

Haringey Civic Centre

Fire Strategy

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15 Fire Engineering

15.1 Introduction

This RIBA Stage 3 report outlines key requirements for the proposed Haringey Civic Centre HQ Building in Haringey, North London.

This report is intended to the Design Team and Client; and has been produced to set out key parameters for the design and operation of the Haringey Civic Centre HQ Building in terms of fire safety.

The strategy is based upon information supplied and is determined on the basis of there being one fire seat in the building at any one time. Asset and property protection are not explicitly stated as design objectives and as such have not been considered within this fire strategy.

Where this fire strategy report is silent on a particular issue, it is expected that the applicable design guidance (see section 15.1.2), or the referenced codes and standards within it, be followed accordingly.

15.1.1 Building Description

The proposed development comprises of the following:

- an existing five-storey building (the Civic Centre: basement, ground floor, first, second and third floors) to the east of the site, proposed to be refurbished and restored, containing offices and meeting rooms on ground and the three upper levels, with a Civic Chamber between first and second floor, plant rooms at basement level and PVs on the roof level.
 - Please note that the third floor is new and added as part of this project. As existing, the Civic Centre's top floor was the second floor.
- a new three-storey building (the Annex: ground floor, first and second occupied floors, and third floor solely used for maintenance) to the west of the site, that contains offices/meeting rooms at ground and on the two upper storeys, plant rooms on third, PVs and plant rooms on the roof levels
- an existing two-storey extension (ground and first floor) of the Civic Centre containing workspaces and meeting rooms
- a new two-storey extension (ground and first floor) of the Annex to the west of the site, linking the Civic Centre with the Annex
- a new external canopy with gates to the north of the site, with a one-storey linking bridge (first floor) linking the Civic Centre with the Annex
- a new courtyard formed between the two buildings

The topmost occupied floor of the Civic Centre (level 03) is ca 12.5m above ground.

The topmost occupied floor of the Annex (level 02) is ca 8.5m above ground.

As per Section 15.2, the two buildings operates as one zone, therefore the height of the whole building will be assumed to be 12.5 above ground when determining the fire safety provisions in accordance with code guidance.

An indicative arrangement of the building layout is shown in Figure 15—1.

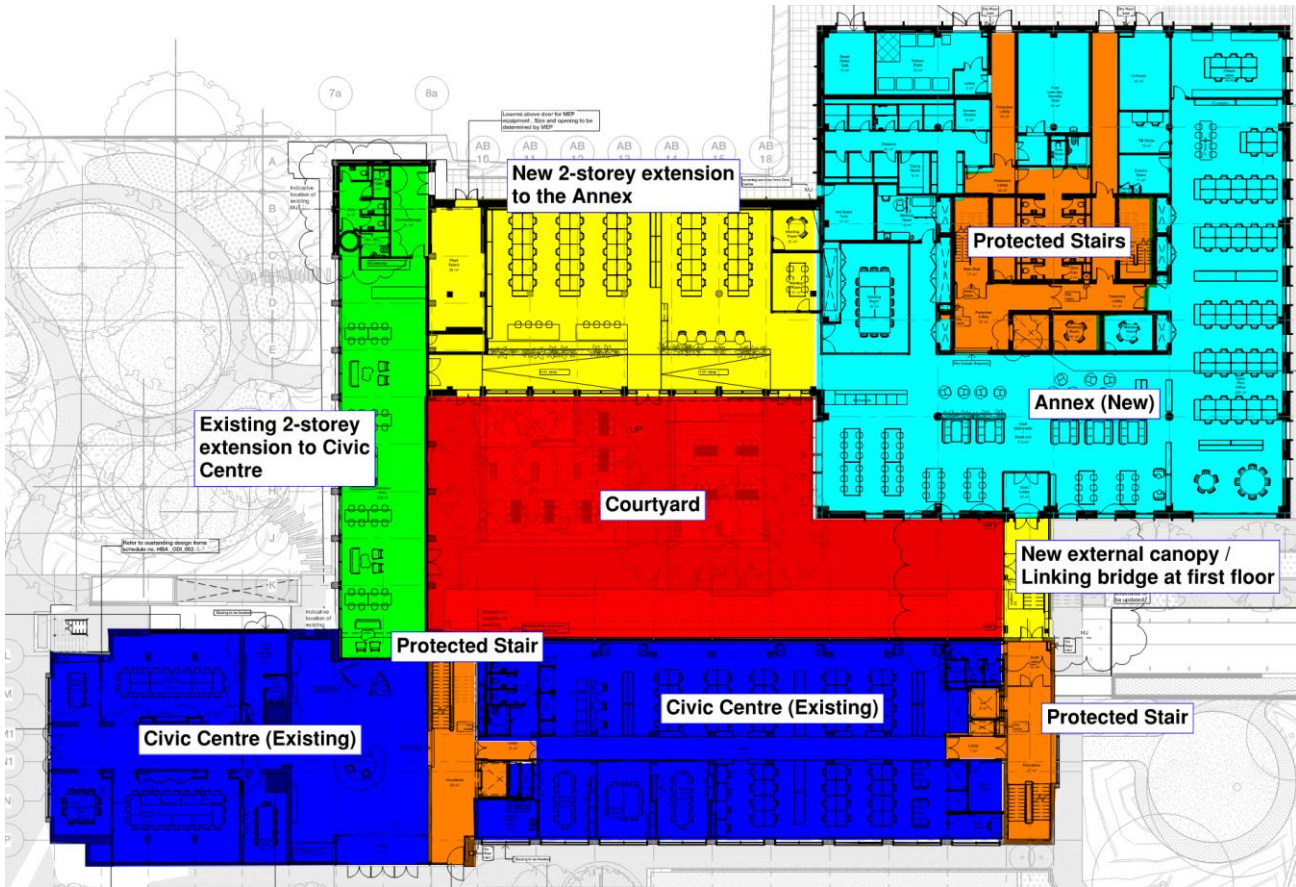


Figure 15—1 General Arrangement Ground Floor Plan

15.1.2 Design Framework

To meet the functional requirements of Part B of the Building Regulations 2010¹, the fire strategy is based upon the recommendations within BS 9999². However, where this is not possible or a more appropriate solution enhances the design, a fire engineered solution could be adopted.

15.1.3 Regulatory Reform Order

Responsibility for complying with the Regulatory Reform (Fire Safety) Order³ rests with the 'responsible person'. In a workplace, this is the employer and any other person who may have control of any part of the premises, e.g. the occupier or owner.

The fire safety strategy developed by the design team is not a risk assessment under the Order but will form part of the information used by the 'responsible person' in developing their risk assessments.

¹ The Building Regulations 2010 as amended. SI 2010/2531.

² BS 9999: 2017 Code of practice for fire safety in the design, management and use of buildings.

³ Regulatory Reform (Fire Safety) Order 2005 SI 2005/1541. The Stationery Office 2005.

15.1.4 Referenced Drawings

This report has been based on the drawings by Hawkins Brown, as shown in Table 15—1.

Table 15—1 Referenced Drawings

Drawing No.	Title	Revision	Date
HCC-HBA-ZZ-B1-DR-A-200100	Level B1 – Proposed GA Plan	P13	01/2023
HCC-HBA-ZZ-00-DR-A-200101	Level 00 – Proposed GA Plan	P15	01/2023
HCC-HBA-ZZ-01-DR-A-200102	Level 01 – Proposed GA Plan	P14	01/2023
HCC-HBA-ZZ-02-DR-A-200103	Level 02 – Proposed GA Plan	P13	01/2023
HCC-HBA-ZZ-03-DR-A-200104	Level 03 – Proposed GA Plan	P13	01/2023
HCC-HBA-ZZ-04-DR-A-200105	Level 04 – Proposed GA Plan	P12	01/2023
HCC-HBA-ZZ-ZZ-DR-A-200200	Proposed East Elevation	P8	02/2022
HCC-HBA-ZZ-ZZ-DR-A-200201	Proposed North Elevation	P8	02/2022
HCC-HBA-ZZ-ZZ-DR-A-200202	Proposed West Elevation	P8	02/2022
HCC-HBA-ZZ-ZZ-DR-A-200203	Proposed South Elevation	P8	02/2022
HCC-HBA-ZZ-ZZ-DR-A-200204	Proposed East Courtyard Elevation	P7	02/2022
HCC-HBA-ZZ-ZZ-DR-A-200205	Proposed North Courtyard Elevation	P8	02/2022
HCC-HBA-ZZ-ZZ-DR-A-200206	Proposed West Courtyard Elevation	P8	02/2022
HCC-HBA-ZZ-ZZ-DR-A-200207	Proposed South Courtyard Elevation	P9	01/2022
HCC-HBA-ZZ-ZZ-DR-A-200300	Proposed Section AA	P9	01/2022
HCC-HBA-ZZ-ZZ-DR-A-200301	Proposed Section BB	P9	01/2022
HCC-HBA-ZZ-ZZ-DR-A-200302	Proposed Section CC	P9	01/2022
HCC-HBA-ZZ-ZZ-DR-A-200500	Axonometric View	P3	02/2022
556-CTF-ZZ-00-DR-L-100000	Landscape Site Plan	P4	01/2023

15.1.5 Approving Bodies

Approval of the following fire strategy will need to be agreed with the following key stakeholders:

- London Fire Brigade (LFB);
- Building Control;
- The London Borough of Haringey (LBH) (the owner); and,
- The building’s Insurers.

15.2 Design Approach

The development is designed to BS 9999 which considers the risk profile for the building when specifying the fire safety provisions.

From a fire point of view, the Civic Centre and the Annex will be treated and operate as one building.

15.2.1 Risk Profile

The risk profile is derived from a combination of the occupancy characteristics and the fire growth rate for the proposed building.

The risk profile for the office areas of the building will be A2, as described in Sections 15.2.2 and 15.2.3.

The risk profile for the plant areas will be A3, as described in Sections 15.2.2 and 15.2.3.

15.2.2 Occupancy Characteristics

The building is an office building with most occupants being staff, which will be familiar with their surroundings. The risk profile has been assumed as A – awake and familiar.

Note: the above assumes that any public within the community spaces at ground, or elsewhere in the building, will be accompanied by management/staff similar to within an office environment.

15.2.3 Fire Growth Rate

The buildings use is predominantly office space with a wide variety of working environments, such as focus spaces, space for informal meetings, collaboration and breakout spaces. This is representative of a fire load located at low to mid-level with mix combustible materials and a medium fire growth rate, category 2.

This fire growth rate has been assigned to most areas of both buildings and their linking bridges.

Plant areas within the development have been assigned a fast fire growth rate, category 3. All risk category 3 rooms will be separated from the rest of the floorplate by fire-resisting construction as per Section 15.4.

