

Report title
 

---

**Firefighting in high rise buildings**


---

Meeting

Date

Operational Directorate's Co-ordination Board

17th September 2014

Report by

Document Number

Head of Operational Procedures

ODCB/170914

**Summary**

On behalf of the Chief Fire Officers Association (CFOA) national GRA working group, London Fire Brigade (LFB) played a central role in reviewing the [Generic Risk Assessment \(GRA\) 3.2 Fighting fires - In high rise buildings](#) and this resulted in a significant amount of amendments being made to this GRA.

At the conclusion of this work Operational Procedures (OP) undertook a comparative review of the new amended GRA and the existing LFB high rise policy and risk assessment.

This review identified that the revised GRA contained a number of new hazards and control measures which were not reflected in the LFB high rise policy.

This comparison initiated amendments being made to the LFB policy ([PN 633 - High rise firefighting](#)) to ensure it included the content of GRA 3.2. The new draft policy 633 has been consulted on with Heads of Service, but has yet to be submitted Brigade Joint Council for Health and Safety at Work (BJCHSW).

The purpose of bringing this new draft policy 633 to the attention of ODCB (the Board) is that a key effect of recognising and including the content of GRA 3.2 into this policy is the need to re-evaluate the LFB's Pre-Determined Attendance (PDA) resources mobilised to a high rise incident.

This review has also taken place within the context of matters raised as part of Dynamic and Intelligent Operational Reporting (DIOT) at the Board regarding the need for additional equipment to tackle fires in high rise buildings.

The DIOT process has indicated that the provision of controlled dividing breaching and some form of carrying solution (often referred to as a 'high rise' or 'first strike' bag) to enable the easier and more effective movement of equipment to upper floors at high rise incidents would improve LFB's operational response.

A separate report setting out progress to develop and trial this new equipment will follow in due course, but, for the purposes of this report, it would seem prudent to place this report within this wider context and to confirm for the Board that these proposed changes are part of a broader programme of improvement which is underway to enhance LFB's response to dealing with fires in high rise buildings.

The following documents are attached to this report for background information:-

- Appendix 1 Historical high rise mobilisation data

- Appendix 2 Draft high rise firefighting policy 633
- Appendix 3 LFB risk assessment for draft high rise firefighting policy 633

### **For decision**

Formal agreement is sought to:

- Approve 1 of 3 PDA options for high rise incidents. The recommended option (No.2) is for Mobilising Control to mobilise a high rise PDA, of four pumping appliances, where information provided by the caller(s) suggests a fire is in progress on the 5<sup>th</sup> floor or above; fires below the 5<sup>th</sup> floor will continue to receive the current PDA of three pumping appliances
- Submit the amended draft Policy 633 – High rise firefighting to BJCHSW with ODCB's decision on the appropriate PDA to high rise fires
- Accept that a method of evaluation is implemented to ensure that the benefits associated with increasing the PDA are realised.

### **Background**

For the purpose of this report, a high rise building is defined as a building containing 5 or more floors.

With regard to fires at this height, the LFB's ability to implement effective external firefighting and/or external rescue operations are severely constrained using the capability of pumping appliances and to work at height using ladders and aerial appliances.

In addition to a building's height, modern methods of construction and the resulting absence of any 'openings' means that LFB typically implements internal firefighting and rescue operations, which depend upon bespoke procedures, equipment and building facilities.

The review of GRA 3.2 included an analysis of recent incidents of note such as, Lakanal House, Salamanca Place and Shirley Towers. In doing so a further 17 significant hazards were identified to be potentially associated with high rise firefighting each with a control measure to reduce risk to acceptable levels.

The publication of the new GRA 3.2 in January 2014 initiated a review of the LFB policy and local risk assessment with the subsequent addition of these new hazards and control measures.

The amended LFB risk assessment identified that the extant policy required review and amendment. The draft PN 633 (appendix 2) now reflects all of the hazards and control measures that have been identified, both within the revised LFB local risk assessment and new GRA 3.2.

### **Analysis of GRA**

A gap analysis between the national GRA and existing LFB high rise risk assessment and policy identified the following 17 'new' hazards:-

- Floor/ceiling collapse
- Wall panel failure
- Construction technique
- Information gathering
- Cable entanglement
- Oxygen deficient/toxic atmosphere
- Downward fire spread
- Fires on multiple floors
- Limited ventilation
- Poor housekeeping/High fire load
- Unknown premises/unknown structural changes
- Evacuation
- Heating Ventilation Air Conditioning (HVAC) systems
- Failure of electrical systems (including fire lifts)



- Persons shut in lift
- Buildings under construction/renovation
- Moral pressure and moral factors to act where insufficient resources are present.

The control measures associated with these additional hazards include:

- Additional safety officers internally and externally
- Early designation and deployment of emergency crews
- Sufficient weight of attack
- Additional resources.

In total, the new GRA 3.2 identifies 32 hazards with associated risks and control measures. The LFB risk assessment identifies 38 hazards with associated risks and control measures.

The analysis of recent high rise incidents (such as those which occurred at Shirley Towers and Lakanal, as part of both the GRA review and the local risk assessment) also recognised that a combination of these hazards is reasonably foreseeable and can make a significant contribution to both the severity and complexity of an incident.

It is reasonable to say that these additional hazards have always been present, but they have not previously been explicitly identified nor have they been given appropriate recognition in LFB policy and training. As a consequence, Incident Commanders (IC) may not have fully taken them into account when planning and managing the resolution of such incidents. The revised LFB risk assessment and draft policy requires ICs to implement new and additional control measures at high rise incidents.

A key impact of this is that additional resources are likely to be required to implement some or all of these additional measures in the early stages of an incident, such as the use of a fire fighter in a stairwell to monitor internal smoke spread or the need to use alternative means to move water or equipment to upper floors in the event fixed firefighting facilities such as lifts or risers are unavailable for any reason.

GRA 3.2 and the revised LFB risk assessment and policy recognise that, where a fire occurs at such a height or position that external firefighting/rescue is unlikely to be possible and/or effective, there will be a need to implement high rise procedure.

The current PDA of three pumping appliances was selected to support implementation of the previous GRA and LFB risk assessment and high rise policy. These documents were completed and published some time ago, before the incidents which are referred to above and were based upon the explicit statement of fewer hazards and control measures than are now recognised and articulated in current documents.

In this context – and noting that any *combination* of these factors may lead to more dynamic and complex incidents - this report recommends that four fire appliances are initially sent to fires in buildings that require the implementation of high rise procedure.

This will support the IC in to fully implement a safe system of work at the earliest opportunity and to deal more effectively with the full range of scenarios that are reasonably foreseeable.

Examples of such scenarios include but are not limited to:

- Difficulty in gaining access to high rise building. This may slow response and require additional resources to effect entry or transport equipment
- Unavailability or poor water supply. This will require additional resources and equipment to identify and establish a suitable water supply, especially on occasions when this is required on upper floors
- Unavailability of dry rising main. This will require additional equipment and personnel to supply water to scene of operations using an aerial appliance, hose hauled aloft or use of intermediate pumps
- Unavailability of firefighting lift. This will require additional personnel to move equipment, establish a bridgehead and rescue casualties via internal staircases.

## **Mobilising Options**

This report proposes the following three options to ensure sufficient resources are mobilised to high rise incidents:-

### Option 1

Maintain the current PDA and mobilising protocols for high rise fires and continue to facilitate the need for additional resources through current "make-up" protocols. This option has no additional impact on appliance movements.

### Option 2

Introduce intelligent flexible mobilising to high rise incidents. Through call handling by Mobilising Control identify high rise incidents which are on the 5<sup>th</sup> floor of the building or above and mobilise an attendance of 4 pumping appliances, whilst maintaining the current PDA of 3 pumping appliances to fires below the 5<sup>th</sup> floor.

Data from London Safety Plan 5, Support Document 24, indicates that only 3% of all fires in 2011/12 occurred on or above the 5th floor. The total number of fires on the 5th floor or above (all property types), attended by 3 or more appliances, for 2011/12 was 185. Based on this data it can be estimated that this option will generate approximately 185 additional appliance movements per annum.

### Option 3

To have a PDA of 4 fire appliances for all fires in known high rise buildings (LFB incident type code A1HR – known high rise buildings or identified during call).

Based on attendances to all fires at high rise buildings, as cited within LSP5 Support Document 24, changing the PDA to 4 appliances would generate approximately 1,118 additional appliance movements. Further data collected for this report, based on mobilisation figures from 2013 (Appendix 1), suggests that this option would generate approximately 1,603 additional appliance movements.

The three options above were presented to the Mobilising Governance Board (MGB) on 26<sup>th</sup> September 2014. The MGB's view was all three options are achievable but the board had a preference for option 2. Operational Procedures also recommends selection of option 2.

## **Evaluation**

It is recommended that Operational Assurance, using the Incident Monitoring Process Database (IMPD) and the Operational Review Team (ORT) evaluate the effectiveness of the selected high rise PDA option set out above, at both 6 and 12 months following the publication of the new high rise policy.

The evaluation would seek to provide assurance, through a report back to ODCB, that the LFB's approach to mitigating identified hazards at high rise incidents is effective and that the provision of additional resources as part of an enhanced high rise PDA is delivering the expected benefits.



## Revised high rise procedure consultation

Name / Role	Method consulted
DORT Reason Operational Directorate's Co-ordination Board	Draft circulation of policy & meetings Presented and agreed 03/09/12 and 14/10/13
Sue Budden (Director)	Draft circulation of policy
Heads of Service	Draft circulation of policy
Head of Service Peter Cowup	Draft circulation of policy & meetings
DAC Hughes	Draft circulation of policy & meetings
DACs	Draft circulation of policy
GM A'Court	Draft circulation of policy & meetings
GM Churchill	Draft circulation of policy & meetings
GM Drawbridge	Draft circulation of policy & meetings
Gary Hopkins (FRS E)	Draft circulation of policy & meetings
SM Utting	Draft circulation of policy & meetings
SM Morton	Draft circulation of policy & meetings
SM Goodall	Draft circulation of policy & meetings
SM Jason Jones	Draft circulation of policy & meetings
Operational sounding board	Draft circulation of policy

## Appendix 1

### Methodology of data gathering

Strategy and Performance (S&P) have provided data on appliance mobilisations for a range of Incident Type Codes (ITC)<sup>1</sup>. All data has been provided for incidents attended where 3 appliances or fewer were mobilised. S&P have provided data within the following parameters between the dates of 1 January 2011 to 31 December 2013:

- The property is a building (dwelling, residential, non-residential)
- There is an A1 ITC code and no A10 ITC code
- The property is deemed to be of high rise height
  - It has an ITC of A1HR
  - It is 6 floors or higher
  - High rise building equipment is present (e.g. Firefighter lift)
  - Applicable property type classification
- The building is not derelict.

For the purposes of this report the mobilisation data has been split into two sections:

#### 1) A1(HR) mobilisations

2) Mobilisations based on A1(HR) and A1 ITCs which resulted in an IMS report stating that the fire was in a property of 6 floors and above or contains firefighting installations.

### High rise attendance data

#### 1) A1(HR) mobilisations

In 2011 the LFB mobilised a A1 (HR) mobilisation to 357 incidents (where 3 or fewer appliances were mobilised). This resulted in a total of 1,071 appliance movements. Increasing the PDA provides a project increase of appliance movements to 1,428 – a difference of 357 appliance movements.

In 2012 the LFB mobilised a A1 (HR) mobilisation to 279 incidents (where 3 or fewer appliances were mobilised). This resulted in a total of 837 appliance movements. Increasing the PDA provides a project increase of appliance movements to 1,116 – a difference of 279 appliance movements.

In 2013 the LFB mobilised a A1 (HR) mobilisation to 311 incidents (where 3 or fewer appliances were mobilised). This resulted in a total of 933 appliance movements. Increasing the PDA provides a project increase of appliance movements to 1,244 – a difference of 311 appliance movements.

Over the 3 year period between 2011 – 2013 the LFB mobilised a total of 2,841 pumping appliances to A1 (HR) incidents. An increase in PDA to 4 appliances provides a projected figure of 3,788, an increase of 947 pumping appliance movements.

---

<sup>1</sup> The ITC codes applied to an incident are only an indication of the information Control had when they mobilised the initial resources. These ITC codes do not necessarily reflect the final outcome of an incident. In some instances an ITC code is not updated to reflect further information acquired during a call. This anomaly is accounted for by reviewing all ITC (A1) linked to the data collected about the height of the building or high rise equipment used post incident using the Incident Monitoring System (IMS).



Figure 1: A1(HR) mobilisations

Calendar year   NIL pumps	0	1	2	3	Total
2011	1	7	55	294	357
2012		3	42	234	279
2013		2	50	259	311
<b>Total</b>	<b>1</b>	<b>12</b>	<b>147</b>	<b>787</b>	<b>947</b>

2) Mobilisations based on A1 ITCs that were identified as high rise buildings after the initial mobilisation

In 2011 the LFB mobilised a A1 mobilisation to 1565 incidents (where 3 or fewer appliances were mobilised). This resulted in a total of 4,695 appliance movements. Increasing the PDA provides a project increase of appliance movements to 6,260 – a difference of 1,565 appliance movements.

In 2012 the LFB mobilised a A1 mobilisation to 1,451 incidents (where 3 or fewer appliances were mobilised). This resulted in a total of 4,353 appliance movements. Increasing the PDA provides a project increase of appliance movements to 5,804 – a difference of 1,451 appliance movements.

In 2013 the LFB mobilised a A1 mobilisation to 1,292 incidents (where 3 or fewer appliances were mobilised). This resulted in a total of 3,876 appliance movements. Increasing the PDA provides a project increase of appliance movements to 5,168 – a difference of 1,292 appliance movements.

