

BB7

Outline Fire Strategy Report

Premier Inn,
Piccadilly-Manchester

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1 Introduction

1.1 Project description

The purpose of this report is to provide an Outline Fire Strategy for the proposed hotel development at Piccadilly in Manchester which will be 14 storeys (including basement and ground). The 12th floor consists of plant and rooftop area. The primary use of the building will be a hotel with 129 rooms with retail and restaurant spaces.

The height from ground level to 11th floor (uppermost habitable storey) is approximately 32m.

The building will comprise of 14 storeys as follows:

- Basement Floor – Retail, Bike store, cellar, linen store and plant.
- Ground Floor – Entrances, Retail, Refuse, Substation
- First Floor – Reception Area, Restaurant/Bar units, Luggage.
- Second Floor – Bedrooms and Linen store.
- Third to Eighth Floor – Bedrooms and Linen store.
- Ninth and Tenth Floor – Bedrooms and linen Store.
- Eleventh Floor- Bedrooms and Linen Store
- Twelfth Floor – Plant, external chiller well and rooftop area

This report doesn't factor in Premier Inn Brand Standards. This may have an impact on the design and will be considered in the detailed design stage of the report.

The ground floor layout of the development is shown below.

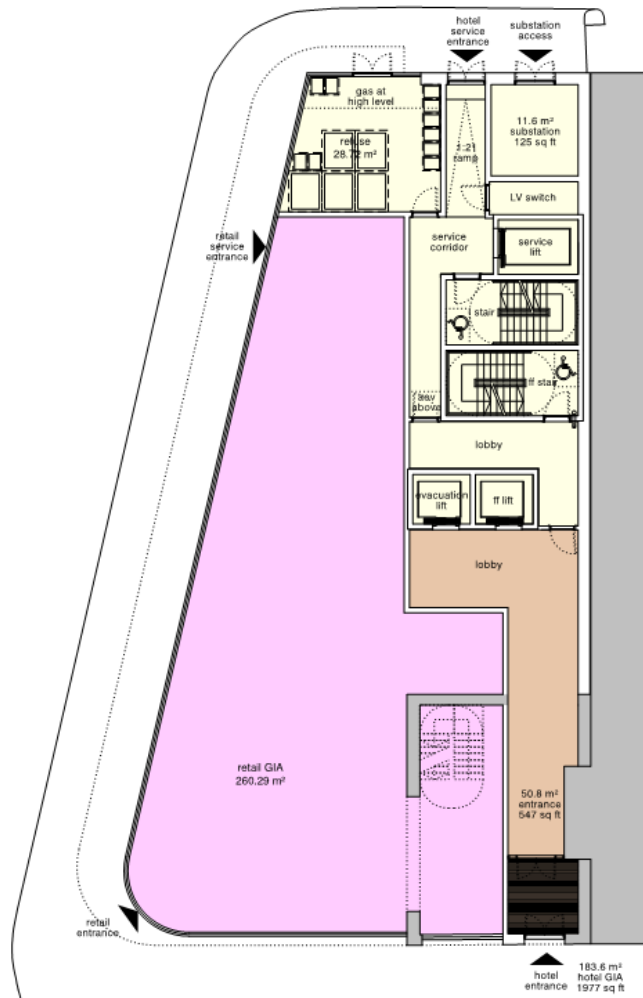


Figure 1: Site Location

1.2 Project instructions

BB7 has been appointed to produce a RIBA Stage 2 Outline Fire Strategy for the proposed Hotel. The client for the project is Trafalgar Leisure Ltd.

1.3 Limitations

This strategy puts forward proposals for the design of the building and for the fire safety systems to be incorporated in the building. It is intended that these will satisfy the requirements of the relevant legislation. The final decision as to whether the proposals satisfy the requirements rests with the regulatory authorities.

This document may contain some in-principle agreements already reached with the authorities. However, any agreements reached prior to a formal application under the Building Regulations or other relevant legislation must be considered as risk items until formally approved. Whilst these would have been negotiated and agreed in good faith, the regulatory authorities are not bound by them and they may therefore be subject to change.

Unless otherwise stated, the proposals in this document are intended to specify the general principles which will be used to satisfy the life safety requirements only. They are not directed towards property protection and do not reflect any Brand Standards which are specific to the Hotel operator. Where increased levels of protection are considered necessary to meet property protection requirements these should be discussed by the client with those responsible for insuring the building.

