

Meeting Record

Date	4 th July 2022 (Mon), 16:30-18:00
Venue	Video conference using Microsoft Teams
Chair	Paul Bussey
Author	-

Attendees	Name	Initial	Organisation
1	Paul Bussey (chair)	PB	AHMM
2	Aamir Shahzad	AS	Currie Brown
3	Ana Matic	AM	Scott Brownrigg
4	Chris Ottaway	CO	Ottaway and Associates
5	Dagmar Binsted	DB	Scott Brownrigg
6	"daniel"		???
7	Danny Coomber	DC	Hardwood
8	David Brook	DB	Hawkins Brown
9	David Mulligan	DM	Network
10	David Stanley	DS	Martin Arnold
11	Eleni Asimakopoulou	EA	UCLan School of Engineering
12	Gary Walpole	GW	NFRC
13	Gavin Bull	GB	HSE
14	Lee Harvey	LH	EPSOM & St Helier University Hospitals NHS Trust / Redline Fire Safety Consultancy
15	James Taylor	JT	Nicholas Hare
16	Jeffrey Tribich	JT	Tribich Consultancy
17	Jeremy Williams	JW	Grid Architects Ltd.
18	Joanne Lear	JL	NFRC
19	Liesl Dommissie	LD	Bernard Sims Associates
20	Mark Reynolds	MR	Boundary Concepts Limited
21	Mark Skinner	MS	Hawkins Brown
22	Martin Touška	MT	Rolfe Judd
23	Euan McRobie	EMcR	Capital
24	Myshkin Clarke Hall	MCH	Myshkin Clarke Hall
25	Nick Panayiotou	NP	P&P Architects Ltd.
26	Peter Hegarty	PH	Chapman Taylor
27	Peter Taylor	PT	Leslie Clark
28	Philip Roy	PR	
29	Ralph Isitt	RI	Scott Brownrigg
30	Richard Collins	RC	Feilden Clegg Bradley Studios
31	Richard Price	RP	Sweco
32	Russell Smith	RS	Robinson Low Francis
33	Sarah Susman	SS	Scott Brownrigg
34	Shephard Ndlove	SN	UCLan School of Engineering
35	Stuart Osborne-Cudmore	SOC	???
36	James Martin	JM	AHMM
37	Goh Ong	GO	AHMM

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NOTE ON COVID-19: Since 23rd March 2020, all DIOHAS meetings will take place over video conference.

Speaker

Presentation Title: Feedback session for the SAFE High Rise Residential Building Evacuation research.

Background:

Following on from the Grenfell Tower Inquiry Phase 1 report, the Home Office and the National Fire Chiefs Council (NFCC) are undertaking research on how the fire and rescue services carry out evacuations of high-rise residential buildings. This is linked to recommendations from the Grenfell Tower Inquiry.

The University of Central Lancashire (UCLan) was appointed to deliver the project, and live testing is taking place here in London this May, supported by the London Fire Brigade. The title of the overall research is SAFE – Operational Strategies Aiming at Effective Fire Evacuation in HRRB's.

The live exercises will help the Fire and Rescue Service make key choices about how best to evacuate high rise buildings. Using cutting-edge technology the exercises will provide data to support computer modelling. Every minute counts in an emergency, and this modelling will help commanders in real incidents in the future make the best operational decisions.

The dates for the research exercise are the 3rd to 6th May 2022.

Brent Council have kindly provided an excellent venue for the exercise called Hereford House. This is an empty 17 storey high-rise residential building.

The Salvation Army have kindly agreed to supply refreshments all day during the research to volunteer residents.

Agenda (as worded in meeting invitation):

The Department for Levelling Up, Housing and Communities (DLUHC) conducted a London Fire Brigade trial evacuation of the 17-storey residential Hereford House in May this year. Various DIOHAS members, Architects and others from the general public attended.

Paul Bussey sits on the DLUHC Means of Escape Steering Group who assisted the University of Central Lancashire with the arrangements for this key event, the first since the Post War Building Regs Studies in the 1950's.

Paul will present a compilation of details of this event and a summary presentation of RIBA driven analysis. We are still awaiting the official report, but we would like to hear the views of DIOHAS members who attended, and perhaps even those who did not.

Details

Link to the recording of the meeting:

https://youtu.be/E_EeE5keaM

Evacuation Research Trials - Volunteer Invitation

3rd to 6th May 2022, Hereford House, Carlton Vale, London NW6 5QH

Invitation from London Fire Brigade

Following on from the [Grenfell Tower Inquiry Phase 1 report](#), the Home Office and the National Fire Chiefs Council (NFCC) are undertaking research on how the fire and rescue services carry out evacuations of high-rise residential buildings. This is linked to recommendations from the Grenfell Tower Inquiry.

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This is where we need your help. For the experimental tests to be successful we will need approximately 250 volunteers per day to act as residents over the 4 days to take part in the research. Can I ask you to spread the word widely as we need as many volunteers as you can provide. This is a huge opportunity for housing teams, emergency planners & Local Authority Liaison Officers, and other agencies to see exactly what an evacuation looks and feels like, and to contribute to this important research. There will be fire crews facilitating the various evacuations to simulate a real evacuation. This research will have a huge impact nationally with the support of London Local Authorities and other resilience partners.

Below is the link directly to our calendar where people can register their attendance, it is optional to volunteer for a day at a time.

[Click here to register](#)

Frequently Asked Questions

- 1. What time is the exercise?** Please arrive in time for a 10.30 safety briefing. The finish time is flexible due to the nature of the exercise but will be approximately 16.00.
- 2. What are the travel arrangements?** Volunteers will need to make their own travel arrangements to and from the exercise. The nearest Underground station is Kilburn Park (5 min walk). The nearest Overground station is Kilburn High Road (8 min walk).

3. **Refreshments.** Refreshments (tea/coffee/cold drinks) and snacks will be provided during the day. Please bring a packed lunch / other food you may require.
4. **Who can take part?** There are no restrictions on who can take part. Please feel free to pass on the invitation to colleagues, family and friends, but please do not advertise the event publicly or pass on my contact details to anyone outside of the London Resilience Partnership. There is no requirement for volunteers to have prior emergency services or resilience experience.

Children of any age can participate provided they are accompanied by an adult. If you intend to bring a child, please include a note and their age when you book online (include this in the section '**Anything else you would like to say**').

5. **Professional observers / other exercise participation.** There are no opportunities for observers or to participate in emergency response coordination arrangements at these exercises. Anyone wishing to observe **would** need to do so by volunteering as a resident/evacuee.
6. **Is registration required?** Yes. It will not be possible to participate without registering in advance via the link above. Anyone who turns up on the day without registering will not be able to participate.

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'Appropriate' Means of Escape in Single and Two Staircase Residential Buildings?



The Building Regulations Statutory Requirement B1

Means of warning and escape

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 of safety outside the building capable of being safely and effectively used at all material times.

ONLINE VERSION
HM Government

The Building Regulations 2010

Fire safety

APPROVED DOCUMENT

B

VOLUME 2 – BUILDINGS OTHER
THAN DWELLINGHOUSES

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

Came into effect April 2007



For use in England*

ONLINE VERSION

2006 edition
incorporating 2007
and 2013
amendments

FAILED-Is this
too simplistic?

Approved Document B1 - 2010

Criteria for means of escape

B1.v The basic principles for the design of means of escape are:

- a. that there should be alternative means of escape from most situations; and
- b. where direct escape to a place of safety is not possible, it should be possible to reach a place of relative safety, such as a protected stairway, which is on a route to an exit, within a reasonable travel distance. In such cases the means of escape will consist of two parts, the first being unprotected in accommodation and circulation areas and the second in protected stairways (and in some circumstances protected corridors).

Omitted from Approved Document B1 – 2019WHY?

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



Approved Document B1 - 2010

Alternative means of escape

B1.vii There is always the possibility of the path of a single escape route being rendered impassable by fire, smoke or fumes. Ideally, therefore people should be able to turn their backs on a fire wherever it occurs and travel away from it to a final exit or protected escape route leading to a place of safety. However, in certain conditions a single direction of escape (a dead end) can be accepted as providing reasonable safety. These conditions depend on the use of the building and its associated fire risk, the size and height of the building, the extent of the dead end and the numbers of persons accommodated within the dead end.

Since 2006 this guidance is not mandatory in residential tower blocks

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



2019 Approved Document B Vol 1 Dwellings

Number of escape routes

3.26 A person escaping through the common area, if confronted by the effects of a fire in another flat, should be able to turn away from it and make a safe escape via an alternative route.

Number of common stairs

3.59 A building should provide access to more than one common stair if it does not meet the criteria for a single common stair (see paragraph 3.26 and 3.27).

How can this NOT mean 2 staircases in a tower block above 11m?

But ADB Vol 1- 2019 is still not mandatory?