Figure 2: Mobilisations based on A1 ITCs that were identified as high rise buildings after the initial mobilisation

Calendar year   NIL pumps	0	1	2	3	Total
2011	1	48	690	826	1565
2012	41	34	611	765	1451
2013		36	541	715	1292
<b>Total</b>	<b>42</b>	<b>118</b>	<b>1,842</b>	<b>2,306</b>	<b>4308</b>

3) Estimated total increase in appliance movements to fires in all high rise buildings

Assuming that the LFB are able to establish, before initial mobilisation, that a fire is in a high rise building. The estimation of the number of additional appliance movements over a 3 year period would be a combination of the two sets of figures above.

In 2011 the projected increase to A1(HR) is 357 and A1 is 1,565 appliance movements which creates an estimated total increase of 1,922 movements.

In 2012 the projected increase to A1(HR) is 279 and A1 is 1,451 appliance movements which creates an estimated total increase of 1,730 movements.

In 2013 the projected increase to A1(HR) is 311 and A1 is 1,292 appliance movements which creates an estimated total increase of 1,603 movements.

Figure 3: Estimated total increase in appliance movements to fires in all high rise buildings

Calendar year   NIL pumps	A1(HR)	A1	Total
2011	357	1,565	1,922
2012	279	1,451	1,730
2013	311	1,292	1,603
<b>Total</b>	<b>947</b>	<b>4,308</b>	<b>5,255</b>

The estimate of the total number of additional appliance movements over the 3 year period is 5,255.



# High rise firefighting

**Protect** – Ops Security | **Protect** – Health & Safety

New policy number: draft633  
Old instruction number:  
Issue date: 26 November 2008  
Reviewed as current: 18 November 2011  
Owner: Head of Operational Procedures  
Responsible work team: Operational Tactics

## Contents

**Key point summary..... 10**

1 Introduction ..... 12

2 Hazards ..... 12

3 Firefighting facilities and fixed installations ..... 16

4 Planning ..... 16

5 En route..... 18

6 On arrival ..... 18

7 Operational procedure ..... 19

8 References ..... 27

Appendix 1 - 7(2)(d) ..... 29

Appendix 2 - Firefighting shafts..... 30

Appendix 3 - Firefighting lifts ..... 31

Appendix 4 - Dry rising mains ..... 33

Appendix 5 - Wet rising mains ..... 34

Appendix 6 - Automatic sprinkler systems ..... 35

Document history ..... 36

## Key point summary

### Operational procedures **NB This will be put in DMM format once content agreed**

- Site appliances, taking into account access/egress requirements for additional appliances including aerials and other emergency services. Consider falling debris.
- Carry out a visual inspection to identify affected areas and fire spread.
- Incident Commander (IC) to remain at ground floor level unless planning arrangements have identified a more appropriate location e.g. the Fire Control Centre.
- Identify fire floor and type of property involved (e.g. flat, maisonette, open plan office).
- Establish status of any fixed installation systems.
- Secure water supplies – twin hydrant and twin dry rising main (DRM) with 70mm hose and charge the DRM.
- Establish safety cordon at base of building to protect teams and public from falling debris.
- Order additional resources (including aerials) as required as soon as possible.
- Secure the use of the firefighting lift, do not use non-designated lifts designed for public use. Teams must confirm which floor they are to go to. This floor must be at least 2 floors below where the fire is believed to be.
- Set up bridgehead, minimum team of 3 Firefighters (2 BA and one ECO) managed by minimum role of CM as fire sector commander, in firefighting lobby 2 floors below fire floor, unless pre-planning or circumstances dictate otherwise.
- Equipment to be taken to bridgehead as soon as possible:
  - 2 x branches.
  - 45mm hose sufficient to set up attack and covering jets to reach beyond affected area.
  - 1 x BA entry control board, bracket and tripod.
  - 2 x BA sets.
  - Immediate emergency care (IEC) pack.
  - Long line.
  - Breaking in gear.
  - Thermal imaging camera.
  - Access keys/codes (if available).
  - Floor plans (if available).
  - Forward information board (FIB).
- If the building is fitted with a water suppression system that is actuating, send a firefighter to the Main Stop Valve. Sprinklers should not normally be shut down until the fire is confirmed extinguished with the assurance that there is no unseen fire spread - and only on the orders of the IC.
- If the bridgehead becomes congested consider setting up a staging area for resources on the floor below.
- BA teams must be committed with a sufficient weight of attack, supplied from the DRM outlet below the fire floor, if the outlet is unavailable the nearest DRM outlet below that should be used.
- Maintain regular communications between the BA teams, bridgehead and IC.
- An additional BA team with a second jet (at least 1 hose length longer than attack jet) should be provided as soon as possible.
- The second jet and BA team must be present if there are signs, symptoms or conditions that indicate backdraft, flashover or other abnormal fire conditions before the search and rescue/firefighting team are committed to the fire compartment.
- IC to consider the need to be aware of the occupier's evacuation plan.



- Ventilation by LFB personnel should only be undertaken on the instruction of the IC and communicated to all relevant personnel at the incident. Any measures necessary to protect surrounding risks, such as covering jets, must be implemented before ventilation commences.
- Send the message: "From ..... at .....; high-rise procedure implemented, tactical mode Oscar" when a safe system of work has been implemented. This message can only be sent where the following minimum systems of work have been implemented; the location of the bridgehead has been risk assessed as appropriate; access and egress to and from the bridgehead is secured and maintained; the bridgehead has been established with two charged jets deployed.
- If the bridgehead becomes compromised and requires relocation:
  - IC, all officers and BA teams (including those committed) must be informed.
  - BA teams must consider the impact of the increased travel distance on their turn-around time.
  - Fire sector commander must consider the withdrawal of BA teams.
  - Establish emergency team.
  - All information and resources should be transferred to the new bridgehead location.
  - Consider implementing Stage 2 BA procedures.
  - Consider EDBA where SDBA would not provide sufficient duration for them to reach the scene of operations and undertake tasks.
  - Where life saving operations are delayed, the IC should consider alternative methods of effecting rescue.

## 1 Introduction

- 1.1 This policy is designed to provide guidance for operational personnel who are engaged in search, rescue and firefighting in high-rise buildings.
- 1.2 Further information is available from the documents set out in Section 8, within the station training support notes and presentations available via the icon on computer desktops. **ADD LINK TO TRAINING**
- 1.3 A high rise building, for the purposes of this procedure, may be defined as a building containing floors at such a height or position that external fire fighting and rescue operations may not be feasible.
- 1.4 The term high rise building encompasses a wide variety of structures from conventional tower blocks containing residential flats to very large and complex commercial buildings. Some high rise buildings may be of multiple-use (e.g. occupied by a mixture of commercial and residential accommodation) and can contain complex systems which control the building's internal environment, during normal use or during a fire situation.

## 2 Hazards

- 2.1 Fires in high rise buildings present a range of logistical and physical challenges to operational personnel which should not be underestimated.
- 2.2 Some of the hazards detailed below are specific to high rise buildings; others are more general in nature but are included due to their likely occurrence at high rise incidents and because the characteristics of the building are likely to intensify their effect.
- 2.3 Hazards of high rise firefighting can be grouped under three headings:
  - (a) Building height, layout and design.
  - (b) Fire behaviour and development.
  - (c) Firefighting and rescue operations.

### Building height, layout and design

- 2.4 The height of the building, which may impact operations due to vertical travel distance affecting personnel, equipment and water supply.
- 2.5 Objects falling from height. These can be a risk to anyone entering or exiting the building. Debris can be ejected explosively and building materials such as glass and curtain walling can 'plane' some distance from the building.
- 2.6 Access for firefighters may be delayed due to security arrangements, such as code entry systems, security grilles and multi-lock door systems. Progress may be inhibited on more than a single occasion as devices are encountered at a number of points along the route to a fire.
- 2.7 Large or complex floor layouts, the operation of fire engineering systems (such as fire curtains) and a lack of information on the internal layout or flat or floor numbering systems can have an adverse impact on safe movement in the building. It may also increase the risk of teams becoming disorientated.
- 2.8 Individual maisonette style dwellings may be encountered where access can be up or down a staircase from the front door. Personnel may also encounter interlocking staircases within one enclosure that provide two separate paths of egress, to two or more floors and these are



sometimes referred to as 'scissor-style staircases'. If these are used to gain access to upper floors firefighters may find themselves exiting the stair at different locations on each floor level, or different floor levels. This can cause disorientation and/or affect the decision regarding where the bridgehead is sited. Some residential flats have emergency exits which may leave the flat on a different level to the initial access point.

- 2.9 Difficulty with lines of communication and radio reception. The scene of operations may be a considerable distance from the Brigade access level and point of command; additionally communication blind spots may exist within high rise buildings.
- 2.10 Risk of an intermediate floor or ceiling collapse in single dwellings which consist of more than one floor i.e. a maisonette style construction.
- 2.11 Firefighters falling from height due to the failure of external walls, panels or windows.
- 2.12 Risk of entanglement in electric cabling that has been displaced from surface-mounted cable trunking, fixings or failure of false ceilings.
- 2.13 High rise buildings may have a range of fixed installations and fire engineered solutions installed. If the building has been subject to poor standards of management and/or vandalism, these systems may be impaired, which increases risk to occupants, firefighters and other emergency service personnel in the event of a fire.
- 2.14 The operation of fire suppression/total flooding systems may result in either an oxygen deficient or irrespirable atmosphere.
- 2.15 Timber frame construction can result in rapid fire spread during the construction phase where fire protection measures may be absent. When under construction, timber framed buildings have a significant fire loading and consideration must be given to protecting surrounding risks. There is also a risk during occupation due to occupants damaging the internal framework of the structure allowing unseen fire and smoke spread.
- 2.16 When any high rise building is under construction or refurbishment additional hazards are likely to be present. Facilities such as firefighting shafts, rising mains and active/passive fire safety measures may be incomplete or absent. The introduction of modern materials and services (such as cable television) may compromise existing fire safety measures or compartments. This may cause the incident to develop in an unpredictable way following the unexpected spread of fire or smoke. Some buildings may be completed in phases and, in these cases there may be partial occupancy and people other than construction workers requiring rescue. Original doors may have been replaced with types which do not necessarily offer the required level of fire protection. This may promote more rapid fire spread or hinder access where additional security is encountered.
- 2.17 Radio waves from telecommunication antennas on high rise buildings generating electromagnetic radiation may cause adverse health effects linked to exposure to electromagnetic radiation.

### **Fire behaviour and development**

- 2.18 Fire and smoke spread may occur in an upward, downward and/or horizontal directions. Fire spread from one compartment to another may be more rapid and less predictable than other building types due to the effects of wind. Fire spread can travel internally but more commonly occurs externally when fire breaks out of windows, this may lead to rapid spread to other compartments and floors.

- 2.19 Air currents can move up and down the face of a high rise building and this may lead to any smoke within the building being drawn downwards. Downward smoke spread, particularly in the staircase, can have a significant and adverse impact on operations.
- 2.20 Wind speeds are likely to increase with the height of the building and be affected by the position of any nearby buildings. A 'blow torch' type effect can be created by wind speeds forcing the products of the fire from the compartment, sometimes in unpredictable directions, resulting in rapid fire spread.
- 2.21 Burning material falling from upper floors can also spread fires by igniting combustible materials through open windows, on balconies and around the base of the building, compromising water supplies if hose is damaged.
- 2.22 Poor housekeeping and the storage of combustible materials in escape routes may obstruct the escape of residents and the progress of firefighting personnel, while assisting fire development. Combustible material in voids and cavities and poor quality construction can also contribute to the spread of fire.
- 2.23 Undivided stairways in high rise buildings have the potential to act as a chimney allowing the products of combustion to rise, increasing the risk of fire spread to other floors. Smoke rising through a high rise building may start to cool and will lose buoyancy, compromising escape routes. This is caused by the cooling smoke becoming less buoyant and falling within the stair enclosure. Older building guidance allows for a single staircase not to have a top level stair vent and therefore "mushrooming" can occur driving smoke and the products of combustion downwards.
- 2.24 In residential flats or maisonettes the opening of any door, window or emergency exit may create a chimney style effect leading to a rapid, unexpected increase in temperature.
- 2.25 Fires may be encountered on more than one floor as a result of the factors identified above or by acts of deliberate fire setting.
- 2.26 Some buildings will have compartments that have few or no openings. This can create a build up of toxic gases and reduce visibility. It may also create backdraft and fire gas ignition conditions and promote horizontal and vertical spread of fire and smoke. (See [Policy number 793 - Compartment firefighting](#)).
- 2.27 Uncontrolled ventilation and/or the operation of heating, ventilation and air conditioning systems can cause unpredictable fire and smoke spread.

### **Firefighting and rescue operations**

- 2.28 Fire calls to a premises which is unknown, or has been subject to un-notified refurbishment or changes to use, may lead to insufficient resources being mobilised. This may cause delay in firefighting and search and rescue. Firefighters may have no or limited knowledge of the premises layout and any existing engineered solutions.
- 2.29 Where there is unexpected growth of fire or fixed installations are unavailable, commencing operations without sufficient resources or adequate access to fixed installations can increase the level of risk to occupants and firefighters (see also 2.42 below). There is also a risk that conditions in the fire compartment will worsen, if an intervention with sufficient resources is not made in a timely manner.
- 2.30 Firefighting operations can be affected by the type of evacuation being undertaken, the progress of the evacuation and the number and type of people being evacuated.



