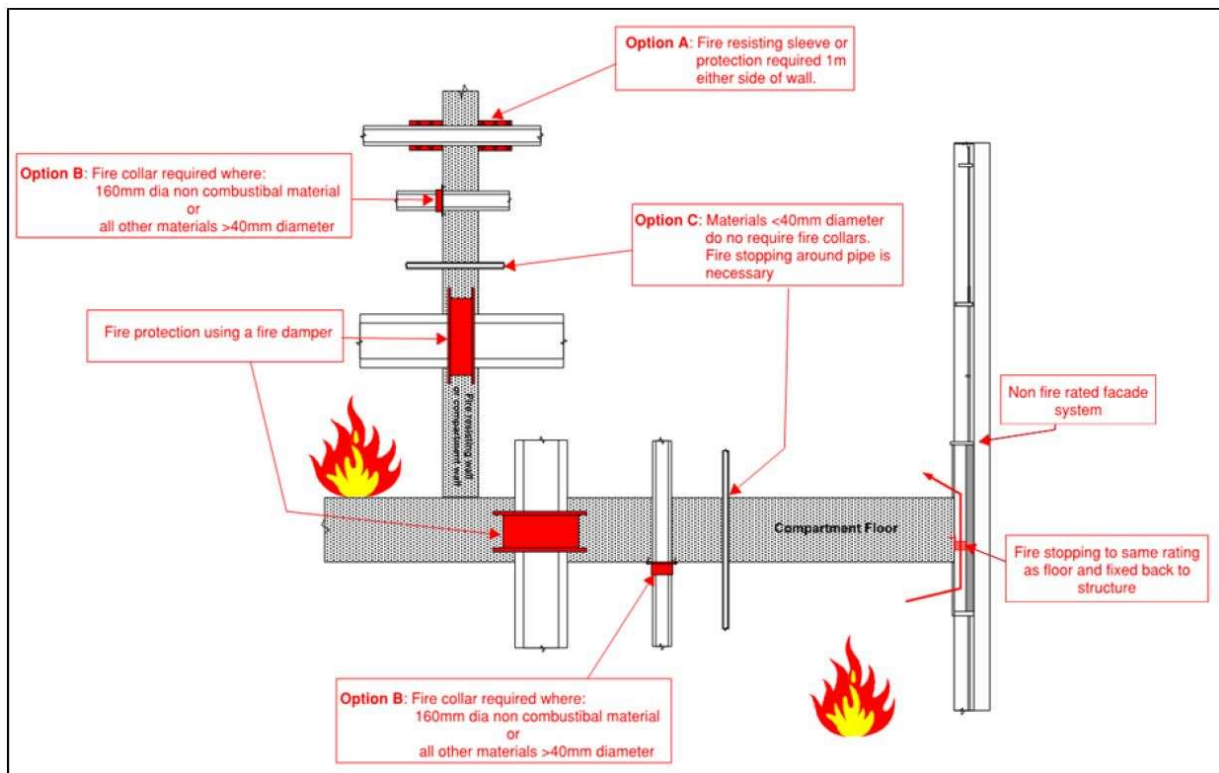


Figure 7: Fire stopping details

## 5.5 CAVITY BARRIERS

Cavity barriers will be included in any large cavity with the potential for extensive unseen fire spread. The key areas that require cavity barriers are as follows:

- At the junction between an external cavity wall and a compartment wall that separates buildings; and at the top of such an external cavity wall;
- At the junction between an external cavity wall and every compartment floor and compartment wall;

- At the junction between a cavity wall and every compartment floor, compartment wall, or other wall or door assembly that forms a fire-resisting barrier;
- In a protected escape route, above and below any fire-resisting construction that is not carried full storey height;
- Within the void behind the external face of rain screen cladding at every floor level and on the line of compartment walls abutting the external wall;
- At the edges of cavities (including around openings, i.e., windows).

In addition to the above locations, cavity barriers are also normally required in cavities (including ceiling voids and under floor service voids) where the cavity exceeds 20m. However, ADB makes the recommendation those cavity barriers (including dampers in air conditioning ductwork) can be omitted, resulting in unlimited cavity sizes providing the criteria outlined in Paragraph 9.12 of ADB are adopted. There are a number of certain situations that have to be achieved for the removal of cavity barriers in this situation and each project must be assessed on its individual conditions and merits as stated below.