15.2.4 Minimum Fire Protection Measures

BS 9999 outlines a minimum package of fire safety for A2 & A3 risk profiles, as follows:

Table 15—2 Minimum Package of Fire Safety

Item	A2 Risk Profile	A3 Risk Profile
Fire Detection and alarm	M ¹	L2 (M)
Maximum single direction travel ³	25.3m	18.0m
Maximum two directional travel ³	63.2m	45.0m
Storey exits width	3.06mm/person (minimum clear width 850mm ²)	4.6mm/person (minimum clear width 850mm ²)
Stair width over 3 stories (Annex stairs incl. Ground)	2.70mm/person (minimum clear width 1000mm)	-
Stair width over 4 stories (Civic Centre incl. Ground)	2.34 mm/person (minimum clear width 1000mm)	-
Stair width from basement	minimum clear width 1200mm	

Note¹: An L2 (M) standard automatic fire detection and alarm will be provided, and therefore additional benefits (15%) can be included as per BS 9999.

Note ²: Minimum clear exit width can be 800mm in areas not accessible by Mobility Impaired Persons (MIP)

Note ³: Any areas of the building that contain provisions for the consumption of alcoholic beverages are subject to a reduction in travel distance limits by 25%. Currently it is understood that no spaces are catering for alcohol consumption. This will be reviewed as the design progresses.

15.2.5 Managing Fire Safety

BS 9999 expects a minimum standard of fire safety management for each risk profile. This is a positive approach to fire prevention and ties into the ongoing regulation of the Fire Strategy through occupation.

The standard of management for this development is Level 2, as set out in BS 9999 (2017).

15.3 Means of Escape

In the event of fire, safe and effective routes of escape are required from all areas of each building. Escape routes are provided so that all occupants can reach a place of safety within an acceptable travel distance.

15.3.1 Design Philosophy/Evacuation Procedure

Both buildings will operate on a simultaneous evacuation. Both buildings form a single evacuation zone, so they will be treated as one building, with the linking bridge and the external canopy connecting them. Upon activation of the detection system, all occupants will be alerted and evacuated.

15.3.2 Risk Profile

BS 9999 recommends for risk profiles to be assigned to non-residential areas to ensure that the Means of Escape are designed for the risk it associated with the space and the occupant characteristics. This includes a letter (A or B) to represent occupants' familiarity with their surroundings:

- A: occupants which are awake, and familiar with their surroundings, or,
- B: occupants which are awake and unfamiliar with their surroundings.

In addition, the risk profile includes a number to represent the fire growth within the area. This number is between 1 to 4 and represents a fire growth from "low" at 1 to "ultra-fast" at 4. This fire growth can be reduced by 1 where sprinklers are provided in line with code guidance. Note, "2" represents a medium fire growth rate.

These are summarised in the table below:

Table 15—3 Risk Profile

Area Use	Occupant characteristic	Fire Growth	Risk Profile
Offices/Meeting Rooms/Collaboration Spaces	Awake and familiar with building	2 without sprinklers	A2
Plant areas (mainly at Basement and Annex 3 rd Floor)	Awake and familiar with building	3 without sprinklers	A3

Note: the above assumes that any public within the community spaces at ground, or elsewhere in the building, will be accompanied by management/staff similar to within an office environment.

15.3.3 Number and Arrangement of Exits

The minimum number of escape routes from a room or storey is governed by the number of persons who are required to use them. The minimum number of exits is specified in Table 15—4.

Table 15—4 Minimum number of escape routes and exits from a room, tier, or storey

Maximum Number of Persons	Minimum Number of Escape Routes/ Exits
60	1
600	2

BS 9999 recommends for single direction of escape to be limited, and these assessed up to a point where occupants have a choice of direction (45° angle) – see Figure 15—2 below.

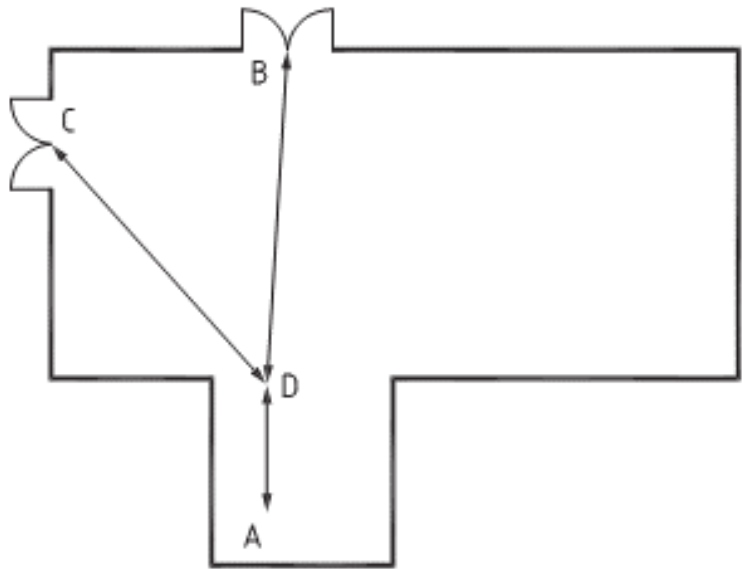


Figure 15—2 Exit separation using 45° angle as per BS 9999

15.3.4 Horizontal Means of Escape

15.3.4.1 Travel Distances

Travel distances within the building will be in line with those set out in Table 15—5, the travel distances are shown in Figure 15—3 to Figure 15—7.

Table 15—5 Travel Distance limits

Occupancy profile/area	Travel in a single direction	Travel in more than one direction
A2 – all areas except for below	25.3m	63.2m
A3 – plant areas	18.0m	45.0m

Please note that in line with BS 9999, where a A2 risk profile is used, 15% increase can be used to account for automatic fire detection (AFD) throughout the space. This is to account for the added benefits of detection where enhanced from the minimum required by code guidance (manual call points only).

Please also note that any areas of the building that contain provisions for the consumption of alcoholic beverages are subject to a reduction in travel distance limits by 25%. Any such areas will be identified as the design progresses, but currently it is understood that there are no such areas in the buildings.

The following figures are intended to graphically convey the methods of measurement of the escape distance variables identified in the above table.

All travel distances are currently within the limits of code guidance.

