

Public Hearing
October 26, 2021

To: Honorable Mayor and Members of the City Council

From: Dee Williams-Ridley, City Manager

Submitted by: Abe Roman, Interim Fire Chief, Department of Fire and Emergency Services

Subject: Proposed Ordinance Amending Paragraph 'NN' of Berkeley Municipal Code Section 19.48.020 ("Amendments to the California Fire Code") to Require Fire Sprinkler Installation in All New Structures and Retrofit of Existing Structures in Berkeley Fire Zones 2 and 3 – Second Reading

RECOMMENDATION

Conduct a public hearing and upon conclusion adopt the second reading of Ordinance No. 7,788-N.S. which modifies the language of Paragraph 'NN.' of Berkeley Municipal Code Section 19.48.020 ("Amendments to the California Fire Code) by adopting a building standard which is more restrictive than that standard currently contained in the California Fire Code and which will expand the existing local code amendment that requires the installation of fire sprinklers in new structures and the retrofit fire sprinklers into existing structures that currently exists in Fire Zone 3 to include structures located in Berkeley Fire Zone 2.

SUMMARY

Long term fire trends and wildfire events within the past five years demonstrate that the wildfire problem in California has become progressively worse and constitutes a major threat to the City of Berkeley and it's residents. Since 2007 an existing amendment within the Berkeley Fire Code has required the installation of fire sprinklers in new and retrofit of fire sprinklers within existing single-family and duplex residences in the "Environmental Safety- Residential" land use district when certain conditions are met. This geographic land use district is now also known as Fire Zone 3 in the Berkeley Fire Code. This requirement was instituted in response to the disastrous 1991 Tunnel Fire which affected Berkeley and Oakland.

This ordinance proposes to extend this requirement for the installation and retrofit of fire sprinklers within single-family and two-family dwellings that currently exist within Fire Zone 3 to include properties within Fire Zone 2 and to expand the application of this requirement to alteration projects when certain conditions are met. Fire sprinkler installation and retrofit would be required whenever new structures with habitable space are constructed, when structures or portions of structures are converted to habitable space when such structures did not previously contain formally approved habitable space, or when the valuation of permitted work exceeds a specified threshold. Some limited exceptions to the requirement are proposed. Fire sprinklers would limit the development of fire within a residence and prevent the spread of fire to surrounding vegetation. This requirement is a reasonable response to the increased threat of wildfires since the majority of wildfires are caused by human activity, and in

predominantly residential areas most fires are related to normal activities associated with human habitation and living.

FISCAL IMPACTS OF RECOMMENDATION

The fiscal impact to the City of Berkeley will be negligible. The staff required to review additional fire sprinkler permit submittals and inspect the installation of any fire sprinkler systems initiated by the proposed amendment are already budgeted by the City. The overall workload associated with potential fire sprinkler retrofit installations of primarily residential fire sprinkler systems is not expected to exceed staff's capacity to support the added workload. Also, permit fees associated with the installation of fire sprinkler systems are designed to offset staff costs which may be incurred in the review and inspection of those installations.

CURRENT SITUATION AND ITS EFFECTS

The wildland fire problem throughout the State of California and the western region of the United States has become progressively worse over the past 30-40 years. The duration of what was once considered a 'wildfire season' has extended to the point that wildfire events occur throughout most of the calendar year. This tends to blur any distinct lines between adjacent fire seasons. As a result, wildfire activity has become more of a cycle and less of a 'season'. Recent wildfire incidents since 2017 have consistently set records for fire size, intensity and rate of spread. Scientific evidence suggests that our current extreme drought conditions that make vegetation more susceptible to ignition and the fire weather conditions which lead to extreme fire behavior and make fire control difficult are due in large part to global climate change.

Berkeley is placed at great risk by the historic trends of deteriorating wildfire conditions and increasing fire severity throughout the state, by decades of accumulated vegetation fuel loading in the hills and by the steadily increasing human population within Berkeley's vulnerable wildfire zones. We believe that the community must act now to decrease the potential for a catastrophic wildfire developing in Berkeley's wildfire zones. We are therefore recommending the expansion of the current Fire Zone 3 fire sprinkler installation and retrofit requirements to include properties and structures within Fire Zone 2.