If larger cavities are required a summary of the necessary provisions are listed below:

<b>ADB recommendations from §9.12</b>
A) The room and the cavity together are compartmented from the rest of the building
B) An automatic fire detection and alarm system meeting the relevant recommendations of BS 5839-Part 1 is fitted in the building (however detectors are not required in the cavity) if it meets certain criteria*
C) The cavity is used as a plenum and the recommendations about re-circulating air distribution systems in BS9999 are followed
D) The surface of the ceiling exposed in the cavity is Class 0 and the supports and fixings in the cavity are non-combustible construction
E) The flame spread rating of any pipe insulation system is Class 1
F) Any electrical wiring in the void is laid in metal trays, or in metal conduit
G) Any other materials in the cavity are of limited combustibility

Table 13: Cavity details

Note\*: Detectors are required in voids that exceed 800mm in depth, in order to satisfy the requirements stated in BS5839-Part 1.

The cavity barriers will provide at least 30-minutes fire rating (i.e., 30-minutes integrity and 15-minutes insulation).

Any penetrations through the cavity barriers will be either fitted with a proprietary sealing system, or pipes of limited diameters that are sealed with fire-stopping or sealed with sleeving of non-combustible pipe material.

The figure below illustrates typical cavity barrier details. It is only indicative and is presented in order to assist the design team. A detailed cavity barrier design will be developed by the specialist contractor.

