

A 3D molecular model of a complex organic molecule, possibly a polymer or a large organic compound. The structure features several interconnected rings and chains of atoms, represented by spheres (likely carbon and hydrogen) and connecting rods. A prominent blue wavy line is visible at the top of the image, possibly representing a liquid surface or a specific functional group. The overall appearance is that of a scientific visualization of a chemical structure.

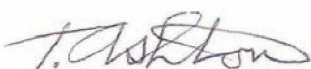

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**Testing
Advising
Assuring**

Revision History

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Validity

This report is formulated on the basis of the information and experience available at the time of preparation. It is applicable to the above-mentioned project only in accordance with the client's instructions. It is only valid provided no other modifications are made other than those for which a formal opinion has been sought and given by Exova Warringtonfire.

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1 Introduction

The proposed development is the refurbishment of Grenfell Tower, a 24 storey residential block incorporating a boxing club at ground storey level, a nursery at mezzanine level (between the ground storey and walkway level) and office accommodation in the mezzanine level between walkway level and first storey level.

The refurbishment comprises:

- The creation of a new reception area, offices and a new stair providing access to the boxing club at ground storey level;
- The re-siting of the nursery to ground storey level;
- The creation of new residential apartments and office accommodation in the mezzanine over the ground storey (mezzanine level);
- The re-siting of the boxing club to walkway level;
- The creation of new offices and a community office at walkway level;
- The creation of new residential apartments in the level over walkway level (walkway + 1 level); and
- Improvements to the building services.

This report details the applicable statutory controls in respect of fire safety and contains an outline fire safety strategy for compliance with these statutory controls.

The report is based upon discussions held with the design team, the Royal Borough of Kensington & Chelsea and on fire access and fire strategy drawings (numbers 1279_SEA_(08) 100 and 1279_SEA_(08) 101) produced by Studio E LLP.

2 Statutory Considerations

2.1 The Building Regulations 2010

The building work will have to be carried out in conformity with the requirements of Schedule 1 of the Regulations. To satisfy Regulation 4, it will be necessary to ensure that, where a building is altered, it is no more unsatisfactory in relation to the requirements of Schedule 1 than it was before the works were carried out.

The requirements of Schedule 1 relating to fire safety are:

- a) B1 (means of warning and escape);
- b) B2 (internal fire spread (linings));
- c) B3 (internal fire spread (structure));
- d) B4 (external fire spread); and
- e) B5 (access and facilities for the fire service).

Compliance with these requirements is normally achieved by meeting the standards contained in Approved Document B (ADB)⁽¹⁾ and/or BS 9991⁽²⁾.

2.2 The Regulatory Reform (Fire Safety) Order 2005

The Regulatory Reform (Fire Safety) Order came into effect on 1 October 2006. One effect of this Order is that the owner (or the "responsible person" as defined in the Order) will have to carry out a fire risk assessment (or have a fire risk assessment carried out on his/her behalf). Compliance with the Regulatory Reform Order is normally achieved by following the guidance given in the DCLG Guide⁽³⁾.

2.3 London Building Acts (Amendment) Act 1939

The building was subject to the requirements of Section 20 of the London Building Acts (Amendment) Act 1939. However, Section 20 was repealed on 9 January 2013.

3 Proposed Outline Fire Safety Strategy

3.1 Compliance with The Building Regulations 2010

3.1.1 Compliance with B1 (means of warning and escape)

FIRE DETECTION/ALARM SYSTEM

The nursery, the boxing club and the ground and walkway offices will all be provided with at least a Type "M" system as defined in BS 5839-1⁽⁴⁾. Each system in these three elements will be "stand alone" but interlinked so that an outbreak of fire in one of them will be enunciated on all fire alarm control panels.

New apartments will be provided with "LD3" systems of detection and sounders as defined in BS 5839-6⁽⁵⁾.

MEANS OF ESCAPE

NURSERY

The nursery will have at least two exits direct to the exterior.

BOXING CLUB

The boxing club will have two exits: one to the stair serving the office accommodation and one via the new stair from walkway level to ground storey level.

