

**EMBARGOED UNTIL THURSDAY 22 MARCH 2018 AT
00:00**

LONDON ASSEMBLY

**Never again: Sprinklers as
the next step towards safer
homes**



Planning Committee
March 2018

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Holding the Mayor to
account and
investigating issues
that matter to
Londoners

LONDONASSEMBLY

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Planning Committee Members



The Planning Committee's role is to scrutinise the detail of the London Plan, the Mayor's use of his planning powers and the strategic planning challenges facing London.

Contact

Reece Harris, Assistant Scrutiny
Manager
Email: reece.harris@london.gov.uk
Telephone: 020 7983 5802

Alison Bell, Communications
Manager
Email: alison.bell@london.gov.uk
Telephone: 020 7983 4228

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Navin Shah AM

Rapporteur, Planning Committee



We pay our respects to all those who have died in fires in their place of residency and those who've been affected. Our thoughts are particularly with the families and loved ones of all those who died and suffered following the Grenfell Tower block fire. Never again.

It is crucial that we use the outrage and the lessons of this fire to ensure that every Londoner is better protected from fire in their homes. That is why I led this review on behalf of the Planning Committee to look at whether sprinklers should be made mandatory in London's homes.

The evidence clearly suggests that sprinklers can provide an additional layer of fire safety before the London Fire Brigade arrive. The Commissioner of the London Fire Brigade, Dany Cotton told the London Assembly that "as a measure as part of a range of options in making buildings safe [sprinklers] are key going forward." Sprinklers are a reliable and cost-effective fire safety measure that can greatly reduce risk of death, injury, property damage and harm to local communities.

In the long term the evidence also strongly points towards making sprinklers mandatory in all residential buildings as has been the case in Wales since 2016. But it is important to be pragmatic and accept that given the magnitude of the task it is not feasible to make sprinklers immediately mandatory in all buildings in England. Retrofitting sprinklers in buildings over 30 metres high – 10 storeys – in London alone could cost up to £500 million and the relatively small sprinkler industry would be overwhelmed due to the issues of capacity.

As such, we are calling for a risk-based, phased, 'road map' towards making sprinklers mandatory in all homes in England. So we are recommending that the Building Regulations should require all new residential buildings over 18 metres – 6 storeys – high, new care homes and sheltered housing be fitted with sprinklers immediately. We also call on the Government to require sprinklers to be retrofitted in every existing tall building, care home and sheltered housing block during refurbishment work.

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While Government will need to set the regulatory framework, extra support from the Mayor will be needed to ensure existing high-risk buildings in London are fitted with sprinklers, where housing providers do not have the resources to do so. Therefore, to facilitate a risk-based, phased approach to fire safety, we are recommending that the Mayor establish a £50 million 'London Sprinkler Retrofitting Fund'.

“The Government, the Mayor and local authorities must act now while the drive for change is palpable”

The time is right for action. Dame Judith Hackitt is leading the Independent Review of Building Regulations and Fire Safety, which is due to release its final report in Spring 2018. The London Fire Brigade and the Royal Institute of British Architects, among others, want to see sprinklers fitted in London's new and existing buildings. The Government, the Mayor and local authorities must act now while the drive for change is palpable or risk missing this opportunity to further protect future generations from fire.

I would like to take this opportunity to thank all of those who contributed to this review for their valuable expertise and insights. To paraphrase the words of Ann Jones, the Welsh Assembly Member who pushed for mandatory sprinklers in all new buildings in Wales; how can it be right that people are better protected at work, in an office fitted with sprinklers, than they are in their own homes? We're particularly thankful to Ann Jones for her evidence founded on her passion and experience in this field and Dany Cotton, the Commissioner of the London Fire Brigade for her evidence, including describing requiring sprinklers in all new residential buildings as a 'no brainer'.

Summary

Although automatic fire suppression systems represent the next step in fire safety, they are not mandatory in residential buildings below 30 metres high in England.

Suppression systems are the next step in fire safety

It is impossible to begin any discussion of fire safety in London without expressing the greatest respect for the 71 victims of the fire at Grenfell Tower on 14 June 2017. We must use this moment to ensure that such a terrible fire does not happen again.

The evidence shows that Londoners are protected from fire thanks to a mixture of 'passive' and 'active' fire safety measures installed in their homes. Passive fire safety measures, such as fire doors, when combined with active measures which activate during a fire, such as fire alarms, can allow people to quickly and safely escape fires. This, alongside behavioural changes such as a decline in smoking, has resulted in the number of dwelling fires in London falling from 7009 incidents in 2009/10,¹ to 5507 in 2016/17, a fall of nearly 21 per cent.²

However, as the fires at Lakanal House in 2009 and Grenfell Tower in 2017 demonstrate, the failure of fire safety measures can have devastating consequences. Passive fire safety measures designed to contain a fire in compartments can fail. This means fires, hot gases and smoke can spread quickly, harming residents and firefighters and causing significant damage to property.

Automatic fire suppression systems (AFSS) offer an additional layer of protection that can suppress or even extinguish a fire, saving both lives and property. AFSS, which include sprinklers, prevent fire from spreading and allow firefighters to more easily extinguish it. They also reduce the water damage from putting out a fire with a powerful fire hose. In addition, AFSS can allow for more innovative and flexible building design. However, although AFSS represent the next step in fire safety, they are not mandatory in residential buildings below 30 metres high in England.

Targeting AFSS installation in new flats is feasible

The costs of installing AFSS in new flats are relatively low, although costs are higher for houses. A typical sprinkler system in a new-build block of flats costs around £1000 to £2000 per flat, or around 1 to 2 per cent of the total development cost. However, installation costs for houses are significantly higher than for flats, largely because water supply problems represent a significant cost in AFSS installation. While it should be possible to supply houses

directly from the mains, in many cases a pump and tank are needed. Thames Water will not supply water for firefighting directly from the mains unless there is no alternative.

Many of the costs of installing AFSS in new build can be offset by innovative and flexible design and a more rigorous approach to building resilience. AFSS often allow for reductions in other fire safety measures and allow for more marketable open plan room layouts. Installing high quality systems throughout a building can also significantly reduce damage costs when a fire does occur. A greater focus on resilience in the Building Regulations is required to encourage high quality systems and give insurers the confidence to reduce premiums.

Require AFSS in blocks of flats over 18 metres high

AFSS should be required in all residential buildings over 18 metres high in England.

Requiring AFSS in all new build low-rise residential buildings is not yet feasible, due to high water supply costs and a lack of market capacity. However, as sector capacity grows and confidence in AFSS develops, the case for it to become mandatory in every residential building in England will strengthen. It should be the ultimate objective to require every new residential building to have AFSS, as is the case in Wales.

The Government, the Mayor and industry should therefore work together on a phased road map towards mandatory AFSS in all new residential buildings in England. This road map should be based on clear milestones for bringing in changes to the Building Regulations, based on an assessment of risk for different types of residential development, the capacity of the market and the installation skills in the labour force. To support this process, the new Deputy Mayor for Fire should work with London water companies, Water UK and local authorities to identify methods to improve the viability of connecting new AFSS to the water mains. In addition, the AFSS industry should help to build capacity by working with the GLA to identify new AFSS training opportunities in London's further education (FE) colleges.

A very important first step will be to require AFSS in all residential buildings over 18 metres – 6 storeys – high in England. Fires in such buildings are a higher risk to both residents and firefighters. The relatively low-cost of installation and the clear life safety and resilience benefits make AFSS ideally suited for tall residential buildings above 18 metres.

A targeted fund for retrofitting is needed

AFSS should be fitted using a risk-based approach through a new £50 million 'London Sprinkler Retrofitting Fund' that prioritises the most vulnerable people.