The strategy should be seen as a live document that may evolve during further discussions within the design team and with the approving authorities.

2 Relevant criteria

2.1 Applicable guidance

The fire safety design has been based on the recommendations given in Approved Document B Volume 2 2019 edition incorporating amendments up to and including May 2020, along with any other relevant British Standard when referenced. However, as is the case with many buildings, the architectural features mean that it is not possible to apply all the prescriptive recommendations of fire safety guidance in order to satisfy the requirements of the applicable legislation.

This report may therefore propose some additional fire engineered solutions which offer an alternative method of meeting the legislative requirements. As with all fire engineered solutions, the importance of early discussion and agreement with the Approving Body must be emphasised.

2.2 Drawings

This report is based on the following drawings made available by Stephenson Studio.

Table 1: Drawings

Drawing number	Date	Description	Revision
AI(SK)101	2020.01.22	Site Plan	P01
AI(SK)0111	2020.04.17	Basement + Ground Floor	P11
AI(SK)0112	2020.04.17	First +Second	P12
AI(SK)0113	2020.04.17	Third -Tenth	P09
AI(SK)0114	2020.04.17	Eleventh + Twelfth	P07

3 Building layout

There are two staircases within the building; staircases 1 and 2 which will serve all levels. Staircase 1 will be utilised as a fire-fighting stair and thus it is suggested that only the FF stair will be provided with a dry riser. The retail space is provided with separate entrances and is accessed externally.

The hotel will be accessed at ground level either via the hotel entrance or hotel service entrance.

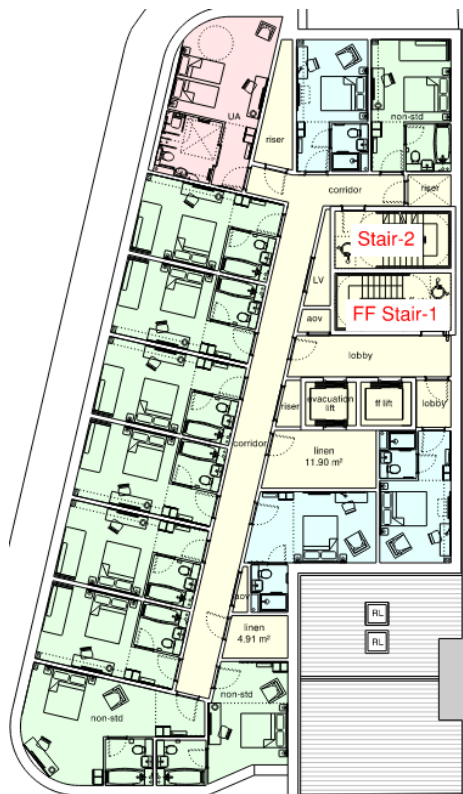


Figure 2: Staircases showing standard hotel bedroom floor

4 Means of escape

In the event of a fire, it is imperative that the buildings are designed and constructed to provide appropriate early warning of fire and appropriate means of escape from the building to a place of safety outside the building safely at all material times.

4.1 Evacuation strategy

It is proposed the whole building will adopt a simultaneous evacuation strategy.

4.2 Fire alarm system

It is recommended the building is provided with a fire alarm system to category L1, in accordance with BS5839-1:2017. This will incorporate detectors in all rooms in the building. A double knock approach may be utilised, providing suitable management procedures are put in place.

The fire alarm control panel should be situated in a location on the ground floor level easily accessible by the fire and rescue service.

4.3 Horizontal Escape

4.3.1 Hotel rooms

As all hotel rooms have escape in a single direction only, travel distance should not exceed 9m, from the furthest point in the room to the entrance door. The travel distances within the rooms are considered compliant.

4.3.2 Corridors

Travel distances in hotel corridors should not exceed 9m in a single direction, or 35m where alternative escape is available. This limit for single direction in corridors is significantly exceeded at over 13m (see Figure 3) .

Due to the number of bedrooms with extended travel distance to the nearest exit per level, it is proposed that mechanical smoke ventilation, system is provided to ventilate these corridor in the event of a fire. The mechanical shaft needs to be located as close to the end of the corridor as possible (approximately no further than 3m-4m from the furthest room).