- 2.31 In a multiple-use high rise building there may be different evacuation or "Stay put" policies which may result in difficulty identifying whether persons are involved or need rescuing. Additionally occupants may not be aware of a building's evacuation policy, leading them to behave differently to the IC's expectations.
- 2.32 The need to assist with the evacuation of persons can divert teams away from the task they were briefed to undertake and this can have an adverse affect on the IC's plan and resourcing for the incident.
- 2.33 Facilities such as fire mains, ventilation systems and compartmentation are provided to assist firefighters and to aid occupants evacuating the premises. Any unavailability of these facilities will increase risk to firefighters and may increase the resources required to resolve an incident.
- 2.34 The size and layout of some buildings may make it difficult to reliably determine the location, floor of origin and the extent of fire and smoke spread from the ground. This can create the potential for teams using firefighting lifts to proceed directly onto a floor area involved in fire or may mean that resources are deployed to inappropriate locations. The fire service access level may not be the recognised ground floor level of the building. This can lead to an incorrect count of floors to the fire floor potentially putting teams using the firefighting lift at risk.
- 2.35 There may be an insufficient water supply on upper floors due to either the height of the incident, vandalism, characteristics of the fire main or the limitations of fire service equipment.
- 2.36 The intensity of work rate in the fire compartment can lead to an increase in the core body temperature of firefighters. In addition, access to the fire may be limited to a single point so that teams entering the premises may have little or no option to avoid hostile conditions.
- 2.37 Hose, other equipment and firefighting operations in staircases and other parts of the building may create slip and trip hazards for firefighters and those evacuating the building. This risk will be intensified in buildings which have a single staircase.
- 2.38 The removal of casualties to medical care beyond the building may involve vertical transportation over a considerable distance. Personnel involved in carrying casualties long distances will be at increased risk of manual handling injury.
- 2.39 Verbal and physical attack, fire setting, vandalism and unlawful activities may compromise the safety of firefighters. Personnel may be the target of objects thrown or dropped from height. Traps, such as the positioning of sharp objects or flammable materials in bins or lift shafts, may be present.
- 2.40 Personnel may also encounter unexpected hazards associated with activities such as drug manufacture and storage; this type of activity is also associated with increased risks from electrical hazards due to illegal access to power supplies. Additional hazards may include the deliberate placement of flammable materials or gas cylinders in properties and/or additional fire setting while teams are in attendance.
- 2.41 At incidents where hoarding of property is encountered (see [Policy number 829 - Hoarding](#)), a number of hazards may be present. These include;
- (a) Large volumes of combustible materials,
  - (b) Difficult access/egress and changes to the normal layout of a premises,
  - (c) Items of property falling and trapping occupiers/firefighters,
  - (d) Absorption of water which will add significant weight, increasing the likelihood of collapse,



- (e) Deep seated/hidden fires.
- (f) Contaminated water run-off.

- 2.42 Firefighting operations may breach firefighting lobbies increasing risk to occupants and impacting on personnel at the bridgehead. The size of firefighting lobbies may be insufficient to contain the resources necessary to mount an effective attack. It will be necessary to run hose lines onto protected routes and stairways to undertake firefighting and this will allow smoke to spread into previously unaffected areas of the building.
- 2.43 Total or partial electrical failure can occur as a result of damage by fire, heat or water used for firefighting operations, sprinkler run off and any failure of water supply pipes. Where electricity supplies have been tampered with the supply may not trip and increase the risk of electrocution.
- 2.44 Any failure of firefighting lift equipment or use of non-designated lifts can lead to firefighters and evacuees becoming trapped in a lift car. Either the lift, its shaft and/or machine room may be affected by the spread of smoke, fire, heat and water ingress from firefighting operations. Any diversion of resources necessary to rescue trapped lift occupants will have an adverse impact on firefighting operations.
- 2.45 There are public expectations that firefighters will attend incidents and that personnel will put themselves at risk to save lives. This can lead to moral pressure to act immediately, even if the incident is beyond the capacity of resources available at the time. This is most likely to be the case if an IC identifies the potential for saveable life is not proportionate to the risks to personnel and either decides not to commit or to withdraw personnel.

### **3 Firefighting facilities and fixed installations**

- 3.1 Facilities are provided within high rise buildings to assist in a safe and timely intervention by the fire service.
- 3.2 Building Regulations require all buildings over 18m in height to make provisions for firefighting and firefighter access. Those in excess of 60m require wet systems (as of 2006 – 50m). The basic facilities provided within these buildings may include:
  - Firefighting shaft.
  - Dry/wet rising mains (DRM or WRM).
  - Firefighting lift.
- 3.3 Firefighting shafts including fire mains (but not firefighting lifts) may also be found in certain building types with floor heights exceeding 7.5m. In addition to those within firefighting shafts, fire mains may also be located in other staircases and/or corridors within a high rise building.
- 3.4 Sprinklers and other fire engineered systems may also be found in high rise buildings. The installation of sprinkler systems may indicate that there are larger compartment areas with significant fire loadings present.
- 3.5 It is important to understand any engineered system installed and how it operates during familiarisation visits. Additional information on firefighting facilities and fixed installations is provided in Appendices 2 – 6.

### **4 Planning**

- 4.1 Operational intelligence should be gathered and recorded in accordance with [Policy number 800 - Information gathering/contingency plans](#).

- 4.2 Station personnel should assess the hazards identified for a premises or location and determine the level of risk by reference to factors such as size, complexity and layout. The contents, any processes carried out and occupancy should also be considered and the premises must be included within the Operational Risk Database (ORD) as the Premises Risk Assessment score dictates.
- 4.3 Simple line drawings identifying individual compartments (or flat numbers) associated with floor levels will assist prioritising rescue operations. This is of particular importance where multiple compartments over many levels may be affected by fire or smoke. Some residential flats have emergency exits which should be recorded.
- 4.4 Planning must consider the appropriate Pre-Determined Attendance (PDA). This can be temporarily or permanently increased to compensate for factors such as the absence of fixed installations and the type of incident likely to be encountered. For further information, see [Policy number 412 - Mobilising Policy](#).
- 4.5 To increase the PDA for a high rise premises to cover a temporary or permanent absence of fixed installations, submit a request via the special attendance database at: hotwire > station diary > special attendance request. Out of office hours, requests can be made via the officer of the day (OOD).
- 4.6 Planning must consider the knowledge and understanding of fixed installations and how they can assist fire and rescue operations. Where required, advice and guidance should be obtained from Fire Safety Officers (FSO) regarding fixed installations provided, such as sprinklers, ventilation systems (including manual over-rides) and rising mains. FSOs can be invited to familiarisation visits.
- 4.7 Some older premises may not provide all the expected firefighting facilities, in which case additional planning may be required.
- 4.8 The tactics and resources required to mount safe rescue and fire fighting operations should be assessed, practiced and confirmed where necessary for the building concerned. This may include the following considerations:
- (a) Planning for fire spread beyond the compartment of origin and the potential for multiple rescues.
  - (b) Consideration of the logistical and physical demands on personnel conducting search and rescue over multiple floors and compartments.
  - (c) Contingency plans for loss of water or inadequate water supplies (including internal supplies and identification of distances from the bridgehead to the full extent of the possible fire compartment).
  - (d) The time required to assemble sufficient resources from the PDA.
  - (e) Ensuring adequate resources are provided to undertake initial assessment, effect an early response and establish an effective safe system of work.
  - (f) The complexity and size of building design and security measures, such as code entry systems, which may delay teams reaching the scene of the fire.
  - (g) Staircases and lifts not accessing all floors.
  - (h) The siting of bridgeheads and alternative options if they are compromised by worsening conditions.
  - (i) Floor numbering, as some buildings may have concealed entrances and the gradient of the ground may lead to front and rear elevations having different floor counts.



- (j) Alternative communication arrangements to overcome any radio blind spots.
  - (k) Training to implement operational procedure, site specific plan and to overcome worst case scenarios, such as teams shut in a firefighting lift and unavailability of fixed installations.
- 4.9 Borough training plans should take account of the quantity and nature of high rise premises and ensure this is reflected appropriately in the exercise schedule. Training should include scenarios designed to develop and test operational tactics for overcoming the failure of fixed installations.
- 4.10 Where LFB Premises Information Boxes, are available, the information provided should be checked for accuracy and completeness during 7(2)(d) visits. Premises evacuation procedures and their impact on firefighting tactics should be considered as part of 7(2)(d) visits (see [Policy number 513 - Premises information box systems](#)).
- 4.11 Where anti social behaviour towards firefighters has been identified consider an appropriate intervention strategy as part of community fire safety.
- 4.12 Further guidance on the type of information which should be gathered during 7(2)(d) visits to high rise premises is contained in Appendix 1.
- 4.13 Where radio antennas are fitted to high rise buildings, these should be identified and recorded during 7(2)(d) visits.

## **5 En route**

- 5.1 Information received en route and any planning that may affect on arrival tactics must be passed to all personnel.
- 5.2 Full use must be made of all operational information systems, such as Mobile data terminals (MDT). Where floor plans are available these should be printed off.

## **6 On arrival**

- 6.1 Attendance should be made to the main entrance of the premises, unless an agreed RVP or split attendance has been identified during the planning phase or prevailing conditions dictate otherwise.
- 6.2 The siting of appliances that form the PDA should take into account the potential need for access for aerials, other specialist appliances and emergency services, and the potential danger of objects falling from height.
- 6.3 To establish effective command and control, the IC should:
  - (a) Remain at ground floor level unless planning arrangements have identified a more appropriate location e.g. the Fire Control Centre.
  - (b) Gather all available relevant information from sources such as building occupants and from any building or evacuation plan. The IC should confirm the accuracy of any information received by cross-checking different sources and clearly conveying what information they require.
  - (c) Identify which floor(s) the incident is located on in order to determine where the bridgehead should be sited.
  - (d) Carry out a 360° visual inspection to identify affected areas and fire spread.
  - (e) Ensure initial teams equip themselves with all of the necessary equipment to set up a bridgehead before going aloft (see 7.24).



- (f) Establish the location and status of any fire control, fire engineering and/or fixed installation systems.
- (g) Secure water supplies for firefighting teams at the bridgehead. The hydrant supply and deliveries from the pump to the DRM must be twinned and charged using 70mm hose.
- (h) Establish a cordon to help protect personnel and others from falling materials.
- (i) Determine the status of any Heating, Ventilating and Air Conditioning (HVAC) systems in the building.
- (j) Implement reliable lines of communication with the bridgehead, pump operator and other sectors.

6.4 The IC should also give early consideration to the following points:

- (a) Whether additional resources are required to support operations.
- (b) Recognise the effect of wind, noting this may be amplified and made more unpredictable by factors such as the building's height and its proximity to other tall buildings.
- (c) The need to layout jets to control fires caused by falling debris and deploy ground monitors to prevent external fire spread.
- (d) The need to establish, if appropriate, separate attack and evacuation stairwells. If this tactic is employed, personnel assigned to assist evacuation must then use a different stairwell that should be clearly identified as the evacuation stairwell.

## 7 Operational procedure

### Securing water supplies for firefighting

- 7.1 DRMs and WRM's have a finite capacity to deliver water. If multiple jets are in use, it may not be possible to achieve optimum flow rates or recommended operating pressure for individual branches. Branch flow control facilities can be used to improve distribution between all jets in use.
- 7.2 A DRM can deliver a maximum of 1500 litres of water per minute. If the requirement for water exceeds the DRM capacity, the IC should consider augmenting supplies, such as by hauling hose aloft; use of aerial appliances; and/or by laying hose lines up staircases. When laid on stairways, hose should be positioned in such a way that it minimises obstruction. Vertical water relays may be required, using intermediate pumps to increase flow. Wet rising mains are designed to supply 1500 litres per minute for 45 minutes as a minimum.
- 7.3 The IC must consider the building's construction, size, layout and fire load when making decisions regarding the size of hose lines and weight of attack to be used at an incident.
- 7.4 At larger incidents, the IC will need to consider the optimum means to provide the overall quantity of water required, noting that this could include augmentation of fixed installations and the supply of internal and external jets and monitors.
- 7.5 MDTs will provide the location of hydrants, the size of the water main supplying them and the location of emergency water supplies. Bulk media advisors (BMA) are available to provide advice with regard to securing and optimising water supply.
- 7.6 If fixed installations are vandalised or unavailable for any other reason, the IC should consider implementing alternative tactics and/or requesting additional resources.

- 7.7 If the nature of the debris poses a risk to hose lines going into the building, consideration should be given to either protecting these with hose ramps or finding an alternative route outside of the area within which the debris is falling.
- 7.8 Effective communication between BA teams, bridgehead, the IC and the pump operator are necessary to ensure best use is made of the available water supply.
- 7.9 WRM installations may require augmentation at larger or protracted incidents. (See appendices 2, 4 and 5 for further information regarding dry and wet rising mains).
- 7.10 Some high rise buildings have fire sprinkler systems and, where fitted, a firefighter must be sent to the main stop valve. This is usually located on the ground floor, but it may be located elsewhere, depending on building design. The sprinkler system should only be switched off on instructions from the IC, following consideration of the points outlined in Appendix 6.
- 7.11 When in operation, the sprinkler system should not normally be turned off.

