

## Chapter 6

# SAFETY ELEMENT

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Approved and Adopted by the Rio Dell City Council October – Resolution No.

## Chapter 6 Safety Element

### 6.1 Introduction



The purpose of the safety element is to reduce the potential risk of death, injuries, property damage, and economic and social dislocation resulting from fires, floods, earthquakes, landslides, and other hazards. The safety element overlaps topics also mandated in the land use, conservation, and open-space elements. The components of this Element include:

- Geologic/Seismic Hazards
- Flood Hazards
- Fire Hazards
- Airport Safety
- Industrial Hazards
- Hazardous Materials
- Emergency Management

The safety element must identify hazards and hazard abatement provisions to guide local decisions related to zoning, subdivisions, and entitlement permits. The element contains general hazard and risk reduction strategies and policies supporting hazard mitigation measures. Policies address the identification of hazards and emergency response, as well as mitigation through avoidance of hazards by new projects and reduction of risk in developed areas.

### 6.2 Hazard and Risk Reduction

Land development is subject to a number of hazards to life and property, including seismic and non-seismic land instability, flooding, fire, and dangers from airport operations.

The degree of risk associated with these hazards can only be measured in relative terms. What

constitutes 'acceptable risk' varies with the type of development involved. For instance, a hospital should meet very strict earthquake standards in order to ensure that it is able to function in the event of a serious earthquake. A warehouse, on the other hand, would not need to be designed to the same rigorous standards because its functions during an earthquake would not be critical to the community's response to the emergency, nor would it pose serious risk to large numbers of people should it fail.

The General Plan manages risk through the use of land use designations to limit exposure to hazardous areas and through policies tailored to specific hazardous conditions. The goals, policies and implementation measures of this Element are many of the same existing policies found in Chapter 5, the Open Space and Conservation Element. All of the goals, policies and implementation measures are designed to proactively improve overall safety conditions within the City.

### 6.3 Seismic and Geologic Hazards



**Seismicity:** Humboldt County is located within the two highest of five seismic risk zones specified by the California Building Code, and offshore Cape Mendocino has the highest concentration of earthquake events anywhere in the continental United States. The area near Cape Mendocino is a complex, seismically active region, where three crustal

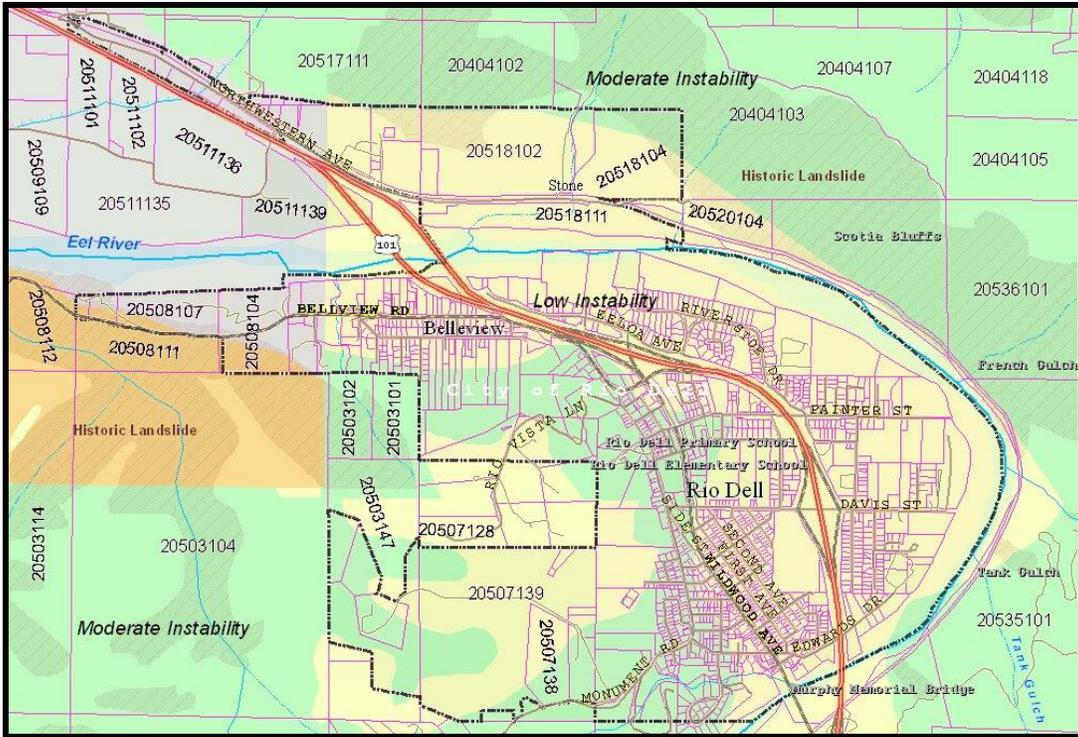
plates, the Pacific Plate, the Gorda Plate, and North American Plate intersect to form the Mendocino Triple Junction.

