



The Relocation of The Limes, Fallowfield Campus

Fire Safety Strategy
For Rider Levett Bucknall

RIBA Stage 3
Revision 01 – Planning

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PLANNING STATEMENT

University of Manchester: The Relocation of The Limes, Fallowfield Campus

The proposed development will combine the University's Catering Central Processing Unit (CPU), Maintenance Services Unit (MSU), Environmental Services Unit (ESU) and Residences Team to form a facility consisting of facility management stores and workshops, catering facilities, staff workspaces and storage facilities.

The proposed car park and cycle parking facilities are as follows:

- The western side of the site will provide 45 car parking spaces, inclusive of 4 accessible spaces. It is noted that Richmond Park Halls will also be allocated 2 dedicated accessible car parking spaces.
- The eastern side of the site will provide 14 car parking spaces for staff, inclusive of 2 accessible spaces. Again, 2 accessible car parking spaces will be dedicated to Richmond Park Halls for student parking. There are also 5 electric vehicle (EV) car parking spaces to be provided, inclusive of 1 accessible EV parking space for tail lift/sprinter parking.
- The total number of car parking spaces will be 66 and 1 tail lift/sprinter. The overall car parking provision represents a reduction of 64 spaces.
- A bike store with 20 cycle spaces and 7 cycle racks will be provided for staff and students outside the entrance to the main building.

EXECUTIVE SUMMARY

Building Description	The proposed development includes two levels: the ground floor and the first floor. The ground floor primarily features a cooking area, storage spaces, an office, a chiller cold room, a preparation room, a dry store, a cold and freezer room, a washroom (w/c), a goods-in room, and other ancillary accommodations. The first floor comprises a workshop, storage room, comms room, meeting room, office, staff room, changing facilities washroom, plant room, and a cleaner’s room. Additionally, a separate storage area is proposed adjacent to the main building, comprising a residential store, ESU store, transformer room, plant room, and switch room. Each of these spaces will have separated access from the main building.
Design Guidance and Legislation	The development is generally to be designed in accordance with BS 9999:2017 for all areas. All deviations from this guidance will require agreement with the approving authority and local fire service.
Fire Detection & Alarm Systems	The minimum fire detection and alarm system Category for the areas with a risk profile of A3 is a Category L2 system that is designed, installed and commissioned in accordance with BS 5839-1:2017. The minimum fire detection and alarm system Category for the areas with risk profile of A2 is a Category (M) system, all manual call points should be designed and installed in accordance with Clause 20.2 of BS 5839-1:2017.
Evacuation Strategy	The proposed evacuation strategy is based on a single-stage simultaneous evacuation. In a single-staged evacuation, the activation of a call point or detector gives an instantaneous warning from all fire alarm sounders for an immediate evacuation of the while building.
Structural Fire Protection	The element of structure throughout the building are to achieve at least 60 minutes fire resistance, with regard to load-bearing capacity. However, on the basis of the building not requiring compartment floors, the stairs and passenger lifts are permitted to be enclosed in a minimum of 30 minutes. See Section 6.2 for further information.
External Fire Spread	The external fire spread calculation for the north, south, east, and north store elevations does not meet the required standards. Appropriate measures should be implemented to reduce the potential for incident radiation affecting these

Fire Service Access	boundaries. Hydrock has recommended the following measures to address this issue Section 7.1.4for further information. On the basis of the building height, and floor areas, a firefighting shaft need not be provided. Fire service access will be gained via the primary entrance door to the South of the building. It is required that 15% perimeter access is provided to the building.
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1. INTRODUCTION

Hydrock Fire have been engaged by Rider Levett Bucknall to provide fire engineering services for the proposed development, The Limes of University of Manchester.

1.1 Purpose of Report

The purpose of this report is to demonstrate to the approving authorities that the proposed The Limes of University of Manchester satisfies all functional requirements of Part B (Fire Safety) of Schedule 1 to the Building Regulations 2010 (as amended) and to outline the Fire Safety Strategy to the design team.

1.2 Basis of Report

This Fire Safety Strategy has been developed based on the information and drawings provided by Buttress Corporation as outlined in Table 1.

Table 1 Information on which the Fire Safety Strategy is based

Description	Drawing No.	Revision	Date
Proposed Ground Floor Plan (Main Building)	LIMES-BUT-B1-00-DR-A-04000-P01	P01	18.10.24
Proposed First Floor Plan (Main Building)	LIMES-BUT-B1-01-DR-A-04001-P01	P01	18.10.24
Proposed Roof Plan (Main Building)	LIMES-BUT-B1-R3-DR-A-04002-P01	P01	18.10.24
Proposed Elevations – North and South (Main Building)	LIMES-BUT B1-ZZ-DR-A-05001-P01	P01	18.10.24
Proposed Elevations – East and West (Main Building)	LIMES-BUT-B1-ZZ-DR-A-05002-P01	P01	18.10.24
Proposed Ground Floor Plan (Stores)	LIMES-BUT-B2-00-DR-A-04003-P01	P01	18.10.24
Proposed Roof Plan (Stores)	LIMES-BUT-B2-R3-DR-A-04004-P01	P01	18.10.24
Proposed Elevations -North and South (Stores)	LIMES-BUT-B2-ZZ-DR-A-05003-P01	P01	18.10.24
Proposed Site Plan	LIMES-BUT-MS-R3-DR-A-04101-P01	P01	18.10.24
Material data sheet – Issued by Buttress	372/19-530-9	-	12.08.2024

1.3 Limitations of Report

1.3.1 Information Provided by Others

The Fire Safety Strategy represents only the best judgement of the consultants involved in its preparation, and is based, in part, on information provided by others. Under no circumstances is liability accepted for the accuracy of such information provided by others.

1.3.2 Alternative Methods of Compliance

Where the Fire Safety Strategy proposes alternative methods of compliance, that have been based on accepted codes of practice, to satisfy the functional requirements of Part B (Fire Safety) of Schedule 1 to the Building Regulations 2010 (as amended), they will be subject to the agreement of the approving authorities and local Fire and Rescue Service.

1.3.3 Minimum Requirements

This report outlines the minimum requirements to satisfy the functional requirements of Part B (Fire Safety) of Schedule 1 to the Building Regulation 2010 (as amended). However, whilst these satisfy the statutory imperatives, Hydrock advise consideration of additional fire safety measures. Examples of how the minimum fire safety requirements for the building may be enhanced and their benefits are provided.

1.4 Building Overview

The proposed development includes two levels: the ground floor and the first floor. The ground floor primarily features a cooking area, storage spaces, an office, a chiller cold room, a preparation room, a dry store, a cold and freezer room, a washroom (w/c), a goods-in room, and other ancillary accommodations. The first floor comprises a workshop, storage room, comms room, meeting room, office, staff room, changing facilities washroom, plant room, and a cleaner’s room.

Additionally, a separate storage area is proposed adjacent to the main building, comprising a residential store, ESU store, transformer room, plant room, and switch room. Each of these spaces will have separated access from the main building.

The proposed development included two staircase that provide access to all floors as illustrated in Figure 1



Figure 1 Site plan

1.4.1 General Arrangements

Ground Floor

Ground floor level mainly consists of cooking space, store, chiller cold room, prep room, dry store room, cold & freezer room, office In, and ancillary room, as illustrated in Figure 2.



Figure 2 Ground floor general arrangement

First Floor

The first floor consists of ancillary accommodation, office, meeting room, rest room, workshop, store, comms, cleaner room, changing room, internal and external plant room and is served by a one lift and two stairs, as illustrated in Figure 3.



Figure 3 First Floor general arrangement

Roof Level

The roof level, which includes a PV panel, can be accessed through stair 2, as well as via a hatch connected to stair 1 from the first floor, as illustrated in Figure 4.

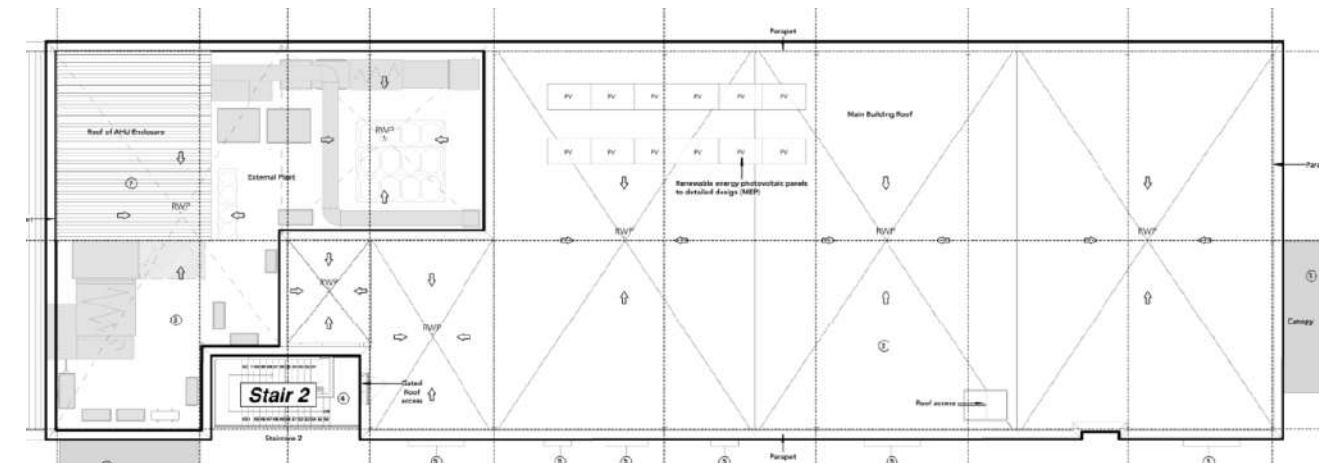


Figure 4 Roof level general arrangement

Ground Floor (Stores Area)

The ground floor includes a dedicated store area, comprising with residential store, ESU store, transformer room, plant room and switch room. These facilities are separated from the main building and have their own independent access, as illustrated in Figure 5.

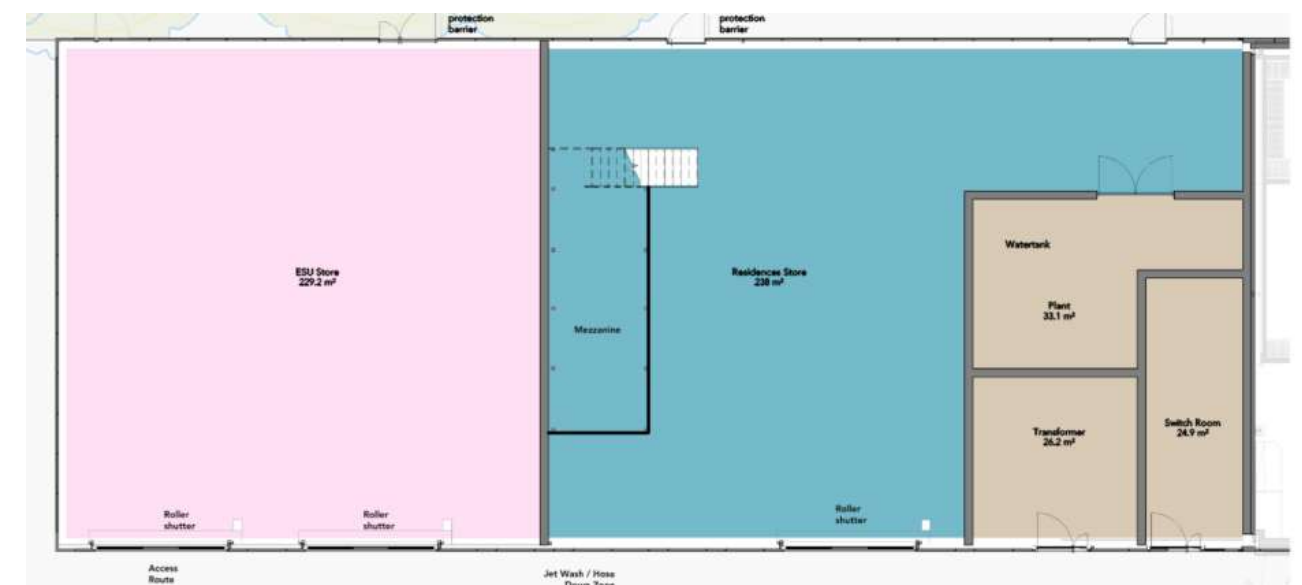


Figure 5 Ground floor store area general arrangement

Roof Level (Store Area)

The store roof level is shown in the following figure, however, the access to the store roof needs to be confirmed as shown in Figure 6.

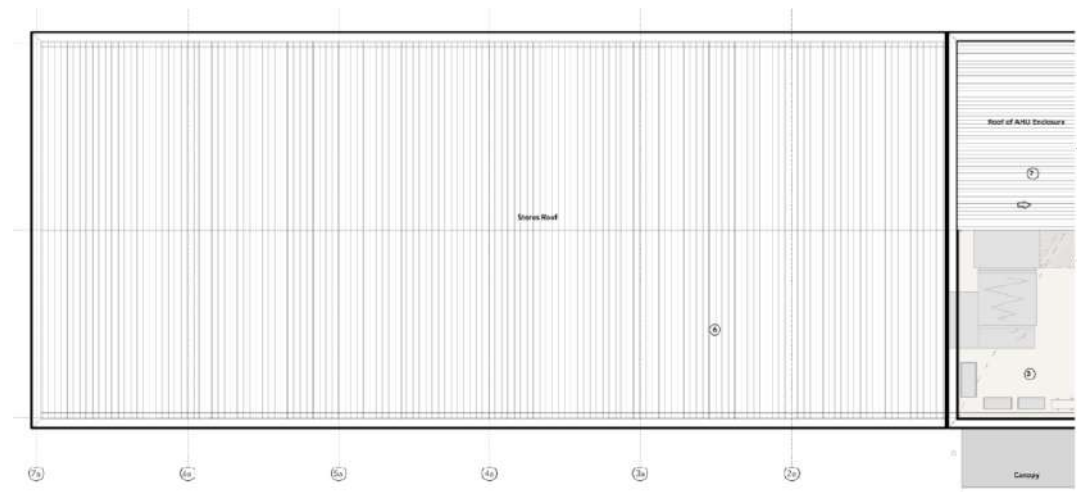


Figure 6 Roof level (Store Area) general arrangement

1.4.2 Building Height

For the purposes of the Fire Safety Strategy, it should be noted that the top occupied storey of the proposed building is approximately 4.85m above ground level, measured from the upper floor surface to the top most occupied storey to ground level on the lowest side of the building, as illustrated in Figure 7.



