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RICHMOND HOUSE, WORCESTER PARK, LONDON KT4

INITIAL REPORT ON CAUSES OF FIRE SPREAD

26 NOVEMBER 2019

1 INTRODUCTION

1.1 This report has been prepared following the fire at Richmond House early in the morning of Monday 9 September 2019. The fire spread rapidly and destroyed much of the block, despite the efforts of 125 firefighters. The photograph below shows the aftermath, with much of the south west elevation having been destroyed.

1.2 The fire did less damage on the north east elevation. The photograph below shows that elevation: there was very significant damage to the north west, while the walls and the roof to the south east remained largely in place.

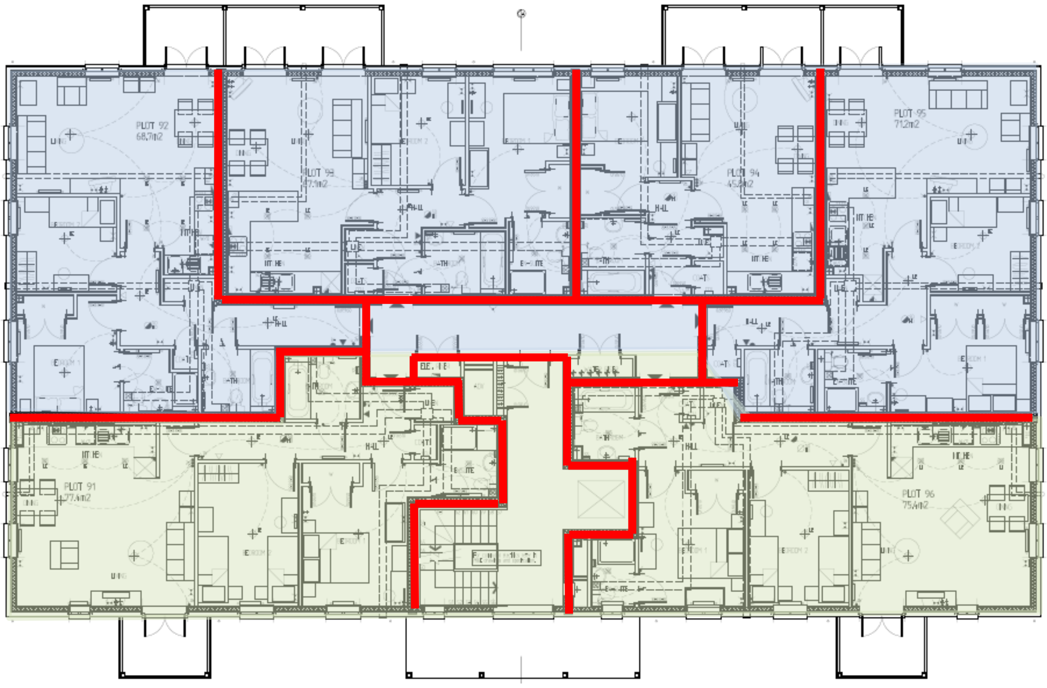
1.3 This report considers the construction of the building, and why fire was able to spread so rapidly in its early stages.

2 INTERNAL WALLS AND DOORS

2.1 The internal walls were constructed of plasterboard attached to timber stud walls, typically with two layers of board to each side. This is a recognised and long-established method of providing fire protection; it is effective and reliable so long as the boarding is continuous and properly attached to the studs, and any gaps, or penetrations around cables or pipes, are sealed using fire-resisting materials.

2.2 The effectiveness of protection in internal walls also depends on any doors in those walls being fire doors which provide an appropriate level of protection.

2.3 The plan below, shows the second floor layout of the building. The lines in red show the main lines of internal fire resistance, providing 60 minutes' fire resistance. The area above the line, shaded in blue, was largely destroyed; that below the line, shaded in green was remained largely intact, except at top floor and roof level where fire spread via the roof.



2.4 The internal walls and doors resisted the spread of fire more effectively than the external walls. While the flats to the south west of the circulation corridor were almost completely destroyed, those to the north east suffered little direct damage from the fire: they were damaged by smoke, and by firefighting water, and the structure as a whole became unstable, but the fire was held back on this line for a reasonable period of time.

