

OMEGA FIRE

The Place

Detailed Fire Strategy

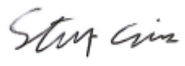
Capital & Centric

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Quality Assurance

Revision	-	Rev A	Rev B
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Date	22/07/16		
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Prepared By	Stuart Crick		
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Signature			

This document has been prepared by Omega Fire and is only applicable to The Place.

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1 Executive Summary

1.1.1 Omega Fire has been commissioned by Capital and Centric to develop the fire safety strategy for the provision of the existing serviced apartments in Manchester. Figure 1 adjacent provides a proposed elevation of the development.

1.1.2 The development is an existing building which was designed to the guidance of Approved Document B, which has subsequently been updated over time during various refurbishments. This report will serve to collate the existing strategy to ensure the proposed changes to the building align with the original design intentions. Where fire engineering has been used this will be justified through quantitative analysis and qualitative discussions on the performance of the solutions. The final objective is to produce a level of life safety commensurate with prescriptive guidance documents.

1.1.3 The assessment has not primarily considered any requirements associated with property protection additional to those which are inherent within the prescriptive guidance and any discussions associated with variations to the prescriptive approach are on the basis of life safety.

1.1.4 It is considered that the recommendations in this report will provide sufficient guidance to obtain approval from the relevant authorities and achieve a satisfactory level of safety commensurate with the risks of the occupied premises.

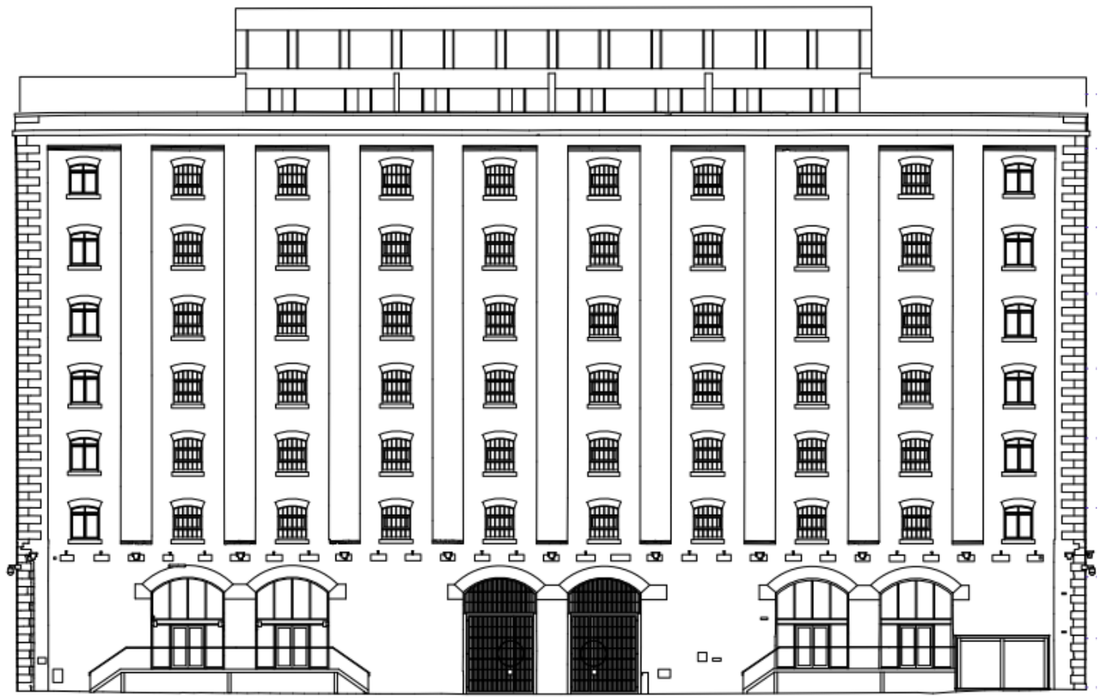


Figure 1–Proposed elevation

2 Introduction

2.1.1 This report outlines the recommendations for fire safety features within the proposed redevelopment of the Place. This is to satisfy the functional requirements of the Building Regulations on the basis of fire engineering principles.

2.1 Legislation

2.1.1 Under the Building Regulations a building owner is required to provide an adequate level of life safety to the building by providing suitable means of escape, means of warning occupants of a fire, limiting internal fire spread, protecting adjacent property from fire, and facilitating Fire Service operations. This can be achieved by the adoption of standard guidance as documented within Approved Document B (ADB) 2006 Edition. However, ADB further recognises that alternative solutions may provide a more appropriate design. The use of an alternative approach is detailed in ADB, Use of Guidance page 5:

"The approved documents are intended to provide guidance for some of the more common building situations. However, there may well be alternative ways of achieving compliance with the requirements. Thus there is no obligation to adopt any particular solution contained in an approved document if you prefer to meet the relevant requirement in some other way."

2.1.2 ADB has been approved and issued by the Secretary of State for the purpose of providing practical guidance in the design of buildings, with regards to fire, for meeting Part B of the Building Regulations. As with all legislation and supporting guidance documents, ADB has been subject to numerous revisions and amendments over the years and continues to evolve to reflect modern design practises and/or significant changes in current thinking. The current version of ADB that is required to be considered in redevelopments is the 2006 edition.

2.1.3 The development is used as serviced apartments which are not considered as a purpose group in the guidance of Approved Document B, in principal they would sit between Hotel use Private Residential, therefore a fire engineered design will be required to justify the arrangement.

2.1.4 Given the age of the building, it is fully recognised within the Building Regulations that the adoption of the current ADB is not always feasible or practical without major reconstruction works being undertaken, therefore the general principle with refurbishment works is that in order to comply with the building regulations the current level of fire safety must not be lowered during the works. If it can be demonstrated that once the buildings works have been completed, any specific elements that didn't comply with design guidance were no more unsatisfactory than before the works, the building would be considered to meet the requirements of the Building Regulations.

2.1.5 This report provides the recommendations for the fire safety features within the proposed alterations. The report will detail the measures which need to be maintained and/or implemented in the final scheme in order to satisfy the fundamental objectives of the Building Regulations on the basis of fire engineering principles.

2.1.6 The strategy has not considered any requirements associated with property protection additional to those which are inherent within the existing design, and any discussions associated with variations to the prescriptive approach are on the basis of life safety only.

2.1.7 Where no reference is made within this report with regards to a certain element it is assumed that it will be designed and installed in accordance with ADB, and or the relevant British Standard.