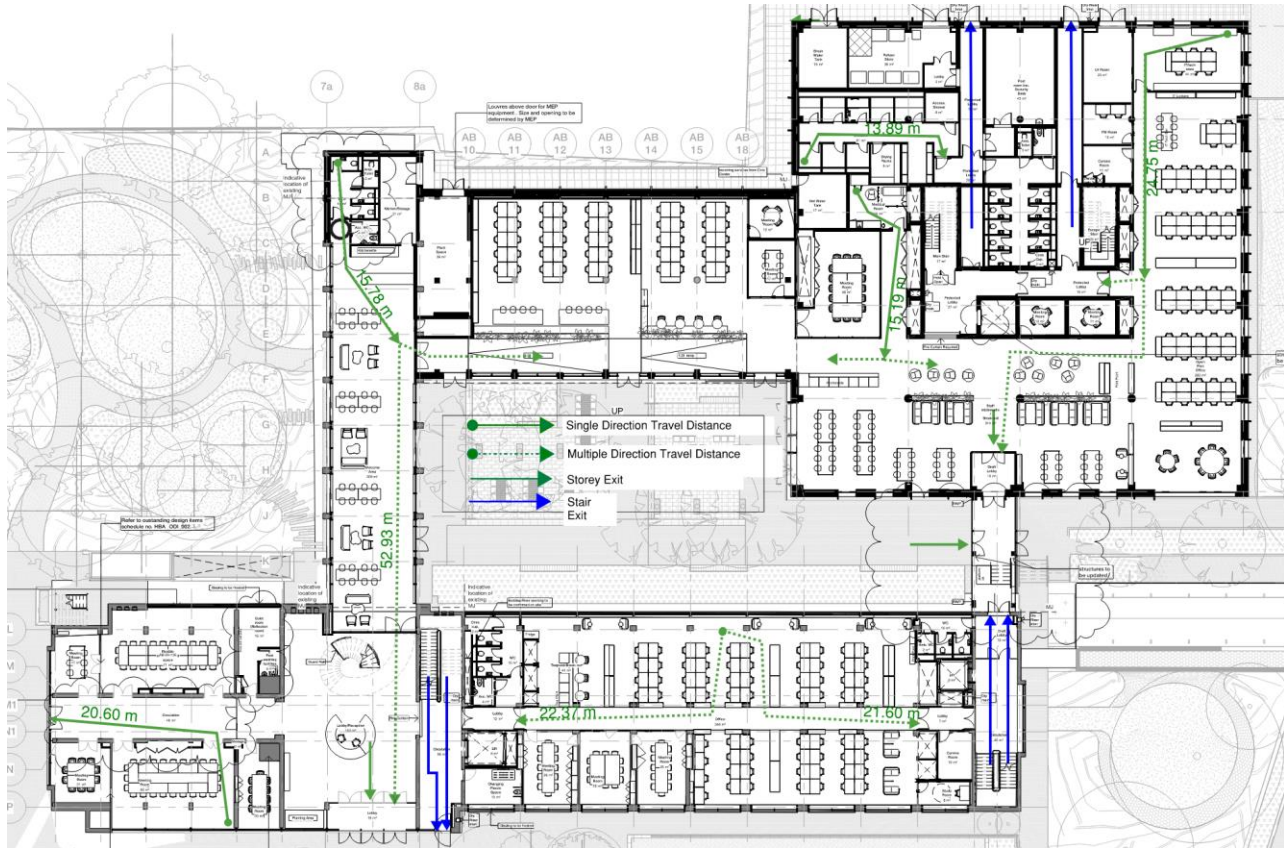


Figure 15—3 Ground Floor Travel Distances

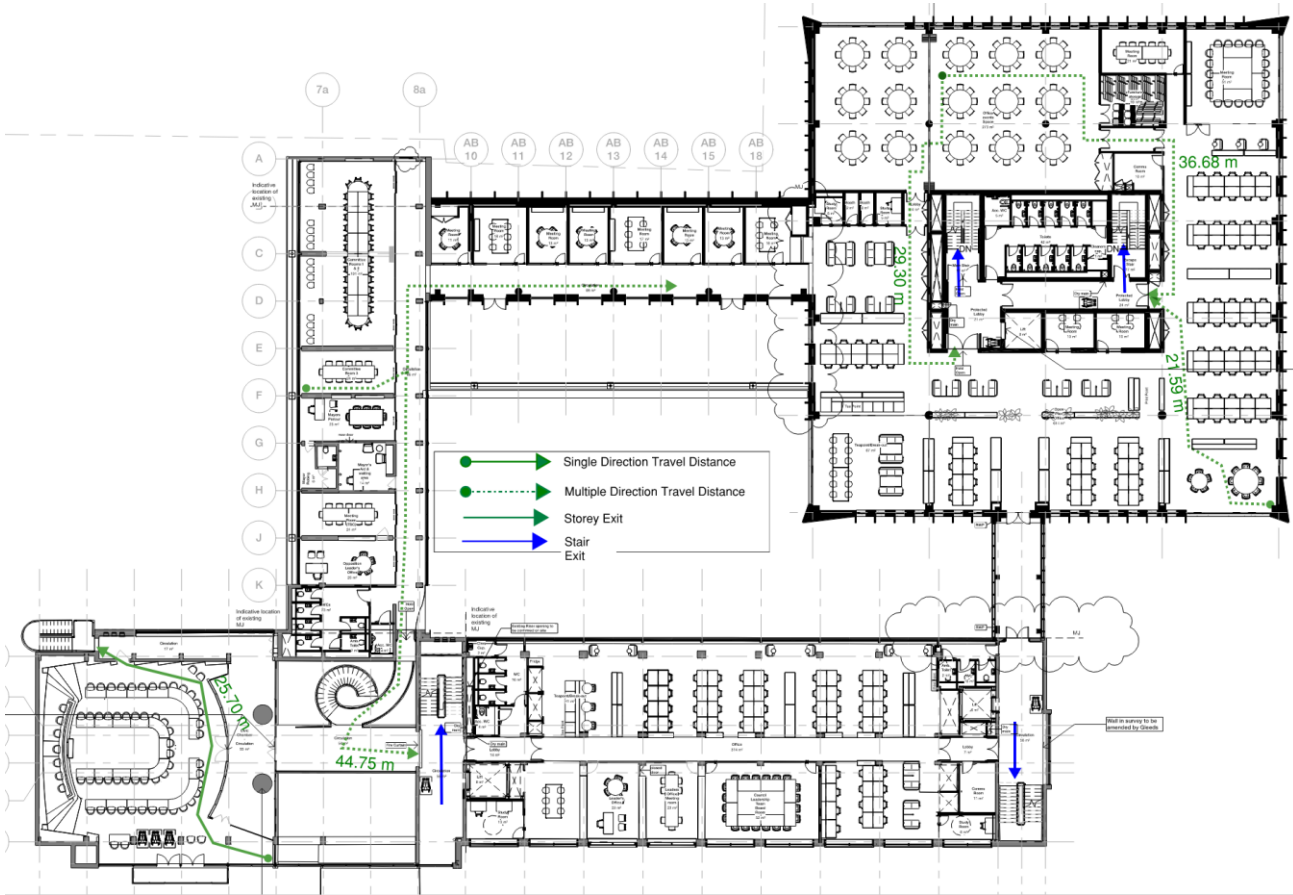


Figure 15—4 First Floor Travel Distances

Note: Lobby protection will be provided to the South stair of the existing building, by replacing the existing door with a 60-min fire curtain (deployed upon local detection). If the fire is close enough to close the fire curtain upon local detection, west wing occupants can escape via the Annex building as an alternative.

Note ²: For the Annex event space, when the foldable partition will be shut, an alternative escape (door or similar) will be provided to be prevent long one-way travel distances.

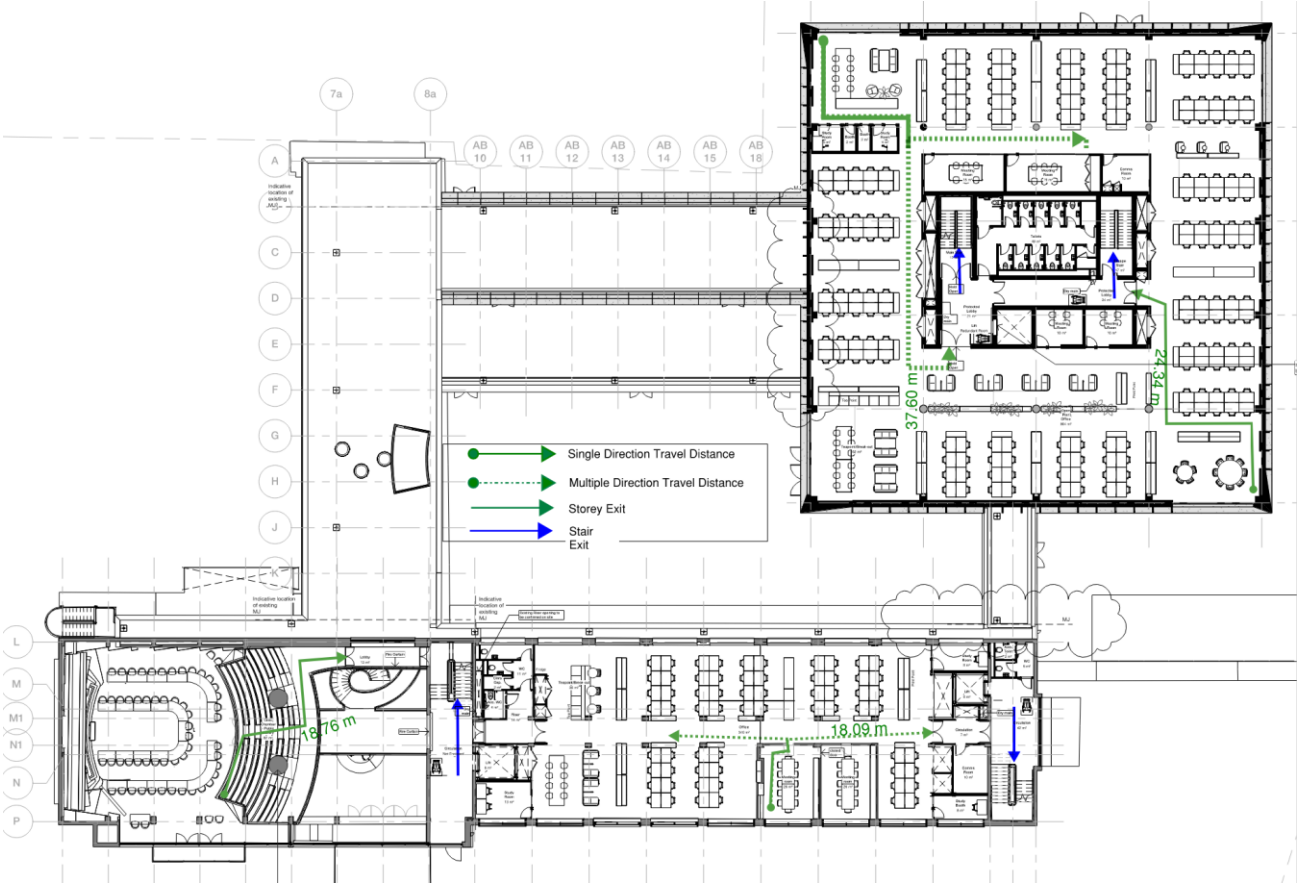


Figure 15—5 Second Floor Travel Distances

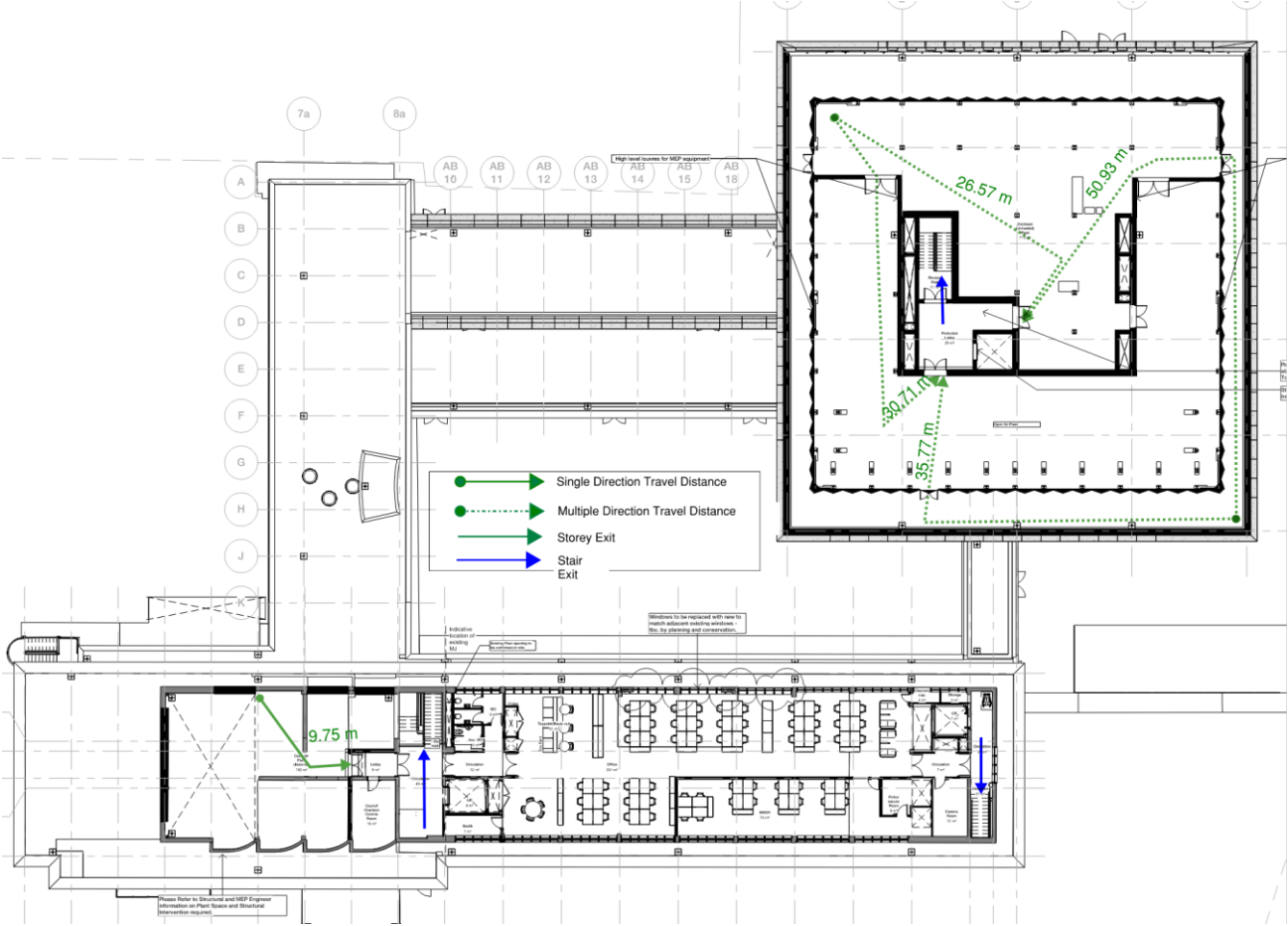


Figure 15—6 Third Floor Travel Distances

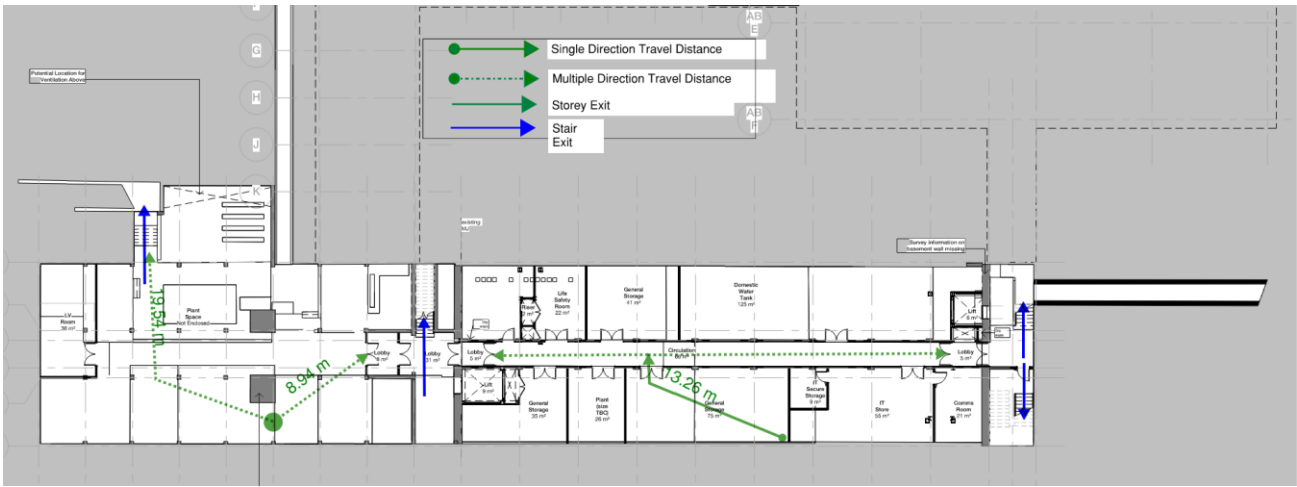


Figure 15—7 Basement Plant Travel Distances

15.3.5 Doors on Escape Routes

The following applies to all doors on escape routes:

