PLAN RC

Natural Hazards

Existing Conditions Report

May 2020

CITY OF RANCHO CUCAMONGA GENERAL PLAN

RANCHO CUCAMONGA

Summary

To better guide the development of Rancho Cucamonga's General Plan update strategy, which identifies the potential hazards and strategies to protect and enhance the safety of residents and businesses throughout Rancho Cucamonga, this chapter identifies the various natural hazards that may impact the City. It further identifies potential issues and opportunities to consider within the City's Safety Element update.

Key Findings

Provided below are the key findings from this report:

- Seismic hazards (earthquakes) have the greatest potential to cause loss and damage within the City.
- While wildfire hazards are generally limited to areas of the City north of Interstate 210, they have the potential to cause significant harm to residents in this part of the City and cause challenges associated with fire response and evacuation.
- During wildfire events, there is the potential for other parts of the City to be impacted by limited resources, poor air quality, and increased response times for services, which could affect all residents.
- A recent update to California Government Code Section 65302(g) requires a review of evacuation routes and identification of developments with less than two routes, or routes that have issues with capacity, safety, or viability.
- Flooding hazards in the City have been managed effectively over the years; there is minimal exposure to 100-year flood zone impacts.
- Severe weather impacts are anticipated to increase in the future as these conditions become exacerbated by changing climatic conditions.
- Future development should focus on areas of reduced hazard threat, which will ensure residents and businesses are operating in safer and more resilient locations.

Natural Hazards

Rancho Cucamonga is located in an area of southern California that is prone to a variety of hazards due to it's proximity to the steep mountainous terrain of the San Gabriel Mountains.

Introduction

The city of Rancho Cucamonga is located in the western portion of San Bernardino County, just south of the San Bernardino National Forest. As a foothill community situated along the base of the San Gabriel Mountains, the City is prone to the effects of natural hazards related to seismic activity, flooding, wildfire, and geologic hazards. Additionally, as an inland community, the City is susceptible to hazards associated with severe weather such as extreme heat, drought, and wind. Many of these hazards have affected the community previously; the City should anticipate impacts will continue and will possibly change in the future as a result of new and changing conditions.

Regulatory Environment

California Government Code Section 65302 (g) identifies the statutory requirements that govern the preparation of a General Plan Safety Element. This section of the Government Code has been modified several times to respond to the changing issues and priorities of the State since its original adoption. For additional detail regarding the statutory requirements governing General Plan Safety Elements, please refer to Appendix A of this report.

Basic Element Requirements

Government Code Section 65302 (g) 1 requires the Safety Element to address the protection of the community from any unreasonable risks associated with the effects of the following hazards:

- Seismically induced surface rupture
- Ground shaking
- Ground failure
- Slope instability leading to mudslides and landslides
- Tsunami
- Seiche
- Dam Failure
- Flooding
- Subsidence
- Liquefaction
- Other geologic hazards
- Wildland and Urban Fires

In addition, Safety Elements are required to address these non-hazard specific issues, as they apply to the City:

Peakload Water Supply Requirements	Evacuation Routes	Military Installations	Minimum Road Widths and Clearances Around Structures

Recent Bill Changes

Changes by the California Legislature have recently been made and will require the following topics be addressed in the Safety Element:

Evacuation Concerns (AB 747 and SB 99)

SB 99—California Government Code Section 65302 (g) 5—requires the identification of developments in any hazard area that do not have two evacuation routes. Also, AB 747 —California Government Code Section 65302.15— further requires that Safety Elements shall be reviewed and updated as necessary to identify the capacity, safety, and viability of evacuation routes under a range of emergency scenarios within the jurisdiction. While this requirement identifies the Safety Element, there is the potential this analysis may overlap with the Circulation Element and will require coordination to reduce any potential conflicts.

Climate Change Concerns (SB 379)

SB 379 —California Government Code Section 65302 (g) 4— requires that the Safety Element be reviewed and updated, as necessary, to address climate adaptation and resiliency. This review occurs in conjunction with the preparation of a vulnerability assessment or with reliance on a Local Hazard Mitigation Plan (LHMP), which addresses climate adaptation risks and vulnerabilities. Compliance with this requirement will rely on the integration of the Greenhouse Gas Emissions and Climate Change Vulnerability Assessment, Sustainable Community Action Plan, and an LHMP. Reliance on these documents ensures compliance and leveraging of these plans, effectively allowing for comprehensive implementation of future projects and programs that support addressing the effects of climate change.

Plan Integration (AB 2140)

AB 2140 —California Government Code Section 65302.6— recommends the integration of the LHMP into the General Plan Safety Element. Upon completion of this voluntary requirement, the City would be eligible for potential cost savings during future disaster/emergency events where the California Disaster Assistance Act requirements are activated. Preparation of the LHMP and General Plan Safety Element anticipates compliance with this requirement.

State Regulations

Alquist-Priolo Earthquake Fault Zoning Act

The intention of the Alquist-Priolo Earthquake Fault Zoning Act (1972)—California Public Resources Code (PRC), Chapter 7.5, Section 2621-2699.6—is to reduce the risks associated with surface faults. It requires the designated State Geologist to identify and map “Earthquake Fault Zones” around known active faults. Per PRC Section 2623, before the approval of a project, cities and counties shall require a geologic report defining and delineating any hazard of surface fault rupture. If a city or county finds that no undue hazard of that kind exists, the State Geologist may waive the report. For a list of project types, please refer to PRC Section 2621.6.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act —California Public Resources Code, Chapter 7.8, Section 2690-2699.6— created a statewide seismic hazard mapping and technical advisory program in 1990 to help cities and counties address the effects of geologic and seismic hazards caused by earthquakes. Per PRC 2697, cities and counties shall require, before the approval of a project located in a seismic hazard zone, a geotechnical report defining and delineating any seismic hazard. If a city or county finds that no undue risk of this kind exists, based on information resulting from studies conducted on sites near the project and of similar soil composition to the project site, the geotechnical report may

be waived. After report approval or a waiver granted, subsequent geotechnical reports shall not be required, provided that new geologic datum, or data, warranting further investigation is not recorded. Each city and county shall submit one copy of each approved geotechnical report, including the mitigation measures, if any, and are delivered to the State Geologist within 30 days of report approval. For a list of project types, please refer to PRC Section 2693.

Section 1 - Hazards of Concern

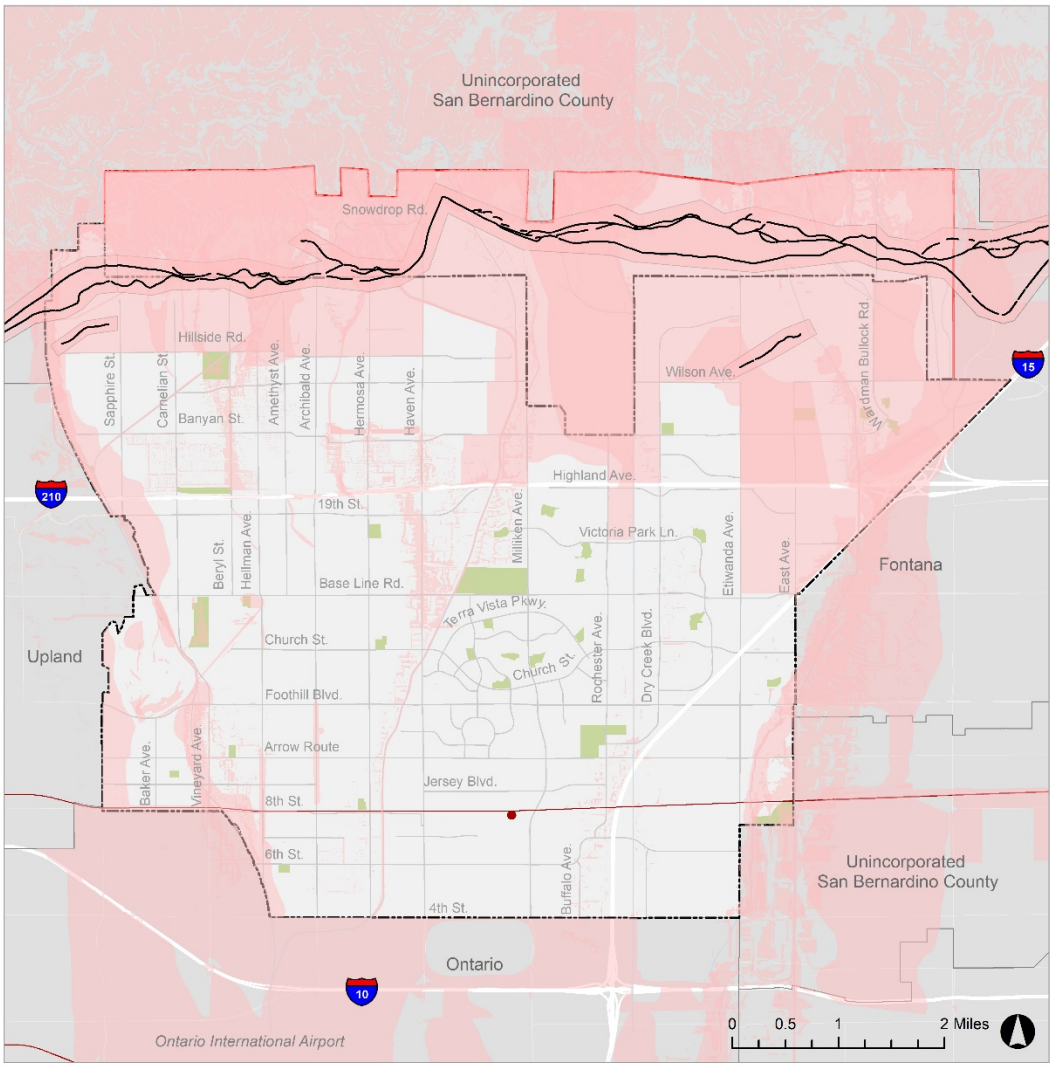
Hazards of Concern Discussion

The Safety Element is the primary location for the city of Rancho Cucamonga to address natural hazard issues within and nearby the community. The California Government Code identifies the minimum requirements of this element based on the location and setting of the City, and addresses the following hazards:

- Seismic Hazards
- Flooding
- Wildfire
- Other Geologic Hazards
- Severe Weather

Figure 1 helps to understand the interaction of these various hazards better. This figure maps the different hazard layers available from local, regional, state, and federal sources. By overlaying individual hazard layers, the map highlights darker areas (where multiple hazards overlap) and lighter areas, where few hazards are identified. Based on this map, it is evident which areas of the City should be the primary focus for new development versus those areas where a significant amount of risk is prevalent. In these riskier areas, development should be modified to reduce future impacts or relocated to more suitable areas.

Figure 1. Rancho Cucamonga Hazard Overlay Compilation



Raimi + Associates, 2020 | Sources: City of Rancho Cucamonga, 2020; SCAG, 2020; County of San Bernardino, 2020. California Geological Survey, 2020; Cal FIRE, 2007; California Department of Water Resources, 2020; Federal Emergency Management Agency, 2020

Fault Traces

Hazard Layers Compiled Include:
- Special Study Fault Zones
- Dam Inundation Areas
- FEMA Flood Zones
- Landslide Hazard Zones
- Liquefaction Hazard Zones
- Wildfire Hazard Zones

Rancho Cucamonga City Limits
Sphere of Influence
Adjacent City Limits
Parks
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Metrolink Station
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Seismic Hazards

Rancho Cucamonga is located in a seismically active region of southern California. Surrounded by active earthquake faults of varying size and significance, the City is prone to seismic hazards (earthquakes). Typically seismic shaking and fault rupture are deemed primary hazards as they occur as a result of an earthquake. Liquefaction and earthquake-induced landslides are considered secondary hazards since an earthquake event often triggers them. Often, earthquakes can trigger other effects such as building damage/collapse, infrastructure failure, pipeline breakage, and damage to transportation and communication facilities. The size of the earthquake and distance from the epicenter typically determine the severity of these events.

Primary Seismic Hazards

Primary Seismic Hazards are the direct result of an earthquake. These hazards usually occur in the form of moderate to strong seismic shaking, as well as fault rupture directly resulting from the seismic event.

Seismic Shaking

Seismic shaking (ground shaking) is the term that refers to the movement of the earth's surface resulting from an earthquake. This shaking is typically the primary cause of damage in earthquakes, which generally correlates to the magnitude of the earthquake and proximity to the event's epicenter.

Typically, the Modified Mercalli Intensity (MMI) scale measures the intensity of seismic shaking, based on the amount of observed damage. The MMI scale replaced the Richter Scale, which loses its effectiveness when measuring stronger earthquakes. Since the degree of shaking, and consequently damage, generally decreases as the seismic energy travels further away from the fault rupture's point of origin, different sections of a city or region can report different MMI measurements in different locations. The MMI scale (Table 1) uses Roman numerals on a 12-point scale to measure each degree of shaking intensity.

The City is located near a variety of active faults in southern California. The closest faults include the Etiwanda Avenue Fault and Cucamonga Fault, both located within the City and Sphere of Influence(SOI). While these faults are considered active and have the potential to generate earthquakes, the probability of producing a significant event is low. According to the Third Uniform California Earthquake Rupture Forecast, depicted in Figure 2, the Cucamonga Fault has an approximately 1.5% chance of generating an M6.7 earthquake in the next 30 years. In contrast, located within 8 to 12 miles of the City are two of the most active faults in Southern California (San Jacinto and San Andreas). They have a probability between 4% and 20%, respectively, of rupturing over the same time frame.

