Shoreline Fire Response to Master Builders Association of King County:
December 29th, 2020.

As the Shoreline Fire Marshal, I would like to say the Shoreline Fire Department appreciates Mayor Hall and Councils continued education on residential sprinkler systems and Shorelines residential fire problem. I know there are several local issues they must consider, and they rely on other experts to help them make decisions.

I respect MBAKs objection to the added cost of installing a fire sprinkler system to a new home, and also consider them the experts on building a home, framing, plumbing, electrical, and all things building related. But I look to other experts to research and understand fire dynamics, why fires start, how they grow, todays synthetic fuel loads, egress times for occupants, and national fire statistics.

For fire data and research the experts include; United States Fire Administration (USFA), National Institute of Safety and Technology (NIST), National Fire Protection Agency (NFPA), FM Global, Underwriter Laboratories (UL), and Society of Fire Protection Engineers (SFPE). Even MBAKs references a SFPE article in a very important FPE issue that I will be referencing. All of these agencies have a tremendous data base and research library concerning residential structure fires, smoke detectors and sprinkler systems. It is very hard to read through their vast amount of research and not come to the conclusion that all of the above experts believe the solution is home fire sprinklers.

I want to start with something I believe is compelling written by Fire Protection Engineering. They reference a 2007 NIST residential sprinkler cost analysis study, this was back when the International Residential Code was considering *requiring* sprinkler systems for the 2009 code:

"Notarianni and Fischbeck[3] also analyzed the costs and benefits of mandating residential sprinklers as a function of housing type (one- or two-family, multiple family or mobile home) community size, region of the country and whether the mandate would apply to new or existing homes. Notarianni and Fischbeck considered the installation costs, reduction in direct and indirect losses, reduction in injuries to occupants and fire fighters and the number of fire related fatalities that would be averted by installing residential sprinklers.

Notarianni and Fischbeck calculated with 90 percent confidence that the cost to society associated with a residential sprinkler mandate would be in the range of $4.2 million to $10.7 million per averted fire death, with a median value of $7.3 million (USD)."

This ofcourse is 2007, 2020 calculations would be 25% higher for inflation.

Full Article:
https://sfpe.connectedcommunity.org/publications/fpeextra/etarchives/fpeetissue28

We have had 2 fire deaths in Shoreline in the last 8 years, but several close calls, where occupants just barely made it out of the house. And we continue to run an average of 54 structure fires every year, 80% of those are residential. That is a consistent number for the last decade.

Master Builders (MBAKS) first paragraph from e-mail:
"To my knowledge Shoreline is the only jurisdiction in King County currently considering adoption of the mandatory fire sprinkler amendment to the 2018 Building Code. Many cities have adopted some version of a sprinkler requirement to mitigate risk similar to what Shoreline adopted in 2006, but are not pursuing a mandatory requirement for all new construction. Few have adopted this blanket mandate in the region. More broadly, 44 states have rejected fire sprinkler requirements. Only two, require them for all new one and two family homes. And, an overwhelming majority of homebuyers have decided that the systems are not worth the additional expense."

Response:

I can safely say, every Fire Marshal in King County would gladly implement a full sprinkler ordinance because residential fires are our biggest life safety issue, cause the most devastation, require the most resources, and cost the most to our communities. But because it is approximately 1-1.5% of the total cost to build a home, it is still an added cost, so the issue has become political. Because of the politics involved most fire departments do not want to take it on at the moment.

As the Shoreline Fire Marshal, our data shows that the majority of fires in Shoreline are in residential homes, started by human error or accidental. Smoke alarms although effective at alerting occupants to the fire, are not sufficient. The fire does not go out, homes are lost, massive amounts of water are used, toxins and smoke are released into the atmosphere, and a large amount of resources are required for an extended amount of time.

We see sprinkler heads putting out fires in new multi-family occupancies in Shoreline. The Polaris, Artiste, Arabella, Ronald Commons, and The Blakely, have all had fires extinguished by sprinklers. They work and they save the Shoreline community from a lot of devastation. It's time to see those benefits in single family homes where our biggest problem is.

MBAKs 2nd paragraph:
"*Safety is the main reason cited for requiring residential fire sprinklers. Safety is very important to MBAKS members, and the industry as a whole. New homes are safer today than ever before because of cost effective building codes, new building techniques and advances – all which have been embraced by the industry. Today's smoke alarms, coupled with advances in building science in the codes make new homes safer than ever before.*

Code provisions and technological innovations provide safety:

- *Fire blocking-*
- *Draft stopping*
- *Emergency escape and rescue openings*
- *Electrical circuit breakers*
- *Outlet spacing and capacity*
- *Fire walls and fire separation*
- *Adequate heating systems and energy efficient homes*
- *Interconnected hardwired smoke detection systems"*

Response:
Fire blocking and draft-stopping is a framing method, which is great if the fire is in the wall. The majority of fires in Shoreline are compartment fires with high fuel loads, meaning they start in a bedroom, a kitchen, a living room, or a garage. They typically extend out of an open door into the rest of the house. If the fire goes long enough it will get into the walls, which I guess is where a fire block or draft stop might help.