- They should have a clear width not less than 800mm (850mm where unassisted wheelchair access is necessary);
- They should be openable without the use of a key from the escape side;
- Where serving more than 60 occupants they should open in the direction of escape, and be at least 1050mm wide (subject to occupancy calculations); and
- Panic hardware in accordance with EN 1125 should be fitted to all secured doors serving more than 60 occupants.
- Vision panels will be provided in doors that subdivide a corridor. Other vision panels may be required as part of accessibility requirements, and in particular to vertical escape routes. All fire-resisting doors shall be fitted with smoke seals (where specified) and the complete door assemblies will be able to demonstrate compliance with:
 - BS EN 1634-1 (fire resistance); and
 - BS EN 1634-3 (smoke leakage).
- Corridors should have a clear width of at least 1200mm.

15.3.6 Vertical Escape

Each building is served by two protected stairs, having a protected lobby or creating a lobby via a fire curtain deployed upon local detection at all floors.

For the purpose of vertical escape calculations, all protected stairs are assumed to be available as per code guidance on the basis of lobby protection at all levels. It's worth noting that lobby protection is not strictly required at the top stair level, but it has been provided.

15.3.6.1 Staircase Width

The width of an escape stair should be at least 1000mm wide (1200mm from the basement), measured as the clear width between the walls at the narrowest point up to 1500mm above pitch line. Handrails which do not intrude more than 100mm into this width may be ignored. Wider stairs may be required for DDA compliance.

Both above-ground protected stairs at the Annex have a clear width of 1200mm. Both Annex stair final exits are assumed to also serve as an alternative for Ground floor occupants. Therefore, each Annex stair has a capacity of 444 persons, based

based on 2.70mm/person escape width, as per Table 15—2. This equates to 888 persons across all floors of the Annex as both stairs are lobby protected at all levels, and therefore do not need to be discounted as per code guidance.

Assuming an even split, each Annex floor (ground, first and second) can hold 296 persons, based on vertical capacity calculations.

Both above-ground protected stairs at the existing Civic Centre have a clear width of 1200mm. Each protected stair has a capacity of 512 persons, based on 2.34mm/person escape width, as per Table 15—2. As per BS 9999, as there is a merging flow of occupants from the office at ground into the stair, the ground floor has been counted as a floor served (i.e. 4 storeys in total). This equates to 1024 persons across ground and upper floors as both stairs are lobby protected at all levels, and therefore do not need to be discounted as per code guidance. As such, a maximum vertical capacity of 256 persons is permitted on each level of the existing Civic Centre floor (excl. basement).

Stairs serving the basement of the Civic Centre should have a minimum clear width of 1200mm. This is currently achieved.

15.3.7 Horizontal Escape

For the purpose of horizontal escape calculations, the largest escape route from each level should be discounted.

The capacity of each level is based on exit widths of doors leading to protected stairs. All doors leading to protected stairs should be of minimum 1050mm width, and open in the direction of escape.

For the Annex, the door leading to the north stair measures 1050mm wide, while the door leading to the south stair measures 2200mm wide (discounted). Therefore, the horizontal capacity of the Annex is 343 persons per floor, using an exit size of 3.06 mm/person.

For the Civic Centre, doors leading to both south and north stairs measure 1600mm wide. With one of them discounted, horizontal capacity of Civic Centre is 522 persons per floor, using an exit size of 3.06 mm/person.

15.3.8 Final Exits

The minimum clear width of all final exits should be 1050mm and lead direct to external.

The final exits from the protected stairs should be at least as wide as the stair they serve (i.e. 1100mm for the Annex and 1200mm for the Civic Centre respectively), and open in the direction of travel.

15.3.9 Escape Capacity Summary

The maximum escape capacity is determined using the limiting factor between the horizontal and vertical exit capacities. The total capacity for each level/area is as follow:

- **Level 0 Civic Centre – 256 persons (limited by merging flow through stairs)**
- **Level 1 Civic Centre – 256 persons (limited by stair capacity)**
- **Level 2 Civic Centre – 256 persons (limited by stair capacity). Note: the balcony to the Civic Chamber should be limited to 60 occupants.**
- **Level 3 Civic Centre – 256 persons (limited by stair capacity)**
- **Basement Civic Centre – 60 persons (limited by floor use – plant rooms only)**
- **Level 0 Annex - 296 persons (limited by merging flow through stairs)**

- **Level 1 Annex – 296 persons (limited by stair capacity)**
- **Level 2 Annex - 296 persons (limited by stair capacity)**
- **Level 3 Annex – 60 persons (limited by floor use – plant rooms only)**

15.3.10 Inner Rooms

When the only escape route available from a room is through another room it is called an inner room. An inner room is accepted by the guidance on the following basis:

- occupant capacity of the inner room does not exceed 60
- inner room is directly off the access room
- escape route from the inner room does not pass through more than one access room
- travel distance from any point in the inner room to the exit(s) from the access room does not exceed the recommendations
- access room is not a place of special fire hazard

In addition, access rooms will be fitted with automatic fire (smoke) detection and alarm to warn the occupants of the inner room of a fire in the access room.

There are currently a few inner rooms such as store rooms, and meeting rooms, and the above recommendations will apply.

15.3.11 Height and Width of Escape Routes

All escape routes should have a clear headroom of at least 2m. The width of corridors will be set by the minimum width based on the occupancy using the route and should be no less than the minimum of 1200mm (or 1000mm if the corridor is not expected to be used by wheelchair users).

The width of a door in a corridor should be not less than the corridor width minus 150 mm.

15.3.12 Stair Discharge Arrangement

The stairs will discharge at ground level direct to external, or via protected corridors, from which occupants can then move away towards the agreed assembly points. Any rooms accessed off the stair escape corridors will be separated via lobby protection.

The stairs serving the upper levels should be fully separated at ground (i.e. between ground and basement level) to provide further protection from smoke ingress.

At the Civic Centre this is not achieved (existing condition) and instead, lobby protection will be provided between the basement stairs and any adjacent rooms to provide protection from smoke ingress. This has been discussed and agreed in principle with BCO, as this is an existing condition which is significantly improved. This item is pending final LFB approval.

15.3.13 Means of Escape for Mobility Impaired Persons

The minimum recommendations contained within current design codes are the provision of refuges. Building Regulations, BS9999:2017 and recent changes to fire safety legislation (covered by the Regulatory Reform (Fire Safety) Order 2005) contain recommendations that evacuation of disabled persons be designed into the management plan of the building. In order for this to be achieved, it is necessary to understand the capabilities or limitations of the building. It is noted that it is the building owner/ tenant’s responsibility and not that of the fire service to assist people from the building.

A management strategy will need to be developed by Haringey, which will include Evacuation Plans to enable a flexible response to different situations.

In addition, suitably sized wheelchair refuges will be allocated on each level where step free egress is not possible, and an evacuation lift will be provided to prevent the need for carry-down procedures.

15.3.13.1 Evacuation Plan

An appropriate Personal Emergency Evacuation Plan (PEEP) should be put in place to enable staff to be aware of occupants/staff members within the building who may require assistance escaping and be trained in how to assist in evacuating them safely. The PEEP should include:

- Individual PEEPs for disabled people who are regularly in the premises, for example staff and regular visitors. Following discussion with an individual, a plan can be developed for their specific needs which should contain details of how they will evacuate the premises. By taking into account the individual needs of a person when preparing a PEEP, management are able to make any reasonable adjustments to the premises or procedures that are necessary.
- PEEPs for visitors (GEEP – Generic Emergency Evacuation Plan) to the premises who will make themselves known to staff. Visitors who are likely to require assistance in the event of an evacuation should be encouraged to make themselves known to staff on arrival. Management should be encouraged to have, especially at reception, staff who are trained in disability awareness. This makes the process more comfortable for disabled people and more effective for management. The generic PEEPs (or GEEPs) should provide a wide range of guidance for differing disabilities and be adapted for the individual premises. They should include what the visitor needs to do in an evacuation, and what the management response will be. They should also reflect what specific fire safety provisions are provided for disabled people on the premises, e.g. specific evacuation chairs/uses of lifts etc. The generic PEEP (or GEEP) should be discussed with each visitor and their particular needs taken into account where possible.
- PEEPs for visitors not previously identified to staff. The standard evacuation plan should include measures to make evacuations suitable for all persons on the premises. Information for disabled people should be noted in fire action notices and in the fire management plan. Staff should be trained so that they are aware of the facilities and their responsibility to evacuate disabled people, and know how to use features such as evacuation lifts or refuges.

Enough staff should be available at all times to make sure that evacuation plans are viable, such as the use of the evacuation lift to evacuate mobility-impaired people.

15.3.13.2 Refuges

A refuge is a place of relative safety in which those requiring assistance can wait for management/staff. MIPs should not be left alone in a refuge area whilst waiting for assistance with evacuation.

Refuge points will be provided at all protected lobbies to escape stairs and provided with a two-way communication system – Emergency Voice Communication (EVC). They should also be provided within the protected lobby of each escape stair of the Civic Centre basement.

Refuges will be a minimum of 900mm x 1400mm sufficient for a wheelchair occupant to await assistance in relative safety and located such that it does not encroach on the clear width of the escape route.



Figure 15—8 Example of a disabled refuge within a protected stair

At ground floor it is intended for all MIPs are able to escape directly to outside via step free escape routes.

15.3.13.3 Evacuation Lift

The installation of lifts which can be used for evacuation purposes (accompanied by a management plan) provide a dignified and more independent solution than carrying an occupant down the stair.