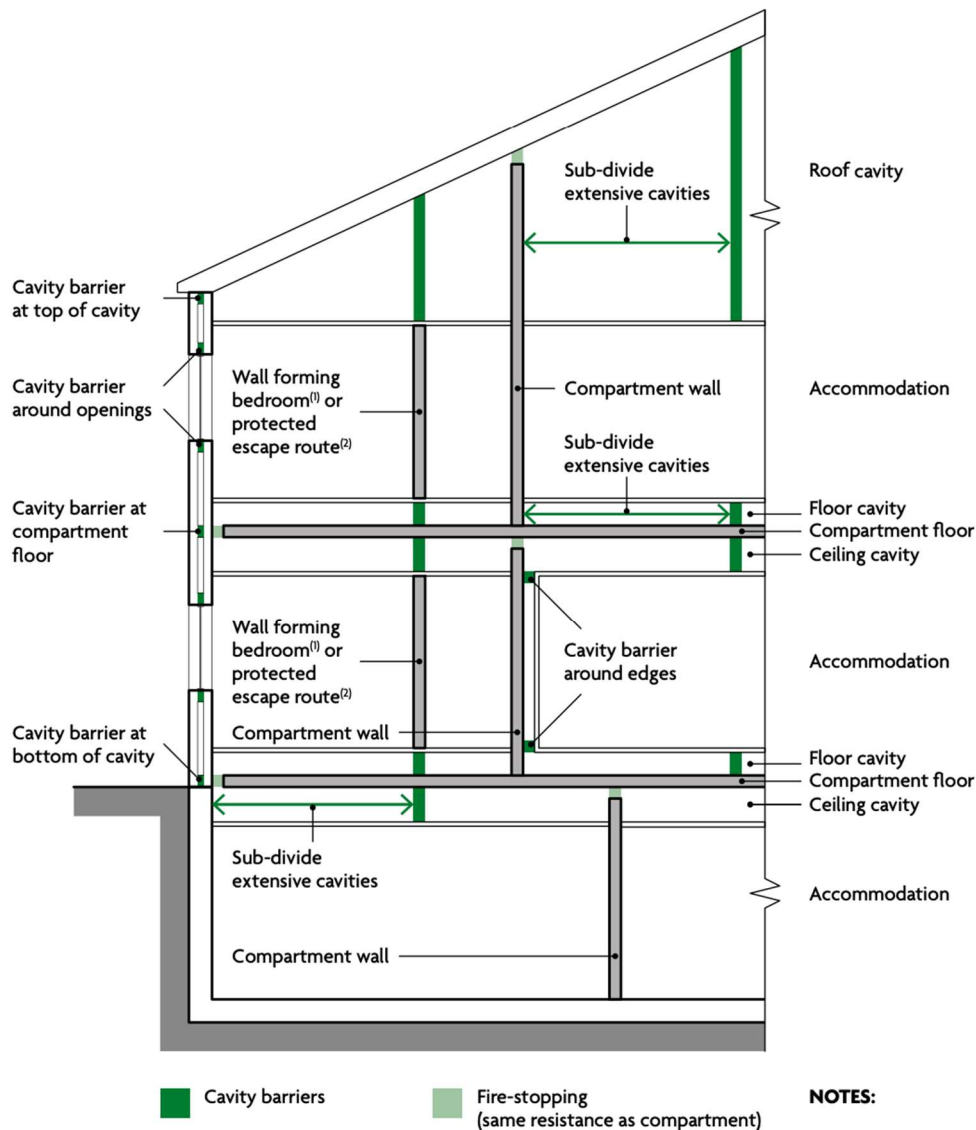


Figure 8: Cavity barrier details

## 5.6 BUILDING SERVICES COORDINATION

### Primary and secondary power supplies

In the event of a failure of the mains power supply a secondary backup power supply will be provided to feed all life safety systems that require electricity to function as intended. The secondary supply will be appropriate for the life safety system concerned. The following life safety systems will include a backup power supply.

- Automatic fire alarm and detection system;
- Automatic fire water suppression system;
- Smoke control system;

- Illuminated emergency signage;
- Emergency lighting;

As a life safety system, dual power supplies will be needed as part of this system. It is recommended that where practicable, power supplies should be provided via two separate intakes into the building from the same external substation or via a single intake and a standby generator. Where neither of these options is technically viable, e.g., a risk assessment has been undertaken which concludes that a life safety generator would not be suitable, a single intake from the external substation may be provided as the only alternative option remaining, provided that the following recommendations are met.

- a) The life safety system should be connected to an independent distribution board used exclusively for that system.
- b) The life safety distribution board should be clearly marked at the point of isolation with a warning explaining that isolation would switch off the life safety system.
- c) The life safety distribution board should be located in a separate fire-resisting enclosure (with a minimum of 60-minutes fire resisting construction) to the primary main electrical distribution board and should not be accessible directly from the communal areas of the building or from a part of the building where dual supply is required (such as a shaft serving an evacuation lift).
- d) The enclosure surrounding the primary main electrical distribution board should be provided with a minimum of 60-minutes fire resisting construction.
- e) The substation or transformer room should be either located outside the building or separated by 120-minutes fire resisting construction and directly accessible from the outside.

The diverse (primary and secondary) power cables should only come together in the fire compartment housing the control panel by means of an automatic change-over switch, unless the cable route is via a fire compartment, which does not open onto areas requiring protection via the relevant life safety system.

### **Protected Stairs and Firefighting Shafts**

Core 01 will be constructed as a firefighting shaft and will be enclosed in 120-minutes fire rated construction with FD60S self-closing doors.

Core 02, 03 will be constructed as protected stairs and will be enclosed in 90-minutes fire rated construction with FD60S self-closing doors.

### **Gas Services**

All gas services will need to be installed in accordance with all current safety Regulations. It should be confirmed by the design team that no gas services are passing within the building and in particular protected escape routes or protected staircase shafts. Please discuss the provision of gas services to the whole building. Any gas riser in the building will be ventilated to fresh air at the top and bottom of the riser.

It has been confirmed that gas pipes that run within the building will be enclosed in a fire-rated construction, achieving at least 120-minutes fire rating.

### **Electrical Services**

Electrical services should be designed and installed in accordance with the latest version of electrical guidance and Regulations, mainly BS7671 18<sup>th</sup> Edition.

### **Fire and Smoke Dampers**

Fire and smoke dampers will be required to all lines of internal compartmentation and fire resistance when the integrity has been breached. Fire dampers should always be located within the thickness of the

fire separating element they are protecting and suitable access for inspection, maintenance and testing should always be provided.