The subducting Gorda and Juan de Fuca Plates form the "Cascadia Subduction Zone," which runs north offshore of Humboldt, Del Norte, Oregon, and Washington. Recent investigations have shown that this system has moved in unison in a series of great earthquakes (magnitude 8 to 9) over the last 20,000 years, most recently about 300 years ago, with events occurring at 300–500 year intervals.

Seismic shaking poses a potentially significant hazard to Rio Dell and vicinity. An array of strong motion sensors (part of the California Strong Motion Instrumentations Program) are mounted on the Painter Street overpass. These sensors recorded seismic shaking during the 1992 Petrolia earthquakes that occurred on April 25<sup>th</sup> and 26<sup>th</sup>. These earthquakes had magnitudes of 7.1, 6.6 and 6.7. Acceleration rates were measured from 0.55 g (acceleration of gravity) up to 1.23 g. However, acceleration rates near the epicenter were close to 2 g, indicating the potential for very strong ground shaking throughout the northcoast region.

Surface fault rupture is a particular type of seismic hazard that is specifically addressed by state legislation, the Alquist-Priolo Earthquake Fault Zoning Act. This act generally requires disclosure and avoidance. Humboldt County has a number of fault zones mapped under this law. The Little Salmon fault zone is the closest mapped Alquist-Priolo fault hazard zone to Rio Dell, approximately six (6) miles northeast. The Little Salmon fault hazard zone extends from Hydesville northwesterly towards Humboldt Hill near Eureka.

Ground-shaking gives rise to two secondary natural hazards, liquefaction and landsliding. Liquefaction involves a sudden loss in strength of a water-saturated soil, and results in temporary transformation of the soil into a fluid mass. Recent alluvial flood plain soils and coastal sand deposits exhibit the highest liquefaction hazard. To mitigate this hazard, soils engineering investigations can assess the potential for liquefaction and specify appropriate foundation and building design. Based on the County's Hazard mapping, Rio Dell is not within a high area of potential liquefaction. Ground-shaking can induce landslides, especially under saturated conditions. Again, soils engineering investigations can evaluate the seismic stability of slopes and prescribe appropriate setbacks. Figure 6-1 identifies slope stability and historic landslides.