At Civic Centre, evacuation lifts will be provided for each protected stair, serving all levels, and with protected access/egress from external at ground.

At the Annex, one evacuation lift will be provided serving all levels, and with protected access/egress from external at ground. This evacuation lift will be accessible from both stair protected lobbies, providing dignified escape to MIPs for both escape routes.

These are to be designed in line with BS 9999 and certified to EN 81-20 for use as evacuation lifts. They would include dual power supplies and specific override controls.

The above follows the recommendations of the London Plan Policy D5.

15.3.13.4 Communication Systems

Where people have to wait at a refuge location, a fire protected two-way emergency voice communication (EVC) system to a control point will be provided in accordance with BS 5839-9⁴.

This system will alert the building management to the location of a person requiring assistance from the building, thus initiating the appropriate response.

15.3.14 Assembly Points

Assembly points will need to be established outside the building in safe locations to allow occupants to vacate the building and remain in safety. The assembly points should typically be located 1.5 times the building height away (or a reasonable distance away).

There are currently no specific recommendations within the prescriptive guidance document adopted pertaining to the provision and design of assembly points. Therefore, in the absence of prescriptive guidance, Buro Happold recommends that assembly points are provided on site and have the following features:

- The routes from final exits to the assembly point(s) should ensure a safe and rapid dispersal of occupants from the vicinity of the building. The routes from the buildings to the assembly points should be well defined;
- External escape routes and assembly points should have sufficient artificial lighting that will continue to illuminate the route should main power supply fail;
- Should not hinder fire tender access roads;
- The area provided should be adequate to accommodate the likely number of occupants evacuated in a fire scenario; and

Ideally, assembly points should be in open air and be remote from the building in which the fire is located. It is therefore recommended at this stage to use the Trinity Gardens as an assembly point for the site. This public space is a large open-air area which allow all occupants and staff to gather in the event of a fire, away from the fire service access roads.

The proposed location should be reviewed throughout the lifetime of the building as part of the RRO fire risk assessment.

⁴ BS 5839: Part 9 – Fire Detection and Alarm Systems for Buildings. Code of practice for the design, installation, commissioning and maintenance of emergency voice communication system

15.4 Structural Fire Protection and Compartmentation

15.4.1 Structural Fire Protection

The structural fire resistance of a building is based on the height of the topmost occupied floor. For an A2 risk profile building with a top storey height of >5m and<18m, 60 minutes structural fire resistance is required for all loadbearing elements of structure. This applies to both buildings of the development.

Elements of structure that require protection include the following:

- a member forming part of the structural frame of a building or any other beam or column
- a loadbearing wall or loadbearing part of a wall
- a compartment floor (all floors should be designed as compartment floors)
- a [loadbearing] external wall
- a compartment wall

Exclusions from the provisions for elements of structure and do not require any fire resistance include a structure that only supports a roof, unless:

- i. the roof performs the function of a floor (i.e. the external terraces which can be used for corporate and similar events, etc
- ii. the structure is essential for the stability of an external wall which needs to have fire resistance
- iii. the structural beam/column forms or supports part of a fire resisting wall
- iv. the failure of the roof would result in disproportionate collapse or unacceptable consequences for occupants below e.g. in an arena

Structural fire protection should be installed in accordance with BS EN 1365 standards.

It is understood that the existing hollow pot structure is not in good conditions, and upgrade works will be required to achieve REI60.

15.4.2 Compartmentation

The following fire resisting construction will need to be provided in line with BS 9999:

Table 15—6 Fire Resisting Construction Requirements

Compartmentation	Minimum Required Period of Fire Resistance [min]
Compartment Floors	60REI
Shafts Penetrating Compartment Floors	60REI
Protected stair	60 (FD30S fire doors)
Protected lobby to stair	60 (FD30S fire doors)

Compartmentation	Minimum Required Period of Fire Resistance [min]
Risers	60 (FD30S fire doors)
Life Safety Plant Rooms, and protected access to these	120 (FD60S fire doors)
Plant Rooms (non-life safety)	60 (FD60S fire doors)
Storerooms (less than 450 m2)	30 (FD30S fire doors)
Storerooms (greater than 450 m2), and refuse rooms	60 (FD60S fire doors)
Flues	120
Transformer Room/Substation	240 (to be confirmed by utility provider)

All fire resistance is for Integrity (E) and Insulation (I) unless stated otherwise, when tested to EN 1364. R- Loadbearing

Please also refer to the Hawkins Brown fire strategy drawings.

An EW60 fire and smoke curtain is proposed at ground, first and second floor levels at the south end of the south civic centre stair, and to the ground floor eastern entrance of the south Annex stair. These provide an equivalent level of protection to the stair as a standard lobby protection. Please note that these curtains will not obstruct any escape route, as the stairs are intended to discharge direct to external or via a protected corridor, and occupants in the entrance can escape direct to external. Occupants at upper floors can always escape through alternative exits, if local detection closes the fire curtain (in which case the route is discounted).

The fire and smoke curtains should be provided with smoke seals and be designed in accordance with BS 8524-1&2 (including all annexes).

The fire and smoke curtains should meet the following criteria:

- Must achieve 60-minutes integrity and radiation (EW) as well as a smoke rating.
- Will deploy on local activation of the fire alarm.
- There should be notification mechanisms in place to warn:
 - Occupants when the curtain is descending (visually and by sound; flashing beacons + alarm)
 - Staff when the path of the fire curtain is obstructed (this can be done by installing a beam detection that detects when there is an object under the fire curtain that would block its descent).
- The curtain needs to be fail-safe in the closed position or be provided with dual power supply.
- There should be manual override buttons to re-open the curtains if necessary.

The existing Civic Centre building has a void at first and second floor level above the main entrance. It is proposed to treat this space as one compartment for the purpose of external fire spread calcs. It is not proposed to maintain the floor compartmentation here as it adds minimal benefit to the fire strategy.

15.4.3 Compartment Sizes

In accordance with BS 9999, there are no maximum compartment sizes for A2 risk profile (less than 18m building height). A3 risk profile rooms should have a maximum area of 14,000 m² which is achieved.

15.4.4 Fire Doors

Fire doors should be certified fire resisting doorsets, or door assemblies with evidence that the assembly meets the fire resistance standards listed in BS EN 1634-1. In all cases the frame, ironmongery, vision panels etc. should be those relevant to the fire door to be installed.

Doors in fire resisting elements should have self-closing devices unless they are to a service cupboard which is kept locked shut. Fire doors should have been tested in accordance with BS 476-22⁵ or BS EN 1634-1⁶. Where specified as smoke sealing with a suffix S or Sa, door assemblies will comply with the recommendations of BS 476-31⁷ or BS EN 1634-3⁸, respectively.

The requirement (in either case) is for test exposure from each side of the door separately, except in the case of lift doors which are tested from the landing side only.

Note: Both BS 476-22 and BS EN 1634-1 acknowledge that it may not always be necessary to carry out tests from both sides of a doorset. Clause 13.4 of BS EN 1634-1 gives more detailed guidance on this issue, and Annex C of the guidance sets out the rationale for that guidance. Clause 13.4 of BS EN 1634-1 should be followed regardless of whether the doorset is being classified to BS 476-22 or BS EN 1634-1.

15.4.5 Fire Stopping

Fire stopping should be in accordance with the recommendations of BS 9999. Fire stopping should be provided on the line of compartment and fire resisting walls and floors where gaps exist, which could allow smoke and flames to breach the compartment wall or floor. Joints between elements that serve as a barrier to the passage of fire should be fire stopped and all openings for pipes, ducts, conduits or cables to pass through any part of an element that serves as a barrier to the passage of fire should be:

- Kept as few as possible;
- Kept as small as practicable; and,
- Fire stopped (which in the case of a flue or duct should allow for thermal movement).

Please refer to BS 9999 and supplier’s information regarding fire stopping.

15.4.6 Concealed Spaces

Concealed spaces or cavities within the construction of a building provide a means for flames and smoke to spread, often unseen. Where cavities occur within a wall, floor, roof space, or ceiling, they will be sub-divided with a cavity barrier with a fire resistance of not less than 30/15 minutes (integrity/insulation).

Cavity barriers will be installed so that the maximum distance between them does not exceed 20m, where materials in the cavity have a Class 1 spread of flame, reducing to 10m where the materials have a lower spread of flame value.

15.4.7 Internal Angles

Where there is an internal angle of not more than 135° to the adjoining external wall of a separate fire compartment, the distance between any unprotected area in the external elevation and any unprotected area should be at least 1.8m.

This applies for example to the existing South protected stair of the existing Civic Centre at ground and first floor level.

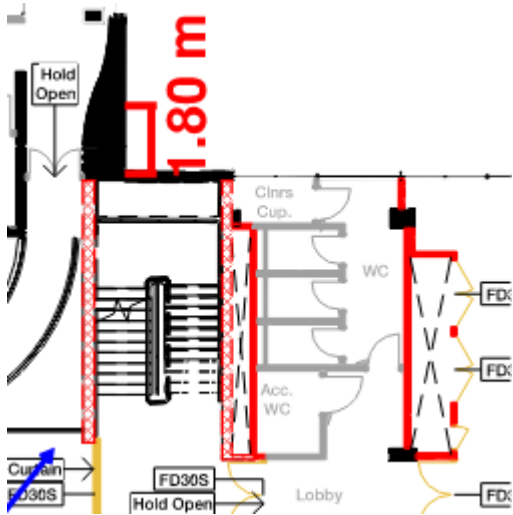


Figure 15—9 Internal Angle Protection to the Existing Civic Centre South Stair (first floor)

The 1.8m protection is to be achieved via a 60-min fire resisting wall.

⁵ BS 476-22:1978 Fire tests of building materials and structures. Part 22 – Method for determination of the fire resistance of non-loadbearing elements of construction.

⁶ BS EN 1634-1:2014 Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Part 1 – Fire resistance test for door and shutter assemblies and openable windows (+A1:2018) (Incorporating corrigendum August 2018).

⁷ BS 476-31.1:1983 Fire tests on building materials and structures. Part 31 – Methods for measuring smoke penetration through doorsets and shutter assemblies. Method of measurement under ambient temperature conditions.

⁸ BS EN 1634-3:2004 Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Part 3 – Smoke control test for door and shutter assemblies.

15.5 Internal Linings

All internal surfaces and finishes provided throughout are to meet the minimum recommendations of The Building Regulations. For the purposes of those regulations, this is all wall and ceiling linings only and does not apply to floor coverings.

The choice of materials for wall and ceiling linings needs careful consideration as they can significantly affect the spread of fire within a building and its growth rate. To ensure that rapid growth and spread do not occur, surface spread of flame values for coverings of surfaces forming the wall and ceiling linings will satisfy the following criteria.

All references to surface spread of flame are based on the performance tests results when the material and products are tested in accordance with BS476-6⁹ and 7¹⁰, or BS EN 13501-1¹¹.