2.2 Project Information

2.2.1 Table 1 and 2 provides summary of the drawing information that has been considered to develop this fire strategy.

Table 1 – Report Schedule

Architects	Drawing Title	Drawing Number	Revision	Date
Warrington Fire Reseach	Ducie Warehouse, Manchester Fire Safety Strategy	WFRC No. CP98108.Issue 3	-	24/02/99
Ove Arup & Partners	Ducie Street Warehouse, Revised Smoke Control Strategy	59819/00 11.0	-	24/07/00
WSP	Proposed Amendments to The Place, Ducie Street	Issue 2	-	20/10/06

Table 2 - Drawing Schedule

Architects	Drawing Title	Drawing Number	Revision	Date
Archer Humphreys	Proposed Ground Floor Plan	AHA/PLC/GA/100	J	20.07.16
Archer Humphreys	Proposed Mezzanine Floor Plan	AHA/PLC/GA/101	H	20.07.16
Archer Humphreys	Proposed Ground Floor Section DD	AHA/PLC/GA/140	-	12.07.16
Archer Humphreys	Proposed First Floor Plan	AHA/PLC/GA/303	D	15.04.16
Archer Humphreys	Proposed Second Floor Plan	AHA/PLC/GA/304	D	15.04.16
Archer Humphreys	Proposed Third Floor Plan	AHA/PLC/GA/305	D	14.04.16
Archer Humphreys	Proposed Fourth Floor Plan	AHA/PLC/GA/306	D	14.04.16
Archer Humphreys	Proposed Fifth Floor Plan	AHA/PLC/GA/307	D	14.04.16
Archer Humphreys	Proposed Sixth Floor Plan	AHA/PLC/GA/308	D	14.04.16
Archer Humphreys	Proposed Seventh Floor Plan	AHA/PLC/GA/309	C	07.04.16

Archer Humphreys	Proposed Eighth Floor Plan	AHA/PLC/GA/310	C	07.04.16
Archer Humphreys	Proposed Section A	AHA/PLC/GS/501	A	15.04.16
Archer Humphreys	Proposed Section B	AHA/PLC/GS/502	A	15.04.16
Archer Humphreys	Proposed Section C	AHA/PLC/GS/503	A	15.04.16
Archer Humphreys	Proposed Section D	AHA/PLC/GS/504	A	15.04.16
Archer Humphreys	Proposed North Elevation	AHA/PLC/GE/601	B	15.04.16
Archer Humphreys	Proposed South Elevation	AHA/PLC/GE/602	C	21.04.16
Archer Humphreys	Proposed East Elevation	AHA/PLC/GE/603	C	21.04.16
Archer Humphreys	Proposed West Elevation	AHA/PLC/GE/604	C	21.04.16

3 Building Summary

3.1 Building Description

3.1.1 The Place is an existing development located in Manchester on Ducie Street. Originally constructed in 1867, the building served as a warehouse which was then converted to residential use in 1998. This was originally as private apartments but has subsequently changed to act as serviced apartments.

3.1.2 The original building had seven storeys (ground to 6th) which have been retained, these each measured approximately 2800m². During the redevelopment an atrium was cut through the first to sixth floors to allow light into the lower levels. Two additional floors (7th & 8th) were included at the top of the building to provide duplex apartments. The buildings height from adjacent ground to the highest occupied floor is approximately 28m.

3.1.3 The ground floor of the building is used for primarily for non-residential purposes, this includes central lobby area below the atrium alongside a residents lounge and private commercial areas. The first to sixth floors contain residential apartments which open into the common atrium. The seventh floor contains duplex apartments which extend to the eighth floor, these are accessed from a common corridor above the atrium on the seventh floor.



Figure 2 – The Place

3.1.4 The original fire strategy for the building concerning the change to residential use was written in April 1998, revised in February 1999, which considered the development as private residential apartments. In June 2000 an amended report was produced which concerned the smoke control system to the common atrium, this also considered the development as private apartments. In October 2006 a further report was produced which concerned changes to the reception area at ground floor, this report considered the development as apart-hotel use. It is unclear what design work was considered between June 2000 and October 2006 to convert the building from private residential to apart-hotel use.

3.1.5 The proposed alterations to the scheme will redesign the lounge/reception area at the ground floor and will also redesign the internal apartment layouts. The ground floor will still contain a lobby/reception area, a commercial/function space will be refurbished to provide a residents lounge and part of the lobby will be replaced with 4 apartments with a further 4 apartments on the mezzanine level above.

3.1.6 At ground floor the opening to the atrium space above will be retained a long with the fire protection of fire rated shutters to maintain the compartmentation. An open stair adjacent to the atrium opening will be removed and the opening will be enclosed to maintain the period of fire resisting construction. It appears from the early reports of the building that this should have always been the case, as the only opening was protected with fire rated shutters. It is not clear at what point this opening was introduced to the design or if it was justified.

3.1.7 The internal layout of the apartments will change on the first to sixth floors. Currently these are generally protected entrance hall designs which will be converted to studios and open-plan apartments. Some of the apartments will be reduced in size in order to increase the total number of apartments per floor.

3.2 Building Population

3.2.1 It is understood that the communal areas at ground floor will be open to the public as well as guests, therefore the additional occupancy must be considered. The ground floor and mezzanine have a total seating for up to 199 persons.

3.2.2 The Ground and Mezzanine Floors each contain 4 studio apartments. The First to Fourth Floors each contain 24 apartments, 16 one-bed apartments or studios, and 8 two-bed apartments. The Fifth and Sixth Floors each contain 28 one-bed apartments or studios. The Seventh Floor gives access to 8 two-bed duplex apartments.

3.2.3 There are a total of 168 apartments within the development, totalling 208 bedrooms. Assuming up to two persons per room this predicts a maximum occupancy of 416.

3.2.4 A restaurant retail unit is proposed at ground floor however the layout is not yet known and will be subject to a separate fit-out strategy.

4 Emergency Escape Strategy

4.1 Evacuation Principal

4.1.1 The building is currently understood to operate with two separate alarm systems, a private domestic system within the apartments and a non-domestic alarm system within the common areas. Detection within an apartment would evacuate the apartment of origin only. Detection within the common areas would evacuate the entire building. A sounder from the non-domestic alarm is extended into the entrance hall of each apartment in order to alert occupants to evacuate. This evacuation policy will be retained in the new proposals.

4.1.2 The non-domestic areas of the alarm will typically operate on a 'double knock' basis whereby the operation of a single smoke detector in the building will alert hotel reception who will then investigate the cause of the activation. The investigation period to be adopted will be determined by the Hotel Operator, but in accordance with BS5839 Part 1 it should not exceed 6 minutes, including the acknowledgement period of 1 minute. If the alarm is not acknowledged within 1 minute, or the investigation period expires, or a second detector or manual call point is activated, then a full evacuation alarm will sound throughout the building.

4.1.3 There are four studio apartments on the ground floor and four on the mezzanine which will be considered as part of the non-domestic zone, as these areas are not provided with ventilation.

4.2 Automatic Fire Detection and Alarm (AFDA)

4.2.1 An L1 alarm system will be provided throughout the development. This will be an addressable system zoned to each apartment to maintain the current cause and effect strategy.

4.3 Horizontal Evacuation

Studio Apartments

4.3.1 Travel distance within studios will not exceed 9m from the apartment entrance door to the furthest point within the apartment. There are a number of studios where this distance is extended by approximately 1.5m to 10.5m. Based on the travel speeds stated in BS 7974 this extension equates too approximately 2 seconds additional travel time. It is proposed to justify this extension by reducing the detector spacing from a 7.5m maximum radius to 5m maximum radius. This enhanced detection will reduce the time to detection to justify the increased travel time

4.3.2 Cookers should be located so not to prejudice escape. Sprinklers will be provided to apartments where cookers are located on escape routes. It will not be necessary to provide enhanced detection to apartments provided with sprinklers.

