

**RODEO-HERCULES FIRE PROTECTION DISTRICT FINDING OF FACT AND NEED FOR
CHANGES OR MODIFICATIONS IN THE 2019 CALIFORNIA BUILDING STANDARDS
CODE, TITLE 24, PART 9, CALIFORNIA FIRE CODE, DUE TO LOCAL CONDITIONS**

Changes or Modifications: Pursuant to §§17958 and 18941.5 of the California Health and Safety Code, the Board of the Rodeo-Hercules Fire Protection District in its ordinance adopting and amending the 2016 California Building Standards Code, Title 24, Part 9, California Fire Code, changes, modifies, and amends Section 903.1 through Section 914.11. Under the adoption of the 2016 California Fire Code, specific amendments have been established which are more restrictive in nature than those adopted by the State of California and the State Fire Marshal.

Findings: Pursuant to §§17958.5, 17958.7 and 18941.5 of the State of California Health and Safety Code, the Board of the Rodeo-Hercules Fire Protection District has determined and finds that the attached changes or modifications are needed and are reasonably necessary because of local climatic, geologic and topographic conditions.

Local Conditions: Local conditions have an adverse effect on the prevention of (1) major loss fires (2) major earthquake damage, and (3) the potential for life and property loss, making necessary changes or modifications to the California Fire Code and the State Buildings Standards Code in order to provide a reasonable degree of property security and fire and life safety in this Fire District.

The local amendments to the California Fire Code, 2019 Edition, have been evaluated by the Fire District as a procedure for addressing the fire hazards and concerns within the Fire District which will establish and maintain an environment for a high level of risk of fire and life safety to all persons who work and live within the Fire District boundaries.

Below are listed adverse, local climatic (See No.1), geologic (See No. 2) and topographic (See No. 3) conditions:

1. Climatic

a. Precipitation

Precipitation ranges from 15 to 24 inches per year with an average of approximately 20 inches per year. Ninety-six (96) % falls during the month of October through April and four (4) % from May through September. This is a dry period of at least five (5) months each year. Additionally, the area is subject to occasional drought.

b. Relative Humidity

Humidity remains in the middle range most of the time. It ranges from forty-five (45) to sixty-five (65) percent during spring, summer, fall, and from sixty (60) to ninety (90) percent in the winter. During late winter and summer months it drops to twenty (20) percent and occasionally drops lower.

c. **Temperatures**

Temperatures have been recorded as high as 105 degrees F. Average summer highs are in the 75 to 95-degree range.

d. **Winds**

Prevailing winds are from the northwest. However, winds are experienced from virtually every direction at one time or another. Velocities are generally in the five (5) to twenty-three (23) mph range, gusting seven (7) to thirty-five (35) mph during the summer months. Forty (40) mph winds are experienced occasionally and winds up to fifty-five (55) mph have been experienced. During the winter months strong, dry, gusty winds move through the area for several days creating extremely dry conditions.

e. **Impact**

The local climatic conditions affect the acceleration, intensity, and size of fire in the community. Times of little or no rainfall, of low humidity and high temperatures create extremely hazardous conditions, particularly as they relate to wood shake and shingle roof fires and conflagrations. The winds experienced in this area can and do have a tremendous impact upon structure fires or buildings in close proximity to one another, commonly found in the Town of Rodeo and City of Hercules. During wood shake and shingle roof fires, winds can carry sparks and burning brands to other structures, thus spreading fires and causing conflagrations. In building fires, winds can literally force fire back into the building and can create a blowtorch-like effect as well as preventing "natural" ventilation and cross-ventilation efforts. Fires involving non-irrigated weeds, grass and brush can grow in magnitude and be quickly fanned to intensity beyond the control capabilities of the Fire District, even in moderate winds. National statistics frequently cite wind conditions, such as those experienced locally as a major factor where conflagrations have occurred.

