

## Fire Safety Statement for Meadow High School, Uxbridge

|                       |                                                |
|-----------------------|------------------------------------------------|
| <b>Project Title:</b> | Meadow High School, Uxbridge                   |
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| <b>Issue No:</b>      | 01                                             |
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|                                  |                      |   |
|----------------------------------|----------------------|---|
| <b>Type of building work(s):</b> | New build            | X |
|                                  | Extension            | X |
|                                  | Material alterations | X |
|                                  | Change of use        |   |

|                           |                     |   |
|---------------------------|---------------------|---|
| <b>Comments based on:</b> | AD B                |   |
|                           | BS 9991: 2015       |   |
|                           | BS 9999: 2017       | X |
|                           | Engineered Solution |   |

## 1 Executive Summary

The proposed development at Meadow High School has been assessed in line with the guidance BS 9999:2017. The information within this document is considered sufficient at this stage of design and can be progressed as the design continues.

## 2 Introduction

The Meadow High School is an existing SEN educational facility located in Uxbridge. The proposal involves the extension and refurbishment of the existing school.

The existing part of the school is a one storey building consisting of science studios, art rooms, a workshop, the library and some therapy rooms. This part will undergo light refurbishment works. Adjacent to this part, a new sports hall, along with changing facilities, will be built. Linking to the existing building will be a new 2 storey build, which will consist of classrooms, a main hall, a dining hall and a kitchen, as well as offices and resource centre. The plans for the building are shown below.

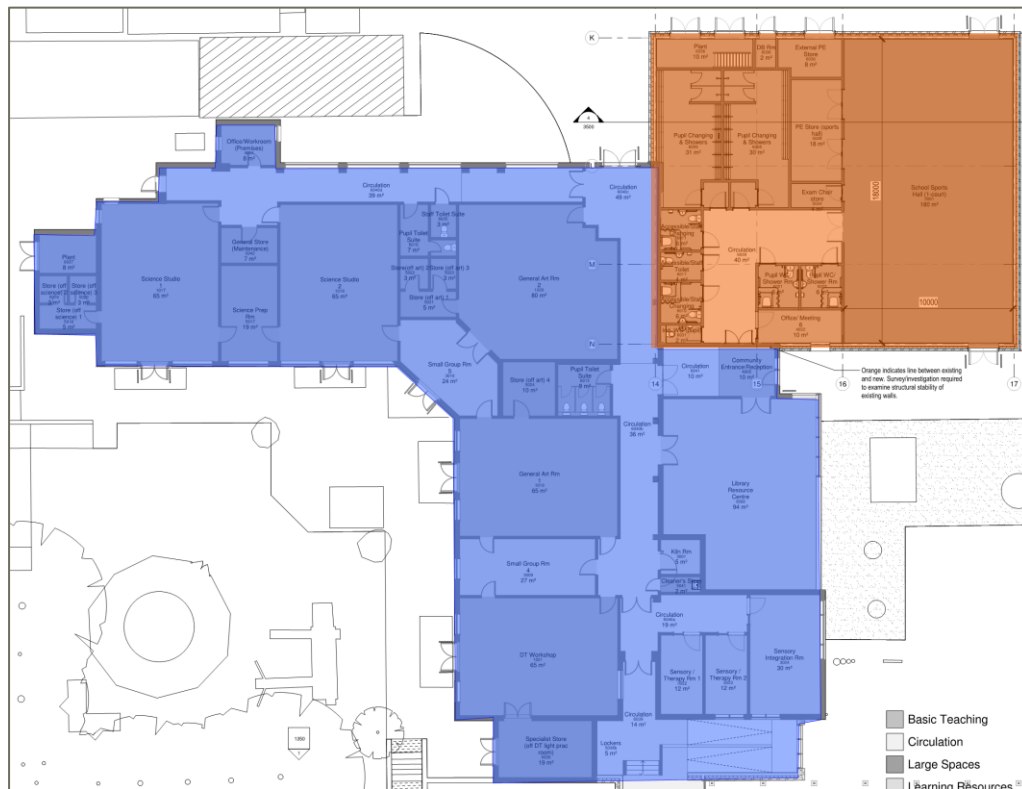


**Figure 1: Ground floor: existing building in blue, new build in orange**



**Figure 2: Ground floor: new build wing**

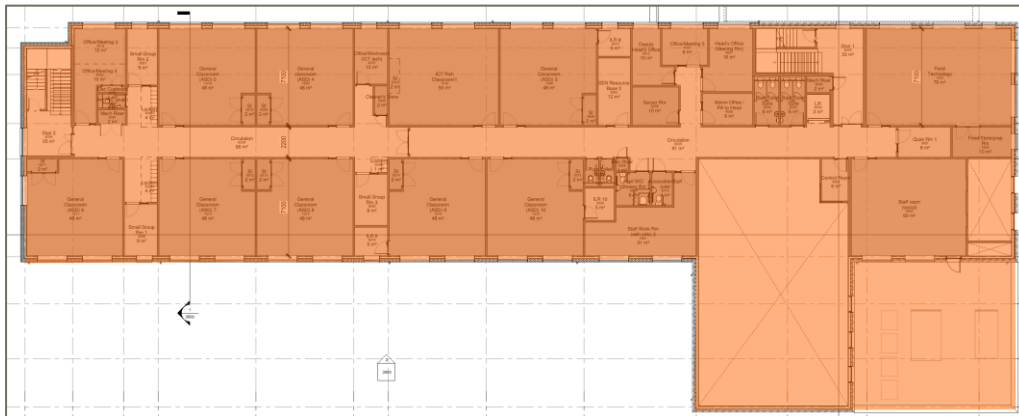


**Figure 3: First floor: new build wing**

## 2.1 Guidance

This document will provide design advice in accordance with BS 9999:2017 and is to act as a guide to the Design Team. In any case, due to the preliminary stage of design, where general requirements have been stated and addressed to specific elements of the design, the design team should ensure this is correctly being referenced.

## 2.2 Purpose of the Document

The information within this document is considered sufficient at this stage of design and can be progressed as the design continues.