Protecting people living in London's existing buildings from fire is rightly a priority for the Mayor. To encourage the phased retrofitting of AFSS, the Government should amend the Building Regulations to require AFSS where 'consequential improvements' are made to large buildings.

However, requiring AFSS to be retrofitted in every existing building is not immediately feasible. In those buildings over 30 metres high alone, this could cost up to £500 million. There is no public funding available to meet these costs and freeholders, leaseholders and tenants cannot be expected to pay the full amount.

A different approach is therefore needed, one that focuses on protecting those most vulnerable to fire. While vulnerable people might be at risk in London's tall buildings, many of those at risk from fire also live in low-rise buildings. Therefore, a more targeted approach would help protect those most at risk from fire while being more economically feasible. As part of this approach, AFSS should be fitted in all new and existing care homes and sheltered housing to protect people and property.

To fund a risk-based approach, the Mayor should launch a new £50 million 'London Sprinkler Retrofitting Fund' that prioritises AFSS to protect the most vulnerable people.

Recommendations

Reducing the costs of AFSS installation

Recommendation 1

The new Deputy Mayor for Fire and Resilience should establish a working group including London's water companies, Water UK and local authorities to identify methods to improve the viability of connecting new AFSS to water supplies, covering issues such as London's water pressures and new meter and pump technologies.

Recommendation 2

The Government should amend the Approved Document Part B for fire safety in residential buildings to place a clear emphasis on the resilience of buildings as well as fire safety. This should include information the level of damage that AFSS can prevent and on the acceptable recovery time for the building.

Making AFSS mandatory

Recommendation 3

The Government should work with developers and the fire and AFSS industries to develop a phased legislative road map with clear milestones towards making AFSS mandatory in every residential building in England.

Recommendation 4

The British Automatic Fire Sprinkler Association (BAFSA) should work with the GLA Skills Team to identify opportunities at London's further education (FE) colleges to develop new AFSS training opportunities. This should include opportunities for existing plumbers to diversify their skills.

Recommendation 5

The Government should amend the Building Regulations Approved Document B to make installing automatic fire suppression systems (AFSS) in all new-build residential developments above 18 metres in height mandatory. To promote building resilience, AFSS should be required in all flats and communal areas, such as stairs, corridors and landings.

The Mayor should include a strong presumption that buildings over 18 metres high should be fitted with AFSS in policy D11 of the new London Plan.

Protecting those most vulnerable to fire

Recommendation 6

The Government should amend the Building Regulations so that freeholders with existing residential buildings above 1,000m² are required to install AFSS where the building requires 'consequential improvements' and where technically, functionally and economically feasible.

Recommendation 7

The Government should update the Building Regulations to require sprinklers for all new care homes and sheltered housing to be fitted with sprinkler systems in England.

All existing care homes and sheltered housing should be required by the Building Regulations to be retrofitted with AFSS where 'consequential improvements' are made.

The Mayor should include a strong presumption that care homes and sheltered housing should be fitted with AFSS in policy D11 of the new London Plan.

Recommendation 8

The Mayor should create a £50 million 'London Sprinkler Retrofitting Fund' to fund AFSS in 200 existing high-risk buildings over the next five years. To facilitate this, the Mayor should lobby Government to provide around half of the funding, with the remainder match-funded by the Mayor.

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The Government should also consider allowing local authorities to borrow from the Public Works Loan Board or relaxing the rules around borrowing through the Housing Revenue Account specifically for retrofitting AFSS.

1. The benefits of fire suppression

Key findings

- Passive fire protections, such as fire doors, can effectively prevent a fire from spreading beyond the compartment where it started, giving people time to escape.
- Automatic fire suppression systems (AFSS) go further, offering an additional layer of protection that can suppress or even extinguish a fire, saving both lives and property.
- Although AFSS represent the next step in fire safety, they are not mandatory in residential buildings below 30 metres in England.

Fire safety in Londoners' homes

- 1.1 The deaths of 71 people in the fire at Grenfell Tower demonstrate the importance of ensuring that London's homes are safe from fire. There were 112 fire related deaths in 2016/17³, a figure that includes the 71 people now confirmed to have died in the Grenfell Tower fire.⁴ However, devastating fires like the Grenfell Tower fire are thankfully rare. The risk of death from fire in London's residential buildings had been falling for the past five years until 2016/17. The number of fatalities from accidental fires in residential buildings declined from 51 in 2009/10ⁱ to 26 in 2015/16. Over the same period, the number of residential fires in London has fallen, from 7009 incidents in 2009/10,⁵ to 5548 in 2016/17,⁶ a fall of nearly 21 per cent.
- 1.2 Londoners are better protected in their homes thanks to the widespread introduction of smoke alarms. Smoke alarm ownership in London increased from 9 per cent in 1987 to 80 per cent in 2017.⁷ Preventive work has also encouraged changes in behaviour. Actions that have encouraged fewer smokers, more home fire safety visits, and less toxic furniture materials, have also resulted in fewer fire deaths and injuries.
- 1.3 Building standards ensure that fire safety is taken seriously in all new buildings. Londoners are protected from fire in their homes by the Building Regulations, which set out requirements for fire safety in England's residential buildings. These regulations are supplemented by Approved Document B, which gives guidance on the use of passive fire safety measures, such as fire doors, and active protections, such as fire alarms.
- 1.4 Passive fire safety measures work on the principle of 'compartmentation'. This means buildings are designed to effectively contain the fire within a compartment – such as a room in a flat or a corridor – for a certain amount of time. Practical measures include smaller compartments to contain fires to a smaller area and the fitting of fire doors, fire-resistant walls, fire-resistant glass, fire stops and cable coating. Approved Document B specifies that compartments should prevent the fire from spreading for between 60 to 120 minutes for the tallest residential buildings.⁸ In most situations, this gives people time to escape from a fire and for the fire brigade to extinguish it and rescue occupants.
- 1.5 Despite the fire at Grenfell Tower on 14 June 2017, fires in tall buildings are relatively rare. In fact, the total number of fires in tall residential buildings is lower than the total number of fires in dwellings below 3 storeys, such as houses. Fires in houses and low-rise blocks are the most common type of residential fire. As Table 1 (overleaf) shows, between 2010 and 2016, 60 per

ⁱ Data from before 2009/10 was recorded using a less robust set of statistics and is therefore not included.

cent of all residential fires in London occurred in houses and low-rise blocks. By comparison, fires in flats above ten storeys made up only five per cent of fires over the same period. Nevertheless, with some 2000 fires taking place over the last 6 years in the 1100 tall buildings across London, this is still too high.

Table 1 – In London, most fires in were in low-rise dwellings between 2010 to 2016⁹ (Source: London Fire Brigade)

	Number of fires, 2010 to 2016	Percentage of total fires
Flats/ maisonettes above 10 storeys	2240	5%
Flats/ maisonettes above two storeysⁱⁱ	10984	24.6%
Residential dwellings below 3 storeysⁱⁱⁱ	26879	60.2%
Houses in multiple occupation (HMO)	1243	2.8%
Residential care providing locations and sheltered housing	3323	7.4%
Total	44669	100%

Are passive fire safety measures enough?