Open-Plan Apartments

4.3.3 Open-plan apartments are apartments where bedrooms are accessed from the living area within the apartment as opposed to from an entrance hall. These types of apartment are not considered in the guidance of ADB, instead these apartments will be justified through the use of an alternative fire engineered solution. This alternative approach will be based on the report "*Open plan flat layouts – Assessing life safety in the event of Fire*" this summary report is based on the research report "*Assessing life safety of open plan flats layouts*" commissioned by the NHBC Foundation and carried out by BRE (NHBC report).

4.3.4 The main findings of the report and the "Guidance for designers" states that:

As guidance for designers of open plan flat designs and for the scenarios described in appendix B of this report, active fire protection comprising: a sprinkler system in accordance with BS 9251 or BS EN 12845 as appropriate; and an enhanced detection and alarm system (LD1) in accordance with BS 5839-6 can provide a level of safety that is at least as good as that of a similar AD B compliant design.

4.3.5 As such, open-plan apartments will be provided with a sprinkler system in accordance with BS 9251, and a Category LD1 alarm system in accordance with BS 5839-6. In addition, apartments will not exceed 12m by 16m.

4.3.6 Following the issue of the Approved Document B the guidance of BS 9991 has also covered the issue of open-plan apartments. The guidance of BS 9991 would also require apartments exceeding 32m² in area to have kitchens their enclosed. As an alternative arrangement it is proposed to link the cooking facilities to remove the power in the event of a fire.

Duplex Apartments

4.3.7 The duplexes are provided with an open stair between 7th and 8th floor, this stair is fire separated from the accommodation on the 7th floor and open to the kitchen/living area on the eighth floor. This is unchanged from the previously accepted design on the duplexes.

Residential Common Atrium

4.3.8 The residential floors are provided with two protected stairs for escape, these discharge direct to external at ground floor. On the first to sixth floors a combination of vented atrium and unvented corridors accessed through the atrium are used to access the apartments. On the seventh floor the duplexes are accessed through protected vented corridors.

4.3.9 The ground floor and mezzanine residential apartments have access to a single protected escape stair.

4.3.10 Travel distances in the common areas accessing the apartments should be limited to 7.5m where escape is possible in a single direction, or 30m where alternative escape is possible. This travel distance can be measured in a ventilated corridor, or in an unvented corridor which gives access to a vented sterile lobby. Only corridors and lobbies adjoining an escape stair require ventilation.

4.3.11 On the ground floor and mezzanine the studios will be accessed through two separate unvented corridors on each level which adjoin a common unvented lobby, which subsequently adjoins the protected stair. The travel distance in the unvented corridor will not exceed 9m in a single direction.

4.3.12 On the first to sixth floors the travel distances within the common atrium are compliant. The travel distances in the unvented corridors do not exceed 7.5m in a single direction, however these give access to the atrium space rather than a protected sterile lobby. This is shown in Figure 3.

4.3.13 This arrangement is proposed to be acceptable as the smoke control within the atrium was found to achieve tenable conditions with a significantly larger fire than would be expected within a residential apartment. This is based on the amended smoke control report produced by Over Arup & Partners in July 2000 which appears to have been the most recent to consider a fire within an apartment.

4.3.14 The ventilation of the atrium will be activated by activation of a detector in the non-domestic system.

4.3.15 The most recent report from WSP states that the atrium is provided with 85.6m² on vent at the head of the atrium and 26m² vent at the base. This will be retained in the new refurbishment.

4.3.16 The corridors adjoining the stair on the 7th floor will be provided with 1.5m² manual vents as the area has access to multiple stairs. This is present in the current strategy for the building and will be maintained for the new proposal.

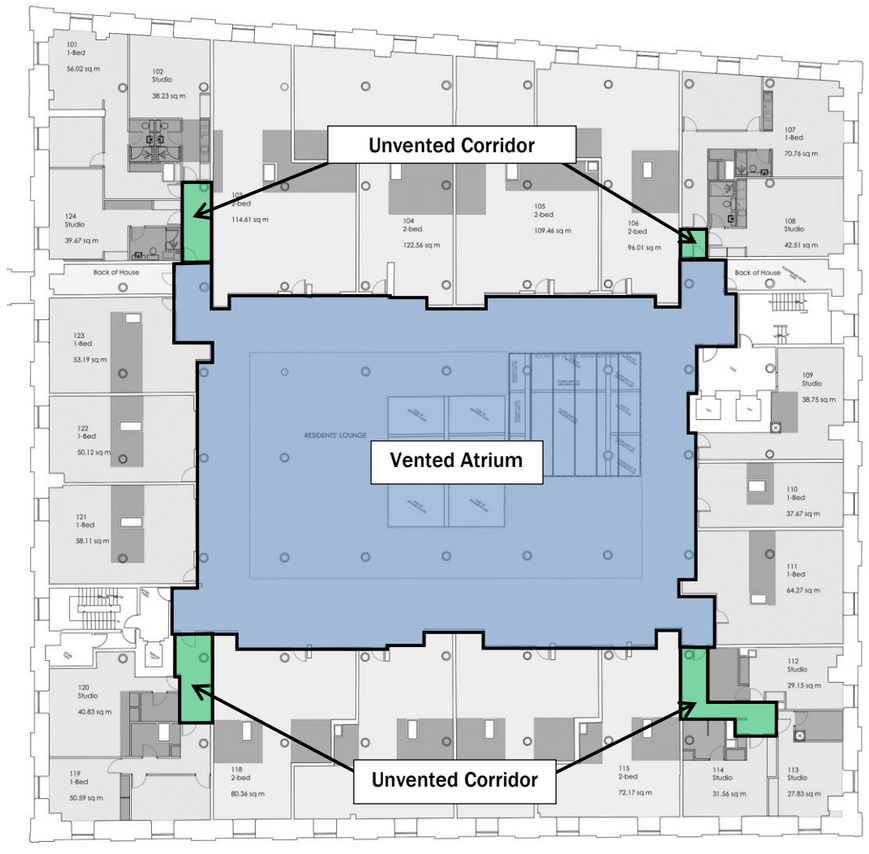


Figure 3 – Ventilation arrangement, first to sixth floors

Non Residential Accommodation

4.3.17 The ground floor lounge is provided with 10 exits to external, however two open against the direction of escape and will therefore be discounted.

4.3.18 To calculate the maximum occupancy of an area, the largest exit must be assumed to be unavailable due to fire. A fire located in the lower-right of the lounge could obstruct four exits which will be discounted. The remaining exits are three 1550mm doors and a 1650mm door. These are sufficient for up to 1260 occupants, significantly above the expected occupancy of the space.

4.3.19 In the original design of the building the ground floor was completely fire separated from the atrium above with the exception of one central opening between ground and first floor, and a void with an accommodation stair adjacent. The central opening was enclosed on two sides with fire resisting construction and on two sides with active fire curtains which would close dependent on the fire location. If the fire was located on ground floor the curtains would close to prevent smoke/fire spread to the atrium above. If the fire was in the residential areas the curtains would remain open and the doors at low level would also open to provide inlet air to the atrium for the smoke control. It is not discussed in the original strategy, however it is assumed that the adjacent void was an area sterile of fire load to permit the opening to the atrium above. This must have been the case as otherwise the protection to the central opening would serve no purpose if an unprotected opening were permitted adjacent.