## 2.3 Compliance with the New Draft London Plan

**A.** In the interests of fire safety and to ensure the safety of all building users, all development proposals must achieve the highest standards of fire safety and ensure that they:

- 1) identify suitably positioned unobstructed outside space:
  - a) for fire appliances to be positioned on
  - b) appropriate for use as an evacuation assembly point
- 2) are designed to incorporate appropriate features which reduce the risk to life and the risk of serious injury in the event of a fire; including appropriate fire alarm systems and passive and active fire safety measures
- 3) are constructed in an appropriate way to minimise the risk of fire spread
- 4) provide suitable and convenient means of escape, and associated evacuation strategy for all building users
- 5) develop a robust strategy for evacuation which can be periodically updated and published, and which all building users can have confidence in
- 6) provide suitable access and equipment for firefighting which is appropriate for the size and use of the development.

**B** All major development proposals should be submitted with a Fire Statement, which is an independent fire strategy, produced by a third party, suitably qualified assessor. This fire statement details how the development proposal will function in terms of:

- 1) the building's construction: methods, products and materials used, including manufacturers' details. **Please see Sections 5, 6 and 7.**
- 2) the means of escape for all building users: suitably designed stair cores, escape for building users who are disabled or require level access, and associated evacuation strategy approach. **Means of escape is discussed in Section 4. Travel distances and exit widths in particular are assessed in Section 4.5. Evacuation strategy is simultaneous and is found in Section 4.1, whereas disabled evacuation is discussed in Section 4.8.**
- 3) features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans. **Please see Sections 3.4, 4.2, 4.3.**
- 4) access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and positioning of equipment, firefighting lifts, stairs and lobbies, any fire suppression and

smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these. **Please see Sections 3.4, 4.2, 4.3 for passive and active fire safety systems, and Section 8 for provisions for firefighting.**

5) how provision will be made within the curtilage of the site to enable fire appliances to gain access to the building. **The development has good road access throughout, therefore firefighter access is compliant with the requirements.**

## 3 Risk Profile

### 3.1 Occupancy Characteristic

During school hours the building is categorized as **Occupancy Characteristic A** consisting of people who are awake and familiar with the building layout.

During out-of-hours use the building is categorized as **Occupancy Characteristic B** consisting of people who are awake and unfamiliar with the building. The plan below shows the area of the building available for community use. Only certain rooms at ground floors will be available for community use.



Figure 4: Areas of the building available for community use

### 3.2 Fire Growth Rate

A fire growth rate of **Medium (Category 2)** is applicable.

### 3.3 Risk Profile

The building is therefore **Risk Profile A2** during school hours and **Risk Profile B2** for out-of-hours public use.

### 3.4 Automatic Water Fire Suppression Systems (AWFSS)

As a result of the height and use, the building is not required to be provided with a sprinkler system in accordance with BS 9999:2017.

## 4 Means of Escape and Warning

### 4.1 Evacuation Approach

The means of escape has been designed based on the following assumptions:

- Any fire in the building is assumed to be unintentional and therefore it is unlikely to start in two different locations at one time;
- The building will be evacuated by simultaneous evacuation in the event of a fire; and
- Suitable evacuation muster points will be identified & agreed with the school management and these will form part of the evacuation procedures for the school.

The School will operate a simultaneous evacuation on sounding of the fire alarm system will result in the evacuation of the whole school building.

## 4.2 Fire Detection and Alarm Systems

The minimum recommended fire alarm system as recommended by Table 7 in BS 9999 is a category L3 automatic fire detection and alarm system in accordance with BS5839-1: 2013. It is recommended that an L2 system is provided.

This category of the system requires detectors to be located in all escape routes, circulation spaces, all rooms accessed directly from an escape route and any other rooms considered to represent a high fire risk. In this instance, high-risk areas will include rooms containing a credible fire hazard.

**Table 1: Fire Detection and Fire Alarm System**

| Accommodation | Minimum Acceptable System | Recommended System             |
|---------------|---------------------------|--------------------------------|
| A2            | L3                        | L2 in accordance with BS5839-1 |

Optical type smoke detectors will be provided throughout the building with the exception of rooms that may contain naked flames or within which smoke or steam (plant rooms and the kitchen) may be expected. In these cases, heat detectors will be provided as an alternative to the smoke detectors. However, heat detectors are not suitable for use within escape routes or circulation routes and optical type smoke detectors will be provided throughout these areas.

**Table 2: Fire Detectors**

| Areas       | Detector        |
|-------------|-----------------|
| All Areas   | Smoke Detectors |
| Kitchen     | Heat Detectors  |
| Plant Rooms | Heat Detectors  |

Type A (direct operation) manual call points, designed in accordance with BS EN 54-11:2001 and installed in accordance with BS 5839-1: 2013, will be located at all storey and final exits between 1.2m and 1.4m from the finish floor level.

Audible alarm sounders designed to comply with BS 5839-1: 2013 will be provided throughout the building. The alarm signal will be distinct from any other alarms or signals used in the school.

It should be ensured that the fire alarm takes priority over any other sound system or sound effect to be used in the main hall, and the evacuation signal or tone will be distinct from other sounders.

In addition to audible alarms, visual alarms devices (VADs) will be provided to isolated areas such as Toilets or plant rooms etc. The visual alarm devices must comply with BS EN 54 part 23; 2010.

All inner rooms will be provided with means of warning such as sounders, doors or walls with adequate vision panels. The access rooms will be provided with appropriate fire detection systems.

Furthermore, it will be necessary for the fire detection and alarm system to be linked to other systems and equipment as necessary to ensure operation or activation in a fire scenario as follows:

- Hold-open devices on fire doors to be released;
- Air handling plant to shut down;

## 4.3 Emergency Lighting & Signage

Emergency lighting will be provided in the areas indicated in Table 8 of BS 9999 and the system should comply with the recommendations given in BS 5266-1:2016 and BS 5266-4:1999.

Escape and other fire safety signage will be provided in accordance with the recommendations of BS 5499-4:2013 to every escape route.

## 4.4 Occupancy

Correspondence with GT and Pozzoni Architecture provided the expected occupancy within all areas of the school. The expected occupancy of the classrooms is 15 occupants for the existing building and 12 occupants per classroom. The main hall has a maximum occupancy of 291 occupants, the new build sports hall has a maximum occupancy of 90 people, and the dining hall has a maximum occupancy of 20 people. The food technology room at first floor in the new build has an occupancy of 16 people.