- 1.6 Making London’s residential buildings safer will mean going beyond passive fire safety measures alone. When passive fire safety measures fail, in most cases there is no further safety net from fire until the London Fire Brigade arrives. According to the London Fire Brigade, while fire may remain within a sealed compartment for as long as that compartment is designed to contain the fire, some fires can last longer than this and, as we saw with the fire at Grenfell Tower, compartments are not always perfectly self-contained. This means that fires may affect the utilities of the building or spread beyond the room to other parts of the building, affecting other residents. Firefighters and

ⁱⁱ includes converted flats/maisonettes above 3 storeys and purpose built flats/maisonettes from 4 to 9 storeys

ⁱⁱⁱ includes houses, bungalows, purpose built flats/maisonettes up to 3 storeys, converted flats/maisonettes up to 2 storeys and ‘other’ residential buildings

residents may also be harmed by hot gases in the corridors, causing further injuries and death.¹⁰

1.7 Going beyond passive fire safety measures alone will also protect local communities from fire. The London Fire Brigade notes that buildings without AFSS installed have a greater risk of a fire developing to a size that causes:

- loss of property and homes, with a more damaging effect on buildings that house vulnerable residents that have specific housing needs
- loss of critical community assets with a subsequent major impact on society
- damage to the environment, surrounding property and communities¹¹

Automatic Fire Suppression Systems

1.8 The use of active fire safety measures, such as Automatic Fire Suppression Systems (AFSS) like sprinklers, alongside passive protections like fire doors, could further significantly reduce the risk of loss of life and property. The Commissioner of the London Fire Brigade, Dany Cotton, told this review that this would represent the “next step” in fire safety beyond fire alarms and passive measures.¹²

1.9 Sprinklers are the most common type of AFSS and are used in a wide range of residential and commercial buildings.^{iv} Their purpose is to contain a fire, rather than put it out completely. Residential sprinklers are triggered by heat, typically being activated at temperatures of around 68°C. They do not activate from smoke alone. All sprinklers are required to meet British Standard (BS) 9251¹³ to ensure they are effective and reliable.

Sprinkler myth-busting

- ✓ Only the sprinkler head closest to a fire will activate – sprinklers do not all go off at once like they do in films
- ✓ Sprinklers worked 97 per cent of the time in residential dwellings, according to research by the National Fire Chiefs Council (NFCC)¹⁴
- ✓ Sprinklers will not activate from smoke, only from heat

1.10 Other types of AFSS technologies are also available. These include water-misting and personal protection systems (see Table 2 overleaf). Water-misting can offer the ability to extinguish the fire, but typically require more individual

^{iv} This report primarily refers to AFSS as a package of different fire safety products. However, where the evidence is specifically about sprinklers, this word is used instead.

sprinkler heads, higher water pressures and a more contained environment. Water mist systems are therefore generally more expensive than sprinklers. Personal protection systems (PPS) are very similar to sprinklers, but are designed to have more limited coverage. This makes them ideal for protecting people who are at greater risk from fire in certain parts of their home, such as people who are likely to forget about food cooking in the kitchen or people who smoke in bed.

Table 2 – Examples of passive and active fire safety measures

	Safety measure	Role
Passive	Fire doors	Compartmentation
	Fire-proof walls, floors, ceilings and glass	Compartmentation
	Fire-proof cables, fixtures and air ducts	Compartmentation
	Fire-proof building materials	Structural protection
Active	Smoke and carbon monoxide alarms	Detection
	Sprinkler	Fire suppression (and in most cases detection)
	Water misting	Fire suppression
	Personal protection systems	Fire suppression (and often also detection)

AFSS saves lives and protects property

1.11 There is a compelling case to look seriously at the role of AFSS. The Chief Fire Officers Association (CFOA) states in its report *Business Case for Sprinklers* that where a sprinkler system has been installed:

- fire deaths (including firefighter deaths) have been almost eliminated
- fire injuries have been reduced by 80 per cent

- there have been significant improvements in firefighter safety.¹⁵
- 1.12 AFSS are particularly beneficial for the most vulnerable members of society who cannot easily escape in the event of a fire. Responses to the call for evidence noted that sprinklers would most benefit people who:
- are very young
 - are elderly
 - have mobility or sensory impairments
 - have addictions
 - have learning difficulties
- 1.13 Those on lower incomes are also more likely to benefit from fire suppression systems. The London Borough of Croydon highlighted that people at lower socioeconomic scales will benefit from sprinklers as these people are more vulnerable compared to the rest of the population.¹⁶
- 1.14 As well as saving lives, AFSS can protect property and society from fire damage. Sprinklers mean less fire damage as they can help contain a fire quickly. Water damage from sprinkler systems is also far less than the damage caused by a fire hose. This can significantly reduce the cost refurbishment and disruption to residents and local communities following the fire.
- 1.15 The Chief Fire Officers Association (CFOA) states in its report *Business Case for Sprinklers* that for fires in properties where a sprinkler system has been installed:
- property damage has been reduced by over 80 per cent
 - the effects of arson have been reduced
 - there has been a reduction in the environmental impact of fire
 - there has been a reduction to the economic cost of fire¹⁷
- 1.16 So, there is generally far less fire damage and disruption in buildings with AFSS. Research by the National Fire Sprinklers Network (NFSN), a non-commercial lobby group of fire professionals, showed that fires in dwellings where sprinkler systems operated had an average area of fire damage of under 4 square metres. This compares to an average area of fire damage of 18 to 21 square metres for all dwelling fires in England between 2011/12 and 2015/16.¹⁸
- 1.17 Water damage is generally much more significant without sprinkler systems. The British Automatic Fire Sprinkler Association (BAFSA) notes that ‘because

they operate at relatively low pressure and use a small flow of water produced as a spray, the water damage is considerably less than if the Fire and Rescue Service were called to extinguish the fire.’¹⁹

Water flow: sprinklers versus fire hoses

Sprinkler

45 to 200 litres of water per minute

Fire hose

700 to 4000 litres of water per minute²⁰

- 1.18 With sprinklers buildings can therefore be brought back into use more quickly and cost effectively. Fire damage can render buildings uninhabitable for an extended period of time, which can adversely affect local people and communities.²¹ The London Borough of Croydon stated that ‘less fire damage from smoke and water means the affected area can be put back into normal use more quickly and the rest of the building may be unaffected.’²² The Association of British Insurers (ABI) cites drastic reductions in ‘consequential losses and inconvenience’ in buildings with sprinklers fitted.²³
- 1.19 One such example of this is Studley Green in Wiltshire, one of the first major residential sprinkler retrofit projects in the UK. The development has suffered three small fires since having sprinklers installed in 1999, all of which were extinguished without significant fire or water damage, including an external fire.²⁴

AFSS as part of a package of fire safety measures

- 1.20 Passive fire safety measures should always be used alongside AFSS to reduce the risk of loss of life. Sprinklers are typically designed to contain a fire, rather than put it out completely. The NFCC notes that insufficient heat is the most common cause of failure for residential sprinklers – this could mean a smoky or smouldering fire does not trigger sprinklers and the fire is not contained. Installing AFSS is therefore not a panacea for fire deaths. In the USA, where AFSS are more commonplace, there were 35 deaths a year from residential fires in sprinklered households between 2010 and 2014.²⁵
- 1.21 It is also important to note that AFSS are not normally effective against multiple ‘seats of fire’. For example, during an arson attack where there may be multiple fires started, sprinklers will not be able to manage the discharge of water required to contain the fire.²⁶ The Fire Protection Association (FPA) suggested that the same is true for fires on flammable cladding, where fire may enter the building from multiple points, overwhelming the sprinkler system.²⁷

Should AFSS be made mandatory?