Figure 7 Elevation illustrating building height

2. LEGISLATION

The following sections provide an outline of the regulations and guidelines on which the Fire Safety Strategy is based.

2.1 The Building Regulations 2010

The building work will be subject to control under the restrictions of the Building Regulations 2010 (as amended). The Building Regulations are concerned with the life safety of persons in and around a building. The development will be designed and constructed to satisfy the functional requirements of Part B (Fire Safety) to Schedule 1 of the Building Regulations 2010 (as amended), which includes the following:

- B1 – Means of warning and escape
- B2 – Internal fire spread (linings)
- B3 – Internal fire spread (structure)
- B4 – External fire spread
- B5 – Access and facilities for the Fire Service

2.2 Guidance Documents

Guidance referred to in this report includes, but is not limited to the following:

- BS9999:2017 ‘Fire safety in the design, management and use of buildings – Code of practice’;
- Approved Document B (ADB) 2:2022 ‘Buildings other than dwellings’;
- BS5839-1:2017 ‘Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in non-domestic premises’;
- BS81-72:2015 ‘Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Firefighters lifts’;
- BS5499-4:2013 ‘Code of practice for escape route signing’;
- BR187:2014 ‘External Fire Spread – Building separation and boundary distances’;
- BS5266-1:2016 ‘Emergency lighting. Code of practice for the emergency lighting of premises’;
- BS9990:2015 ‘Non-automatic firefighting systems in buildings’;
- RISCAuthority RC59 version 2:2023 ‘Recommendations for life safety when charging electric vehicles’;
- BS EN 13501-1:2018 ‘Fire classification of construction products and building elements. Classification using data from reaction to fire tests’;

Guidance for the fire precautions will generally follow the recommendations contained within BS9999:2017. Any deviations from these standards are to be provided with justification demonstrating that the functional requirements of Part B (Fire Safety) of Schedule 1 to the Building Regulations 2010 (as amended) are met; however, these will be subject to approval from the approving authority and local Fire Service. Where no specific provision is mentioned in this document regarding any particular aspect, reference should be made to BS9999:2017. Consideration is also to be given to insurers and other stakeholders requirements.

The Fire Safety Strategy is to be read in conjunction with the Fire Strategy Drawings in Appendix A.

2.3 Other Applicable Legislation

2.3.1 The Regulatory Reform (Fire Safety) Order 2005

The Regulatory Reform (Fire Safety) Order (RRFSO) regulations shall apply to this development and are the landlord’s responsibility. The RRFSO came into force in 2006 with the aim of resolving the overlap caused by a number of previous legislations. Therefore, a large number of legislations were rationalised and consolidated into the RRFSO with the result that it also rationalised the number of enforcement authorities involved in fire safety matters.

The RRFSO applies to all workplaces and other non-domestic areas and premises, requiring the ‘Responsible Person’ to undertake an assessment of the fire risk in their premises and to keep this assessment under review. It requires that where the ‘Responsible Person’ does not have the relevant training and experience to undertake such an assessment they must appoint a suitable ‘Competent Person’ to undertake the Risk Assessment.

The main focus of the Risk Assessment is to ensure that the premises is safe for the occupants to use and that all fire safety measures are adequate and appropriately maintained. In new buildings, the Fire Risk Assessment ensures that the fire safety provisions required under the Building Regulations 2010 are maintained, whereas in existing buildings it ensures that despite any modifications undertaken throughout the building’s history, it is still safe for use. It is therefore important that the Fire Safety Strategy for more complex buildings (regardless of age) is clear and well documented.

Fire Safety Act (2021)

The Fire Safety Act 2021 (published on 29.04.2021) has amended the applicability of the RRFSO to residential buildings as follows:

- ‘Where a building contains two or more sets of domestic premises, the things to which this order applies include—
 - a. the building’s structure and external walls and any common parts;
 - b. all doors between the domestic premises and common parts (so far as not falling within subparagraph (a)).
- The reference to external walls includes—
 - a. doors or windows in those walls, and
 - b. anything attached to the exterior of those walls (including balconies).’

This clarification will empower fire and rescue services to take enforcement action and hold building owners to account if they are not compliant.

2.3.2 *Regulation 38*

In conjunction with the RRFSO, Regulation 38 requires that information relating to the fire safety provisions within a building is provided to the ‘Responsible Person’ so that they (or an appointed ‘Competent Person’) can undertake the Fire Risk Assessment required under the RRFSO. It is therefore of paramount importance that the fire safety information for a building that falls under the requirements of the Building Regulations 2010 is kept up to date and a true reflection of the completed building.

This report does not form the Risk Assessment required under the RRFSO, nor does it absolve the client from exercising their duties under Regulation 38. However, the aim of this Fire Safety Strategy is to demonstrate how the project complies with the requirements of the Building Regulations 2010 (as amended) and therefore should form part of the information provided to the ‘Responsible Person’ in order for them to undertake and maintain the Fire Risk Assessment for the project.

3. RISK PROFILE

BS9999:2017 takes a risk-based approach to developing the fire safety strategy. A risk profile is assigned to each occupancy type within the building in order to determine the appropriate means of escape and the appropriate design features of the building for life safety. The risk profile consists of an occupancy characteristic and an expected fire growth rate based on the expected fire load in the space.

3.1 Occupancy Characteristic

The occupancy characteristic is principally determined according to whether the occupants are familiar or unfamiliar with the building and whether they are likely to be awake or asleep:

- Category A - Occupants awake and familiar with building layout
- Category B - Occupants awake but unfamiliar with building layout
- Category C - Occupants asleep

The building is under the University of Manchester therefore, it is assumed that these areas are likely to be occupied by staff and students, and therefore that occupants would be awake and familiar with building layout. Thus, an occupancy characteristic of A applies to the proposed development. However, this need to be confirmed by the client.

3.2 Fire Growth Rate

The fire growth rate is the rate at which it is estimated that a fire will grow. The fire risks associated within each space are determined by the use of each space:

- Category 1 - Slow fire growth rate
- Category 2 - Medium fire growth rate
- Category 3 - Fast fire growth rate
- Category 4 - Ultra-fast fire growth rate

Generally, throughout the building, there is expected to be evenly distributed low to mid-level fire load, which exhibits a medium fire growth rate (Category 2). However, kitchen, stores and plant areas are considered to have a higher load of combustible materials and is therefore deemed to have a fast fire growth rate (Category 3). Fire growth rate of the premises in proposed areas are detailed in Table 3.

Table 2 Fire Growth Rates

Area	Risk Profile
Cooking space / Storage / Prep Room / Cold & Freezer Room / Comms / Plant	3
Office / Meeting Room / CPU Staff Rest / FMC Rest / Workshop	2

3.3 Risk Profiles

The Fire Safety Strategy has been developed based on the following risk profiles, as outlined in Table 3, in accordance with BS9999:2017.

Table 3 Risk profiles

Area	Risk Profile
Cooking space / Storage / Prep Room / Cold & Freezer Room / Chiller Coldroom / Comms / Plant Room	A3
Office / Meeting Room / Staff Rest / Workshop / Dishwash	A2

4. MEANS OF WARNING AND ESCAPE

4.1 Functional Requirements B1

The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place outside the building capable of being safely and effectively used at all material times.

4.2 General

Means of escape from the building is generally to be in accordance with BS9999:2017. Where the proposed means of escape strategy deviates from this guidance document it will require agreement with the approving authority and local Fire Service.

4.3 Evacuation Strategy

The proposed evacuation strategy is based on a single-staged simultaneous evacuation. In a single-stage evacuation, the activation of a call point or detector gives an instantaneous warning from all fire alarm sounders for an immediate evacuation of the whole building.

4.4 Fire Detection and Alarm System

Fire detection and alarm systems are designed to give warning of fire at an early stage to enable all occupants to evacuate the building safely, before the escape routes are impassable owing to the presence of fire, smoke or toxic gases.

The minimum fire detection and alarm system category for the areas (cooking space / storage / prep room / cold & freezer room / chiller cold room / comms / plant room / goods in-including goods in office) with a risk profile of A3 is a Category L2 system that is designed, installed and commissioned in accordance with BS 5839-1:2017.

The minimum fire detection and alarm system category for the area (Office / Meeting Room / Staff Rest / Workshop / Dishwash) with risk profile of A2 is a Category Manual (M) system, all manual call points should be designed and installed in accordance with Clause 20.2 of BS 5839-1:2017.

As per Clause 20.2 (d) of BS 5839-1:2017, it is also recommended to provide MCPs (Manual call points) at all storey exits and all exits leading to ultimate place of safety (open air). Following recommendation are applicable for MCPs;

- The method of operation of all MCPs in a system should be that of type A as specified in BS EN 54-11. All call points should be identical unless there is a special reason for differentiation.

- All MCPs should be fitted with a protected cover, which is moved to gain access to the frangible element.
- The delay between operation of an MCP and the giving of an “Evacuate” signal in, at least, the alarm zone within which the call point is located should not exceed 3 s.
- MCPs should be fixed at a height of 1.4m above finished floor level, at easily accessible, well-illuminated and conspicuous positions free from potential obstruction.

4.4.1 Fire Alarm System Interfaces

An automatic fire alarm system will have interfaces and links as necessary to operate equipment/devices and a number of examples are indicated below; for more information see BS5839-1:2017:

- Electromagnetic hold-open devices on fire doors – released to closed position;
- Security systems on exit doors – released as required;
- Gas supply valves (plant areas) – isolate;
- Smoke ventilation systems – relevant system activates depending on location of detection;
- Heating, ventilation and air conditioning systems – shut down to restrict spread of smoke and hot gases.

4.5 Maximum Expected Occupancy Levels

For the purposes of the Fire Safety Strategy the maximum expected occupancy within each area of the building is outlined in Table 4.

This information has been based on the floor areas provided by Buttress Corporation, see Section 1.2. It is not expected that all spaces will be occupied simultaneously, this is considered the worst-case occupancy of the building, which has been considered to determine the egress capacity for the means of escape.

The circulation, WC, changing room, storage space, dry store, cold room, prep room, chiller cold room have not been included, as these will be utilised by the existing occupancy of the building only. It is assumed those working in the building will be based in the office space and/or the cooking spaces and not remain in the circulation space. Clients’ needs to be confirmed that these areas are being utilized by the current kitchen occupancy.

Table 4 Maximum expected occupancy levels

Level	Occupancy	Area (m ²)	Floor Space Factor (m ² /person)	Maximum Expected Occupancy
Ground Floor	CPU Office / Goods In office	N/A	N/A ^[1]	3
	Kitchen	100.8	7 ^[2]	14
Ground Floor Occupancy				17
First Floor	Office 1	N/A	N/A ^[1]	12
	Staff Rest Room 1	N/A	N/A ^[1]	19
	Staff Rest Room 2	N/A	N/A ^[1]	16
	Office 3	N/A	N/A ^[1]	9
	Meeting Room	N/A	N/A ^[1]	8
	Office 2	N/A	N/A ^[1]	3
	FMC Workshop	31.5	5 ^[2]	6
	External/Internal Plant Room, (including Comms room)	N/A	N/A ^[3]	1 per room
	First Floor Occupancy			74
	Total Occupancy			91

- Notes:
- 1. Occupancy determined by available seats.
 - 2. Cooking space and workshop space factor taken from Approved Document B Volume 2 (2022).
 - 3. This area is considered to be transiently occupied, and for maintenance/staff access only.

4.6 Horizontal Means of Escape

4.6.1 Travel Distances

Travel distance is the actual distance a person needs to travel from any point within a building to the nearest storey/final exit.

In accordance with BS9999:2017, the maximum travel distances within each area of the building (based on the relevant risk profiles) are outlined in Table 5.

Table 5 Maximum permitted travel distances

Area	Risk Profile	Maximum Permitted Travel Distance (m)			
		With Only One Escape Route Available		With Alternative Escape Routes Available	
		Layout Known	Layout Unknown	Layout Known	Layout Unknown
Office / Meeting Room / Workshop / Staff Rest Room	A2	22	15	55	37
Plant Room / Cooking Space / Storage / Prep Room / Cold & Freezer	A3	18	12	45	30
External Plant ^[1]	A3	60	40	200	133

- Notes:
- 1. Following the guidance of Table F.1 of BS 9999:2017 for maximum travel distance of external plant

As illustrated in the Fire Strategy Drawings in Appendix A, the proposed works are considered acceptable with regard to maximum permitted travel distances in accordance with BS 9999:2017 with the exception of the external plant at the first level as the current unknown travel distance is 16.8m while the distance should not exceed 12m. It should be noted that this distance will be reassessed upon confirmation of the room layout.

4.6.2 Number of Escape Routes

In the event of a fire within the building, occupants should be provided with a sufficient number of exits to ensure a prompt evacuation of the building prior to escape routes becoming blocked by the effects of fire and smoke. The minimum number of escape routes required from each area is determined based on the maximum expected occupancy of the area as outlined in Table 6, in accordance with Table 10 of BS9999:2017.

Table 6 Minimum number of escape routes

Maximum Expected Occupancy	Minimum Number of Routes / Exits
Up To 60	1
61-600	2
More Than 600	3

All areas of the building have been assessed and are considered to meet the requirements outlined in Table 6.

4.6.3 Minimum Required Exit Widths

In accordance with BS9999:2017 exit widths are to be:

- Not less than required to serve the expected occupancy; and
- Not less than 850mm where unassisted wheelchair access is necessary; and
- Not less than 800mm where unassisted wheelchair access is not necessary.

In accordance with Clause 16.6.1 of BS9999:2017, the capacity of any exit with an effective clear width of less than 1050mm is calculated as follows:

$$n_{<1050} = 500/m$$

Equation 1

where;

$n_{<1050}$ is the maximum occupancy capacity of the exit with an effective width less than 1050mm

m is the minimum exit width required per person based on the relevant risk profile

Therefore, the maximum occupancy capacity of an exit with an effective clear width less than 1050mm is outlined in Table 5 (based on the relevant risk profiles).