BACKGROUND

During its adoption of the 2007 California Fire Code, the Berkeley Fire Department added a local amendment to Berkeley's code adoption. Paragraph 'NN' of Section 19.48.020 of the Berkeley Municipal Code ("Amendments to the California Fire Code") required the installation of fire sprinkler systems in any new construction having a permit valuation of \$100,000 or more in the "Environmental Safety- Residential District" (also known as the Panoramic Hill District). The amendment also required the retrofitting of existing structures with fire sprinklers in the same District whenever new additions to existing structures with a permit valuation of \$100,000 or more were made. This area of the City is now also known as Fire Zone 3 in the Berkeley Fire Code. The fire sprinkler installation and retrofit requirements have been in force in Fire Zone 3 since this amendment was first adopted on December 27, 2007, and went into effect as part of Berkeley Ordinance 7,003-N.S.

This ordinance provision was adopted as part of Berkeley's response to the October 20, 1991 Oakland-Berkeley firestorm (known officially as the Tunnel-Oakland Hills fire). At the time it was believed that the risk of fire and the accompanying potential for the loss of life and property represented by fires like the Oakland-Berkeley firestorm justified the additional precaution of an aggressive fire sprinkler ordinance with retrofit requirements. The goal in providing aggressive fire sprinkler requirements for structures in Fire Zone 3 was to interrupt a potential chain of events where a routine structure fire could spread to adjacent vegetation and result in the ignition of a catastrophic wildfire.

ENVIRONMENTAL SUSTAINABILITY AND CLIMATE IMPACTS

Fire protection sprinkler systems (including residential fire sprinkler systems in one- and two-family dwellings) are environmentally friendly and contribute to the sustainability of our society. A 2021 study which continued earlier work to quantify the benefits of fire protection sprinkler systems reinforced earlier findings that on a per-fire basis where fire sprinklers were involved, fire sprinklers reduced greenhouse gas emissions by 97.8%, reduced water usage to extinguish the fire by 50%-91%, and reduced water pollution and the amount of materials committed to landfills when compared to the manual extinguishment of fires. This analysis does not include the additional benefits gained in energy savings and reduced carbon dioxide emissions when a destroyed building or building materials represented by the 98% reduction in fire property losses do not need replacement.

The Factory Mutual Insurance Company (a major leading insurance company in the Highly Protected Risk insurance market) published studies which attempt to quantify the environmental impact of fire sprinklers. The latest study estimated that in the eleven years between the publication of the 2010 and 2021 studies that residential fire sprinklers in the United States (specifically sprinklers in one- and two-family dwellings) could have prevented the emission of over 1.7 billion pounds of carbon dioxide into the atmosphere if residential fire sprinklers were universally installed.

RATIONALE FOR RECOMMENDATION

Formal studies confirm that the overall severity of the wildfire problem in the state has steadily increased over the past 30-40 years and recent wildfire incidents in California since 2017 have consistently set records for fire size, intensity and rate of spread. The difficulty of controlling recent wildfires is evidenced by the number of structures being lost in wildfires despite the record expenditure of public funds on fire control efforts and in the anecdotal reports of experienced firefighters.

In 2007, the amendment requiring the installation and retrofit of fire sprinklers in Fire Zone 3 was one of the few mitigations available to help address the fire potential in that area. Today, the same conditions that originally motivated the 2007 Panoramic Hill District fire sprinkler amendment remain in effect in Fire Zone 3. The Berkeley Fire Department believes that based on deteriorating wildfire conditions throughout the state that the wildland fire problem in Fire Zone 2 is now very similar to the wildland fire problem in Fire Zone 3.

The geographic area designated as Fire Zone 2 shares most of the wildfire characteristics present within Fire Zone 3. Both areas are recognized by the City and the Director of the California Department of Forestry and Fire Protection as Very High Fire Hazard Severity Zones (VHFHSZ) and share similar fire weather. Both areas have narrow, winding and steeply graded roads and streets. Both areas have abundant vegetation intermixed with structures. The topography of both areas is steep which creates the potential for rapidly advancing slope-driven fires. The original parcel subdivisions created narrow but deep lots in both Fire Zones. This tends to crowd adjacent structures and greatly reduces the amount of defensible space available to provide for wildfire safety. The main factor that the two areas do not share is the condition of a single means of evacuation and access by road that exists in Fire Zone 3. The majority of street segments in Fire Zone 2 have access to more than one evacuation and access route. However, given the dramatic increase in the severity of the wildfire problem it is believed that the availability of a second or additional access routes, which is typical in Fire Zone 2, cannot mitigate all of the factors previously listed that may contribute to a catastrophic wildfire.