2. **Geologic and Geographic**

a. **Geographic Location**

The fire environment of a community is primarily a combination of two factors: the area's physical geographic characteristics and the historic pattern of urban-suburban development. These two factors, alone and combined, create a mixture of environments that ultimately determines the area's fire protection needs.

The basic geographical boundaries of the District include San Pablo Bay to the northwest, Pinole Ridge to the south, Franklin Canyon and Franklin Ridge to the east and Pinole Creek to the west.

Because of the size of the Rodeo-Hercules Fire District (26 square miles) the characteristics of the fire environment changes from one location to the next. Therefore, the District has not one, but a number of fire environments, each of which has its individual fire protection needs, from a major oil refinery to urban wildland interface to freeways, rail lines, waterways and urban town settings.

The service area of the Rodeo-Hercules Fire District has a varied topography and vegetative cover. A conglomeration of bay plains, hills and ridges makes up the terrain. Development has occurred on the flat lands in the central portion of the District. However, over the last fifteen (15) years, development has spread into the surrounding hills and the smaller valleys and canyons with planned growth extending well into the wildland interface.

b. Geological Location.

Rodeo-Hercules Fire District is located in Contra Costa County and Seismic Risk Zone 4, which is the worst earthquake area in the United States. Buildings and other structures in Zone 4 can experience major seismic damage. Rodeo and Hercules are in close proximity to numerous earthquake faults including the San Andreas Fault, Hayward Fault, Calaveras Fault, Rogers Creek Fault, Concord Fault and other lesser faults. The Concord Fault has a potential for a Richter 6 earthquake and the Hayward and Calaveras Faults have the potential for a Richter 7 or greater earthquake. Major tremblers from seismic activity are not unknown in the area.

Interstate 80 runs through the District and State Route 4 runs through one half. Two major rail lines, Burlington Northern Santa Fe (BNSF) and Southern Pacific (SP) runs through the District. Interstate 80 and the BNSF Railroads divide the District by north and south, east and west. An overpass or under crossing collapse would significantly alter the response route and time for responding emergency equipment. This is due to the limited crossings of the interstate and rail lines either at grade or elevated. Earthquakes of the magnitude experienced locally can cause major damage to electrical transmission lines and facilities and any one of the numerous natural gas, gasoline, jet fuel, fuel oil, crude oil and hydrogen transmission pipelines within the District. Damage to these facilities could start fires throughout the District. The occurrence of multiple fires will quickly deplete Fire District resources, thereby reducing and/or delaying response to any given fire or emergency.

c. Size and Population

The Rodeo-Hercules Fire Protection District covers twenty-six (26) square miles including a population of 33,000 which is expected to increase to 40,000 within the next five (5) to ten (10) years. Within the Fire Protection District are two (2) fire stations and a total of twenty-one (21) full time personnel. The Fire Protection District handles diverse responsibilities including refineries, urban, urban wildland, freeway, rail and medical.

d. Roads and Streets

Single access points generally service developments with emergency vehicle -only access strategically located. Roads in excess of 15% grade serve older portions of Rodeo. Several roads within Hercules exceed a 15% grade. The roadway system within the Fire District is for the most part a grid or loop system. Roadways with less than twenty (20) feet unobstructed paved surface, with a dead end longer than one hundred fifty (150) feet, a cul-de-sac diameter less than sixty-eight (68) feet or grade of more than fifteen (15) % are considered hazardous in terms of fire access and protection. A large number of roadways within the District fall into one of the above categories.

3. Topographic

a. Conditions

The District's service area is a conglomeration of bay plains, hills, valleys and ridges. The flatter lands are found in the central portion of Rodeo and newly developed Waterfront District of Hercules. Only a small portion of the urban and suburbanized areas is on relatively flat lands (0 - 5% slope). The majority of residential development is on hillsides with slopes ranging from 15 - 30% and 30% +. A large portion of the eastern District is designated agricultural or preserve.