**Figure 6-1 Slope Stability and Historic landslides**

Source: Humboldt County GIS August 2016

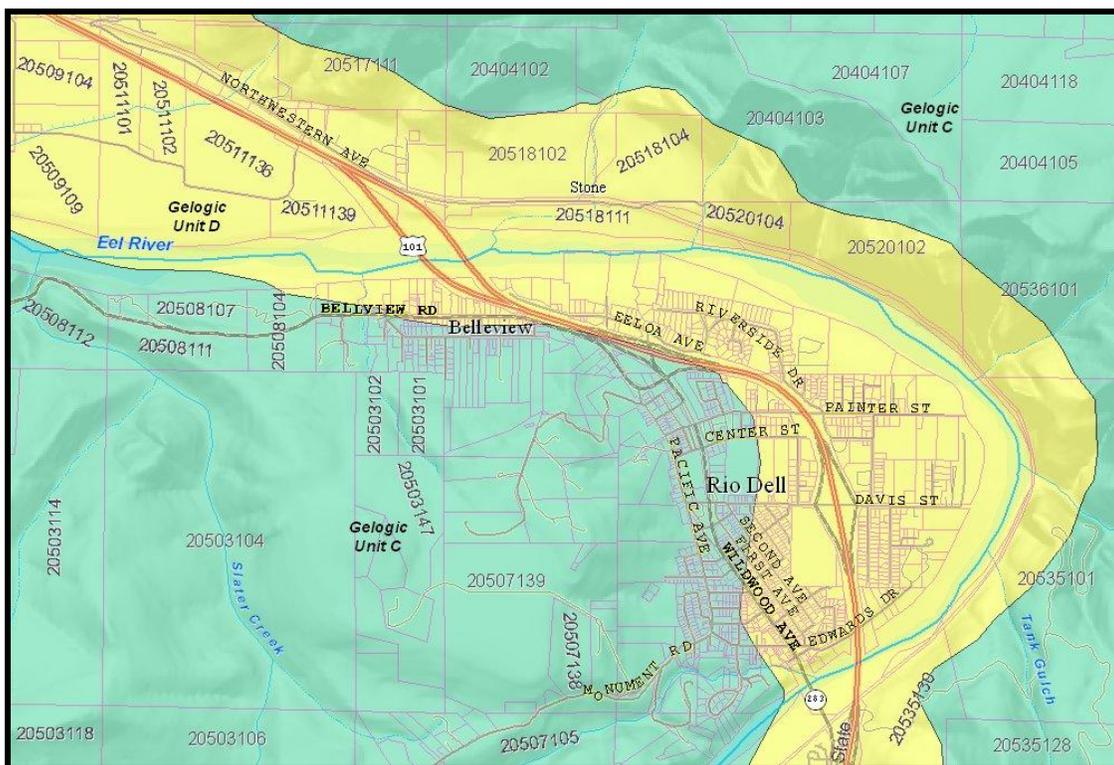
**Bedrock Geology:** The bedrock geology of the county is divided generally into two provinces: the Klamath Mountains province in the northeast, and the Coast Ranges province in the central and southwest portion of the county. The dividing line between the two provinces is the South Fork Mountain Ridge, which separates the Trinity River basin from the Mad River and Redwood Creek drainages.

Rio Dell is within the Coast Range province. The Coast Ranges province is the dominant geologic province in the county, trending northwest and drained by the Mad, Eel, and Mattole River drainages. The Franciscan and Yager complexes dominate inland, with sand and other alluvial deposits dominating in the lower reaches of the river basins and the area surrounding Humboldt Bay.



The Franciscan complex can be divided into two distinct units: Franciscan sandstone and Franciscan mélangé. Rio Dell is bisected by the Franciscan mélangé and younger alluvial deposit formations. Franciscan mélangé consists of rubble of sheared sandstone and siltstone in which occur more competent blocks of volcanic rock, chert, and schist.

Mélangé terrain is generally unstable and characterized by rolling hummocky slopes that are highly susceptible to mass movement. Younger alluvial deposits are found in the lower reaches of the river basins and in the area surrounding Humboldt Bay, alluvial sediments dominate. These unconsolidated to partially consolidated sediments have been mildly folded and faulted, but when forested or gently sloped, are generally stable. Figure 6-2 identifies the location of the Franciscan mélangé, Unit C and younger alluvial deposit formations, Unit D.



**Figure 6-2 Bedrock Geology; Unit C: Franciscan Mélangé; Unit D: Alluvial**

Source: Humboldt County GIS August 2016

Below are existing General Plan polices and implementation measures regarding soils and geologic hazards:

#### **Soils and Geologic Resources Policies**

- Update the Conservation and Safety Element to include the most current soil stability

and geologic hazard mapping.

- Make soils and geologic resources information publicly available.
- Update the Conservation and Safety Element to require that minimum parcel sizes be increased in areas greater than 15 per cent slopes.
- Require that geo-technical reports be prepared by qualified professionals for developments in areas of potential slope stability to ensure that slope and soil stability measures are incorporated into project design.