During out of hours public use it is assumed that the sports hall, dining, main halls and library on ground floor will be occupied.

The table below summarises the maximum occupancy levels per floor.

**Table 3: Total Expected Occupancy Levels**

| Level  | Expected Occupancy  |                         |
|--------|---------------------|-------------------------|
|        | During School Hours | Out-of-hours Public Use |
| Ground | 180                 | 410                     |
| First  | 127                 | 0                       |

## 4.5 Horizontal Evacuation

### 4.5.1 General Requirement

In accordance with the BS 9999: 2017 the following should be adopted:

- The horizontal escape routes are required to be kept free from obstacles, such as steps or raised thresholds, which delay or impede travel in an emergency evacuation or escape. Where such obstacles occur, a suitable ramp should be provided. All escape routes which will be utilised by wheelchair users, including external, where applicable should be flat or suitably ramped.
- Regardless of risk profile the exit door width should be not less than 800mm.
- Corridors at all levels will not be less than 1,200mm in clear width and cross-corridor doors will not be less than 1,050mm.
- Cross-corridor fire doors (FD30s) will be provided where a corridor is greater than 12m in length and/or serves more than one exit, this will limit the spread of smoke, therefore, minimising the chance of two escape routes being compromised as a result of a fire.
- All dead-end greater than 4.5m in length will be protected with 30 minutes fire resistance and door opening into the corridor will be FD30S doors with self-closers in lieu of a cross corridor door.

### 4.5.2 Travel Distance

The maximum applicable travel distance in accordance with BS 9999:2017 is shown in the table below.

**Table 4: Maximum travel distance requirements when minimum fire protection measures are provided**

| Area/Zone                         | Risk Profile | One Way Travel Distance (Direct/Actual) | Two Way Travel Distance (Direct/Actual) |
|-----------------------------------|--------------|-----------------------------------------|-----------------------------------------|
| Staff and Student Areas           | A2           | 15/22 m                                 | 37/55 m                                 |
| Areas accessible to community use | B2           | 13/20 m                                 | 33/50 m                                 |

**Note 1:** Any room or area that is provided with a single exit should be restricted to a maximum of 60 occupants.

**Note 2:** Direct travel applies where the layout is unknown, actual travel distance applies where it is known.

### 4.5.3 Inner rooms and Access rooms

The proposed building contains rooms where the only escape is through another room. This inner room scenario is present at ground floor and first floor for individual learning room and store rooms, all which open into classrooms. Additionally, the terrace at first floor has a similar inner room arrangement as escape must be done via the staff room.

Analysis of the provided layouts indicates the building complies with the requirements for inner room scenarios.

A category L2 alarm and detection system is proposed to be installed in the building in accordance with BS 5839 Part 1. As a result, the access rooms will be fitted with an automatic fire detection and alarm system that serves to warn occupants of the inner room.

In all scenarios, the occupant capacity of the inner rooms should not exceed 60 people.

### 4.5.4 Dead End and Recesses off Corridors

Dead end corridors or recesses that exceed 2m in length should be constructed as protected corridors. The proposed layouts indicate recesses off corridors on ground floor and first floor, therefore in order to comply with the above requirements the corridor should be built with walls achieving 30 min fire resistance.

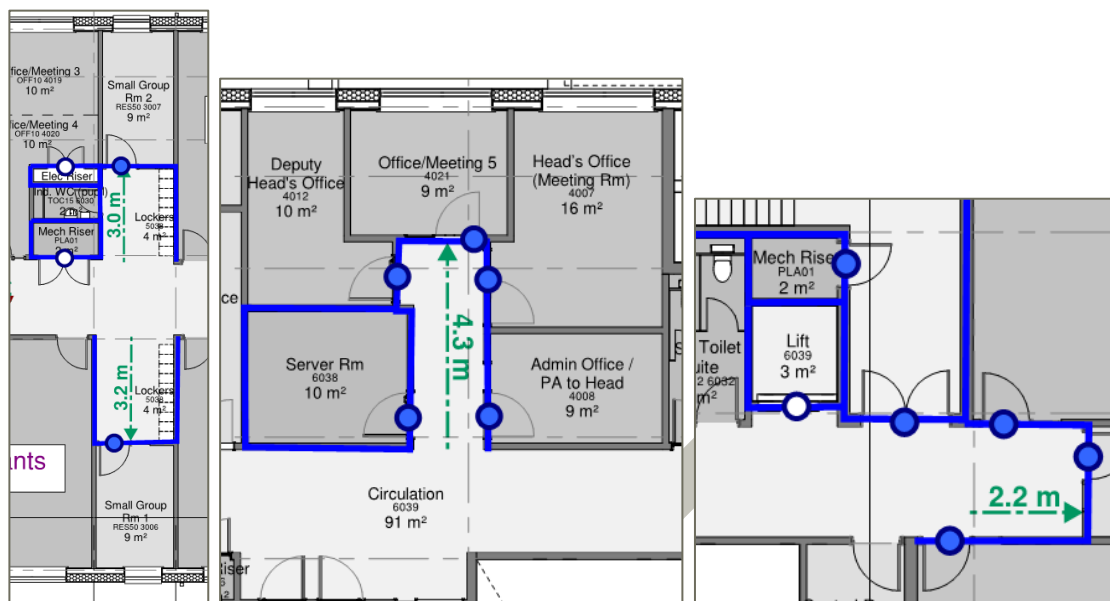


**Figure 5: Recesses off corridors at first floor**

For dead ends more than 4.5m, the corridor needs to be enclosed in 30 min fire rated construction. There is one instance of a dead end longer than 4.5m at ground floor, as shown above. The proposed arrangement is compliant.