Since, mechanical smoke ventilation of the corridors is considered to be a mitigation against the extended travel, it is still considered to be a deviation from the guidance and thus would require the agreement of the authorities having jurisdiction. Computational Fluid Dynamics (CFD) modelling will be required to demonstrate compliance.

On second floor level there is a separate corridor off the main corridor which serves two bedrooms. This is not currently compliant as it has extended travel distance and will not be afforded with mechanical ventilation, however it is understood an alternative escape route will be provided from this corridor to access the stair.

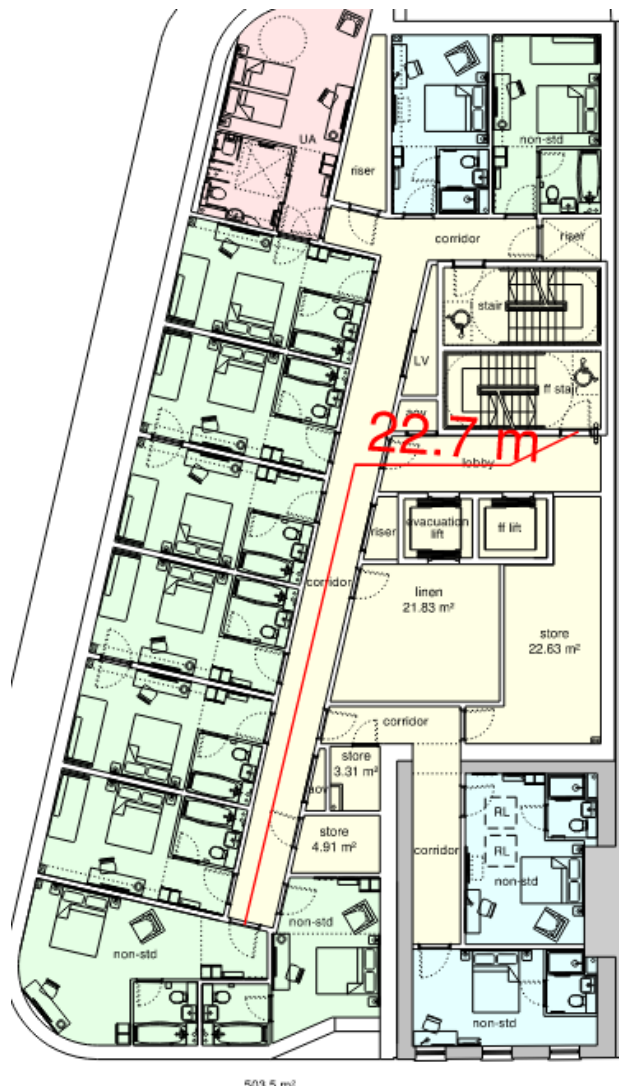


Figure 3: Extended Travel Distances

4.4 Vertical Escape

The building is currently designed with 2 protected staircases; escape stairs should measure a minimum of 1000mm. Since one stair needs to be a fire-fighting stair, this would need to have a minimum width of 1100mm. These escape stairs discharge directly to a final exit or via a protected route leading to a final exit. This appears to be provided currently. The firefighting lobby and stair should be provided with ventilation. The route to the final exit should be completely sterile and must not contain any combustible materials, vending machines and the like.

Stair width

All stairs need to be lobbied at every level as they serve a storey over 18m in height. A lobby should be provided between the plant room on the twelfth floor and the stair, although it is recommended this is accessed via the roof. As this lobby serves the firefighting stair it will also need to be ventilated by a 1.5m² AOV.

The stairs need to be wide enough to accommodate all occupants during escape, due to the simultaneous evacuation strategy. In the current design, both staircases are shown as 1200mm wide.

In accordance with Table 3.2 of Approved Document B, staircases 1 and 2 would each accommodate 690 people each giving 1,380 people in total.

Assuming 2 persons in each hotel room, this would total up to 258 occupants excluding staff and those occupants in the ancillary areas such as bar/restaurant, the maximum number of occupants is unlikely to be exceeded by more than double the room occupation giving a figure of 516.

It is noted that Premier Inn may have higher occupant loadings, therefore this would need to be factored in when carrying out the full occupancy calculation, this will be done in the detailed design stage.