ONLINE VERSION
HM Government

The Building Regulations 2010

Fire safety

B

APPROVED DOCUMENT

Volume 1: Dwellings

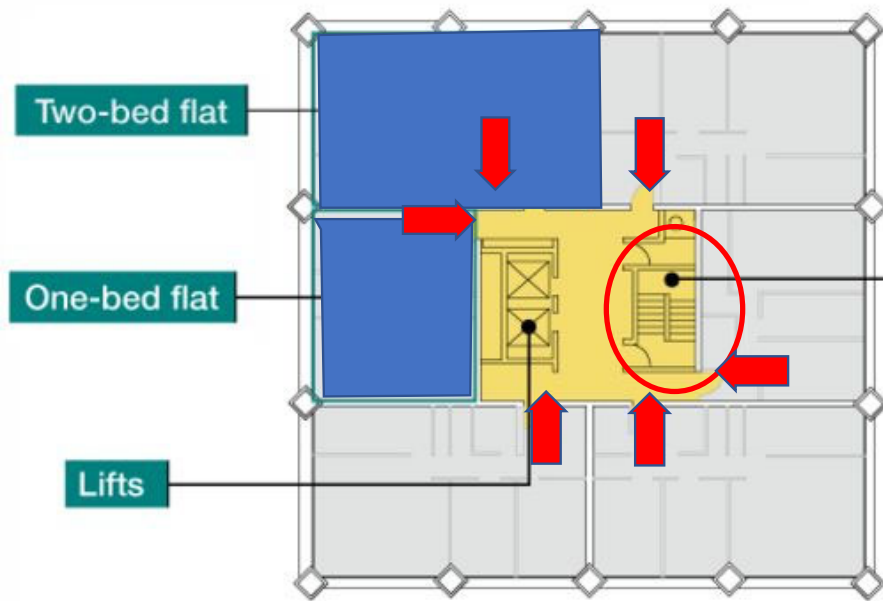
Requirement B1: Means of warning and escape
Requirement B2: Internal fire spread (linings)
Requirement B3: Internal fire spread (structure)
Requirement B4: External fire spread
Requirement B5: Access and facilities for the fire service
Regulations: 6(3), 7(2) and 38

2019 edition – for use in England
ONLINE VERSION

Regulatory Relaxation 1974 GLC CoP & London Building Acts 1939 & ADB 2016 Ed

6 Flats & 6 exits. No opportunity for alternative exits or another stair?

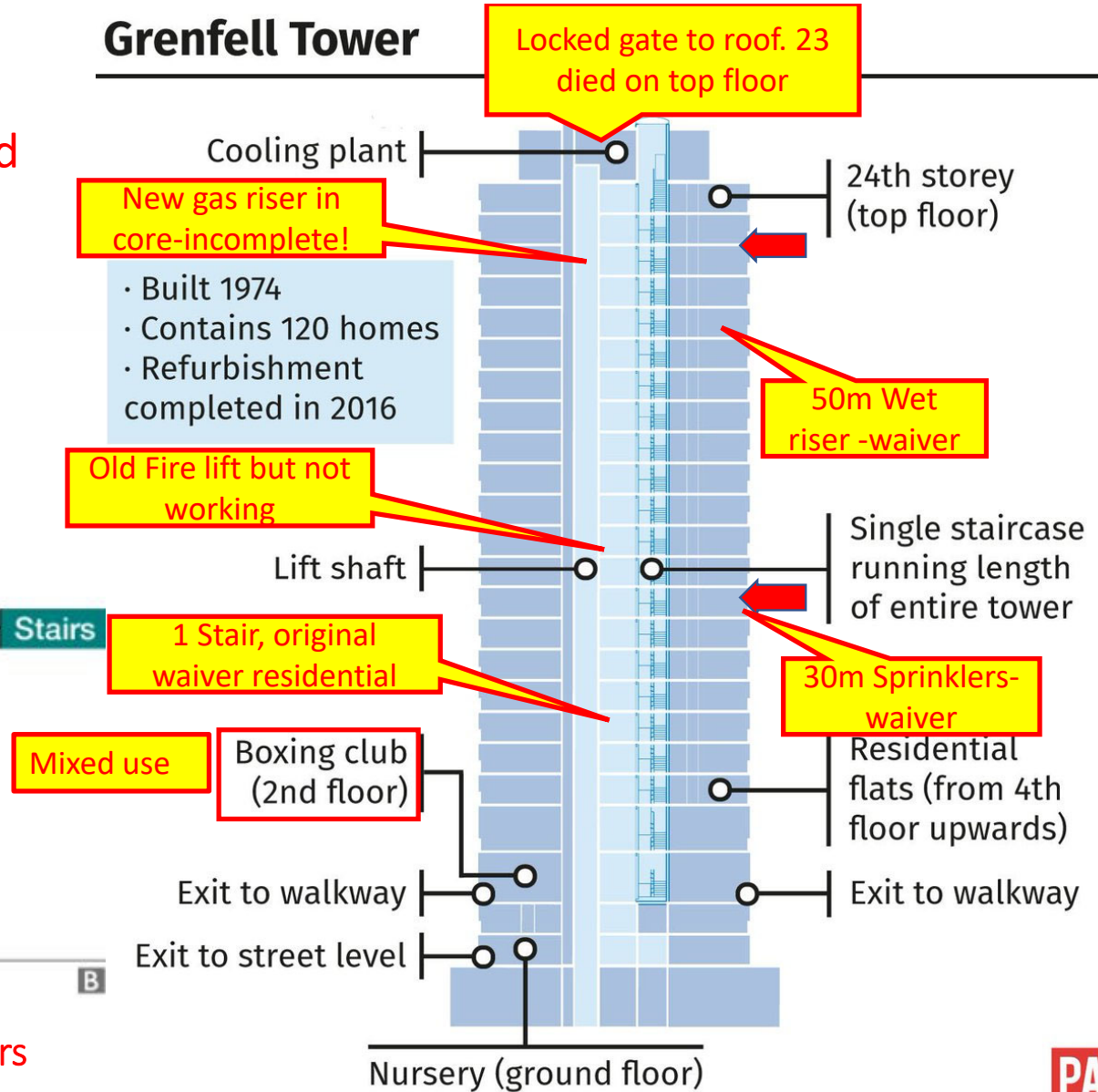
Typical residential floor in Grenfell Tower



Source: Studio E Architects

.....but actual design in 1974 & 2016 given waivers

Grenfell Tower



The Fire Source & expected compartmentation

The fourth floor

The majority of floors in Grenfell Tower have six flats. Four with two bedrooms and two with one bedroom

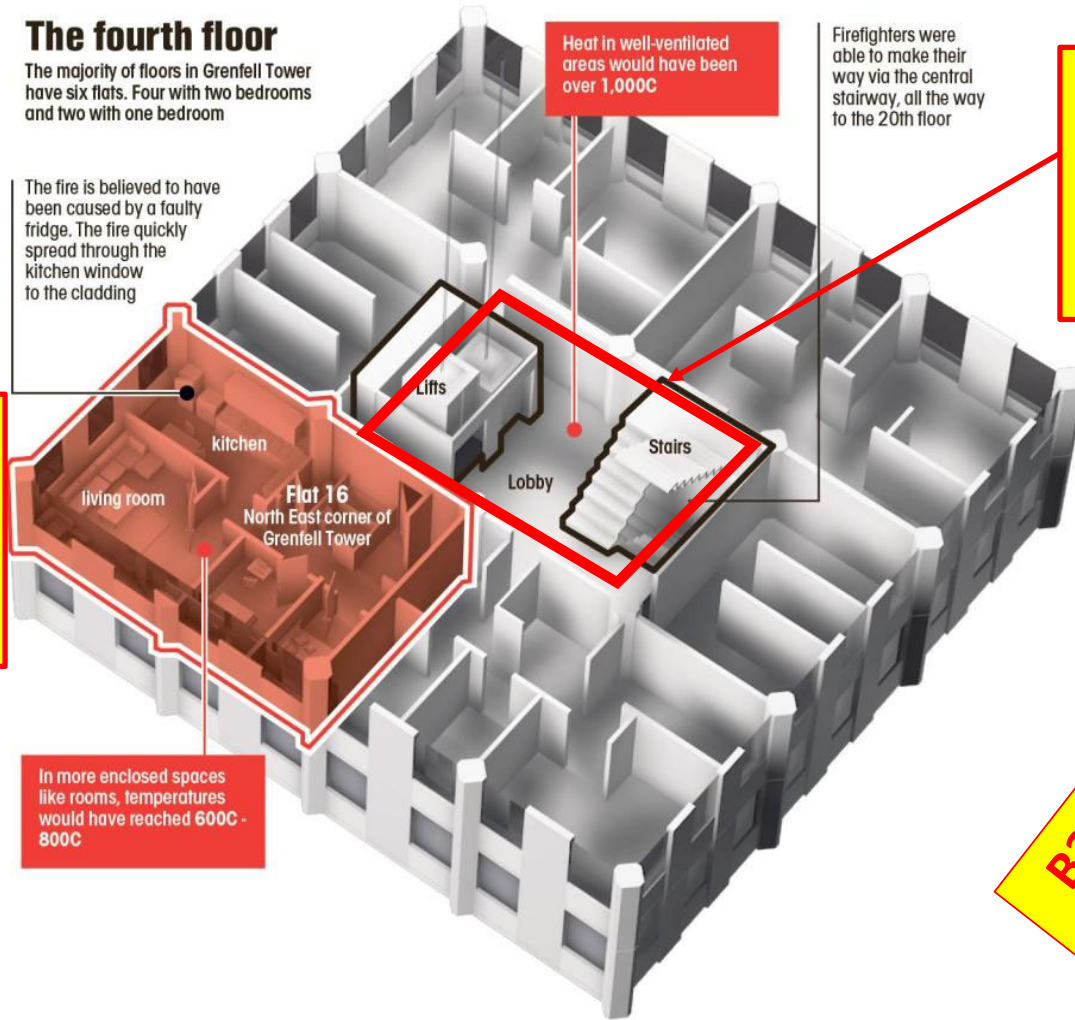
The fire is believed to have been caused by a faulty fridge. The fire quickly spread through the kitchen window to the cladding