### **Soils and Geologic Resources Implementation Measures**

- The City shall prepare and adopt a Conservation and Safety Element of the General Plan to expand soil stability and geologic hazard information and develop specific implementation measures.
- The City shall develop a Geographic Information System (GIS) that contains data on slope stability and geologic hazards and maintain large-scale hazard maps.
- The City shall prepare Development Regulations that require soil and geological investigations of proposed development on slopes of 15% or greater. Information obtained should be used to continually update the GIS database.
- The City shall prepare a Grading Ordinance.
- The City shall prepare Hillside Development Regulations to control the density and location of development on parcels that include slopes of 15% or greater

In addition the Safety Element contains the following goals policies and implementation measures (action plan) regarding soil and geologic hazards:

#### **Goal S 6.3-1**

Minimize risks to life and property due to soils and/or geologic hazards.

#### **Policy S 6.3-1**

Continue to utilize all available data on geologic hazards and related risks from the appropriate agencies.

**Implementation S 6.3-1.a.** Utilize geologic maps to identify those areas of instability to require soils/geologic reports.

Responsibility: Community Development Department

Timeframe: Ongoing  
Resources: Project Proponents.

**Goal S 6.3-2**

Maintain unstable and hillside areas exceeding 15% as open space within the City.

**Policy S 6.3-2**

Adopt a Hillside Development Regulations within the Zoning Ordinance to implement hillside development provisions. Benches or flats on hillside areas may be developed when demonstrated that access roads and building site are geologically stable.

**Implementation S 6.3-2.a.** Prior to adoption of Hillside Development Regulations, any development on slopes exceeding 15% shall require a Geologic Report demonstrating the area is stable and suitable for the proposed development.

Responsibility: Community Development Department  
Timeframe: Ongoing  
Resources: Project Proponents.

**Policy S 6.3-3**

Roads serving hillside development shall follow natural contours, with minimum disruption to hills or forests.

**Implementation S 6.3-3.a.** Adopt road standards minimizing alterations to natural contours accessing hillside development.

Responsibility: Community Development Department, Public Works Department and  
City Engineer  
Timeframe: Ongoing  
Resources: General Fund

## 6.4 Flood Hazards



The 1955 and 1964 floods caused extensive damage throughout the northcoast. Damages from the 1964 flood alone totaled more than \$100 million dollars. Most of the City is outside the mapped 100 year flood zones. All development within the 100 year flood zone is subject to the requirements of the Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program. The County maintains a Geographic Information System (GIS) which identifies flood zones and dam failure inundation zones for the entire County.

One of the major issues in floodplain management and flood protection is how much encroachment of human development should be allowed into 100-year flood zones. The closer to the river that development is sited, the higher a barrier to floodwaters will have to be erected, as greater limitations on the horizontal expanse of a waterway will require a vertical increase in the water level in order to maintain a similar cross-section. (Federal standards require that encroachment cannot occur within an area that will impose a vertical increase of more than one foot, or increasing water velocity will become hazardous.) Otherwise, floodwaters will spill over into developed areas.

Lands within special flood hazard zones "A" and "V" as delineated by the Federal Emergency Management Agency (FEMA) are typically required to have flood insurance. FEMA as part of the National Flood Insurance Program publishes Flood Insurance Rate Maps. These maps identify various flood hazard zones for flood insurance and land use purposes. Lands within Flood Zone "A" and "V" are located within a 100 year flood plain.

Zone A is for inland areas and Zone V is for coastal areas. A 100 year flood event has an **average** occurrence of once in 100 years. There are instances where lands and or structures within mapped zones "A" or "V" may actually be located outside or above the mapped flood