Table 7 Capacity of exits with an effective width less than 1050mm

Risk Profile	Minimum Width Required Per Person, m	Maximum Number of Occupants Served by Exit, $n_{<1050}$
A2	3.6mm	138
A3	4.6mm	108

The occupancy capacity of exits with an effective clear width equal to or exceeding 1050mm is calculated as follows:

$$n_{\geq 1050} = W/m$$

Equation 2

where;

$n_{\geq 1050}$ is the maximum occupancy capacity of the exit with an effective width of 1050mm or more

m is the minimum exit width required per person based on the relevant risk profile

W is the effective clear width of the exit

It should also be noted that, in accordance with BS9999:2017, where a space is provided with multiple exits for escape, one of the exits is to be discounted when determining the occupancy capacity of the space (assuming the exit is blocked by the effects of fire/smoke. However, it should be noted that exits in close proximity to each other may be blocked simultaneously.

Considering the estimated occupancy number on the first floor being 74 persons, where the largest storey exit is discounted in this calculation, the proposed storey exit width of not less than 850mm is sufficient to accommodate the escape of the occupants on the first floor.

For the purposes of this report, the width of a doorway is the clear width of the opening between the door leaf and frame (or projecting building hardware or the width between two opening door leaves in the case of double doors) assuming that the door leaf is free to open 90° or more.

The proposed design is considered to be compliant with regard to exit capacity.

Where double doors are provided the width of one of the leaves should be not less than 800mm.

Minimum Storey Exit Widths

All escape doors from rooms are to achieve an effective width of at least 800mm (or 850mm where the door may be expected to serve wheelchair users). However, where the occupancy of a room may be expected to exceed 60 persons it should be ensured to provided door width is sufficient to serve the expected occupancy.

As per Table 8 outlines the required clear storey exit widths from each level within the building. As per Clause 16.6.1 of BS 9999:2017, if a storey has two or more storey exits it should be assumed that a fire might prevent the occupants from using one of them. The remaining exits (s) should be wide enough to allow all the occupants to leave quickly.

Table 8 Minimum required storey exit widths from each level

Level	Risk Profile	Maximum Expected Occupancy	Number of Exits Provided	Calculation – Permitted maximum occupancy	Compliant Yes / No
First Floor	A3	74	2 ^[2]	Exit 1 (990mm) = 108 Exit 2 (1020mm) = 108	Yes
Ground Floor	A3	17	3 ^[2]	Exit 1 (1690mm) = 108 Exit 2 (900mm) = 108 Exit 3 (1210mm) = 108	Yes

Notes

1. Door widths should not be less than 800mm, or 850mm if unassisted wheelchair access necessary.
2. Worst-case scenario where widest exits (s) blocked by fire.

At each area, the available escape capacity exceeds the expected occupancy identified in Table 8. Both floors provided with sufficient horizontal escape capacity.

4.6.4 Door Opening Direction

Where an exit may be expected to be required to serve more than 60 persons for escape in a fire scenario it should be arranged to open in the direction of escape. Otherwise, the door is limited to serving a maximum of 60 people.

4.6.5 Corridors and Escape Routes

The width of a door in a corridor should not be less than either the calculated corridor width minus 150mm, or 1050mm, whichever is the greater.

The width of a corridor or escape route should not be less than the calculated width of any door leading onto it, or 1000mm, whichever is the greater (increased to 1200mm where it may be used by wheelchair users).

Where a corridor exceeds 12m in length and connects two or more storey exits it should be subdivided by a self-closing, fire resisting door (and associated screens) to ensure smoke will not affect access to more than one stairway. The subdivision should be located approximately halfway along the central corridor.

Where a dead-end corridor exceeds 4.5m in length and meets a section of corridor where alternative means of escape are available cross-corridor fire doors should be provided to separate the dead-end section of corridor from each alternative means of escape separately (to prevent both routes from becoming blocked by smoke simultaneously).

4.6.6 Inner Rooms

There are a number of rooms within the building which are considered as ‘inner rooms’; where the only escape from a room is through another room (the “access room”). In the proposed development, the inner dry store equipment room, chiller cold-room, freezer room, cold room and goods-in office on the ground floor are all classified as inner rooms.

All inner rooms are to meet the requirements outlined within Clause 16.3.4 of BS9999:2017 as follows:

- The occupant capacity of the inner room is not to exceed 60 (30 where the occupants may require assistance escaping);
- The inner room is to be entered directly off the access room;
- The escape route from the inner room is not to pass through more than one access room;
- The one-way travel distance from any point in the inner room should not exceed the appropriate given limit;
- The access room is not to be a place of special fire hazard; and

- One of the following arrangements should be provided:
 - The enclosures (walls or partitions) of the inner room should be stopped at least 500mm below the ceiling; or
 - a suitably sited vision panel not less than 0.1m² should be located in the door or walls of the inner room; or
 - the access room should be fitted with a suitable automatic fire detection and alarm system.

The inner rooms at ground floor are considered to be reasonable to maintain within the design, subject to agreement with the approving authorities, on the following basis:

- Since these areas are designated for transient occupancy and staff access only, the number of people in each room will be limited to 2 people. Consequently, the limit of 60 persons for the inner rooms will not be exceeded;
- The travel distance from any point within the inner room should not exceed 12m, when the layout is currently unknown. As measured in Appendix A, this limit is met;
- All rooms are fitted with L2 detection and alarm system, providing early warning upon detection of fire/smoke, and thus reducing the required safe egress time (RSET) for occupants in those spaces;
- The neither inner room passes through more than one access room;

Note: It should be noted that the access room must not present a special fire hazard and should be controlled by the same occupier as the inner room, as recommended in Section 4.6.6. While the current layout does not fully comply with this recommendation, both rooms will serve the same purpose, subject to approval by the relevant authority.

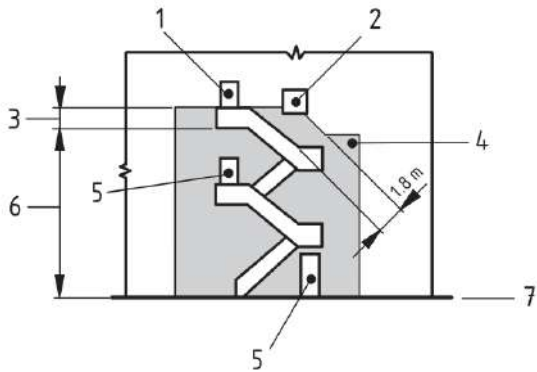
4.7 Vertical Means of Escape

4.7.1 External Stair

The proposed development is provided within 2 designated escape stairs, where Stair 2 is proposed to be an external gantry stair. In accordance with Clause 17.7 of BS9999:2017, when more than one escape route is available from a storey or part of a building, one or more of the escape routes from the storey or part of the building may be by way of an external escape stair, provided that there is at least one internal escape stair from every part of each storey (excluding plant areas) and that the external stair (s) meet the following recommendations.

- a. All doors giving access to the external stair should be fire-resisting and self-closing, except that a fire-resisting door is not needed at the head of stair leading downwards where there is only one exit from the building onto the top landing.
- b. Any part of the external walls within 1800 mm of (and 9m vertical below) the flights and landing of an external escape stair should be of fire-resisting construction, except that the 1800 mm dimension may be reduced to 1100 mm above the top level of stair if it is not a stair up from a basement to ground level.
- c. Any part of the building (including any doors) within 1800 mm of the escape route from the stair to a place of relative or ultimate safety should be provided with protection by fire-resisting construction.
- d. Glazing in areas of fire-resisting construction should also be fire-resisting to meet the criteria for both integrity and insulation, and should be fixed shut.
- e. Where a stair is more than 6m in vertical extent it should be protected from the effects of adverse weather conditions.

Note: A full enclosure is not necessary. The extent of enclosure needed depends on the location of the stair and the degree of protection given to the stair by the building itself. Trace heating is acceptable but needs to be maintained throughout the life of the building and be treated to the same standard as emergency escape lighting and provided with thermostatic control to operate in cold weather.



- Key**
- 1 No fire resistance needed for door
 - 2 Window with 30 min fire-resisting construction
 - 3 100 mm zone above top landing
 - 4 1800 mm zone of fire-resisting construction at side of stair
 - 5 Self-closing fire door with 30 min fire-resisting construction
 - 6 6 m maximum height of stair without weather protection
 - 7 Ground level or a roof or podium served by an independent stairway

Figure 8 Fire resistance of areas adjacent to external stairs

Considering the external stair is adjacent to the external plant area on the first floor, the fire resistance of the external wall within 1800 mm should be at least 30 minutes, but is recommended to be increased to 60 minutes.

The escape stairs, levels served and stair protection provisions are outlined in Table 9.

Table 9 Escape stair provision

Stair	Levels Served	Lobby Protection Provided ^[1]	Smoke Control System Provided	All Areas Served By Stair Sprinkler Protected	Discounting Required
Stair 1	2 ^[2]	No	No	No	Yes
Stair 2	1	No	No	No	Yes

- Notes
- 1. Lobby protection not required at top-most level
 - 2. If the stair and a storey exit at the final exit level share a common final exit door then the total number of floors served by the stair should include the storey at final exit level.

4.7.2 Required Stair Widths

The absolute minimum width of the stair should satisfy the following requirements in accordance with BS9999:2017:

- Should be not less than required based on the expected occupancy served; and
- Should be not less than 1000mm for downward travel; and
- Should not be less than the width(s) of any exit(s) affording access to them.

Note: Handrails and strings which do not intrude more than 100mm into this width may be ignored.

In accordance with BS9999:2017 escape stairs are to be provided with adequate effective width to serve the expected occupancy that may be required to use them in a fire scenario. The minimum width per person is based on the risk profile and the number of floors served by the stair as outlined in Table 10. Both stair 1 and 2 meet the minimum stair width requirements.

Table 10 Minimum stair width per person

Stair	Levels Served	Minimum Width Per Person	Number of persons	Required escape width	Acceptable
Stair 1	2 ⁽²⁾	4.6mm	74	340.4mm	Yes (Currently 1150mm ⁽¹⁾)
Stair 2	1	5.4mm	74	399.6mm	Yes (Currently 1030mm ⁽¹⁾)

- Notes
1. Measured form GA plans listed in Section 1.2;
 2. If the stair and a storey exit at the final exit level share a common final exit door then the total number of floors served by the stair should include the storey at final exit level.
 3. Based on allowing one stair to be discounted (assumed blocked by the effects of fire/smoke).

Stair 1 and Stair 2 should each achieve a clear width of no less than 1000mm.

As GA plans provided in Section 1.2, it is understood that the width of both staircases should be as follows:

- Stair 1 = 1140mm
- Stair 2 = 1200mm

It is acknowledged that stair 1 and stair 2 achieves the minimum required clear width.

Stair 1 needs to be considered further in the merging flow assessment, as the stair connects to one of the final exits at the ground floor. The merging flow calculation has been provided in Section 4.7.4.

4.7.3 Stair Discharge

Protected escape stair are to discharge to external either directly or via a protected passageway. The discharge routes from protected escape stairs are to be provided with the same standard of fire resistance enclosure. All discharge routes from protected stairs (stair 1 and stair 2) are prescribed to have 30 minutes fire resistance, and lead directly to external as shown in Appendix A.

4.7.4 Merging Flow at Final Exits

In accordance with Clause 17.2.7 of BS9999:2017 the exit route from an escape stair is to be at least as wide as required for the stair leading to it. However, where a merging flow exists at the stair discharge route (e.g. merging flow between occupants escaping via stair and occupants from discharge level also utilising stair discharge route for escape, etc.) the width of the route is to be sufficient to serve all occupants. On the basis of projected occupancy distributed on the ground floor the merging flow is shown in Figure 10.

The following calculations for merging flow have been done so in accordance with Figure 6.a., BS 9999:2017.

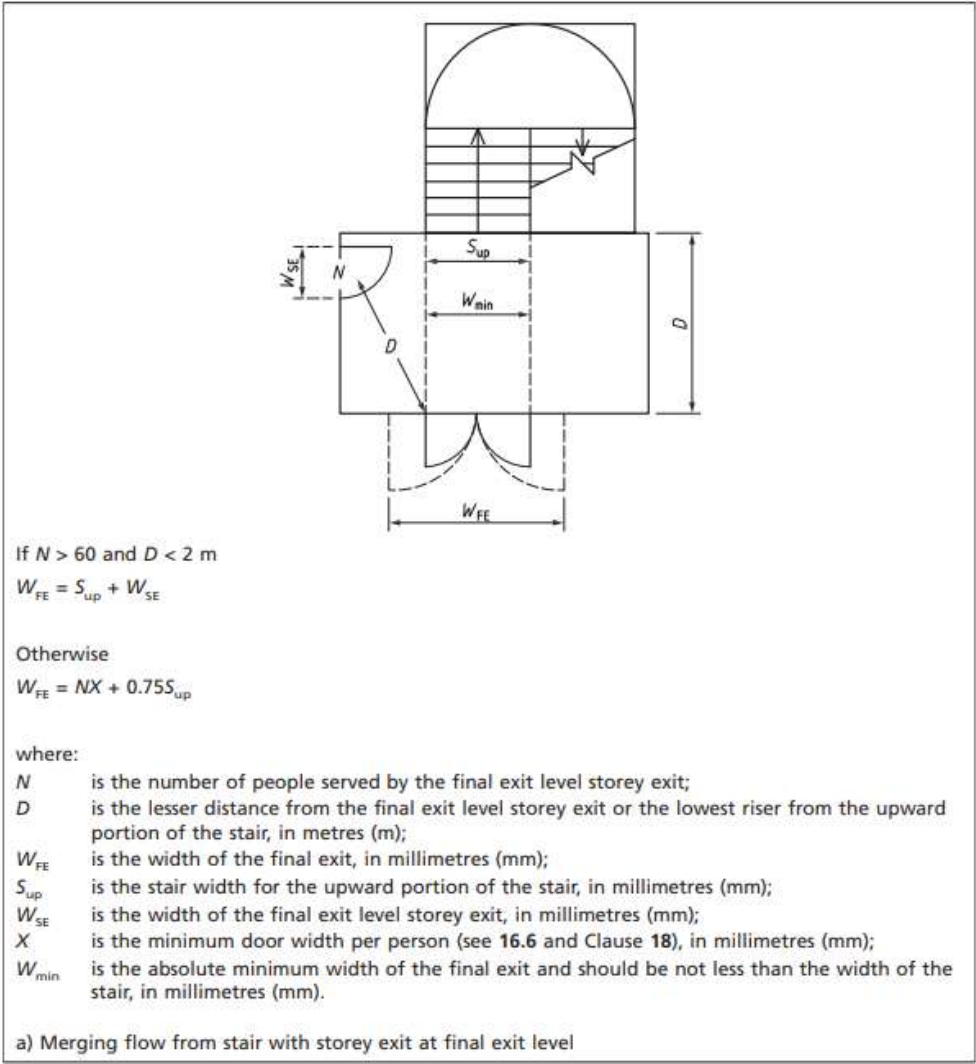


Figure 9 Extract from Figure 6, BS 9999:2017

In the merging flow scenario for stair 1, D is taken to be greater than 2m, as illustrated below. Therefore, the second equation given in Figure 9 will be used.