- 1.22 There is widespread evidence from across the fire safety industry that demonstrates the benefits of installing sprinklers as part of a package of fire safety measures. This has led some countries to require their installation, particularly in tall residential buildings. For example, in Norway, Finland, and some US jurisdictions sprinkler systems are mandatory, although exemptions are often made for the smallest dwellings. Wales is the first country in the world to require AFSS in all new residential buildings. Wales had previously been subject to Building Regulations covering England and Wales, but in 2011 the UK Government devolved power over Building Regulations to the Welsh Government. In the same year the National Assembly for Wales passed the Domestic Fire Safety (Wales) Measure, which allowed the Welsh Government to require AFSS at its discretion.²⁸

Building Regulations in Wales

- The Welsh Government commissioned the Building Research Establishment (BRE) to conduct a cost-benefit analysis into requiring sprinklers in all new residential buildings.²⁹ This found that while the benefits of sprinklers outweighed the costs in flats, they did not in houses.
- However, Ann Jones AM, who pioneered the new legislation, argued that while there is protection in a multitude of other buildings, this level of protection is not in people's homes.
- Following a series of pilot schemes in social housing in Wales, changes to the Building Regulations in Wales first made AFSS mandatory in all new care homes, student housing and hostels in 2014. AFSS have been mandatory in all new residential buildings since 2016.
- The Welsh Government told the review that delaying the mandatory requirement until 2016 allowed developers and the industry to build capacity. The Government worked with developers to address issues, including the avoidance of the policy during transitional arrangements. Welsh Water also now holds regular meetings with developers.

- 1.23 However, such systems are not mandatory in London, where development is regulated by the English Building Regulations. Approved Document B states that only 'if the building has a storey over 30m [or 10 floors] above ground level, the building should be protected by an automatic sprinkler system'.³⁰ Dame Judith Hackitt is currently considering possible changes to the Building Regulations as part of the Independent Review of Building Regulations and

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Fire Safety, in response to the Grenfell Tower fire, and we do not want to pre-empt her findings.

- 1.24 Nevertheless, with the Building Regulations under review, it is timely to consider the costs and benefits of installing AFSS and how far it should be made mandatory. The following chapter assesses the main costs associated with installing AFSS in new residential buildings and how these can be mitigated or offset. Chapter 3 looks at the case for making AFSS mandatory and actions the Mayor can take to support this. Finally, Chapter 4 considers how the installation of AFSS can better protect London's most vulnerable residents and looks at the feasibility of retrofitting London's existing tall buildings.

2. Costs and challenges of AFSS

Key findings

- The costs of installing AFSS in new flats are relatively low, although costs are higher for houses.
- Water supplies, maintenance costs and market pressures can all raise the cost of AFSS.
- Many of the costs of installing AFSS can be offset by innovative design and a more rigorous approach to building resilience.

The cost of installing AFSS in new buildings

- 2.1 Fire suppression offers clear benefits for life, safety and property protection. But since AFSS provides an additional layer of fire safety, it comes with an additional cost.

High-rise blocks of flats

- 2.2 Incorporating sprinkler systems during the build phase is relatively inexpensive in blocks of flats, particularly in high-rise properties. This would generally cost between £1000 and £2000 per flat (Table 3 overleaf).³¹ This should be contrasted with the cost of ‘doing nothing’ – the Association of British Insurers (ABI) notes that the average amount paid out for a fire claim on a domestic property was £15,000 in 2016.³² The evidence provided to this review suggests that the low cost of components, such as pipework, and the shared nature of a communal AFSS system can help reduce costs. Costs can be further reduced by integrating fire suppression into the design of the building from the beginning, preventing more expensive changes later. Typically, this means that AFSS costs are between only one and two per cent of the total build costs for the development.³³

97 – 103 Newport Road, Cardiff

- Cadwyn Housing Association is building a new affordable housing scheme consisting of 48 apartments in Cardiff. The development was not designed with sprinklers, but following the Grenfell Tower fire, the housing association decided to fit them in the building. Our review heard that this was achievable: sprinkler systems could have been installed at any point up until plaster-boarding took place.³⁴
- The total cost of the system was approximately £100,000, out of a total build cost of £5.2 million (approximately 2 per cent of the build cost). The total cost per flat is consistent with the figures in Table 3 above, at around £1800 to £2000. Cadwyn told us that they were able to reduce costs as their contractor, Willis Construction, had experience of working on sprinkler pilot schemes run by the Welsh Government.

Table 3 – Estimates of the cost of installing sprinklers in new high-rise flats are low

	Cost of installation per flat
Building Research Establishment (BRE)³⁵	£879
London Fire Brigade^v	£1098 to £1525
BAFSA and European Fire Sprinkler Network (EFSN)	£1000 to £2000
Optivo	£1000 to £3000
Design Fire Consultants	£1500
Royal Institution of Chartered Surveyors (RICS)^{vi}	£1525 to £1891
Cadwyn Housing Association	£1800 to £2000
Suffolk Fire and Rescue Service	£1500 to £3000

2.3 As with investment in transport, health and other sectors, the value for money of investing in fire safety should account for the value of human life. A BRE study compared the statistical value of a life, based on the Department for Transport “willingness to pay figure”, and the savings from reduced property damage with the cost of installation (including that of the water supply). It concluded that in new blocks of over 32 flats in Wales the benefits were likely to outweigh the costs over time by £1.6m.³⁶ In 2012, an additional BRE study based on a literature review of AFSS installation costs also argued that installing AFSS in flats was cost effective.³⁷ However, there have been no other recent analyses of the value for money of installing AFSS.

^v Based on £18-25 per m² fit out in a 2-bedroom 3-person single storey flat meeting the minimum space standard of 61 m² set out in Policy D4 of the draft London Plan 2017.

^{vi} Based on £25 to £31 per Net Internal Area m² fit out in a 2-bedroom 3-person single storey flat meeting the minimum space standard of 61 m² set out in Policy D4 of the draft London Plan 2017. RICS also supplied figures of £30 to £40 per Gross Internal Area m² for sprinkler installation in the shell and core of a building.

Low-rise buildings

- 2.4 While the cost of installing AFSS in high rise blocks is relatively small, the per unit cost of installing a sprinkler system in a new build low-rise dwelling is significantly higher. The Local Government Association suggests a figure of £3000 to £3500 if water is supplied from the mains. Insufficient water pressure can add £750 to the cost due to the need for pumps and/or tanks. Scaling up helps however: increasing the number of houses on a development can reduce costs by 10 to 15 per cent as supply costs are shared.³⁸ Table 4 (below) shows the range of costs of installation per house.

Table 4 – The estimated cost of installing sprinklers in a house is higher than in a flat

	Cost of installation per house
Building Research Establishment (BRE)³⁹	£3075
Local Government Association	£3000 to £3500
Berkeley Group	£5000
Design Fire Consultants	£3000

The cost of supplying water

- 2.5 Water supplies can significantly increase the cost of installing AFSS. Water pressures and concerns about Legionella^{vii} mean that often water must be supplied via a pump and tank system.⁴⁰ Thames Water, which supplies most of London, takes a position that water should be provided from storage. If there is insufficient space, water may be supplied from the mains by agreement.⁴¹ This can bring additional cost, particularly if only one house or flat is using the system.
- 2.6 The cost of installing AFSS could be reduced if water was supplied directly from the mains. Water UK guidance on the supply of water for fire-fighting systems states that ‘the preferred method of supply is via a direct feed from the water main’.⁴² However, many water companies are used to more complex and demanding commercial solutions that need high pressures and tanks.⁴³ To supply water from the mains, they need to develop policies for

^{vii} Legionnaire’s disease – a potentially fatal form of pneumonia – is caused by the bacteria *Legionella pneumophila*. This can sometimes be found in purpose-built water systems if the risk is not properly controlled.

supplying a much larger quantity of less demanding low-tech residential systems. Even with these changes, low water pressures may mean some buildings will always have to be supplied from a tank.

- 2.7 These obstacles to water supply for AFSS must be overcome. Water companies in London need to be more consistent in their approach to installation and more innovative in encouraging new technologies to make installing AFSS more feasible. The Welsh Government's engagement with Dŵr Cymru/Welsh Water has led to the water company taking a more facilitative approach towards AFSS.⁴⁴ This includes working with developers and installers to fit new water meters and pump technologies that might eliminate the need for a tank. In London, the Deputy Mayor for Fire and Resilience could adopt a similar facilitative role.

