City of Fullerton
Local Hazard Mitigation Plan

August 2010

amec

EXECUTIVE SUMMARY

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. The City of Fullerton developed this Local Hazard Mitigation Plan (LHMP) update to make the City and its residents less vulnerable to future hazard events. This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 so that Fullerton would be eligible for the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation and Hazard Mitigation Grant programs.

The City followed a planning process prescribed by FEMA, which began with the formation of a hazard mitigation planning committee (HMPC) comprised of key City representatives, and other regional stakeholders. The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to the City of Fullerton, assessed the City's vulnerability to these hazards, and examined the capabilities in place to mitigate them. The City is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. Floods, wildfires, severe weather, and earthquake hazards are among the hazards that can have a significant impact on the City.

Based on the risk assessment, the HMPC identified goals and objectives for reducing the City's vulnerability to hazards. It was decided a singular goal would be used. The goal of this multi-hazard mitigation plan is:

- Protection of People, Natural and Built Environments and Economy from Natural Hazards

To meet this identified goal, the plan recommends 28 mitigation actions, which are summarized in the table that follows. This plan has been formally adopted by the City and will be updated every five years at a minimum.

Mitigation Actions

Mitigation Action Title	Priority	Cost Estimate	Schedule	Responsible Party	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
Multi-Hazard							
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	High	Staff time	As soon as possible	City of Fullerton Planning Division	X	X	X
Tree Master Plan Update	Medium	Unknown	summer/fall 2010	Maintenance Services, Landscape Division	X	X	
Community Forest Master Plan Update	High	Unknown	summer/fall 2010	Maintenance Service, Landscape Division	X	X	
Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program	High	$5,000-$20,000	Part of seasonal multi-hazard public awareness campaign	City of Fullerton Community Development Department, Fullerton Public Information Office, Fullerton Chamber of Commerce, and the American Red Cross.	X	X	X
Hazardous Materials GIS improvements	Medium to High	Staff time	Unknown at this time	Fire Department and GIS staff	X	X	X
Acacia Grade Separation	High	Unknown	Upon funding availability	Engineering Department/Design Division	X	X	
State College Grade Separation	High	$62,083,000	June 2012	Engineering Department/Design Division	X	X	
Raymond Grade Separation	High	$64,539,000	June 2012	Engineering Department/Design Division	X	X	
Data Gathering and GIS Tracking of Police and Fire Calls for Service in Response to Natural Hazard Events	Low	Staff time	Unknown at this time	Community Development Department to coordinate with Police and Fire representatives	X	X	

Mitigation Action Title	Priority	Cost Estimate	Schedule	Responsible Party	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
GIS Integration	Medium	Staff time	Unknown at this time	Community Development Department with City Manager's Office	X	X	
GIS tracking of Historic, Cultural, and Natural Resources	Low	Staff time	As soon as possible	GIS staff	X	X	
Multi-hazard: flood, liquefaction							
Structure Buy Out Program and Conversion (Southwest Fullerton) to Open Space	Low	Less than $50,000	Phase 1: Develop understanding of Community Land Trusts (CLT) and the steps required to establish and operate a 501(c)3. Phase 2: Identity potential organizers and partners for establishing the CLT. Phase 3: Prepare a feasibility analysis for establishing and operating the CLT. Phase 4: Prepare the case statement for the CLT and its mission. Phase 5: Establish the 501(c)3 and begin pursuit of mission	Planning Division, in coordination with other divisions and departments	X	X	X
Dam Failure							
Brea Dam Safety and Maintenance Plan	Medium	Staff time	As soon as possible	Parks and Recreation	X	X	X
Drought							
Convert Lions Field/Richmond Park to Artificial Turf	Medium	$1,100,000 – $2,475,000	Lions Field – Sept. 2010, Richman Park – August 2010	Parks and Recreation Department	X		
Water Main Replacement	High	$1,600,000	June 2010 for Lois Lane area and November 2010 for Coronado area	Engineering Department/Water Division	X	X	
Water Allocation Study	High	$2,000,000	Unknown due to lack of funding	Water Engineering	X	X	
Water Meter Replacement	High	$6,000,000	Unknown due to lack of funding	Water Engineering	X		