In the following equation, N will be taken as the worst-case number of occupants expected to utilise the final exit as determined in Table 8. and X is 4.6mm as defined in Table 7 . S will be taken as the clear width of Stair 1 as confirmed by Buttress Corporation.

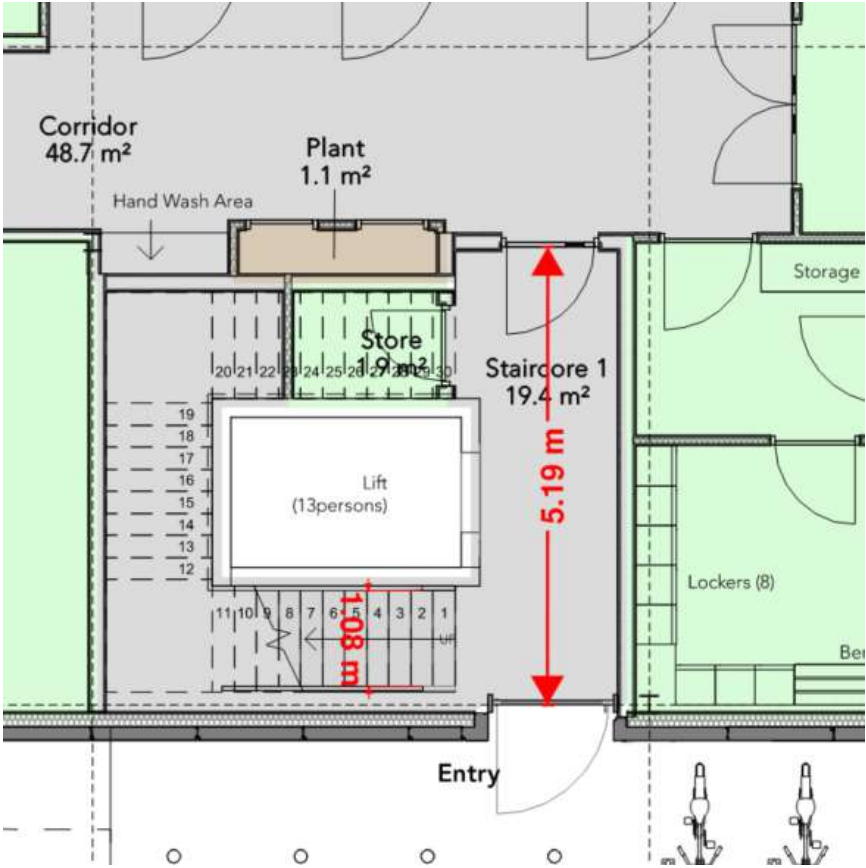


Figure 10 Stair 1 merging flow, D>2m

	$W_{FE} = NX + 0.75S_{up}$	Eq. 3
	Given the inputs of: X is the minimum door width per person N is the number of people served by the final exit level storey exit S_{up} is the stair width for the upward portion of the stair	
	$W_{FE} = 7 * 4.6 + 0.75 * 1000$ $= 782.2mm$	

The proposed final exit is measured to be 1210mm, although it is considered that the current width is compliant with regards to the merging flow scenario for stair 1, it should be at least as wide as any exits giving access to the stairs.

4.8 Exits

Doors on escape routes (whether or not the doors are fire doors) should either not be fitted with lock, latch or bolt fastenings, or be fitted only with simple fastenings that can be readily operated from the side approached by all people (including disabled and elderly) making an escape. The operation of these fastenings should be readily apparent and without the use of a key and without having to manipulate more than one mechanism.

On activation of the fire alarm all electronic locks on means of escape doors from the evacuation zone in alarm are to fail-safe open. All escape doors to be provided with an electronic lock are also to be provided with a green break glass.

4.9 Automatic and Revolving Doors

Automatic doors may obstruct the passage of persons and therefore should not be placed across escape routes unless they are the required width for means of escape and are provided with either of the following;

- Arranged to fail safely open with either detector activation or in event of a power failure; or
- Are provided with a monitored failsafe system for opening the doors if the mains supply fails; or
- Provided with a pass door next to the revolving or automatic door.

4.10 Roller Shutters (Storage Areas)

It has been noted that the ground floor storage area currently has only a roller shutter on the escape exits, which is not permissible for use as an escape door. Therefore, an additional fire exit is needed for each area.

4.11 Evacuation Lifts

Generally, lifts should not be used of evacuation case of emergency, unless it is designed to be used as an evacuation lift. Where installed, the evacuation lifts should be designed and installed in accordance with relevant provisions in BS EN 81-20 and BS EN 81-70.

The client needs to confirm whether the lift is designated as an evacuation lift or a passenger lift.

If the lift is designed and installed as a passenger lift only, then upon activation of the alarm the lift should return immediately to the final exit level and be taken out of action, unless the final exit level is the fire floor.

5. INTERNAL FIRE SPREAD (LININGS)

5.1 Functional Requirements B2

1. To inhibit the spread of fire within the building, the internal linings shall—

a. adequately resist the spread of flame over their surfaces; and

b. have, if ignited, either a rate of heat release or a rate of fire growth, which is reasonable in the circumstances.
2. In this paragraph “internal linings” means the materials or products used in lining any partition, wall, ceiling or other internal structure.

5.2 Internal Fire Spread (Linings)

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 linings may offer the main means by which fire spreads and where rapid spread is most likely to prevent occupants from escaping.

For the purposes of satisfying Requirement B2 of Schedule 1 to the Building Regulations 2010 (as amended) the internal wall and ceiling linings should adequately resist the spread of flame over the surfaces and have, if ignited, a rate of heat release/growth rate which is reasonable in the circumstances.

Therefore, the internal surface linings are to be in accordance with Table 11 throughout the building.

Table 11 Internal lining requirements

Location	British Standard Performance Class ^[1]	European Performance Class ^[2]
Non-residential rooms having an area not more than 30m ²	3	D-s3, d2
All other rooms	1	C-s3, d2
Circulation spaces within dwellings	1	C-s3, d2
Other circulation spaces	0	B-s3, d2

- Notes
1.

Relates to performance measures in BS476 Parts 6 & 7 criteria
2.

Relates to performance determined in accordance with BSEN13501-1:2018

The surface linings of the walls and ceilings should generally conform to the classifications outlined in Table 11. However, parts of walls in rooms may be of a lower class but not lower than Class 3 (national class) or Class D-s3, d2 (European class) provided that the total of those parts in any one room does not exceed 50% of the floor area of the room (subject to a maximum of 60m² in non-residential areas and 20m² in residential areas).

For the purposes of internal surface lining requirements, the following definitions should be noted:

Room	An enclosed space within a building that is not used solely as a circulation space. The term includes not only conventional rooms, but also cupboards that are not fittings and large spaces such as warehouses and auditoria. The term does not include voids such as ducts, ceiling voids and roof spaces;
Circulation space	A space (including a protected stairway) mainly used as a means of access between a room and an exit from the building or compartment.

Table 12 outlines the inclusions/exclusions regarding the definitions for walls and ceilings for the purposes of internal surface spread of flame requirements.

Table 12 Internal lining inclusions/exclusions

	Walls	Ceilings
Definition includes	• The surface of glazing (except glazing in doors) • Any part of a ceiling which slopes at an angle of more than 70o to the horizontal	• The surface of glazing • Any part of a wall which slopes at an angle of 70° or less to the horizontal • The underside of a mezzanine or gallery • The underside of a roof exposed to the room below
Definition excludes	• Doors and door frames • Window frames and frames in which glazing is fitted • Architraves, cover moulds, picture rails, skirtings and similar narrow members • Fireplace surrounds, mantle shelves and fitted furniture	• Trap doors and trap door frames • The frames of windows or rooflights and frames in which glazing is fitted • Architraves, cover moulds, picture rails, exposed beams and similar narrow members

6. INTERNAL FIRE SPREAD (STRUCTURE)

6.1 Functional Requirements B3

1.

The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period.
2.

A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those buildings.
3.

Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising either or both of the following;

a.

sub - division of the building with fire - resisting construction; and,

b.

installation of suitable automatic fire suppression systems.
4.

The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited.

6.2 Elements of Structure

For the purposes of the Fire Safety Strategy, the building height for elements of structure is measured from the upper floor surface of the top floor level to the lowest side of the building. Therefore, the building height, for the purposed of structural fire resistance, is considered to be 4.9m. As the building is proposed to be used by occupancy of risk profile A3 the most onerous risk profile has been applied throughout based on the design purpose of the development. Therefore, in accordance with Table 23 of BS 9999:2017, the element of structure throughout the building are to achieve at least 60 minutes fire resistance, with regard to load-bearing capacity.

The structure of the roof and the structure that supports only the roof need not to be fire rated unless the roof:

- Forms part of an escape route; or
- Function as a floor; or
- Is part of a portal frame structure where the roof and the supporting stanchions form a single element of structure; or
- Is integral to the stability of a fire-resisting external wall.

6.3 Compartmentation

The maximum compartment size based on the relevant risk profiles are outlined in Table 13.

Table 13 Maximum floor area on each floor of a compartment

Area	Risk Profile	Maximum Area on Any Floor ^[1]
Office / Meeting Room / Workshop / Rest Room	A2	No limit
Plant Room / Cooking Space / Storage / Prep Room / Cold & Freezer	A3	14000m ²

- Notes
1.

It should be noted that, in accordance with BS9999:2017, where compartment walls are provided to limit the floor area of the compartment on each floor

i)

these compartment walls need not be in one vertical plane; and

ii)

the floor connecting between non-aligning compartment walls need not be constructed as a compartment floor.

The floor area of each floor level is below the maximum permitted compartment size for the relevant risk profile.

6.3.1 Compartment Floors

Based on the following points, the building is not required to provide compartment flooring:

- The floor area of each floor level is below the maximum permitted compartment size for the relevant risk profile, as well as for the most onerous risk profile (A3); and
- The building is under one and the same ownership use.

6.4 Additional Fire Resistance Requirements

Fire resistance to achieve the required compartmentation and protection to escape routes is to be provided in accordance with BS9999:2017 as outlined in Table 14.

Table 14 Fire resistance requirements

Space		Minimum Fire Resistance ^[1] (minutes)			Method of Exposure
		Load-bearing Capacity (R)	Integrity (E)	Insulation (I)	
Structural Frames, Beams and Columns		60 ^[2]	-	-	Exposed faces
Load-bearing Wall Elements		60 ^[2]	-	-	Each side separately
Floors		60 ^[2]	60 ^[2]	60 ^[2]	From underside
Compartment Walls	Separating occupancies	N/A	N/A	N/A	Each side separately
	Any other type	60 ^[2]	60 ^[2]	60 ^[2]	Each side separately
Roofs	Any part forming part of an escape route	60	60	60	From underside
	Any part forming the function of a floor	60 ^[2]	60 ^[2]	60 ^[2]	From underside
External Walls	Any part within 1m of a relevant boundary	60 ^[2]	60 ^[2]	60 ^[2]	Each side separately
	Any part more than 1m from a relevant boundary ^[3]	60 ^[2]	60 ^[2]	15	From inside building
	Any part within 1.8m of an external escape route	60	60	-	From inside building
Protected Shafts	Between shaft and protected lobby or corridor	60	60	60	Each side separately
	Between shaft any other accommodation	60 ^[2]	60 ^[2]	60 ^[2]	Each side separately
Protected Lobbies and Corridors		30	30	30	Each side separately
Protected Stairways and Lift Shafts		30	30	30	Each side separately
Corridor Sub-Division		30	30	30	Each side separately
Ancillary Accommodation		^[4]	^[4]	^[4]	Each side separately

- Notes
- When tested in accordance with the relevant parts of BS476 or equivalent European standard
 - Equivalent to that required for elements of structure as defined in Section 6.2.
 - This does not apply to allowable unprotected openings calculated within 7.1.
 - Refer to Ancillary Accommodation Section 6.5

6.5 Ancillary Accommodation

In accordance to Clause 31.4 of BS 9999:2017, every ancillary accommodation should be required to be enclosed with fire resistance construction as per the Table 29 of BS 9999:2017. The requirements for the enclosure of each of the ancillary accommodation spaces is shown in Table 15.

Table 15 Ancillary accommodation fire resistance requirements

Space	Minimum Fire Resistance ^[1] (minutes)
External/Internal / plant room	60
Switch Room	60
Transformer	60
Comms Room	30
Low-voltage plant room	30
Storage areas	30
Cleaner/COSHH room	30
Changing room	30
Cooking space	30

- Notes
- When tested in accordance with the relevant parts of BS476 or equivalent European standard

6.6 Fire Doors

Fire doors are to be provided in all fire rated partitions noted in Section 6.4. The fire resistance requirements for the doors are outlined in Table 16.

Table 16 Fire door fire resistance requirements

Location		Minimum Fire Resistance ^[1] (minutes)
Compartment Wall	Enclosing a protected shaft forming a protected stair wholly or partly above ground level	FD30S
	Enclosing a protected shaft forming a protected stair below ground level	^[2]
	Enclosing a protected shaft forming a lift well or service shaft	^[3]
	All other compartment walls	^[3] ^[4]
Common Protected Lobby / Corridor		FD30S
Protected Stairway or Lift Shaft		FD30S
Corridor Sub-Division		FD30S
Ancillary Accommodation		^[5]

- Notes
- When tested in accordance with the relevant parts of BS476 or equivalent European standard
 - At least half the period of fire resistance required of the wall in which it is fitted but not less than FD30 and with a smoke seal (S)
 - At least half the period of fire resistance required of the wall in which it is fitted but not less than FD30
 - Smoke seal only required where compartment wall is utilised for progressive horizontal evacuation
 - As for the wall or floor in which it is fitted

A fire door that is required to resist the passage of smoke at ambient temperature conditions (i.e. with suffix ‘S’) should either:

- a. have a leakage rate not exceeding 3m³/h/m, when testing in accordance with BS476-31.1 with a threshold taped and subjected to a pressure of 25Pa; or
- b. meet the classification requirement of Sa when tested in accordance with BSEN1634-3.

Fire Strategy Drawings

Notional fire resistance (including fire doors) layouts are illustrated within the Fire Strategy Drawings in Appendix A.

