

King's House School, London

London Plan Policy D12 (A) – Planning Fire Safety Strategy

King's House School

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1.0

Fire Statement

1.0 Fire Statement

1.1 Introduction

The proposed works involve the refurbishment of certain areas of the existing King's House School as well as the construction of a new teaching building adjacent to the existing Sports Hall, as an extension.

King's House School is formed by a series of interconnected buildings and extends from lower ground floor to second floor level, with most areas terminating at first floor level.

The proposed refurbishment of the school building mainly affects the North East of the school, which is essentially new build, following the demolition of the existing structure. The majority of the other areas within the remainder of the school are being subjected to minor alterations, such as removal partitions.

The design of the building and refurbished areas has been carried out in line with the requirements of BS 9999: Fire safety in the design, management and use of buildings – Code of practice.

During construction stage a fire risk assessment shall be carried out to ensure any risk of fire are provided with appropriate preventative measures. Method statements will be provided by the contractor for each task and toolbox talks should occur on a daily basis. The fire safety design of the building and refurbished areas has been carried out in line with the requirements of BS 9999: Fire safety in the design, management and use of buildings – Code of practice, which is outlined in detail within the Fire Safety Strategy report (ref: 1018236-RPT-MD-002, first issue) for the development. Incorporating the fire safety strategy will ensure the proposed development achieve the highest standards of fire safety, proportionate to the size and nature of the development.

2.0 Planning Fire Safety Strategy

2.1 Author introduction

The author of this document is Calum Smith who is a Fire Engineer working for Cundall and who holds an MEng in Mechanical and Electrical Engineering from the University of Bath. He has been working as a Fire Engineer at Cundall since January 2020 and hereby has 1 year and 11 months of relevant experience.

The authoring of this document has been supervised by Suzanne Comerford, who is a Fire Engineer working for Cundall who holds a MSc in Fire Engineering obtained from the Ulster University. At the time of writing, she has been working as a Fire Engineer with Cundall since January 2016 and hereby has 5 years and 11 months relevant experience.

This document has been written under the supervision of Lee Leston-Jones, Structural Partner at Cundall. He initially graduated with a degree in Structural Engineering from the University of Sheffield in 1993, before completing a PhD in the response of structures to fire in 1996. Prior to joining Cundall he was a founding Director of a fire engineering consultancy and has been involved in the fire engineering of projects since obtaining his doctorate 25-years ago.

2.2 London Plan Policy D12(A)

2.2.1 Identify Suitably Positioned Unobstructed Outside Space

The building is provided with an access road via King's road. A small, paved area in front of the school building for car parking facilities is also provided. The section of road outside of the school is conspicuously marked with "SCHOOL KEEP CLEAR" and it is therefore considered that suitable area for a fire service pump appliance to park in is provided.

The project will provide approximately 530 sq m of external play courts which may form a suitable assembly point for pupils as part of the school's fire evacuation strategy, enabling staff to coordinate the evacuation in a location away from the building.