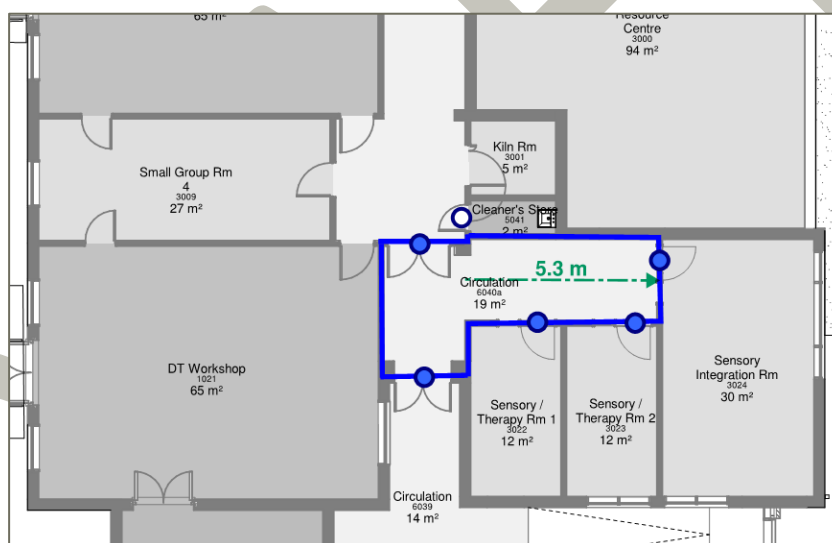


**Figure 6: Dead end corridor longer than 4.5m at ground floor**

#### 4.5.5 Escape Door Widths

Any room serving less than 60 occupants can be provided with one exit with a minimum clear width of at least 800mm and 850mm for wheelchair users.

Where the floors are expected to have more than 60 occupants they will have more than one exit, with the doors opening in the direction of escape, and a clear width representative of the expected occupancy levels.

Where there is access to more than one exit, it will be assumed that the largest exit is unavailable due to the location of the fire and the remaining exits will be sized such that there is sufficient capacity for all the anticipated occupants.

**Table 5: Minimum Number of Exits/ Routes**

| Maximum Number of Persons | Minimum Number of Exits or Escape Routes |
|---------------------------|------------------------------------------|
| 60                        | 1                                        |
| 600                       | 2                                        |
| More than 600             | 3                                        |

Escape door widths are calculated using the maximum occupancy multiplied by the minimum door width required per person from Table 13 in BS 9999:2017.

Refer to Table 8 summarising applicable variables for door width calculations.

**Table 6: Minimum Door Width Per Person**

| Zone                      | Risk Profile | Min. door width per person<br>(min. fire protection measures) |
|---------------------------|--------------|---------------------------------------------------------------|
| Staff and Student Areas   | A2           | 3.6 mm                                                        |
| Sports, Main, Dining Hall | B2           | 4.1 mm                                                        |

**Note:** Minimum door widths per person has not been provided for the Plant room as the occupancy is considered so low within the spaces they will require a minimum exit width of 800mm.

**Note:** 800mm is the minimum required door width in accordance with BS 9999:2017 for Part B compliance. Larger exits may be required to satisfy other parts of the Building Regulations such as Part M.

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 degrees or more,

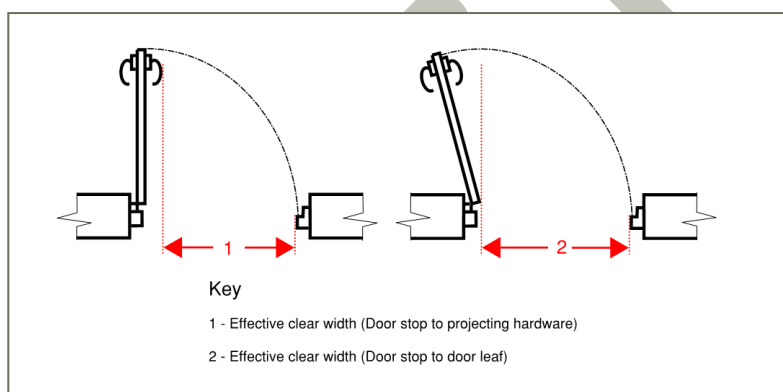


**Figure 7: Door Clear Width Calculation**

Ground floor



**Figure 8: New Build Ground Floor – Escape Doors**

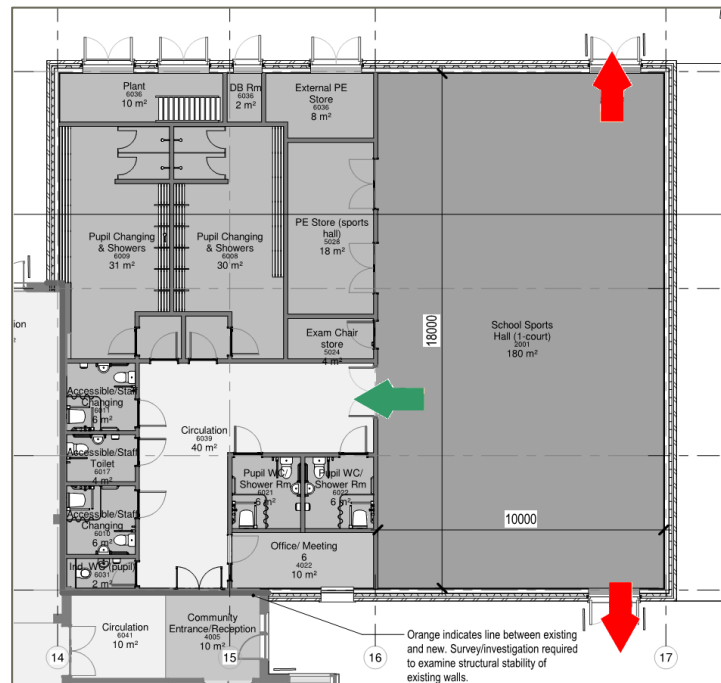


**Figure 9: New Build Sports Hall – Escape Doors**

### Table 7: Ground Floor – Clear Exit Width Calculation

| Area                 | Occupancy | Number of Exits                | Clear Width Calculation After Discounting Process | Minimum clear Width Required per Exit | State of Compliance |
|----------------------|-----------|--------------------------------|---------------------------------------------------|---------------------------------------|---------------------|
| New build classrooms | 96        | 1 final exit<br>3 storey exit  | $96 \div 3 = 32$                                  | 800mm                                 | Acceptable          |
| Main Hall            | 291       | 2 final exits<br>1 storey exit | $291 \div 2 = 145$                                | 1050mm                                | Acceptable          |
| Sports Hall          | 90        | 2 final exits<br>1 storey exit | $90 \div 2 = 45$                                  | 800mm                                 | Acceptable          |

**Note:** Rooms with less than 60 people occupancy with an exit directly to the external are not considered in this calculation.