Seismic shaking associated with an earthquake has the most significant potential to result in loss of life along with property and economic damage within the City. To better estimate the potential impacts associated with an extreme seismic event, a HazUS estimate was prepared for the City as part of the San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan update. Based on the results of this analysis (Table 2), the city of Rancho Cucamonga can anticipate estimated losses of approximately $5.2 billion, resulting from a significant earthquake along the San Andreas Fault.

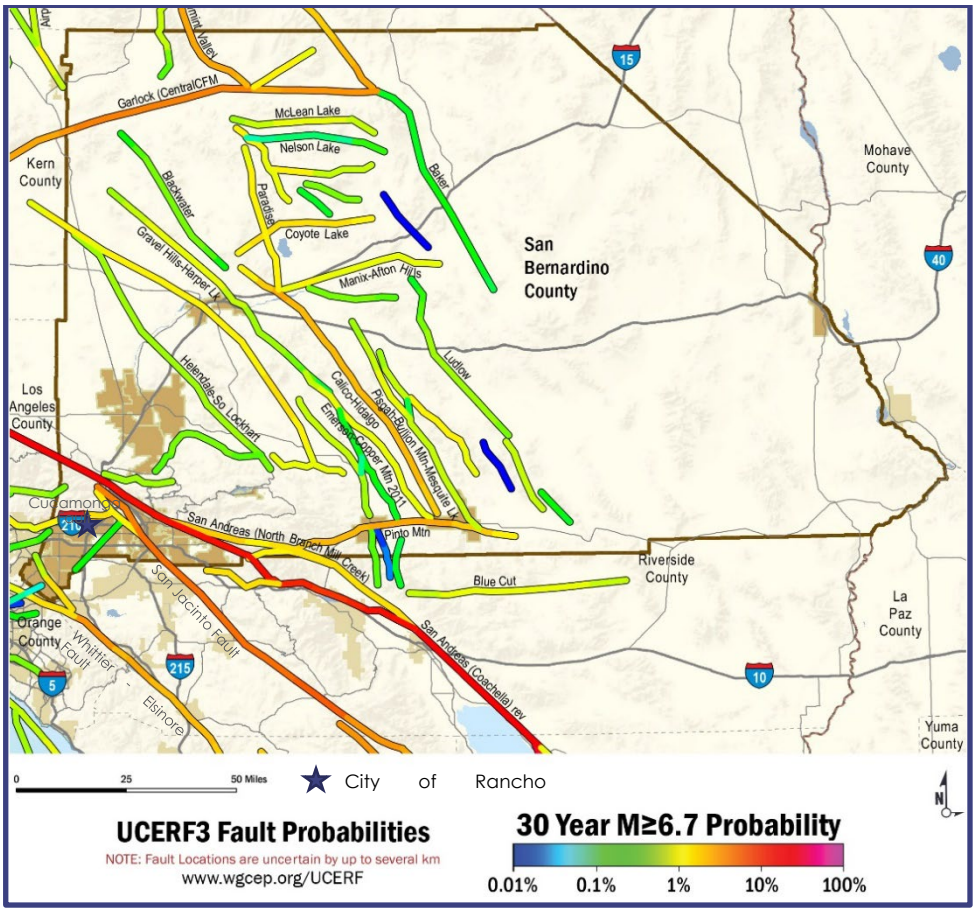
Table 1. Modified Mercalli Scale

Intensity	Description	Effects Observed
I	Instrumental	Felt only by a few people, under especially favorable conditions.
II	Feeble	Felt only by a few people at rest, especially on the upper floors of buildings.
III	Slight	Noticeable by people indoors, especially on upper floors, but not always recognized as an earthquake.
IV	Moderate	Felt by many indoors, and by some outdoors. Sleeping people may be awakened. Dishes, windows, and doors are disturbed.
V	Slightly strong	Felt by nearly everyone, and many sleeping people are awakened. Some dishes and windows broken, and unstable objects overturned.
VI	Strong	Felt by everyone. Some heavy furniture is moved, and there is slight damage.
VII	Very strong	Negligible damage in well-built buildings, slight to moderate damage in ordinary buildings, and considerable damage in poorly built structures.
VIII	Destructive	Slight damage in well-built buildings, considerable damage and partial collapse in ordinary buildings, and great damage in poorly built structures.
IX	Ruinous	Considerable damage in specially designed structures. Significant damage and partial collapse in substantial buildings, and buildings are shifted off foundations.
X	Disastrous	Most foundations and buildings with masonry or frames are destroyed, along with some well-built wood structures. Rail lines are bent.
XI	Very disastrous	Most or all masonry structures are destroyed, along with bridges. Rail lines are substantially bent.
XII	Catastrophic	Damage is total. The lines of sight are distorted, and objects are thrown into the air.

Additionally, Figure 3 identifies the faults located within the City and vicinity, as well as the potential intensity of seismic shaking, resulting from a massive earthquake along the San Andreas Fault. The data mapped is measured in relationship to the force of Earth's gravity (g) or percent g. Percent g is computed by determining the acceleration of the earthquake's motion relative to the force of gravity, which is 1.0g. Based on this, parts of the City are expected to experience shaking intensity ranging from .65g (65%) to 1.55g (155%). Factors that impact the intensity of shaking include the types of earth materials (soil, rock, etc.), degree of consolidation (loose, compact, etc.), and proximity to the source of the earthquake. Areas in the northeastern portion of the City (closest to the San Andreas and San Jacinto Faults) will likely experience the highest degrees of shaking.

- Proximity to the Cucamonga Fault Zone could subject the City to significant seismic shaking; however, the likelihood of a strong earthquake is relatively low.
- The probability of a significant seismic event is higher along the San Jacinto and San Andreas Fault zones, which are some of the most active faults in Southern California.
- Damage associated with a significant earthquake will likely have the greatest impact on the community, with estimated losses exceeding $5 billion.

Figure 2. Major Active Faults within San Bernardino County



Source: San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan, July 13, 2017

Table 2. HazUS Earthquake Damage Estimate

Building Type	Total Value	Total Loss Estimation (% of Total Value)	Total Estimated Loss
Agricultural	$120,868,000	15.8%	$19,137,000
Commercial	$8,306,428,000	20.9%	$1,733,335,000
Educational	$316,191,000	14.8%	$46,745,000
Government	$112,050,000	15.8%	$17,695,000
Industrial	$3,882,509,000	20.6%	$800,729,000
Religious	$408,060,000	18.3%	$74,692,000
Residential	$32,521,315,000	8.0%	$2,601,189,000
Grand Total	**$45,667,421,000**	**11.6%**	**$5,293,523,000**

Source: San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan, July 13, 2017

Fault Rupture

Fault Rupture occurs when the earth's surface shifts and cracks along a fault line during a seismic event. While this phenomenon is not especially dangerous in natural environments, issues arise when structures are built near or on top of an active fault. Per the California Geologic Survey (CGS), an active fault is one that has experienced surface movement in the past 11,700 years.

CGS Special Study Zones

Based on this definition, the CGS has identified special study zones (AP Zones) under the Alquist-Priolo Earthquake Fault Zone Act that require additional investigation before the construction of habitable structures or critical facilities.

Figure 4 identifies the CGS designated AP Zones, which encompass the following faults:

- Cucamonga Fault: an east-west trending thrust fault that separates the basement rock of the San Gabriel Mountains from the alluvial fan deposits at the base of the mountain range. This fault, located within a special study zone, is believed to generate M6.0-7.0 earthquakes and could impact the City if a major earthquake were to occur. The majority of this fault zone is located within the City's SOI.
- Etiwanda Avenue Fault: a northeast-southwest trending thrust fault found in the northern portion of the City. This fault is delineated within a special study zone and thought to be active; however, its slip rate and rupture interval is currently unknown. This fault is believed to be the northern segment of the Red Hill-Etiwanda Avenue Fault.

Rancho Cucamonga Special Study Zone

In addition to the AP Zones identified, the City has established its own special study zone for the Red Hill – Etiwanda Avenue Fault. The southern section of the fault is located at the base of Red Hill, which is better defined and located by changes in subsurface geology and groundwater elevations in the area as mapped by the California Department of Water Resources. As the fault moves northeast, the theory is that a central segment connects the Red Hill segment to the Etiwanda Avenue Fault (discussed above); however, previous studies have not located this segment.

Given the uncertainty of the fault location and lack of understanding regarding its potential activity, the City identified this zone for the southern and central segments to gather evidence of any connection between the Red Hill Fault and the Etiwanda Avenue Fault. As of 2018, a Geologic Fault Investigation, prepared by RMA for the City's Proposed Public Safety Facility, found no conclusive evidence of an active fault crossing the site, which is located in the vicinity of the central segment of the Red Hill Fault.

Table 3 identifies the characteristics of the properties located within the mapped AP Zones. Based on this information, it is estimated that approximately 4,018 acres of property within the City and SOI is situated in an AP Zone. Of the nearly 600 parcels within these areas, about 61% contain single-family residences, while nearly 26% are vacant. In total, the properties within the AP Zones are valued at nearly $325 million, which could be at risk if fault rupture impacts them.

Secondary Seismic Hazards

Secondary Seismic Hazards include those that involve the interaction/reaction of earth materials to a seismic event. In 1990, the Seismic Hazards Mapping Act went into effect, which identifies and maps potential hazard conditions, typically including liquefaction and earthquake-induced landslides.

Table 3 – Fault Rupture Risks

Parcels Located in AP Zones	Parcels	Acreage
Total	592	4,081.2
Vacant Uses	*153*	*2,854.1*
Single Family Residential	*363*	*902.6*
Other Uses (Commercial, Religious, Infrastructure)	*76*	*324.5*
Property Values		
Average	$ 530,114	
Maximum	$ 9,741,968	
Total	$ 324,429,645	
Source: City of Rancho Cucamonga Assessor Parcel Database, 2019		

Liquefaction

Liquefaction is a ground failure phenomenon that occurs as a result of a seismic event. Ground failure typically occurs when the following occur:

- Loose unconsolidated granular soils
- Shallow groundwater conditions
- Strong seismic shaking

When all three of these conditions are met, and liquefaction occurs, soils experience a total or substantial loss of shear strength and behave like a liquid. Figure 5 identifies Secondary Seismic Hazards within the City, which indicates minor locations of liquefaction potential in the vicinity of Hellman Avenue and Baseline Road, and west of Vineyard Avenue, south of Baseline Road. These locations were identified due to the presence of shallow groundwater (less than 50 feet from the ground surface) and will require additional analysis associated with new development.

In terms of risk, approximately 166 acres are located within these liquefaction hazard zones, with a majority of it dedicated to residential use. Table 4 identifies property values of nearly $55 million in this hazard zone, which could be at risk should liquefaction occur.

- Within the City, areas of liquefaction potential are limited. A review of future developmental proposals within the vicinity of these locations should verify that groundwater elevations are deeper than 50 feet per CGS requirements for liquefaction analysis.

Earthquake Induced Landslides

Ground failure resulting from an earthquake can also occur in the form of an Earthquake-Induced Landslide. These failures typically happen in areas with steep slopes or unstable soil conditions. Usually, post-wildfire conditions and intense precipitation can further exacerbate these unstable hillside conditions, contributing to greater landslide vulnerability. Landslides can impact structures, sever utility lines, block roadways, and impact people and properties in the path of the failure. Figure 4 identifies the Secondary Seismic Hazards associated with Earthquake Induced Landslide, which requires evaluation of the stability of hill slopes.

Table 4 also identifies the properties located within the earthquake-induced landslide zone. Approximately 3,704 acres of land are located within this zone, which is isolated from the steep topography within the City's SOI. Of these properties, approximately 73% are vacant parcels, and approximately 14% contain single-family residences, which is expected, given the steep nature of the terrain in this area. Total estimated property values within the zone are approximately $64 million, which could be affected by this hazard.

- Earthquake Induced Landslide hazards are isolated to the City's SOI, which primarily consists of vacant parcels. Limiting development in these areas would reduce future impacts associated with slope instability.
- The establishment of a transfer of development rights program would assist in reducing development pressure in risky areas of the City, like the Earthquake Induced Landslide areas.