### **Securing and using the firefighting lift**

- 7.12 Where the height and location of the incident makes the use of a fire lift beneficial, the firefighting lift should be identified and a firefighter detailed to take control of, and remain in the lift. The IC should also be aware that some lifts may not access all floors of the building.
- 7.13 Only designated firefighting lifts are safe to use during an operational incident and therefore other lifts must not be used for firefighting operations. The IC should be aware that some older style lifts may not have the same capabilities as modern lifts.
- 7.14 Teams must exit the fire lift at least two floors below the floor where the fire is reported or believed to be. This is to ensure that the risk of firefighters becoming involved in the fire is minimised.
- 7.15 If the location of the fire is not known with a reasonable level of certainty, personnel should approach the believed or likely location of the incident with caution, using a protected staircase.
- 7.16 The firefighting lift should remain at the established bridgehead so that rescued persons can be quickly brought to ground floor level.
- 7.17 In the event that the fire lift is not available, consideration should be given to:
  - (a) The resource implications for teams accessing and carrying equipment to the bridgehead.
  - (b) The use of aerial appliances to transport equipment to the bridgehead (if the building design makes this a viable option).
  - (c) Additional resources to enable safe manual handling of casualties down stairways to the point where they can be passed to the care of the Ambulance Service.
- 7.18 See Appendix 3 for further information regarding firefighting lifts.

### **Establishing a bridgehead and fire sector**

- 7.19 The bridgehead should be located two floors below the fire floor unless planning arrangements or the specific design features of the building allows for safe air to be reliably maintained in a position which is closer to the fire. The bridgehead should be established in a firefighting lobby and not in a corridor (unless the building design results in the corridor performing the lobby function).



- 7.20 When positioning a bridgehead, consideration should be given to smoke spread through doors that will be opened and which will have to remain open for firefighting purposes.
- 7.21 A minimum of Crew Manager must be nominated as the fire sector commander. The fire sector commander will be responsible for establishing a bridgehead and committing teams to firefight and search and rescue as required.
- 7.22 The IC should give early consideration, in relation to the size of the incident and scope of responsibility, to whether it is necessary to nominate a more senior manager to take over the fire sector commander role.
- 7.23 Sectorisation of high rise incidents should be in accordance with [Policy number 434 - Sectorisation at incidents](#). Due to potential congestion at larger incidents a staging area below the bridgehead may be required for additional resources.
- 7.24 As the water supply is being secured, the fire sector commander will take a minimum of three firefighters to the bridgehead. They will be a firefighting/rescue team of two BA wearers and a BA entry control officer (ECO).
- 7.25 The following items of equipment must be provided as soon as possible:
- sufficient hose for two lines to reach the affected area of the building,
  - two branches,
  - one BA board, bracket and tripod,
  - two BA sets,
  - immediate emergency care (IEC) pack,
  - long line,
  - breaking in gear,
  - thermal imaging camera,
  - access keys/codes (if available),
  - floor plans (if available)
  - forward information board (FIB).

The above equipment is a minimum, and other items of equipment, such as an appropriate extinguisher can also be provided, if resources permit and the nature of incident indicates this is appropriate.

- 7.26 Regular communication should be maintained to ensure that the IC is aware of the developing situation and can anticipate resource requirements effectively. This also ensures the fire sector commander is kept updated regarding any fire and smoke spread that may only be visible to those outside the building.
- 7.27 Information available either on site or available on appliances should be used to identify floor numbers, flat and compartment numbers (or other identification) and their proximity to the fire compartment. This can include signage, building plans or plans drawn from the floor layout of unaffected floors where the floor layout is consistent throughout the building.
- 7.28 Where specific information on the location of persons requiring rescue is available this should be confirmed with teams and recorded on FIBs. A record of persons rescued and areas searched or partly searched should be made to inform additional teams. This will assist with prioritising further rescues and reduce repeated searches of the same areas. Plans of the building will assist this process.
- 7.29 Where there is information that hoarding of property may be present teams should be made aware and consideration given to requesting additional resources. Large volumes of



combustible materials will require a significant weight of attack and incidents are often protracted during the damping down and turning over phase. Any rescue efforts will be extremely demanding and damage control will be difficult.

- 7.30 Consideration should be given to the effect that fire service operations and vertical/ downward fire spread may have on an established bridgehead. If worsening conditions or fire spread at or below the bridgehead require it to be repositioned, the following should be acted upon:
- (a) The IC, all officers and BA teams must be informed of any decision to re-locate the bridgehead.
  - (b) All BA teams must be informed to ensure they monitor their air supply and take the new distance into account when assessing their turn around time.
  - (c) As relocation will increase the travel distance for BA teams, consideration must be given to the immediate withdrawal of BA teams. Any decision to withdraw breathing apparatus teams must be balanced against the urgency of the task(s) they are performing.
  - (d) If not already established, an emergency team the same size as the largest committed team and rigged to at least the same level of protection must be made available at the bridgehead as soon as practicable.
  - (e) All information and resources should be transferred to the new bridgehead location.
  - (f) Consider implementing Stage 2 BA procedures.
  - (g) Where life saving operations are delayed, the IC should consider alternative methods of effecting rescue.

### **Messages**

- 7.31 When attending a high rise incident, the IC will have to gather sufficient information to carry out a risk assessment and implement the appropriate safe systems of work. The implementation of high rise procedure should be reflected in an informative message to Brigade Control as soon as possible. If sent in isolation, the full details of the incident (e.g. dimensions, area involved) do not need to be sent. See [Policy number 518 – Messages from incidents](#).
- 7.32 Example: "From ..... at .....; high-rise procedure implemented, tactical mode Oscar"
- 7.33 The above message indicates that a risk assessment has been carried out, and that a safe system of work has been implemented. This message can only be sent where the following minimum systems of work have been implemented;
- (a) the location of the bridgehead has been risk assessed as appropriate for the incident,
  - (b) access and egress to and from the bridgehead is secured and maintained,
  - (c) the bridgehead is established with two charged jets deployed (as described in 7.35 and 7.36 below).

### **Committing teams**

- 7.34 All specific tasking of teams should take place at the bridgehead once the decision has been made by the IC to commit them to internal firefighting and rescue operations above the bridgehead.
- 7.35 Any delay committing teams can increase the likelihood of fire growth and fire spread occurring and in turn, can increase the pressure on firefighters to act before sufficient resources are

available. The IC should give early consideration to whether additional resources are required to assist in the evacuation of occupants or to replace teams that have been diverted to this task.

- 7.36 The fire sector commander should inform the IC before committing any BA teams. The initial BA team's charged branch should (where possible) be supplied from the rising main outlet one floor below the fire; if this unavailable, the nearest available outlet below that should be used.
- 7.37 An additional BA team with a second jet should be provided as soon as possible, in order to protect and support personnel involved in rescue/ firefighting operations. This second jet should be at least one hose length longer than the first. This allows the first team to be supported in firefighting and allows rescue of the team without compromising water supply. The second jet can be supplied from the rising main outlet on the fire floor or the next available outlet below the fire floor, as appropriate.
- 7.38 If signs, symptoms or conditions that may lead to backdraft, flashover or other abnormal fire development are present, a covering jet and BA team must be present before the search and rescue/ firefighting team are committed into the fire compartment. Any entry into a fire compartment should be in accordance with [Policy number 793 – Compartment firefighting](#).
- 7.39 Hose lines should be laid and charged in an area unaffected by fire or smoke and behind the safety afforded by a fire resistant structure or fire resisting door(s). Hose lines should be fully charged before entering any doorway to prevent them passing under a door, which could subsequently cause a flow restriction or obstruction into or out of the premises when the jet is charged.
- 7.40 In circumstances where personnel need to work in an area above the bridgehead which is not affected by fire or smoke and the IC has confirmed that the building's construction and any fire engineered solutions have not been compromised, teams can be committed without BA. These teams must maintain communication with the bridgehead and a Safety Officer must be deployed in the stairwell and be in contact with other Safety Officers and the IC outside the building. Teams should be withdrawn as soon as it is believed there is a risk that fire or smoke is likely to spread to the unaffected area.
- 7.41 The IC should consider team welfare and rotation of firefighters, in light of the effort required to move personnel and equipment to the Bridgehead.
- 7.42 The implementation of hydration regimes will help to minimise physiological stress (see [Policy number 284 - Metabolic heat stress](#)).

## **Search and Rescue**

- 7.43 Search and rescue within high rise buildings presents logistical and physical challenges to operational personnel which should not be underestimated. They will generally be resource intensive and therefore any additional resources required should be requested early in the incident. The travel time from the bridgehead to the scene of operations should be considered.
- 7.44 It is good practice to nominate a search co-ordinator early in an incident to support a systematic and thorough process. See [Policy number 803 – Search and rescue procedures within structures](#).
- 7.45 Accurate records should be maintained to confirm areas that have been searched as well as identifying areas which still require searching. FIBs can be used to record this information and ensure its availability should the bridgehead be relocated.



## Evacuation

- 7.46 The IC should consider following the evacuation plan devised as part of the occupier's fire risk assessment, unless the fire situation dictates otherwise.
- 7.47 It may be necessary to undertake a partial or full evacuation in a residential building where a "Stay put" policy is normally in place.
- 7.48 Firefighting operations can be adversely affected by the type of evacuation being undertaken, the progress of the evacuation and the number and type of people being evacuated. Evacuation can be made more resource intensive if the occupants have an impaired ability to make their own way to safety; for example, disabled persons or those under the affect of alcohol or drugs may need greater assistance. The IC should consider:
- (a) the effect of firefighting tactics on evacuation (and vice versa),
  - (b) the resources required to support the evacuation or "Stay put" policy,
  - (c) where it is safe to do so, using other emergency service personnel to assist with evacuation; and that widespread evacuation may divert teams from the task(s) they were briefed to undertake which may require additional resources,
  - (d) the need to establish, if appropriate, separate attack and evacuation stairwells.

## Fire Survival Guidance

- 7.49 Incidents in high rise buildings can lead to Fire survival guidance (FSG) calls being received by Brigade Control. In these circumstances, the IC should take action necessary to either rescue or reassure occupants.
- 7.50 The management of FSGs is resource intensive. Where FSGs are received at a high rise incident Control will mobilise a stand alone FSG attendance. This attendance is additional to any other resources that have been requested or are en-route. If the size of the incident is subsequently increased, the mobilising system will not include these resources when calculating the additional attendance required.
- 7.51 A clear record of FSG calls and relevant information on their location and circumstances will be necessary at the mobilising centre and the incident ground. This will assist confirmation of priorities and subsequent reassessment of those priorities should information change as the incident develops.
- 7.52 The advice offered during fire survival calls should be re-evaluated throughout an incident and this may require a change in the advice given. In exceptional circumstances an IC may consider informing control that their advice to FSG callers should be altered e.g. to attempt to leave their property. The IC should remember that this advice may be contrary to National Policy for control staff on FSGs and liaison with the officer in charge at control will be required for agreement to change the prescriptive advice. See [Policy number 790 - Fire survival guidance calls](#).

## Ventilation

- 7.53 Ventilation should only be undertaken on the instruction of the IC. Before operating any ventilation systems or undertaking ventilation, the IC should consider:
- (a) any adverse affect on fire development, such as the risk of causing a backdraught or flashover and the effects on personnel and occupants in the hazard zone.
  - (b) what impact wind may have if doors, windows or emergency exits are opened or should fail prematurely.



- (c) the need to communicate with and possibly withdraw personnel in affected areas or occupants still in the building.
  - (d) that sufficient resources are in place to contain the fire if there is a need to breach any built-in or engineered safety systems.
  - (e) that measures such as covering jets are in place to protect surrounding risks.
- 7.54 If the risk cannot be properly assessed or sufficient control measures implemented, ventilation should only be undertaken in the post fire stage. The IC must maintain an awareness and understanding of the effect and impact of any ventilation tactics employed throughout an incident.
- 7.55 All lobby doors should normally be kept closed except when it is necessary for them to be opened to facilitate the movement of personnel and equipment through the building. Some ventilation shaft systems require inlet air from doors being held in the open position. This is noted by doors opening inwards rather than outwards.
- 7.56 Any building ventilation systems operating on arrival should be left switched on until the IC is satisfied, as a result of discussion with an on-site engineer or FSO, that switching off the system will not cause an escalation of the incident. Measures such as covering jets should be considered to protect surrounding risks.
- 7.57 ICs should consider, on the basis of expert advice and building design, using any available ventilation systems to minimise smoke-logging in areas outside the fire sector.
- 7.58 Before operating any heating or ventilation systems or undertaking ventilation the IC should also identify:
- (a) the path that fire, heat and smoke will follow to escape to open air or another compartment within the building,
  - (b) any adverse affect on fire development, such as the risk of causing a backdraught or flashover,
  - (c) any adverse affect on evacuation in progress, and
  - (d) what impact wind may have if windows or doors are opened or should fail prematurely.

### **Building design and fire safety measures**

- 7.59 During a fire, the level of risk can be significantly increased if any of the building's design measures are compromised. This can include the loss of compartmentation, ventilation or sprinkler systems.
- 7.60 The IC should determine what fixed installations are available, check whether they are functioning and incorporate them as appropriate within the operational plan.
- 7.61 If any fire safety measures have been compromised, the IC should consider requesting additional resources if these would be needed to implement alternative tactics.
- 7.62 The IC should consider the impact of building materials and contents on fire spread; for example, PVC window frames may be subject to early failure. The failure of any external window frames or walls will create an increased risk of firefighters falling from height and, where this occurs, the IC should ensure appropriate procedures are in place to maintain a safe working area. See [Policy number 547 – Line operations and safe working at height](#).
- 7.63 Automatic fire curtain systems may be present in a variety of configurations and orientations. If the building has an automatic fire curtain system installed, the IC must ensure teams are

suitably briefed on their location(s) and the risk they can pose to safe egress from the building, should they operate whilst a team is committed in the compartment where they are installed.

7.64 A FSO will be informed of all four pump fires, will attend all five pump fires and above and can be requested whenever specialist advice is required by the IC.

7.65 Where firefighters will be working within the vicinity of radio antennas, ICs should follow guidance within [Policy number 298 - Operations at radio transmitter sites](#).