### First floor



**Figure 10: First Floor – Escape Doors**

**Table 8: Ground Floor – Clear Exit Width Calculation**

| Occupancy | Number of Exits | Clear Width Calculation After Discounting Process | Minimum clear Width Required per Exit | State of Compliance |
|-----------|-----------------|---------------------------------------------------|---------------------------------------|---------------------|
| 256       | 2 storey exits  | $127 \div 1 = 127$                                | 800mm                                 | Acceptable          |

**Note:** Rooms with less than 60 people occupancy with an exit directly to the external are not considered in this calculation.

**Note 2:** The main hall and sports hall are not assumed to be occupied at the same time as the classrooms, so the assessment of the main hall storey exits is done in the section related to the public use of the ground floor.

## 4.6 Vertical Evacuation

The minimum required stair width has been based on the preceding occupancy approximations above and the following assumptions:

- 127 expected occupancy on the upper floor.
- The stair width factor for an A2 risk profile building over two upper floors in accordance with Table 13 in BS 9999:2017 is 4.50mm/pers.

The school is provided with two protected stairs with a width of 1350mm.



Figure 11: Internal Protected Escape Stairs

Table 9: Internal Protected Stair width Calculations

| Stair   | Max. Occupancy | Number of Floors Served | Minimum Stair width per person | Minimum Required Stair Widths | State of Compliance |
|---------|----------------|-------------------------|--------------------------------|-------------------------------|---------------------|
| Stair 1 | 127            | 1                       | 4.5mm                          | 1000mm                        | Acceptable          |
| Stair 2 | 127            | 1                       | 4.5mm                          | 1000mm                        | Acceptable          |

## 4.7 Final Exit and Final Exit Widths (Merging Flows)

The final exit from a stair should be at least the same width as the stair.

Where a ground floor storey exits shares a final exit with a stair, the width of the final exit should be able to accommodate the number of occupants evacuating from that storey exit and all upper levels.

Merging flows are present at the ground level of both stairs.

The proposed building satisfies the criteria for merging flows in accordance with the requirements of BS 9999:2017

Table 10: Merging flows at level exits

| Area    | Occupants served (N) | Distance to exit (D) | Proposed Final Exit Width | Minimum Required Final Exit Widths | State of Compliance |
|---------|----------------------|----------------------|---------------------------|------------------------------------|---------------------|
| Stair 1 | >60                  | >2                   | 1700mm                    | 1350mm                             | Acceptable          |
| Stair 2 | >60                  | >2                   | 1700mm                    | 1350mm                             | Acceptable          |

## 4.8 Disabled Means of Escape

The means of escape for disabled persons is largely dependent upon the school management. No reliance will be placed on the fire service to assist in the evacuation process. Disabled evacuation procedures will coincide with normal evacuation procedures.

Disabled occupants on the ground floor will be able to evacuate or via the nearest exit to place of ultimate safety outside the building.

Disabled occupants on the upper floors will evacuate using the protected staircases, where they can get to the ground floor and evacuate the building. Any occupants in wheelchairs will require an adequate number of trained staff available to assist in the evacuation.

Each protected stair will be provided with a disabled refuge space which will be a minimum of 900mm x 1400mm and this will be located within the stair landing area on both upper levels, and will not reduce the clear width of the escape route.

An Emergency Voice Communication (EVC) system will be provided which will communicate with a master station suitably located (internally on the ground floor or the main school reception), to allow staff to coordinate the evacuation of occupants waiting in refuges.

An evacuation chair will be provided at each refuge for use by trained staff when evacuating any disabled occupants.

**Note:** Staff will need to be available to offer assistance to disabled individuals evacuating the upper floors if required.

## 5 Internal Fire Spread (Linings)

The surface finishes should satisfy the following classifications shown in the table below, when tested under either the National Classifications (in accordance with BS 476) or under the European Classifications (in accordance with BS EN 13501-1:2002).

**Table 11: Wall and Ceiling Lining Requirements**

| Location                                   | National Class | European Class |
|--------------------------------------------|----------------|----------------|
| Small rooms not exceeding 30m <sup>2</sup> | 3              | D-s3,d2        |
| Other Rooms                                | 1              | C-s3,d2        |
| Circulation Spaces                         | 0              | B-s3,d2        |

**Note:** When a classification includes 's3, d2' this means that there is no limit on the production of smoke or flaming droplets/particles.

The surface linings of the walls and ceilings should generally conform to the classification recommended above for the appropriate location. Parts of walls may have a poorer performance than specified above (but never less than National Class 3 or European Class D-s3,d2) provided the total area of those parts in any one room does not exceed one half of the floor area of the room, subject to a maximum of 60m<sup>2</sup>.

## 6 Internal Fire Spread (Structure)

### 6.1 Fire Resistance of Elements of Structure

The building is not more than 18m measured from access level to the height of the top occupied storey.

All elements of structure should be provided with 60 minutes of fire resisting construction.

**Table 12: Fire Resistance Requirements**

| Part of the Building                                                                       | Minimum provisions when tested to the relevant part of BS 476(minutes) |           |            | Method of Exposure       |
|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------|------------|--------------------------|
|                                                                                            | Loadbearing Capacity                                                   | Integrity | Insulation |                          |
| <b>Structural Frame, Beam or Column</b>                                                    | 60                                                                     | N/A       | N/A        | Exposed faces            |
| <b>Load bearing Wall</b>                                                                   | 60                                                                     | N/A       | N/A        | Each side separately     |
| <b>Floors</b>                                                                              | 60                                                                     | 60        | 60         | From Underside           |
| <b>Roofs</b><br>Any part forming an escape route                                           | 30                                                                     | 30        | 30         | From Underside           |
| <b>External Walls</b><br>Any part more than 1000mm from the relevant boundary <sup>1</sup> | 60                                                                     | 60        | 15         | From inside the building |
| <b>Enclosure</b><br>Protected escape stairs, lifts, Services risers                        | 30                                                                     | 30        | 30         | Each side separately     |
| <b>Fire resisting construction<sup>2</sup></b><br>Place of special fire hazard             | 30                                                                     | 30        | 30         | Each side separately     |
| <b>Cavity Barriers</b>                                                                     | N/A                                                                    | 30        | 15         | Each side separately     |

**Notes:** <sup>1</sup> Excluding permitted unprotected areas in section 6.2.

<sup>2</sup> Refer to Section 6.3 for more information on places of special fire hazard.