Emergency escape and rescue openings is an interesting argument in that you have to assume a person needs it because they cannot escape through the front or back door of the home. This means the fire has extended to a point where typical egress paths are hindered. If you are an elderly person or even a child, you most likely do not want to have to climb out a "rescue opening", especially on a second floor. I will also add Shoreline had a fire in the middle of the night on 185th. It was started by a cigarette in a couch in the living room. The fire extended into th e kitchen and ining room then down the hallway towards the bedrooms. The occupant tried to get to the front door but finally had to run back to a bathroom out dive out a a window into bushes. His arms were burned. Richmond Beach had a similar fire a year later.

Yes true, electrical codes are way better now, so there are less electrical fires inside walls. Electrical fires are a small portion of fires in Shoreline.

Fire walls and separation, if you keep all your doors closed all the time is valid, but unrealistic. The fires in Shoreline that moved from compartment to compartment, were because they migrated through an open

door. Also, most homes have an open living room, kitchen, and dining room with no compartmentation. I would also add that the majority of fires in Shoreline that were confined to one compartment were sprinklered buildings. Yes these were new apartment complexes, but still a residential setting with fires started by human error or accident. These fires were extinguished with one sprinkler head and everyone got to go back into the building within an hour or two. You will not see a large apartment fire in Shoreline on the news because of a 13 gpm sprinkler head.

Adequate heating systems and energy efficient homes; not sure if MBAKs is referring to safer furnaces? But again, heating system fires are low in Shoreline.

Interconnected smoke alarm systems are great at alerting residences to a fire so they can get out, but that is where the benefit ends. A smoke alarm cannot put a fire out, so the fire gets to grow for about 4-7 minutes before the Shoreline Fire Department shows up. We are very good at putting large fires out, but we use a very large amount of water, and if we're successful at containing a fire to one or two rooms, the smoke and water damage makes the home un-inhabitable for an extended amount of time. An argument may be made that a smoke alarm will alert someone early enough to put the fire out. That assumes they know where the fire extinguisher is, they know how to use it and that they didn't have to wake up get their bearings and act.

MBAKs 3rd paragraph:
"The information brought forward at the Dec. 7 meeting relative to fires and types/size of structures did not include any information as to when they were built, or if they were equipped with working smoke detectors. Is it possible to see a breakdown of structure fires for newer single family and duplex construction? And, if they were equipped with working smoke detectors? National statistics show that fire safety continues to improve dramatically in new construction without the requirement of residential fire sprinklers.

The chart below provided by the National Association of Home Builders illustrates the steady decline of fires in one and two family structures."

Response:
So for starters, yes the majority of fires in Shoreline are in older homes, that is because the majority of homes in Shoreline are older homes. But the age of a home is a deceiving data point for a fire. An older house doesn't catch on fire just because its old. As stated above fires in Shoreline are mostly human error or accidental. The age of the home is irrelevant. Newer construction methods and better smoke detectors cannot address the human factor and the more flammable fuel loads in homes. This is why the International Residential Code (IRC) continues to require sprinklers in single family homes. The IRC knows human caused accidental fires will happen and the only way to solve the issue is by getting water onto the fire while it is still small.

I believe the time is now. Shoreline is starting to replace a lot of its residential building stock, within the next 20 years Shoreline will look like a different City. If we continue with our current codes, we will continue to have the same issues. Accidental human caused fires that leave homes un-inhabitable, leaving occupants leaning on Red Cross for a hotel room while they figure out what to do next. Or we can reverse the trend, and let one sprinkler head put a fire out, allowing the occupants to re-enter the home and call a company to clean up the water. We have a saying in Fire Prevention "you can un-wet a home but you can't un-burn it."

The fire data chart MBAKs provided only goes to 2006, it does not show you that the trend has leveled off. Here are the last 6 years nationally:

Year	Residential Fires	Civilian Deaths	Injuries	Property Damage/ 2019 dollars
2014	367,500	2745	11,825	7.3 b
2015	365,500	2560	11,075	7.5 b
2016	352,000	2735	10,750	7.7 b
2017	357,000	2630	10,600	8 b
2018	363,000	2720	11,200	8.1 b
2019	339,500	2770	12,200	7.7 b

And Shoreline Fires data shows a fairly steady trend also. An average of 54 structure fires every year.