### **Safety officers**

7.66 The early appointment of one or more Safety Officer(s) will help ensure that risks are either eliminated or reduced to an acceptable level.

7.67 The IC should appoint Safety Officers as soon as practicable to monitor conditions in the staircase or shaft being used for the bridgehead and observe all relevant external sides of the building. Identified hazards within and external to the building should be established to inform the IC's plan for removing, reducing or controlling the associated risks in the associated sectors. The Safety Officer working outside the building should check for;

- (a) falling debris,
- (b) cordon maintenance for personnel, other emergency services and the public, and
- (c) external spread of fire and smoke.

### **Safety cordon**

7.68 ICs must consider the implementation of an appropriate sized hazard zone. This should take into account the size, height and construction of the building, as this will affect the footprint in which debris and other items may fall.

7.69 The hazard zone should separate those at risk from the hazards, facilitate operational activities and protect the scene from unauthorised access to evidence or property. The IC should undertake early liaison with the police, who may be best placed to resource and manage cordons around a high rise incident.

### **Damage control**

7.70 The IC should give early consideration to damage control and, due to the fact high rise premises frequently have high levels of occupancy, any additional resources needed to mitigate damage from fire and the effects of firefighting operations.

7.71 It should be remembered that fire, smoke and the water used for firefighting may be able to travel considerable distances through shafts and voids that may form part of the building construction.

### **Anti-social behaviour**

7.72 If Brigade personnel are subject to either verbal or physical threat or abuse, the IC should request the attendance of the police.

### **Communication difficulties**

7.73 Where appropriate and available the IC should consider the use of alternative radio channels to manage the volume of radio traffic or, where there are communication difficulties, other equipment, such as radio repeaters, leaky feeders and hand-held digital main scheme radios (see [Policy number 488 - Incident communications](#)). Door entry call points, internal telephones, public address systems or loudhailers can be employed to communicate with building occupants. Consider the use of runners.



- 7.74 When radio communications with any team committed to the incident are lost, it must not automatically be assumed that any loss of communications is associated with transmission difficulties caused by the building. Every effort should be made to re-establish communications as quickly as possible.
- 7.75 If a BA team loses radio contact with the communications operator/ECO, the team leader will decide whether to withdraw. If both telemetry and radio signal is lost the BA team must withdraw. If communications or contact is lost with any BA team without warning a BA team will be committed to investigate. If it is established that the original BA team is in difficulty, the IC must be immediately informed.

## Post incident

- 7.76 As appropriate to the nature and scale of the incident, the following measures should be considered to help eliminate or remove risks after an incident:
- (a) fire protection and structural safety should be assessed to ensure that it has not been compromised before handing over the building to a responsible person,
  - (b) arrangements should be made with the occupiers to reinstate, as far as practicable, all fixed installations, such as ventilation systems and fire alarms, to their normal working condition,
  - (c) consider the need to review existing information held on a premises or location, or the need to add a new premises or location into future planning,
  - (d) where the scale and nature of the incident makes it justified, arrangements should be made for personnel to make a contemporaneous written record of their actions, (see [Policy number 828 – Recording decisions at incidents](#)). This information may be used to assist in any internal or external investigations or enquiries that follow any incident, such as a Coroner's Court or public enquiry,
  - (e) any fire safety contraventions identified at an incident should be followed up by the relevant Fire Safety team and/or reported to the appropriate authority.
  - (f) consideration should also be given to any community safety interventions which may be appropriate, such as promoting smoke alarm ownership or highlighting issues such as vandalism or anti-social behaviour to relevant partner agencies.
  - (g) further advice and guidance can be obtained from FSOs.

## 8 References

- 8.1 The following policies are relevant to and should be read in conjunction with this policy:
- [Policy number 47 - Sprinklers and drenchers](#)
  - [Policy number 120 – Phased evacuation of office buildings;](#)
  - [Policy number 284 – Metabolic heat stress;](#)
  - [Policy number 238 – Incident command procedures;](#)
  - [Policy number 412 – Mobilising policy;](#)
  - [Policy number 434 – Sectorisation at incidents;](#)
  - [Policy number 466 – Respiratory protective equipment - breathing apparatus – operational procedures;](#)
  - [Policy number 513 – Premises information box systems;](#)
  - [Policy number 518 – Messages from incidents;](#)
  - [Policy number 540 - Manual handling operations procedure;](#)
  - [Policy number 543 - Immediate emergency care \(IEC\)/medical first aid;](#)

- [Policy number 547 – Line operations and safe working at height;](#)
- [Policy number 790 - Fire survival guidance calls;](#)
- [Policy number 793 - Compartment firefighting.](#)
- [Policy number 800 – Information gathering/contingency plans;](#)
- [Policy number 803 - Search and rescue procedures within structures](#)
- [Policy number 828 – Recording decisions at incidents](#)
- [Policy number 829 - Hoarding](#)
- [Generic Risk Assessment 3.2 Fighting fires – In high rise buildings](#)



## Appendix 1 - 7(2)(d)

- 1 During 7(2) (d) visits personnel should ensure they are familiar with the following and their impact on firefighting and search and rescue operations:
  - Means of access and egress from the site and the building.
  - Location and accuracy of information available on site.
  - Location and availability of water supplies.
  - Rising main inlets, outlets, drain valves and isolation valves.
  - Hydrant locations and size of main.
  - Parking for pumping appliances within 18m of rising main inlet.
  - Location of fire control room if provided.
  - Firefighting shafts, and protected lobby areas.
  - Location and function of firefighting lifts (noting not all lifts provide the necessary protection to meet the most recent standards) and lift machinery.
  - The likelihood and impact of any fire spread beyond the compartment of origin and the potential for multiple rescues.
  - Occupancy and use profile (by time of day and day of week).
  - Floor layouts and any building construction features which may promote rapid or abnormal fire spread, such as sandwich panels, timber-framed construction, atria or voids.
  - Plans to show flat and maisonette numbers, by floor and in relation to each other.
  - Length of hose runs from rising main outlets.
  - Additional security measures, such as security grills, multi lock doors and code/card access systems.
  - Plans for automatic fire alarm/ fire suppression systems and means of locating the head(s).
  - Means of ventilation and smoke control including location of operating switches.
  - Evacuation arrangements which may include phased evacuation.
  - Any hazardous materials that are used or stored on site.
  - Fire engineered solutions within the building design.
  - Potential communication problems.
  - Identification of areas that would be suitable for RVP and appliance marshalling.
  - These points should also form the basis and be included as part of any site-specific plan that is necessary.
- 2 Inform the building owner of defects or safety issues concerning firefighting facilities and report these to the Resource Management Centre as an alleged fire risk. A FSO will be informed and determine the appropriate course of action.
- 3 Building occupiers or the responsible person should be encouraged to inform the Brigade of any relevant changes that might occur between 7(2)d visits. If any such notification is received, consideration should be given to the impact of any change on the level of risk and whether this requires a change to the PDA.
- 4 Any identification of hoarding of property should be addressed as per [Policy number 829 - Hoarding](#).

## Appendix 2 - Firefighting shafts

- 1 Firefighting shafts are a means of enabling firefighters, to reach any point within a building in the shortest possible time. They provide a position of relative safety while firefighters carry out their firefighting and rescue roles.
- 2 The detailed recommendations on the provision of firefighting shafts within buildings are contained within BS 9999. In brief a firefighting shaft will contain a firefighting stair, a firefighting lobby with a dry or wet fire main and a firefighting lift. Additionally there may be provision made to ventilate the firefighting shaft dependant on the building type. In large complexes with a variety of uses, firefighting shafts may serve separate parts of the complex. For example, in a complex consisting of high-rise offices over a shopping centre, the offices may be provided with a dedicated firefighting shaft that does not serve the shopping centre.
- 3 It should be remembered that hose lines and other equipment laid through doorways from firefighting shafts may allow smoke and the products of combustion to travel into the protected stairwell, worsening conditions on upper floors and possibly increasing fire spread.



## Appendix 3 - Firefighting lifts

- 1 Firefighting lifts are provided in high-rise buildings to enable firefighters and their equipment to reach the upper floors speedily and without undue fatigue. Firefighting lifts are dedicated lifts that have a special electrical circuit and a fire control switch at the fire brigade access level (usually at ground floor). Wherever possible a firefighting lift is not smaller than an eight person lift and will carry a load of up to 850kg. The electrical supply to the lift is independent of the other circuits in the building.
- 2 The term “fireman’s lift” describes a normal lift, in which is fitted a “fireman’s switch” at ground floor or at fire-fighter access level used to override the normal lift controls. These were normally installed in buildings prior to or around the 1980s. As a normal lift it will not have all the structural protection, protected services, duplicate power services, functionality, or overall resilience that a more modern standard BS EN 81-72: 2003, BS 5588 Part 5 or BS 9999 fire-fighting lift will have.
- 3 The term “Fire-fighting lift” describes a lift installed to BS EN 81-72: 2003, BS 5588 part 5 or BS 9999, and is a lift fitted with additional protection, functions, and controls that enable it to be used under the direct control of the fire service when fighting a fire. The fire-fighting lift is a development of the type of lift known as a “fireman’s lift”. Although existing “fireman’s lift” installations may in some circumstances be refurbished, in new buildings and those under going significant changes, the aim should be to provide lifts that comply with the current codes of practice. Further information can be sourced from BS EN 81-72 2003 – Lifts: Fire-fighters lifts.
- 4 Lifts must be identified during the planning phase and during 7(2)(d) visits. Older lift installations may not provide all the facilities that modern firefighting lifts, conforming to the latest European standard will offer. In these instances, lift facilities and functions must be checked during the planning phase for appropriate use at an incident.
- 5 The minimum features to be considered by when assessing whether a lift is safe for use by Firefighters should include the provision of:
  - Primary and secondary power supplies
  - Water protection measures (e.g. IP rated wiring and controls, drainage measures)
  - Fire fighter recall switch at access level
  - Fire fighter in-car controls
  - Fire fighter communication system
  - Floor indicators.
- 6 Early control of the firefighting lift(s) must be taken by switching the fire switch to the ‘on’ position. If any doubt exists as to which floors a lift serves, its use should be avoided.
- 7 The fire control switch varies according to the manufacturer, but is of a positive on/off type and is located adjacent to the firefighting lift. There are a number of different types e.g. a switch contained in a glass fronted box or metal fronted padlocked box, or of lift key type. In all cases the position of the control switch should be indicated by a suitable notice. For a modern standard firefighting lift installation the expectation is that when the control switch is operated to the ‘on’ position it will provide the following action:
  - (a) If travelling upwards the lift car will stop and return to the access floor level, while if the car is travelling downwards, it will continue in travel and stop at the access floor level. At the access floor level the doors will then open and remain open. The buttons provided at each floor landing and inside the car will be inoperative during this period.

- (b) When the lift reaches the access floor level the landing call point buttons will remain inoperative but the car buttons will resume control. Because of this, a firefighter is to be detailed as the firefighting lift operative to maintain control of the lift and is to remain in control until relieved of the duty. This firefighter is to have a radio for communication with the bridgehead and the IC.
- (c) Modern lifts require the close door button to remain depressed until the door has closed fully and the open door button depressed until the door has opened fully. This is a safety mechanism to minimise the risk of firefighters becoming caught in a fire in the lift lobby area.
- (d) When two lifts are side by side it is possible that both will be controlled by the fire control switch; this will be the case if, on the operation of the switch, both cars return to the access floor level and the doors open and remain open.
- (e) The lift is to be taken to the bridgehead when firefighting commences so that it is available to transport any rescued people quickly to ground floor level. The lift operative must closely monitor radio traffic to ensure that the lift is used to greatest effect when required at either the bridgehead or ground floor. If the lift is not available to transport casualties to the ground floor, consideration must be given to requesting additional resources to assist.
- (f) When a firefighting lift is used for emergency purposes care must be taken not to overload it and, when the emergency is over, the fire switch is to be returned to the off position, the cover closed and secured and one of the landing call buttons operated to check that the lift has been restored to normal working.
- (g) The use of passenger lifts that are not identified as a firefighting lift should be avoided and must not be used for firefighting purposes. Normal lifts do not have a dedicated power supply and will not be under the control of the fire service personnel. It is possible for a normal lift to be called to the floor involved in the fire and the doors to open automatically, exposing the occupants to potential harm.



## Appendix 4 - Dry rising mains

- 1 A DRM consists of an empty pipe installed vertically in buildings over 18 metres in height, with a fire service inlet at the lower end and outlets at various levels throughout the building. DRMs may be installed in any building as a compensatory feature to address other factors such as the nearest hydrant or poor perimeter access.
- 2 The advantages of using a DRM are that it:
  - Reduces the time taken to supply water to upper levels.
  - Reduces the amount of hose required to reach the fire.
  - Reduces frictional loss in the delivery supply.
  - Lessens the amount of equipment needed.
  - Reduces effort required by personnel.
  - Keeps stairways clear of hose.
- 3 A standard DRM will be supplied from a hydrant via the pump into two male inlets housed in an inlet box normally found at ground floor level. A DRM is able to provide 1500 litres of water per minute.
- 4 The inlet box will have the words 'DRY RISER INLET' in 50mm lettering on the box door for identification. They have a 65mm instantaneous female outlet on each floor or in some cases alternate floors. Riser outlets should be located either in a protected lobby or approach stairway. The outlets should be secured in the closed position. In a residential building, it should be noted that the lobby may be the corridor.
- 5 A drain valve is connected at the inlet and allows the system to be drained on completion of the incident. An air valve is normally fitted at the highest point in the riser to facilitate drainage by allowing air to enter the riser.
- 6 When charging a DRM the IC should ensure as soon as possible that all unused landing valves are in the closed position.
- 7 Where multiple jets are in use, it may not be possible to achieve maximum flow rates or optimum operating pressures for individual branches. In these circumstances, branch flow facilities can be used to improve water distribution between all branches that are in use.
- 8 The British Standard – BS 9990:2006 includes the requirement for the provision of isolation valves at intervals not exceeding 10m so that sections of the fire main can be isolated to enable repairs to be carried out. The valves should be secured in the open position by a chain and padlock or incorporated within a monitoring system to indicate when the valve is not fully open. (However these are considered an overprovision in DRM installations and may not therefore be present. They should however be found in new WRM installations.)