6.7 Limitations on Non-Insulating Glazing

6.8 Ductwork

Where air handling ducts pass through compartmentation/fire-resisting construction, the integrity of these compartments should be maintained. There are four basic methods in order to prevent smoke and flame spread through the building/compartment. For more information see Clause 21 of BS 9991:2015. The requirements for each option are as follows:

Method 1 – Thermally actuated fire dampers

- Fire dampers that are thermally operated can be provided where ductwork penetrates through fire resisting construction.
- Fire dampers only actuated by fusible links are not suitable for protected escape routes or sleeping risk.

Note: Fire dampers should be tested to BS EN 15650:2010. They should have an E classification equal to or greater than 60 minutes.

Note: Method 1 is not suitable for ductwork serving kitchen extracts or sleeping risk.

Method 2 - Fire resisting enclosures

- The fire-resisting enclosures should achieve the same fire resistance as the wall the ductwork penetrates which forms a compartment known as a protected shaft. This allows a multiplicity of services to be transferred together with the duct to traverse a number of compartments within the building, without the need for further sub divisions. Fire dampers (thermally or actuated by an automated fire detector, AFD) will only be required where the ductwork enters or leaves the protected shaft.

Note: Method 2 can only be used on ductwork that passes through an escape route, providing the ductwork does not serve the escape route it passes through.

Method 3 - Protection using fire resisting ductwork

- The ductwork itself forms a protected shaft. The ductwork should achieve the same fire resistance as the wall the ductwork penetrates. The fire resistance can be achieved by the ductwork material itself, or through the application of a protective material.

Note: Method 3 can only be used on ductwork that passes through an escape route, providing the ductwork does not serve the escape route it passes through.

Note: the supporting hangers should be capable of supporting the ductwork for not less than the period of fire resistance of the ductwork.

Air transfer grilles should be in accordance with BS 9991:2015. Generally, air transfer grilles should not be installed in:

- Elements of construction enclosing compartments or protected shafts;
- Enclosures to protected stairways, protected lobbies, protected corridors, firefighting stairs or firefighting lobbies.

Method 4 – Automatically actuated fire and smoke dampers triggered by smoke detectors

- Method 4 may be used for extract ductwork passing through the enclosures of protected escape routes, both where the ductwork does and does not serve the escape route.

Note: Method 4 is not suitable for ductwork serving kitchen extracts.

Note: Fire and smoke dampers should be tested to BS EN 15650:2010. They should have an ES classification equal to, or greater than, 60 minutes.

Method 4 is the only appropriate method to use for duct work within the apartments where there is a sleeping risk.

6.9 Fire Stopping

If the fire separating element is to be successful, every joint or imperfection of fit, or opening to allow services to pass through the element, should be adequately protected by sealing or fire stopping so that the fire resistance of the element is not impaired. Fire stopping is to be provided at the following locations:

- Joints between fire-separating elements;
- In line with fire rated walls and floors where there is a penetration of the wall/floor in order to maintain the fire resistance integrity of the wall/floor;
- Between fire rated walls/floors (where the floor forms part of a fire rated enclosure of a compartment floor) and an external wall to ensure the fire resistance integrity of the wall/floor is maintained to the external wall.

Where fire stopping is provided, it is to achieve the same level of fire resistance as required for the wall/floor it replaces. For more information see Clause 32.6 from BS9999:2017.

6.10 Cavity Barriers

In accordance with BS9999:2017 cavity barriers are to be provided in the cavity of:

- an external wall at all cavity edges and around all openings in the external wall (i.e. windows);
- an external wall in line with a compartment floor where it meets the external wall;
- an external wall in line with a compartment wall where it meets the external wall;
- an internal cavity wall at the junction with a fire rated wall/floor (where the wall/floor forms part of a fire rated enclosure or a compartment wall/floor).

It should be noted that cavity barriers need not be provided within internal or external cavity walls where the following conditions are met:

- Cavity closers are provided around all edges and openings in the cavity wall (cavity closers need not achieve a specific performance in relation to fire resistance); and
- The cavity is enclosed within two leaves (one either side) of either concrete or masonry each at least 75mm thick.

Cavity barriers should also be provided in cavities to prevent the excessive spread of unseen fire and smoke. Cavity barriers are to be provided to ensure the maximum dimensions of undivided concealed spaces do not exceed the requirements outlined in Table 17.

Table 17 Maximum dimensions of concealed spaces

Location of Cavity	Class of Surface/Product Exposed in Cavity		Maximum Distance In Any Direction
	National Class ^[1]	European Class ^[2]	
Between Roof and Ceiling	Any	Any	20m
Any Other Cavity	Class 0 or Class 1	Class A1, Class A2, Class B or Class C	20m
	Any Other Class	Any Other Class	10m

- Notes
1. Relates to performance measures in BS476 Parts 6 & 7 criteria
 2. Relates to performance determined in accordance with BSEN13501-1:2018

Cavity barriers in a stud wall or partition, or provided around openings, may be formed of the following;

- Steel at least 0.5mm thick;
- Timber at least 38mm thick;
- Polyethylene sleeved mineral wool or mineral wool slab (both require to be under compression when used in cavity barrier construction); or
- Calcium silicate, cement based or gypsum plaster boards at least 12mm thick.

Where provided, cavity barriers are to achieve at least 30 minutes fire resistance for integrity and 15 minutes fire resistance for insulation. Refer to Clause 33.1 of BS9999:2017 for further information with regard to cavity barrier provisions, construction and fixing requirements.

6.11 Roof Coverings

The terms roof covering describes constructions which may consists of one of more layers of material but does not refer to the roof structure as a whole. The requirements refer to the covering with regards to the performance of the roof when exposed to fire from outside.

The performance of roof coverings is designated by reference to the test methods specified in BS 476-3:2004 or determined in accordance with BS EN 13501-5:2005. Construction is classified within the national system by 2 letters in the range A to D, with an AA designation considered the highest performance. The first letter indicates the time to penetration; the second letter measures the distance of surface spread of flame.

Construction classified under the European system is BROOF(t4) – FROOF(t4), with the prior representing the best performance. BS EN 13501-1 refers to four tests, with the suffix indicating Test 4 is to be applied for the purposes of Part B of the building regulations.

Limitations are also applicable to glass, wood shingles and plastic rooflights within recommendations provided under the relevant section of ADB.

The following roof classification is to be achieved based on the separation distance provided from the relevant boundary.

Table 18 Performance of Roof Coverings

Requirements for Roof Covering Performance					
Designation of covering of roof		Minimum distance from any point on relevant boundary			
National Class	European Class	Less than 6m	At least 6m	At least 12m	At least 20m
AA, AB or AC	B _{ROOF} (t4)	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE
BA, BB or BC	C _{ROOF} (t4)	-	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE
CA, CB or CC	D _{ROOF} (t4)	-	[1] [2]	[1]	ACCEPTABLE
AD, BD or CD	E _{ROOF} (t4)	-	[1] [2]	[1]	[1]

- Notes
- Not acceptable on any of the following buildings:
 - Houses in terraces of three or more buildings;
 - Industrial, storage or other non-residential purpose group buildings;
 - Any other building with a cubic capacity of more than 1500m³
 - Acceptable on buildings not listed in note 1, if part of the roof is no more than 3m² in area and is at least 1500mm from any similar part, with the roof between the parts covered with a material of limited combustibility.

Where the roof covering passes over a compartment wall, the roof covering should be situated on top of a deck of material of Class A2-s3, d2 or better, for at least 1500mm either side of the compartment wall. It should be noted that this requirement is not considered necessary where the roof achieves a fire resistance (from the underside) equivalent to that of the compartment wall (e.g. where the roof is a concrete slab).

6.12 Photovoltaic (PV) Panels

It has been noted in the GA plans that photovoltaic (PV) panels are proposed on the roof level of the main building. Therefore, the PV panels must comply with the specified requirements outlined below:

For UK projects, the design should be undertaken in accordance with the IET PV Code of Practice and MCS requirements. The definitions of “low voltage” in both BE EN 7671 and Regulatory Reform (Fire Safety) Order 2005 should be adhered to. If the design cannot be cannot be classified as ‘low voltage’, then additional fire protection mitigations shall be incorporated into the design. Examples of measures include:

- Isolation of the DC strings at the modules via a remote switch accessible at a ground level location;
- Use of module level power electronics that switch to ‘extra low voltage’ when the AC supply is disconnected.

Changing climatic conditions make exposed metallic framed PV systems vulnerable to lightning strikes. The IET PV Code of Practice outlines the requirements for lightning protection and should be followed and electrical compliance with BS EN 7671 is a core requirement.

PV installations should be installed on non-combustible roofs meeting Class A1 or A2 s1, d0 when classified to BS EN 13501-1. Additional fire protection measures will be needed if the roofing material is not PV arc resistant. Fires involving combustible roofs will spread quickly without the benefit of any protection installed within the building. The requirement for occasions requiring fire detection is outlined in section 5.3.9 and the IET PV Code of Practice.

PV arrays should not traverse fire barriers or fire walls, and all cabling should be sealed or contained in order to prevent the spread of fire across fire barriers. Components of PV systems often contain combustible materials. In order to effectively limit the spread of fire via components of PV systems, the following measures are necessary (CFPA-E Guideline No 37:2018 F):

- Components of PV systems with combustible elements, e.g., cables, are not allowed to be passed over a compartment/fire wall. If this cannot be avoided, they should be installed in fire-resistant cable ducts and shafts.
- On roofs, there should be a minimum distance of 2.5 m between the PV modules on each side of the compartment/fire walls. A reduced distance is permitted if the potential for a fire to spread across a compartment boundary is considered low.

For PV installations where the potential for a fire to spread across a compartment boundary is considered low, a minimum 1.2 m separation between the PV modules on each side of the compartment/fire wall is recommended. It is recommended PV panels are excluded from the zone directly above the protected escape corridor and within 1.2m from every side.

Cable routes and containment should be given careful consideration and mitigation measures put in place to manage DC cable routes within the building that could pose a risk to firefighters in the event of a fire including the DC cable in the areas where PV modules are located, and both external and internal cable routes.

Where possible, the internal DC cable route length should be minimal and where the cables are within occupiable areas, there should be appropriate mechanical protection (e.g., covered cable tray to protect firefighters and other occupants where the PV cables may still be live).

All installation work should be in accordance with the requirements of MCS and the IET PV Code of Practice and documents referenced therein (or equivalent if non-UK) and installation teams should hold the prerequisite competence and experience.

6.12.1 Operation And Maintenance

At the commissioning stage, the nominated operator of the system should have the function and control of the system explained to them by the installer. Full details of the system and its operation should be handed over in an appropriate format, to include:

- the objectives of regular visual inspections
- the nature of damage that might be seen following a gale or thunderstorm
- the cleaning and day-to-day maintenance of the system
- the need for vigilance to identify damage to cable insulation and overheating of
- components; and
- the requirement for regular scheduled maintenance.

Maintenance requirements vary significantly in scale, depending on the size of the system. However, the fundamental principles are the same for all PV systems and current knowledge of the operational status of each system is key, both from an energy generation perspective and in terms of the general condition of the system. If a system is not working correctly due to a potential malfunction, there are likely to be consequent failure risks that could result in fire.

Solar Energy UK have produced an O&M document, Industry best practice manual 2.0: Guidelines for the operation and maintenance of rooftop solar photovoltaic systems providing a comprehensive guide to best practice in terms of maintenance in the context of rooftop systems. It also recommends inspection of commercial systems at least annually by a competent person.

Rodents, squirrels, and nesting birds can all cause harm and alter the fire safety properties of a PV system. Consideration should be given to the potential impact, and suitable mitigation measures put in place.

Vegetation growth can enter electrical equipment and cover PV modules in a relatively short space of time. Regular inspection and reactive vegetation clearance are essential. Bird droppings and other debris may also cause hotspots which may lead to faults and subsequently fire. Regular cleaning programmes are required by specialist cleaning contractors.

After a storm or extreme weather event, PV systems should be inspected for damage.

If there has been a fire the corrective measures from IEC TR 63226:2021 should be carried out immediately. The first step is to turn off the system at all isolation points and establish exclusion zones around uncontrolled parts of the PV installation, as parts of the system may remain vulnerable to reignition by short-circuits or arcs of an array.

6.12.2 Provisions For the Fire and Rescue Service

Arrangements should be made to provide prompt access to the site on the arrival of the Fire and Rescue Service. Firefighters should be met by security personnel or other designated members of staff, who should have the gates or barriers open awaiting their arrival.

Externally, a clear route should be maintained to allow high reach vehicles and pumping appliances to gain suitable access to all buildings with roof mounted PV installations. Suitable turning places should also be available.

Information should be provided for the Fire and Rescue Service at a prominent location, such as the PV installation site entrance, or at a reception/gatehouse, to include:

- the layout of the site, including plans of large buildings, showing the locations of the PV panels and control equipment;
- the location of isolation switches for PV panels;
- the location of the main electrical intake(s) and consumer units;
- the location of the indicator panel for the automatic fire detection and alarm installation;
- details of any automatic fire suppression system(s) and the location of their controls or valves;
- details of ventilation systems;
- the nature and location of any hazardous substances on the premises;
- contact details for staff who may need to be consulted; and

- the location of hydrants, rising mains, and other sources of water on site or nearby, for firefighting purposes.

The presence of a PV system on a building is not always obvious from ground level, thus a sign that indicates the presence of a PV system on a building or structure should be prominently displayed for the information of the fire and rescue service. The sign, measuring at least 100mm x 100mm shown in Figure 11, should be displayed at the consumer units or supplier's cut-out.

Where mandated for compliance within BS EN 7671, or due to particular client/insurance requirements for commercial PV installations, a switch (or switches) should be provided in a prominent position readily accessible to firefighters to remotely isolate the DC side of the PV system. Such 'fire service switches' help to ensure the safety of firefighting personnel. Operation of the switch should as a minimum make the DC side of the wiring inside the building voltage-free. The switch should be tested during routine maintenance, with the results recorded. These switches should be placed in safe locations remote from the PV panel arrays and are additional to operational AC and DC isolation switches.

Fire personnel should disconnect PV installations from the mains electricity at the intake to render the AC side of the installation voltage-free, and operate the 'fire service switch' if installed.

Fire and Rescue Service personnel should be aware that PV panels produce a DC voltage from daylight and other light sources, including any floodlights used to illuminate the fire ground, even if the AC side of the circuit is isolated from the mains electrical supply. This continuing production of DC voltage may have to be addressed in the risk assessment undertaken before firefighting commences. In many existing installations, a DC disconnect for the DC cables on the roof is not provided.