Human activity has been a major cause of fires throughout human history. A National Fire Protection Association study which examined the causes of wildfires nationally from 2011-2015 found that approximately 54% of wildfires were due to human activity other than intentionally set fires (which accounted for another 19%). Only 4% of fires were attributed to natural causes such as lightning. In residential areas, activities associated with human habitation pose the greatest potential for ignition of a fire. In residential areas where ignitable vegetation is closely intermixed with dwellings (such as in Fire Zones 2 and 3), it is a reasonable precaution to attempt to extinguish fires related to human habitation before those fires can spread to surrounding vegetation.

Typical residential structure fires that may occur in Fire Zones 2 and 3 pose much greater risks to neighboring structures and the broader community when they take place during periods conducive to wildfires in areas with the wildfire characteristics present in these fire zones. Detailed studies of a number of significant wildfires by the federal government's National Institute of Standards and Technology (NIST) indicate that once a structure is ignited, structure-to-structure fire spread is an important consideration in the Wildland Urban Interface fire environment.

An NIST study¹ on the November 8, 2018 'Camp Fire' that destroyed the community of Paradise, California and other communities characterized fire behavior across and within residential parcels. The report observed that fire exposures to structures from large flames in high exposure areas were often due to "*...high vegetative fuel loading or the proximity of nearby burning structures*". The report continues, stating that "*[t]he historic growth of Paradise and surrounding communities, going back over a century, resulted in many structures on smaller lots, with small structure separation distances. Combined with the vegetative fuel loading, this enabled rapid structure-to-structure fire spread*". This characterization of the community of Paradise as containing many structures on smaller lots with small separation distances and heavy vegetative fuel

¹ "NIST Technical Note 2135", National Institute of Standards and Technology, January 2021

loading applies equally to Berkeley parcels in Fire Zones 2 and 3. We need to learn from the experience of Paradise, California and anticipate similar types of fire behavior within our community. The community of Paradise was lost due to a wildfire spreading into the community. However once structures ignite for any reason, experience has shown that both adjacent vegetation and structures may quickly become involved. As a community we need to take steps to ensure that a routine structure fire in a residence in Fire Zones 2 or 3 cannot spread to adjacent vegetation and structures and result in a catastrophic wildfire.

In addition to preventing the transition of residential fires to surrounding vegetation, the life safety benefits of residential fire sprinklers are well established and documented. These life safety benefits are evidenced by the fact that the California Building Code has mandated fire sprinklers throughout buildings containing new residential fire areas since the 2010 edition of that code. The proposed addition of fire sprinklers to existing and new residential properties will not only reduce the risk of a catastrophic wildfire incident but will have substantial, long-term safety benefits to the occupants of these structures.

This proposed ordinance amendment will greatly expand the use of fire sprinklers in our wildfire vulnerable areas, enhance the safety of building occupants and reduce the potential for fire spread from a structure to vegetation. However, it is not a panacea for the city's wildfire problem. Additional, substantial wildfire problems exist. Major problems include an inadequate road network for evacuation and emergency access, the need for more effective notification of citizens of developing emergencies, the need to coordinate citizen evacuations, the need for more and better vegetation management and defensible space, and the need to make fire-hardening of structures more universal. These problems have all been identified and can be addressed through other measures.

Given the potential financial impacts to property owners in the community, the subject of financial costs to the regulated community must be examined. For home owners subject to the requirement to install or retrofit fire sprinklers in their homes installation costs can vary substantially. A 2013 cost study for fire sprinkler installation in new residences by the National Fire Protection Association included multiple installations in projects in various areas of California and around the country. At that time the total cost for fire sprinkler installation in new construction (on cost-per square foot of sprinklered space) ranged from \$0.94 in Fresno to \$1.11 per square foot in Elk Grove, \$1.29 per square foot in Bakersfield and \$1.44 per square foot in Irvine, California. Nationwide, the NFPA study found an average installed cost of \$1.35 per sq. ft. and also found that in the two states having statewide installation requirements (California being one of those states) that the costs of installed systems are significantly and consistently lower. It also found that average fire sprinkler installation costs actually decreased between 2008 and 2013.