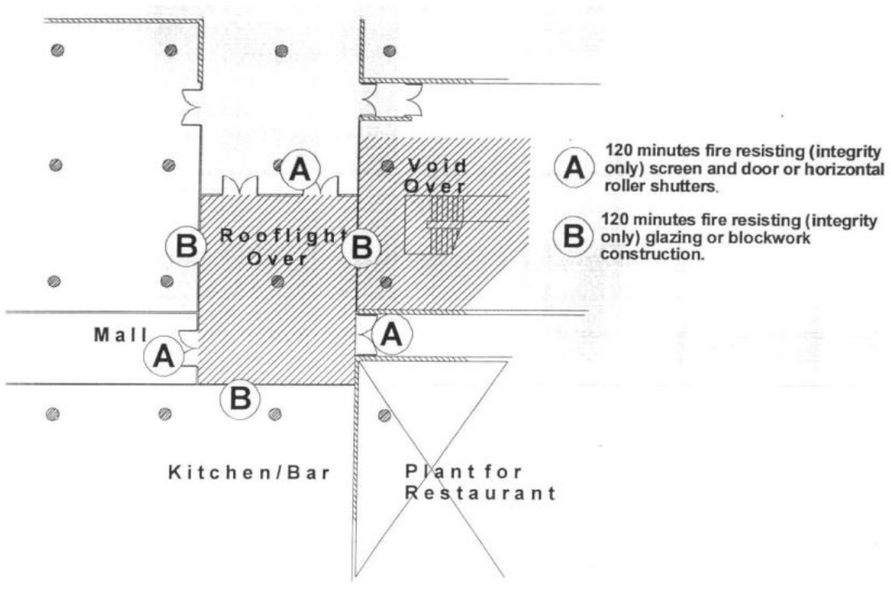


Figure 4 – Original Ground Floor Layout

4.3.20 The current design of the building has larger areas of the ground floor open to the reception which has been justified through the inclusion of sprinklers to the high risk areas in the bar and reception, and low combustibility furnishings to the remaining reception area.

4.3.21 The proposal will return the ground floor to the original design with the ground and first floor fully fire separated with the exception of the small central opening which will be protected with fire curtains as discussed. Any furnishings within the central opening will be non-combustible. This area will also house a small bar area. To limit any potential fire size a watermist suppression system will be provided to this area. This is highlighted in Figure 5.

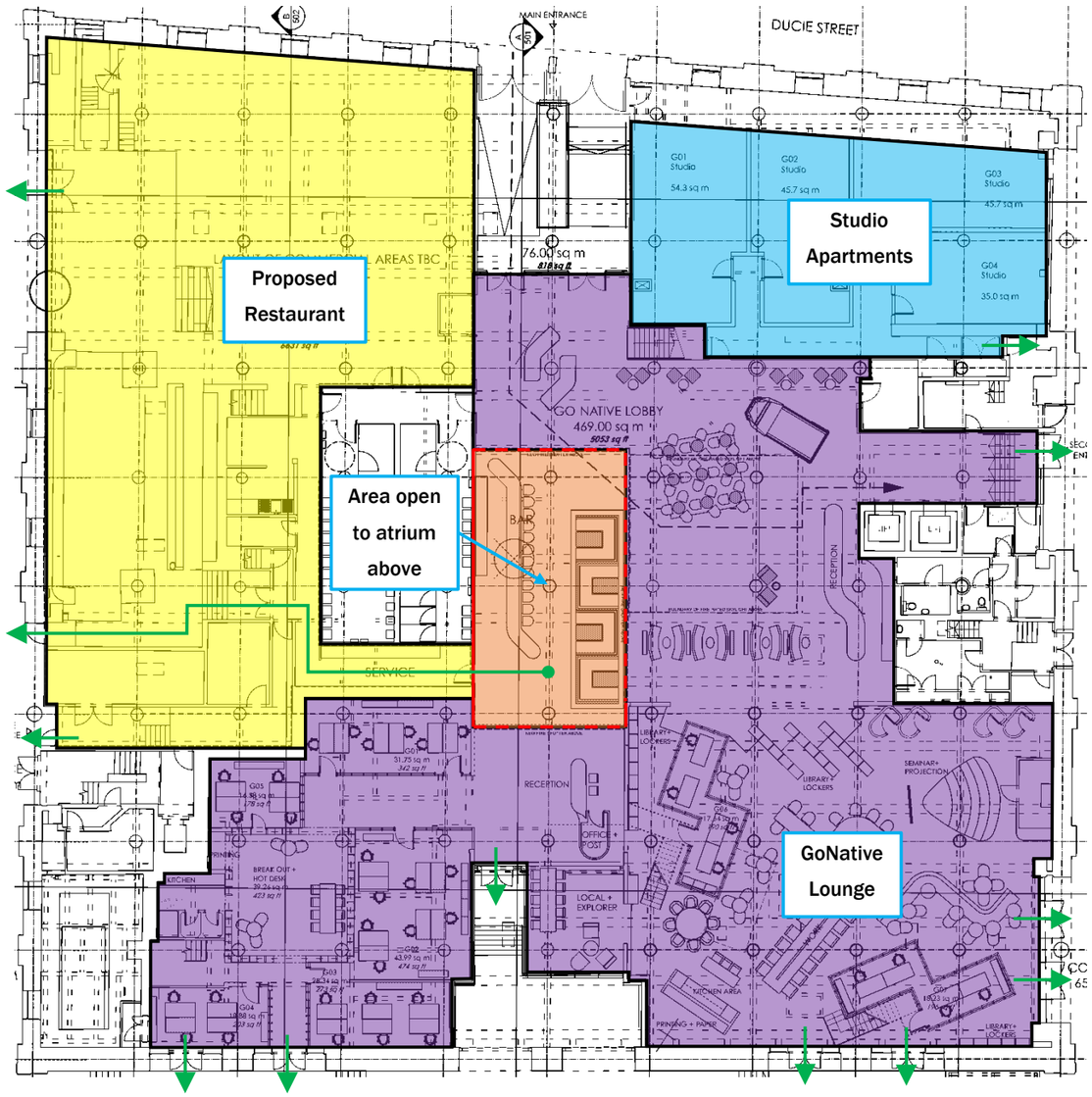


Figure 5 – Ground Floor Layout

Restaurant

4.3.22 The layout and use of the restaurant is yet to be determined but will be assessed separately.

Doors on Escape Routes

4.3.23 Access control measures incorporated into the design of the building which restrict access or egress from the building should not adversely affect the means of escape. If some escape routes are secured outside of normal hours the remaining measures should be sufficient to allow safe egress of any persons remaining within the building.

4.3.24 When the building is occupied, all electrically powered locking mechanisms are to return to the unlocked position on operation of the fire alarm system or loss of power. The door is also provided with a manual door release unit complying with BS EN 54-11 on the side approached by people making their escape.

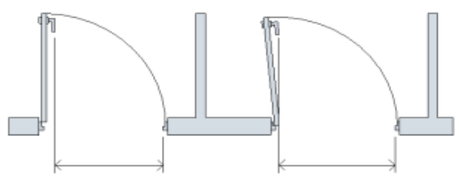
4.3.25 Doors on escape routes should:

- Be hung to open not less than 90 degrees.
- Be hung clear of any change of floor level,
- Should be sufficiently recessed to prevent its swing from encroaching on the required egress route of the escape route or stair.
- Provided with vision panels if they are provided to sub-divide corridors or where doors are hung to swing both ways.
- Only fitted with lock or fastenings which are readily operated, without the use of a key and without having to manipulate more than one mechanism.