## Appendix 5 - Wet rising mains

- 1 Wet rising mains may be fitted in all buildings over 60 metres in height (as of 2006 buildings over 50 metres in height) due to the excessive pressures required to pump water beyond this level.
- 2 Wet rising mains consist of vertical pipes similar to the dry rising main system with landing valves at each floor except the ground. The pipe system is connected to a permanent water supply normally a tank, fed from the town mains. Duplicate automatic pumps, one duty and one standby supply this water to the pipe system.
- 3 The tanks are fitted with an automatic warning system to indicate a low water level.
- 4 At protracted incidents the wet rising main tank may need to be augmented.
- 5 Wet rising mains are designed to supply 1500 litres per minute for 45 minutes as a minimum. Due to the height of the building and the pressures used, water pressure reduction valves are fitted to the outlets at each floor.
- 6 If the WRM should fail, the IC should identify whether the system has isolation valves installed and use these to optimise water supplies to the outlets being used.
- 7 Buildings constructed prior to 2006 will have outlet pressures of 4 to 5 Bars. Changes to BS 9990:2006 now recommend an outlet pressure of 8 Bars, this recommendation does not affect installations installed before this date.



## Appendix 6 - Water suppression systems

- 1 These may be found in commercial, residential and multiple use high rise buildings (and since 2006 has been a requirement to be installed in residential buildings over 30m) and can play an important part in fire suppression. Sprinkler installations comprise a system of pipes erected at or near the ceiling of each floor and are connected (through a series of valves) to one or more dependable water supplies. The installation of sprinkler systems may enable larger compartment areas with significant fire loadings to be constructed. It is important to understand the system installed and how it operates during familiarisation visits.
- 2 Sprinklers perform three functions: to detect fire, to attack fire and to give an audible warning. The following points should be borne in mind with a building fitted with sprinklers.
- 3 On arrival a member of the team should be sent to the main stop valve so that:
  - They can open the valve if they find it closed, (on the orders of incident commander).
  - They can ensure that the valve is not closed except on the specific orders of the incident commander.
  - Where the water supply can be augmented, via a Brigade inlet, the pump should be set in ready to increase the pressure should a large number of sprinkler heads be operating at the same time.
  - The sprinklers should not normally be turned off in order that the fire may be fought with jets or spray branches.
  - If extra water is needed, it should not be taken from the main supplying the sprinklers unless it is of a large size.
  - Always check the area where the sprinklers have activated to make sure the fire is out and not hidden under stored items.
  - If for any reason the water supply to the sprinklers cannot be turned off, consider damage control to avoid unnecessary water damage. Single sprinkler heads can be dealt with by tying the female coupling of hose under the sprinkler head and running the hose out of the building.
  - Sprinkler floor isolating valves may be fitted to the system to allow for maintenance or repair of part of the sprinkler system. See [Policy number 47 - Sprinklers and drenchers](#).

NB Where fire control centres are provided often the sprinkler system is fully monitored. Therefore there should not be any need to send a FF to the stop valve. The IC should liaise with the fire control centre to confirm this.

Water mist –systems.

Water mist systems are increasingly being used in the built environment but are still classed as water suppression systems. Crews are advised to familiarise themselves with the basic components of these systems as they may not have all the design features of a traditional sprinkler system. Additionally they will fall into different categories depending on the risk they are designed to protect.

For more technical detail reference can be made to the British Standard Draft for Development series 8489-1:2011

## Document history

### Assessments

An equality or sustainability impact assessment and/or a risk assessment was completed on:

EIA	15/10/2008	SIA	15/11/2011	RA	17/05/2013
-----	------------	-----	------------	----	------------

### Audit trail

Listed below is a brief audit trail, detailing amendments made to this policy/procedure.

Page/para nos.	Brief description of change	Date
Throughout	This policy has been protectively marked.	21/06/2011
Throughout	This policy has been reviewed as current. Minor changes have been made throughout and the Key Point Summary has been updated to reflect current procedure. Please read to familiarise yourself with the content.	18/11/2011
Throughout	Minor wording corrections added. Sections now correctly referenced.	23/11/2011
Page 16, para 8	Updated reference to form 5566 as this has now been withdrawn and replaced with a new procedure.	10/05/2012
Pages 11 and 12	Cross reference links to policies added to paragraphs 7.30, 7.35 and 7.37.	13/12/2012
Page 14	Reference page has been updated with additional policy numbers.	13/02/2012
Throughout	Policy updated to reflect GRA 3.2.	27/06/2013

### Corporate subject list

You can find this policy under the following subjects.

Level 1	Level 2
Incident Management	Buildings & Structures

--	--	--



## Appendix 3 – Draft LFB High rise risk assessment



### Operational Procedures

Risk Assessment for Policy 633 High rise firefighting

User Department: Operational Tactics

Created by: SM Pat Utting

Approved by: GM Simon Churchill

### Document History

Version	Date of Issue	Author(s)	Reason for Issue
1.0	XXXXXX	Pat Utting	Policy review following Lakanal House Rule 43

### Generic Assumptions

The following generic assumptions have been made for policy 633:

All personnel will have received training in High rise firefighting

All personnel will have received training in Compartment firefighting

All personnel will have received training in Risk assessment

All personnel will have received training in Working at height.



**RISK ASSESSMENT – Policy 633**

Description of activity, process or equipment assessed and associated documentation:	The purpose of the policy is to explain the safe working practices at a high rise fire.  It is a key control issue in the Corporate Risk Register mitigating the death or serious injury to our staff and members of the public resulting from poor delivery of the safe person concept.	Date prepared:	XXXXXX
Associated documentation:	GRA 3.2 Fighting fires in high rise buildings.  Corporate risk register.  Draft policy 633 High rise firefighting.	Review Date:	XXXXXX

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
1	Height of the building	Operations constrained by the finite capacity of fire and rescue personnel and equipment  Reliance on provision of purpose-designed facilities to support effective Fire and Rescue Authority intervention that are missing or defective	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Identification of risk by local crews  Planning including 7(2)d where necessary  Dedicated facilities designed to aid fire fighting intervention  Equipment designed for high rise situations  Firefighting lift commandeered and operator designated  Operational procedure to set out contingency arrangements, if fixed installations are unavailable.	5	2	10	M	Y	
2	Objects falling from height	Impact injuries to those entering or exiting building, working or assembling outside  Debris ejected explosively and materials such as glass and curtain wall panels can 'plane' some distance from the building	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Initiate hazard zone around building  Protect hose lines from falling debris  Re-route hose lines around hazard zone  Utilise other emergency services to aid movement of casualties/public to safe areas	5	1	5	L	Y	



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
								Cover external fire spread with jets/monitors  Appoint Safety Officers around perimeter of building.						
3	Extended lines of communication	Difficulty with lines of communication and radio reception  Operations may be a considerable distance from point of command and building construction may cause communication blind spots	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	3	15	M	Identification of risk by local crews  Planning including 7(2)d where necessary  Leaky feeder radio cables, repeater equipment, internal telephones, public address systems and mobile telephones  Alternative radio channels  Utilise separate attack/evacuation stairways where appropriate.	5	1	5	L	Y	
4	Premises security	Access for firefighters may be delayed by security arrangements, such as door-code entry systems, security grilles and multi-lock door systems  Progress slowed by multiple	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not	4	4	16	H	Identification of risk by local crews  Planning including 7(2)d where necessary  Exercise scenarios to reflect reasonably foreseeable	4	2	8	M	Y	

				Initial rating No controls				Amended rating - Controlled					
No.	Hazard	Risk	Persons at risk	Sev	L	R	Rating H,M,L	Existing Control measures	Sev	L	R	Rating - H,M,L	Further control measures required if risk rating not tolerable
		security devices along the route to a fire	involved					scenarios, such as movement of bridgehead, loss of firefighting lift, or dry rising main Additional resources Appoint Safety Officers to monitor outside of building and conditions in firefighting shaft being used for Bridgehead Appropriate level of manager to take charge of fire sector at Bridgehead Fire survival guidance procedure implemented Liaison with other agencies Police liaison traffic/crowd control Standard equipment, such as breaking in gear, taken aloft.					
5	Complexity of internal layout	Crews may become disorientated, safe movement may be hindered and	Fire and rescue personnel Other emergency personnel	5	4	20	H	Identification of risk by local crews Planning including 7(2)d	5	1	5	L	Y



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
		operations slowed due to: <ul style="list-style-type: none"> <li>lack of information on the internal layout</li> <li>large or complex floor layouts</li> <li>operation of fire engineering systems (such as fire curtains)</li> <li>individual maisonette style dwellings may be encountered where access may be up or down a staircase from the front door</li> <li>scissor-style staircases</li> </ul>	Members of public involved  Members of public not involved					where necessary  Manage bridgehead and staging areas  Use of building plans and Regulatory Fire Safety records  Use floor plans to brief crews  Suitable and sufficient de-brief of crews  Awareness of fire engineered solutions  Effective lines of communication  Use of guidelines to assist crews to find relocated Bridgehead  Fire survival guidance procedure implemented.						
6	Activation of Heating Ventilation Air Conditioning systems	Unpredictable fire spread  Unexpected fire/smoke behaviour	Fire and rescue personnel  Other emergency personnel  Members of public involved	5	4	20	H	Determine status of heating ventilation air conditioning systems  Maintain operation of all heating ventilation air conditioning systems until	4	2	8	M	Y	

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
			Members of public not involved					specialist advice dictates otherwise Ventilate only on order of Incident Commander Cover surrounding risks.						
7	Floor and ceiling collapse	Intermediate and main floor and ceiling collapse within a high rise building	Fire and rescue personnel Other emergency personnel Members of public involved Members of public not involved	5	2	10	M	Ensure training covers signs and symptoms of building collapse Attendance of Senior Fire Safety Officer Attendance of structural surveyor Subject matter experts e.g. urban search and rescue Effective lines of communication Appoint Safety Officers Fire and Rescue Authority lighting Establish hazard zone.	4	1	4	L	Y	
8	Wall panel failure	Falls from height due to the failure of external walls,	Fire and rescue personnel Other emergency	5	3	15	M	Identification of risk by local crews	5	1	5	L	Y	

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
		window frames or panels made of lightweight construction, such as UPVC	<p>personnel</p> <p>Members of public involved</p> <p>Members of public not involved</p>					<p>Planning including 7(2)d where necessary</p> <p>Hazard awareness training regarding issues with open areas at heights due to failure of structures in a fire</p> <p>Exercise scenarios to reflect reasonably foreseeable scenarios, such as loss wall panel</p> <p>Tactics training supported at high rise training events for operational crews</p> <p>Briefing and debriefing of crews</p> <p>Adequate resources</p> <p>Subject matter experts, such as structural surveyor, urban search and rescue and Fire Safety Officer</p> <p>Working at height protocols</p> <p>Safety officers to monitor outside of building</p>						



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Amended rating - Controlled				Further control measures required if risk rating not tolerable	
				Sev	L	R	Rating H,M,L	Existing Control measures	Sev	L	R	Rating - H,M,L	
								Hazard zone around perimeter of building.					