In general, fire dampers activated by fusible link are not permitted in escape routes. Fire and smoke dampers activated by the fire alarm may be used in this situation. When a building includes sleeping risk, all fire dampers should be activated by smoke detection within the building, so they release automatically in the event of a fire. This mechanism is in addition to the thermally activated device (fusible link). However, where the building has been provided with an L1 standard fire alarms system in accordance with the latest version of BS5839-Part 1, and the occupants can make an un-aided escape the following may be applied.

- If, on detection of smoke the alarm signals for the immediate evacuation of all occupants (simultaneous evacuation procedure), then fire/smoke dampers are not needed; and
- If the building has been divided into separate fire compartments and the alarm system has been designed to immediately evacuate the compartment in question, then smoke/fire dampers only need to be provided on the fire compartment lines of the building where they enter or leave the fire compartment to be evacuated.

## **5.7 MAXIMUM COMPARTMENT SIZE**

The maximum compartment size limitations that are applicable to the shop and commercial and assembly and recreation accommodations (i.e., 2,000m<sup>2</sup> since a sprinkler system will not be provided) have been met and thus, no further consideration is required.

## **5.8 FIRE DOORS**

Each fire door provided should be tested and achieve the appropriate performance as stated in BS476-22.

All doors utilised as means of escape should be openable without the use of a key at all material times.



## **6 EXTERNAL FIRE SPREAD**

### **6.1 BUILDINGS AND BOUNDARIES**

Unprotected areas are the areas of the façade that are not fire rated and have to be limited in size so that fire spread is unlikely to occur to buildings on the adjacent site or to separate fire compartments/buildings on the same site which may be under the same occupation and ownership.

As the building will still occupy the existing curtilage, it is considered that with the compartmentation described in the report and with the implementation of the fire safety measures described in this document, the potential risk of external fire spread is limited to as low as reasonably practicable (ALARP) and therefore should be considered acceptable.

### **6.2 EXTERNAL WALL CONSTRUCTION**

#### **General**

The external wall of a building includes all of the following.

- Anything located within any space forming part of the wall;
- Any decoration or other finish applied to any external (but not internal) surface forming part of the wall;
- Any windows and doors in the wall;
- Any part of a roof pitched at an angle of more than 70 degrees to the horizontal (if that part of the roof adjoins a space within the building to which persons have access, but not access only for the purpose of carrying out repairs or maintenance);

A specified attachment includes any of the following.

- A balcony attached to an external wall;
- A device for reducing heat gain within a building, by deflecting sunlight which is attached to an external wall;
- A solar panel attached to an external wall;

The following are exempt from this regulation.

- Membranes, however membranes used above ground level should achieve at least Class B-s3, d0 to meet Requirement B4;
- Window frames and glass, however window spandrel panels and infill panels must comply with Regulation 7;
- Door frames and doors;
- Electrical installations;
- Insulation and water proofing materials used below ground level;
- Intumescent and fire stopping materials, where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
- Seals, gaskets, fixings, sealants, and backer rods;
- Thermal break materials, where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1. However, thermal break materials 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).

## **Regulation 7**

Regulation 7 requires that the materials used in the construction are appropriate for the circumstances in which they are used, adequately mixed or prepared and are applied, used, or fixed so as to adequately perform the functions for which they are designed.

The Building Regulations 2010 (incorporating 2018 Amendments) place specific regulatory requirements upon materials incorporated into external wall construction, for any development which falls under the following categories.

1. Is over 18m in height (measured from the lowest ground floor level to the floor slab of the top storey);  
AND
2. Contains any of the following:
  - Dwelling(s);
  - An institution;
  - A room for residential purposes (excluding hostel, hotel, or boarding house);

Regulation 7 is not applicable to this building. However, it is recommended that materials forming part of an external wall or specified attachment achieve at least Class A2-s1, d0 or Class A1.

## **Surface spread of flames**

Regulation 7 is not applicable to this building. However, it is recommended that the external façade is provided with Class A2-s1, d0 or Class A1 materials to limit the surface spread of flames, tested in accordance with BS EN 13501-1 (21).

To protect the stairs and the external walkway access routes from a fire on the floor plates, the wall construction within 1.8m of the escape/firefighting stairs and walkway will be fire rated to at least 30 minutes.