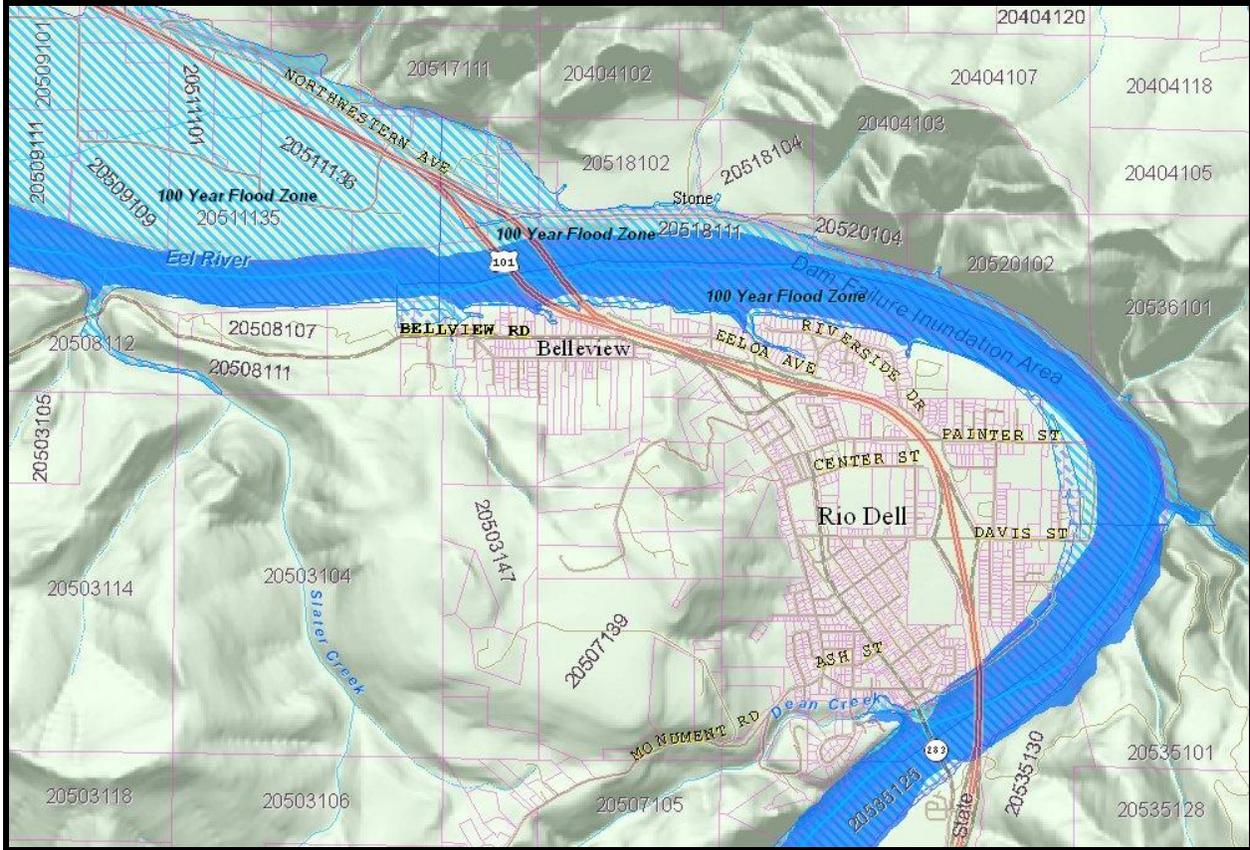
zone. A property owner is typically required to provide a Flood Elevation Certificate in order to get a Letter of Map Revision (LOMR) or a Letter of Map Amendment (LOMA) from the National Flood Insurance Program.



**Dam Failure:** While providing some degree of flood control, dams also present a possible hazard in the event of failure. In Humboldt County the Trinity Dam (Trinity and Klamath rivers) and the Ruth Dam (Mad River) pose the most substantial risk, with their large volumes and, in the event of a failure, short downstream warning times. The Scott Dam is near the headwaters of the Eel

River. The Scott dam was built in 1922 for hydroelectric power. It is 130' high, forms Lake Pillsbury and holds 80,560 acre-feet of water.

Hazards from dam failure are those associated with the downstream inundation that would occur given a major structural failure of a nearby impoundment. Such failures would most likely be caused by geologic phenomena, including seismic events and slope stability problems. For the most part the dam failure inundation area within or adjacent to the City is limited to the channel of the river. Figure 5-5 identifies the 100 flood zone and the dam failure inundation zone.