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Amended rating - Controlled				Further control measures required if risk rating not tolerable	
				Sev	L	R	Rating H <sub>i</sub> M <sub>i</sub> L	Existing Control measures	Sev	L	R		Rating – H <sub>i</sub> M <sub>i</sub> L
9	Construction technique	Timber-frame construction resulting in rapid fire and smoke spread and premature collapse	Fire and rescue personnel Other emergency personnel Members of public involved Members of public not involved	5	3	15	M	Planning including 7(2)d where necessary Utilise appropriate fire fighting tactics (consider defensive) Adequate resources in attendance/requested Identify fire situation Appoint Safety Officers to monitor outside of building and conditions in firefighting shaft being used for bridgehead Operational procedure and exercises to include reasonably foreseeable scenarios, such as loss of firefighting lift or dry rising main Information from fire safety and other agencies on new/changes to premises Attendance of Fire Safety Officer Consider additional	5	1	5	L	Y

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
								evacuation  Attendance of structural surveyor  Subject matter experts, such as an urban search and rescue adviser.						
10	Information gathering	Difficulty for the Incident Commander and others working on ground level to be confident regarding location of incident and extent of fire and smoke spread  External signs of fire and smoke may be difficult to see or be misleading  Information obtained from occupants may be inaccurate	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	3	15	M	Identification of risk by local crews  Planning including 7(2)d where necessary  Crews informed of access issues  Rendezvous point, road closures and access routes  Adequate resources  Incident Commander must remain at ground floor level and implement the command function unless preplanning arrangements have identified a more appropriate location  Use of command unit at larger incidents	5	1	5	L	Y	



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
								Confirm accuracy of information by cross-checking information obtained from various sources.						
11	Cable entanglement	Entanglement in electrical or telecommunications cabling displaced from cable trunking	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Identification of risk by local crews  Operational procedure and training to include suitable reference to cable entanglement  Planning including 7(2)d where necessary  Provision and use of rescue equipment, such as cable cutters  Suitable personnel tasking, appropriate briefing and debriefing of crews  Early availability of emergency crews  Fire survival guidance procedure implemented.	5	3	15	M	N	Procurement of cable cutter solution  Policy and procedure for safe extrication from suspended cables  Engineered solution fitted to BA set to minimise risk of entanglement
12	Known unavailability	Poor maintenance, poor management and/or	Fire and rescue personnel	5	4	20	H	Identification of risk by local	3	2	6	L	Y	

				Initial rating No controls				Amended rating - Controlled					
No.	Hazard	Risk	Persons at risk	Sev	L	R	Rating H <sub>1</sub> M <sub>1</sub> L	Existing Control measures	Sev	L	R	Rating – H <sub>1</sub> M <sub>1</sub> L	Further control measures required if risk rating not tolerable
	of fixed installations, fire engineered solutions and firefighting facilities	vandalism may result in impaired or unavailability of fixed installations, fire engineered solutions and/or fire fighting facilities hindering operations  Premises information box unavailable/information missing  Unexpected operation of fire engineered solutions	Other emergency personnel  Members of public involved  Members of public not involved					crews  Planning including 7(2)d where necessary  Contingency arrangements included within operational procedure and training  Augment supplies to fire fighting floors using 70mm hose  Use of aerial appliance(s)  Fixed installation defects reported to appropriate agency or authority  Increase to predetermined attendance to meet specific circumstances, such as defective dry rising main  Dry/wet rising main augmented  Check to ensure sprinkler main stop valve in open position  Sprinkler systems only turned					

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Further control measures required if risk rating not tolerable	
				Sev	L	R	Rating H <sub>i</sub> M <sub>i</sub> L		Sev	L	R	Rating - H <sub>i</sub> M <sub>i</sub> L		
13	Unknown unavailability or malfunction of fixed installations, fire engineered solutions and firefighting facilities	Poor maintenance, poor management and/or vandalism may result in impaired or unavailability of fixed installations, fire engineered solutions and/or fire fighting facilities hindering operations  Premises information box unavailable/information	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	off on instruction of Incident Commander  Information from fire safety and other agencies on new or changes to premises  Management to reinforce guidance and requirement to identify high rise risk premises  Defensive firefighting techniques  Accurate floor plans  Surrounding risks covered  Emergency crews standing by.	5	3	15	M	N	Increase PDA to 4 PA at A1HR



				Initial rating No controls				Amended rating - Controlled					
No.	Hazard	Risk	Persons at risk	Sev	L	R	Rating H <sub>i</sub> M <sub>i</sub> L	Existing Control measures	Sev	L	R	Rating – H <sub>i</sub> M <sub>i</sub> L	Further control measures required if risk rating not tolerable
		missing Unexpected operation of fire engineered solutions						hose Use of aerial appliance(s) Fixed installation defects reported to appropriate agency or authority Dry/wet rising main augmented Check to ensure sprinkler main stop valve in open position Sprinkler systems only turned off on instruction of Incident Commander Information from fire safety and other agencies on new or changes to premises Management to reinforce guidance and requirement to identify high rise risk premises Defensive firefighting techniques Accurate floor plans					

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
								Surrounding risks covered Emergency crews standing by.						
14	Oxygen deficient or toxic atmospheres	The operation of fire suppression/total flooding systems may result in either an oxygen deficient or toxic atmosphere  Spread of smoke	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Adequate resources  Breathing apparatus and associated control measures  Emergency crews  Sufficient weight of attack  Ventilation.	5	2	10	M	Y	
15	Buildings under construction and refurbishment	Access difficulties  Rapid fire and smoke spread  Collapse and problems establishing an effective firefighting attack  Lack of information on the internal layout  Partial occupancy and people other than construction workers present  Spread to adjacent buildings or areas	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Identification of risk by local crews  Planning including 7(2)d where necessary  Protect surrounding risks  Consider defensive fire fighting  Management of access/egress routes  Adequate resources are in attendance/requested  Police assistance	5	2	10	M	N	Increase PDA to 4 PA at A1HR

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
								Utilise appropriate fire fighting tactics (consider defensive)  Consultation and preventative work with partner agencies to address social issues  Fire survival guidance procedure implemented  Weight of attack  Extended hazard zone  Use of ground monitors/aerial appliances  Utilise Safety Officers to monitor fire spread.						
16	Fire and smoke spread	Vertical and/or horizontal fire and smoke spread less predictable than in other building types  Fire and smoke spread can develop internally but also externally when fire breaks out of windows leading to rapid spread to other compartments and floors	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Incident Commander ensures appropriate manager in charge of bridgehead  Ensure risk of fire and smoke spread included within operational procedure and training  Bridgehead to be established in fire fighting lobby  If necessary due to worsening	5	2	10	M	Y	



				Initial rating No controls				Amended rating - Controlled					
No.	Hazard	Risk	Persons at risk	Sev	L	R	Rating H,M,L	Existing Control measures	Sev	L	R	Rating - H,M,L	Further control measures required if risk rating not tolerable
		Vertical shafts and ducting can result in the unpredictable and rapid spread of fire and smoke over considerable distances  Personnel may encounter fire and smoke spread through un-protected joints and small spaces between structural materials  Fire spread to applied fire loading on balconies e.g. cylinders  Bridgehead is compromised by worsening conditions						conditions relocate bridgehead  Incident Commander to be informed prior to breathing apparatus teams being committed  Personnel proceeding beyond bridgehead must be wearing breathing apparatus unless Incident Commander confirms area to be searched is not affected by smoke/fire and buildings construction and fire engineered solutions not compromised  Maintain regular and effective communication between Incident Commander, bridgehead and crews  Fire survival guidance procedure implemented  Ventilation  Keep doorways closed  Incident Commander to					

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
								consider ventilation of stairways and corridors  Appointment of Safety Officers to monitor conditions in stairways and shafts  Utilise fire engineered solutions such as pressurisation of stairwells or smoke vents only on order of Incident Commander  Utilise attack /evacuation stairwells where appropriate.						
17	Fire on multiple floors	Fires may be encountered on more than one floor as a result of the factors identified above or deliberate fire setting	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Ensure this risk is included within operational procedure and training  Incident Commander ensures appropriate manager in charge of bridgehead  Bridgehead to be established in fire fighting lobby  Incident Commander to be informed prior to breathing apparatus teams being committed	5	2	10	M	N	Increase PDA to 4 PA at A1HR

				Initial rating No controls				Amended rating - Controlled					
No.	Hazard	Risk	Persons at risk	Sev	L	R	Rating H <sub>1</sub> M <sub>1</sub> L	Existing Control measures	Sev	L	R	Rating – H <sub>1</sub> M <sub>1</sub> L	Further control measures required if risk rating not tolerable
								Personnel proceeding beyond bridgehead must be wearing breathing apparatus unless Incident Commander confirms area to be searched is not affected by smoke/fire and buildings construction and fire engineered solutions not compromised  Movement of bridgehead to area of clean air as required  Fire survival guidance procedure implemented  Ventilation  Keep doorways closed unless necessary to open to allow passage of personnel or equipment  Consider need for evacuation outside fire sector  Incident Commander to consider ventilation of stairways and corridors  Appointment of Safety					



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
								Officers to monitor conditions in stairways and shafts  Utilise fire engineered solutions such as pressurisation of stairwells or smoke vents only on order of Incident Commander  Utilise attack/evacuation stairwells where appropriate.						
18	Effect of wind	Strong winds entering a fire compartment can intensify the fire creating a 'blow torch' effect as well as increasing the likelihood of flashover and/or backdraught  This can be in unpredictable directions resulting in rapid fire spread and the premature failure of structural features, such as fire doors	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	3	15	M	Identification of risk by local crews  Planning including 7(2)d where necessary to identify likely impact of surrounding buildings  Ensure this risk is included within operational procedure and training  Adequate resources  Consider evacuation of non affected areas  Protect surrounding risks  Consider defensive fire	4	2	8	M	Y	

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
								fighting  Ensure sufficient weight of attack  Awareness training about wind/weather affecting high rise fire  Safety officers to monitor external conditions e.g. compartment glazing, external fire spread.						
19	Limited ventilation in compartment s with few or no openings	Build up of toxic gases, poor visibility, creation of backdraft/flashover conditions, horizontal and vertical fire/smoke spread	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Planning and training and tactics for preparation of high rise incidents  Ensure ventilation included within operational procedure and training  Ventilate only on order of Incident Commander  Keep doorways closed as far as is possible  Incident Commander to consider ventilation of stairways and corridors	5	2	10	M	N	Tactical ventilation policy required

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
								Appointment of Safety Officers to monitor conditions in stairways and shafts  Utilise fire engineered solutions such as pressurisation of stairwells or smoke vents only on order of Incident Commander.						
20	Burning debris falling from height	Burning material falling from upper floors or propelled by wind can spread fire by igniting combustible materials through open windows, on balconies and around the base of the building  Burning debris may also fall from the building as a consequence of firefighting actions causing secondary fires  Water supplies could be compromised if hose is damaged by falling debris	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	3	15	M	Planning including 7(2)d where necessary  Ensure risk included within operational procedure and training  Adequate resources  Consider appointing a Safety Officer to monitor outside of building  Exercises to reflect reasonably foreseeable scenarios  Management to reinforce guidance and requirement to identify high rise risk premises  Community safety advice	4	2	8	M	Y	



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
								Building owner/management and fire safety office advised about significant hazards on premises  Appropriate evacuation of affected area  Removal of identified unaffected fire loading  Fire survival guidance procedure implemented  Hazard zone around perimeter of building						
21	Poor housekeeping and high fire loads	Poor housekeeping, including the storage of combustible materials in escape routes and on balconies can obstruct doorways and escape routes, impede the progress of firefighting personnel and assist fire development in the event of a fire  High fire loads may be encountered associated with hoarding large quantities of	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	3	15	M	Identification of risk by local crews  Planning including 7(2)d where necessary  Liaison with housing providers and/or building management  Consider appointment of Safety Officers to monitor conditions in stairways and shafts  Remove materials not involved	4	2	8	M	Y	

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
		combustible material						in fire. Fire Safety Officer Sufficient weight of attack Adequate resources.						
22	Smoke travel	Internal conditions can increase fire/smoke spread throughout the building  Fires in refuse or refuse containers can create extensive smoke spread through chutes, other shafts and voids  Relatively small fires involving refuse can be interpreted as more serious due to the volume of smoke generated and the potential for excessive smoke travel in different directions	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Planning including 7(2) d where necessary  Ensure risk of fire and smoke spread included within operational procedure and training  Identify fire situation  Adequate resources  Appoint Safety Officers to monitor outside of building and conditions in firefighting shaft being used for bridgehead  Tactics training supported at high rise training events for operational crews  Exercise scenarios to reflect reasonably foreseeable scenarios, such as loss of	5	2	10	M	Y	

				Initial rating No controls					Amended rating - Controlled				Tolerable	
No.	Hazard	Risk	Persons at risk	Sev	L	R	Rating H,M,L	Existing Control measures	Sev	L	R	Rating – H,M,L		Further control measures required if risk rating not tolerable
								firefighting lift or dry rising main.  Information from fire safety and other agencies on new or changes to premises  Fire Safety Officer  Consider additional evacuation.  Fire survival guidance managed  Movement of bridgehead to area of clean air as required  Keep doorways closed  Incident Commander to consider ventilation of stairways and corridors  Utilise fire engineered solutions such as pressurisation of stairwells or smoke vents only on order of Incident Commander.						
23	Premises unknown to	Evacuation protocols not communicated	Fire and rescue personnel Members of public	5	4	20	H	Planning to include systems for ensuring information is	5	2	10	M	N	Increase PDA to 4 PA at A1HR



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
	attending personnel or un-notified refurbishment and changes to occupation	Delay in fire fighting/search and rescue Limited knowledge of layout/engineered solutions Insufficient resources Rapid fire/smoke spread	involved  Members of public not involved					available when required  Information from fire safety and other agencies on new or changes to premises  Management to reinforce guidance and requirement to identify high rise risk premises  Incident Commander to ensure adequate resources  Consider defensive firefighting techniques.						
24	Evacuation of buildings	Firefighting operations can be affected by the type of evacuation being undertaken  Availability of firefighting lifts for use by fire and rescue personnel may be hindered due to public evacuation  Evacuation of persons can divert crew(s) away from the task(s) they were briefed to undertake	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Planning including 7(2)d where necessary  Ensure evacuation protocols and issues are included within operational procedure and training  Follow the management evacuation plan unless fire situation dictates otherwise - consider vulnerable people  Plan fire fighting action in consideration with evacuation	5	2	10	M	N	Increase PDA to 4 PA at A1HR

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L	
								protocols Utilise other emergency services to aid movement of casualties/public to safe areas Utilise attack /evacuation stairwells where appropriate Fire survival guidance procedures implemented Consider all means of contacting persons within building, such as intercom telephones, loud hailers etc.					