Any element of structure supporting a section of the roof, which does not form the function of a floor, is not required to be fire rated.

## 6.2 Compartmentation

There are no limitations on the size of a compartment for a building with **Risk Profile A2** having a height of less than 30m.

However, compartment sizes on each floor level should be restricted to 8000m<sup>2</sup> for a building with **Risk Profile B2** having a height of less than 18m. Analysis of the public use areas within the building indicates no requirements for compartmentation.

Areas of ancillary accommodation should be enclosed in fire rated construction consisting of either 30 or 60 minutes depending the level of hazard within these areas. Refer to Section 6.3 for more information.

The protected escape stairs should be enclosed in 30 minutes of fire rated construction with self-closing FD30S fire doors therein. 30 minutes of fire rated construction should also be utilised to provide subdivision between the accommodation stair and other escape stairs.

The proposed building satisfies the criteria for compartmentation in accordance with the requirements of BS 9999:2017.

## 6.3 Places of Special Fire Hazard

All storage areas and kitchens containing cooking facilities are considered to be places of special fire hazard and should be enclosed with construction having not less than 30 minutes fire resistance. Similarly, all plant areas should be enclosed in walls having not less than 60 minutes fire resistance.

**Table 13: Fire Resistance Requirements for Ancillary Accommodations**

| Area                 | Minimum Fire resistance (minutes) |
|----------------------|-----------------------------------|
| Store rooms          | 30                                |
| Cleaner's stores     | 30                                |
| Server and hub rooms | 30                                |
| Kitchen              | 30                                |
| Food Tech Rooms      | 30                                |
| Plant room           | 60                                |

## 6.4 Fire Doors

Fire doors should be provided in all fire rated enclosures in accordance with BS 476-Part 22:1987 and specified with cold smoke seals (only where smoke seals are required) in accordance with the recommendations of BS 476 Section 31.1. The fire resistance requirements for the doors are shown in the table below:

**Table 14: Fire Doors**

| Position of Door                                    | Rating (When Tested in Accordance With BS 476-22) | Rating (When Tested in Accordance With BSEN1634-1) |
|-----------------------------------------------------|---------------------------------------------------|----------------------------------------------------|
| Lift                                                | FD 30                                             | E 30                                               |
| Enclosing an escape stair                           | FD 30S                                            | E 30S <sub>a</sub>                                 |
| Enclosing a services riser                          | FD 30 <sup>1</sup>                                | E 30 <sup>1</sup>                                  |
| Enclosing protected corridors or dead end corridors | FD 20S                                            | E 20S <sub>a</sub>                                 |
| Enclosing place of special fire hazard              | Same fire resistance as the wall it is fitted in  | Same fire resistance as the wall it is fitted in   |
| Sub-dividing corridors                              | FD 30S                                            | E 20S <sub>a</sub>                                 |
| Within a cavity barrier                             | FD 30S                                            | E 30S                                              |

<sup>1</sup>Smoke seals should be provided if the position of door is within a protected escape route.

Fire doors on circulation routes may be held open by devices which release automatically when the fire alarm activates. The control of such hold-open devices should conform to BS 7273-4. It is recommended that doors on hold-open devices close at night to prevent warping of doors over time.

Fire doors should incorporate self-closing mechanisms (or be kept locked shut when not in use), and cold smoke seals should be provided where the suffix (S) is indicated in the table above.

Fire doors should be identified by appropriate standard signs "Fire Door – Keep Closed" or "Fire Door – Keep Locked Shut".

## 6.5 Cavities, Openings and Fire Stopping

Details of cavity barriers, openings in compartmentation and fire stopping will be covered in the main fire strategy report.

# 7 External Fire Spread

External surfaces of the walls should be constructed in order to adequately resist the spread of fire across the façade of the building. The building is not more than 18m high with all facades greater than 1m from the relevant boundary.

**Table 15: Provisions for External Surfaces or Walls**

| Distance from Relevant Boundary | Height of the Wall | External Wall Surface Classification |
|---------------------------------|--------------------|--------------------------------------|
| 1m or more                      | <18m               | No provisions required               |

<sup>1</sup>The index I relates to tests specified in BS 476-6.

## 7.1 Space Separation between Neighbouring Buildings

A space separation calculation is required. The Enclosing Rectangles method from BR 187 would be used to determine if external fire spread is an issue to neighbouring buildings. The methodology in which the worst case compartment is considered where glazing is shown (assuming the remaining wall construction is protected), in addition a compromise made between compartment size and distance to site boundary line/adjacent building or to the point of half way along a public road / walkway is also considered.

The provide site layout indicated only the south elevation in the main hall area may be at risk of external fire spread, therefore the other elevations have sufficient distance from the boundaries to be allowed 100% unprotected areas.

**Table 16: BR 187 Allowable Unprotected Areas**

| Elevation          | BR 187 Enclosing Rectangle | Actual Distance to Relevant Boundary | Allowed Unprotected Area | Proposed Unprotected Areas | State of Compliance |
|--------------------|----------------------------|--------------------------------------|--------------------------|----------------------------|---------------------|
| South (Main Hall)  | 12 × 9 = 108m <sup>2</sup> | 1.8m                                 | 23.76m <sup>2</sup>      | 3.7m <sup>2</sup>          | Acceptable          |
| South (Plant Room) | 6 × 9 = 54m <sup>2</sup>   | 1.8m                                 | 15.12m <sup>2</sup>      | 3.7m <sup>2</sup>          | Acceptable          |

Therefore the development is compliant with the requirements for external fire spread.

## 8 Firefighting Facilities

### 8.1 Access to Buildings

The total area of the building is more than 2,000m<sup>2</sup> but less than 8,000 m<sup>2</sup>, and is less than 11m in height. Therefore, vehicle access for a pump appliance should be provided to 15% of the building perimeter.