Heat in well-ventilated areas would have been over 1,000C

Firefighters were able to make their way via the central stairway, all the way to the 20th floor

120 minutes enclosure to Fire Lobby, lift and staircase
FAILED

60 Minutes Enclosure to flats internally
FAILED



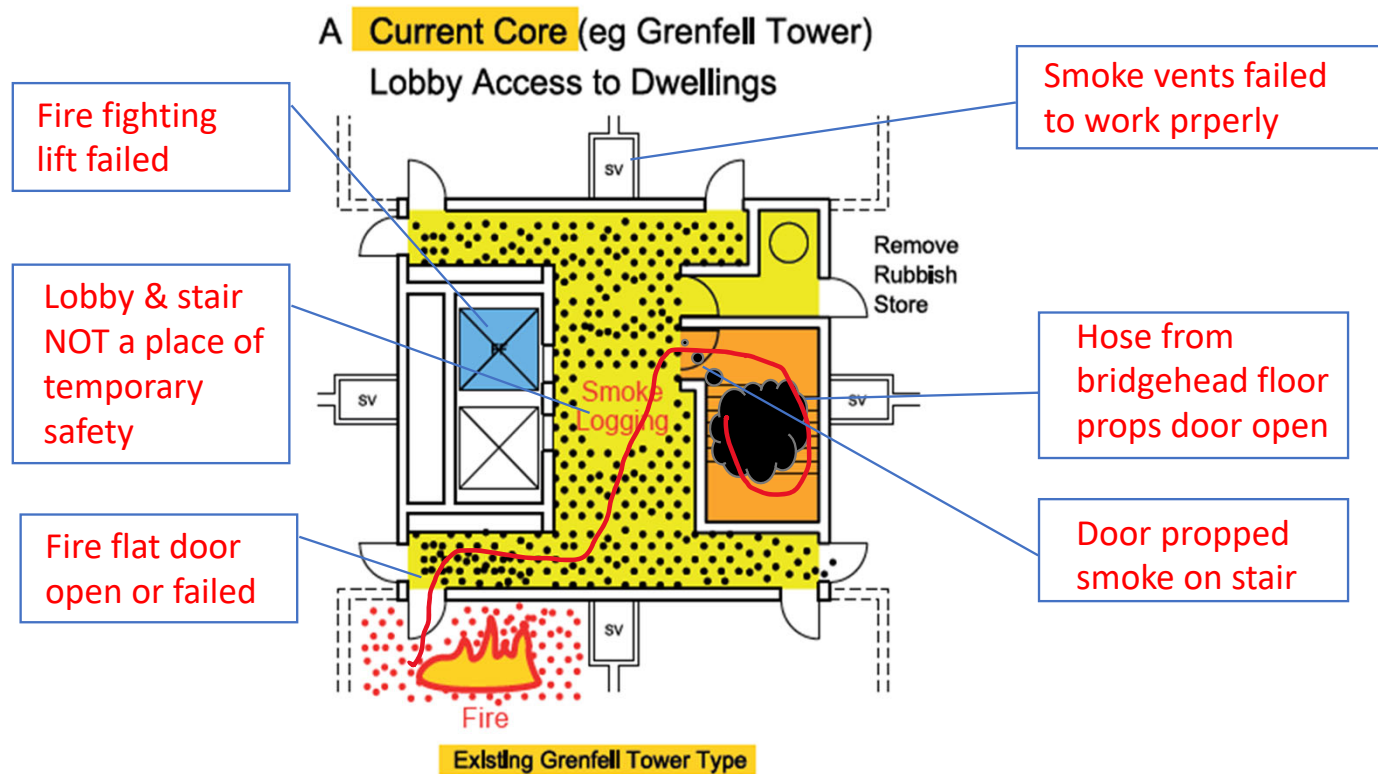
B3 Compartmentation- Internal Fire Spread (Structure) FAILED?

Grenfell Core - Failed in all respects

CORE PRINCIPLES

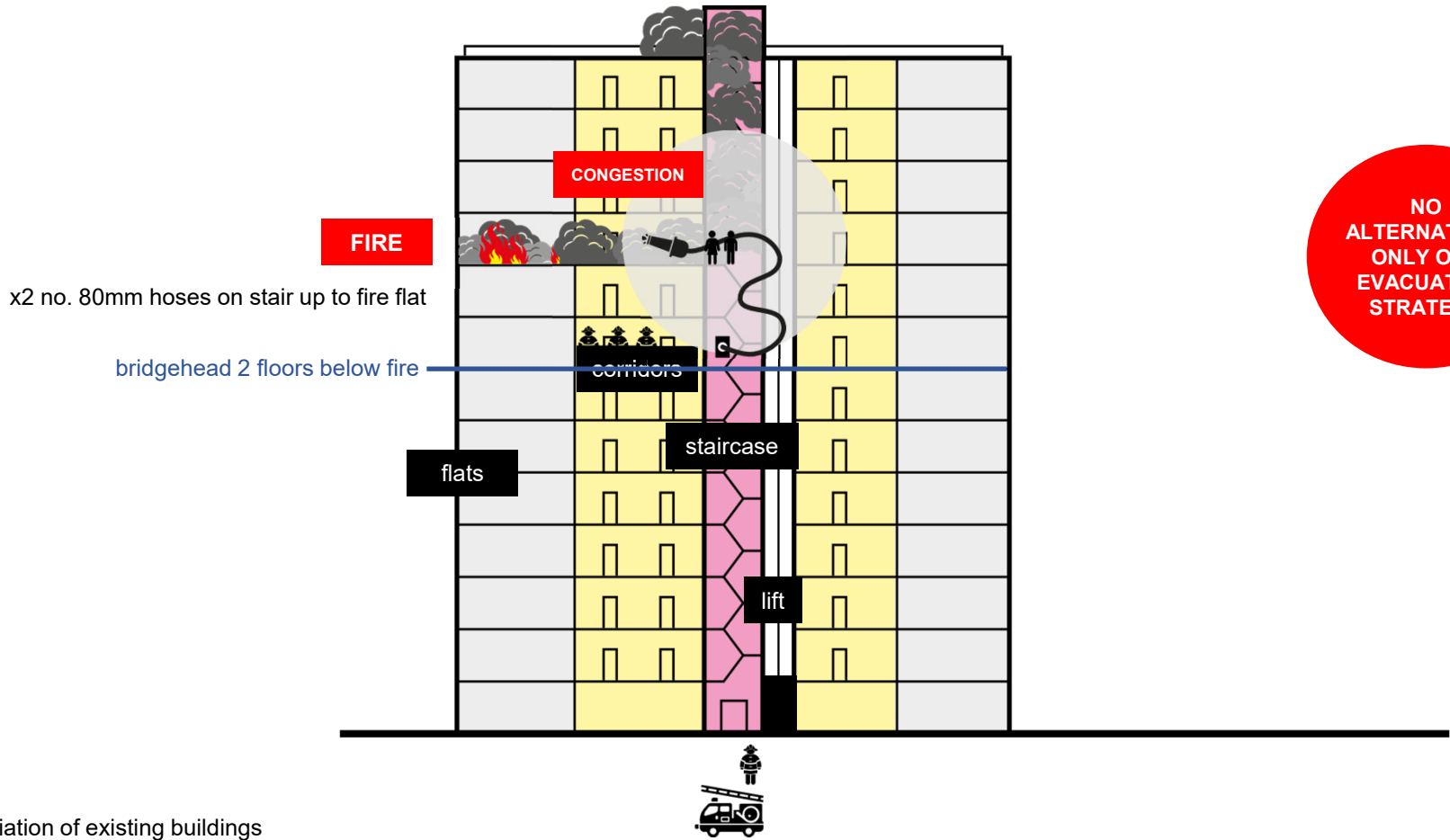
EXISTING HRRBS IN OCCUPATION Typical Single Staircase & related Legislation

Central Core Block (e.g. Grenfell Tower)



So called 'Appropriate' means of escape principles? FAILED?