**Figure 6-3 100 Year Flood and Dam Failure Inundation Zones**  
 Source: Humboldt County GIS August 2013

**Local Flooding:** The City experiences local flooding during larger storm events. The Belleview/Ogle and Riverside neighborhoods have the most significant drainage problems. The City recently made application for a Community Development Block Grant (CDBG) for a drainage/hydraulics study of the Belleview/Ogle and Riverside neighborhoods.



Subdivisions and new development subject to the California Environmental Quality Act (CEQA) are required to submit drainage/hydraulics reports when deemed necessary. In addition, pursuant to Section 17.30.180(12)(a)(iii) of the Rio Dell Municipal Code (RDMC) multifamily, commercial and industrial ministerial projects are required to incorporate Low Intensity Development (LID) techniques including on-site retention, detention of stormwater runoff.

The current General Plan contains a number of policies and implementation measures regarding flooding and drainage issues. Below is a copy of the existing policies and implementation measures. Again, many of the recommended policies and implementation measures are also addressed in the Open Space and Conservation Element and the Safety Element.

### **Hydrology and Water Resources Policies**

- Update the Conservation and Safety Element to include the most current information regarding flood and drainage conditions.
- Identify improvements that can be made to municipal drainage facilities so they can better convey runoff and minimize flood impacts.
- Require new development projects to incorporate on-site drainage features such as retention and infiltration systems to reduce runoff and maximize infiltration.
- Use a combination of incentives, educational programs, and ongoing system audits to promote water conservation.

### **Hydrology and Water Resources Implementation Measures**

- The City shall prepare and adopt a Conservation and Safety Element of the General Plan to expand hydrologic information and develop specific implementation measures.
- The City shall utilize the County's GIS data on stream and drainage channels and identified flood plains and make available to the public large-scale hazard maps.
- The City shall pursue funding for a detailed study of the conditions of the municipal drainage system. The study should include an assessment of drainage improvements required for build-out of this General Plan.
- The City shall require Drainage Plans for proposed development to show on-site retention or improvements to the municipal drainage system.

### **Goal S 6.4-1**

Minimize risks to life and property due to flooding hazards.

### **Policy S 6.4-1.a**

Continue to utilize all available data on flooding hazards and related risks from the appropriate agencies.

**Implementation S 6.4-1.a.** Utilize Flood Insurance Rate Maps to identify those areas subject to flooding.

Responsibility: Community Development Department

Timeframe: Ongoing

Resources: Flood maps.

**Policy S 6.4-1.b**

Coordinate flood hazard analysis and management activities with the Army Corps of Engineers, Federal Emergency Management Agency (FEMA) and other responsible agencies. Request changes in FEMA maps where appropriate to reflect new data or analyses.

**Implementation S 6.4-1.b.** Review flood elevation information provided by project proponents and when appropriate request changes in the FEMA maps.

Responsibility: Community Development Department, Army Corps of Engineers, City Engineer.

Timeframe: Ongoing

Resources: Project proponents and General Fund.

**Policy S 6.4-1.c**

Continue to utilize all available data on dam failure inundation and related risks from the appropriate agencies.

**Implementation S 6.4-1.c.** Utilize Dam Failure Inundation Maps to identify those areas subject to flooding as a result of the potential failure of the Scott Dam on the Eel River.

Responsibility: Community Development Department

Timeframe: Ongoing

Resources: Dam Failure Inundation maps.

**Goal S 6.4-2**

Minimize drainage impacts associated with new development.

**Policy S 6.4-2**

Require project proponents to incorporate Low Intensity Development (LID) techniques including on-site retention and detention of stormwater runoff.

**Implementation S 6.4-2.a.** Review projects and require hydraulics/drainage studies where deemed appropriate.

Responsibility: Community Development Department, Public Works Department and City Engineer.

Timeframe: Ongoing

Resources: Project proponents.

## 6.5 Fire Hazards

The safety element must identify urban and rural-residential areas that are prone to wildland fire hazards. Fire hazards fall into two general categories: wildland fires, which emanate from forest, grassland, or coastal scrub; and structural fires, which damage homes and workplaces. Both bring risk of spreading to other areas. In general, structural fire protection is the responsibility of local agencies, such as fire protection districts and volunteer fire companies; wildland fire protection is the responsibility of federal and state agencies.