The specifications for the access routes should be in accordance with the table below.

**Table 17: Typical Vehicle Access Requirements**

| Appliance type | Min. width of road between kerbs | Min. Width of gateways | Min. Clearance height | Min. Carrying capacity | Min. Turning circle |               |
|----------------|----------------------------------|------------------------|-----------------------|------------------------|---------------------|---------------|
|                |                                  |                        |                       |                        | Between kerbs       | Between walls |
| Pump           | 3.7m                             | 3.1m                   | 3.7m                  | 17.5 tonnes            | 16.8m               | 19.2m         |

**Note:** The size and mass of fire appliances is not standardised. The dimensions of access routes and hardstands will vary according to the fire appliances that are used in a particular fire authority area.

Dead-end fire service access roads may be up to 20 meters long without being provided with a turning bay (i.e. a fire service vehicle will not have to reverse further than 20m).

As shown in the figure below, the scheme complies with the 15% perimeter access requirement (62.5m required, approx. 112m available).

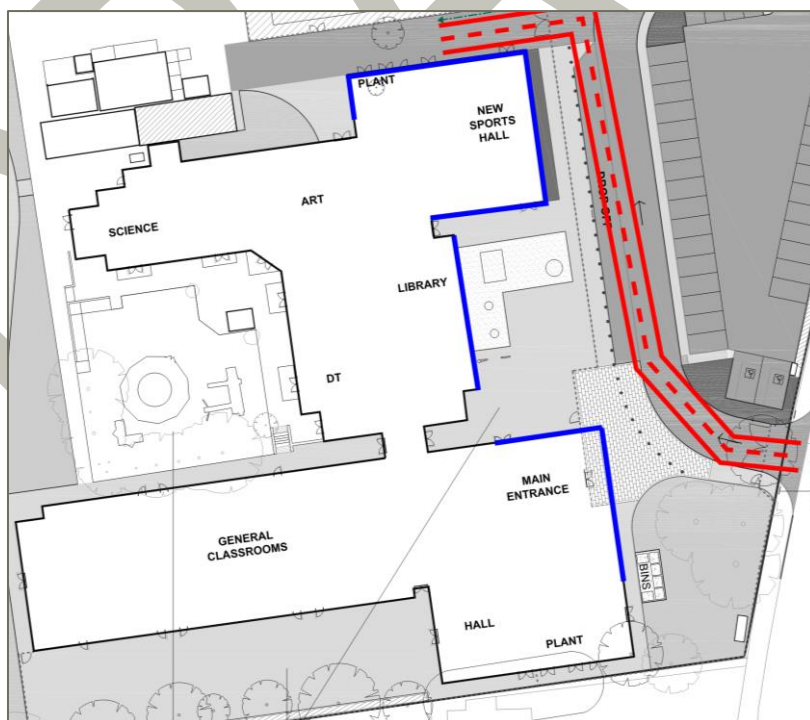


**Figure 12: Fire vehicle perimeter access**

## 8.2 Firefighting Water Supply

Where there is no existing fire hydrant located within 100 metres of an entrance to the building a new a hydrant designed and installed in accordance with BS9990 should be provided.

Where a building, which has a compartment of 280m<sup>2</sup> or more in area, is being erected more than 100m from an existing fire-hydrant additional hydrants should be provided as follows:

- For buildings not provided with fire mains, hydrants should be provided within 90m of an entry point to the building and not more than 90m apart.
- Each fire hydrant should be clearly indicated by a plate, affixed nearby in a conspicuous position, in accordance with BS 3251:1976. Where no piped water supply is available, or there is insufficient pressure and flow in the water main, or an alternative arrangement is proposed, the alternative source of supply should be provided in accordance with the following recommendations:
  - a charged static water tank of at least 45,000 litre capacity; or
  - a spring, river, canal or pond capable of providing or storing at least 45,000 litres of water at all times of the year, to which access, space and a hard standing are available for a pumping appliance; or
  - Any other means of providing a water supply for fire-fighting operations considered appropriate by the Fire and Rescue Authority.

There are two fire hydrants in the vicinity of Meadow High School, as shown below. The fire hydrant placed to the north of the school is less than 100m from the entrance to the new build sports hall, while the fire hydrant to the south of the school is less than 100m from entrance to the new build area and to the new sports hall.