## **Material**

Regulation 7 is not applicable to this building. However, it is recommended that all significant elements (cladding, insulation, sheathing board, and internal wall lining) of the external wall construction achieve at least Class A2-s1, d0 or Class A1 in accordance with BS EN 13501-1.

## **Cavity barriers**

Cavity barriers are required in the following locations of any external cavity walls, or behind rainscreen cladding.

- In line with all compartment walls and floors;
- Around all windows and openings within the external wall;

All cavity barriers should be mechanically fixed to the structure of the building and in all cases be installed in accordance with the recommendations of the manufacturer.

Cavity barriers should achieve at least 30-minutes fire resistance for integrity and 15 minutes for the insulation value; no structural fire resistance is required.

## **6.3 ROOF COVERINGS**

To limit the spread of fire over the roof of the building, roof coverings are to be provided in order to limit and reduce the risk of a fire impacting the surface of a roof and potential spreading the fire into other compartments.

All roof coverings are to be tested, installed, and designed in accordance with BS EN 13501-5 (22).

## 7 ACCESS AND FACILITIES FOR THE FIRE SERVICE

### 7.1 HYDRANT PROVISION

Hydrants should be provided to all new developments where an existing hydrant is more than 100m from an entry point into the building and the building contains a compartment greater than 280m<sup>2</sup> in floor area.

In addition, where there is no piped water available or there is insufficient capacity or flow in an existing main, alternative means of providing water for firefighting should be considered.

Alternative methods may be:

- A charged static tank of at least 45,000 litres capacity;
- A spring, river or canal/pond which is capable of providing at least 45,000 litres of water at all times of the year;
- Any other suitable method of providing water for the firefighting operations that the local fire service considers appropriate.

A site survey should be carried out to confirm the above criteria is achieved based on any existing hydrant provisions. If this survey establishes that the existing hydrants are inadequate, then an additional private hydrant or water supply will need to be included on the site.

### 7.2 FIRE SERVICE VEHICLE ACCESS

Due care should be given to ensure that the vehicle access route meets the requirements for a pump appliance as shown in the table below.

Appliance type	Min. width of road between kerbs	Min. width of getaways	Min. turning circle between kerbs	Min. turning circle between walls	Min. clearance height	Min. carrying capacity
Pump	3.7m	3.1m	16.8m	19.2m	3.7m	12.5t

Table 14: Fire Service vehicle – Appliance type

Any access/security measures in and around the site (especially any bollards preventing vehicle access) will need to be by-passable by the Fire Service. The details of the bypass arrangements will need to be developed and agreed with the Fire Service as applicable.

### 7.3 FIRE SERVICE PERSONELL ACCESS

As per §17.5 of ADB, for a building with a height that exceeds 18m and includes a storey with an area that exceeds 900m<sup>2</sup>, a minimum of two firefighting shafts should be provided. However, on the basis that the building is existing and also considering the following provisions, it is considered acceptable to only include one firefighting shaft (incl. a firefighting lift).

- All parts of the floor plate will be within 60m of the dry riser outlet;
- Core 02 and 03 will also be provided with dry riser mains;

This is subject to agreement with the Approving Authorities and until then should be registered as a risk.

Core 01 will be designed as a firefighting shaft in accordance with Section 6 of BS9999 and will form the main access for the Fire Service.

The 60m hose run distance requirement is met and therefore, no further consideration is required.

#### **7.4 FIRE MAINS PROVISION**

The building will be provided with dry riser outlets on every floor level, within the firefighting lobby of Core 01 and within the staircase of Core 02 and 03.

Dry riser main connection points will be located adjacent to the entrances and within 18m of a point where the Fire Service vehicle can park on the roadway.

The dry riser outlets on ground floor will be within 18m from the dry riser inlet point.

#### **7.5 SMOKE CLEARANCE/CONTROL**

##### **Firefighting/Protected stairs**

Core 01, 02 and 03 will be provided with 1.62m<sup>2</sup> OV windows, within the staircase itself, on each floor level.

##### **Firefighting lobby**

Core 01 (incl. a 4m x 4m lift shaft) is an existing element of the building.