Table 15—7 Internal Fire Spread (Linings) – Classifications

Location	European Class
Circulation/escape routes including staircases	B-s3, d2
Rooms (excluding small rooms) and circulation spaces within apartments	C-s3, d2
In the non-residential areas' small rooms less than 30 m2	D-s3, d2

Note:

- The National classifications do not automatically equate with the equivalent classifications in the European column, therefore, products cannot typically assume European class, unless they have been tested accordingly; and,
- When a classification includes “s3, d2”, this means that there is no limit set for smoke production and/or flaming droplets/particles.

The following are excluded from the performance requirements of surface spread of flame:

- doors and door frames
- window frames into which glazing is fitted
- architraves, cover moulds, picture rails and similar narrow small members
- fitted furniture, i.e. demountable sanitary “back panels”

The provisions do not apply to the upper surfaces of staircases (i.e. treads and risers) because they are not significantly involved in a fire until it is well developed.

Where a room is an access room, although it provides circulation to other rooms it is in accordance with the recommendations for inner rooms and therefore the surface spread of flame used will be that applicable to the size of room.

⁹ BS 476-6:1989+A1:2009 Fire tests on building materials and structures. Method of test for fire propagation for products

¹⁰ BS 476-7:1997 Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products

¹¹ BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using data from reaction to fire tests

15.6 External fire Spread

15.6.1 Building Separation and Maximum Unprotected Area

The construction of external walls and the separation between buildings to prevent external fire spread are closely related. The external walls of the building must have sufficient fire resistance to prevent fire spread across the relevant boundary.

For the external walls 1m or more from the relevant boundary the calculation of boundary distances and percentage protection of all facades is performed using methods in accordance with BR187 External Fire Spread: Building Separation and Boundary Distances.

The protected areas of the façade should achieve the fire resistance period equivalent to this of element of structure in terms of loadbearing and integrity, and 15 minutes in terms of insulation. The fire resistance should be achieved from the inside of the building only.

Based on preliminary assessments carried out in line with BR187, no additional fire protection is required to prevent fire spread to adjacent buildings in all elevations, except for the west-facing elevation of the linking bridge and the south-facing elevation of the Annex.

Please note that BR187 calculations have been performed assuming the provision of compartment floors in the building and a max floor height of 4.5 m.

The amount of unprotected area allowed to the façades is as follows:

- North Annex – **100%**
- North Civic Centre – **100%**
- East Civic Centre – **100%**
- South Civic Centre – **100%**
- West Civic Centre – **100%**
- South Linking Bridge – **100%**
- West Linking Bridge (red walls in Figure 6.1) – **0%**
- West Linking Bridge (orange wall in Figure 6.1) – **32% (41 m²)**
- South Annex (green wall in Figure 6.1) – **49% (38 m²)**
- West Annex - **100%**

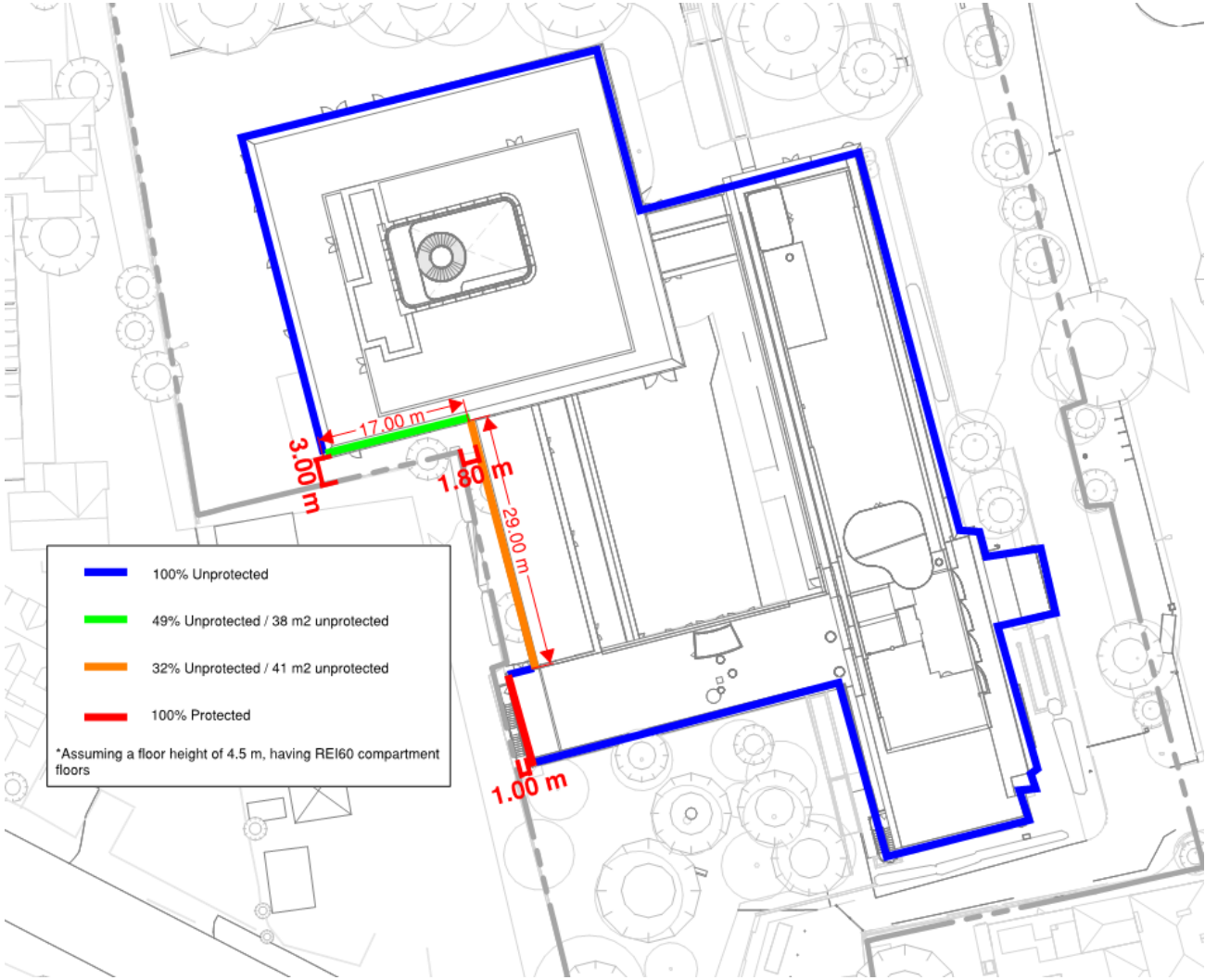


Figure 15—10 BR187 Elevations level of protection

15.6.2 External Faces of the Building

15.6.2.1 Code Guidance

External walls should be constructed using material that does not support fire spread. Flame spread over or within an external wall construction should be controlled to avoid creating a route for rapid fire spread bypassing compartment floors or walls.

While the building is just under 18m, it is recommended that external wall systems should be constructed using products achieving European Class A2-s1,d0 or A1 when tested in accordance with BS EN 13501-1¹².

Note, this does not apply to the following, however, less performing products within the list below would need to be demonstrated as suitable to the design team and client:

- a. cavity trays when used between two leaves of masonry;
- b. any part of a roof (other than any part of a roof that is connected to an external wall);
- c. door frames and doors;
- d. electrical installations;
- e. insulation and water proofing materials used below ground level;
- f. intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
- g. membranes;
- h. seals, gaskets, fixings, sealants and backer rods;
- i. thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or
- j. window frames and glass.

15.6.2.2 Cavity Barriers

Cavity barriers should be provided in extensive cavities, at the perimeter of the cavity, and to close the edges of cavities including around openings (such as for doors and services). Cavity barriers should also be provided:

- At the junction between an external cavity wall (except where the cavity wall conforms to Figure 36 of BS 9999) and every compartment floor and compartment wall, and
- At the junction between an internal cavity wall (except where the cavity wall conforms to Figure 36 of BS 9999) and every compartment floor, compartment wall, or other wall or door assembly which forms a fire resisting barrier. Provision of cavity barriers is shown in Figure 35 of BS 9999.

¹² BS EN 13501-1: 2018 Fire classification of construction products and building elements. Classification using data from reaction to fire tests.

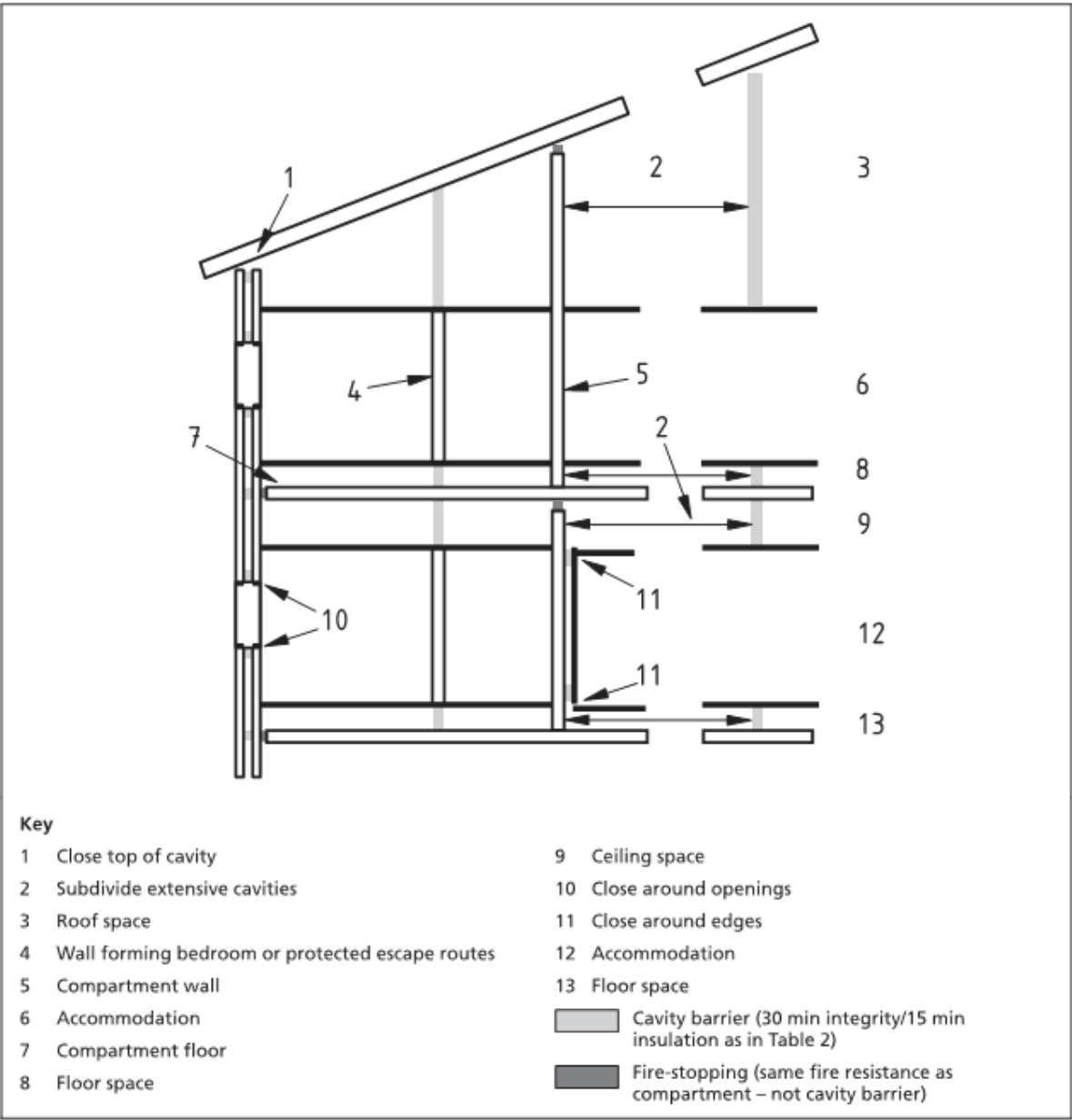


Figure 15—11 Provisions for Cavity Barriers (Figure 35 of BS 9999:2017)