4.3.26 Doors on escape routes servicing more the 60 people are:

- Provided with panic fastenings in accordance with BS EN 1125:1997 if locks are required.
- Hung to swing in the direction of escape, if escape is available in both directions these doors are double swing door sets.

4.3.27 Door widths are to be measured in accordance with Figure 3 below.



Effective clear width (door stop to projecting ironmongery) | Effective clear width (door stop to door leaf)

Figure 6–Door Widths

4.3.28 Where automatic hold open devices are to be installed in the development it is essential that these hold open devices release automatically on activation of the fire alarm system and failsafe to release the door in the event of a power failure. The hold open devices should comply with BS 5839: Part 3.

4.4 Vertical Evacuation

Residential Accommodation

4.4.1 The scheme is served by 2 protected stairs, located on east and west side of the building. Each stair has a minimum width of 1100mm. These stairs lobbied at every level meaning there is not requirement to discount a stair when considering the escape capacity. The stairs discharge direct to external at ground floor.

4.4.2 The stairs serve 6 storeys above ground, this is sufficient to accommodate up to 840 persons of the upper levels, significantly greater than the expected occupancy of the apartments.

4.5 Evacuation of Disabled People

4.5.1 Disabled refuges are provided in the lobby of each stair.

4.5.2 There is no requirement for disabled provisions within the residential accommodation as this is afforded with a high levels of compartmentation which allows occupants to remain in the non-fire affected apartment. If a fire was to initiate within an apartment, the disabled occupants can evacuate to a protected place of safety in the stair lobby.

4.5.3 Currently the scheme does not appear to have refuges or communication, however consideration should be given to providing refuges on every above ground floor with emergency voice communication (EVC) panels that are linked to the management suite/reception desk.

4.6 Emergency Lighting

4.6.1 Emergency lighting will be provided in accordance with BS 5266 and BS EN 1838:1999.

4.6.2 The escape lighting should be sited to provide an appropriate luminance near each door exit door and where it is necessary to emphasise potential danger or safety equipment. The following bullet points indicate some of the critical areas.

- At each exit door intended to be used in an emergency;
- Near stairs or any other change in level so that each flight of stairs receives direct light;
- Mandatory emergency exits and safety signs;
- At each change of direction;
- At each intersection of corridors/ decks
- Outside and near to each final exit;
- Near each first aid post;
- Near each piece of firefighting equipment and call point.

4.7 Emergency Escape Signage

4.7.1 Fire escape signs are to be provided to guide occupants from any point in a building, via a place of relative safety (the escape route) to the place of ultimate safety (outside the building). Exit and directional signage should be provided in accordance with the requirements if BS5499: Part 1, 4 and 5.

4.7.2 Signage is provided to identify the primary escape route from each location within the building. To achieve this, the following principles have been adopted.

- At least one escape route or doorway leading to an escape route should be visible from any place within every room or enclosure (with the exception of the internal apartments).
- Where direct sight of the escape route is obstructed, additional signage to be considered.
- Escape route signage is to take precedence over all other signs.
- All changes of direction in corridor, stairways and open spaces forming part of an escape route will be marked with intermediate signs. Each intermediate door or junction will also be similarly signed.
- Signs are not to be fixed to doors or sited where they are obscured by open doors.

4.7.3 Escape route signs are to be sited conspicuously within the normal field of vision. The following principles, which will assist the evacuating occupants to predict the location of successive signs, should be applied:

- Signs above doors or open spaces should be mounted between 2m and 2.5m from floor level, measured to the base of the sign and be sited as close to the center line of the escape route as practicable;
- Signs sited on walls should be mounted between 1.7m and 2m from floor level to the base of the sign;
- Signs should be sited at the same height throughout the escape route, so far as is reasonably practicable.

5 Internal Fire Spread

5.1 Linings

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

5.1.2 All surface finishes are to achieve the classifications in Table 3 when tested under the national classifications in accordance with BS 476 or the European classifications in accordance with BS EN 13501-1:2002.

Table 3 - Classifications of Internal Linings

Location	National Class	European Class
Small room not more than 4m² in the residential accommodation i.e. bathrooms	3	D-s3, d2
Rooms not more 30m²in the non-residential areas i.e. store rooms	3	D-s3, d2
Other rooms	1	C-s3, d2
Escape routes, stairs and protected entrance halls	0	B-s3, d2

5.1.3 Parts of walls in rooms may be of a poorer performance than specified in Table 4 above (but not poorer than Class 3 (National Class) or Class D-s3, d2 (European class)), provided the total area of those parts in any room does not exceed one half of the floor area of the room: and subject to a maximum of 60m² in non -residential areas and 20m ² in residential areas..

5.2 Structural Requirements

5.2.1 Premature failure of the structure can be prevented by provisions for load bearing elements of structure to have a minimum standard of fire resistance, in terms of resistance to collapse or failure of load bearing capacity.

5.2.2 The purpose of providing the structure with fire resistance is:

- To minimize the risk to occupants;
- To reduce the risk to fire fighters who may be engaged on search and rescue operations;
- To reduce the danger to people in the vicinity of the building.

5.2.3 The building is to be afforded 60 minutes and 90 minutes fire protection in accordance with the existing fire strategy, as the building is less than 30m in height to the highest common floor. This period of fire resistance refers to the performance achieved by the structural elements when tested in accordance with the appropriate parts of BS 476 for load bearing elements of structure. Compartmentation between apartments will be provided with 60 min of fire resistance.

5.3 Elements of Structure

5.3.1 Elements of structure are defined as follows:

- A member forming part of the structural frame of a building or any beam or column;
- A load bearing wall or load bearing part of a wall;
- A floor;
- A gallery;
- An external wall structure supporting fire protected elements for the prevention of external fire spread; and;
- A compartment wall.

5.3.2 The following are excluded from the definition of elements of structure:

- A structure that only supports a roof, unless:
  - i) The roof performs the function of a floor such as parking vehicles or as a means of escape; or
  - ii) The structure is essential for the stability of an external wall which needs to have fire resistance;
- The lowest floor of the building;

5.3.3 Balconies and decks should conform following recommendations:

- The construction should provide a minimum fire resistance of 30min,
- The walking surface should be imperforate,
- The sectional profile should be such that any fire plume breaking out of a flat or maisonette is directed upwards and outwards, and should be arranged such that smoke does not laterally along the soffit.
- The soffit above the balcony or deck to be less than 2m. (To avoid requirement for down stands).

6 Compartmentation

6.1 Provisions of Compartmentation

6.1.1 The spread of fire within a building can be restricted by sub-dividing the building into compartments separated from one another by walls and/or floors of fire resisting construction. This is to restrict rapid fire spread which could trap occupants of the building and to reduce the risk of fires becoming large.

6.2 Compartmentation Requirements

6.2.1 Each apartment is to be a separate compartment and all party walls (and walls to common areas) are to be compartment walls. As the building provides residential accommodation; all floors (within the building) are to be constructed as 60 minutes compartment floors.

6.2.2 The studios on the ground and mezzanine have an internal façade and an external façade, where smoke could be trapped in between and spread to adjoining studios. This is not considered to be a deviation as these studios evacuate simultaneously on the principal of a hotel, where no separation would be required between the bedrooms.