It is currently proposed to split the aforementioned lift shaft into two parts and utilise one of the two (i.e., the northern one) for smoke ventilation purposes, while the other part (i.e., southern one) will be utilised as a firefighting lift designed and installed in accordance with BS EN 8172: 2015. The firefighting lift will be provided with the required back-up power supply and will achieve the required certificates.

The lift shaft is cased in structural concrete and has been confirmed by the architect to achieve at least 120-minutes fire resistance.

Considering the above, the following are noted as part of the smoke control ventilation approach.

##### **Size**

The part of the existing lift shaft utilised for smoke ventilation purposes, will now be designed as a Natural Smoke Ventilation Shaft (NSVS), achieving at least 2.0m<sup>2</sup> free area.

##### **AOV dampers**

On each floor level, it will be provided with AOV dampers within the firefighting lobby, achieving at least 2.0m<sup>2</sup> free area and opening into the NSVS.

The NSVS will utilise the existing opening at the top of the shaft, on the side elevation. The aforementioned opening will achieve at least 2.0m<sup>2</sup> free area. It has been confirmed (see Figure 1 below) that the opening will be located at least 0.5m above any surrounding structures that fall within a 2.0m radius on a horizontal plane, so that it is not subject to adverse wind effects.

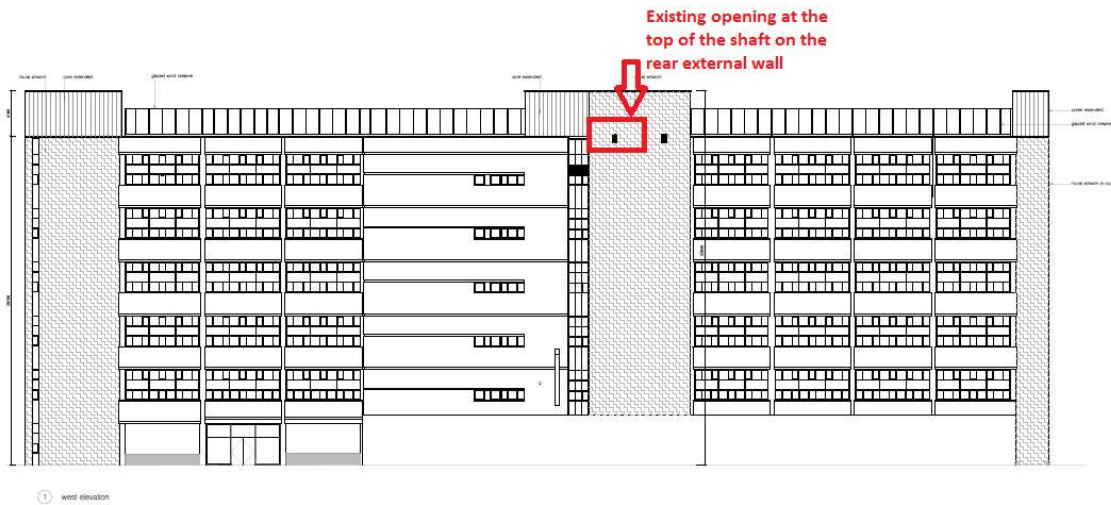


Figure 9: West elevation - AOV damper

It should be noted that as and when the roof is converted, the NSVS will be extended to the roof, above means of escape to prevent any potential smoke obstruction.

### **Cause & effect**

The detailed cause & effect design will be developed by the specialist contractor. However, the following table illustrates a summary of the systems' actions following the activation of a smoke detector within the firefighting lobby.

Accommodation	Cause	Effect
Firefighting lobby	Smoke detector activates	<ul style="list-style-type: none"> <li>• Alarm signal throughout the building;</li> <li>• Simultaneous evacuation will commence;</li> <li>• Lift(s) will ground;</li> <li>• AOV on the affected floor level only will activate;</li> <li>• AOV at the top of the NSVS will activate;</li> </ul>

Table 15: Cause & effect

## **7.6 FIRE CONTROL ROOM**

It is recommended that a single point of control/management for all life safety systems within the building is introduced, mainly for the following.