APARTMENTS

The new apartments in the mezzanine over walkway level will have access via a new doorway to the existing escape stair serving the residential tower.

The new apartments in the mezzanine over the ground storey will have access to the new stair serving the boxing club.

While the sharing means of escape between residential and non-residential accommodation is not endorsed by current statutory guidance, these proposals represent a continuation of the existing principles for means of escape in the building and therefore do not create a non-compliance with the requirements of the Building Regulations. It is noted in this context that the fire loads in the offices and boxing club are no greater than those in a typical flat, and that the non-residential accommodation will be separated from the stairs by ventilated lobbies (see below). The risks the occupants of a flat from a fire in a non-residential demise are therefore not considered significantly greater than those stemming from a fire in another flat.

OFFICES

The new offices at mezzanine and walkway levels will have access to a stair which delivers to the main entrance to the building and to the new stair serving the boxing club. The office accommodation at ground storey level will have access to the main entrance to the building.

NEW STAIR

The new stair will be separated from the remainder of the accommodation at each level by construction having a 30 minute standard of fire resistance with the doorways therein fitted with self-closing "FD30S" doors.

EXISTING STAIRS

The existing stair (and the lobbies thereto at each level) which serves the residential apartments forms part of the fire-fighting shaft serving the building. Therefore, the stair and lobbies will be enclosed by construction having a standard of fire resistance to satisfy B5 (see below)

The existing stair which serves the new office accommodation (and which serves as an alternative escape from the boxing club) together with the exit from this stair to the main entrance at ground storey level will be enclosed by construction having at least a 30 minute standard of fire resistance with the doorways therein fitted with self-closing "FD30S" doors. However, where parts of the walls enclosing this stair form part of the enclosure to the fire-fighting lobbies, these parts will have a standard of fire resistance of 120 minutes and the doorways therein will be fitted with self closing "FD60S" doors.

SMOKE VENTILATION OF LOBBIES

LIFT LOBBIES

The lift lobbies serving the residential apartments at mezzanine + 1 level will be ventilated by the existing supply and extract ventilation system which serves the upper levels which will be extended down to this level. This supply and extract system will be overhauled as part of the improvement to the building services. This is covered in a separate report by Max Fordham.

OTHER LOBBIES

The stair serving the office accommodation effectively forms lobbies between this accommodation and the lift lobbies referred to above. An automatic vent (AOV) 0.4m² in area will be provided at the head of the stair. This will provide a means for venting smoke from the office accommodation at mezzanine and walkway levels and from the lift lobby at walkway level. An AOV 0.4m² in area will be provided between the lift lobby and the stair to facilitate smoke ventilation of the latter.

The corridor between the offices and the main entrance at ground storey level will also be provided with an AOV 0.4m² in area opening direct to atmosphere.

The lobby between the boxing club and the new stair at walkway level will also be ventilated direct to atmosphere via an AOV 0.4m² in area.

The community room on the mezzanine above ground storey level will be vented direct to the exterior by an AOV 0.4m² in area.

All these AOVs will open on activation of smoke detectors sited within each of the areas.

ESCAPE ROUTES WITHIN APARTMENTS

The new apartments will have protected entrance halls (i.e. entrance halls enclosed by construction having a 30 minute standard of fire resistance with the doorways therein fitted with "FD20" doors). Bathrooms and WCs will not be enclosed by fire resisting construction but, where they abut other rooms, they will be separated from the latter by walls having a 30 minute standard of fire resistance.

The travel distance from the apartment entrance door to the door to the furthest habitable room will not exceed 9m.

EMERGENCY LIGHTING

Where necessary, emergency lighting will be provided in the escape routes from the building designed in accordance with the recommendations of BS 5266⁽⁶⁾.

3.1.2 Compliance with B2 (internal fire spread (linings))

All new wall and ceiling linings will be the equivalent of the following:

- a) in circulation spaces and escape routes other than circulation spaces within the apartments – Class 0 (using the UK testing methods) or Class B-s3, d2 (using the European testing methods); and
- b) elsewhere – Class 1 (using the UK testing methods) or Class C-s3, d2 (using the European testing methods), although a Class 3 standard or Class D-s3, d2 could be used within rooms not exceeding 30m² in non residential accommodation or 4m² in area within the apartments.