6.2.3 Fire doors should conform the recommendations given in Table 4 below.

Table 4 – Compartmentation Summary

Floor / Wall Location	Fire Rating (minutes)	European Standard (minutes)
Compartment floors	90	REI 90
Compartment walls	90	REI 90
Walls separating apartments	60	REI 60
Firefighting Shaft External	120	REI 120
Firefighting Shaft Internal	60	REI 60
Fire resisting construction between ground and first	60	RE 60
Protected Stair (Duplex)	30	REI 30

Table 5 – Fire Door Summary

Locality of the door	Fire Rating (minutes)	European Standard (minutes)	Self-Closing Device Required
Firefighting Shaft External	FD60S	E60Sa	Yes
Firefighting Shaft Internal	FD30S	E30Sa	Yes
Apartment Entrance	FD30S	E30Sa	No (to be kept locked shut)
Protected Stair (Duplex)	FD20	E20	No

6.3 Protection of Openings and Fire Stopping

6.3.1 To ensure all fire separating elements are effective, every joint or imperfection of fit, or opening to allow services to pass through the element, suitable fire protection is to be provided by sealing or fire stopping so that the fire resistance of the element is not impaired.

6.3.2 Vertical service risers are to be enclosed in a fire protected shaft or fire stopped at each compartment floor level or are to provide a protected shaft thought the building.

Fire Stopping

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

6.3.4 Where non rigid material are adopted or unsupported spans exceeding 100mm are adopted, the fire stopping material to be reinforced with materials of limited combustibility.

Openings of Pipes

6.3.5 Where services pass through a fire separating element, the following three fire stopping measures will need to be considered to evaluate the most appropriate fire protection measure, these are summarised below and in Figure 7.

Method 1 *- Proprietary Seals*

Provide a proprietary sealing system e.g. intumescent collar which has been tested to maintain the fire resistance of the wall, floor or cavity barrier for a pipe of any diameter.

Method 2 *– Pipes with a restricted diameter*

On the provision that the type and internal diameter dimension satisfies the requirements in Table 6, fire stopping such as cement mortar or intumescent mastic may be used around the pipe.

Method 3 *- Sleeving*

A pipe of lead, aluminium alloy, fibre cement or uPVC, with a maximum nominal internal diameter of 160mm, may be used with a sleeving of non-combustible pipes. The specification for non-combustible and uPVC are given in Table 6.

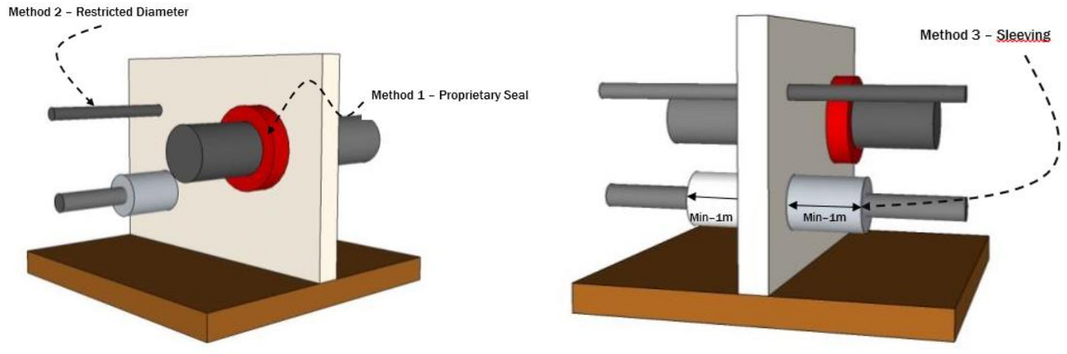


Figure 7–Services Breaches to Compartment Walls

Table 6 – Maximum nominal internal diameter of pipes passing through a compartment wall/floor

Situation	Pipe material and maximum nominal internal diameter		
	Non-combustible material[1]	Lead, aluminium, aluminium alloy, uPVC[2], fibre cement	Any other material
Structure enclosing a protected shaft which is not a stairway or a lift shaft	160	110	40
Compartment wall or compartment floor between apartments	160	160 (stack pipe)[3] 110 (branch pipe)[3]	40
Any other situation	160	40	40

Note 1: Any non-combustible material (such as iron, copper or steel) which, if exposed to a temperature of 800 degrees, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.

Note 2: uPVC pipes complying with BS 4514:2001 and uPVC pipes complying with BS5255:1989.

Note 3: These diameters are only in relation to pipes forming part of an above ground drainage system and enclosed in Method 3. In other cases the maximum diameters against situation 3 apply.

Fire Dampers

6.3.6 Fire dampers are to be operated by smoke detection and thermal fusible link if ducts access or leaves a compartment (apartment/corridor/ stair/ riser etc.).

6.3.7 All fire and smoke dampers are to be tested to BS EN 1366-2:1999 and be classified to BS 13501-3. The dampers are to have the same fire resistance (integrity) as the wall or floor they penetrate (subject to a minimum fire resistance of 60 minutes).

6.3.8 Dampers are not required within internal protected entrance halls if;

- The duct work used is of rigid steel construction and all joints in the duct work are sealed with an intumescent sealant to prevent any leakage of hot smoke into the corridor.
- All penetrations in walls are fire stopped to the minimum fire resistance of the wall duct passes through.
- Ventilation ducts supplying or extracting air directly to or from a protected entrance hall, should not also serve other areas.

6.4 Cavity Barriers

6.4.1 Concealed spaces or cavities in the construction of a building provide a route for smoke and flame spread. This is particularly in the voids above and below the construction of a building e.g. walls, floors, ceilings and roofs. The provision of cavity barriers within the voids is intended to restrict the spread of smoke and flames.

6.4.2 Fire resistant cavity barriers are to be installed in cavity spaces exceeding 20m in any direction. The cavity barriers will offer a minimum of 30 minutes fire resistance integrity and 15 minutes fire resistance insulation (European Standard E30 & EI15).

6.4.3 See Figure 8 for a summary of cavity barrier locations and the differentiation between cavity barriers and fire stopping.

6.4.4 Table 7 shows the maximum dimensions of undivided concealed spaces for the different classifications of the cavity barrier. Any exclusions should be in full accordance with the recommendations and specifications of ADB.

6.4.5 Where a concealed space is an undivided area which exceeds 40m in either or both directions on plan there is no limit to the size of the cavity if:

- The room and the cavity together are compartmented from the rest of the building;
- An automatic detection system compiling to BS 5839-1 is installed. Detectors are only required in the cavity to satisfy BS 58390- 1;
- The cavity is used as a plenum and the recirculation air distribution systems in BS 5588-9 are followed;
- The surface of the material/product used in the construction of the cavity is Class 0 (National class) or Class B-s3, d2 or better (European class) and the supports and fixings in the cavity are non-combustible;
- The flame spread rating of any pipe insulation systems is Class 1 (National Class) or Class C-s3, d2 or better (European class);
- Any electrical wiring in the voids is laid in metal trays, or in metal conduit; and
- Any other materials in the cavity are of limited combustibility or Class A2 or better (European class).