- It should be noted that, the above comments are recommendations from Hydrock as a best practice, to be followed while installing PV panels on the roof as no specific guidance is available on fire safety PV panel installation in a non-residential building.

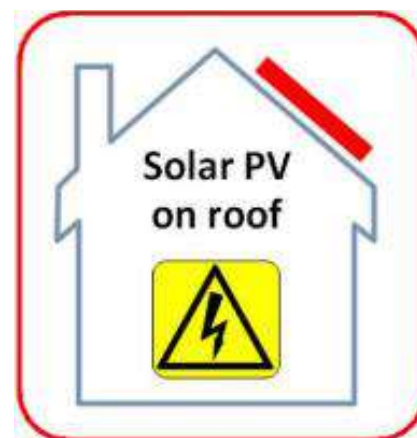


Figure 11 sign indicating the presence of a PV panel installation

7. EXTERNAL FIRE SPREAD

7.1 Functional Requirement B4

1. *The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.*
2. *The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.*

7.1.1 Fire Spread to Adjacent Properties

In order to prevent fire spread between properties it should be ensured sufficient separation distance is provided between fire compartments within the building and the relevant boundaries based on the extent of unprotected area to the fire compartments. External fire spread analysis has been conducted based on the enclosing rectangle method as described in BR187:2014.

7.1.2 Enclosing Rectangle Method

The enclosing rectangle method considers each fire compartment within the building separately. The methodology for this analysis is summarised as follows:

- A plane of reference is defined which ‘touches’ the elevation under consideration at least once but does not pass through it;
- A rectangle is constructed enclosing all unprotected areas on the elevation. The dimensions of this rectangle are then rounded up to the nearest dimensions defined in the tables of BR187:2014;
- The unprotected area on the elevation projecting on to the plane of reference is taken as a percentage of the area of the ‘enclosing rectangle’;
- The tables in BR187:2014 are then used to determine the required minimum distance between the plane of reference and the relevant boundary based on the dimensions of the enclosing rectangle and the percentage of unprotected area;
- The methodology of the enclosing rectangle analysis may also be carried out in ‘reverse’ based on a known boundary distance to determine the maximum percentage unprotected area on the elevation.

7.1.3 Enclosing Rectangle Analysis Assumptions

External fire spread analysis in accordance with BR187:2014 is based on the following assumptions:

- All parts on the elevation to the fire compartment are considered ‘unprotected’ except the following:

- All parts of the elevation that meet the fire resistance requirements for elements of structure with regard to integrity (i.e. 60 minutes) and 15 minutes for insulation;
- Small unprotected areas (less than 1m²) and groups of unprotected areas (within an area not exceeding 1m²) that are separated from all other unprotected areas on the compartment elevation by at least 4m (reduced to 1.5m where one of the unprotected areas does not exceed 0.1m²);
- Unprotected areas to protected shaft that is enclosed within at least 60-minute fire rated construction;
- The relevant boundary distance is taken from the plane of reference to the adjacent site boundary except where the adjacent boundary is to a public roadway or river etc. In the case the adjacent boundary is a public roadway or river the relevant boundary distance may be taken to the middle of the road or river etc;
- Analysis for each fire compartment is to be conducted based on the relevant occupancy characteristic of the compartment (i.e. industrial premises, storage area or offices, etc.);
- The analysis will consider the ‘worst-case’ scenario for each elevation (i.e. compartment with greatest extent of unprotected area closest to the relevant boundary). Providing the analysis for the worst case demonstrates compliance it is considered acceptable to assume all other compartments on the elevation are also acceptable with regard to external fire spread.

7.1.4 External Fire Spread Analysis

Relevant Boundary Distances

The maximum relevant boundary distances from each elevation/analysis are illustrated on the site plan in Figure 12. For the North and South elevations, the relevant boundary is taken to be the site boundary (highlighted by the red line). For the East and West elevations, the relevant boundary is taken to the mid-point of the road (highlighted by the blue line).

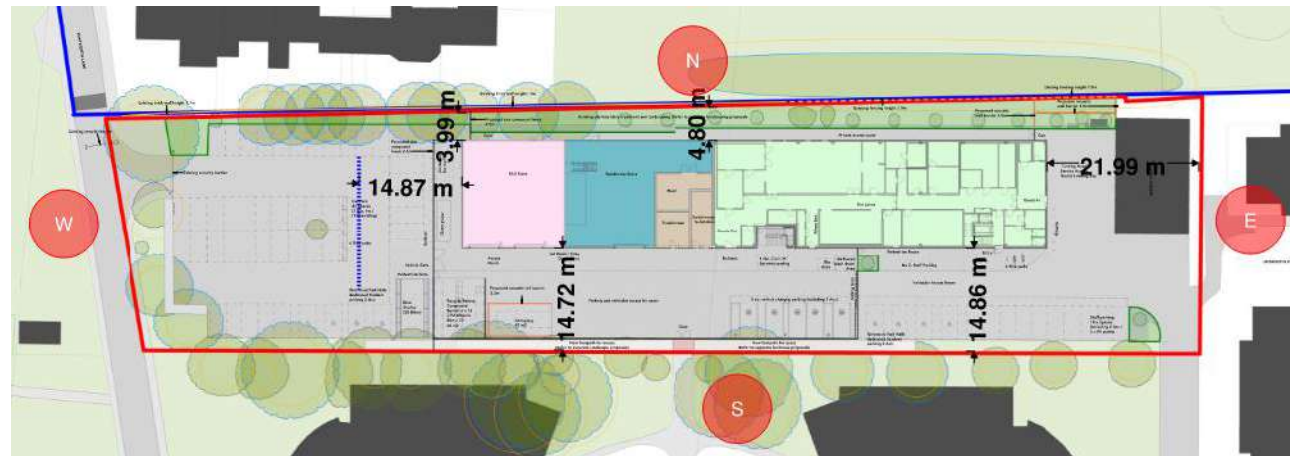


Figure 12 Maximum relevant boundary distances

Enclosing Rectangles

North Elevation

The 'worst-case' compartment on this elevation is considered to be north-most elevation, based on the extent of the unprotected area and proximity to the relevant boundary. The extent of unprotected area is illustrated in Figure 13.

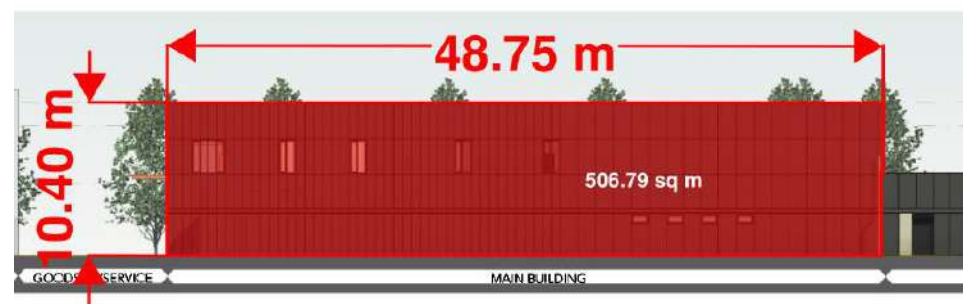


Figure 13 North elevation analysis

The plane of reference for this analysis is taken parallel to the elevation. The unprotected area of the compartment elevation is approximately 506.79m² within an enclosing rectangle of 12m (10.40m) high x 50m (48.75m) wide (total enclosing 600m²). Therefore, the percentage of unprotected area within the enclosing rectangle is 84.5%, resulting a maximum required boundary distance of 20.7m. The actual distance from the plane reference to the adjacent relevant boundary (i.e., site boundary) is 4.80m. Therefore, elevation is considered not acceptable with regard to external fire spread and 312.57m² of the north elevation is required to be protected by a least 60mins fire resistance from inside to outside to enhance fire resistance of the build-up of the external wall system.

It has been confirmed by the Buttress via email on 12.08.2024 (Document reference: 372/19-530-9) that the material test data sheet for the external wall verifies it achieves a 120EI fire resistance rating. Consequently, the external fire spread is considered acceptable.

East Elevation

The 'worst-case' compartment on this elevation is considered to be east-most elevation, based on the extent of the unprotected area and proximity to the relevant boundary. The extent of unprotected area is illustrated in Figure 14.

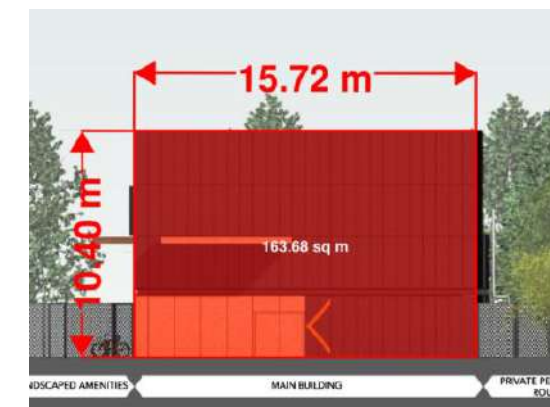


Figure 14 East elevation analysis

The plane of reference for this analysis is taken parallel to the elevation. The unprotected area of the compartment elevation is approximately 163.68m² within an enclosing rectangle of 12m (10.40m) high x 18m (15.72m) wide (total enclosing 216m²). Therefore, the percentage of unprotected area within the enclosing rectangle is 76%, resulting a maximum required boundary distance of 12.6m. The actual distance from the plane reference to the adjacent relevant boundary (i.e., site boundary) is 21.99m. Therefore, elevation is considered acceptable with regard to external fire spread.

West Elevation

The 'worst-case' compartment on this elevation is considered to be west-most elevation, based on the extent of the unprotected area and proximity to the relevant boundary. The extent of unprotected area is illustrated in Figure 15.

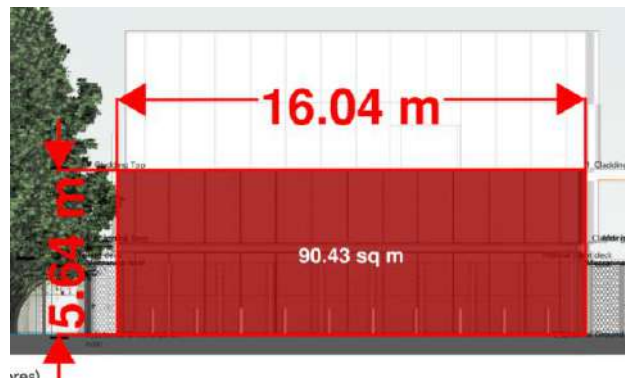


Figure 15 West elevation analysis

The plane of reference for this analysis is taken parallel to the elevation. The unprotected area of the compartment elevation is approximately 90.43m² within an enclosing rectangle of 6m (5.64m) high x 18m (16.21m) wide (total enclosing 108m²). Therefore, the percentage of unprotected area within the enclosing rectangle is 84%, resulting a maximum required boundary distance of 9.2m. The actual distance from the plane reference to the adjacent relevant boundary (i.e., national boundary between mid-point of the road) is 14.87m. Therefore, elevation is considered acceptable with regard to external fire spread.

South Elevation (Main Building)

The ‘worst-case’ compartment on this elevation is considered to be south-most elevation, based on the extent of the unprotected area and proximity to the relevant boundary. The extent of unprotected area is illustrated Figure 16.

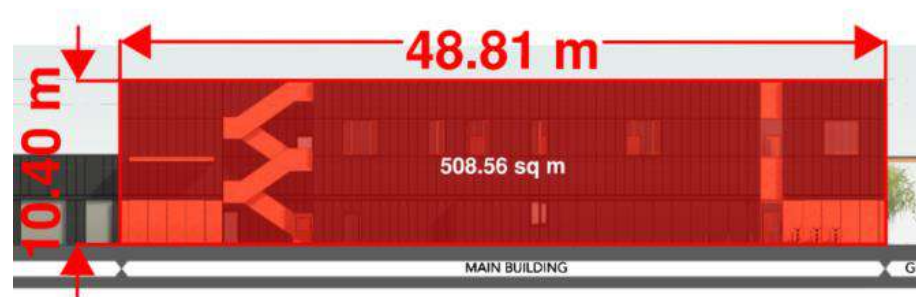


Figure 16 South elevation analysis

The plane of reference for this analysis is taken parallel to the elevation. The unprotected area of the compartment elevation is approximately 508.56m² within an enclosing rectangle of 12m (10.40m) high x 50m (48.81m) wide (total enclosing 600m²). Therefore, the percentage of unprotected area within the enclosing rectangle is 85%, resulting a maximum required boundary distance of 20.71m. The actual distance from the plane reference to the adjacent relevant boundary (i.e., site boundary) is 14.86m. Therefore, elevation is considered not acceptable with regard to external fire spread, and external wall system is required to obtain

fire resistance and 212.5m² of the south elevation is required to be protected by at least 60 minutes fire resistance from inside to outside to enhance fire resistance of the build-up of the external wall system.

North Elevation (Stores)

The ‘worst-case’ compartment on this elevation is considered to be north-most elevation (stores), based on the extent of the unprotected area and proximity to the relevant boundary. The extent of unprotected area is illustrated Figure 17.



Figure 17 North elevation analysis (stores)

The plane of reference for this analysis is taken parallel to the elevation. The unprotected area of the compartment elevation is approximately 207.14m² within an enclosing rectangle of 6m (5.69m) high x 40m (36.45m) wide (total enclosing 240m²). Therefore, the percentage of unprotected area within the enclosing rectangle is 86.3%, resulting a maximum required boundary distance of 12.6m. The actual distance from the plane reference to the adjacent relevant boundary (i.e., site boundary) is 3.99m. Therefore, elevation is considered not acceptable with regard to external fire spread, and external wall system is required to obtain fire resistance and 153.3m² of the north (stores) elevation is required to be protected by at least 60 minutes fire resistance from inside to outside to enhance fire resistance of the build-up of the external wall system.

South Elevation (Stores)

The ‘worst-case’ compartment on this elevation is considered to be north-most elevation (stores), based on the extent of the unprotected area and proximity to the relevant boundary. The extent of unprotected area is illustrated Figure 18.



Figure 18 South elevation analysis (stores)

The plane of reference for this analysis is taken parallel to the elevation. The unprotected area of the compartment elevation is approximately 207.38m² within an enclosing rectangle of 6m (5.69m) high x 40m (36.35m) wide (total enclosing 240m²). Therefore, the percentage of unprotected area within the enclosing rectangle is 86.4%, resulting a maximum required boundary distance of 12.6m. The actual distance from the plane reference to the adjacent relevant boundary (i.e., site boundary) is 14.72m. Therefore, elevation is considered acceptable with regard to external fire spread.