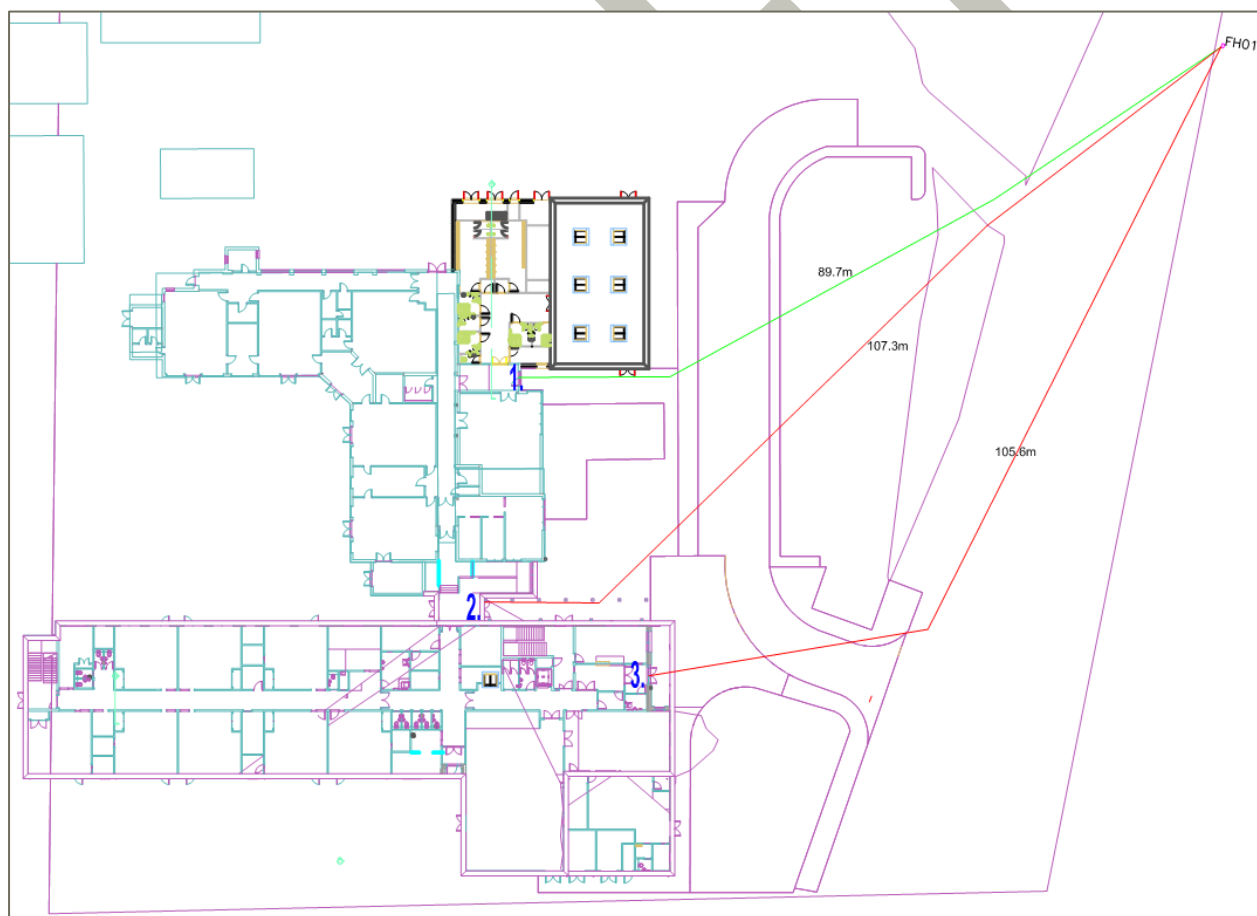


**Figure 13: Existing fire hydrant location to the north of the development**

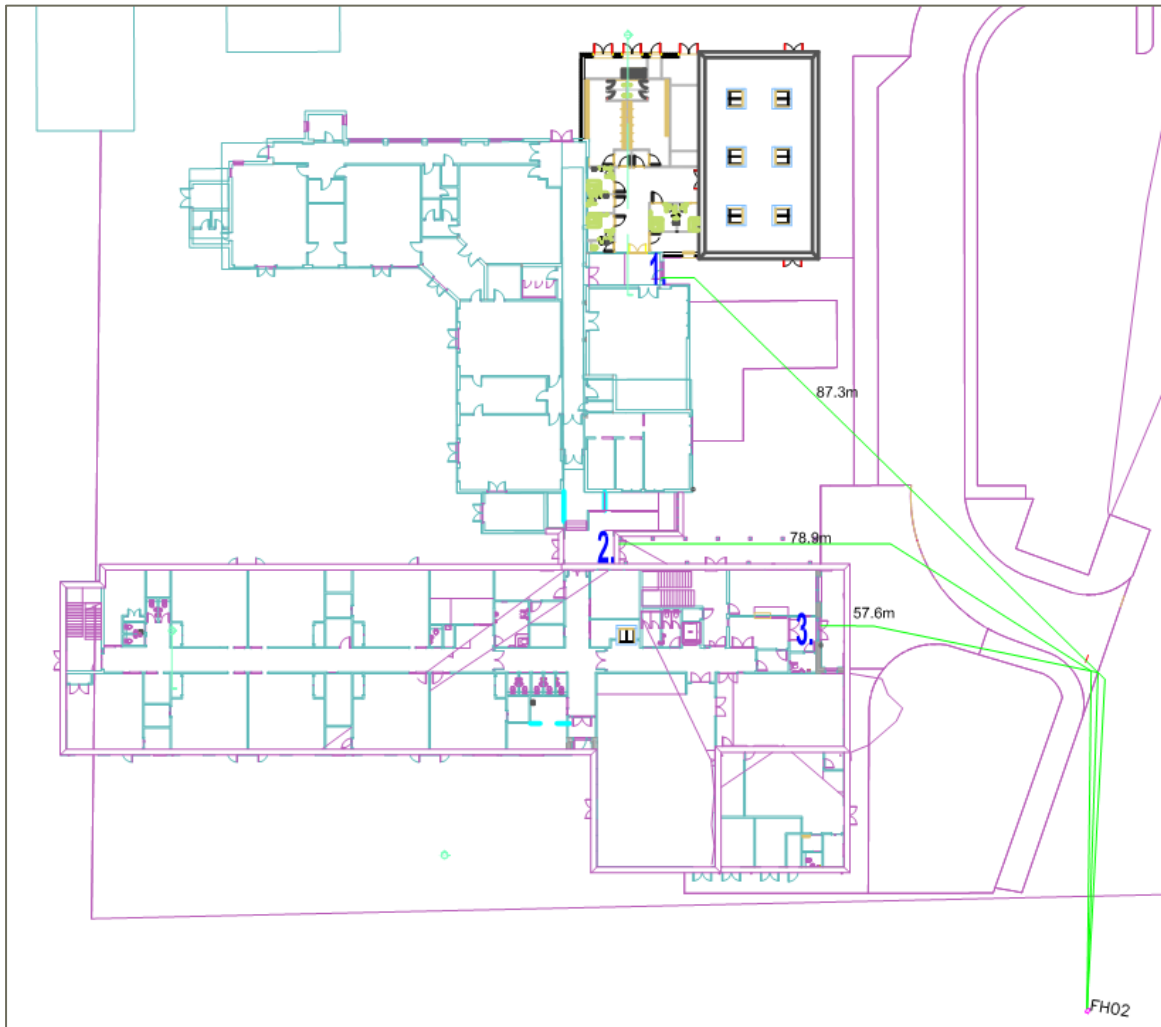


Figure 14: Existing fire hydrant location to the south of the development

## 9 Conclusion

The proposed development at Meadow High School has been assessed in line with the current guidance. The guidance used is BS 9999:2017 for the light industrial areas. The information within this document is considered sufficient at this stage of design and can be progressed as the design continues.

The development complies with the requirements set out in the guidance documents.