Recommendation 1

The new Deputy Mayor for Fire and Resilience should establish a working group including London's water companies, Water UK and local authorities to identify methods to improve the viability of connecting new AFSS to water supplies, covering issues such as London's water pressures and new meter and pump technologies.

Maintenance costs

- 2.8 Maintenance costs of AFSS are relatively low and do not generally constitute a significant addition to tenants' or leaseholders' service charges. The Chief Fire Officers Association estimates that annual maintenance costs for domestic fire sprinklers are between £75 and £150 per annum per house.⁴⁵ Costs in flats may be lower due to the shared nature of the system.
- 2.9 The experience of the London Fire Brigade is that some building owners do not properly understand the importance of sprinkler systems and that they are not always maintained to the standards required.⁴⁶ There is also the risk of negligence or of value engineering^{viii} in maintenance. It is therefore important that a maintenance regime for AFSS is included in the design process.

Better design and resilience can reduce costs

Offsetting costs through design

- 2.10 As AFSS is considered to provide an extra layer of protection, developers who fit them are able to reduce the provision of other fire safety measures in new

^{viii} An approach whereby better value is achieved either by improving the functionality of the AFSS system or by reducing its cost. In this context, this can often mean using the cheapest possible system at the expense of its durability or functionality in the event of a fire.

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buildings. The Royal Institute of British Architects (RIBA) notes this can yield cost savings.⁴⁷

- 2.11 Fire suppression can lead to more innovative and flexible design options. The Building Regulations allow for increases in the size of compartments and the removal of some passive protections such as fire doors if AFSS are installed. This can allow for more open-plan layouts than would otherwise be permitted. Such a use of sprinklers to create more innovative design can be seen at Kidbrooke Village, which is being developed by Berkeley Group.

Kidbrooke Village, Berkeley Group

- Berkeley Group are installing sprinklers in selected three and four storey town houses at Kidbrooke, as well as in some apartments.⁴⁸
- This allows an open plan and flexible layout than would otherwise be possible without sprinklers (because the need for fire doors, walls and further compartmentation is removed). Sprinklers offer improved marketability and give occupiers confidence about the fire safety of the building. The sprinklers are almost invisible, hidden behind plain plastic plates that drop off in the event of a fire.
- In a house, installation costs are around £5000 for a standalone system, which accounts for around 3 per cent of the build cost. However, Kidbrooke Village uses a tank-fed communal system, saving costs but meaning leaseholders must give access for maintenance.
- Sprinklers generally require a large amount of space, including a central plant room. Berkeley Group noted that the Community Infrastructure Levy is charged on the floor space needed to provide a plant room.



Improved building resilience

- 2.12 If the resilience of buildings to fire is increased, it is more likely that insurance costs could be reduced. The ABI noted that 'insurers would prefer a higher standard of protection, covering the whole building or at least protection of several dwellings simultaneously'.⁴⁹

- 2.13 At present, it is not clear whether insurance premiums for residential landlords would be reduced as a result of installing AFSS. The ABI suggests 'significant reductions are more prevalent in commercial premises.'⁵⁰ This may be as a result of concerns from insurers about 'escape of water' in residential settings. The ABI noted that escape of water claims are one of the largest costs for the insurance industry,⁵¹ and that there is a greater risk of this with residential sprinkler systems.
- 2.14 Encouragingly, the ABI is working with the Fire Protection Association (FPA) to test new sprinkler heads that might reduce this risk. The insurance industry should be more specific about the types of residential AFSS, standards and installation quality that might lead to a reduction in premiums. This could encourage freeholders to install higher quality AFSS over lower quality options.
- 2.15 The Government should make changes to the Building Regulations to focus more on resilience. This may create a greater emphasis on installing quality sprinkler systems throughout a building that protect property as well as life.

Recommendation 2

The Government should amend the Approved Document Part B for fire safety in residential buildings to place a clear emphasis on the resilience of buildings as well as fire safety. This should include information the level of damage that AFSS can prevent and on the acceptable recovery time for the building.

3. The case for mandatory AFSS

Key findings

- Requiring AFSS in all new residential buildings is not yet feasible, due to high costs and a lack of market capacity.
- However, the Government and industry should work together with the ultimate objective to produce a phased legislative road map towards the future mandatory provision of AFSS in all new residential buildings.
- But AFSS should be immediately mandatory in all new tall residential buildings reflecting the relatively low cost of installation in such blocks, alongside the clear life safety and resilience benefits.

AFSS in every new residential building is not yet feasible

- 3.1 Some industry experts are calling for the mandatory installation of sprinklers in every new building. We do not believe this is feasible right now. The reason it has been possible to mandate this in Wales is that the level of new building is much smaller and, crucially, on this matter, the Welsh Government could deviate from the English Building Regulations. In England, there were 154,000 residential completions last year⁵² (compared with 5590 completions in Wales).⁵³ Putting AFSS in all new homes would therefore overwhelm the relatively small industry.
- 3.2 Even since the fire at Grenfell Tower, there is evidence that the sprinkler industry is struggling to respond to demand from local authorities and private developers. To move too quickly to compulsory installation runs the risk of attracting low-skilled installers carrying out improper installations. This would have the damaging side-effect of reducing confidence in the reliability of AFSS.⁵⁴
- 3.3 Furthermore, if AFSS are made mandatory there is a risk that systems could be poorly maintained. With large numbers of owner-occupiers having responsibility for maintaining their AFSS, there is the risk that poorly maintained systems may not activate in a fire. This could be particularly damaging where developers have used AFSS to design out other fire safety measures.

A long-term goal for requiring AFSS is needed

- 3.4 Nevertheless, we should be working towards a future where all new residential buildings are fitted with AFSS. Fire suppression saves lives and prevents major disruption, its cost can be mitigated, and it represents a modest percentage of the total cost of development. We agree with Ann Jones AM, the Welsh Assembly Member responsible for pushing for mandatory provision of AFSS in Wales, that sprinklers offer protection for all groups of people at a relatively low expense per dwelling.⁵⁵ This is not an isolated call for change; organisations such as the London Fire Brigade and the Royal Institute of British Architects (RIBA) are also calling for AFSS to be required in new residential buildings.
- 3.5 The Government should work with developers and the fire and AFSS industry to develop a road map towards making AFSS mandatory in every residential building in England. The road map should be based on clear milestones for bringing in changes to the Building Regulations. These milestones should be based on an assessment of risk for different types of residential development, the capacity of the market and the installation skills in the labour force. It should have a clear end goal of requiring AFSS in all new residential buildings. Alongside this, the Government and other stakeholders will need to support

the expansion of the AFSS industry by developing new training opportunities and improving technical knowledge among developers and owner-occupiers.

Recommendation 3

The Government should work with developers and the fire and AFSS industries to develop a phased legislative road map with clear milestones towards making AFSS mandatory in every residential building in England.

- 3.6 The AFSS industry could support this process by working with the GLA Skills Team to identify opportunities in London's further education (FE) colleges for new AFSS training courses, including within existing plumbing qualifications. BAFSA operate a range of qualifications, although such certificates are not available at FE colleges in London.⁵⁶ The FPA notes that new training opportunities can be taken up by plumbers to allow them to install AFSS too. Such training should cover both passive and active fire safety measures, as well as effective firestopping, to ensure AFSS are installed safely.⁵⁷

Recommendation 4

The British Automatic Fire Sprinkler Association (BAFSA) should work with the GLA Skills Team to identify opportunities at London's further education (FE) colleges to develop new AFSS training opportunities. This should include opportunities for existing plumbers to diversify their skills.