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
25	Unavailability of firefighting facilities	Any unavailability or failure of fire mains, firefighting lifts, ventilation systems and compartmentalisation will increase risks to firefighters and may increase the resources required to resolve an incident	Fire and rescue personnel  Members of public involved  Members of public not involved	5	4	20	H	Planning to include systems for ensuring information is available when required  Ensure unavailability of firefighting facilities included within operational procedure and training  Manual evacuation of casualties  Adequate resources  Aerial appliance to deliver equipment to upper floors  All defects and unavailability is reported to appropriate agency or authority  Increase to predetermined attendance to meet specific circumstances, such as defective firefighting lift  Augment supplies provided by rising mains  Use of aerial appliance(s).	5	2	10	M	N	Increase PDA to 4 PA at A1HR
26	Locating the	The size and layout of some	Fire and rescue personnel	5	3	15	M	Establish fire floor prior to	5	1	5	L	Y	



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
	fire floor	buildings and means of fire service access may make it difficult to determine the location and floor of origin of a fire from the ground  Potential for crews using firefighting lifts to proceed directly onto a floor involved in fire	Other emergency personnel  Members of public involved  Members of public not involved					committing crews  Manage firefighting lift and location of bridgehead  Thermal imaging camera to determine floors affected by heat/fire  Ensure only firefighting lift used at operational incidents with relevant safety precautions in place  Use of aerial appliance for reconnaissance.						
27	Gathering resources	Incorrect (insufficient) predetermined attendance (PDA) mobilised to a fire in a high rise premises  Time taken to gather adequate resources may compromise public and firefighter safety if a serious fire is in progress  Time taken to assemble sufficient resources may allow conditions in the fire	Fire and Rescue Authority personnel  Members of public involved  Members of public not involved	5	4	20	H	Mobilising policy. Control reference information file (RIF). Information gathering by call handler.  Flexibility in operational procedure to enable a safe but rapid intervention to be made  Identification of risk by local crews  Planning including 7(2)d where necessary	5	2	10	M	N	Ensure Control ask if high rise. Identification of all high rise buildings in LFB and incorporate into the mobilising system.  Increase PDA to 4 PA at A1HR  Research and development into methods of transporting high rise equipment to the bridgehead

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
		<p>compartment to deteriorate and increase the risk of flashover or backdraught</p> <p>Time taken to gather and transport high rise equipment (as detailed in policy) to the bridgehead</p>						<p>Pre-determined attendance sufficient to enable Fire and Rescue Authority's high rise operational procedure to be implemented</p> <p>Request additional resources to deal with any unexpected fire growth or the unavailability of fixed installations</p> <p>Exercises to reflect reasonably foreseeable scenarios</p> <p>Management to reinforce guidance and requirement to identify high rise risk premises.</p>						
28	Water supplies	<p>Insufficient water supply on upper floors due to the height of the incident, characteristics of the fire main and the limitations of fire service equipment</p> <p>High water pressure at pump requiring release</p>	<p>Fire and rescue personnel</p> <p>Other emergency personnel</p> <p>Members of public involved</p> <p>Members of public not involved</p>	5	4	20	H	<p>Planning including 7(2)d where necessary</p> <p>Secure adequate water supply prior to committing crews</p> <p>Augment rising mains</p> <p>Hose lines protected from falling debris</p> <p>Alternative water supplies</p>	5	2	10	M	N	<p>Increase PDA to 4 PA at A1HR.</p> <p>Provide controlled dividing breaching.</p>

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
								sourced to support hydrants Use of subject matter expert (tactical advisor) to support Incident Commander with information and water supply options High volume pumps Additional resources Aerial appliance to deliver water Defensive firefighting where situation dictates Sufficient weight of attack Dividing breeching and length of hose inserted to first length of delivery hose Length of 70 mm hose and branch inserted into first floor dry rising main to release pressure post incident.						
29	Equipment trip hazards	Physiological stress Muscular skeletal injuries	Fire and rescue personnel Other emergency	3	4	12	M	Hose and equipment management Tactics training supported at	3	2	6	L	Y	



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
	on stairs	Impact injuries to body	personnel  Members of public involved  Members of public not involved					high rise training events for operational crews  Exercises to reflect reasonably foreseeable scenarios, e.g. alternative means for providing water to upper floors  Appoint Safety Officers in staircases  Adequate lighting.						
30	Physiological demands and physical workload	The intensity of work in a fire compartment can lead to a dangerous increase in core body temperature of firefighters  Access to the fire may be limited to a single point making it difficult for crews to proceed without encountering hostile conditions  Personnel may have to climb a number of flights of stairs in personal protective equipment and with	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	4	4	12	M	Rotation of crews  Rehydration of crews  Staging areas where crews can manage metabolic stress  Ambulance Service attendance  Early consideration to whether further resources are necessary  Consider additional water for crews  Management of workloads	3	2	6	L	Y	Tolerable – however provision of engineered solution to assist personnel to carry equipment up or down stairs would reduce adverse physical effects

				Initial rating No controls				Amended rating - Controlled					
No.	Hazard	Risk	Persons at risk	Sev	L	R	Rating H <sub>1</sub> M <sub>1</sub> L	Existing Control measures	Sev	L	R	Rating - H <sub>1</sub> M <sub>1</sub> L	Further control measures required if risk rating not tolerable
		equipment which may lead to exhaustion or collapse						Temporary relaxation in personal protective equipment to reduce metabolic heat stress. Use of firefighting lifts Use of aerial appliances Monitoring arrangements to check health and welfare of personnel.					
31	Congestion of access and egress routes within building	Congestion can arise as personnel moving into the building encounter occupants evacuating to safety There is the potential for both the evacuation and firefighting/rescue operations to be impeded	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	3	4	12	M	Identification of risk by local crews  Planning including 7(2)d where necessary  Rendezvous points and marshalling areas designated  Staging area below bridgehead  Marshalling and Safety officers briefed and utilised  Bridgehead/staging area/stairwell management  Consider establishing separate 'attack' and 'evacuation'	3	2	6	L	Y

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
								staircases  Consideration given to access for aerials/specialist appliances  Use of other agencies to assist with evacuation.						
32	Failure of electrical systems	Ingress of water into electrical system creates risk of electrocution, electric shock, loss of visibility and entrapment	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Planning and training  Only use designated firefighting lifts for firefighting purposes  Additional resources  Use of Safety Officers  Damage control.	5	2	10	M	N	Increase PDA to 4 PA at A1HR
33	Person(s) shut in a lift car	Any failure of lift equipment or use of non-designated lifts can lead to firefighters and evacuees becoming trapped in a lift car  A lift may be affected by the spread of smoke, fire and heat  The diversion of resources necessary to rescue trapped	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	3	15	M	Only use designated firefighting lifts for firefighting purposes  Additional resources  Use of Safety Officers externally and within protected lobby to monitor conditions  Declare fire fighter emergency	5	2	10	M	Y	

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
		lift occupants may have an adverse impact on firefighting operations  Firefighting lift motor room becoming involved in fire						Weight of attack  Planning, training and tactics for preparation for lift failure  Incident Commander remove crews from lift, lift motor room and isolate power supply if potential exists for lift motor room to become involved in fire.						
34	Breach of fire fighting lobbies	Fire and Rescue Authority operations may breach firefighting lobbies increasing risk to occupants and impacting on operations at and beyond the bridgehead  The size of firefighting lobbies may be insufficient to contain the resources necessary to mount an effective attack  Hose lines run along protected routes and stairways may creating trip hazards and allow the products of combustion to	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	3	15	M	Planning including 7(2)d where necessary  Ensure breaching firefighting lobbies included within operational procedure and training  Additional resources  Aerial appliance to deliver water  Defensive firefighting where situation dictates  Ensure hose lines are charged before breaching lobby (to prevent flat hose lines passing	5	2	10	M	Y	



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
		spread into unaffected areas of the building						under doors) Increase weight of attack Staircase and bridgehead management Use of fire engineered solutions Senior Fire Safety Officer Use of Safety Officers externally and within protected lobby to monitor conditions Cover surrounding risk.						
35	Casualty retrieval	The removal of casualties to medical care can involve transportation over a considerable distance  Personnel involved in carrying casualties down long stairways will be at increased risk of manual handling injury  Time taken to deliver casualties to medical care may impact upon their potential	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Ensure included within operational procedure and training  Control to be taken of firefighting lift  Firefighting lift to remain at Bridgehead to aid removal of casualties  Adequate/additional resources where manual casualty/equipment	5	2	10	M	N	Increase PDA to 4 PA at A1HR

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating – H,M,L		
		for survival and recovery						movement required  Aerial appliance to deliver equipment to upper floors  Staircase management  Utilisation of other emergency service personnel.						
36	Anti-social behaviour, vandalism and unlawful activities	Verbal and physical attack, fire setting and vandalism may compromise the safety of firefighters  Personnel may be the target of objects thrown or dropped from height and building facilities may be compromised due to vandalism  Personnel may be exposed to unexpected hazards arising from unlawful activities, such as drug manufacture and storage  Fire loading may be increased by the deliberate placement of flammable materials or gas	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	3	15	M	Identification of risk and planning including 7(2) d where necessary  Ensure included within operational procedure and training  Management of access/egress routes  Adequate resources are in attendance/requested  Police assistance  Utilise appropriate fire fighting tactics (consider defensive)  Consultation and preventative work with partner agencies to address social issues	5	2	10	M	Y	

				Initial rating No controls				Amended rating - Controlled					
No.	Hazard	Risk	Persons at risk	Sev	L	R	Rating H,M,L	Existing Control measures	Sev	L	R	Rating – H,M,L	Further control measures required if risk rating not tolerable
		cylinders in properties and or additional fire setting						Fire survival guidance managed  All defects and unavailability is reported to appropriate agency or Authority  Increase to pre-determined attendance to meet specific circumstances, such as defective dry rising main  Augment rising mains  Consider appointing an additional Safety Officer to monitor outside of building  Tactics practised at high rise training events and exercise scenarios to reflect reasonably foreseeable scenarios  Information from fire safety and other agencies  Management to reinforce guidance and requirement to identify high rise risk premises  Community safety advice to					

No.	Hazard	Risk	Persons at risk	Initial rating No controls				Existing Control measures	Amended rating - Controlled				Tolerable	Further control measures required if risk rating not tolerable
				Sev	L	R	Rating H,M,L		Sev	L	R	Rating - H,M,L		
								occupants  Building owner/management and fire safety office advised about significant hazards  Adequate weight of attack  Cover surrounding risks  Consider defensive fire fighting tactics.						
37	Moral pressure and Human factors	Moral pressure to act immediately may increase risk of all hazards listed where safe systems of work and resources are not in place to manage risks	Fire and rescue personnel  Other emergency personnel  Members of public involved  Members of public not involved	5	4	20	H	Planning  Ensure included within operational procedure and training  Adequate resources in attendance  Utilise appropriate fire fighting tactics (consider defensive)  Exercise scenarios to reflect reasonably foreseeable scenarios, such as high fire loading  Fire survival guidance	5	2	10	M	N	Increase PDA to 4 PA at A1HR



No.	Hazard	Risk	Persons at risk	Initial rating No controls				Amended rating - Controlled				Further control measures required if risk rating not tolerable	
				Sev	L	R	Rating H <sub>1</sub> M <sub>1</sub> L	Existing Control measures	Sev	L	R		Rating – H <sub>1</sub> M <sub>1</sub> L
38	Radio waves- from telecommu- nic- ation antennas on high rise buildings generating electromagne- tic radiation	Adverse health effects linked to exposure to electromagnetic radiation	Fire and rescue personnel  Other emergency personnel	4	2	8	M	Identification of risk by local crews  Planning including 7(2)d where necessary  On site signage  Power isolation  Exercise scenarios to reflect reasonably foreseeable scenarios  Liaison with other agencies  Policy 298 - Operations at radio transmitter sites	3	1	3	L	Y

Ranking risks is necessary in order to identify their relative importance. The degree of risk associated with a particular hazard depends on the likelihood of it causing an accident and the probable severity of the consequence of such an accident. The focus in applying this methodology is the risk faced by a single typical member of the Occupation responsible for carrying out the task giving rise to the hazard.

This ranking system involves classifying likelihood (in terms of frequency) and severity each on a five point scale and then multiplying them both together to give the risk ranking as follows:

This matrix gives possible ranking values as follows:

$$\text{RISK} = \text{SEVERITY} \times \text{LIKELIHOOD}$$

The ranking values can then be grouped into three broad classes of risk:

This matrix gives possible ranking values as follows:

**RISK = SEVERITY x LIKELIHOOD**

The ranking values can then be grouped into three broad classes of risk:

		RATING
Critical Risks	16 – 25	HIGH
Significant Risks	8 – 15	MEDIUM
Minor Risks	1 – 7	LOW

		SEVERITY				
		5 Single or multiple fatalities	4 Major disabling injury	3 Injury resulting in 3 or more days off	2 Minor Injury	1 Accident or near miss with no harm arising
LIKELIHOOD	5 Very likely to occur	25	20	15	10	5
	4 Probable	20	16	12	8	4
	3 Possible	15	12	9	6	3
	2 Remote	10	8	6	4	2
	1 Improbable	5	4	3	2	1

## RISK TERMINOLOGY

Term	Definition
Accident	An unplanned and uncontrolled event which gives rise to harm.
Consequence or impact	The outcome of an accident.
Controls	Measures that may be introduced with the intention of reducing risk.
Harm	Any kind of safety loss, including fatalities and injuries
Hazard	Anything with the potential to cause harm (or loss).
Incident/ Near miss	An unplanned and uncontrolled event that does <b>not</b> give rise to harm, but which under different circumstances <b>could</b> have resulted in an accident.

Term	Definition
Likelihood (L)	The number of occasions on which a given event is expected to occur over a given time.
Mitigation	Reduction in risk due to the introduction of risk controls.
Rating	The rate given to the control measures associated with the hazard and risk; either High, Medium or Low
Result (Res)	The result based on the existing control measures or prior to implementing further control measures, in order to reclassify the rating to achieve the desired result. Being either: <ul style="list-style-type: none"> <li>▪ 'H' High Risk</li> <li>▪ 'M' Medium Risk</li> <li>▪ 'L' Low Risk</li> </ul>
Risk (R )	A combination of the likelihood of the harm occurring and the severity of the consequences.
Severity (Sev)	A measure of the significance of consequences.