Table 7 – Maximum dimensions of cavities

Location of Cavity	Class of surface/ product exposed in cavity		Maximum dimensions in any direction (m)
	National	European	
Between roof and ceiling	Any	Any	20
Any other cavity	Class 0 or 1	Class A1 Class A2-s3, d2 Class B-s3, d2 Class C -s3, d2	20
	Not Class 0 or 1	Not any of the above classes	10

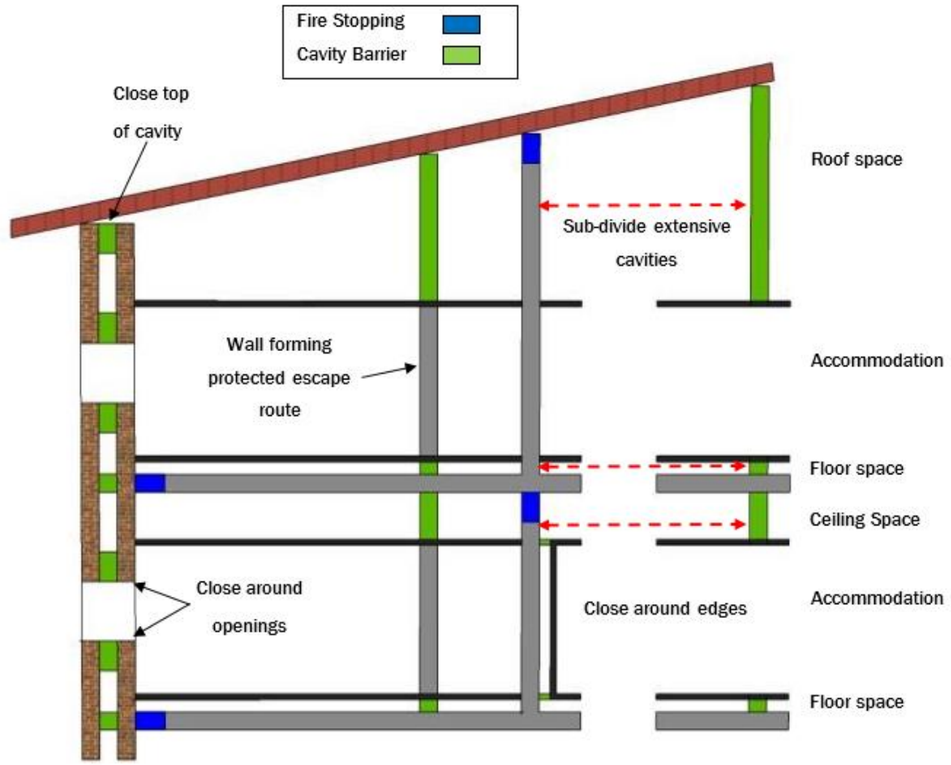


Figure 8–Typical Provision of Cavity Barriers

6.5 Construction and Fixing of Cavity Barriers

6.5.1 Cavity barriers should be constructed to provide 30min fire resistance (E30 EI15 when exposed from each side separately). The cavity barriers should be tightly fitted to a ridged construction and mechanically fixed in position. Where this is not possible (e.g. junctions with slates, tiles, corrugated etc) the junction should be fire stopped in accordance with this report). Cavity barriers should also be fitted so that their performance is unlikely to be made ineffective by movement of the building due to subsidence, temperature change etc. failure of their fixings, material or construction, they abut or collapse of any services penetrating them.

6.5.2 Cavity barriers in a stud wall or partition or provided around openings may be constructed from:

- Steel at least 0.5mm thick;
- Timber at least 38mm thick;
- Polythene-sleeved mineral wool, or mineral wool slab, in either case under compression when installed in the cavity; or
- Calcium silicate, cement-based or gypsum-based boards at least 12mm thick.

6.5.3 It should be noted that cavity barriers provided around openings may be formed by the window or door frame if the frame is constructed of steel or timber of the minimum thickness above. Any openings in a cavity barrier should be limited to those for:

- 30min fire-rated doors;
- The passage of pipes which meet the provisions set out in section 0of this report;
- The passage of cables or conduits;
- Openings or ducts (unless fire rated) fitted with a suitable automatic fire damper where they pass through the cavity barrier.

7 External Fire Spread

7.1 Space Separation

7.1.1 The site boundary for the scheme is shown below in Figure 9.

7.1.2 There are no changes proposed to the external façade of the building during the redevelopment. Internal compartments in the residential areas will remain the same size or reduce in size.

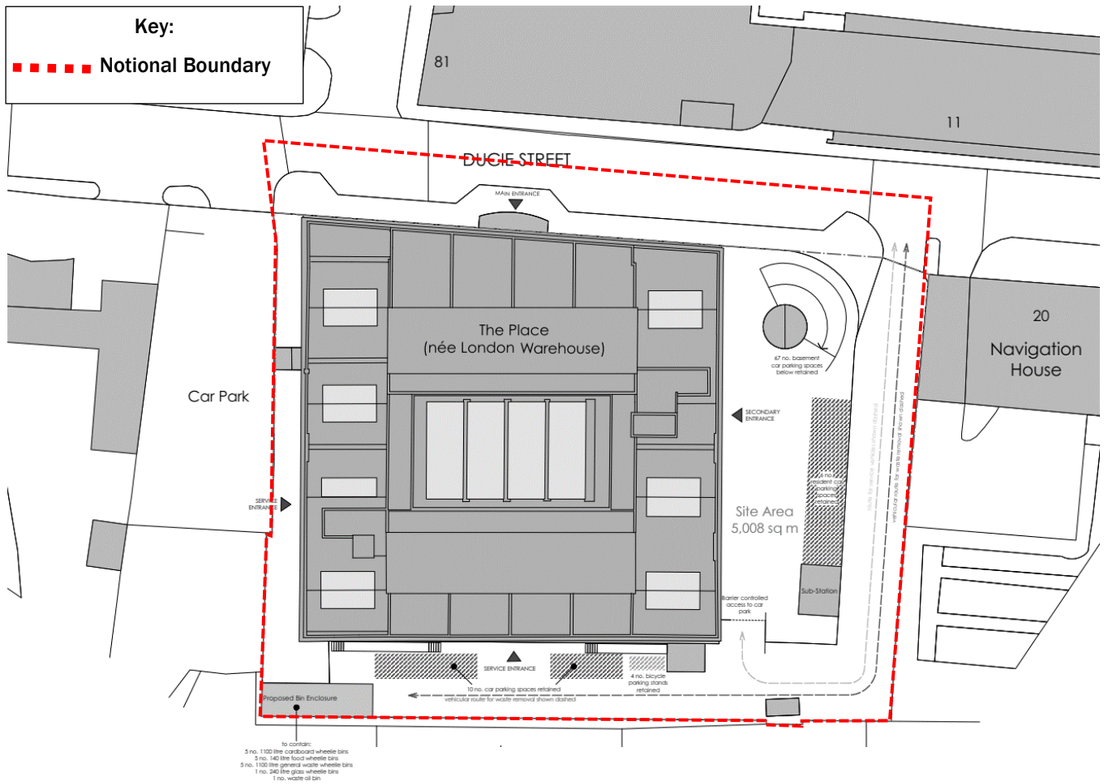


Figure 9 - Site boundary

7.1.3 As the building is over 18m in height any new insulation product or filler material used in external wall construction should be of limited combustibility.