Mitigation Action Title	Priority	Cost Estimate	Schedule	Responsible Party	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
Park and Recreation Master Plan	Medium	$25,000 to $250,000	FY 2011-12	Parks and Recreation Department	X	X	
Drought and Earthquake							
Reservoir Rehabilitation	High	$2,200,000	February 2010 for Las Palmas and July 2010 for Tank Farm #5	Engineering Department/Water Division	X	X	
Earthquake							
Seismic Compliance/Retro Fit for Existing Structures – Public and Critical Facilities	Medium	Unknown	Phase 1: Develop an inventory of qualifying structures. Phase 2: Develop a cost estimate to complete upgrades/retro fits. Phase 3: Examine the feasibility of a regulatory- and voluntary-based system for private facilities while exploring funding mechanisms for both public and private locations.	Building Division	X		
Seismic Compliance/Retro Fit for Existing Structures – Private	Medium	Unknown	Phase 1: Develop an inventory of qualifying structures. Phase 2: Develop a cost estimate to complete upgrades/retro fits. Phase 3: Examine the feasibility of a regulatory- and voluntary-based system, exploring funding mechanisms.	Building Division	X		
Earthquake /Erosion/Flood							
Harbor Slope Stabilization	High	$3,130,000	Upon funding availability	Engineering Department/Design Division	X		X
Erosion/Flood							
Bastanchury Storm Drain Improvements	High	$400,000	June 2010	Engineering Department/Design Division	X	X	X

Mitigation Action Title	Priority	Cost Estimate	Schedule	Responsible Party	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
Flood							
Olive Street Storm Drain Improvements	High	$2,100,000	Upon funding availability	Engineering Department/Design Division	X	X	X
Evaluate status of floodplain management program	High	Staff time	3-5 years	Engineering	X	X	X
WIldfire							
Modifying/Enforcing Fuels Modification Plans and Weed Abatement on Public Lands	High	$75,000	Dependent on funding	Fullerton Fire Department Fire Prevention Bureau	X	X	
Study for Protection of Existing EOC	High	$25,000	Dependent on funding	Fullerton Fire Department/Engineering	X	X	
Purchase Type 3 Engine	High	$350,000	Dependent on funding	Fullerton Fire Department Fire Prevention Bureau	X	X	

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1 INTRODUCTION

1.1 Purpose

The City of Fullerton prepared this Local Hazard Mitigation Plan (LHMP) to guide hazard mitigation planning to better protect the people and property of the City from the effects of hazard events. This plan demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed so the City of Fullerton can be eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, and the Flood Mitigation Assistance (FMA) program.

1.2 Background and Scope

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of $4 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005).

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. This plan documents the City of Fullerton's hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the City will use to decrease vulnerability and increase resiliency and sustainability in Fullerton.

This LHMP is a single jurisdictional plan for the City of Fullerton that geographically covers everything within the City of Fullerton's jurisdictional boundaries (hereinafter referred to as the planning area).

This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the *Federal Register* on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act or DMA.) While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). This planning effort also follows FEMA's 2008 Plan Preparation Guidance. Because the City of Fullerton planning area is subject to many kinds of hazards, access to these programs is vital.

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. The City of Fullerton planning area has been affected by hazards in the past and is thus committed to reducing future impacts from hazard events and becoming eligible for mitigation-related federal funding.