- Fire alarm and detection system;
- Automatic water fire suppression system;
- Smoke control system;
- Gas safety devices;

The fire alarm panel should be visible to the Fire Service at the main entrance of the building, so that in the event of a fire, they can determine where the fire has occurred quickly, in order to activate the firefighting strategy and operations.

## **8 FIRE SAFETY MANAGEMENT**

### **8.1 GENERAL**

Given the use and likely occupancy of the building, management procedures will assist in the prevention and control of fires and the evacuation of occupants.

Good housekeeping standards will be enforced to ensure that the effectiveness of the fire safety provisions is not affected.

Maintenance procedures should be developed to ensure that all equipment and services within the building are able to operate effectively.

A full Fire Risk Assessment should be carried out by the occupier/developer of the building (coordinated by the landlord where multiple tenants are present) nearer to the development completion and be in place on occupation to meet the Regulatory Reform (Fire Safety) Order (RRO) 2005. The assessment should be maintained and act as a record of the provision and measures, passive and active, used to minimise fire risk within and around the building.

### **8.2 KEY MANAGEMENT ISSUES**

This section describes each of the key management areas that will need to be implemented and maintained during the lifetime of the building:

- All necessary fire safety systems must be regularly maintained and tested.
- The building management will regularly monitor and control the specification and use of combustibles within the escape routes and circulation areas. These areas will generally be maintained free of all combustibles and the escape routes will be unobstructed at all times.
- A full Fire Risk Assessment should be developed and kept up to date at all times and especially when any physical changes are made or the use of the building changes.
- All building staff and tenants will receive regular training including roles and responsibilities for key members of staff.

#### **Control of Evacuation and Fire Safety Planning/Implementation**

A detailed fire safety plan will be drawn up by the building management, which will provide clear simple advice for the occupants/residents in the event of an emergency.

The fire safety plan will be prepared, maintained, and implemented by the fire personnel responsible for the building in question and will include:

- The procedures to be adopted in the event of a fire signal being given.
- Procedures for evacuation of occupants.
- Procedures for equipment maintenance.
- Procedures for recording and monitoring equipment maintenance and any fire incidents.
- Special procedures which are in place for occupants who may have a disability and procedures which are in place to ensure that all occupants are made aware to staff when they are in the building.

Expanding on the information given above, the fire strategy includes a number of risk critical areas resulting in the need to formalise the fire safety management in the building. To develop and maintain the safety of the building, the building management should formulate a policy statement appropriate to the building configuration, location, occupation, and if relevant, to the building users. The policy statement should include:

- a) General safety issues related to the use of the building
- b) Possible fire scenarios
- c) Aims and objectives of the proposed management system and its methodology

This policy should be endorsed by the highest level of management.

### **8.3 REGULATION 38**

To satisfy Regulation 38 of The Building Regulations 2010 (as amended in 2018) it is proposed that a full package of building design information is passed to the end user. It is proposed that the following relevant information is provided to the end users:

- This fire strategy report;
- Any management information proposed in addition to that contained in this strategy;
- Details of all passive fire safety measures (including compartmentation, cavity barriers, fire doors, self-closers, and duct dampers);
- Details of the fire alarm and detection systems, emergency lighting, emergency signage, access controls, door hold open devices;
- Details of all active fire safety measures including the smoke control system design, mode of operation and control systems; (where applicable)
- Details of the dry risers and fire hydrants;
- Any high-risk rooms and equipment present;
- As built plans for the building;
- Fire strategy drawings of every floor level within the building.
- O&M Manuals for the building systems, including commissioning information and certification.

This information will be transferred as a package of information by the main contractor at handover of the building.



**APPENDIX A – ARCHITECTS DRAWINGS REFERENCED**

Architect/Provider	Drawing ref.
<p style="text-align: center;">ROAR Architect  &amp;  Purpose Group</p>	116_existing
	0393 - M400 - GF - MEP Services Requirements (C3)
	Ant 497-SK01.2 Proposed First Floor Plan Overall
	Canopy Bar - Roof Layout Plan
	FifthFloorConcept_Rev3
	GROUND FLOOR MASTER
	PG_PL_03 GROUND FLOOR MASTERPLAN