GRENPELL TOWER as June 14th 2017

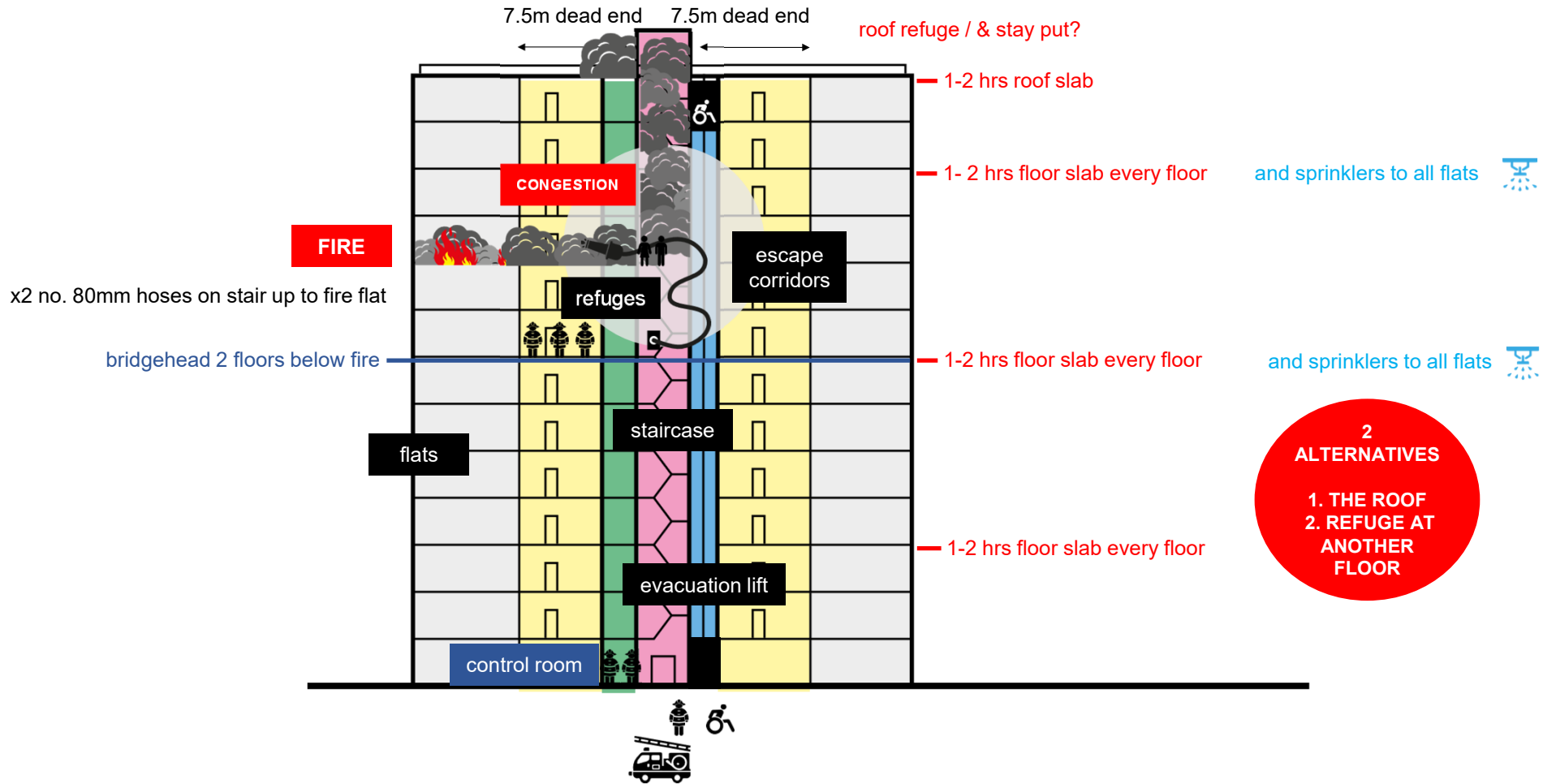


NO
ALTERNATIVES
ONLY ONE
EVACUATION
STRATEGY

Remediation of existing buildings
&/or new build single stair upto 'x'?

'Adequate' means of escape principles?

SINGLE STAIRCASE BUILDING Remediation of existing buildings &/or new build with single stair upto'??' metres.



Understanding “vulnerable persons” evacuation

International
FIRE
Professional



No such thing as “general needs” housing

Every Housing Block is effectively a Care Home!



Understanding “vulnerable persons” evacuation



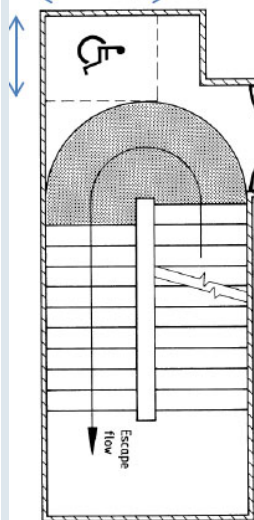
Is this an adequate landing refuge?



Fire Fighters ascending?



1400 mm



Can we make further improvements?



Wider stairs , especially where single?



These design criteria need further validation or change

Slide 12

RW4

if we can find similar images to from stock happy for update replacements, but would need to be very similar for context

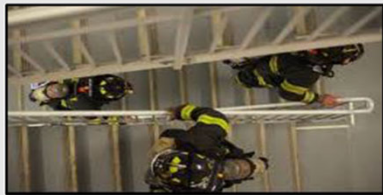
Rachel Walker, 18/01/2022

Kent FRS stairwell protection strategy

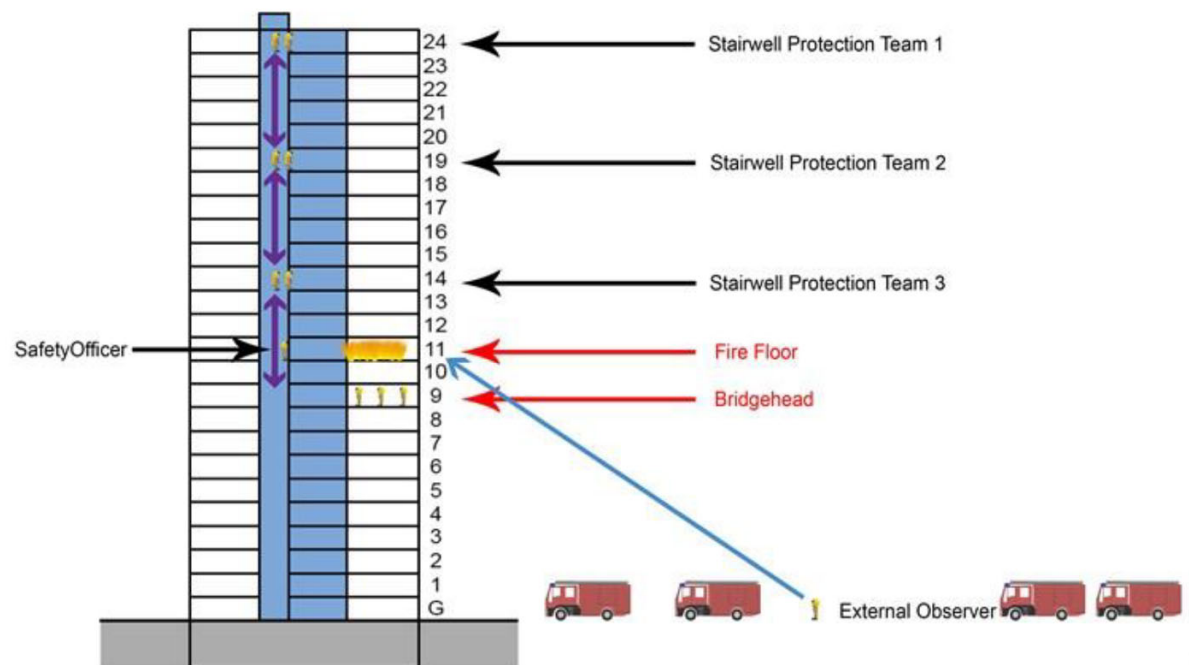
RIBA Academy

Roles of 'Stairway Protection Teams'

- **Patrol** stairwells continuously from top-to-bottom to ensure that egress routes are safe and free of obstructions; monitor gas levels
- **Search** floors, stairwells, hallways, and lifts for building occupants who may be trapped or are entering an untenable environment
- **Report** information about conditions at each floor to the incident commander.
- Ensure the stairs are **clear of smoke**
- **Deploy to FSG calls** where required
- **Manage occupant evacuation** where required