Table 4 – Secondary Seismic Hazard Risks

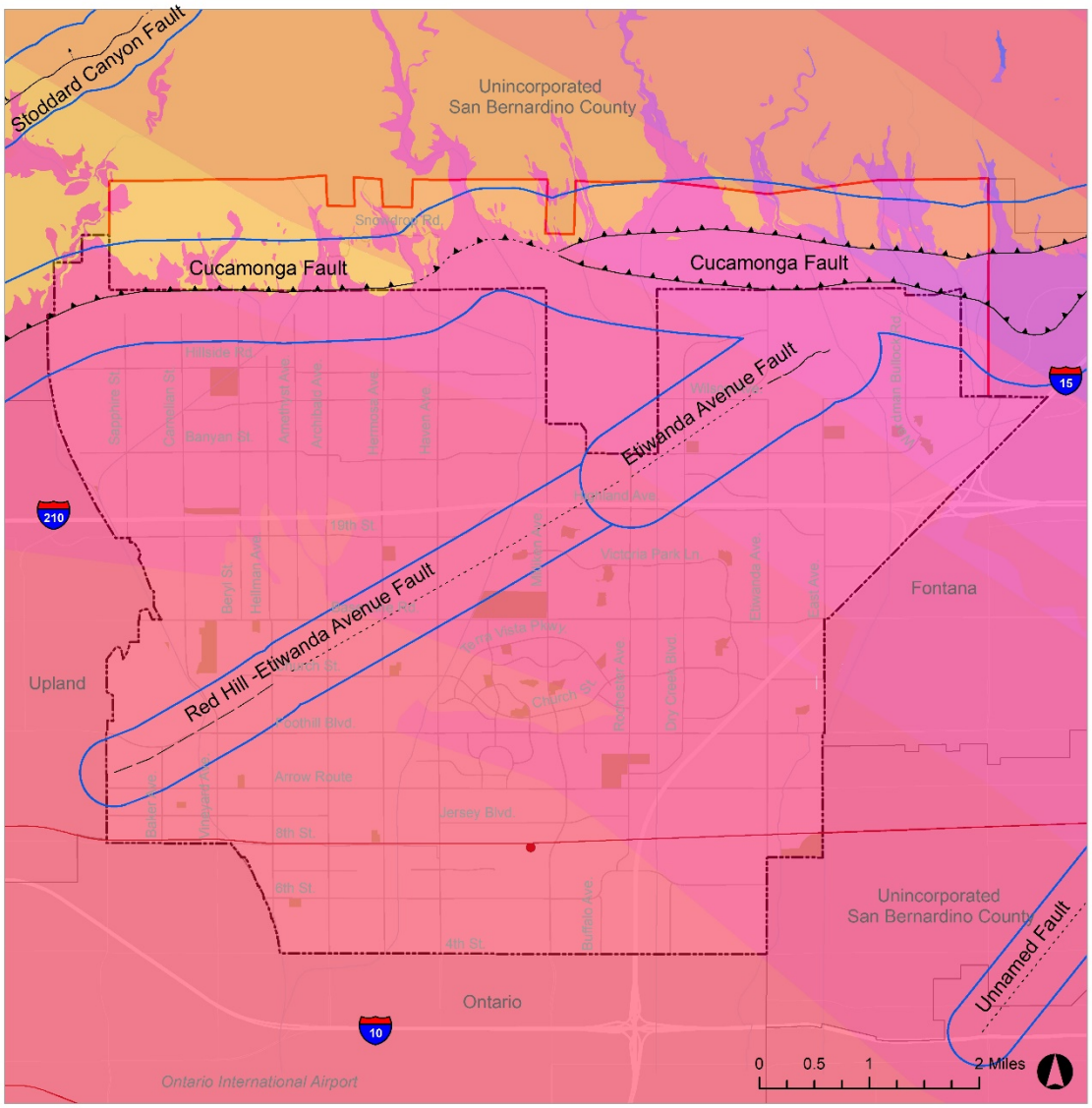
Parcels within Secondary Seismic Hazard Zones	Liquefaction	EQ Landslide
Total Acres	166.7	3703.6
Total Parcels	125	162
Vacant Parcels	*5*	*118 (10 units)*
Single Family Residential Parcels	*91 (139 units)*	*22(22 units)*
Other Parcels	*29*	*22*
Average Property Value	$438,657	$393,621
Maximum Property Value	$4,794,000	$3,118,609
Total Property Value	$54,832,141	$63,766,582
Source: City of Rancho Cucamonga Assessor Parcel Database, 2019		

Settlement

Seismic settlement can occur as a result of an earthquake. Typically the amount of settlement that occurs is based on the intensity and duration of ground shaking and the relative density of the subsurface soils. Most soils are susceptible to some degree of seismic settlement, and much of the soil underlying the City is alluvial and could settle as a result of an earthquake. However, most damage from an earthquake is associated with differential settlement, which is a phenomenon associated with two different earth materials settling at two different rates. This type of settlement typically occurs slowly and isn't considered dangerous to building occupants. However, over time it can cause significant damage to buildings.

- If differential settlement occurs within the City, it is anticipated to be located in areas where un-engineered fill or areas where loose soils occur, which have not been identified at the city-scale.
- Mapping of areas of potential settlement is not currently available; however, this information is typically identified during investigation within site-specific developments.

Figure 3.Seismic Shaking Potential



Raimi + Associates, 2020 | Sources: City of Rancho Cucamonga, 2020; SCAG, 2020; County of San Bernardino, 2020; California Geological Survey, 2020.

Fault (Location Certain)
Fault (Approximate Location)
Fault (Location Concealed)
Thrust Fault (Location Certain)
Thrust Fault (Approximate Location)

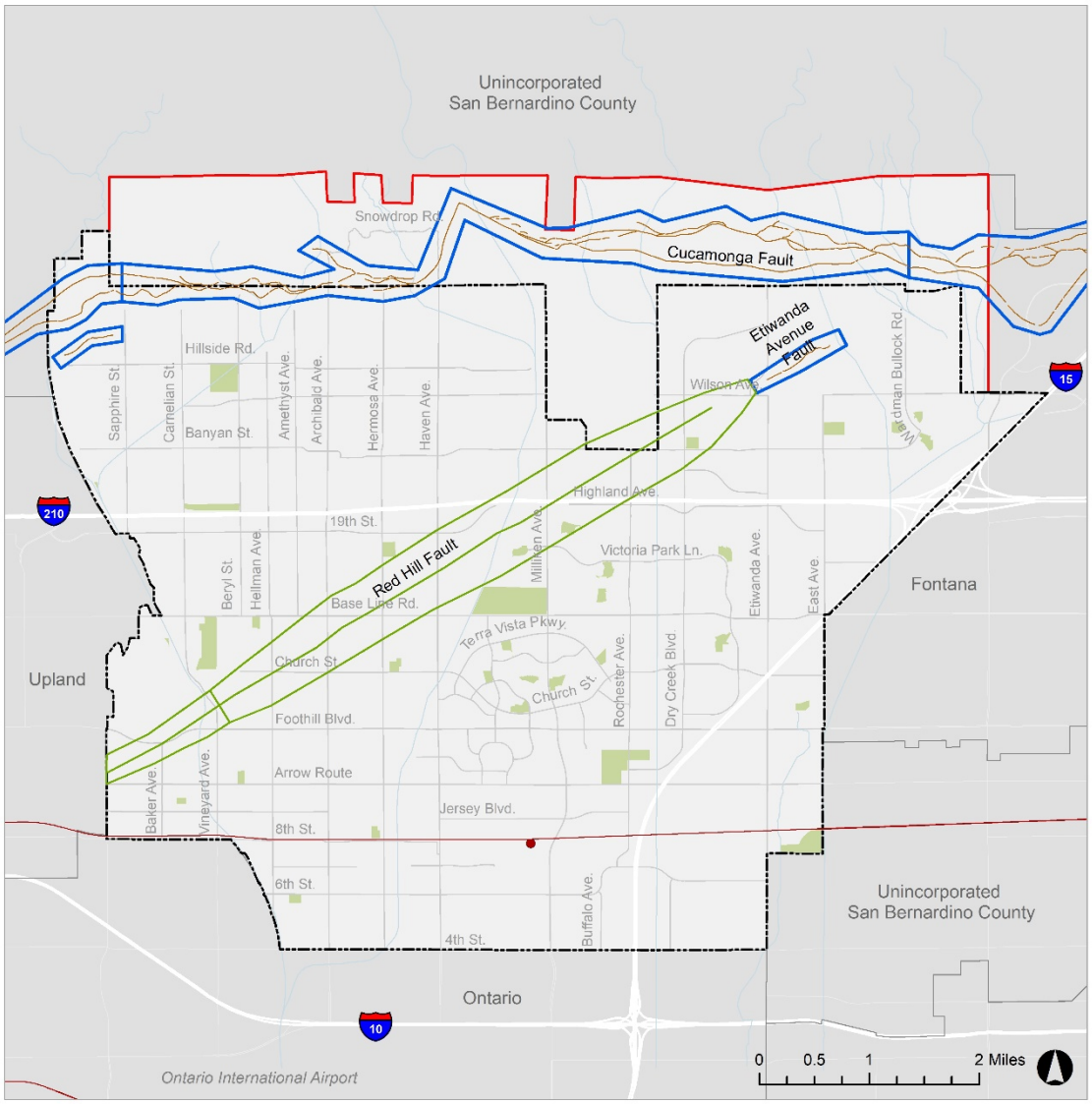
Seismic Shaking Potential (%g)

0.65	1.15
0.75	1.25
0.85	1.35
0.95	1.45
1.05	1.55

Fault Buffer Zones (Non-Regulatory)

Rancho Cucamonga City Limits
Sphere of Influence
Adjacent City Limits
Parks
Waterways
Metrolink Station
Metrolink

Figure 4 – Alquist Priolo Special Study Zones



Raimi + Associates, 2020 | Sources: City of Rancho Cucamonga, 2020; SCAG, 2020; County of San Bernardino, 2020; California Geological Survey Alquist-Priolo Fault Hazard Zones, 2020.

Alquist Priolo Faults
Alquist-Priolo Special Study Zone
Red Hill Fault
Red Hill Fault Special Study Zone

Rancho Cucamonga City Limits
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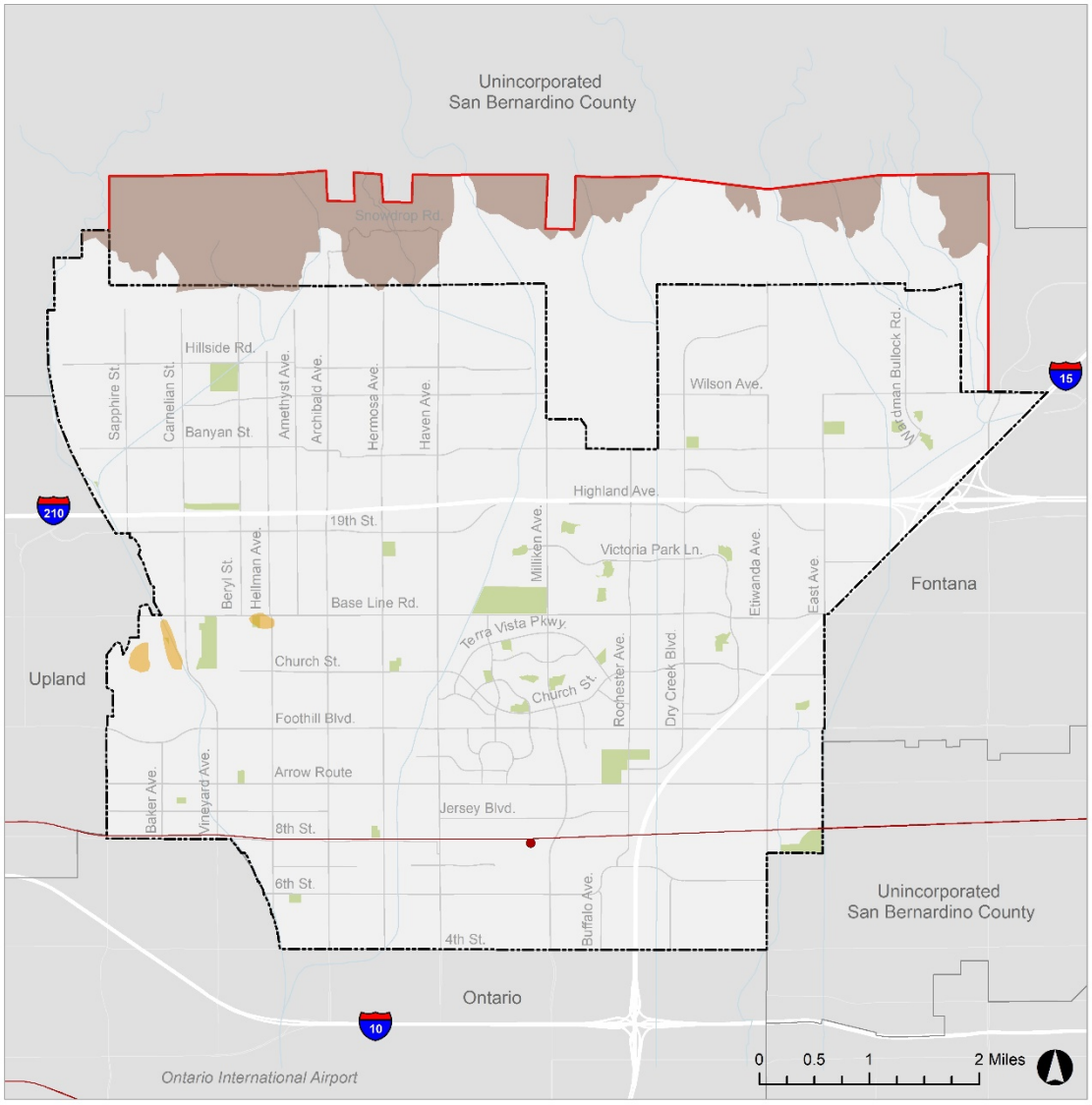
Figure 5 – Secondary Seismic Hazards



Raimi + Associates, 2020 | Sources: City of Rancho Cucamonga, 2020; SCAG, 2020; County of San Bernardino, 2020; California Geological Survey Seismic Hazards Mapping Program, 2020.

Earthquake-Induced Landslide Hazard Zone

Liquefaction Hazard Zone

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Flooding

Located at the base of the San Gabriel Mountains, the city of Rancho Cucamonga has a long history of flooding. Since it's incorporation, the City has worked with San Bernardino County on flood management and mitigation projects. In addition, the City takes steps on an annual basis to maintain and prepare for flood events ensuring the existing infrastructure can convey floodwaters effectively. Flood hazards within the City can occur either as the result of large storms and flash flooding that overwhelms infrastructure or the failure of flood control facilities that inundate downstream communities.