AFSS should be in every new high-rise block

- 3.7 AFSS should be fitted in buildings where more people are vulnerable to death, injury and property damage from fire – in high rises, the risk to vulnerable people is greater. The road map should start by immediately requiring all new residential buildings over 18 metres high to have AFSS installed. The FPA noted that 18 metres was used as a cut-off point for greater levels of fire safety as this is the maximum height that a fire appliance can reach.⁵⁸ The London Fire Brigade told this review that there are a range of challenges above such a height including 'limited access to the fire floor, limited options to 'tackle' the fire, relying on entry via the front door in the main and added commitment to resource firefighting operations'.⁵⁹
- 3.8 It is feasible to require AFSS in buildings over 18 metres. While there are costs, such as water supply and maintenance, improved design and incorporating sprinklers at the start of a development can offset these. AFSS represents just 1 to 2 per cent of total development costs, a low additional cost that ensures peace of mind for occupiers and freeholders alike.

- 3.9 The Mayor has limited power to require AFSS in all tall buildings over 18 metres in London, but he can encourage and actively lobby for change. The Mayor has introduced Policy D11 on fire safety in the draft London Plan.⁶⁰ We welcome the greater consideration of fire safety in the planning process. This is particularly the case if it encourages developers to consider using AFSS to add a level of fire protection where a lack of space for firefighting appliances might hamper effective fire-fighting in a large building. However, we would recommend that policy D11 is strengthened to include a strong presumption that buildings over 18 metres high should be fitted with AFSS, in line with LFEPA's response to the draft London Plan.⁶¹
- 3.10 The power to require AFSS also rests with central Government through the Building Regulations. It is therefore incumbent on Government to see these amended to require AFSS in all new residential buildings over 18 metres high. To help facilitate this, we would urge Dame Judith Hackitt to make the case for AFSS in tall buildings over 18 metres in the final report of the Independent Review of Building Regulations and Fire Safety.

Recommendation 5

The Government should amend the Building Regulations Approved Document B to make installing automatic fire suppression systems (AFSS) in all new-build residential developments above 18 metres in height mandatory. To promote building resilience, AFSS should be required in all flats and communal areas, such as stairs, corridors and landings.

The Mayor should include a strong presumption that buildings over 18 metres high should be fitted with AFSS in policy D11 of the new London Plan.

4. Retrofitting London's existing residential buildings

Key findings

- Protecting people living in London's existing tall buildings from fire is rightly a priority. All buildings should ultimately have AFSS where feasible.
- However, requiring AFSS in every existing building is not feasible. This approach could encourage poor installations, escalate costs and divert money away from other services.
- The Mayor should establish a new £50 million 'London Sprinkler Retrofitting Fund' that prioritises retrofitting AFSS in buildings where the most vulnerable people live.

London's existing buildings must be made safer

- 4.1 In the aftermath of the Grenfell Tower fire, there has been huge upsurge in levels of public concern about the safety of London's tallest buildings. The Grenfell Tower fire was not an isolated incident. There were six fire-related deaths at Lakanal House in 2009.⁶²
- 4.2 Aside from the review of the types of cladding used on tall buildings, there have been calls for London's existing buildings to be fitted with AFSS. This includes a 38 Degrees petition signed by 11,730 people and sent to this review calling for sprinklers in all London tower blocks.⁶³ The Commissioner of the London Fire Brigade, Dany Cotton, has stated "I support retrofitting - for me where you can save one life then it's worth doing".⁶⁴ As the evidence clearly indicates that AFSS provide an extra layer of safety in London's tall buildings, they should be fitted where feasible and appropriate.
- 4.3 We would therefore like to see AFSS retrofitted in buildings undergoing 'consequential improvements' where technically, functionally and economically feasible. At present, consequential improvements feature in Section 28 of the Building Regulations 2010 and apply only to improving energy performance during refurbishments in buildings with a floor area over 1,000m².⁶⁵ The Royal Institution of Chartered Surveyors (RICS) suggested this could be extended so that sprinklers are fitted as a consequential improvement to buildings undergoing material changes.⁶⁶ This would ensure that, over time, London's tallest existing buildings are given the extra layer of safety that AFSS provides.

Recommendation 6

The Government should amend the Building Regulations so that freeholders with existing residential buildings above 1,000m² are required to install AFSS where the building requires 'consequential improvements' and where technically, functionally and economically feasible.

The scale of the retrofitting challenge

- 4.4 However, the immediate retrofitting of every tall residential building in London would be extremely challenging. This review has considered the challenge of retrofitting just those buildings above 30 metres in height. This would include buildings similar in height to Grenfell Tower, which was over 67

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metres high. According to data from Skyscraper News, there are 1,105 residential buildings^{ix} above 30 metres in height in London.⁶⁷

- 4.5 The cost of retrofitting AFSS can vary considerably depending on a wide variety of factors. BAFSA and the London Fire Brigade suggests that retrofit projects cost 20⁶⁸ to 25 per cent⁶⁹ more than a system installed in new buildings during development. Variation may be caused by differences in the design and construction of these buildings, associated redecoration costs, difficulties of access to flats, the capacity of the market and reaction of the AFSS installation companies. Table 5 (below) shows that, drawing on estimates provided to this review, costs can range from as low as £1150 up to £5500 per flat.

Table 5 – Estimates of the cost of retrofitting London’s tall buildings with AFSS are high

	Cost of retrofitting per flat	Retrofitting all buildings over 30 metres high in London ^x
BAFSA Callow Mount study⁷⁰	£1150	£100.6 million
BAFSA	£1500 to £2500	£131.2m to £218.6m
Optivo^{xi} and Fire Protection Association	£2000 to £2500	£174.9m to £218.6m
Essex County Fire and Rescue Service	£2260 to £3500	£197.6m to £306m
London Borough of Croydon^{xii}	£4500 to £5500	£393.5m to £481m

^{ix} The figure is 1,106 buildings, but we have chosen to exclude Grenfell Tower as it is uninhabitable.

^x These costs are an approximation, assuming that none of the 971 high-rise buildings already have sprinklers and ignoring existing retrofit projects currently underway. However, at present just two per cent of the UK’s council or housing association-owned tower blocks have sprinklers installed. These costs are for residential tower blocks over 30 metres only. This figure does not include lower height blocks and other residential properties that may urgently need sprinklers.

^{xi} Includes cost of asbestos removal during installation

^{xii} Estimated costs; includes cost of consulting with residents

- 4.6 Extrapolating from individual schemes indicates that retrofitting AFSS in London's tallest buildings over 30 metres could cost between £100m and £500m in total. Of the retrofitting costs shown in Table 5,^{xiii} it is more likely that costs will be nearer the upper end of the scale as the number of installers and their ability to install more complex high-rise projects is relatively small. Costs are likely to rise due to this low capacity and will be further increased by building-specific challenges which only become apparent once work starts, such as the discovery of asbestos.
- 4.7 Many of the stakeholders who contributed to this review would like to see the retrofitting of every tall residential building in London over 30 metres. For example, Croydon is targeting those buildings it considers most at risk, including spending £10 million to retrofit all 25 of its tower blocks over ten storeys high and one of its sheltered housing blocks.⁷¹ Other councils committed to installing sprinklers include Wandsworth,⁷² Hammersmith and Fulham,⁷³ Brent,⁷⁴ and Waltham Forest.⁷⁵ The London Fire Brigade is aware of around 300 AFSS installation projects taking place in London.⁷⁶
- 4.8 Some local authorities have pressed the Government for financial support but this has not been forthcoming. It is therefore hard to see where the additional costs of retrofitting AFSS would come from. At a time of rising council tax bills, in part to fund rising social care costs, using scarce public funds to pay for such measures carries significant opportunity costs. Local authorities therefore need support to make AFSS installation viable.
- 4.9 There are further costs that are not included in Table 5 such as the costs of having to negotiate with leaseholders, which are likely to be lengthy. The London Borough of Croydon is offering the works for free and is actively trying to encourage the 50 per cent of its leaseholders it sees as being required to consent to the works.⁷⁷ However, this could be a very lengthy process. Optivo housing association told the review that actually 100 per cent coverage is often needed to make AFSS worthwhile.⁷⁸
- 4.10 The sheer scale of the retrofitting challenge means that a risk-based approach to targeting retrofitting efforts makes sense to ensure available public funds are most effectively used. A more targeted approach on a limited number of high-risk buildings could help to protect the most vulnerable, while making costs more manageable for freeholders and better suiting the capacity of the fire safety industry to cope with demand.
- 4.11 However, although high-risk also often means high-rise, that is not always the case. The Fire Brigades Union told us that a shorter building with poor