PVV Positive pressure ventilation by mobile fans suitably deployed with vent to atmosphere openings at the top



Especially where a second staircase is not practicable or available

Stairwell protection teams in high-rise fires

In the UK - s3.3 ADB-1 2019: (in part)

Stairwell Protection Teams R.I.C.E

A Collection of Papers 2020 by Paul Grimwood PhD, FIFireE Kent Fire and Rescue Service

Twin breaching dry riser in protected lobby **NOT** stair

Twin breaching dry riser in protected lobby not stair

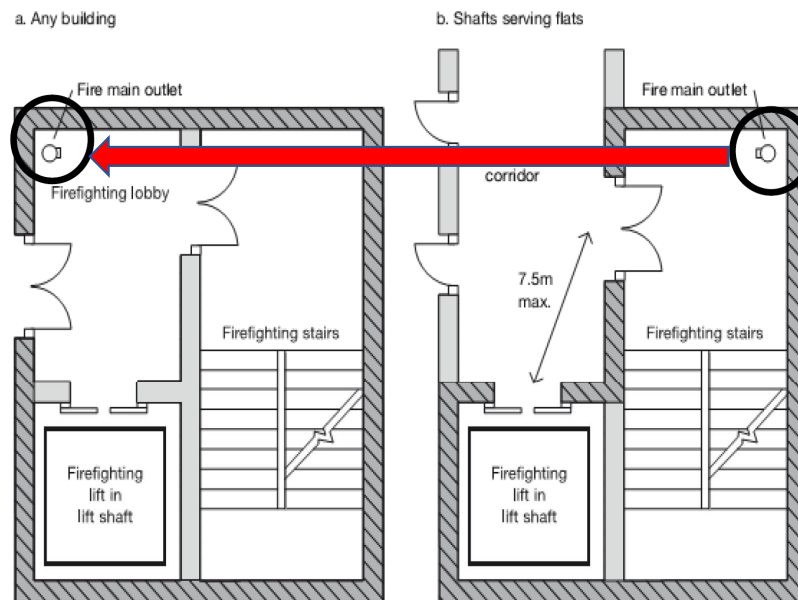
Kent FRS 150mm Rising Mains in New Single Stair Residential Buildings

Kent Fire and Rescue Service have hydraulically calculated and flow tested the new 150mm twin outlet rising fire mains. These have demonstrated a single 750 L/min jet or two jets of 650 L/min each at 50 metres high are achievable using 51mm hose.



Diagram 52 Components of a firefighting shaft

See para 17.1



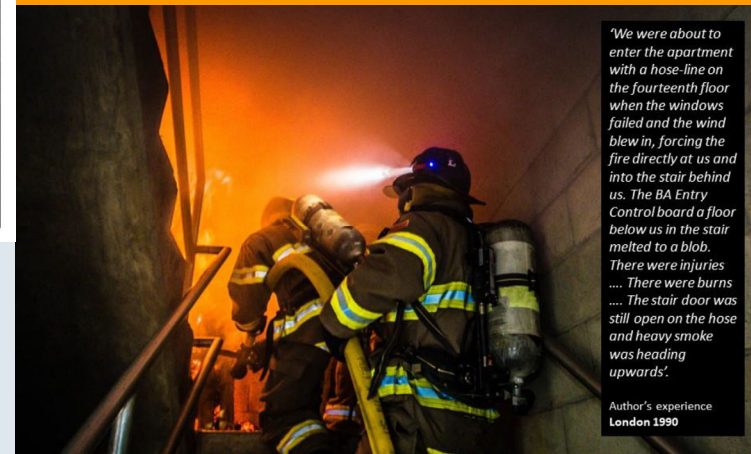
Smoke Hoods carried by Fire Fighters



When controlling stair evacuation, at what gas levels do you issue smoke hoods? Can you continue to support unaided self-evacuation both with or without smoke hoods for large numbers of people? At what gas levels may this be safe to do whilst optimising the use of a limited amounts of available smoke hoods?

Photograph © London Fire Brigade 2019

Avoid hoses on the stairs as trip hazard & stair doors propped open allowing smoke spread



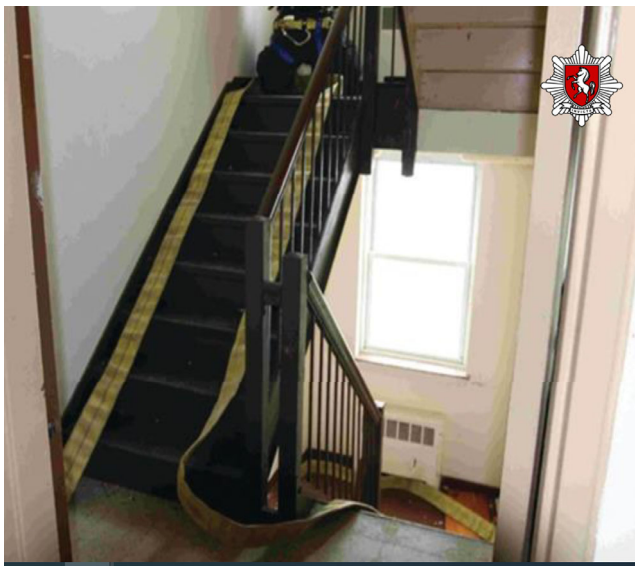
'We were about to enter the apartment with a hose-line on the fourteenth floor when the windows failed and the wind blew in, forcing the fire directly at us and into the stair behind us. The BA Entry Control board a floor below us in the stair melted to a blob. There were injuries There were burns The stair door was still open on the hose and heavy smoke was heading upwards.'

Author's experience London 1990



A German fire chief once said that the most important room in a fire building is the stairwell! He is right. Stairwell protection is a critical strategy in a successful firefighting operation, in an occupied building involved in fire.

Avoid hoses on the stairs as trip hazard & doors propped

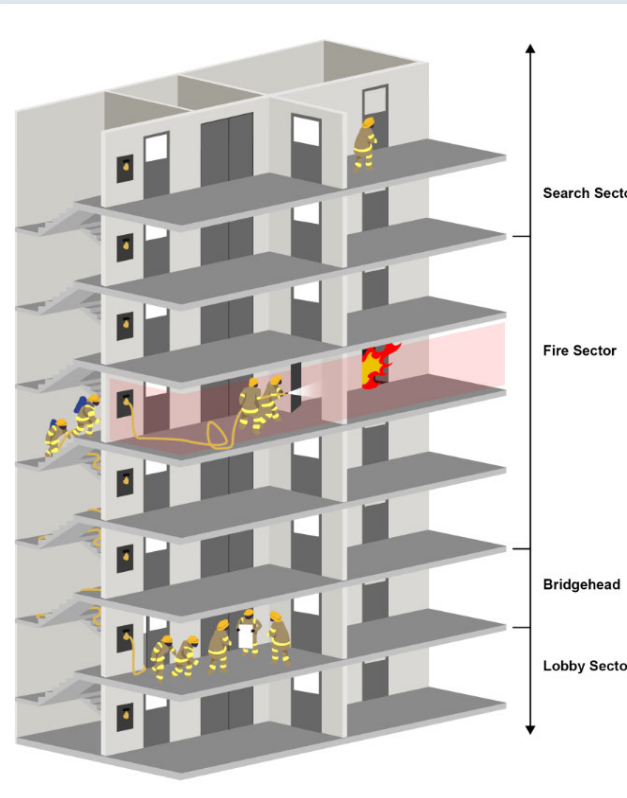
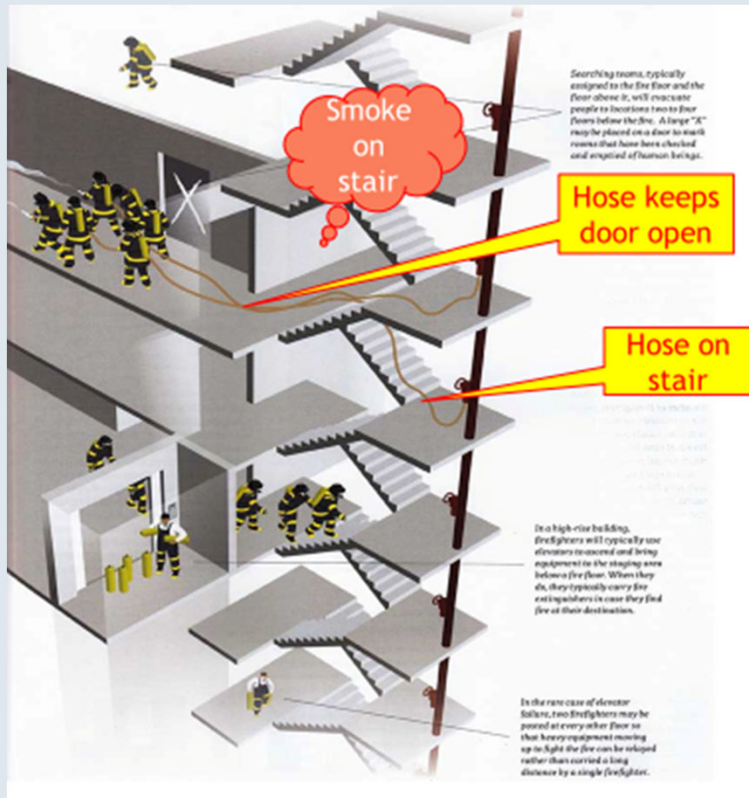


Door smoke curtain deployed

Evacuation whilst firefighting ongoing!