FEMA Floodplains

Since Rancho Cucamonga is vulnerable to flooding during the winter storm season, the City is an active participant in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP). Through this program, "Special Flood Hazard Areas" within the City are identified and mapped on Flood Insurance Rate Maps (FIRMs), which identify the areas that require flood insurance. FIRMs generally describe flooding in terms of a 100- or 500-year flood event, which translates into the probability (1.0% or 0.2%, respectively) that flooding could occur within the designated zone in any given year. In addition to the federal requirements within the NFIP, the City has also adopted flood protection standards requiring minimum building elevation, flood-proofing, and anchoring of buildings in areas identified as prone to flooding. Figure 5 identifies the FEMA Flood Hazard Zones identified within the City.

While these flood hazard zones cover approximately 3,857 acres of the City, other areas within the City may experience flooding during a heavy precipitation event. Table 5 identifies over 4,500 improved parcels (developed parcels with residential, commercial, industrial, or institutional uses) located within flood hazard zones, as mapped in Figure 6. A majority of these parcels are located within a 500-year flood hazard zone, which accounts for approximately $1.49 billion in total exposure. This accounts for approximately 77% of the total exposure of $1.9 billion in potential property losses resulting from flooding. While this estimate is significant, there is still some uncertainty involved, since changing precipitation conditions can cause flooding in areas that haven't experienced these conditions in the past. For additional discussion regarding future flooding implications associated with changing climatic conditions, please refer to the Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report.

Table 5 – Flood Hazard Risks

Flood Hazard Zone	Improved Parcel Count (Percentage) *	Acreage	Total Exposure
100-Year Flood	310 (6.7%)	871.2	$174,652,000
500-Year Flood	3,450 (75.4%)	2,338.4	$1,488,227,000
500-Year (Protected By Levee)	814 (17.8%)	647.8	$ 260,682,000
Total	4,574	3,857.3	$1,923,561,000

** Improved parcels include residential, commercial, industrial, and institutional uses within the flood hazard zone.*

Source: San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan, July 13, 2017

- Flooding hazards have the potential to impact a significant amount of the community; however, less than 10% of this area is subject to a 100-year event.
- Development within flood hazard areas are expected to comply with flood protection standards that reduce vulnerability to flood impacts and ensure safe use and occupation of structures.

Dam Failure/Inundation

The City currently has seven catch-basins that are defined as dams by the State of California. These are:

- Alta Loma Basin
- Cucamonga Creek

- Day Creek
- Deer Creek
- Demens Creek
- Etiwanda Basin
- San Sevaine Basin

With the adoption of SB 92 in 2017, new dam safety requirements mandate that dam owners map the downstream inundation areas for dams governed by the California Department of Water Resources (DWR). In addition to the mapping, owners are required to prepare Dam Emergency Action Plans that identify the emergency management plans and procedures in place for these facilities. Figure 7 identifies the inundation areas mapped for these seven catch basins located within the City. For inundation to occur as depicted in this map, it is assumed the reservoir behind the dam is full, and failure occurs suddenly, releasing water in a relatively short amount of time. Failures typically occur as a result of an earthquake, erosion, design flaw, or water overflow condition during intense storms.

Based on the mapping in Figure 7, Table 6 identifies the estimated size of each inundation area mapped within the City. Of these seven inundation areas, two have the potential to flood properties outside of the City —Cucamonga Creek and San Sevaine. Based on this mapping, the San Sevaine Basin generates the largest inundation area, which inundates a portion of the City and neighboring Fontana.

Table 6 – Dam Inundation Areas

Catch Basin Name	Reservoir Capacity	Dam Inundation Area
Alta Loma Basin	155 acre-feet	332.4 acres
Cucamonga Creek	355 acre-feet	353.3 acres*
Day Creek	140 acre-feet	122.9 acres
Deer Creek	24 acre-feet	212.3 acres
Demens Creek	35 acre-feet	206.9 acres
Etiwanda Basin	283 acre-feet	119.9 acres
San Sevaine Basin	2,765 acre-feet	2,982.7 acres*

** Inundation zones impact areas outside of the city limits.*
Source: Dams Within Jurisdiction of the State of California, September 2019, Califonia Department of Water Resources, Division of Safety of Dams.

- Areas downstream of catch-basins are at greater risk of dam inundation and should be notified and educated on the potential risks associated with this hazard.
- Development within these areas should identify possible flood mitigation improvements that can reduce of minimize both flood and inundation impacts.

Wildfire

As a community located along the foothills of the San Gabriel Mountains (and adjacent to the San Bernardino National Forest), Rancho Cucamonga has a long history of dealing with wildfire. Much of this wildfire threat comes from the types of plants that inhabit the foothills and mountainous areas of the City and adjacent national forest. Chapparal is the most common plant-type found in these areas, which is considered a fire-adapted species that are accustomed to burning on a regular interval.

Figure 6 – FEMA Flood Hazard Zones

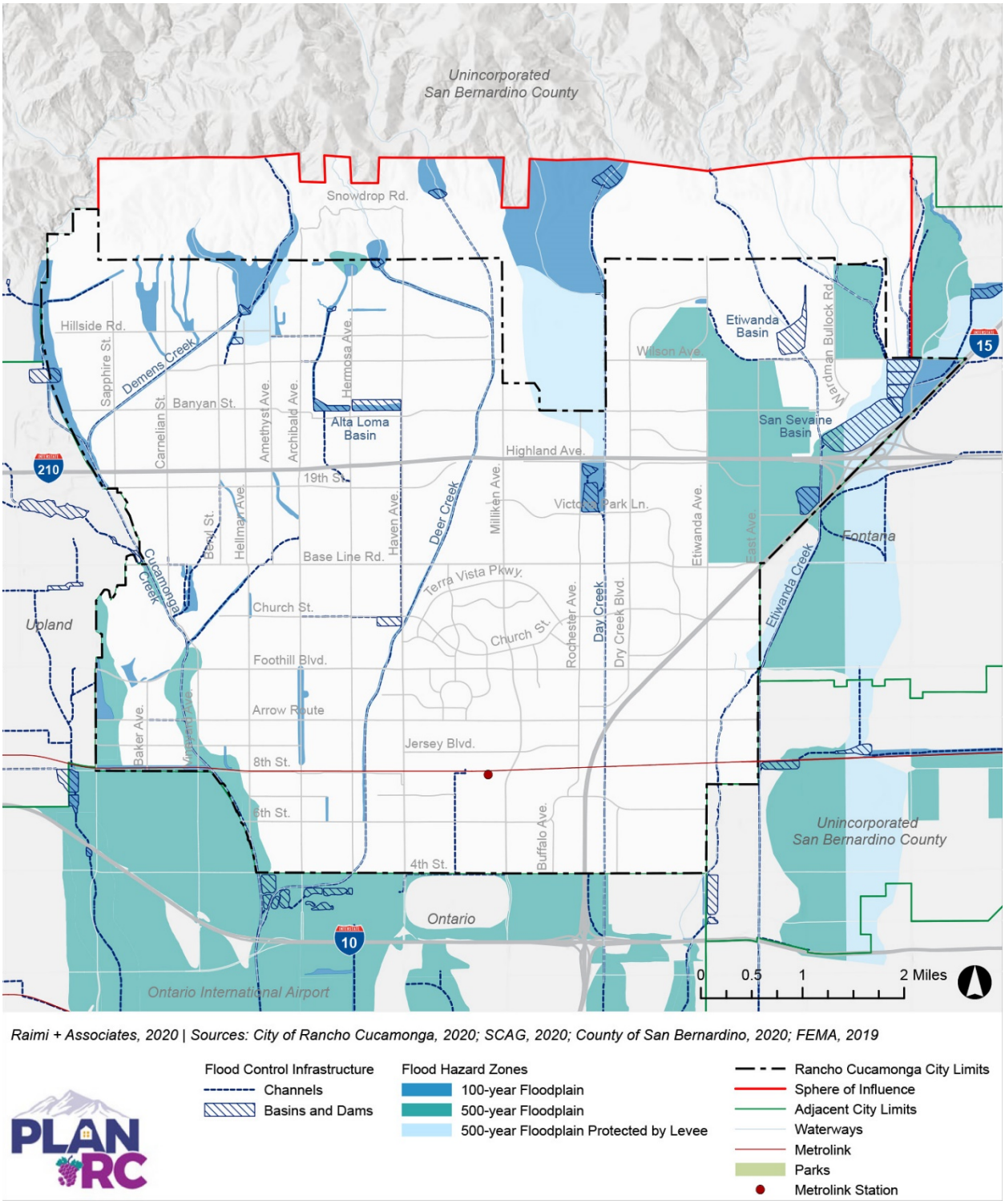
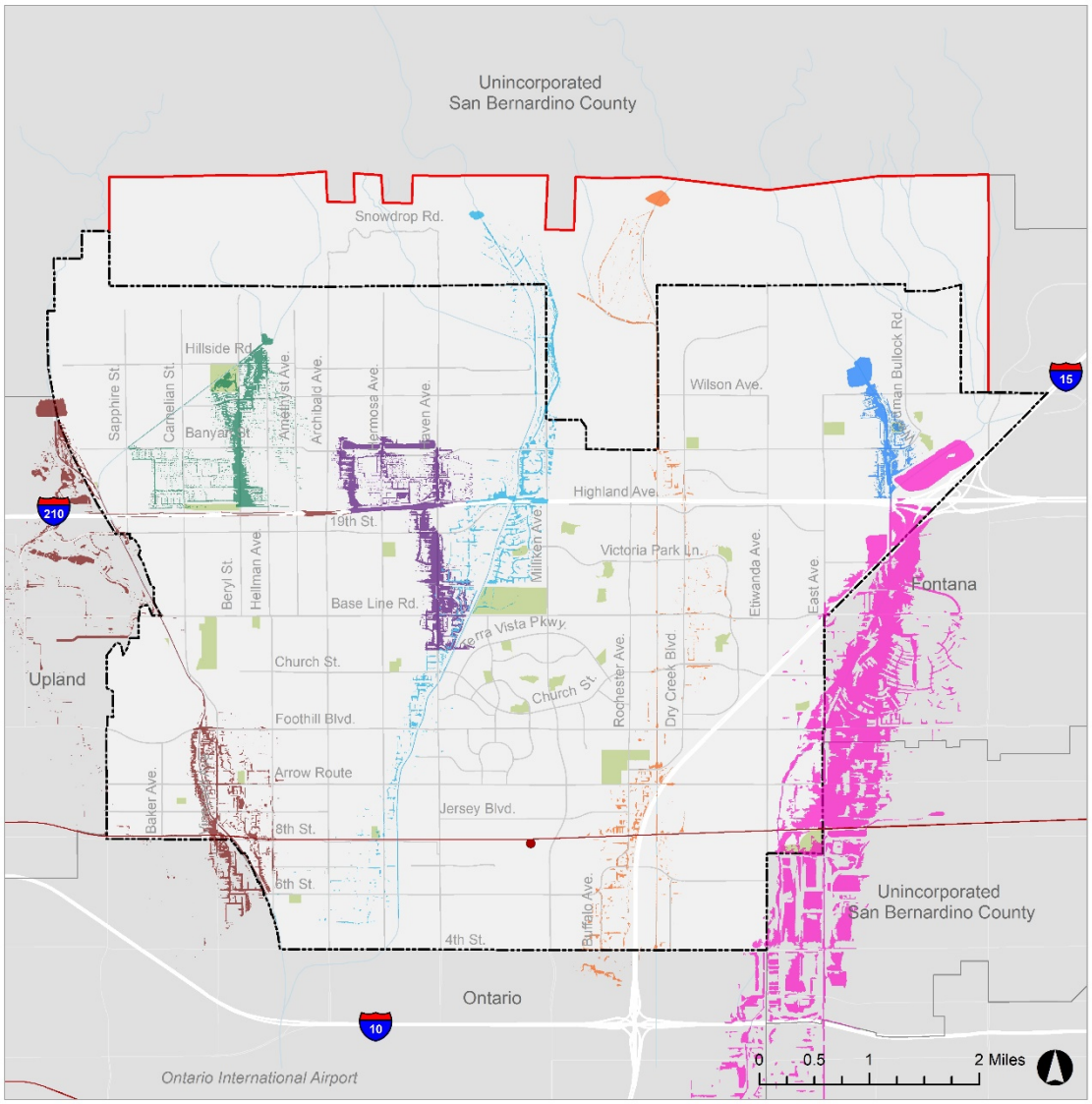


Figure 7 – Dam Inundation Zones



Raimi + Associates, 2020 | Sources: City of Rancho Cucamonga, 2020; SCAG, 2020; County of San Bernardino, 2020; California Department of Water Resources, 2020.

PLAN RC

- San Sevaine Basin
- Etiwanda Basin
- Demens Creek
- Day Creek
- Deer Creek
- Alta Loma Basin
- Cucamonga Creek

- Rancho Cucamonga City Limits
- Sphere of Influence
- Adjacent City Limits
- Parks
- Waterways
- Metrolink Station
- Metrolink

Figure 8 identifies Historic Fire Perimeters dating back to 1964. Based on the location and extent of these historic fires, the northern portions of the City within the foothills of the San Gabriel Mountains have experienced numerous large fires throughout the City's history. The most recent fires that have affected the City include:

- **2003 Grand Prix Fire (Old Fire):** this Santa Ana wind-driven fire burned over 91,000 acres within San Bernardino and Los Angeles Counties. In total, the fires destroyed 975 buildings and killed six people. The total cost associated with fire response and suppression activities totaled over $1.2 billion in 2003 dollars. Within the City, the fire destroyed 15 homes, and thousands of residents were threatened and evacuated during the incident.
- **2014 Etiwanda Fire:** this Santa Ana wind-driven fire burned over 2,100 acres within the City's SOI and required the evacuation of 1,650 homes and closure of nine schools. The location of this fire coincides with the proposed Etiwanda Heights community.