The Rio Dell Fire Protection District was originally formed on January 12th, 1941 under the name of “Wildwood” Fire Protection District. The name was officially changed to the Rio Dell Fire Protection District on December 19th, 1961. The district operates with a five member commission of elected officials.



The Rio Dell Fire Protection District, in conjunction with the Rio Dell Volunteer Fire Department (RDVFD), serves the City of Rio Dell and surrounding areas of Monument Rd, and Blueslide Rd. Under the direction of the Fire Chief, they consist of two assistant chiefs and three fire companies. Rio Dell Fire responds to an average of 350 calls per year, including fires, vehicle accidents, and medical aid calls. The RDVFD is known to be the most active all volunteer fire department in Humboldt County.

The Sawmill Annexation area north of the Eel River is within the Fortuna Fire Protection District. Fortuna's Fire Department is operated totally by volunteers with the exception of the Fire Chief.

The Fire Protection District provides the Department with six fire engines, a 100' aerial, a 55' ladder truck, 2 water tenders, 1 light duty rescue truck, 1 medium duty rescue truck and three command vehicles.

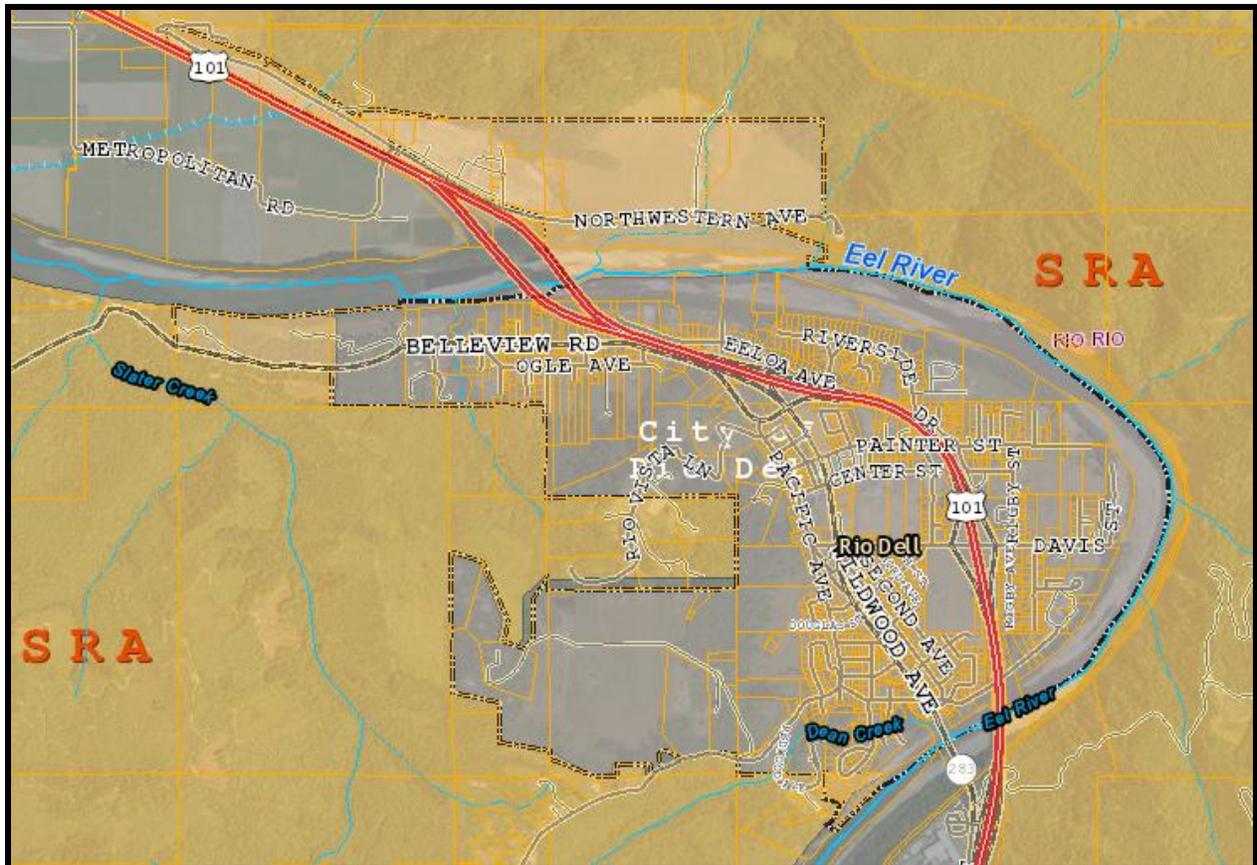
A Board of Commissioners governs the Fire District. A Fire Chief and two Assistant Chiefs direct Department operations. The Department works closely with the Rio Dell Volunteer Fire Department.