8 Access & Facilities - Fire Service

8.1 Fire Fighting Access & Provisions

8.1.1 The site is accessed via Ducie Street which is an existing road which appears suitable for fire service access. Figure 10 shows the fire service access to the building and access on site.

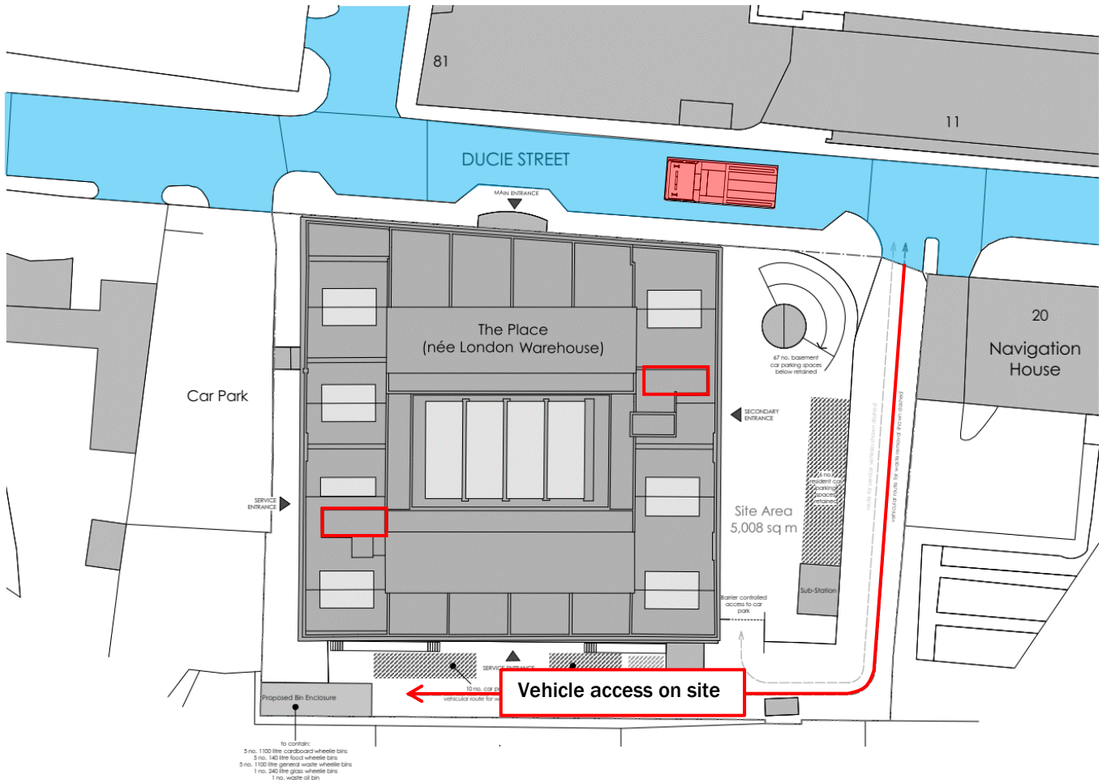


Figure 10 – Site Access

8.1.2 The building is greater than 18m in height and is provided with two firefighting shafts. The firefighting shafts are existing and will be retained as part of the new works. From site inspection it is understood that dry risers are provided to both shafts. The firefighting stairs will be provided with a 1.0m² openable vent at every level within the stairs. A firefighting lift is provided to each shaft. The lobbies are not provided with ventilation as the originally strategy justified the atrium ventilation as sufficient.

8.2 Vehicle access

8.2.1 Table 8 below lists the specifications for pump appliance.

Table 8 - Typical fire and rescue service vehicle access route specification

Appliance Type	Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5

8.3 Fire Fighting Hydrants

8.3.1 The use of the building is unchanged therefore the hydrant provisions are no worse than existing.

9 Fire Safety Management

9.1 Regulatory Reform (Fire Safety) Order

9.1.1 The Regulatory Reform (Fire Safety) Order came into force on 1st October 2006. The order consolidates nearly all previous fire safety legislation revoking the Fire Precautions Act and the Workplace Regulations. The Order places a general duty of fire safety care on employees, occupiers and/or owners of businesses to provide and maintain adequate fire precautions.

9.1.2 The legislation is supported by requiring a fire risk assessment and a fire safety plan.

9.1.3 The fire risk assessment is to be undertaken of the required business by a designated 'responsible person' who is liable to the legislation. This process looks to:

- To identify potential fire hazards;
- Evaluate the risk from the hazards
- Identify who would be at risk
- Identify an adequate level of fire precautions to compensate for the risk

9.1.4 The fire risk assessment is to be fully documented if the building has occupancy of 5 or more persons.

9.1.5 The fire safety management plan details the arrangements to implement, control, monitor and review fire safety standards and to ensure those standards are maintained, particular reference should be made to the ongoing control and maintenance of apartment entrance door within the apartment building. The plan describes the arrangements for effectively managing fire safety so as to prevent fire occurring and, in the event of fire, to protect people and property.

9.1.6 Both the fire safety management plan and fire risk assessment documentation should have been completed before occupation of the building.

9.2 Regulation 38

9.2.1 Regulation 38 requires that, where work involves the erection or extension of a relevant building, or relevant changes of use of a building, fire safety information shall be given to the responsible person at the completion of the project or when the building or extension is first occupied. The information will facilitate the production of the risk assessment, a requirement under the Regulatory Reform Order. This fire strategy should be maintained throughout the building works and accurately reflect the complete design.

9.2.2 Table 9 is a précis of the main active and passive fire safety systems provided within the development.

Table 9 – Active & Passive Systems

Passive System	Provision	Reference in Strategy
Compartmentation	In accordance with Approved Document B and the existing strategy for the building	Section 6 & Appendix A
Fire Doors	In accordance with Approved Document B and the existing strategy for the building	Section 6 & Appendix A
Internal Linings	In accordance with Approved Document B and the existing strategy for the building	Section 5.1
Structural Elements	60 minutes and 90 minutes in accordance with the existing strategy	Section 6
Signage	In accordance with BS 5499 – 1,4 & 5	Section 4.7
Active System	**Provision**	**Reference in Strategy**
Alarm & Detection	Apartments LD3 in accordance with BS5839 Part 6, Car Park M in accordance with BS 5839 Part 1	Section 4.1.1
Emergency Lighting	In accordance BS5266 and BS EN 1838	Section 4.6
Atrium Ventilation	Ventilation to the atrium in accordance with the previous strategy of the building	Section 4.3
Fire Fighting Systems	**Provision**	**Reference in Strategy**
Dry Risers	Two, one in each firefighting shaft	Section 8
Hydrants	No worse than existing	Section 8.3

10 Conclusion

10.1.1 The refurbishment of the building is not significantly altering the common areas of the building. The ground floor and mezzanine layout is changing however the use is remaining the same and will remain fire separated from the residential areas above. The layout of the common areas on the upper floors will remain unchanged, the only change is to the internal apartment arrangements. These new apartment layouts have been brought into alignment with current guidance.

10.1.2 The existing information for the building has been reviewed and changes to the design have maintained the original design philosophy. It is considered that between a culmination of the prescriptive requirements and fire engineering, a solution will be provided adequate to the prevailing risk.