Much of the City north of Interstate 210 (I-210) is located within the Wildland Urban Interface Fire Area (WUIFA), which is a zone of heightened wildfire hazard. The designated WUIFA includes Cal FIRE Very High Fire Hazard Severity Zones within unincorporated San Bernardino County (State Responsibility Area) within the SOI and the City of Rancho Cucamonga (Local Responsibility Area), and other areas designated by the Rancho Cucamonga Fire District to be at a significant risk from wildfires based on historical fire activity and prevalent vegetation types. The WUIFA is adjacent to the San Bernardino National Forest, which is a designated Federal Responsibility Area (FRA) for wildfire prevention and suppression. In 2008, CalFire mapped wildfire hazards throughout the entire state and ranked those hazards with varying degrees of severity. The mapping is expected to be updated soon and, based upon evaluation by the Fire District, could change the extent of the areas at risk due to wildfire hazards. Figure 9 identifies the current designated WUIFA and the adjacent State and Federal Responsibility Areas. Based on this mapping, a majority of the area north of I-210 is at high risk of a wildfire event, especially during windy, dry conditions. Within the WUIFA, there are currently 5,424 improved parcels, which have an estimated value of approximately 2.825 billion dollars. This potential risk of wildfires is the second greatest threat to residents and businesses in the City.

For many of the developed neighborhoods within this area, wildfire vulnerability may increase with the presence of highly combustible landscape vegetation and construction techniques that may not meet current wildfire standards. For areas within the WUIFA, new construction is required to comply with California Building Code Chapter 7A and California Residential Code Section R337, including requirements for fire retardant or ignition resistant construction materials at roofs, eaves, vents, exterior walls, exterior windows, doors, and decks. While compliance with these standards reduces the vulnerability to new structures, existing structures that haven't complied with these standards may be susceptible to undue fire risk.

- Wildfire hazards are a significant threat to portions of the City north of I-210. Much of the development that has occurred in these areas were not built to current standards. This could result in many of these structures requiring mitigation and retrofit to reduce this potential threat.
- Landscaping and vegetation throughout the WUIFA areas can play a critical role in wildfire mitigation. The types of plants and trees used in landscaping can play a role in exacerbating or mitigating wildfire conditions. Greater use and expansion of the Fire District's Undesirable Plants and Trees list can reduce wildfire threats, allowing City and Fire District resources to be used better during a fire incident. Also, the City has an aging population of windrows that consist mainly of Blue Gum Eucalyptus trees. These windrows can increase wildfire risk if not maintained (removal of undergrowth and debris) or if they become diseased. In addition, as these windrows age and deteriorate in health, they may also become susceptible to loss of limbs or could fall over during extreme wind events.
- Wildfire threats in the northern portion of the City continue to pose a serious threat to existing and anticipated new development. Based on wildfire threat projections associated with climate change, wildfire threats are expected to increase. For additional discussion, please refer to the Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report.

Other Geologic Hazards

In addition to seismic hazards, Rancho Cucamonga is also susceptible to other geologic hazards based on the City's proximity to the San Gabriel Mountains, which is one of the fastest rising and disintegrating mountain ranges in the world. Uplift of this mountain range is approximately two centimeters per year, which is relatively quick on a geological time scale. When rapid uplift like this occurs, these areas will be more susceptible to debris flows, rockfalls, erosion, and slope stability issues due to the steepness and fractured nature of the rock units being uplifted. Typically these issues are further exacerbated by intense rainstorms and vegetation losses associated with wildfires. Additionally, steeper slopes generally increase stream flows, which accelerates erosion processes.

Landslides / Slope Stability

Slope stability is dependent on many factors and their interrelationships. Some of the most important factors include height and steepness of slopes, coupled with the strength and orientation of the geologic units, which plays a key role in slope stability. Ultimately, conditions like prolonged rainfall, stream erosion, and alterations to the slope create favorable conditions for failure. Many of these factors are prevalent throughout the hillsides along the northern portion of the City and SOI.

Figure 10 identifies landslide susceptibility within the City based on CGS mapping of deep-seated landslide hazards. Based on this mapping, a majority of the area within the City's SOI has a high degree of landslide susceptibility due to the presence of steep slopes and weak underlying geologic units. In this hazard zone within the City, there are 166 improved parcels (containing residential, commercial, institutional, or public uses) valued at approximately $67 million.

In addition to landslide susceptibility, many of these areas are also prone to debris flows, which can occur rapidly and without warning during intense rainstorms. These events can move large amounts of sediment composed of boulders, cobble, and sand, which can impact downstream drainage facilities and structures. For this reason, many of the catch-basins along the creeks and drainages within and surrounding the City (Alta Loma Basin, Cucamonga Creek, Demens Canyon, Deer Canyon, Day Canyon, Etiwanda Creek, and San Sevaine Basin) were constructed to prevent downstream impacts (see Figure 6).

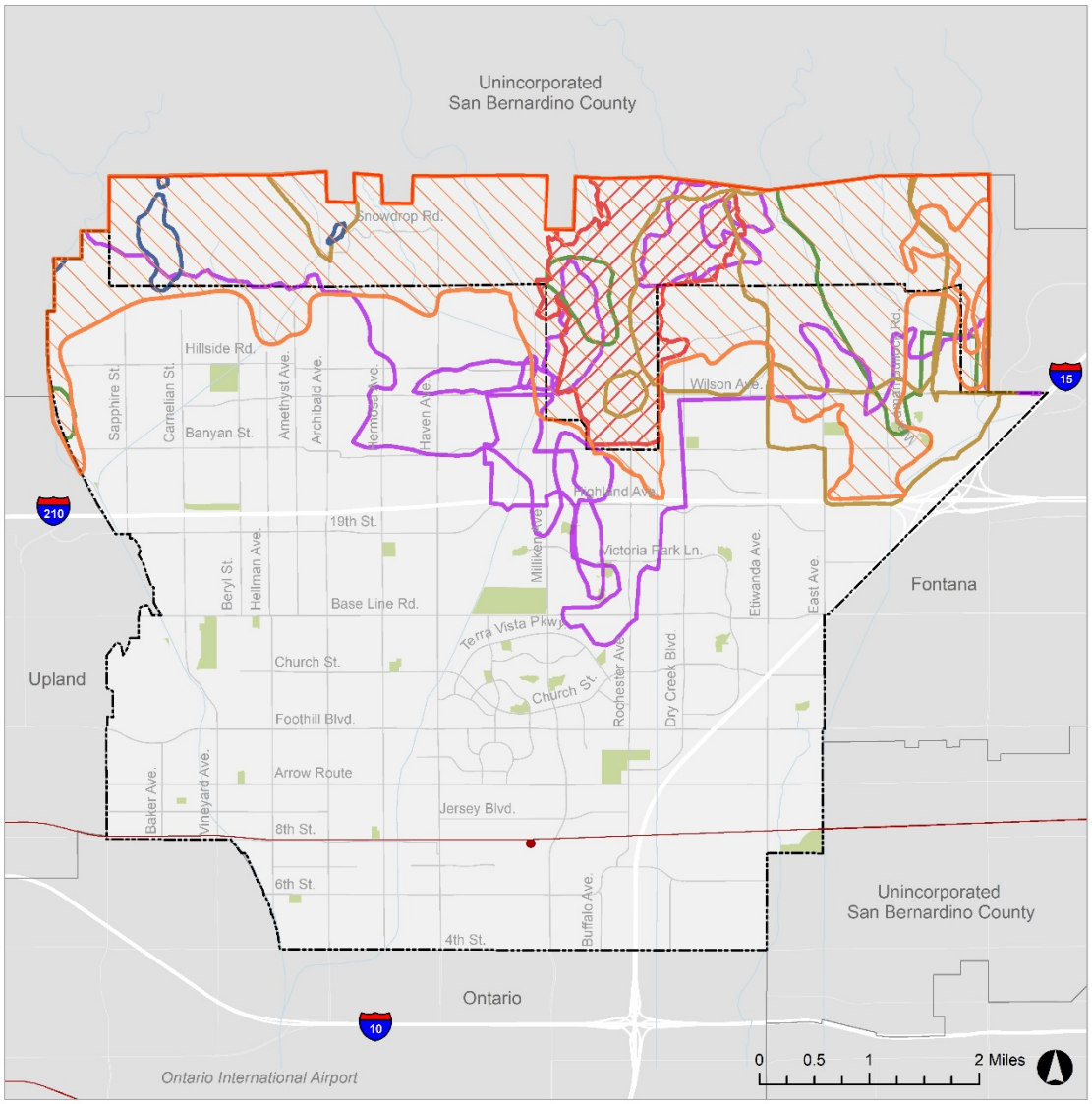
- While slope stability is a major concern for areas within the northern portion of the City and SOI, there is a limited amount of development within these areas, exposed to these risks.
- Typically slope instability and debris flow conditions are exacerbated after a wildfire event due to the loss of vegetation and changes in soil characteristics. After a wildfire event, the City should monitor these areas and prepare for these hazards leading up to a large rain event.
- Future slope stability impacts may be exacerbated by changing climatic conditions resulting in more intense storm events or changes in fire regimes. For additional discussion, refer to the Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report.

Subsidence

In addition to slope stability, ground subsidence is another geologic hazard that involves the gradual settlement or sinking of the ground. This hazard typically involves vertical movement as the result of the extraction of groundwater, oil, or gas; or the decomposition of organic materials like peat. The break down of these materials results in a loss of volume within soils that can result in vertical movement. The likely source for subsidence within the City would be the result of groundwater extraction. According to the Cucamonga Valley Water District 2015 Urban Water Management Plan, groundwater extraction through 2040 is not projected to exceed historical pumping that has occurred in the past. Since subsidence has not been identified as a historic issue within the community, future instances may only occur if a significant amount of groundwater is extracted beyond historic averages or groundwater basin elevations drop significantly.

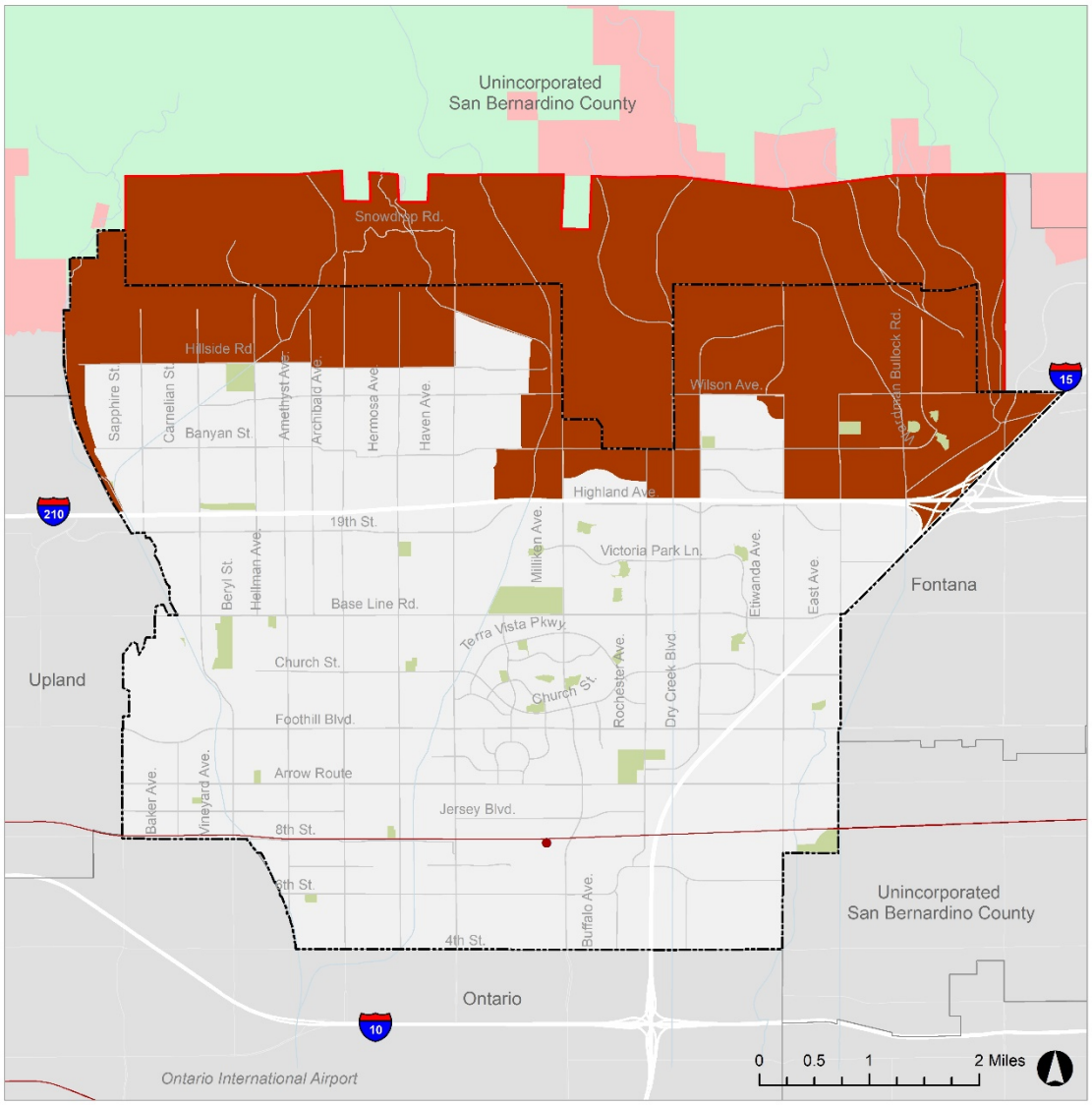
- Coordination with Cucamonga Valley Water District is recommended to monitor groundwater elevations and track any issues that may be related to subsidence.