Understanding actual fire fighting activities whilst designing



Evacuation Research

RIBA Academy



HEREFORD HOUSE FIRST FLOOR

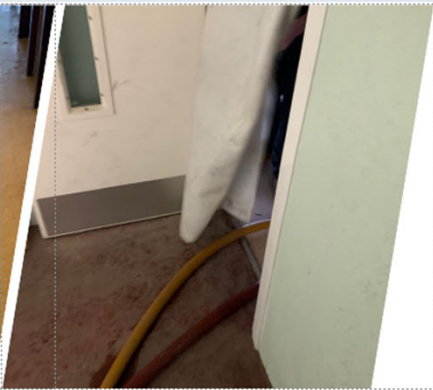
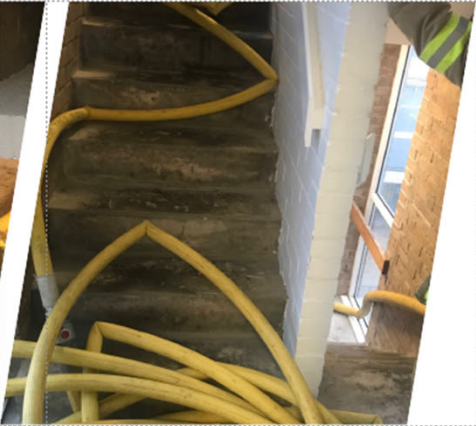
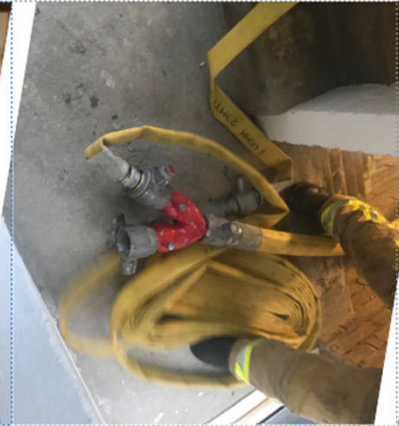
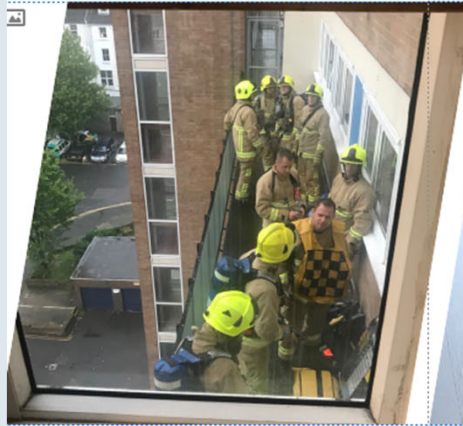
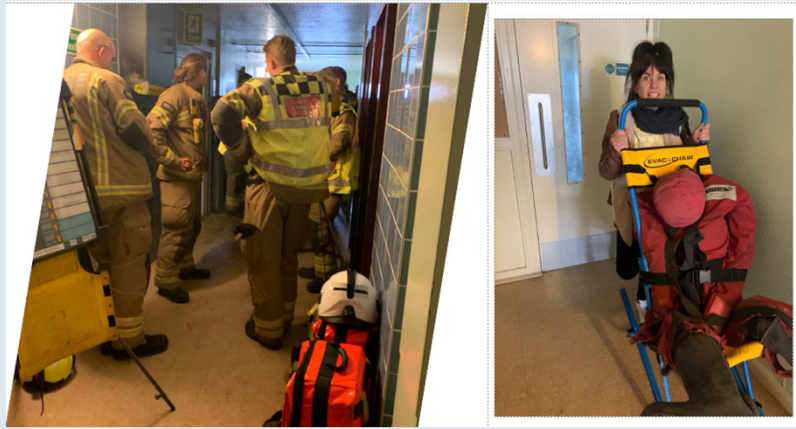


Typical layout created from
vacant properties on different
floors.



Evacuation rehearsals & drills

RIBA Academy



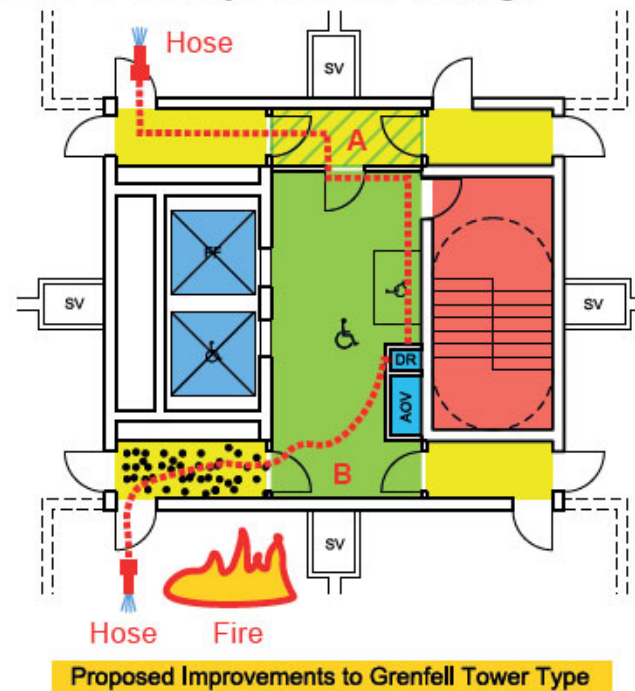
Enhanced core to single & two stair buildings

CORE PRINCIPLES

EXISTING HRRBS IN OCCUPATION Typical Single Staircase & related Legislation

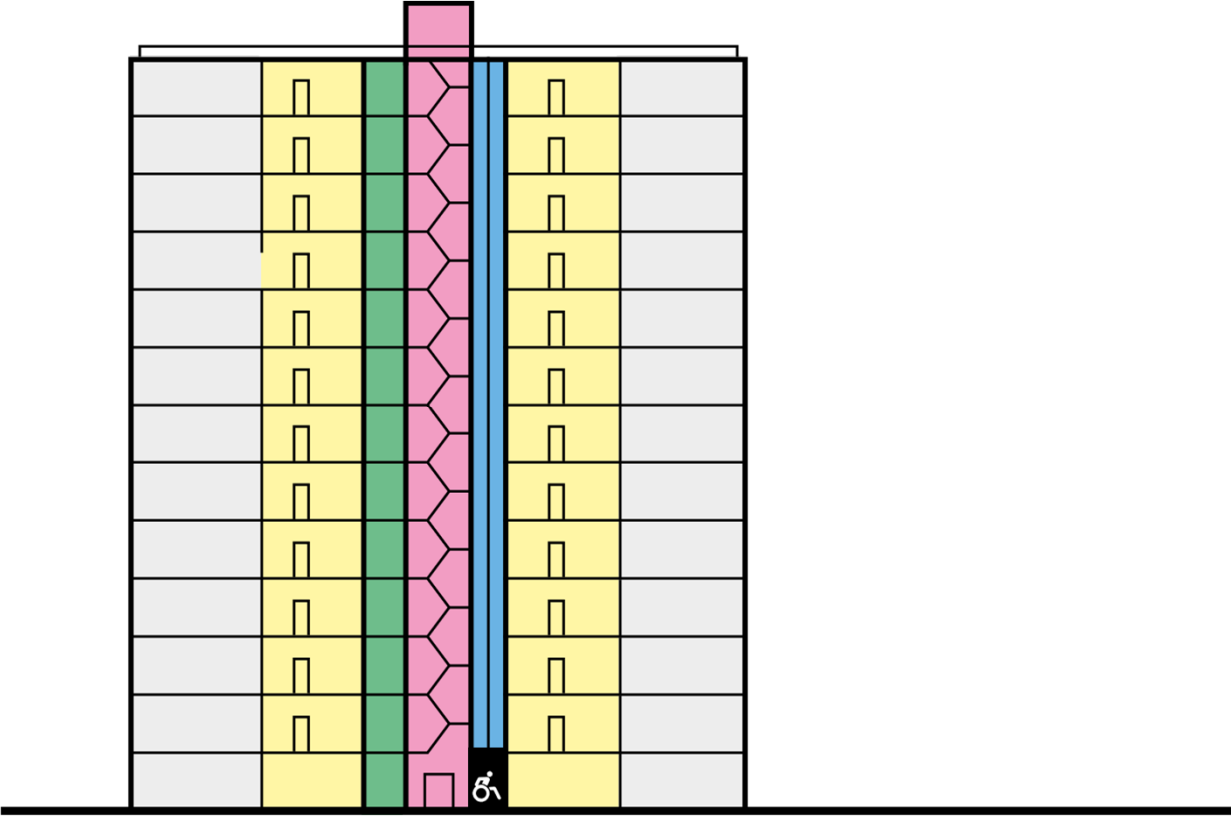
Linear Slab Block (e.g. Lakanal House)