The active powers of the RDVFD include structural fire protection and suppression, rescue, and emergency medical services. The RDVFD states that it can respond to all calls within the City limits within three minutes. The maximum response time to incident calls within the Rio Dell Plan Area is between five and seven minutes. On average, 7 firefighters are available to respond to calls during the day time. Most of the houses within the City limits are located within 1,000 feet of a fire hydrant.

While the RDVFD is responsible for structural fire protection and emergency medical responses, CDF retains responsibility for grass and forest fires. The RDVFD has joint responsibility for grass and forest fires within the District through a mutual aid agreement with the California Department of Forestry and Fire Protection (CAL FIRE). The RDVFD also has mutual aid agreement with the Fortuna Fire Protection District. Mutual aid agreements allow the districts to enter into agreements for services, including emergencies which have the potential to overwhelm the resource capabilities within a single district. This enables the RDVFD to maintain preparedness for a disaster beyond their capacity, without the need to expand and create an additional facility.

The State Board of Forestry has adopted the *California Fire Plan*, which describes the environment at risk for fire and the state's activities to reduce that risk. It has also adopted fire safe regulations for counties with State Responsibility Areas (SRAs) as a means of reducing pre-fire fuel loads (Title 14, § 1270, et seq., California Code of Regulations). Although most of these regulations are too specific and regulatory in nature to include in a general plan, they offer useful ideas for local policies and can be adapted into local fire safe ordinances and regulations outside of SRAs. The statewide fire safe regulations include:

- ◆ Road standards, including width, surface, and grade, for emergency access and evacuation.
- ◆ Standards for signs identifying streets, roads, and buildings.
- ◆ Minimum water supply reserves for emergency fire use.
- ◆ Fuel breaks (i.e., defensible space) around structures and greenbelts around new subdivisions.



**Figure 6-4 100 State Responsibility Areas**

Source: Humboldt County GIS September 2016

### **Goal S 6.5-1**

Minimize risks to life and property due to fire hazards.

### **Policy S 6.5-1**

Development designed to reduce the risk of structural and wildland fires supported by fire protection services that minimize the potential for loss of life, property, and natural resources.

**Implementation S 6.5-1.a.** Review projects and require appropriate access, defensible space access to emergency water supplies, including flows and locations of fire hydrants

Responsibility: Community Development Department, Public Works Department and City Engineer.

Timeframe: Ongoing

Resources: Project proponents.

**Implementation S 6.5-1.b.** The City shall plan collaboratively with the RDVFD, Fortuna's Fire Department, the County and CAL FIRE, on fire prevention and response strategies. Implementation shall be coordinated to maximize efficiency and ensure efforts are complimentary.

## **6.6 Airport Safety**

The closest airport to the City is the Rohnerville Airport located in Fortuna. The County Public Works Department operates six county airports: California Redwood Coast-Humboldt County Airport in McKinleyville, Murray Field, Dinsmore Airport, Garberville Airport, Kneeland Airport and Rohnerville Airport. The Board of Supervisors has adopted Airport Master Plans for each of the County maintained airports. In addition, the Board of Supervisors adopted the Airport Land Use Compatibility Plan, which outlines policies for land uses surrounding the airports. The City of Rio Dell is not affected by the Rohnerville Airport Land Use Compatibility Plan.