Figure 8 – Historic Wildfire Perimeters



Raimi + Associates, 2020 | Sources: City of Rancho Cucamonga, 2020; SCAG, 2020; County of San Bernardino, 2020; Cal FIRE Historic Fire Perimeters, 2020

Figure 9 – Fire Hazard Severity Zones



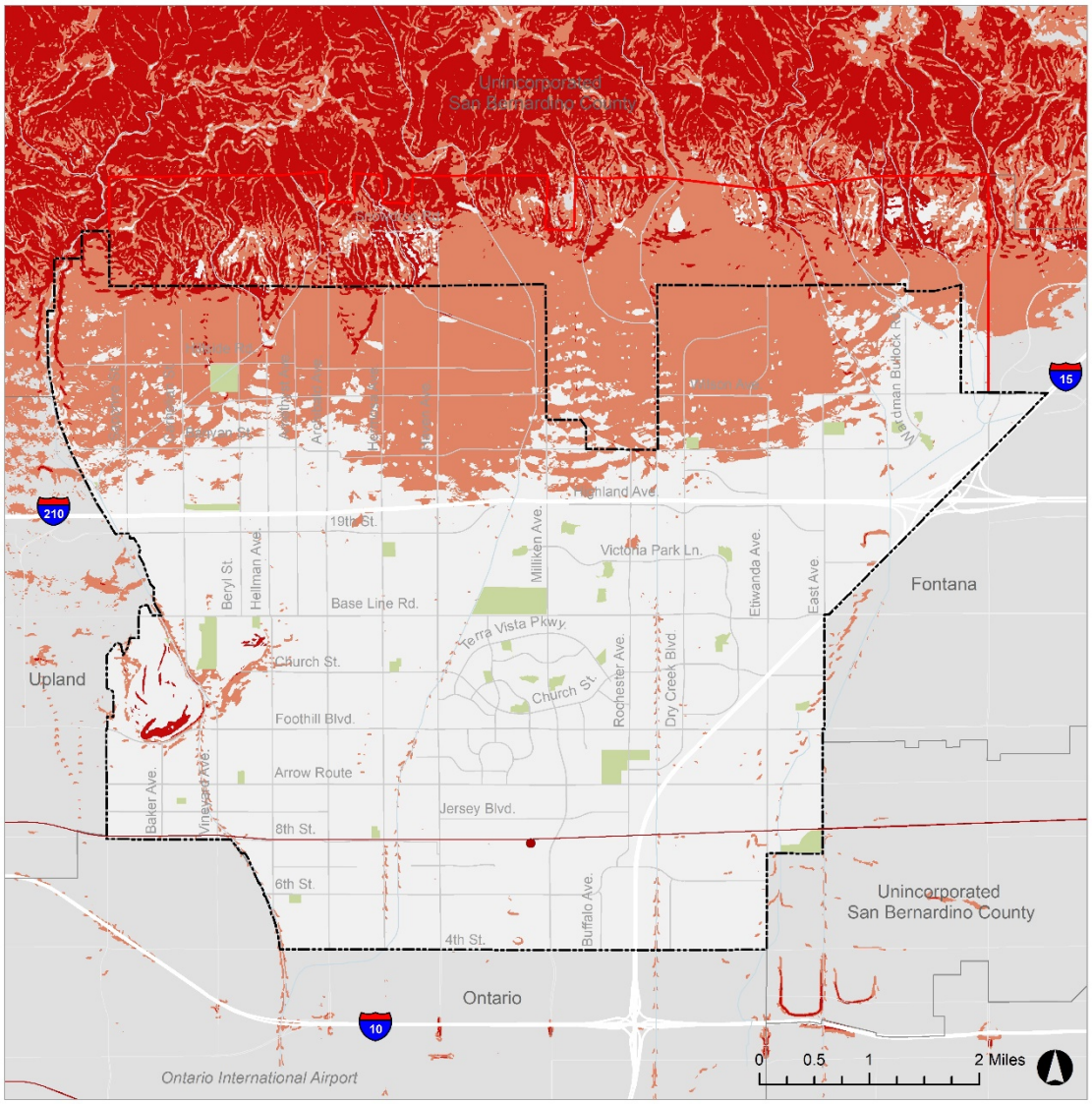
Raimi + Associates, 2020 | Sources: City of Rancho Cucamonga, 2020; SCAG, 2020; County of San Bernardino, 2020; Cal FIRE, 2007

Fire Hazard Severity Zones

- Rancho Cucamonga Wildland Urban Interface Fire Area
- Cal FIRE State Responsibility Areas
- National Forest (Federal Responsibility Area)

- Rancho Cucamonga City Limits
- Sphere of Influence
- Adjacent City Limits
- Parks
- Waterways
- Metrolink Station
- Metrolink

Figure 10 – Landslide Susceptibility



Raimi + Associates, 2020 | Sources: City of Rancho Cucamonga, 2020; SCAG, 2020; County of San Bernardino, 2020; California Geological Survey, MS 58 Landslide Susceptibility Classes, 2020.

Moderate Susceptibility
High Susceptibility

Rancho Cucamonga City Limits
Sphere of Influence
Adjacent City Limits
Parks
Waterways
Metrolink Station
Metrolink

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Section 2 - Hazards Exacerbated by Climate Change

Severe Weather

The information provided below is limited to severe weather hazards, including extreme heat, drought, and wind. These discussions focus on historical and current conditions within the City. To better understand how these conditions may change in the future, please refer to the Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report, which discusses these hazards and many others as they relate to changing climatic conditions.

Extreme Heat

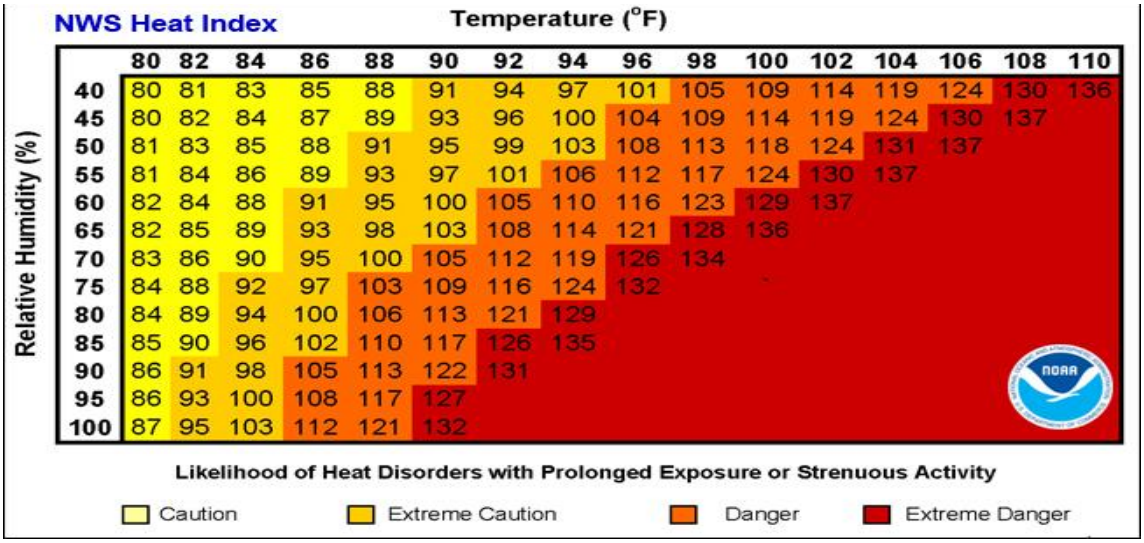
Extreme heat is a period when temperatures are abnormally high relative to the normal temperature range. There are generally three types of extreme heat events:

- Extreme Heat Days: a day during which the maximum temperature surpasses 98 percent of all historic high temperatures for the area, using the time between April and October from 1950 to 2005 as the baseline.
- Warm Nights: a day between April to October when the minimum temperature exceeds 98 percent of all historic minimum daytime temperatures observed between 1950 to 2005.
- Extreme Heat Waves: a successive series of extreme heat days and warm nights where extreme temperatures do not abate. While no universally accepted minimum length of time for a heatwave event exists, Cal-Adapt considers four, successive extreme heat days and warm nights to be the minimum threshold for an extreme heatwave.

Extreme heat events will feel different from region to region since different areas have different historic high temperatures. For example, an extreme heat day on the coast will feel different than an extreme heat day in the High Desert. The reason for this is how humidity plays a factor in the perceived heat that people feel. Humid conditions will make a day feel hotter than non-humid conditions, even though the temperature may be the same. The difference between the perceived temperature and the actual temperature is known as the “heat index.” To illustrate the effect of the heat index, a 90-degree day with 50 percent humidity feels like 95°F, whereas a 90°F day with 90 percent humidity feels like 122°F. Figure 11 shows the National Oceanic and Atmospheric Administration (NOAA)’s National Weather Service Heat Index.

- According to Cal-Adapt, an extreme heat day in Rancho Cucamonga involves a temperature that exceeds 103.9° F.
- Historically the City has experienced an average of 4 extreme heat days during the period from 1950 to 2005. During this same period, the City experienced a 4-day heatwave, approximately every five years.
- For a discussion of the anticipated changes associated with extreme heat events, please refer to the Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report.

Figure 11 – NOAA National Weather Service Heat Index

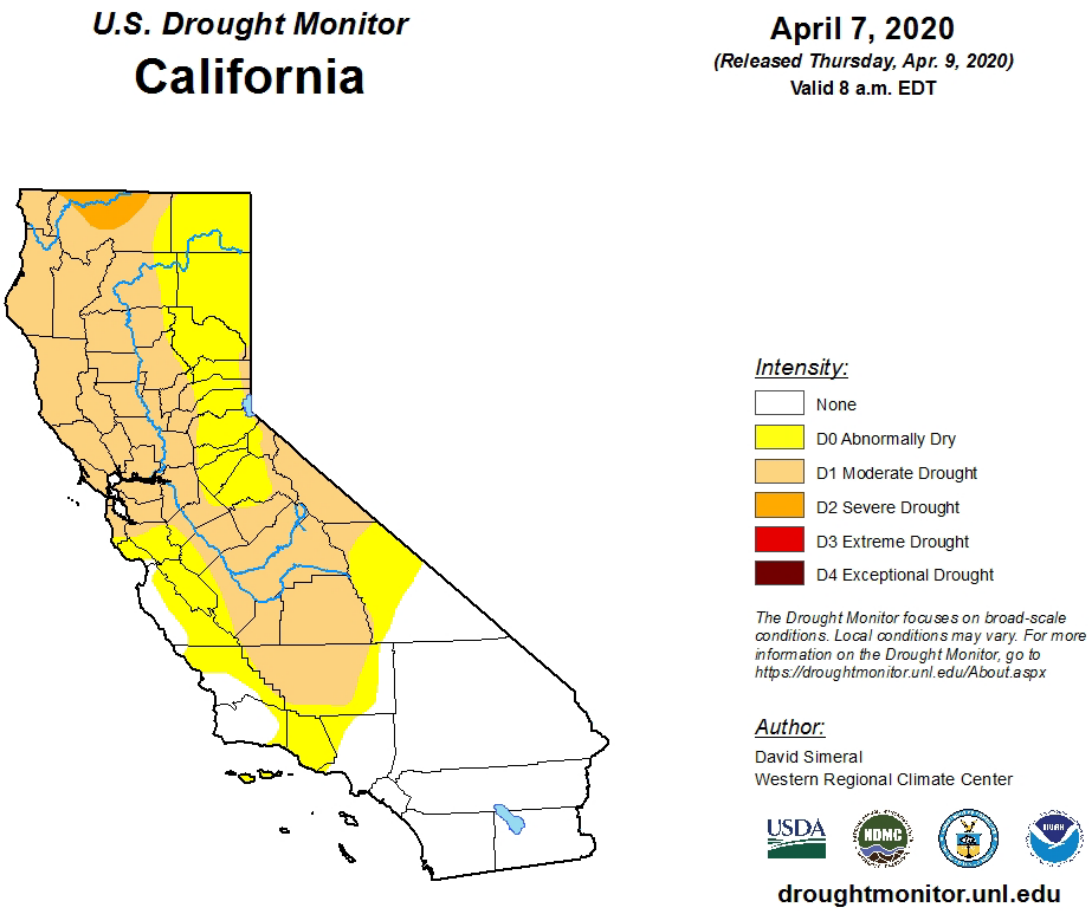


Drought

Droughts are somewhat frequent in California and typically occur when precipitation is limited for an extended period. Rain arrives in California via atmospheric rivers (channels of moist air located high in the atmosphere), as well as the El Niño Southern Oscillation (ENSO) cycle (a regional meteorological phenomenon in the southern Pacific Ocean). This cycle typically gives rise to two distinct phases known as *El Niño*, the warm and wet phase, or *La Niña*, the dry and cold phase. When California experiences a drought, it is typically the result of fewer atmospheric rivers or an active *La Niña* phase, which results in lower than average levels of precipitation. A drought may also occur when conditions in areas where water sources are located experience drought conditions, even though the local region does not. Figure 12 identifies the drought conditions within California identified by the US Drought Monitor program. The city of Rancho Cucamonga is not currently experiencing drought conditions based on this mapping.