(NOTE: the European testing methods referred to above are the new methods developed as part of a harmonisation program for fire testing within Europe as detailed in BS EN 13501-1: 2002⁽⁷⁾. Materials achieving the classifications to either the new European test method or the UK test methods are considered to be acceptable).

3.1.3 Compliance with B3 (internal fire spread (structure))

FIRE RESISTANCE OF ELEMENTS OF STRUCTURE

All new elements of structure will be constructed to have the same standard of fire resistance as that of the existing elements. This is assumed to be 120 minutes for the structural frame and 60 minutes for floors.

COMPARTMENTATION

Compartment walls and/or floors will be provided:

- a) Between apartments and other apartments;
- b) Between apartments and common areas;
- c) Between the nursery and the remainder of the building;
- d) Between the boxing club and the remainder of the building; and
- e) Between the offices and the remainder of the building.

Compartment walls and floors will have a 60 minute standard of fire resistance unless they form part of the structural frame of the building (where they will have a 120 minute standard of fire resistance). Doorways within compartment walls will be fitted with self closing doors having a 60 minute standard of fire resistance, except where a different standard will be necessary to satisfy B5 (see below).

3.1.4 Compliance with B4 (external fire spread)

It is considered that the proposed changes will have no adverse effect on the building in relation to external fire spread but this will be confirmed by an analysis in a future issue of this report.

3.1.5 Compliance with B5 (access and facilities for the fire service)

A new inlet to the existing dry rising main will be provided in a location where it will be within 18m (and in sight of) where a pumping appliance could pull up.

Access to the building for fire service personnel will be at ground storey level. If access is obtained at ground storey level, fire service personnel will have to proceed up the internal stair to either the mezzanine above the ground storey or to walkway level. Outlets from the dry rising main will be provided in the common lobbies at both these levels and in the mezzanine over walkway level.

Notwithstanding the above, access to the fire-fighting lift will be available at ground storey level

The entrance hall containing the stair will be separated from all the accommodation by construction having a 120 minute standard of fire resistance. All connections to the accommodation in this enclosure (except the connections to the common lobbies) will be via lobbies enclosed to the same standard of fire resistance with the openings fitted with self closing doors of the following standard:

- To the accommodation – “FD60S”; and
- To the stair – “FD30S”.

As stated above, these lobbies will be ventilated.

A concierge office will be incorporated within the main entrance to the building. This is considered to be acceptable as all the occupants of the other areas of the building will be able to escape independently of this area.

3.2 Compliance with the Regulatory Reform (Fire Safety) Order 2005

It is considered that the fire safety measures described above will satisfy the requirements of the Regulatory Reform (Fire Safety) Order.

Portable fire-fighting equipment (fire extinguishers) will be provided in the nursery, boxing club and office accommodation in accordance with the recommendations of BS 5306-8⁽⁸⁾.

4 References

1. Approved Document B. Fire safety. Volume 2 – Buildings other than Dwellinghouses. Department for Communities and Local Government - TSO 2006
2. BS 9991: 2011. Fire safety in the design, management and use of residential buildings
3. Fire Safety Risk Assessment – sleeping accommodation. Department for Communities and Local Government 2006
4. BS 5839-1: 2002. Fire detection and alarm systems for buildings: Part 1: Code of practice for system design, installation, commissioning and servicing
5. BS 5839-6: 2004. Fire detection and alarm systems for buildings - Part 6: Code of practice for the design, installation and maintenance of fire detection and fire alarm systems in dwellings
6. BS 5266: Part 1: 1999 Emergency lighting. Code of practice for emergency lighting of premises other than cinemas and certain other specified premises used for entertainment
7. BS EN 13501-1: 2002. Fire classification of construction products and building elements. Classification using data from reaction to fire tests
8. BS 5306-8: 2000. Fire extinguishing installations and equipment on premises. Part 8: Selection, and installation of portable fire extinguishers – Code of practice