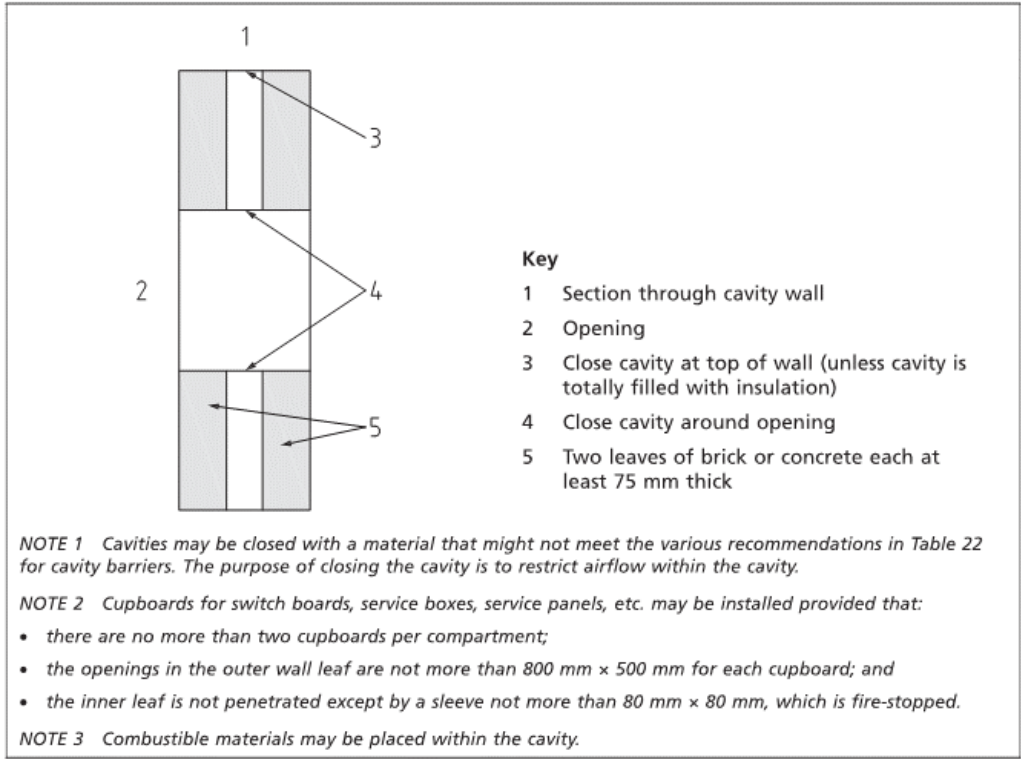


Figure 15—12 Cavity Wall Excluded from Provisions for Cavity Barriers (Figure 36 of BS 9999:2017)

15.6.3 Extensive External Cavities

The maximum dimensions of cavities should be limited to 20m in any direction where the surface spread of flame classification of the exposed products is one of the following:

- Class 0 or Class 1 (National class)
- Class A1 or A2-s3, d2 or B-s3,d2 or Class C-s3, d2 (European).

If none of the above classifications can be confirmed the maximum dimension should not exceed 10m in any direction.

15.6.4 Roof Coverings

For restriction of fire spread over roofs the properties of a roof covering are in relevance if:

- If the roof is close enough to a boundary to be a risk of ignition from a fire in other buildings; and
- In the vicinity of a compartment wall, to avoid fire spread between compartments via a roof covering.

It is therefore recommended for roof coverings to achieve AA, AB, or AC when tested in accordance with BS 476-3, or, Broof (t4) when tested in accordance with BS EN 13501-5.

15.6.5 Canopies

For restriction of fire spread over canopies connecting the two buildings externally, it is also recommended for the canopies (similar to the roofs) to achieve AA, AB, or AC when tested in accordance with BS 476-3, or, Broof (t4) when tested in accordance with BS EN 13501-5.

15.7 Fire Service Access Roads and Facilities

The building is between 11m and 18m and height and therefore will have protected stairs with dry mains in accordance with BS 9999. There is no requirement to provide firefighting shafts in the building in line with code guidance (as the building is under 18m).

It is currently proposed for the main 4 cores of the site (the two serving the new Annex and the two serving the existing Civic Centre building) to be provided with new dry fire mains (4 in total). The dry mains should also extend to also serve the basement level in the Civic Centre.

15.7.1 Vehicle Access Routes

The access routes are required to conform to the dimensions in Table 15—8. Dead-ends more than 20m are to be avoided in terms of fire brigade access and turning facilities should be provided.

Table 15—8 Typical Vehicle Access Route Dimensions

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 [m]	Min. clearance height [m]	Min. Carrying capacity [t]
Pump	3.7	3.1	16.8	19.2	3.7	14

Where turning circles are not achieved, it is recommended for vehicle tracking to be carried out to ensure that the fire truck can reverse using a hammerhead.

Multi-storey buildings fitted with dry fire mains should have fire tender parking position within 18m of the dry main inlet.

This is currently achieved for three cores, except for the new dry riser at the Civic Centre north core (ca. 36m from parking position to dry riser inlet). This is considered reasonable, as this core previously did not have a dry riser and site constraints do not allow for a closer parking position. Additionally, the main fire entry location from which hose coverage to the civic centre floorplate can be achieved within 45m is the south core, therefore the north dry riser serves as an additional fire-fighting facility for the fire brigade. This has been discussed and agreed in principle with BCO, as this is an existing condition which is significantly improved. This item is pending final LFB approval.

Figure 15—13 shows the proposed fire service access road, with the key parking positions.

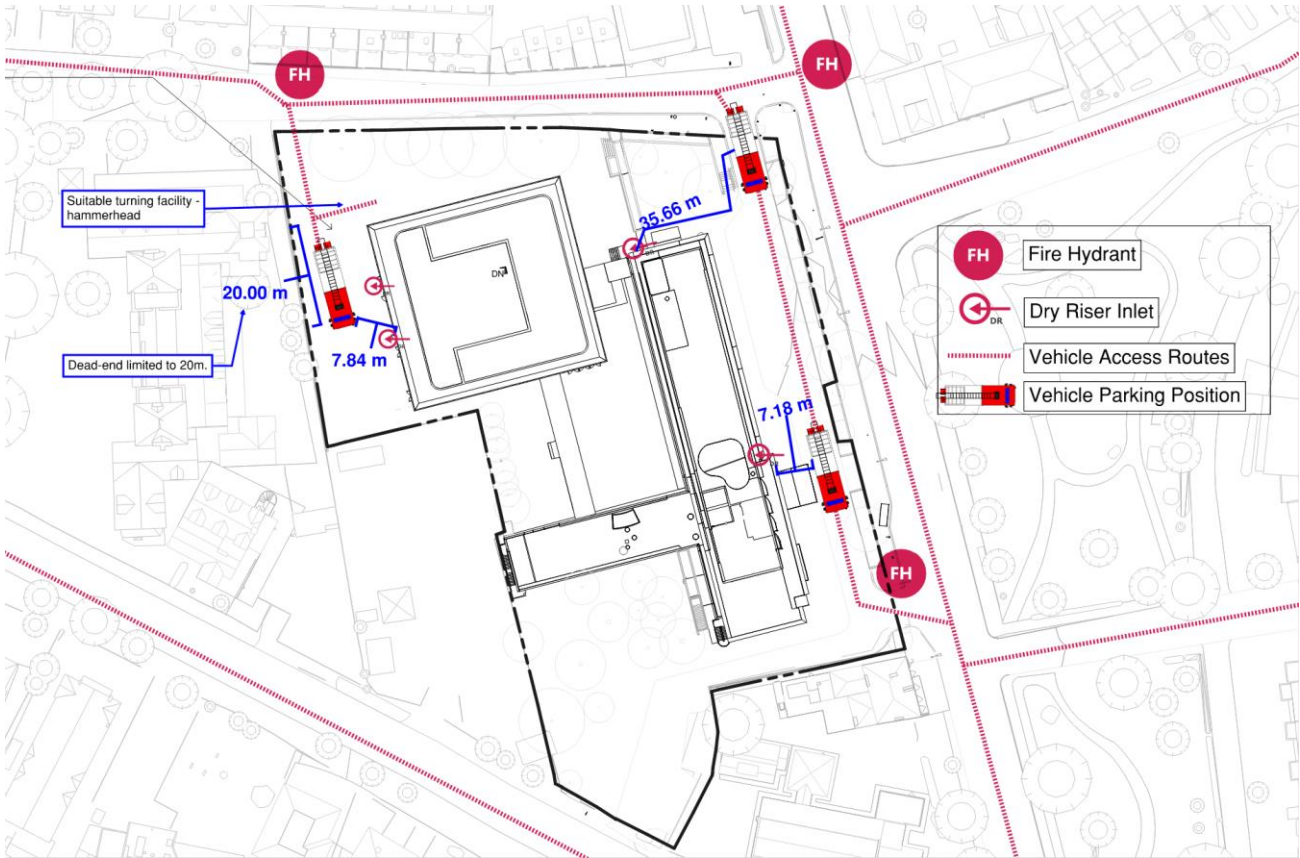


Figure 15—13 Proposed Emergency Vehicle Access Routes – Ground Level

15.7.2 Internal Firefighting Facilities

15.7.3 Fire Mains

For buildings where the topmost occupied floor is greater than 11 m above the firefighters’ access level, fire mains need to be provided in accordance with BS 9990. It is recommended to install a dry main in all 4 no. protected stairs of the buildings.

The dry fire mains should also extend to the basement level of the Civic Centre.

15.7.4 Access to Fire Hydrants

Hydrants shall be positioned such that they are easily accessible from the Fire Service access road, such that they can easily be used to refill fire vehicle water tanks.

Fire hydrants should be located within 90m of the dry fire main inlet, and not more than 90m apart to satisfy BS 9999. They should be designed in accordance with BS 9990.