Figure 1 - Access via King road

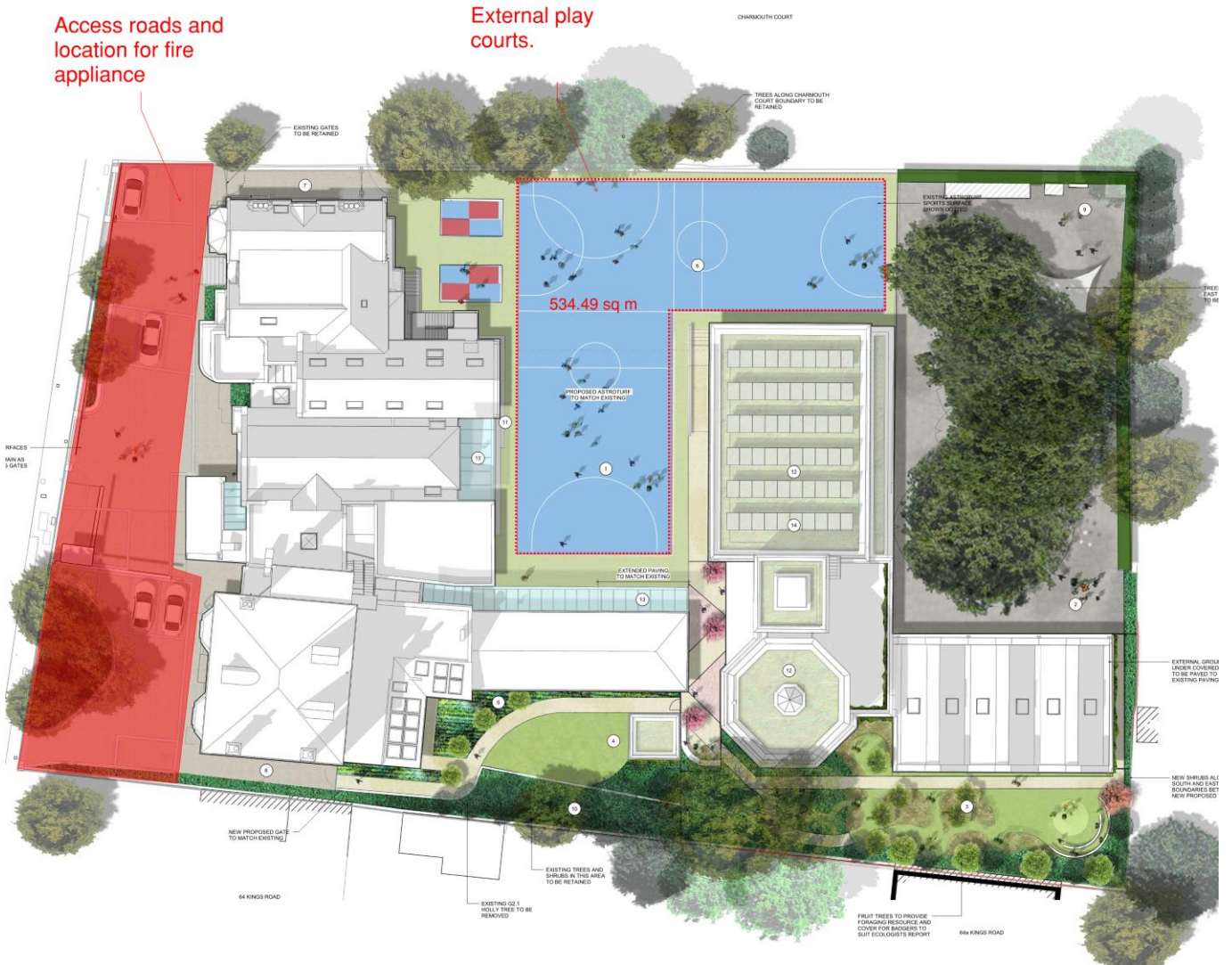


Figure 2 - Site plan showing front paved parking area and external play courts

2.2.2 Features to reduce risk to life safety

2.2.2.1 Passive fire safety measures

In accordance with the guidance contained in BS 9999:2017, there is no limitation on the maximum compartment sizes for this building.

There are, however, a number of required fire rated enclosures that are detailed below:

- All low risk storage rooms to form 30-minute fire resisting enclosures, with FD30S doors.
- Fuel storage room should be provided with a 120-minute fire resisting enclosure, with FD60S doors.
- Plant rooms (non-life safety) should be provided with 60 minutes fire resistance, with FD60S doors.
- Plant rooms that are associated with a life safety function should be provided with a 120-minute fire resisting enclosure, with FD60S doors.
- LV switch rooms to be provided with 30-minutes fire resistance, with FD30S doors.
- Changing rooms to be provided with 30-minutes fire resistance, with FD30S doors.
- Lift shafts to be provided with 60-minutes fire resistance and FD60 doors.

- Services risers to be provided with 60-minutes fire resistance and FD60 doors.

It is therefore considered that the compartmentation strategy for the building, meets the minimum requirements as set out in BS 9999:2017.

For the external wall construction, as the building is less than 18 m in height, all external surfaces of walls on the building should achieve Class 0 (National Class) or Class B-s3, d2 or better (European Class), in accordance with Figure 47 of BS 9999:2017.

Cavity barriers should be provided to all external cavity wall constructions in accordance with Clause 33.1 of BS 9999:2017 and shall be provided in the following locations:

- At the junction between any internal cavity wall which does not comply with Figure 36 of BS 9999:2017, and every compartment floor, compartment wall or other wall or door assembly which forms a fire-resisting barrier; and
- At the junction between any external cavity wall which does not comply with Figure 36 of BS 9999:2017, and every compartment floor and compartment wall.

All fire resisting walls shall be carried to full storey height. Cavity barriers shall be provided to ensure that the maximum dimension in the concealed space does not exceed those recommended in Table 32 of BS 9999:2017 which range from 10 to 20m depending on the location of the space and the flame spread classification of the surfaces exposed within the cavity.

2.2.2.2 Active fire safety measures

A category L2 automatic fire detection and alarm system should be provided throughout the building. This category of system will generally provide coverage to escape routes, rooms off escape routes and places of special fire hazard as well as voids greater than 800 mm in accordance with BS 5839-1.

Manual call points will be provided in accordance with the recommendations of BS EN 54-11, to be located on exit routes, in proximity to entry points of storey exits and at exits to the open air. Points shall be located so that no person in the premises need travel more than 30 m to reach one.