^{xiii} This is based on retrofitting AFSS in 971 of the 1,105 buildings over 30 metres in London for which there is data on the number of flats. The cost of retrofitting per flat has been multiplied by 87,439, the number of flats in the 971 buildings with available data.

compartmentation is more likely to benefit from sprinklers than a taller building with excellent passive fire protection.⁷⁹ Installing AFSS in London's tallest buildings alone therefore misses those vulnerable Londoners living in low-rise buildings.

A risk-based approach should prioritise the most vulnerable

- 4.12 Instead of height alone, a risk-based approach should consider the consequences of fire on those most vulnerable to it.⁸⁰ A risk-based approach also aligns well with the London Fire Brigade's risk-based approach to emergency cover in London.⁸¹ The Brigade already uses a 'concerns, consequences and controls' approach to establishing the level of fire risk in an area, the consequences of a fire and the controls put in place to manage this.
- 4.13 Such an approach could be used to assess individual buildings through a rating system. This should include information from existing fire risk assessments and should prioritise those most vulnerable to fire. A report by BRE and the London Fire Brigade on personal protection systems defined people vulnerable to fire based on their:
- Propensity to contribute to the start of or development of a fire
 - Capacity to respond appropriately to signs of fire or other cues
 - Ability to escape⁸²

Care homes are high-risk and must have AFSS

- 4.14 This risk-based approach clearly shows that older people or people with disabilities are among those most vulnerable to fire. Such groups are more likely to accidentally start a fire, are less able to respond and often lack the ability to escape. In England, the fatality rate from fire for people over the age of 80 in 2016/17 was 19.8 per million, the highest of any demographic group.⁸³ Many older and vulnerable people live in London's 5,900 care providing locations⁸⁴ and sheltered housing. Of those locations inspected by the London Fire Brigade, only 147 have AFSS.
- 4.15 AFSS can protect vulnerable people from the harmful effects of fire. During our review, BAFSA told us about the Rosepark Care Home fire in 2004 in Scotland, which claimed the lives of 14 people. A subsequent test by the Building Research Establishment (BRE) found that the installation of sprinkler systems 'would not have put out the fire, but would probably have made conditions in all areas tenable for one hour'.⁸⁵ In care homes and in social housing, fire can also mean having to rehouse large numbers of people, which represents a significant challenge.⁸⁶ The review's visit to Dol Yr Hafren residential care home in Cardiff demonstrated the advantages of AFSS in bringing properties back into use.

Dol Yr Hafren, Cardiff

- At Dol Yr Hafren residential care home in Cardiff, Hafod Housing Association installed sprinkler systems at a cost of £3000 per flat.⁸⁷ Water is supplied via a tank and the maintenance costs are £250 + VAT per annum, with a twice-per-year inspection.
- In March 2017, a microwave caught fire in one of the flats, but the sprinkler system managed to contain it. There was some minor damage to the kitchen, in part because of the Fire Brigade using a hose to completely extinguish the fire. Within five weeks the flat had been repaired and dried out.
- The cost of making good the damage to the kitchen following the fire was £6695, with most of the cost attributed to the provision of a new kitchen. Without the system in place, the fire service suggested that the fire would have taken hold and destroyed the whole flat at least.

- 4.16 AFSS should therefore be installed in all new care homes and sheltered housing. Such systems not only save lives but provide a positive social and economic benefit by ensuring that buildings survive fires and can continue to function.
- 4.17 Furthermore all 2,400 existing adult social care establishments providing residential care in London⁸⁸ should be fitted with AFSS. This should take a 'person-centred approach' focusing on the vulnerability of the individual and the most effective solution for them.⁸⁹ For example, a smoker may be better protected by targeted personal protection systems focused on the bed or sofa, where a fire can spread quickly.

Recommendation 7

The Government should update the Building Regulations to require sprinklers for all new care homes and sheltered housing to be fitted with sprinkler systems in England.

All existing care homes and sheltered housing should be required by the Building Regulations to be retrofitted with AFSS where 'consequential improvements' are made.

The Mayor should include a strong presumption that care homes and sheltered housing should be fitted with AFSS in policy D11 of the new London Plan.

Funding a risk-based approach

- 4.18 Protecting the most vulnerable using a risk-based approach will still draw funding away from other programmes. Croydon is using its housing investment fund to pay for retrofitting⁹⁰ which may well have a negative effect on its long-term finances.⁹¹ Overall, London boroughs have committed to spend at least £262 million on installing sprinklers,⁹² averaging at around £426,000 per block.⁹³
- 4.19 The review heard that additional support for AFSS could encourage freeholders to install AFSS in buildings. The London Fire Brigade has previously made specific interventions to encourage AFSS, including through its £1.5 million Community Investment Fund (CIF),⁹⁴ most recently in Waltham Forest.⁹⁵ The benefits of partnership working between the fire service and freeholders can be seen at Parkside Court in Chelmsford.

Parkside Court, Chelmsford



- Parkside Court in Chelmsford is an example of good practice in working with residents and installers to quickly and effectively install AFSS in an existing residential tower block.
- The £173,000 retrofit project was delivered by CHP housing association with funding of £50,000 from the Essex County Fire and Rescue Service in 2014.⁹⁶
- The review heard about how residents were consulted on the changes being made to their flats, the benefits sprinklers would offer and the access and installation process. As an incentive, those residents who allowed access on the scheduled dates and times were entered into a prize draw to win a flat-screen TV .
- Since the installation, the sprinklers have put out two fires, potentially saving lives and at a considerable cost saving to CHP compared to recovering a non-sprinklered flat. The total cost of recovering the light fire damage (see right, image courtesy of CHP) in one of the flats came to £916.