Hydrant locations have been reviewed and existing hydrants are highlighted in Figure 15—13. Currently there is an existing hydrant within close proximity of each parking position.

15.7.5 Hose Coverage

In buildings fitted with fire mains, all parts of the floorplate should be no more than 45 m from the fire main outlets or fire truck parking position, as measured on a route suitable for laying hose. This is currently achieved on all floors of both buildings, except for the committee room and one meeting room at first floor (highlighted in yellow), which are covered within 50m of the fire main. This is an existing condition which has been significantly improved by the provision of dry fire mains (currently fire service has to run hoses from the parking positions).

This has been discussed and agreed in principle with BCO, as this is an existing condition which is significantly improved. This item is pending final LFB approval.

See Figure 15—14 below for hose coverage within the building.

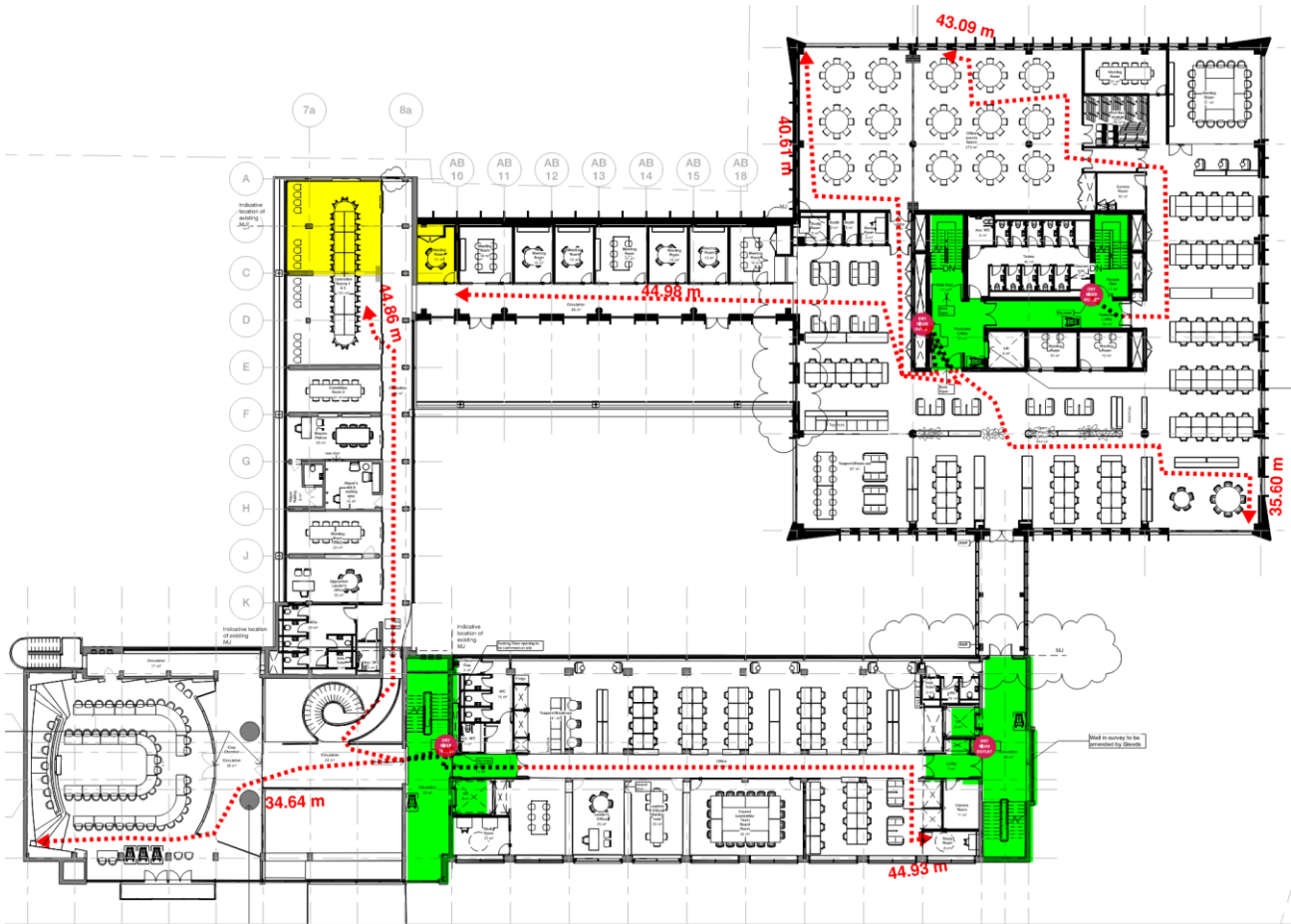


Figure 15—14 Hose Coverage – First Floor

15.8 Active Fire Protection Systems

15.8.1 Automatic Fire Detection and Alarm System

An L2 (M) automatic fire detection and alarm system will be installed throughout both buildings, designed to the relevant parts of BS 5839-1¹³. The automatic detection system will work on a “single knock”, where both buildings will evacuate immediately upon detection. Please note that a fire detected in the Annex will trigger the evacuation of the Civic Centre, and the other way round.

Additional detection should be provided to cover occupants in inner rooms.

Manual call points will be provided on final exits, storey exits, and at regular intervals as per the British Standard.

Sounders will be provided throughout. Visual warnings (beacons) should be provided in rooms where noise levels are likely to be high, or where occupants may be isolated (WCs).

15.8.2 System Interactions

The fire detection and alarm system will also be used to:

- deploy any fire and smoke curtain (upon local detection)
- release any held open fire doors
- activate flashing beacons where provided
- release automated locks
- close off gas supplies (if gas is provided)
- shut down air handling equipment not associated with smoke ventilation
- command all the lifts to ground.

The above is not an exhaustive list.

15.8.3 Locking Mechanisms

Where it is proposed to provide locking mechanisms on doors to maintain security and restrict passage around the building, such mechanisms must be easily deactivated in the event of fire when the public or staff wish to pass through them.

Where the mechanism can be released by a simple handle no further action will be required (e.g. exiting a single room fitted with a mechanical code pad where the lock is disengaged by a lever handle or thumb turn).

Where the mechanism is electromagnetic, requires a number to be punched into a code pad or the use of a swipe card, override features must be provided to ensure that anyone without the code / swipe card can exit the building in the event of a fire.

Locking devices should deactivate:

- upon detection of smoke by the fire alarm system (a single device activation will release the door locks)
- upon failure of the power supplies
- by activation of local manual over-rides (green break glass)

- by activation of a manual call point

15.8.4 Hold Open Fire Doors

Where a fire door is held open, to ensure the doors are released and close effectively they will be provided with an automatic release mechanism that is part of the door or door closing devices that incorporates a hold open mechanism.

A door with a hold open device will close upon:

- detection of smoke by the fire alarm system (a single device will release the door locks, including general manual call points - double knock scenario does not apply)
- mechanical damage to cable
- failure of the power supplies
- activation of a manual call point

To ensure that the device releases in the event of a fire the system will be designed to conform to the requirements of BS 7273-4¹⁴.

The above recommendations apply to held-open doors proposed for the Annex stair lobby and Civic Centre south stair lobby.

15.8.5 Basement Smoke and Heat Ventilation Systems

The existing Civic Centre basement was originally designed as a bomb shelter and provided with a very deep concrete slab at Ground level. It is therefore not possible to provide openings for smoke clearance within the basement. This is an existing situation, which has been improved by removing high-risk plant equipment from it (previously the basement included Gas boilers, a safe, and electrical plant rooms), and by extending the dry main system to cover the basement.

All plant rooms will be enclosed in 60-minutes fire resisting walls to ensure that the compartmentation within the basement is also improved. Additionally access to these rooms will be via 60-minute protected corridors from the cores.

The above is considered reasonable as it is a significant improvement from the existing arrangement, and it is impracticable to provide openings for smoke ventilation.

This has been discussed and agreed in principle with BCO, as this is an existing condition which is significantly improved. This item is pending final LFB approval.

¹³BS 5839: Part 1 – Fire Detection and Alarm Systems for Buildings. Code of practice for systems design, installation and servicing. 1988.

¹⁴ BS 7273-4: 2015 (+A1: 2021) Code of practice for the operation of fire protection measures. Actuation of release mechanism for doors.

15.8.6 Refuse Rooms

Refuse rooms should be accessed via a smoke ventilated lobby with a permanent ventilation direct to external achieving at least 0.2m² geometric free area per lobby, or a suitable mechanical alternative. This should be reviewed as the design progresses and be installed in line with BS EN 12101.

This should apply to the refuse store at ground in the Annex (see lobby highlighted in green).



Figure 15—15 0.2m² Permanently Vented Lobby to Refuse Store (Green Shaded)

15.8.7 Fire & Smoke Dampers

Automatically actuated fire and smoke dampers triggered by smoke detectors should be provided to ductwork passing or serving:

- Protected lobbies to escape stair; and,
- Protected escape routes to outside from escape stairs;

All other ductwork passing through fire resisting construction should be provided with fusible link fire dampers. Smoke control dampers will be provided to smoke extract systems to control extract from individual zones as necessary (EN 12101).

15.8.8 Emergency Escape Lighting

A system of non-maintained self-contained emergency luminaires with a back-up supply of 1 hour will be provided throughout the common areas of the building. 3 hours will be provided to all other areas. Emergency lighting will be designed and installed in accordance with BS 5266-1¹⁵ and will be provided in the following locations:

- all escape routes (staircases and internal corridors)
- windowless accommodation (i.e. plant rooms, car park, store rooms, etc)
- open plan areas more than 60m²
- firefighting equipment
- externally over final exit doors to an Assembly Point.

- courtyard

15.8.9 Emergency Escape Signage

All exits and routes to exits will be clearly marked with appropriate emergency escape signs so that the occupants can easily determine their most direct route to a place of safety in the event of an emergency. The system will be designed and installed in accordance with BS 5499-1¹⁶ and BS ISO 3864-1¹⁷.

15.8.10 Secondary Emergency Power Supplies

Several building systems will require a secondary / back up emergency power supply in accordance with BS 8519¹⁸. These systems currently include (not exhaustive list):

- fire and smoke curtains
- fire detection and alarm
- evacuation lift
- emergency voice communication systems (in refuges)
- emergency lighting

15.8.11 PV Panels

PV panels will be provided in the roofs and will follow the recommendations contained within RC62¹⁹ and an isolation switch should be provided for the fire service near the fire alarm panel.

¹⁵ BS 5266: Part 1 – Emergency Lighting. Code of Practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment. 1988

¹⁶ BS 5499: Part 4 Code of practice for escape route signing, 20dr.

¹⁷ BS ISO 3864-1:2011 Graphical symbols. Safety colours and safety signs. Design principles for safety signs and safety markings

¹⁸ BS 8519:2010 Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications. Code of practice

¹⁹ RC62:2016 - Recommendations for fire safety within photovoltaic panel installations

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