Audio alarms shall be provided in accordance with BS 5839-1, capable of providing a minimum of 65dB(A) or 5dB(A) above sounds likely to persist for some time. With regards to the studios, the sound system should be interlinked to the fire detection and alarm system to shut down in order for the fire alarm to be audible. In addition to this, the lighting system should be interlinked to the fire detection and alarm system to switch the general lighting on upon activation of the alarm.

If there are areas of the building where occupants may be unaware of a fire alarm sounding i.e. areas where ear protectors are used, and at roof level warning devices such as visual alarm devices shall be provided. All sanitary facilities shall be provided with strobes to alert occupants who have a hearing impairment and may be unaccompanied. All strobes shall be provided in accordance with BS 5839-1.

The two-way communications systems for all disabled refugees should be located adjacent the fire alarm panel.

Upon activation of the fire alarm system the following should occur:

- The release of any hold-open devices to fire doors.
- Access control on doors will be disabled (once it is confirmed that this does not conflict with the security design).
- Any fire dampers required to close on operation of the fire alarm system;
- HVAC systems to shut down;
- Lifts, which will descend to ground floor and the doors open.

Due to the extension of the building and to assist with Fire Service intervention it is proposed that an automatic sprinkler system is installed to the Sports Hall and new extension.

The sprinkler system is to comply with the design principles detailed in:

- BS 9999:2017 (Code of Practice for Fire Safety in the Design, Management and use of Buildings);

- BS EN 12845:2015 – Fixed firefighting systems - Automatic sprinkler systems - Design, installation and maintenance;
- LPC rules for automatic sprinkler systems and the associated LPC technical bulletins;
- BS 9990 - Code of practice for non-automatic fire-fighting systems in buildings.

The sprinkler system will be designed to OH1 classification as per BS 12845 and LPC technical bulletin 221 for sprinkler protection of schools.

The sprinkler system will be fed from a dedicated sprinkler water storage tank for building. The tank will be suitably sized to contain sufficient water to deal with the highest sprinkler risk area, for OH1 classification a minimum effective volume of 27.5m³ of storage is required.

The tank and pump house are to be located in the headmaster’s garden, and of timber construction. Heating, ventilation and associated services are to be provided as per BS 12845.

A dedicated water supply infill connection will be required to fill the tank in accordance with BS EN 12845 / LPC Requirements. The building will be served by a single diesel driven sprinkler pump and Installation Control Valve configured to suit the occupancy requirements of the building.

From the Installation Control Valve within the pump house, water will be distributed through risers to the floors, via subsidiary monitored valves and flow switches. The floors will typically be served by a zoned sprinkler connection located within a dedicated sprinkler riser in the building.

The wet pipe sprinkler control valves will incorporate pressure sensitive alarms to indicate sprinkler operation, and these shall be considered as fire alarm signals. Flow alarm switches may also be incorporated at the control valve sets at the discretion of the system installer and where fitted; these also shall be interfaced with the house fire detection system.

2.2.3 Constructed so as to minimise the risk of fire spread

In accordance with Clause 35.5 of BS 9999:2017, external walls should be constructed as such that they will not support the spread of fire at a speed that is likely to threaten people in, or around the building.

Therefore, as the building height does not exceed 18m, all external surfaces of walls on the building should achieve Class 0 (National Class) or Class B-s3, d2 or better (European Class), in accordance with Figure 47 of BS 9999:2017.

Cavity barriers should be provided to all external cavity wall constructions in accordance with Clause 33.1 of BS 9999:2017 and as outlined in Section 3.8.4 of this report.

The new extension is located a sufficient distance away from any neighbouring properties and, therefore, it is not considered that any further provisions are required to mitigated external fire spread to adjacent buildings.

2.2.4 Means of escape

The means of escape for all building users has been sized and located to demonstrate the travel distances and exit capacity recommendation set out in BS 9999:2017 have been met. The means of escape strategy for the building will be a simultaneous evacuation on confirmation of a fire.

The estimated occupancy for which the means of escape have been sized is shown in the below table:

Table 1 - Occupant loads

| Floor | Estimated Occupancy (persons) |
|--------|-------------------------------|
| Ground | 544 |
| First | 72 |
| Second | 60 |

A sufficient number of exits have been provided at ground floor level taking the estimated number of occupants into account. The building comprises of ground floor plus two upper storeys and is served by a single protected escape stair. The building does not exceed 11 m in height and the stair is accessed through a protected lobby.

The escape stair is to be a minimum width of 1,000 mm which is appropriate for the risk profile of the upper floors and the number of occupants who may be expected to use the stair.