2.5 The photograph above shows the condition of the wall in a flat on the “fire” side of the corridor. Through the doorway to the left, the flat has been completely destroyed by the fire, while the corridor, although damaged, remained in place. The walls around the corridor were required to provide 60 minutes’ fire protection, and they largely appear to have done so.

2.6 The contrast between the photographs above and below shows the further protection provided by the corridor walls: as noted previously, the photograph above shows the condition within the circulation corridor and the photograph below shows the relatively undamaged condition within the staircase enclosure to the north east of the corridor.

2.7 The escape staircase, which was constructed to provide protection for those escaping from the building, remained largely undamaged.

3 EXTERNAL WALLS

3.1 The building was largely timber framed, with elements of structural steelwork, built over a concrete framed basement.

3.2 The external walls were finished in a cement board material, called Hardie Plank, manufactured by James Hardie Building Products limited. In the standard fire classification, the Hardie Plank achieves a rating of A2, s1-d0. This means that:

3.2.1 The material is of "limited combustibility": on exposure to fire it does not flame, and it contributes very little to development of the fire. A2 describes a high standard of fire resistance: other materials classified as A2 include plasterboard and some types of mineral wool. The only higher grade in this classification, A1, applies to entirely non-combustible materials such as concrete, glass or cast iron.

3.2.2 On exposure to fire it produces little or no smoke. This is the highest classification in terms of smoke production.

3.2.3 On exposure to fire it produces no burning droplets. This is the highest classification in terms of flaming droplets.

3.3 The Hardie Plank was fixed to three layers of timber battens, of varying thicknesses, which held the Hardie Plank away from the main timber structure. These battens created a void approximately 16cm deep, between the boarding and the main structure, to the full height of the building. The photograph above shows the arrangement of undamaged battens on the north east elevation of the building.

3.4 Once fire entered this void it was able to spread very quickly around the outside of the building as the battens, being natural timber, burned easily. The photograph below shows the condition of the battens when the Hardie Plank boards were broken away during and after the fire.

3.5 The spread of fire behind the cladding should have been slowed very substantially by "cavity barriers", which should have been fitted within the void created by the battens in the following main locations: around all window and door openings in the external wall; on floor lines; and, on party wall lines. Cavity barriers are most often formed of blocks of dense mineral wool insulation, in a polythene sleeve; the patches of red in the photograph above show the remnants of cavity barriers.

3.6 For cavity barriers to be effective they have to be compressed in position and to fully close the cavity. Cavity barriers do not completely prevent the spread of fire, but they slow the spread enough that firefighters can tackle it within a limited area. In Richmond House, the cavity barriers that were fitted were defective: they were too small to close the cavity and they would have contributed nothing to control of the fire. Based on the limited number of drawings that I have seen, the defects in the cavity barrier installation appear to be the result of errors in the design.

3.7 The balconies had a steel structure, but the framework was finished externally in glass-reinforced plastic ("GRP") and the deck was formed in natural timber. Both GRP and timber burn readily, and both contributed to the development of the fire on the south west elevation. In some places that the fire did not reach, the heat was such that the GRP softened and slumped; the photograph below shows the roof of a balcony on the north east elevation, which collapsed during the fire.

3.8 The fire spread very largely in the external walls, as the drawing in Section 2 above shows.

4 ROOF

4.1 Because effective cavity barriers were not fitted in the external wall void, in its early stages the fire was able to spread almost unhindered, both horizontally and vertically. When it reached the roof, there was no effective obstacle to prevent fire spreading into the roof, which there should have been.

4.2 Fire also spread along the eaves, at the base of the roof. The eaves was boxed in using a dense plastic board, which burned readily and melted away; this board was fixed to timber battens held off the main wall of the building. Cavity barriers should have been installed in the eaves boxing to prevent fire spread, but these were absent.

4.3 The photograph below shows part of the north east elevation, where the remaining charred timber framing at the eaves is visible, the white plastic having almost completely melted away in the fire.

4.4 The roof was finished with slate fixed to timber battens, with a waterproof membrane underneath. The roof structure was timber.

4.5 Fire stopping should have been present under the slates, on the lines of party walls, but it may have been absent: the spread of fire across the roof does not appear to have been delayed on the party wall lines. However, if this firestopping was absent, that defect probably contributed relatively little to the spread of the fire: by the time the fire reached the roof, it had already spread so far within the wall cavity that much of the roof was exposed to fire from below at the same time, and firestopping beneath the roof tiles would have had little effect.