7.2 Re-Entrant Corners

The building design should prevent fire spread from occurring around walls/floors required to be fire rated via an external corner in the façade (i.e. re-entrant corners). Therefore, where the internal angle of a corner in the façade is less than 135°, unprotected areas to areas of separate sides of a fire rated wall/floor are to be separated by at least 1800mm as illustrated in Figure 19.

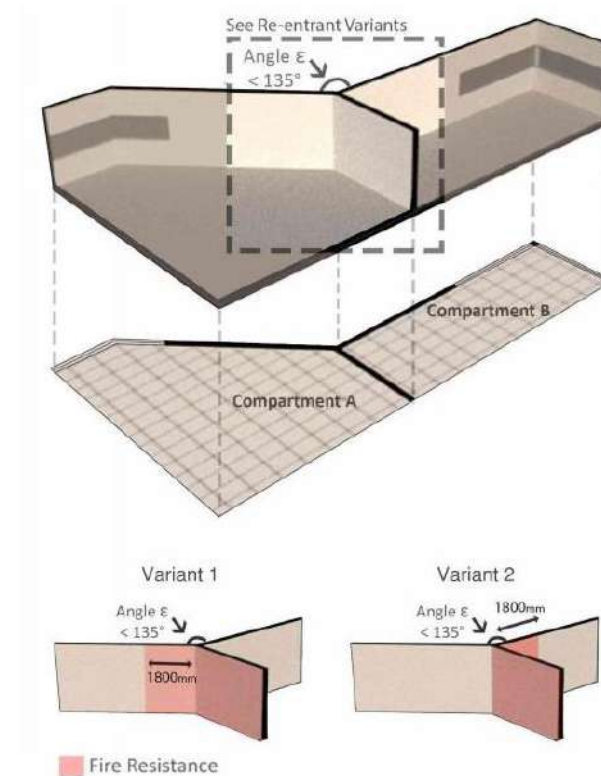


Figure 19 Re-entrant corner requirements

7.3 Building Façade

External walls should be constructed using a material that does not support fire spread and therefore endanger people in or around the building. 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 wall. It should also be ensured external walls close to relevant boundaries are not readily ignitable to avoid fire spread between buildings.

In accordance with BS9999:2017 external walls should either meet the performance criteria of BR135 when testing accordance with BS8414-1 or BS8414-2 or should meet the following requirements:

- Where the external wall is within 1m of a relevant boundary the external surface is to achieve the following requirement:
 - Class B-s3, d2 or better (European class). Profiled or flat steel sheet at least 0.5mm thick with an organic coating of no more than 0.2mm thickness is also acceptable;
 - Where a part of the building is considered risk profile A2 and A3 all external wall surface up to 10m above ground level and up to 10m above a roof any part of the building to which the public have access to are to achieve the following requirement:

- Class B-s3, d2 or better (European class). Profiled or flat steel at least 0.5mm thick with an organic coating of no more than 0.2m thickness is also acceptable;
- Cavity barriers are to be provided as outlined in Section 6.10.

Hydrock recommendation Class A2-s1, d0 (European class) or better [i.e., non-combustible materials] materials in the external wall construction of the proposed building to further restrict the spread of flame via the façade to provide an enhanced level of life safety. This enhancement would not only provide benefit with regard to occupant life safety but may also provide property and building insurance premium reductions.

8. FACILITIES FOR FIREFIGHTING

8.1 Functional Requirements B5

1. The building shall be designed and constructed so as to provide reasonable facilities to assist firefighters in the protection of life.
2. Reasonable provision shall be made within the site of the building to enable fire appliances to gain access to the building.

8.1.1 General

The following section describes the arrangements for firefighting provisions in the event of a fire in order to comply with B5 of Schedule 1 to the Building Regulations 2010 (as amended).

8.2 Fire Service Access

The fire service has vehicle access to the building via Whitworth Lane and Chancellors way, as indicatively shown Figure 20.

In line with Table 17 of BS 9999:2017, the building is not required to be provided with a firefighting shaft, on the basis that the building height is less than 7.5m. However, it is required that the fire service are afforded with adequate vehicle access relative to the building height and total floor area – please see section 8.3.



Figure 20 Fire vehicle access

8.3 Vehicle Access

In accordance with Clause 21.2 of BS 9999:2017, vehicle access should be provided to within 45m of every point on the projected plan area (or 'footprint') of the building, or to 15% of the perimeter, whichever is less onerous. Following conditions shall be met for the perimeter access;

- Every elevation to which vehicle access is provided should have a suitable door (s) not less than 750mm wide giving access to the interior of the building. All parts of the perimeter should be within 18m of a fire appliance parking position.
- Doors should be provided such that there is no more than 60m between each door and/or the end of that elevation.

As shown in Figure 21 it is considered that building provides adequate perimeter access (available perimeter access is 56% (116m)).

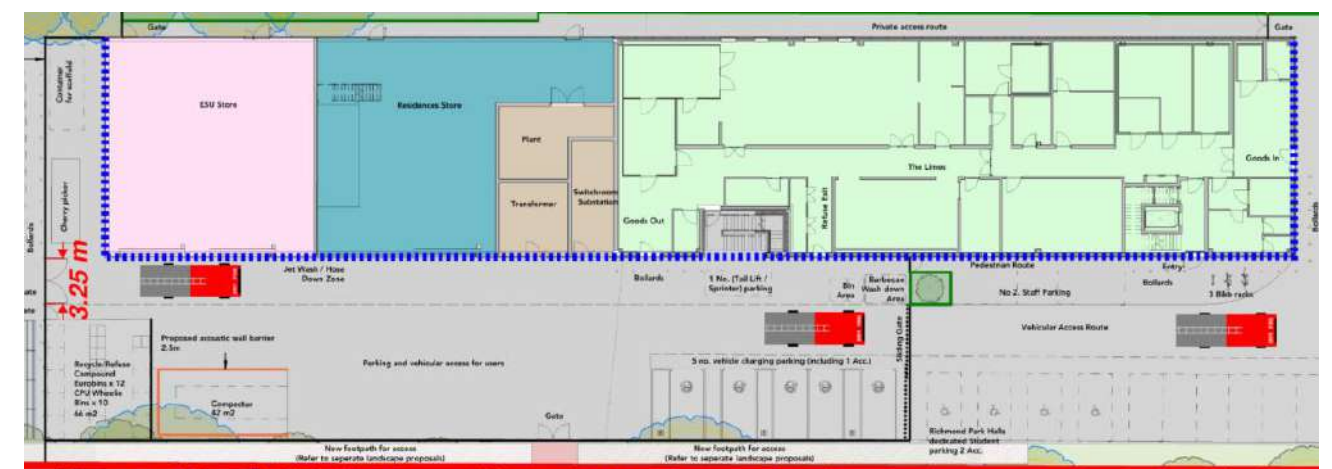


Figure 21 Fire service vehicle access

8.3.1 Fire Appliance Access Specification

Access for a fire appliance is required to meet the requirement outlined in Table 20.

Table 19 Typical access route specifications for Fire Service vehicles

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
High reach	3.7	3.1	26.0	29.0	4.0	17

- Notes:
- Recommendations of BS9999:2017 are based on standardised vehicle sizes
 - Fire appliances are not standardised. The building control body may, in consultation with the local fire and rescue service, use other dimensions.
 - The road base can be designed to 12.5 tonne capacity. Structures such as bridges should have the full 17-tonne capacity. The weight of high reach appliances is distributed over a number of axles, so infrequent use of a route designed to accommodate 12.5 tonnes should not cause damage.

Where the length of a dead-end fire tender accessible roadway exceeds 20m, the route should be provided with turning facilities (i.e. a turning circle or hammerhead). Since the dead-end scenario is less than 20m threshold, there is no requirement for a turning circle or hammerhead as shown in Figure 22.



Figure 22 Dead-end access

8.4 Fire Hydrants

It is to be ensured that fire hydrants (new or existing) are provided within 90m of an entry point to the building. Additional fire hydrants may be required if both of the following apply:

- It has a compartment with an area more than 280m²;
- It is being erected more than 100m from an existing fire hydrant.

Any new fire hydrants to be provided on the site are to designed and installed in accordance with BS 9990:2015.

An existing hydrant site plan/topographical survey plan should be provided in order to confirm compliance with the above, or to confirm requirements for additional hydrants.

9. FIRE PROTECTION SYSTEMS

This section describes the fire protection systems to be provided with the development in order to ensure the safety of occupants and Fire Service personnel in the event of a fire.

9.1 Emergency Lighting

Emergency lighting will be installed to provide temporary illumination in the event of failure of the primary power supplies to the normal lighting system. As part of the emergency lighting system, escape lighting will be provided to ensure the escape routes are illuminated at all material times. Adequate artificial lighting will be provided in all common escape routes and will be of a sufficient standard to enable persons to escape.

Emergency lighting will be installed in accordance with the recommendations of BS 5266 (parts 1-2 and 4-6), BS EN 1838, and BS EN 60598-2-22.

Emergency lighting will illuminate all occupied areas, common evacuation routes (internal and external as necessary) and essential areas including plant areas. It will also illuminate a safe exit route including fire exits, fire alarm call points, changes in level or direction and firefighting equipment.

Emergency lighting will be provided with 3-hour integral batteries.

Primary and emergency lighting will be required for any external escape routes that will not be lit by surrounding street lighting.

9.2 Smoke Ventilation

9.2.1 Protected Stairs

It is not required to provide any smoke ventilation system to protected stairs or corridors in the building in order to meet the minimum requirements of BS 9999:2017.

9.3 Emergency Power Supplies

Alternative supplies to critical life safety plant should be provided from a separate life safety supply. The services connected to the life safety system will include, but are not limited to, the following:

- Emergency lighting
- Evacuation lift
- Emergency voice communication systems
- Fire and smoke dampers,

9.4 Signage

Fire safety signs will be installed where necessary to provide clear identification of fire precautions, fire equipment and means of escape in the event of fire. All parts of the development will be fitted with appropriate fire safety signage to comply with The Health and Safety (Signs and Signals) Regulations 1996 i.e. signage to be specified in accordance with BS 5499-4, BS 5499-10 and BS ISO 3864-1.

The purpose of fire signs is to direct persons towards fire exits, or to provide specific information or warning about particular equipment, doors, rooms, or procedures. They should be recognisable, readable and informative, as they convey essential information to regular and infrequent users of the premises, and the Fire and Rescue Service.

Escape signage consists of and should meet the following:

- Clearly and easily understood;
- Must include a pictogram;
- Text may be used alongside a pictogram;
- Signs above doors or open spaces should be mounted between 2m and 2.5m from floor level (allowing the sign to remain readily seen);
- Signs mounted on walls should be mounted between 1.7m and 2.0m from floor level.

Refuges should be clearly identified by appropriate fire safety signs. Where a refuge is in a lobby or stairway the sign should be accompanied by a blue mandatory sign worded “Refuge -keep clear “.

Consideration should be given to install the dynamic signages, as it would be a conservative approach.

9.5 Electric Vehicles

The site plan indicates that a row of five electric vehicle (EV) charging stations is proposed to be installed in the parking spaces near the site boundary along the south elevation. The EV parking is open to the air, with a distance of 13.35m between the south elevation and the site boundary. Based on the external fire spread analysis, as detailed in Section 7.1.4, this distance is considered reasonable.

The fire safety recommendations for EV charging outlined in the document RC59 version 2:2023 should be adopted as best practices for electric vehicle charging.

The client needs to confirm whether the bike racks accommodate e-bikes/scooters within the premises.

10. PROVISIONS FOR DISABLED OCCUPANTS

The Equality Act became law in October 2010. It replaced previous legislation (Disability Discrimination Act 1995) and provides employers and employees information on what they need to do to make their workplaces a fair environment and comply with the law.

With regard to fire safety, it is generally assumed that disabled occupants will be able to escape to a place away from danger without assistance from the Fire Service. However, there will be a certain proportion of building occupants, such as those who are non-ambulant disabled, i.e. wheelchair users, who will not be able to negotiate stairs unaided; therefore, an evacuation management procedure for disabled occupants will need to be incorporated into the Fire Safety Management Strategy. This is the responsibility of the end user of the building or 'The Responsible Person'.

Fire safety procedures will therefore, where appropriate, make provision for occupants who might need assistance to make their way to a place of ultimate safety in a fire. If there is a need to make specific arrangements, then it is assumed that consultation with the individual(s) or representative organisations should take place at the earliest opportunity.

10.1 Disabled Refuge Areas

In line with Clause G.1 of BS 9999:2017, disabled refuge areas should be provided to each protected stair at each storey served by the stair, and should be of sufficient size to accommodate a wheelchair and to allow the user to manoeuvre into the wheelchair space without undue difficulty.

A disabled refuge should be a place of relative safety in a protected space of the building. It should be protected from a fire for a period of time sufficient to enable the evacuation sequence to be completed without placing the person(s) needing assistance, or those rendering that assistance, at unacceptable risk from a fire within the premises. Refuge should only ever be treated as temporary waiting areas, where disabled people can wait until they can complete their evacuation to a place of ultimate safety. Refuges should not be used as a place to leave disabled people to await rescue by the fire and rescue service.

A refuge should be of sufficient size both to accommodate a wheelchair and to allow the user to manoeuvre into the wheelchair space without undue difficulty. To accommodate the wide variety of wheelchairs in use, including powered wheelchairs, the space provided for a wheelchair in a refuge should not be less than 900mm x 1400mm. To enable wheelchair users to manoeuvre themselves into the refuge, the door width should have a clear opening of not less than 850mm, and the corridor width should be in accordance with Clause 16.6.2 of BS9999:2017.

If disabled members of staff that may not be able to evacuate via the stairways are expected to work in the projection corridor, it is recommended that a disabled refuge be installed on the projection level.

It has been noted in the GA plans that the refuge area for Stair 2 is currently situated in a shared corridor next to the external plant area.

It is recommended to reconfigure the refuge area of stair 2 on the first floor, ensuring it is located within the protected stairwell and does not impede the evacuation of mobile occupants or a protected lobby should be installed to prevent the ingress of smoke into the refuge area in the event of a fire breaking out in the first-floor office or plant room.