In the case of a retrofit in existing structures, the costs tend to be considerably higher and are greatly affected by the style of system installation (exposed vs. concealed pipe), the materials used and the source of water supply. A 2016 study by the City of San Francisco estimated fire sprinkler retrofit costs for exposed piping systems as

approximately \$515 per installed fire sprinkler head. This estimate included costs such as water meter upgrade, backflow prevention device, and material and installation costs. The San Francisco study used a conservative assumed coverage of 80 sq. ft per sprinkler which would equate to a cost-per square foot of coverage of \$6.44. This 80 sq. ft. per sprinkler coverage estimate is considered conservative from a cost estimating standpoint because standard residential fire sprinklers are actually rated for coverage areas of 144 sq. to 440 sq. ft. of coverage. If fire sprinklers were able to consistently cover their full rated area this would drive the report's average installation costs down to \$1.17 to \$3.58 per square foot. As a practical matter the constraints of smaller home spaces such as hallways, entry foyers and smaller bedrooms tend to drive the average coverage area down and the 80 sq. ft. of coverage per installed sprinkler is realistic in many installations. In cases where piping is concealed within walls, the San Francisco report estimated that installation costs would at least double, which would equate to \$12.88 per square foot.

As intended, the proposed revised ordinance language achieves the following goals:

1. It expands the scope and applicability of the existing fire code adoptive ordinance paragraph 'NN' from a requirement applicable only in Fire Zone 3 to a requirement applicable in both Fire Zones 2 and 3. The existing reference to "Environmental Safety- Residential District" (which is a land use planning designation) is replaced with "Fire Zones 2 and 3". These Fire Zone areas are defined in the Berkeley Fire Code as Very High Fire Hazard Severity Zones. As such, the fire sprinkler requirement would be directly linked to the wildland fire hazard present in those areas and not to a Land Use designation. This may become an important distinction as CalFire updates wildfire hazard maps. It is important that our local wildfire mitigation provisions evolve with our technical understanding of the State's wildfire problem.
2. The amended language specifies that the provisions of paragraph 'NN' apply to "any parcel zoned for single-family or duplex dwelling use". This specific language was chosen to mirror language used in State statutes which establish the rights of property owners to develop Accessory Dwelling Units (ADUs) on these properties. ADUs are a major source of new development within Berkeley's built-out neighborhoods in Fire Zones 2 and 3. However, the language is broad enough to capture not only ADU development but a significant percentage of substantial building alterations. Given that most properties within Fire Zone 3 are typically single-family, duplex or in some cases multiple single-family residences such a specification was previously unnecessary in earlier amendment language. The process of expanding paragraph 'NN' provisions to include all of Fire Zone 2 will necessarily capture parcels zoned for other uses. While there is utility in having structures on these other types of properties sprinkler protected in addition to the traditional dwelling units captured in the current paragraph 'NN' language, doing so creates significant obstacles in implementing and administering such a provision for larger campus-style or commercial properties having multiple buildings. In addition, larger residential properties are often captured by other fire code provisions which enhance fire safety such as our

local fire alarm retrofit requirement or, in the case of larger congregate residences, an existing retrofit requirement for fire sprinklers. Also, other property types may not have the same fire hazards associated with daily residential living activities such as cooking.