- Southern California is not currently considered to be in a drought condition, while other parts of the State—Northern California and the Sierra Nevada mountain range—are experiencing moderate drought conditions due to lower than average precipitation.
- Communities that rely on water supplies from these parts of the State may feel the effects of drought versus communities that source their water supplies locally from Southern California. Currently, the Cucamonga Valley Water District sources almost half of its water from imported sources that may come from outside the region.
- For a discussion of the anticipated future trends associated with drought, please refer to the Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report.

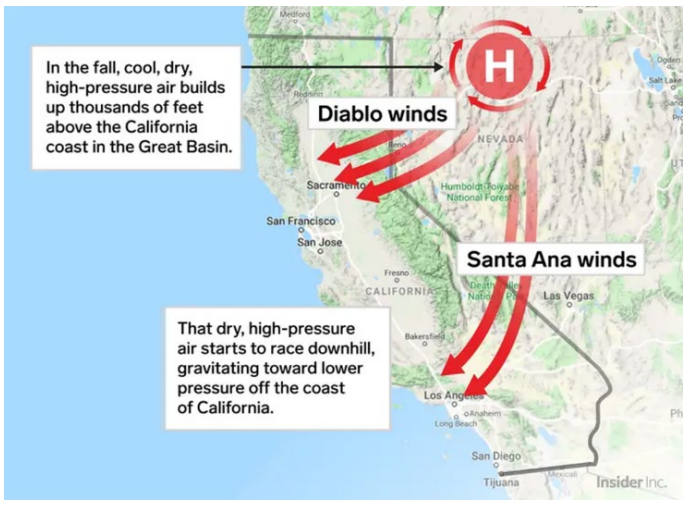
Figure 12 – California Drought Conditions (April 7, 2020)



Wind

Wind is simply the movement of air caused by differences in atmospheric temperature. High-pressure air will naturally move to areas of low pressure. Usually, the distance between these high- and low-pressure zones is far; however, on occasion, these low- and high-pressure zones may be near one another. When this happens, air will flow dramatically, creating high-speed winds. The most common wind events in southern California are the "Santa Ana" wind conditions that typically occur in the fall and winter.

Rancho Cucamonga has a history of extensive windstorms, often related to Santa Ana winds. High winds can also result from thunderstorm inflow and outflow or high and low-pressure systems moving through the region. Wind speeds during these events can typically range from 50 to



100 miles per hour, which can often damage structures, uproot trees, and generate dust and debris that can impact visibility and damage vehicles and structures.

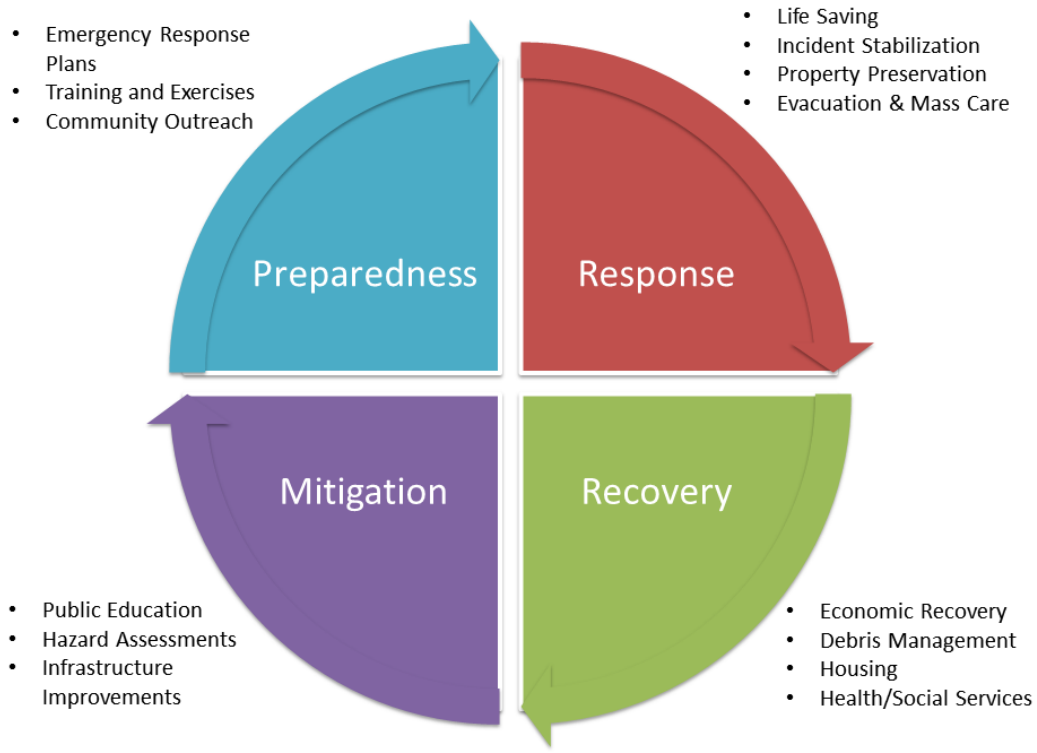
- Since Santa Ana wind events occur several times throughout the year, they are one of the most frequent hazard events that affect the City, however significant incidents are not as common. Generally, 2-4 wind events occur on an annual basis that have the potential to cause damage within the City.
- A significant wind event on January 6, 2003, impacted the City, causing damage to residences and businesses, knocking down power lines and trees, damaging fences, street lights, and signs. In total, 56 incidents were reported that day from this single wind incident, which impacted streets and city services during the incident.
- A major wind event in 2011 impacted the City, causing over 500 downed trees and significant property damage citywide.
- Between 2017 and 2019, the City experienced at least two wind events a year that resulted in downed trees, property damage, and damaged traffic signs and signals.
- Significant wind events can exacerbate fire conditions within Southern California and the City, which could impact residents, businesses, and city services.
- Climatic conditions may worsen future events. Please refer to the Greenhouse Gas Emissions and Climate Change Vulnerability Assessment Existing Conditions Report for additional detail.

Section 3 - Emergency Management

Emergency Management

The City's extensive Emergency Management Program is administered by the Rancho Cucamonga Fire Protection District through collaboration with all city departments and the community . This program focuses on FEMA's four phases of emergency management illustrated in Figure 13.

Figure 13 – Four Phases of Emergency Management



Key components of this program include the City's Emergency Operations Plan, ReadyRC programs and Local Hazard Mitigation Plan, which support City and District functions during emergencies and assist in day to day activities.

Emergency Operations Plan

The Rancho Cucamonga Emergency Operations Plan (EOP) addresses the City's planned response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies in both war and peacetime. This plan supports the City's preparedness functions and is designed to be read, understood, and exercised before an emergency. The EOP provides the planning basis for hazard identification, hazard mitigation, disaster preparedness, emergency response, and recovery efforts.

The purpose of the EOP is to create a uniform structure for emergency management that integrates the City into the California Standardized Emergency Management System and National Incident Management System. This document is written primarily for:

- City Management Staff,
- City Employees,
- Federal, State and County Governments,
- Special Districts who serve city of Rancho Cucamonga residents, and
- Private and volunteer organizations involved in emergencies.

Local Hazard Mitigation Plan

Hazard mitigation involves making a community more resilient to disasters so that when hazard events do ultimately occur, the community suffers less damage and can recover more effectively. It differs from disaster preparedness, which involves advanced planning for how best to respond when a disaster occurs or is imminent.

The Rancho Cucamonga Local Hazard Mitigation Plan (LHMP) provides a comprehensive assessment of the threats that the City faces from natural and human-caused hazard events and contains a coordinated strategy to reduce these threats. It identifies resources and information that can help community members, City staff, and local officials understand local risks and make informed decisions. The LHMP can also support increased coordination and collaboration between the City, other public agencies, local employers, service providers, community members, and other key stakeholders.

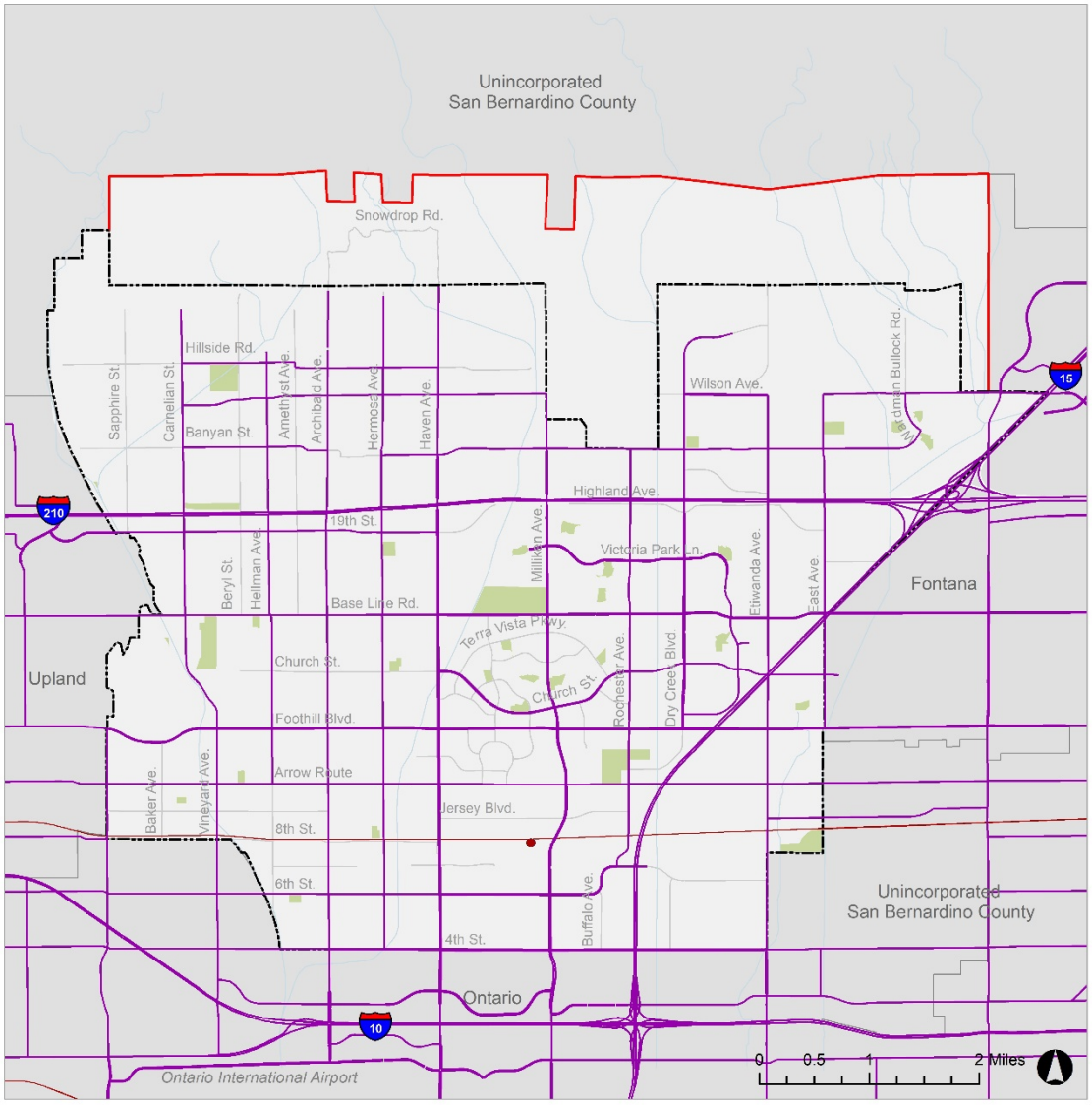
A vital outcome of the hazard mitigation planning process is the City's ability to pursue FEMA hazard mitigation grant funds, which are only available to communities that have a FEMA approved plan. Once an LHMP is approved by FEMA and adopted by City Council, the City has five years to pursue and receive available grant funds in support of implementation. Updating of the plan every five years ensures the City will have continuous access to these funding opportunities. The City's current plan has expired and will be updated as part of the PlanRC project.

Evacuation Routes

Since there are a variety of hazards within the City that could impact businesses and residents, it is vital to identify critical routes for evacuation purposes. Figure 14 identifies recommended evacuation routes along many of the major thoroughfares throughout the City. While these routes are recommended, they are not anticipated to be the only routes used for evacuation purposes. Future evacuations will take into consideration the type of hazard event, areas impacted by the event, expected migration from areas of impact, and establishment of the safest routes necessary to move people out of harm.

- To better understand the City's evacuation constraints and meet the requirements of SB 99 and AB 747, evacuation routes will need to be analyzed to determine:
    - Areas where routes are lacking or inadequate
    - Areas where the circulation network is undersized or inefficient
    - Roadway extensions or modifications that can enhance evacuation.
    - Addressing these issues will play a key role, as a critical evacuation concern for the City is the connectivity across I-210. This freeway creates a barrier for the critical movement of people and utilities (water, electricity, natural gas), which PlanRC should address.