A new London Sprinkler Retrofitting Fund

- 4.20 To facilitate a risk-based approach to fire safety, the Mayor should establish a £10 million per year 'London Sprinkler Retrofitting Fund' provided over five years to support the road map and to help catalyse the sector. The primary goal of this £50 million fund should be to enable housing providers to fit AFSS where they have concluded it is not viable due to cost constraints and, of these, where residents are most vulnerable to fire.
- 4.21 Funding should be provided based on the vulnerability of building occupants to fire. This should be assessed using three components – the fire risk assessment, the vulnerability of the occupants to fire and the effects of fire on the community. Applicants could achieve this by submitting an 'enhanced' fire risk assessment, which not only looks at hazards and how they can be resolved, but considers the number of vulnerable occupants and the likely consequences of a fire on occupants and the local community. The London Fire Brigade's 'concerns, consequences and controls' approach to risk could serve as a guide to developing this 'enhanced' fire risk assessment. By focusing on vulnerability, this would likely prioritise housing providers with:
- large numbers of disabled occupants who may be unable to escape in the event of a fire
 - people, such as students or homeless people, living in hostels, houses in multiple occupation and student accommodation
 - care homes and sheltered housing, particularly if such buildings are taller than 18 metres (6 storeys) high
 - affordable housing tenants, who are more likely to be vulnerable to fire, less likely to have insurance and have less choice over housing if forced out by fire
 - large numbers of leaseholders, particularly where they are unable to pay the costs of retrofitting in buildings over 18 metres high
- 4.22 Applicants to the Fund should provide match funding to support the installation of AFSS. This could be modelled on the approach used by the Essex County Fire and Rescue Service's £250,000 Think Sprinkler Strategy, which allocated a proportion of the funding for AFSS to bids from eligible organisations based on risk, with the remainder provided through match funding.⁹⁷ On this basis, around £50 million would, for example, be sufficient to retrofit around 200 blocks, based on costs of around £400,000 per block and if 50 per cent of the costs were provided through match funding. The Mayor should lobby the Government for the costs of around half of the fund. Given the fund's role in promoting AFSS, contributions from insurers and the AFSS industry should be sought.

- 4.23 The Mayor should also empower tenants and leaseholders to better understand the fire risk of their buildings. The Planning Committee's 2010 report *Fire safety in London: Fire risks in London's tall and timber framed buildings* recommended that social landlords should publish a full register of fire risk assessments for the residential properties that they are responsible for.⁹⁸ The Mayor should establish the viability of working with local authorities, private landlords and housing associations to publish a full register of all fire risk assessments in London. Leaseholders and tenants could use this information to request AFSS or to apply for funding to make their own collective repairs where feasible.
- 4.24 We recognise that high-risk buildings are not unique to London and that many other cities around the UK will face similar issues with unsafe existing residential buildings. When lobbying the Government for funding the Mayor should work with Core Cities UK to build a persuasive case for funding to support retrofitting across the country.
- 4.25 The Government could allow local authorities to borrow from the Public Works Loan Board or relax the rules around borrowing through the Housing Revenue Account specifically for retrofitting AFSS. The Public Works Loan Board provides loans to public bodies and the Housing Revenue Account records the expenditure and income of local authority housing and services.

Recommendation 8

The Mayor should create a £50 million 'London Sprinkler Retrofitting Fund' to fund AFSS in 200 existing high-risk buildings over the next five years. To facilitate this, the Mayor should lobby Government to provide around half of the funding, with the remainder match-funded by the Mayor.

The Government should also consider allowing local authorities to borrow from the Public Works Loan Board or relaxing the rules around borrowing through the Housing Revenue Account specifically for retrofitting AFSS.

- 4.26 Another fire like the one at Grenfell Tower must not be allowed to happen again. Retrofitting London's existing buildings will save lives and provide reassurance to many thousands of Londoners that they are safe in their own homes. By acting now the Mayor and Government can ensure the safety of Londoners into the future.

Appendix 1

London Plan Policy D11 Fire Safety

The Mayor has introduced a new Draft London Plan policy on fire safety. Policy D11 Fire Safety sets out several measures for introducing fire safety at the planning stage.⁹⁹ AFSS do not feature in the policy. However, explanatory paragraph 3.11.3 suggests that sprinklers should also be explored at the early stage of building design.

Policy D11 introduces 'Fire Statements', which should be submitted with planning applications for all major developments. The policy advises that such statements could be sent to the London Fire Brigade for evaluation. The Fire Statement should state how the development will function according to:

- construction
- means of escape and management
- access for fire service personnel and equipment
- access for fire appliances

The policy also requires developments to consider fire safety at the design stage. Developments are required to 'achieve the highest standards of fire safety', including appropriate construction, means of escape and access for firefighting equipment.

Issues with introducing fire safety in the London Plan

Fire safety has traditionally been a building control consideration, in which planning has little to no involvement. The National Planning Policy Framework states that Local Planning Authorities (LPAs) should assume other regimes, such as building control, will operate effectively.

In this context, the Royal Town Planning Institute argues that there are some limited circumstances in which planning policy can influence fire safety. It notes that 'LPAs may be able consult with building control and the fire service where considerations around fire safety have planning implications. This might, for example, include access for fire engines or the aesthetic implications of changing materials for example cladding'.¹⁰⁰

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Fire Statements should therefore be reconfigured to bridge the gap between planning and building control. The London Fire Brigade notes that sometimes the need for AFSS to compensate for the lack of facilities for firefighters to extinguish a fire is not adequately considered at the planning stage. As such, the Mayor should include a strong presumption that buildings over 18 metres high, care homes and sheltered housing should be fitted with AFSS. Fire Statements should also extend to the effects a fire might have on other buildings or the local community. The Mayor should also require that Fire Statements are sent to the London Fire Brigade for evaluation of these issues.

Our approach

The Greater London Authority Act 1999 gives the Assembly the power to investigate and prepare reports on matters of importance to London. The Act also enables the Assembly to arrange for any of its functions to be undertaken on its behalf by a Committee or by a single Assembly Member. A ‘rapporteur review’ is the term used to describe when this function is undertaken by a single Member of the Assembly.

The Planning Committee agreed the following terms of reference for this investigation:

- What are the costs and benefits of installing Automatic Fire Suppression Systems as part of a package of fire safety measures in new buildings and retrofitting them in existing ones?
- Should the provision of Automatic Fire Suppression Systems remain optional or be made compulsory through the Building Regulations requirement?
- What should be LFEPA’s position on the issue and how might the organisation influence any future revision of the Building Regulations?

At its roundtable evidence sessions on 4 December 2017, the rapporteur took oral evidence from the following guests:

- Adam Monaghan, Director, Design Fire Consultants, representing Institution of Fire Engineers
- Adrian Dobson, Executive Director Members, Royal Institute of British Architects
- Barry Turner, Director of Technical Policy, Local Authorities Building Control
- Gary Strong, Global Building Standards Director, Royal Institution of Chartered Surveyors
- Gerry Doherty, Executive Director of Customer Services, Network Homes
- Laura Hughes, Senior Policy Adviser, General Insurance, Association of British Insurers

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- Paul Greenwood, Fire Safety Manager, Optivo
- Philip Boothroyd, Head of Operational & Strategic Planning, Thames Water Infrastructure Alliance
- Saheed Ullah, Programme Manager – Capital Projects, London Borough of Croydon
- Steve Madell, Director of Asset Services, Optivo

Alongside this, the rapporteur hosted a series of meetings taking oral evidence from the following organisations:

- British Automatic Fire Sprinkler Association
- Business Sprinkler Alliance
- Fire Brigades Union
- Fire Protection Association
- London Fire Brigade
- National Assembly for Wales
- Welsh Government

The rapporteur also took part in four site visits, visiting:

- 97 – 103 Newport Road, Cardiff hosted by Cadwyn Housing Association on 27 November 2017
- Dol-Yr-Hafren close care properties, Cardiff hosted by Hafod Housing Association on 27 November 2017
- Kidbrooke Village, Greenwich hosted by Berkeley Group on 17 January 2018
- Parkside Court, Chelmsford hosted by CHP on 26 January 2018

During the investigation, the committee also received 23 written submissions to its call for evidence, including those from the following organisations:

- 38 Degrees
- Association of British Insurers
- Association of Residential Management Agents
- British Automatic Fire Sprinkler Association

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- Certsure
- Construction Industry Council
- Essex County Fire and Rescue Service
- European Fire Sprinkler Network
- London Borough of Croydon
- London Borough of Tower Hamlets
- London Fire Brigade
- National Housing Federation
- Optivo
- Royal Institute of British Architects
- Royal Institution of Chartered Surveyors
- Suffolk Fire and Rescue Service
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- Thames Water

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