4.5 Exit widths

The widths of the exits should be appropriate to the number of people evacuating, and the final exit should be at least as wide as the stairs.

When designing adequate means of escape, doors on escape routes should achieve a width in accordance with the occupancy limits below:

- 750mm – up to 60 persons;
- 850mm – up to 110 persons;
- 1050mm – up to 220 occupants;
- 5mm/person – for occupancy load exceeding 220 persons.

The doors will need to open in the direction of the escape.

4.6 Disabled Evacuation

Measures will be required to assist evacuation of disabled occupants. This should include disabled refuges within each protected stairway on each storey; these should measure 1400mm x 900mm and should not impinge on the means of escape. Disabled refuges should also be provided with Emergency Voice Communication (EVC) systems. There should be a means to evacuate these occupants from the refuge such as evacuation chairs and sufficient trained staff. There is also a evacuation lift adjacent to the firefighting lift, this may be used as a means of escape. Architect to confirm if this is premier Inn brand standard.

An evacuation lift is shown on the plans. This would not be considered necessary in this building, however if this is a Premier Inn requirement, further detail of the requirements will be provided at detailed design stage.

4.7 Door fastenings and access control

With any form of access control, the doors or routes should also be fitted with simple fastenings that can be readily operated from the side approached by people making escape.

Where these access controls include electronic devices the electrically powered locks should return to the unlocked position:

- a. On operation of the fire alarm system;
- b. On loss of power or system error;
- c. On activation of a manual door release unit (Type A) to BS EN 54-11:2001 positioned at the door on the side approached by people making their escape. Where the door provides escape in either direction, a unit should be installed on both sides of the door.

4.8 Horizontal travel in other areas

There are several areas within the development where travel distance will also need to be considered such as the restaurant and plant room. Although the travel distance from the Hotel restaurant appears to be compliant, it is noted that the doors currently open against the direction of travel and would mean the area is restricted to 60 occupants. Doors should open in the direction of travel to allow more occupants to escape. Exit widths from these space (lift lobby into stair) appears to be 850 mm, which would allow up to 110 occupants in this space.

Ancillary areas such as the restaurant, bar or function rooms should not exceed 18m in a single direction. Refuse stores and plant rooms should not exceed 9m in a single direction, or 18m where two directions of escape are available.

4.9 Smoke Ventilation

Since the basement level has a floor area of more than 200m² and is more than 3m below the adjacent ground level, smoke outlets should be provided from the basement. It is proposed that natural smoke outlets should be provided with cross-sectional area of 1/40th of the total floor area. These smoke outlets should be located at a high level and distributed evenly around the perimeter. Alternatively, mechanical ventilation can be utilised if sprinklers are fitted throughout the basement in accordance with BS EN 12845.

Rooms containing refuse chutes, or provided for the storage of refuse, should be approached either directly from the open air or by way of a protected lobby provided with not less than 0.2m² of permanent ventilation.

5 Automatic Fire Suppression

Approved Document B does not specifically require hotels to be provided with sprinklers even though the height of the building is above 30 m. Therefore, it is proposed not to provide sprinklers in this development.

6 Emergency lighting

Emergency lighting meeting the recommendations of BS 5266 Parts 1 and 7 will be provided in the following areas:

Table 2: Locations of emergency escape lighting

Purpose group or use	Areas requiring escape lighting
Residential	All common escape routes
Shop and commercial	a. Underground or windowless accommodation b. Stairways in a central core or serving storey(s) more than 18 m above ground level c. Open plan areas more than 60 m²
Any purpose group	a. All toilet accommodation with a floor area over 8 m² b. Electricity and generator rooms c. Switch room/battery room for emergency lighting system

Source: Approved Document B (Volume 2), Table 9

7 Internal fire spread (linings)

To minimise the spread of fire within a building, the internal linings (materials or products used to line partitions, walls, ceilings or other internal structures) are required to:

- resist the spread of flame over their surfaces
- have a heat release rate or a rate of fire growth that is considered reasonable under the circumstances

The surface linings of walls and ceilings will meet the following classifications:

Table 3: Classification of wall and ceiling linings

Location	National Class	European Class
Small rooms of area not more than:		
a. 4m ² in residential accommodation	3	D-s3, d2
b. 30m ² in non-residential accommodation		
Other rooms	1	C-s3, d2
Circulation spaces within dwellings		
Other circulation spaces (including escape routes)	0	B-s3, d2

8 Internal fire spread (structure)

8.1 Fire Resistance requirement

Due to the height of the building, structural elements should achieve a minimum of 120 minutes fire resistance.