3. The language of the paragraph 'NN' amendment is altered to clarify that it is intended to apply to new construction, to the conversion of buildings or parts of buildings to habitable space when no formally approved habitable space previously existed, and to building alterations when permit valuations exceed the \$100k threshold. 'Alterations' are formally defined in the building code as construction work other than repair work or additions to existing structures or the construction of entirely new structures. The Berkeley Fire Department's historic interpretation of the current paragraph 'NN' language has always included non-repair work and additions in the application of the permit valuation threshold.
4. For the purpose of fire sprinkler system requirements, the permit valuation is the aggregate of all alterations and/or additions over a 3-year period. Some building owners may attempt to perform a series of smaller, separately permitted alterations or additions to an existing residential building in order to avoid having to provide a sprinkler system retrofit. To address this possible "loop-hole", the language of the paragraph NN amendment has a provision for aggregation, which involves adding together the costs of all alterations or additions to the same residential building over a three-year period to determine the sprinkler system obligation.
5. The revised paragraph 'NN' language makes it clear that whenever fire sprinklers are triggered in one building by construction of a new structure or alterations to an existing structure that all structures on the property having habitable space and associated with the new work are affected by the retrofit requirement. This feature of the ordinance language is essential because:
 - a. A retrofit requirement which only applies to the specific structure that is undergoing significant alterations will result in an extended delay in sprinkler adoption as many structures may never experience a substantial remodel.
 - b. As currently written, State statutes addressing the construction of Accessory Dwelling Units limit fire sprinkler requirements to properties where the main structure is also equipped with fire sprinklers.
6. The \$100,000 permit valuation trigger threshold from the original paragraph 'NN' amendment is retained. This allows for reasonable building alterations without triggering fire sprinkler installation while still capturing larger alteration, renovation and construction projects.

The exceptions included in the new paragraph 'NN' language include:

'Exception 1' exempts smaller accessory structures of less than 120 sq. ft. in size that would not normally require a building permit.

'Exception 2' exempts work classified as repairs to existing structures. There would be no permit valuation threshold associated with repair work. This will allow even extensive needed repairs such as reroofs, foundation retrofits, termite/pest repairs and similar work to be completed without the risk of triggering a fire sprinkler installation. This provision also exempts repair or alteration work specifically intended to bring a structure into compliance with ignition resistance construction standards for Wildland Urban Interface fire areas as recognized in the Building Code.

'Exception 3' allows the creation or addition of small utility or mechanical spaces to serve the needs of the structure. This is intended to allow for the incorporation of new energy generation, storage or energy saving features into existing buildings such as 'off-grid' or solar battery power installations, newer space or water heating technologies, etc.

'Exception 4' is intended to provide some relief to sprinkler retrofit requirements in situations where multiple, free-standing primary dwellings may exist on a property and where separate households may have no control over the construction activities of others on the property.

ALTERNATIVE ACTIONS CONSIDERED

Various adjustments to the proposed ordinance language were considered, as were different permit valuation thresholds for triggering sprinkler installation. Staff's belief is that the original \$100,000 permit valuation threshold used in Fire Zone 3 will strike a balance between allowing some significant updates and upgrades of living spaces and structures while still capturing many substantial remodel projects. As a result the \$100k figure is still considered to be a valid trigger threshold for fire sprinkler installation.

CONTACT PERSON

Steven Riggs, Fire Marshal, Department of Fire and Emergency Services, (510) 981-3473

Attachments:

- 1: Ordinance No. 7,788-N.S.
- 2: Public Hearing Notice

ORDINANCE NO. 7,788-N.S.

AMENDMENT OF PARAGRAPH 'NN.' OF SECTION 19.48.020 OF THE BERKELEY MUNICIPAL CODE TO REQUIRE FIRE SPRINKLER INSTALLATION IN AND RETROFIT OF STRUCTURES IN BERKELEY FIRE ZONES 2 AND 3

BE IT ORDAINED by the Council of the City of Berkeley as follows:

Section 1. That Paragraph NN. of Section 19.48.020 of the Berkeley Municipal Code ("Amendments to the California Fire Code") is amended to read as follows:

NN. Section 903.2.23 Environmental Safety--Residential District Fire Zones 2 and 3 [Additional subsection] ~~Any new construction requiring a permit determined to be \$100,000 or more in construction costs or new additions to existing structures shall be required to install automatic fire sprinklers throughout the structure. For the purpose of this subsection "Environmental Safety--Residential District" shall mean those areas designated as such on the Official Zoning Map of the City of Berkeley Fire Code, as it may be amended from time to time. On any parcel zoned to allow single-family or duplex dwelling residential use, any of the following conditions shall trigger the installation of fire sprinklers throughout any new and existing primary and related accessory structures containing habitable space:~~

A. The construction of a new structure containing habitable space, or

B. The conversion of existing structures or portions of existing structures to habitable space when such structures did not previously contain formally approved habitable space, or

C. Any alterations or additions requiring permit(s) determined to be \$100,000 or more in aggregate construction costs over a 36-month period from the date of permit issuance

For the purpose of this subsection Fire Zones 2 and 3 shall mean those areas designated as such in the Berkeley Fire Code, as it may be amended from time to time.