B Proposed Core (eg Grenfell Tower) Enhanced Protected FF Lobby Access Dwellings



'Adequate' means of escape principles

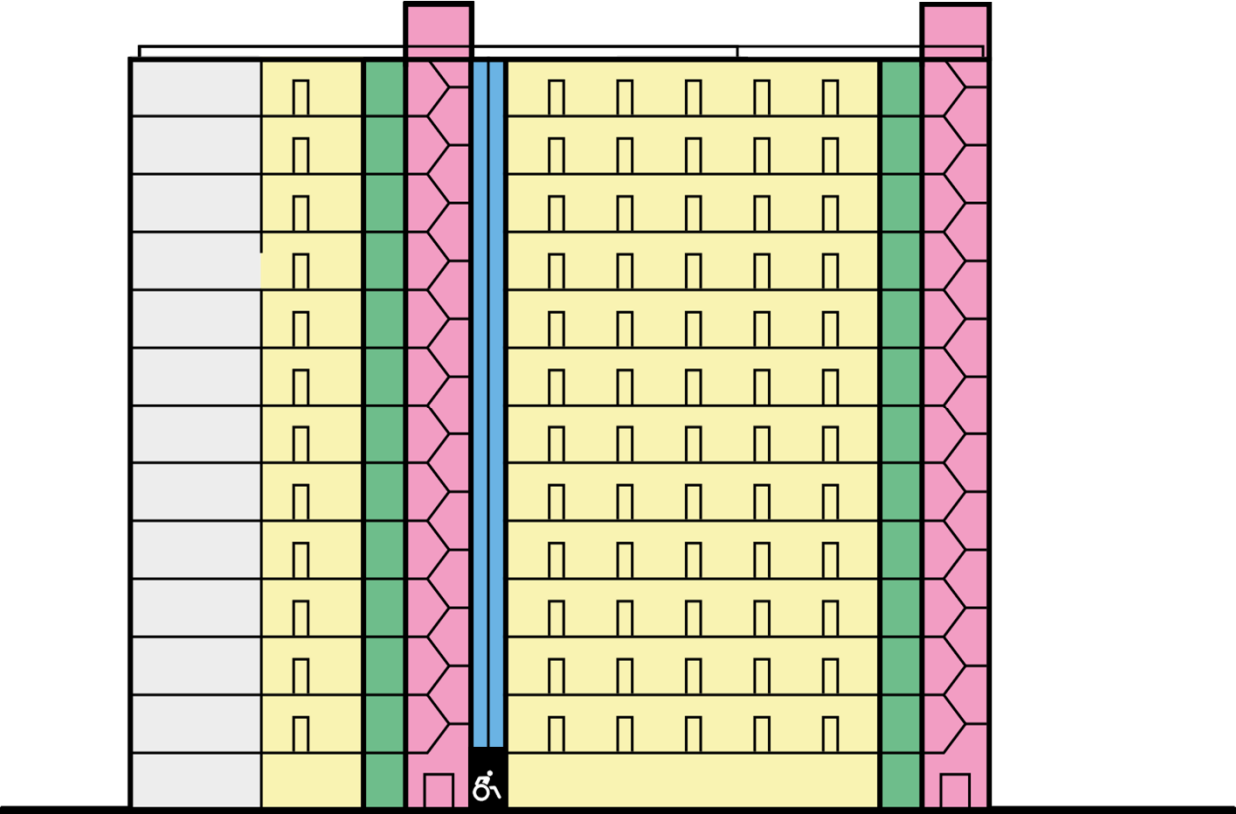
ENHANCED SINGLE STAIRCASE BUILDING



Remediation of existing buildings
&/or new build single stair upto'x'?

'Adequate' means of escape principles

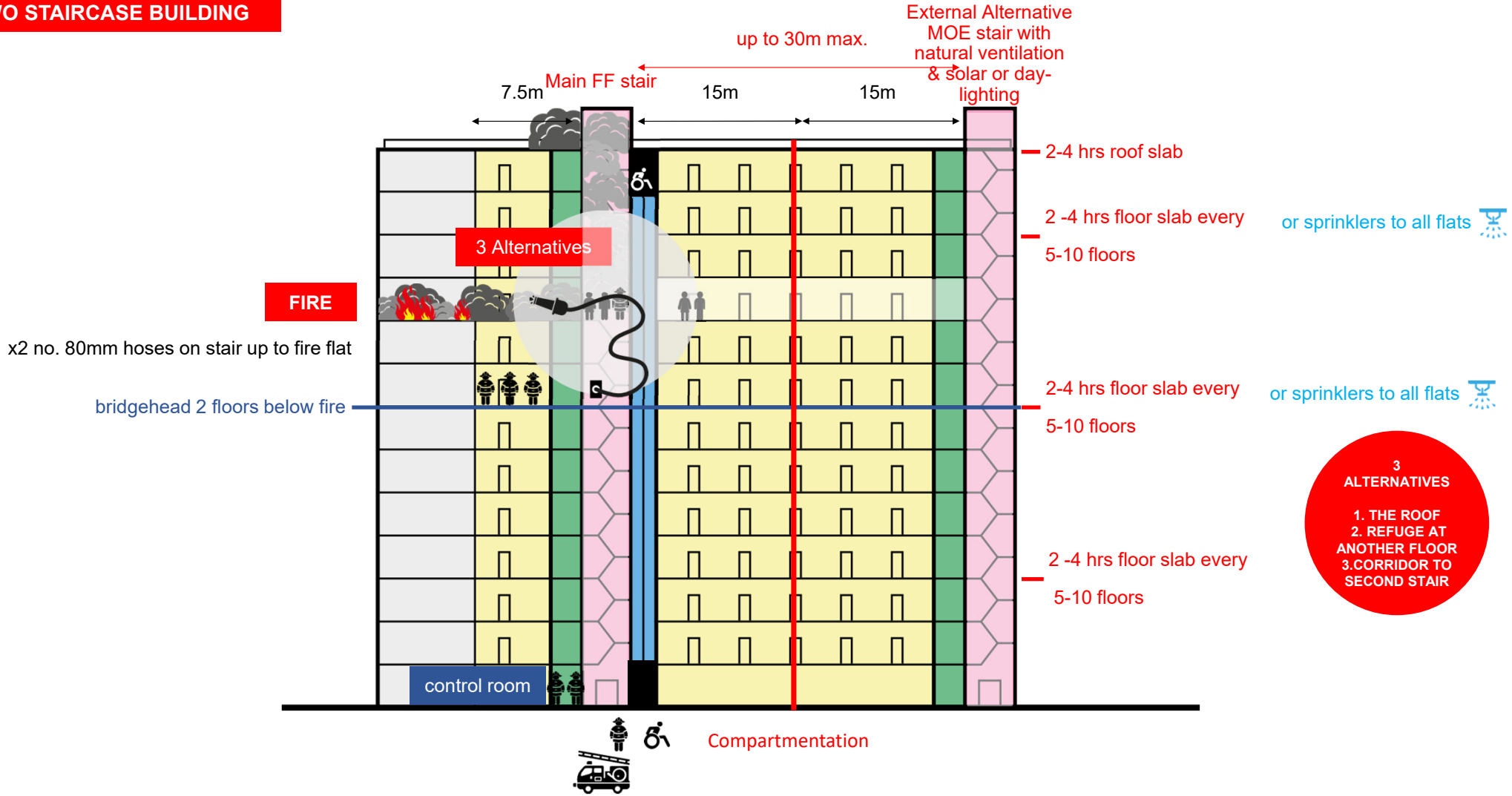
TWO STAIRCASE BUILDING



Remediation of existing buildings
New main stair stage
New main stair stage

'Adequate' means of escape principles

TWO STAIRCASE BUILDING



New build for future

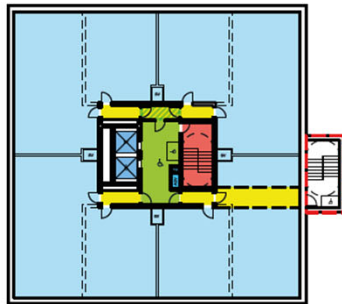
Alternative MOE Options

Additional stairs, OR enhanced core & lifts, and compartmentation.