Figure 14 – Potential Evacuation Routes



Raimi + Associates, 2020 | Sources: City of Rancho Cucamonga, 2020; SCAG, 2020; County of San Bernardino, 2020; WRCOG Resilient IE, 2020

Resilient IE Evacuation Routes

Rancho Cucamonga City Limits
Sphere of Influence
Adjacent City Limits
Parks
Waterways
Metrolink Station
Metrolink

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Summary of Issues and Opportunities

Rancho Cucamonga has a full suite of natural hazard issues with which to contend. Over the years, the City has taken great steps to address these issues and continues to reduce their risk of impact from many of these hazards. As the City looks forward, the following areas should become a primary focus for the PlanRC project:

Hazards of Concern

Seismic/geologic hazards, wildfire, and severe weather are hazards of concern that pose the greatest challenge to the City.

Seismic Hazards

The greatest hazard of concern for the City is earthquakes. Many of the studies conducted over in the past decade conclude that a significant earthquake event will occur and could cause significant disruption to the economy, damaging and destroying buildings and infrastructure, and affecting residents and businesses throughout the City. With loss estimates greater than $5 billion for the City, future preparedness and mitigation efforts should strive to reduce this vulnerability wherever possible.

Additionally, the City has an opportunity to focus on expanding knowledge and understanding of seismic and geologic hazards. A better understanding of the Red Hill-Etiwanda Fault, as well as the potential for landslides and debris flows in the foothills of the San Gabriel Mountains, are opportunities to protect life and property better.

Wildfire

Wildfire hazards are a significant threat to portions of the City north of I-210. Much of the development that has occurred in these areas was not built to current standards that apply to the Wildland Urban Interface Area (WUIFA). As a result, many of these structures may require mitigation and retrofit to reduce this potential threat.

Landscaping and vegetation throughout the WUIFA areas can play a critical role in wildfire mitigation. The types of plants and trees used in landscaping can play a role in exacerbating or mitigating wildfire conditions. Greater use and expansion of the Fire District's Undesirable Plants and Trees list can reduce wildfire threats, allowing City and Fire District resources to be better used during a fire incident. In addition, the City has an aging population of windrows that consist mainly of Blue Gum Eucalyptus trees. These windrows can increase wildfire risk if not maintained (removal of undergrowth and debris) or become diseased. In addition, as these windrows age and deteriorate in health, they may also become susceptible to loss of limbs or could fall over during extreme wind events.

Severe Weather

Extreme heat is anticipated to be a major focus for the City and many inland communities in the foreseeable future. As summer temperatures increase along with the number of extreme heat days and heatwaves, the City should focus on improvements to their assets that can accommodate these new conditions. While the number of extreme heat days has been relatively low in the past (4 days per year on average), it is anticipated that by 2050-2099 the City could experience between 21 and 35 extreme heat days per year, under medium and high emissions projections. This increase should be accounted for in any improvements to city-owned facilities dealing with energy efficiency and resilience.

Since winds are one of the most common hazards impacting the City annually, strategies focused on better design and construction to reduce wind impacts can play a key role in mitigating wind hazards. Critical to reducing wind hazards is a better understanding of the health and condition of large trees within the City as well as remaining windrows that are most vulnerable to strong winds. A key component to understanding these potential impacts would be areas where inadequate planting and maintenance techniques have been practiced.

Changes, Trends, and Opportunities

Evacuation Routes

The need to further analyze evacuation routes and access is one of the most recent changes in Safety Element requirements. These new requirements focus on the identification of areas where routes are lacking or inadequate. A key opportunity with PlanRC is the ability to look at circulation and mobility issues comprehensively to address both everyday community needs as well as specific evacuation needs.

Pending Legislation

In addition to evacuation requirements, the California Legislature is currently developing new legislation (SB 182) that would require the Safety Element be reviewed and updated as necessary to include a comprehensive retrofit strategy to reduce the risk of property loss and damage during wildfires.

Key elements of the strategy should include:

- A list of the types of retrofits needed in an area based on fire risk.
- A process for identifying and inventorying structures in need of retrofit for fire hardening. The strategy shall prioritize the identification and inventorying of residential structures in very high fire risk areas.
- Goals and milestones for completing the needed retrofit work.
- Potential funding sources and financing strategies to pay for needed retrofits on public and private property.
- Once adopted, the planning agency shall submit the adopted comprehensive retrofit strategy to the Office of Planning and Research for inclusion in the clearinghouse established according to Section 71360 of the PRC.

As of April 2020, this bill is currently being held in the California State Assembly, awaiting completion and final approval from the Governor. Moving forward, the City should monitor and incorporate these elements into key plans and programs to ensure easy implementation. Many of the strategies identified can be integrated into existing plans, eliminating the need for additional planning and tracking. The City should investigate the integration of these requirements into the City's updated Community Wildfire Protection Plan, once completed.

Risk Management

Finally, the PlanRC project has an opportunity to identify risk management strategies that can support greater investment in infrastructure to better support resilience. Key strategies may include:

- Expansion and enhancement of fiber optic infrastructure to better support telecommuting and greater reliance on flexible working environments.
- Backup power storage and generation to reduce the threat of power loss during extreme weather events, as well as Public Safety Power Shutoff periods.
- Transfer of development rights from areas of significant hazards to areas with little to no hazards (see Figure 1).

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Appendix A

The following overview provides detailed information regarding the California Government Code pertaining to General Plan Safety Element Requirements.

Overview of Government Code Section 65302 (g)

This section of the California Government Code is organized into nine subsections that address a variety of issues. The basic requirements are identified in subsection 1, while specific updates and new requirements are identified in the subsequent eight sections.

GC Section 65302 (g) (1): requires that a jurisdiction prepare a safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence; liquefaction; and other seismic hazards identified pursuant to Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code, and other geologic hazards known to the legislative body; flooding; and wildland and urban fires.

The safety element shall include mapping of known seismic and other geologic hazards. It shall also address evacuation routes, military installations, peak load water supply requirements, and minimum road widths and clearances around structures, as those items relate to identified fire and geologic hazards.

GC Section 65302 (g) (2) adopted through AB 162 (2007): requires upon the next Housing Element update after 2009 that the jurisdiction:

A. Identify information regarding flood hazards from a variety of sources like FEMA, US Army Corps of Engineers, Central Valley Flood Protection Board, California Department of Water Resources, and other relevant sources that identify areas of historical/current flooding, existing and planned development in flood hazard zones, and other relevant flood issues that pertain to the jurisdiction.

B. Establish a set of comprehensive goals, policies, and objectives for the protection of the community from the unreasonable risks of flooding, and

C. Establish a set of feasible implementation measures designed to carry out those goals, policies, and objectives.

65302 (g) (3) adopted through SB 1241 (2012): Upon the next Housing Element update after January 1, 2014, the safety element to be updated as necessary to address the risk of fire for land classified as state responsibility areas, as defined in Section 4102 of the Public Resources Code, and land classified as very high fire hazard severity zones, as defined in Section 51177. This update should include:

A. Information regarding the location of fire hazard severity zones, historical wildfire information, wildfire information from Federal Agencies (USGS), location of existing and planned uses in fire-prone areas, and identification of responsible agencies overseeing fire protection.

B. A set of goals, policies, and objectives based on the above information for the protection of the community from the unreasonable risk of wildfire.

C. A set of feasible implementation measures designed to carry out the goals, policies, and objectives above that focus on avoiding or minimizing new development in fire-prone areas, locating essential facilities outside of high fire risk areas, when feasible, designing adequate infrastructure in fire-prone areas, and working cooperatively with other agencies responsible for fire protection in or near the jurisdiction.

D. If a city or county has adopted a fire safety plan or document separate from the general plan that fulfills the commensurate goals and objectives above can be used to comply with these requirements.

65302 (g) (4) adopted through SB 379 (2015): Upon the next revision of a local hazard mitigation plan, adopted in accordance with the federal Disaster Mitigation Act of 2000 (Public Law 106-390), on or after January 1, 2017, or, if a local jurisdiction has not adopted a local hazard mitigation plan, beginning on or before January 1, 2022, the safety element shall be reviewed and updated as necessary to address climate adaptation and resiliency strategies applicable to a city or county. This review shall consider the advice provided in the Office of Planning and Research's General Plan Guidelines and shall include all of the following:

A. A vulnerability assessment that identifies the risks that climate change poses to the local jurisdiction and the geographic areas at risk from climate change impacts, including, but not limited to, an assessment of how climate change may affect the risks addressed.

Information that may be available from federal, state, regional, and local agencies that will assist in developing the vulnerability assessment and the adaptation policies and strategies.

B. A set of adaptation and resilience goals, policies, and objectives based on the information above.

C. A set of feasible implementation measures designed to carry out the goals, policies, and objectives identified above.

D. If a jurisdiction has prepared a local hazard mitigation plan, or other climate adaptation plan or document that fulfills the requirements above, that document can be referenced or attached to the Safety Element and where necessary, provide the information needed to show compliance with these requirements.

65302 (g) (5) adopted through SB 99 (2019): Upon the next revision of the housing element on or after January 1, 2020, the safety element shall be reviewed and updated as necessary to identify residential developments in any hazard area identified in the safety element that do not have at least two emergency evacuation routes.

65302 (g) (6) adopted through SB 1035 (2018): After the initial revision of the safety element pursuant to paragraphs (2), (3), (4), and (5), the planning agency shall review and, if necessary, revise the safety element upon each revision of the housing element or local hazard mitigation plan, but not less than once every eight years, to identify new information relating to flood and fire hazards and climate adaptation and resiliency strategies applicable to a city or county that was not available during the previous revision of the safety element.

65302 (g) (7): Cities and counties that have flood plain management ordinances that have been approved by FEMA that substantially comply with this section, or have substantially equivalent provisions to this subdivision in their general plans, may use that information in the safety element to comply with this subdivision, and shall summarize and incorporate by reference into the safety element the other general plan provisions or the flood plain ordinance, specifically showing how each requirement of this subdivision has been met.

65302 (g) (8): Before the periodic review of its general plan and before preparing or revising its safety element, a city and county shall consult the California Geological Survey of the Department of Conservation, the Central Valley Flood Protection Board, if a city or county is located within the boundaries of the Sacramento and San Joaquin Drainage District, as set forth in Section 8501 of the Water Code, and the Office of Emergency Services for the purpose of including information known by and available to the department, the agency, and the board required by this subdivision. ***Additional provisions to this requirement are identified in the discussion regarding "Recent Government Changes that Integrate into the Schedule."***

65302 (g) (9): To the extent that a county's safety element is sufficiently detailed and contains appropriate policies and programs for adoption by a city, a city may adopt that portion of the county's safety element that pertains to a city's planning area in satisfaction of the requirement imposed by this subdivision.

Recent Government Code Changes that Integrate into a Safety Element Update Schedule

65302.5. adopted through AB 2911 (2018): establishes required review time frames for Safety Element review by state agencies.

California Geological Survey

At least 45 days prior to adoption or amendment, the safety element shall be submitted to the California Geological Survey of the Department of Conservation to determine whether they incorporate known seismic and other geologic hazard information, and report its findings to the planning agency within 30 days of receipt. The legislative body shall consider the division's findings prior to final adoption of the safety element or amendment unless the division's findings are not available within the above prescribed time limits or unless the division has indicated to a city or county that the division will not review the safety element. If the division's findings are not available within those prescribed time limits, the legislative body may take the division's findings into consideration at the time it considers future amendments to the safety element. Each county and city shall provide the division with a copy of its adopted

safety element or amendments. The division may review adopted safety elements or amendments and report its findings. All findings made by the division shall be advisory to the planning agency and legislative body.

Cal FIRE

The draft element of or draft amendment to the safety element shall be submitted to the State Board of Forestry and Fire Protection and to every local agency that provides fire protection to territory in a city or county at least 90 days before either of the following:

- The adoption or amendment to the safety element for each county that contains state responsibility areas.
- The adoption or amendment to the safety element for each city or county that contains a very high fire hazard severity zone.

The State Board of Forestry and Fire Protection shall, and a local agency may, review the draft of an existing safety element and recommend changes to the planning agency within 60 days of its receipt regarding both of the following:

- Uses of land and policies in state responsibility areas and very high fire hazard severity zones that will protect life, property, and natural resources from unreasonable risks associated with wildland fires.
- Methods and strategies for wildland fire risk reduction and prevention within state responsibility areas and very high fire hazard severity zones. These methods and strategies shall reflect accepted best practices in the most recent guidance document entitled "Fire Hazard Planning, General Plan Technical Advice Series."
- Prior to the adoption of its draft element or draft amendment, the board of supervisors of the county or the city council of a city shall consider the recommendations, if any, made by the State Board of Forestry and Fire Protection and any local agency that provides fire protection to territory in a city or county. If the board of supervisors or city council determines not to accept all or some of the recommendations, if any, made by the State Board of Forestry and Fire Protection or local agency, the board of supervisors or city council shall communicate in writing to the State Board of Forestry and Fire Protection or the local agency, its reasons for not accepting the recommendations.
- If the board of supervisors or city council proposes not to adopt the board's recommendations concerning its draft element or draft amendment, the board, within 15 days of receipt of the board of supervisors' or city council's written response, may request in writing a consultation with the board of supervisors or city council to discuss the board's recommendations and the board of supervisors' or city council's response. The consultation may be conducted in person, electronically, or telephonically. If the board requests a consultation pursuant to this subparagraph, the board of supervisors or city council shall not approve the draft element or draft amendment until after consulting with the board. The consultation shall occur no later than 30 days after the board's request.

If the State Board of Forestry and Fire Protection's or local agency's recommendations are not available within the time limits required by this section, the board of supervisors or city council may act without those recommendations. The board of supervisors or city council shall take the recommendations into consideration the next time it considers amendments to the safety element.