It is noted that the estimated occupancy number for the first floor marginally exceeds 60 persons. However, this is considered acceptable, in this instance for the following reasons:

- The staircase is a protected escape stair, provided with lobby protection.
- The proposed fire detection and alarm system is a category L2, which in this instance would be almost identical to an L1 system, and is considered to be a considerable enhancement to the minimum required system for this risk profile (manual system).
- The relevant travel distances to a place of relative safety are not exceeded.
- Due to the nature of the building, a high degree of management will be present, and any evacuations are expected to be practiced and be highly managed.
- Each classroom is provided with fire doors and rated partitions, internally in the building, which is a provision over and above the minimum required (non-fire rated) under BS 9999 for a school.
- The occupants are split into two segments of the floor plate, one being internal and the other external, and the majority of occupants being located in the external segment (54 people in the three classrooms to the external balcony). Additional provisions have been made to provide a safe escape route for these occupants escaping to the internal protected escape route (see section 9.7.9)
- There will be little to no queuing to enter the staircase as storey exits are sized considerably larger (double doors) than the required width for the estimated number of occupants.

With regards to the storey exit doors from each upper floor, these are required to have a minimum 850mm, when based on the estimated number of occupants.

The Sports Hall on the ground floor of the extension has an estimated occupancy number of 430 people, when based on a 0.5m²/person floor space factor. The proposal includes for three exits, 2 of which open in direction of escape and one that opens against the flow of people. Based on BS 9999 there one of the exits should be discounted for the purposes of the means of escape calculations. In this instance due to the location and proximity of the exits a single fire could take out both the external and internal escape doors and therefore they have both been discounted. Based on the above, and applying a B2 risk profile (see table 9-6 for escape factor) each exit should have a minimum width of 1498 mm.

An evacuation lift will be provided in the main stair of the extension and a disabled refuge will be provided in the protected lobby on both upper floors to serve as a means of escape for occupants with physical disabilities.

2.2.5 Evacuation strategy

The evacuation strategy for the building will be based on simultaneous evacuation, which is appropriate for this type of building. On confirmation of a fire alarm, all occupants will exit the building via the provided escape routes and stairs and move towards the external evacuation assembly point.

Personal Emergency Evacuation Plans (PEEPs) are to be prepared by the building management for any occupants identified as requiring assistance in their escape.

It is recommended that the evacuation strategy for the building is to be reviewed regularly during any changes to the school occupancy arrangement, e.g. when class timetables change or when new pupils are enrolled, and in all cases not less than on an annual basis in coordination with the academic year. This is to review the impact of the annual changes to the school cohort on the evacuation strategy and identify any new requirements for PEEPs, either due to new occupants who require PEEPs being identified or where alterations to classroom schedules result in occupants with PEEPs being located in new areas of the building.

2.2.6 Suitable access for firefighting

Fire Service vehicle access is afforded via the street and is existing for the school site.

However, as part of the proposed development at the site the central part of the existing school will be demolished to create a courtyard-like area, and a new extension will be built at the existing Sports Hall location. Although the erection of the new extension does not constitute a change in building perimeter, as there is an equal perimeter removed as part of the demolition works, the overall distance to reach the furthest point of the new extension has increased. Therefore, for this reason the proposed arrangement includes for the provision of a sprinkler protection system to the Sports Hall and new extension building areas in mitigation of the increased distance that is created.

Additionally, a dry-rising fire main will be provided in the new extension within the central stair of the building. Pipework will be provided through the existing building to enable an inlet to be sited to the west of the building, located such that it will be within 18 m of the fire service access route via Kings Road.

Personnel access to the building is provided via the normal means of escape from the building.

External firefighting water supply will be supplied to the building via public mains feeding the existing fire hydrants located around the building.

As the site is existing, it is considered that maintaining existing provisions for water supplies is acceptable under the Building Regulations.

3.0 Design code and standards

The guidance used for this development has been based on the recommendations of BS 9999:2017 (Fire Safety in the design management and use of buildings – Code of practice) and the associated British and European Standards (BS and EN respectively).

4.0 London Plan Policy D5(B5)

“In all developments where lifts are installed, as a minimum at least one lift per core (or more subject to capacity assessments) should be a suitably sized fire evacuation lift suitable to be used to evacuate people who require level access from the building.”

The proposed extension includes a single lift; which is to be designed as an evacuation lift in accordance with the recommendations of Annex G of BS 9999.

The building is a school and is expected to have a high level of management as well as personal emergency evacuation plans (PEEPs) in place for occupants that may require assistance. The new build will have a small floor plan, with two storeys above ground level. The school is expected to operate regular fire drills such that in an emergency any occupant who may need assistance will be informed of the procedure.

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