8.2 Compartmentation

Individual hotel bedrooms would not normally need to be separated from each other by fire resistant construction. However, bedrooms may be provided with construction affording 60 minutes fire resistance to provide mitigation against the risk of external fire spread to neighbouring buildings. The separation may also be required by brand standards if they are provided. This may be subject to change once the Premier Inn brand standard have been reviewed.

The staircases require 120 minutes fire resistance. Bedroom corridors require 30 minutes fire resistance.

Each floor should be a compartment floor to achieve fire resistance not less than 120 minutes. Risers will also require 120 minutes fire resistance unless separated by 120 minutes fire resistance at each compartment floor level, in which case they will need at least 30 minutes fire resistance.

Walls enclosing places of special fire hazard should be of a minimum 30 minutes fire resistance.

There is a 60 minute fire resistance requirement for refuse stores which includes any external walls and doors.

8.3 Fire Doors

Fire doors should, as a minimum, be provided with protection in accordance with the below table:

Table 4: Fire Doors

Locations	Fire Door Specification
Staircase doors	FD60S
Front doors of hotel bedrooms	FD30S
Common corridor doors	FD30S
Service Risers and Lift	FD60*
Smoke shaft doors	FD90S

* These would be FD30 if risers are separated by 120 minutes fire resistance at each floor level.

Any doors in the communal areas should be provided with self-closers, except riser and small cupboard doors which should be kept locked shut and signed as such.

Doors are required to open in the direction of travel when more than 60 people will be using a single door to escape.

9 External fire spread

The external wall material should achieve Class C-s3-d2 from ground level to 18m, and Class B-s3, d2 above 18m, in accordance with BS EN 13501-1.

The space separation of the building from its relevant boundaries will be assessed in relation to preventing external fire spread. This will be assessed in accordance with BR 187 – External Fire Spread: Building Separation and Boundary Distances.

Based on the initial assessment, the ground first floor of the north elevation can have 31% unprotected area. All other floors can be 100% unprotected.

The hotel restaurant area and ground floor retail unit is 7m to the relevant boundary and can remain 100% unprotected. The boundary distance is taken to the centre of the road. The boundary distances should be confirmed by the architect and the external fire spread calculations can be re-evaluated at the next stage of design.

10 Secondary Power

The life safety systems within the building should be provided with dual power supplies which can be either via battery backup, generator, UPS or substation. To reduce the risk of the loss of electrical supply to fire protection systems that are required to operate continuously during a fire, a secondary power supply should be provided. This supply should be of sufficient capacity to maintain supplies to all life safety and fire equipment installations. The secondary power system should be designed to operate safely in fire conditions. The means for the provision of a secondary supply should include the overall electrical distribution system within the building, and also the power needs for other equipment requiring a secondary power supply.

11 Fire and Rescue Service Access

In the event of fire, it is essential that suitable facilities are provided for the fire and rescue service to access the building for the protection of life. Since the height of the building is greater than 18m, it is proposed that the stair 1 will be a firefighting core.

All routes will be suitable for a fire appliance in terms of hard standings supporting the mass of a fire appliance (14 tonnes). Fire access routes should also have dimensions in accordance with the table below:

Table 5: Fire and rescue service vehicle access route specification

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

Source: *Approved Document B (Volume 2), Table 20*

It is proposed that the attending fire appliances will be able to pull up on the main road directly outside the building. The access is therefore considered acceptable. In the case of a building fitted with dry fire mains there should be access for a pumping appliance to within 18m of each fire main inlet connection point, typically on the face of the building. The inlet should be visible from the appliance.

11.1 Dry Riser

The dry riser should be designed in accordance with BS 9990. It should be ensured that the distance from the fire appliance to the dry riser inlet is less than 18m and that the horizontal run of the dry riser pipework, from inlet to the point where the dry riser pipework becomes vertical, does not exceed 18m. Dry rising outlets should be provided at each level.

The maximum hose laying lengths from the dry riser is 39m to the furthest point in the room.

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