10.2 Two-Way Communication

Disabled refuge areas are to be provided with a two-way emergency voice communication (EVC) system linked to building management. The emergency voice communication systems are to be designed, installed and commissioned in accordance with BS5839-9:2011. They will be provided such that they are readily operated by, and comprehensible to, all persons likely to need to use them.

10.3 Personal Emergency Evacuation Plans (PEEPs)

Wherever possible, personal emergency evacuation plans (PEEPs) should be produced for all people requiring assistance to leave the building. Through the recording of PEEP, the management team should be made aware of the amount of staff support required for each evacuation.

If a PEEP is produced, it should be one of the following three types:

- **Individual PEEP for disabled people who are regularly in the premises, for example staff and regular visitors.** Following discussions 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. They are also able to make provision for actions to be taken in the event of a false alarm, or if the person cannot return to the building after a fire;
- **PEEPs for visitors 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 available, 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 PEEP 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. fire alarms adapted for people who are Deaf or hard of hearing. The generic PEEP 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, including situations where features such as carry-down procedures are to be adopted to evacuate mobility-impaired people

11. FIRE SAFETY MANAGEMENT

11.1 Management Level

There is to be appropriate fire safety management for the premises when in use. In accordance with BS9999:2017 The Limes is to be provided with at least Level 2 management provisions

11.2 Management Requirements

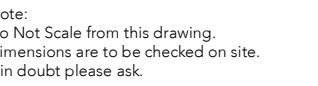
The Fire Safety Manager (or person nominated to monitor and control management of fire safety) should define the fire risk management system and method of implementing the overarching policy within a ‘Fire Risk Management Strategy’.

The ‘Fire Risk Management Strategy’ is to consider at least the principal factors listed in Table 20.

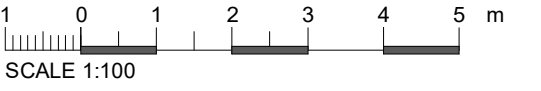
Table 20 Principal factors for consideration within Fire Safety Management Strategy

Principal Factor	Overview
Fire Risk Assessments	A pre-occupation fire risk assessment should be undertaken to ensure a smooth transition from the design and construction phase to the operation phase of the premise. Fire risk assessments should be undertaken (reviewed regularly and kept up-to-date) whilst the building is occupied.
Resourcing and Authority	Those with fire safety responsibilities should be empowered and able to command sufficient resources to maintain the system.
Fire Safety Training	Sufficient numbers of staff should be trained in fire prevention, fire protection and evacuation procedures, and be able to use the appropriate extinguishing equipment (and media), so as to provide full coverage of the building, with provision for contingencies, sickness or holiday absences.
Control of Work Onsite	A work control system should include clear lines of responsibility communicated to contractors; a permit system which takes into account the risks to relevant persons; logging and work control audit processes; and routine checking and supervision.
Maintenance and Testing	Processes should be determined for maintenance and testing of fire safety systems including an accurate record of fire precautions, and procedures for operating and maintaining any fire protection measures within the building
Communications	Adequate internal and external communications procedures should be in place to ensure all persons involved in the management of risk provided with relevant information in an effective and timely manner.
Emergency Planning	Procedures for identifying and responding to unplanned events, potential emergencies or disasters. Where fire is concerned, liaison with the fire and rescue service should include: emergency shut-down of equipment, effective arrangements for notifying the fire and rescue service of changes to the occupancy, periods of abnormal occupancy, fire growth characteristics, and other relevant factors

APPENDIX A – FIRE STRATEGY DRAWINGS



All information is based on external survey information (2D and 3D). Heights have been provided through external 3D survey models and plans have been based on 2D external survey information. Further information required in terms of existing and extent of retained car parking spaces, bike shelter trees, planters, gas governor/meter enclosure TBC. Extent of red line boundary may need to be adjusted to suit proposed road access, turning heads and radius.



As per the Section 16.3.11.3 of BS 9999:2017, where the corridor exceeds more storey exits it should be subdivided by a self-closing door (and associated screens) positioned approximately mid-way between the storey exits.

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Drawing Title	
Fire Strategy Mark-ups Ground Floor - Main Building	
Project Title	
The Limes Relocation	
Project Number	
33445	
Scale @ A#	Date
1:100	24/10/24
Drawn	Checked
HV	SJ
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	01

P01	18.10.24	PLANNING
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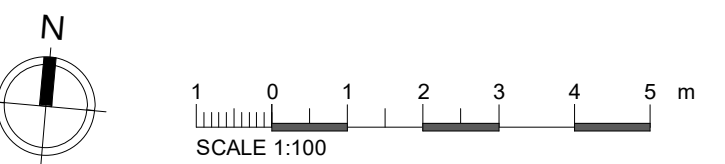
Project Title	The Limes Relocation
Client	Rider Levett Bucknall
Location	Fallowfield Campus, Manchester

Drawing ref Proposed Ground Floor Plan (Main Building)

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Checker	MB	Size	A1
Job No:	9774	Status	S4 Suitable for Stage Approval

Project Origin Volume Level Type Role Number Rev

NOTE:
All information is based on external survey information (2D and 3D). Heights have been provided through external 3D survey models and plans have been based on 2D external survey information. Further information required in terms of existing and extent of retained car parking spaces, bike shelter trees, planters, gas governor/meter enclosure TBC. Extent of red line boundary may need to be adjusted to suit proposed road access, turning heads and radius.
Refer to Turleys for landscape details.



- Legend:**
- FD30s fire door
 - FD60s fire door
 - FD30 fire door
 - 30 minute fire rated construction
 - 60 minute fire rated construction
 - Total travel distance

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Drawing Title		
Fire Strategy Mark-ups First Floor - Main Building		
Project Title		
The Limes Relocation		
Project Number		
33445		
Scale @ A#	Date	
1:100	24/10/24	
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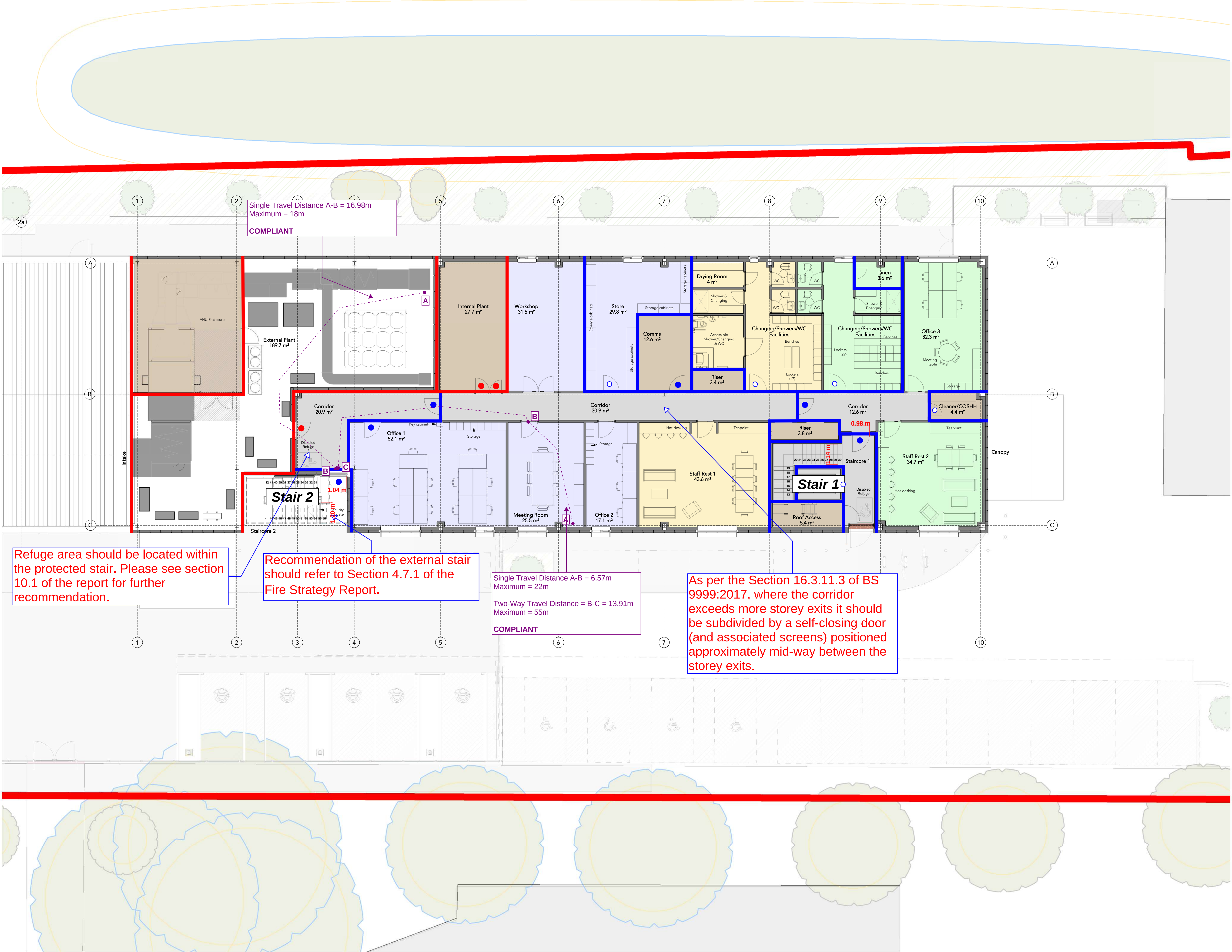
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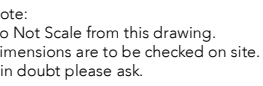
Project Title	The Limes Relocation
Client	Rider Levett Bucknall
Location	Fallowfield Campus, Manchester

Drawing ref Proposed First Floor Plan (Main Building)

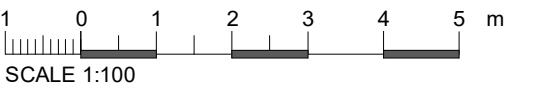
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Job No:	9774	Status	S4 Suitable for Stage Approval

Project	Origin	Volume	Level	Type	Role	Number	Rev
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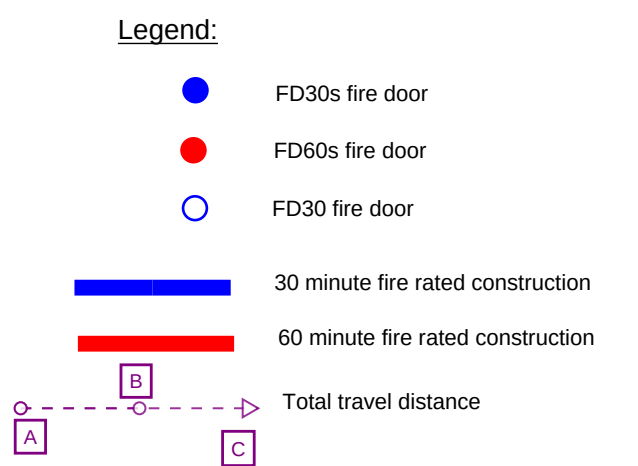




All information is based on external survey information (2D and 3D). Heights have been provided through external 3D survey models and plans have been based on 2D external survey information. Further information required in terms of existing and extent of retained car parking spaces, bike shelter trees, planters, gas governor/meter enclosure TBC. Extent of red line boundary may need to be adjusted to suit proposed road access, turning heads and radius.



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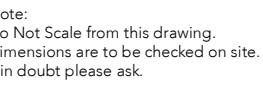
Drawing ref Proposed Roof Plan (Main Building)

Checker	MB	Size	A1
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Job No: **9774** Status **S4** Suitable for Stage Approval

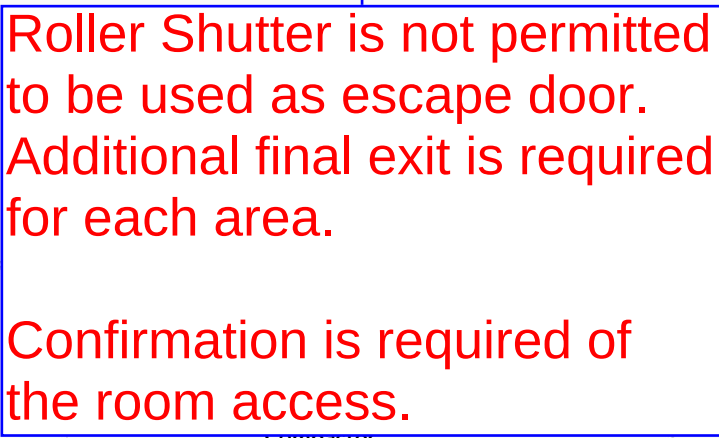
Project	Origin	Volume	Level	Type	Role	Number	Rev
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A compass rose indicates North (N) is towards the top-left. Below it is a scale bar marked from 0 to 5 meters. The scale bar has a 1:100 ratio.



- Legend:**
- FD30s fire door
 - FD60s fire door
 - FD30 fire door
 - 30 minute fire rated construction
 - 60 minute fire rated construction
- Total travel distance

Rev	Date	Intls	Details
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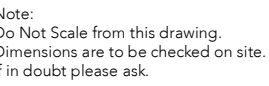
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Drawing ref Proposed Ground Floor Plan (Stores)

Date	15/10/2024 16:15:25			Scale	As indicated		
Checker	MB			Size	A1		
Job No:	9774			Status	S3 Suitable for Review and Comments		

Project	Origin	Volume	Level	Type	Role	Number	Rev
LIMES-BUT-B2-00-DR-A-04003-P01							



All information is based on external survey information (2D and 3D). Heights have been provided through external 3D survey models and plans have been based on 2D external survey information. Further information required in terms of existing and extent of retained car parking spaces, bike shelter trees, planters, gas governor/meter enclosure TBC. Extent of red line boundary may need to be adjusted to suit proposed road access, turning heads and radius.



- FD30s fire door
- FD60s fire door
- FD30 fire door

-

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Drawing Title	
Fire Strategy Mark-ups Roof Floor - Stores	
Project Title	
The Limes Relocation	
Project Number	
33445	
Scale @ A4	Date
1:100	24/10/24
Drawn	Checked
HV	SJ
	Rev.
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Project Title	The Limes Relocation
Client	Rider Levett Bucknall
Location	Fallowfield Campus, Manchester

Date	15/10/2024 16:32:12	Scale	As indicated
Checker	MB	Size	A1
Job No:	9774	Status	S4 Suitable for Stage Approval

Project	Origin	Volume	Level	Type	Role	Number	Rev
LIMES-BUT-B2-R3-DR-A-04004-P01							