Elevations are varied in the District, from downtown Rodeo and the Waterfront District of Hercules at five (5) to ten (10) feet above sea level to Indian Peak at 891 feet. Correspondingly, there is much diversity in slope percentages. Pinole Ridge has slopes from 20 - 75%; Franklin Ridge 30 - 70%; Franklin Canyon 20 - 80% and Ohlone Canyon 20 - 85%. Slope is an important factor in fire spread. As a basic rule of thumb, the rate of spread will double as the slope percentage doubles, all other factors remaining the same.

Many of the newer large buildings and building complexes have building access and landscaping features and designs which preclude or greatly limit any approach or operational access to them by Fire District vehicles. In addition, the presence of security gates and roads of inadequate width and grades that are too steep for Fire District vehicles adversely affect fire suppression efforts.

b. Vegetation

Rodeo and Hercules' semi-arid Mediterranean-type climate produces vegetation similar to most of Contra Costa County, with locally specific growth as a result of topography and prevailing winds. The south-facing exposure is primarily rye grass with occasional clumps of bay and oak trees in the more sheltered pockets. The north-facing slopes are heavily wooded from the lower elevations to the ridges with oak and bay trees and minor shrubs of the general chaparral class. Several large stands of non-native mature eucalyptus trees are found at lower elevations and in all cases are surrounded by development. Expansion of the residential community into areas of heavier vegetation has resulted in homes existing in close proximity to dense natural foliage. Often such dwellings are completely surrounded by highly combustible vegetation compounding the fire problem from a conflagration point of view.

Approximately half of all the residential structures in the District have shingle or shake roofs. This very flammable material is susceptible to ignition by embers from a wildland fire, furthering the spread of fire to adjacent buildings.

c. Impact

The above-mentioned local geographic and topographical conditions increase the magnitude, exposure, accessibility problems and fire hazards presented to the Rodeo-Hercules Fire Protection District.

Fire following an earthquake has the potential of causing greater loss of life and damage than the earthquake itself. Approximately 50% of all dwellings in the District have wood shingle roofs.

Oil refinery and utilities located within the District and within the Seismic Risk Zone 4 pose the largest single risk. The largest concentrations of hazardous material are found here. Hazardous materials, particularly toxic gases, could pose the greatest threat to the largest number of people should a significant seismic event occur.

The District's resources would have to be prioritized to mitigate the greatest threat, and may likely be unavailable for smaller single-dwelling or structure fires and emergencies.

Other variables may tend to intensify the situation:

- 1) The extent of damage to the water system;
- 2) The extent of isolation due to bridge, freeways overpass and rail trestle collapse;
- 3) The extent of roadway damage and/or amount of debris blocking roadways;
- 4) Climatic conditions (hot, dry weather with high winds);
- 5) Time of day will influence the amount of traffic on roadways and could intensify the risk to life during normal business hours;
- 6) The availability of timely mutual aid or military assistance;
- 7) The large portion of dwellings with wood shingle roof coverings could result in conflagrations;
- 8) The large number of dwellings that slip off their foundations and rupture gas lines resulting in further conflagrations

Conclusion

Local climatic, geographic and topographic conditions impact fire prevention efforts and the frequency, spread, acceleration, intensity and size of fire involving buildings in this community. Further, they impact potential damage to all structures from earthquakes and subsequent fires. Therefore, it is found to be reasonably necessary that the 2013 California Fire Code and the State Building Standards Code be changed or modified to mitigate the effects of the above conditions.

Furthermore, California Health and Safety Code §17958.7 requires that the modification or change be expressly marked and identified as to which each finding refers. Therefore, the Rodeo-Hercules Fire Protection District finds that the following table provides code sections that have been modified pursuant to Ordinance 2019-01 which are building standards as defined in Health and Safety Code §18909, and the associated referenced conditions for modification due to local climatic, geologic and topographical reasons.

<u>Section Number</u>	<u>Local climatic, geological, and topographical</u>
903	1a, 1b, 1d, 2a, 2b, 3