Exceptions: 1. Detached accessory structures of Group 'U' Occupancy with a floor area not greater than 120 square feet.

2. Construction or portions of construction defined as repairs for maintenance purposes or construction alterations intended to bring a structure into compliance with ignition resistant construction standards for wildfire exposure of the structure as set forth in the Berkeley Building Code.

3. Additions of new space that total not more than 250 square feet in area and which are used solely for mechanical or utility service of a building.

4. Where multiple, primary, free-standing dwellings exist on a given property the fire sprinkler installation requirements of this section shall be applicable to an individual primary structure and any qualified accessory structures on the property associated with the affected primary dwelling structure. Other free-standing dwelling structures on the property and their accessory structures need not retrofit fire sprinklers at that time.

Section 2. This amendment shall become effective 90 days after adoption of this ordinance.

Section 3. Copies of this Ordinance shall be posted for two days prior to adoption in the display case located near the walkway in front of the Maudelle Shirek Building, 2134 Martin Luther King Jr. Way. Within 15 days of adoption, copies of this Ordinance shall be filed at each branch of the Berkeley Public Library and the title shall be published in a newspaper of general circulation.

At a regular meeting of the Council of the City of Berkeley held on October 12, 2021, this Ordinance was passed to print and ordered published by posting by the following vote:

Ayes: Bartlett, Droste, Hahn, Harrison, Kesarwani, Robinson, Taplin, Wengraf, and Arreguin.

Noes: None.

Absent: None.

**NOTICE OF PUBLIC HEARING
BERKELEY CITY COUNCIL**

**PROPOSED ORDINANCE AMENDING PARAGRAPH 'NN' OF
BERKELEY MUNICIPAL CODE SECTION 19.48.020 ("AMENDMENTS
TO THE CALIFORNIA FIRE CODE") TO REQUIRE FIRE SPRINKLER
INSTALLATION IN ALL NEW STRUCTURES AND RETROFIT OF
EXISTING STRUCTURES IN BERKELEY FIRE ZONES 2 AND 3**

The Department of Fire and Emergency Services is proposing ...

Conduct a public hearing and, upon conclusion, adopt the second reading of Ordinance No. 7,788-N.S. which modifies the language of Paragraph 'NN.' of Berkeley Municipal Code Section 19.48.020 ("Amendments to the California Fire Code) by adopting a building standard which is more restrictive than that standard currently contained in the California Fire Code and which will expand the existing local code amendment that requires the installation of fire sprinklers in new structures and the retrofit fire sprinklers into existing structures that currently exists in Fire Zone 3 to include structures located in Berkeley Fire Zone 2.

The hearing will be held on, OCTOBER 26, 2021 at 6:00 p.m. in the School District Board Room, 1231 Addison Street.

A copy of the agenda material for this hearing will be available on the City's website at www.CityofBerkeley.info as of **October 14, 2021**. **Once posted, the agenda for this meeting will include a link for public participation using Zoom video technology.**

For further information, please contact Fire Marshal Steven Riggs at (510) 981-3473.

Written comments should be mailed or delivered directly to the City Clerk, 2180 Milvia Street, Berkeley, CA 94704, in order to ensure delivery to all Councilmembers and inclusion in the agenda packet.

Communications to the Berkeley City Council are public record and will become part of the City's electronic records, which are accessible through the City's website. **Please note: e-mail addresses, names, addresses, and other contact information are not required, but if included in any communication to the City Council, will become part of the public record.** If you do not want your e-mail address or any other contact information to be made public, you may deliver communications via U.S. Postal Service or in person to the City Clerk. If you do not want your contact information included in the public record, please do not include that information in your communication. Please contact the City Clerk at 981-6900 or clerk@cityofberkeley.info for further information.

Published: The Daily Californian - October 18, 2021 and October 25, 2021
In accordance with California Government Code, Section 50022.3

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I hereby certify that the Notice for this Public Hearing of the Berkeley City Council was posted at the display case located near the walkway in front of the Maudelle Shirek Building, 2134 Martin Luther King Jr. Way, as well as on the City's website, on October 14, 2021.

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Mark Numainville, City Clerk