MBAKs 4th paragraph:
"I encourage you to read the Home Building and Fire Safety article on the effectiveness of smoke alarms published in Fire Protection Engineering Magazine: https://www.fireprotectionengineering-digital.com/fireprotectionengineering/2016_q2/MobilePagedReplica.action?pm=1&folio=8#pg10"

Response:
Please open the article provided by MBAKs and turn 4 pages back to letter from the president.

It reads:
"But as engineers, have we done all there is to do in addressing the residential fire problem?

I hope you would agree that our work in this area is far from complete. It holds true that some fire threats we've endured in the past are similar to those we face today, and require ongoing effort on our part to mitigate them. However, the changing residential environment has also brought on a range of new challenges and concerns. As this issue of Fire Protection Engineering magazine highlights, fires in modern residential structures can behave much differently than they did in the past, prompting a re-examination of some of our traditional strategies and approaches. Data from government agencies and other organizations further support the notion that there is still much to be done to improve the current residential fire situation.

The manner in which our homes are situated, constructed and arranged, the increasing range of activities now conducted in the home, and the make-up of items brought into the home has changed the dynamics of the overall residential fire risk. It has been observed that the modern residential environment can create a "perfect storm" of devastating fire conditions. Homes constructed of newer, more cost effective, attractive and "greener" materials are becoming larger with vast open spaces increasingly filled with synthetic furnishings and other fuel loads. All of this supports more rapid fire propagation, a quicker occurrence of flashover, profound changes in fire dynamics, production of more toxic smoke, decreased escape times and the faster onset of structural collapse."

Furthermore, 2 pages later, the letter from the Technical Director states: in the 5th paragraph:

"Another significant contribution from fire protection engineers is with home fire sprinkler systems. Groundbreaking research by fire protection engineers contributed to the creation of a sprinkler system that prevent flashover and improves an occupants opportunity to escape from a dwelling fire."

As stated above smoke detectors alert occupants but do not stop a fire. The fire service has concluded the combination of smoke alarms AND Sprinkler systems is the best solution. Here is NFPA's findings from 2017:

Combined Impact of Smoke Alarms and Sprinklers

The lowest home fire death rate per 1,000 reported fires is found in homes with sprinkler systems and hardwired smoke alarms. Compared to reported home fires with no smoke alarms or AES, the death rate per 1,000 reported fires was as follows:

18% lower where battery-powered smoke alarms were present but AES were not
39% lower where smoke alarms with any power source were present but AES were not
62% lower where hardwired smoke alarms were present but AES were not
88% lower where hardwired smoke alarms and any AES were present
90% lower where sprinklers and hardwired smoke alarms were present

For Full NFPA report:
https://www.nfpa.org//-/media/Files/News-and-Research/Fire-statistics-and-reports/Suppression/ossprinklers.pdf

MBAKs 5th paragraph:
"MBAKS and its members would welcome the opportunity to participate in a stakeholder meeting to discuss this proposal. Would the City Council consider allowing an opportunity for staff, residential home builders and the Fire Chief to discuss the thresholds for fire protection, challenges and costs to implementing a mandate and the potential for offsets/incentives to the cost?"

We are always open to discussion but would not change our stance that sprinkler systems are the proven method to reducing our problem. We believe this change would change the trend over the next 20 years and beyond and reduce the devastation fires cause in the City of Shoreline.

It has been proven over and over and over again by NIST, UL, NFPA, the USFA, and fire protection engineers that sprinkler systems are the best answer for fire safety. Putting the fire out early is the solution. That is why we require sprinklers in every other type of residential structure and why the International residential Code still requires it in every code cycle. Every industry has adjusted and a cost-efficient sprinkler system that is part of the domestic plumbing system and requires very low maintenance has been developed. We would love to consider the building industry as partners in this endeavor.

I will end with this short video from the Home Fire Sprinkler Coalition, a video that has been seen by the building industry:

https://www.youtube.com/watch?v=whlymAuRtzU

Thank you for your time

Respectfully,
Derek LaFontaine
Fire Marshal
Shoreline Fire Department

For further research if interested:

NFPA Home Structure 2020 Fire Study:
https://www.nfpa.org/~/media/Files/News%20and%20Research/Fire%20statistics%20and%20reports/Building%20and%20life%20safety/oshomes.pdf

NIST Benefit Cost Analysis of Residential Fire Sprinklers
https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=860105

NIST Report on Fireground Field Experiments:
https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=904607

NFPA Home Fire Sprinkler Flyer
https://www.nfpa.org/-/media/Files/Public-Education/Resources/Safety-tip-sheets/Home_Sprinklers.pdf