EXISTING HRRBS IN OCCUPATION Typical Single Staircase & related Legislation

Central Core Block (e.g. Grenfell Tower)

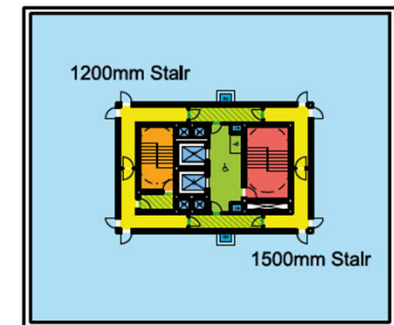
- ② Staircases (not very viable)
OR Enhanced Core + Sprinklers



As above
+ Sprinklers
and / or Second Staircase
+ Delayed Full Evacuation

FUTURE HRRBS TO BE DESIGNED Anticipating or Under New Future Regulation

- ② Staircases Nett to Gross Areas can be the same or better than single staircase central core due to increased travel distances



No Dead Ends

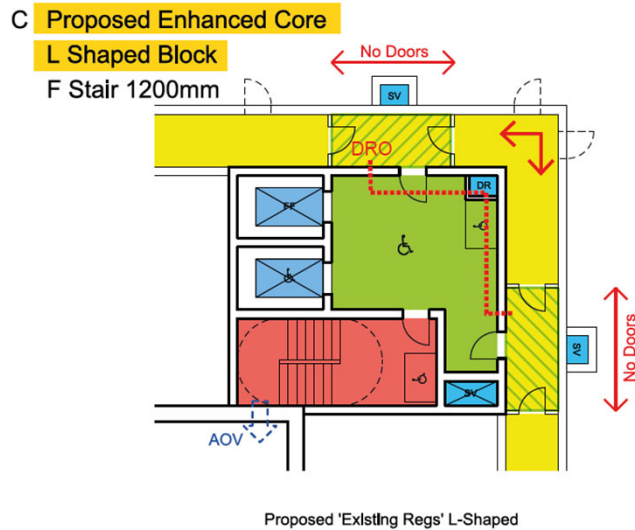
As above
+ Second Staircase
+ Delayed Full Evacuation

Alternative MOE Options

Additional stairs, plus enhanced core & lifts, and compartmentation.

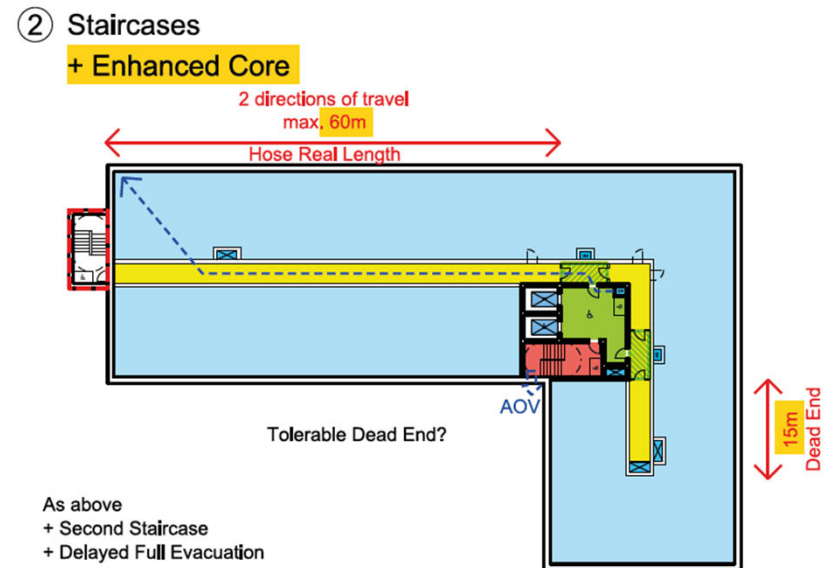
CURRENT HRRBS UNDER DESIGN/ CONSTRUCTION

Typical L Shaped Block



CURRENT HRRBS UNDER DESIGN/ CONSTRUCTION

Typical L Shaped Block



RISK ASSESSED FUTURE
Fire Strategy Proposals

RIBA Proposed HRRB Fire Strategy Sketch recommendations for further "Industry & Professional Discussion"

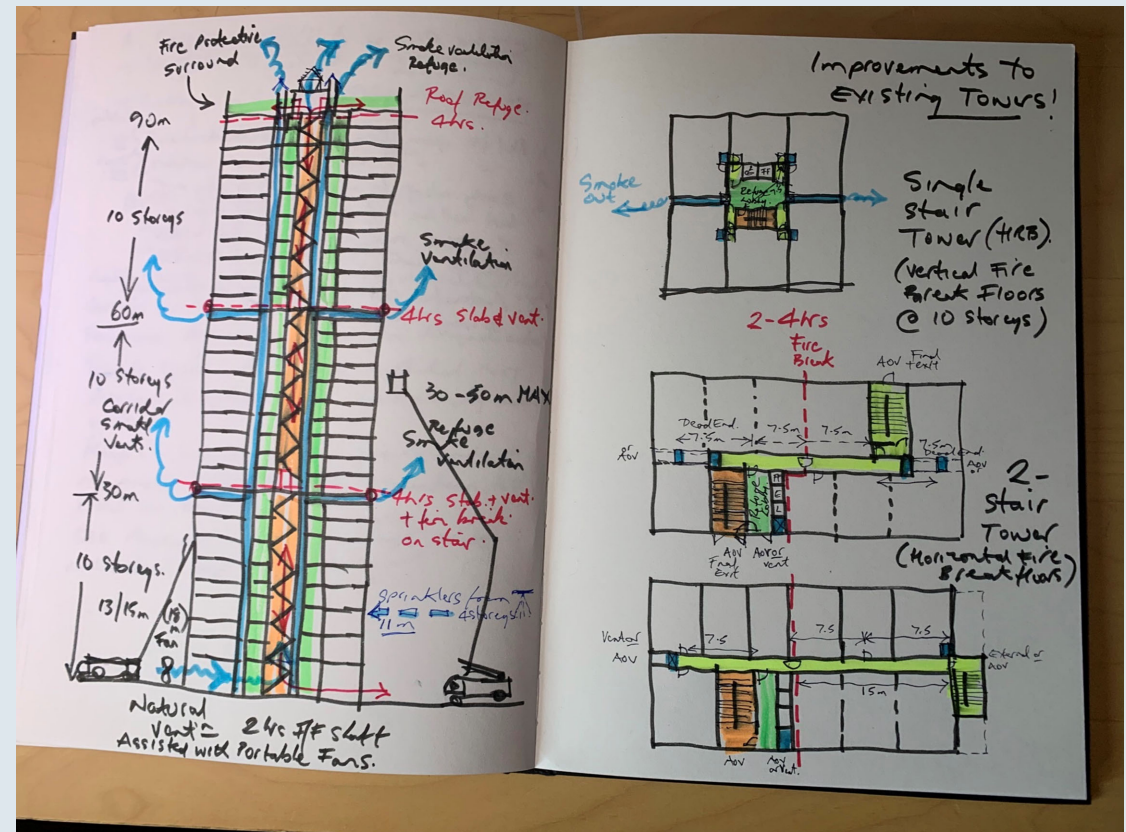
RIBA Academy

Existing & Proposed Single Staircase High Rise Residential Buildings

Could require, by a mandatory Approved Document B:-

1. **Horizontal & Vertical progressive evacuation** and 2 or 4 hour compartmentation and smoke extract at every 10 storeys and roof (B1)
2. **Roof top refuge** area above a 4 hour slab (B1)
3. **Refuges for Vulnerable person & Fire Fighting** at all levels. (B1- Places of Relative Safety)
4. **Travel Distances**- Maximum 7.5 m single and 2X 15m (ie. 30m) twin direction of escape to refuge areas (B1;3.25-38)
5. **Dry & Wet rising mains** with twin breeching in all refuge areas (B5; 15.2. Revised location)
6. **Positive staircase pressure differential system and assisted natural smoke extraction** where not on external walls. (B1;3.49- 3.54)
7. **Evacuation lift** to all levels & Fire Fighting lift to all levels above 18m (London Act & B5)
8. **Sprinklers** in all areas & at all levels from 11m (B3.7)
9. **Compartmentation**- 2 hour staircase and 1hour dwelling and fire-stopping at all levels . 100% proven (B3. 7.5)
10. **BS Evacuation Alert Systems** as BS 8629:2019 for phased evacuation by fire brigade (B1). Voice
11. **Fire Brigade access & external fire spread** requirements (2019 current B4 & B5)

2 Staircase existing and proposed buildings may require all the above (sfarp) excluding items 1 & 2.



Thank-You
p.bussey@ahmm.co.uk