1.3 Plan Organization

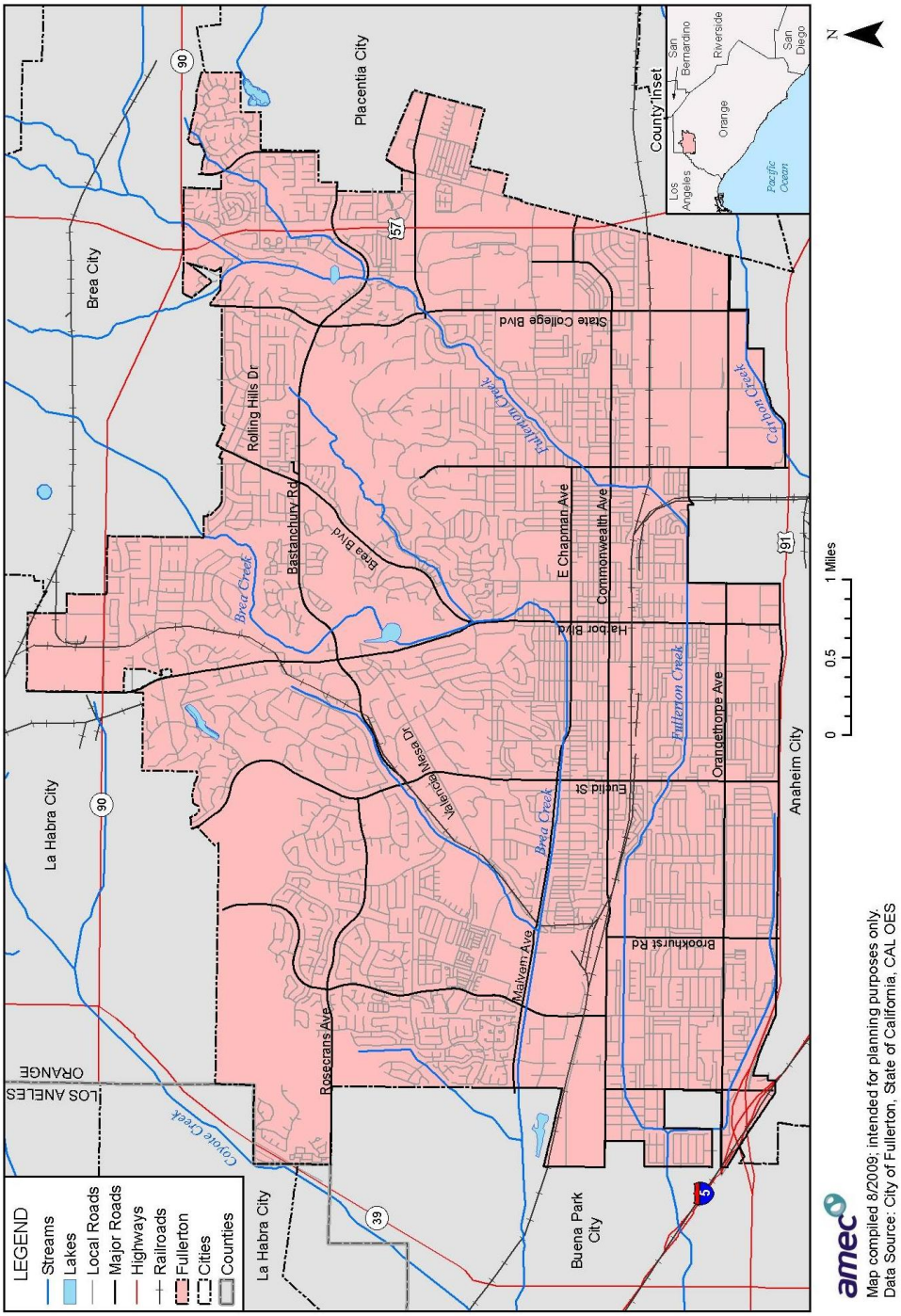
The City of Fullerton's Hazard Mitigation Plan is organized as follows:

- Chapter 2: Community Profile
- Chapter 3: Planning Process
- Chapter 4: Risk Assessment
- Chapter 5: Mitigation Strategy
- Chapter 6: Plan Adoption
- Chapter 7: Plan Implementation and Maintenance
- Appendices

2 COMMUNITY PROFILE

The City of Fullerton is illustrated in Figure 2.1.

Figure 2.1. City of Fullerton Base Map



2.1 History

In 1887, George and Edward Amerige founded Fullerton. With the advent of the 1880s, Southern California was the scene of a "land boom" sparked by the area's growing prosperity and the promotional campaigns of the railroads. It is at this point that George and Edward Amerige join the Fullerton story. The Ameriges were grain merchants in Malden, Massachussets, when, in 1886, they sold their business and headed west to investigate the land boom for themselves. Arriving first in San Francisco, they worked their way south, purchasing a fruit ranch in Sierra Madre. On a duck hunting vacation to the Westminster marshes near Anaheim in early 1887, the Ameriges overheard the "locals" talking about the hot news of the day - that the California Central Railroad, a subsidiary of Santa Fe, was looking for land. George H. Fullerton, president of the Pacific Land and Improvement Co., also a Santa Fe subsidiary, had been sent west specifically to purchase land for railroad right-of-way. The Ameriges learned that a likely site for a town was located north of Anaheim. The brothers were so convinced of the potential of the area that they sold their Sierra Madre holdings and opened a real estate office in Anaheim. They then began negotiating for the land, arranging to buy 430 acres at a cost of approximately $68,000.

Discussions next began with Pacific Land and Improvement, with the Ameriges offering free right-of-way and half interest in the land if the railroad survey were altered to include the proposed townsite. With George Fullerton's assurance that the area would be included, the Ameriges purchased the 430 acres. On July 5, 1887, Edward Amerige drove a stake into a mustard field at what is now the corner of Harbor Boulevard and Commonwealth Avenue, and the townsite of Fullerton was born. The appreciative community voted to name the town in honor of its benefactor, George Fullerton.

Agriculture quickly became the new community's leading industry, with Fullerton packing houses shipping as much as $15 million in citrus crops in banner years. At one time, Fullerton boasted of having more orange groves than any other Orange County city. Today, however, it is estimated there are less than 50 acres of groves remaining in the City.

The first oil wells were struck in the late 1890s, and, by 1912, wells extended for 12 miles. The oil fields were located in the northern reaches of the town, much of which is now in Brea. The 1920s heralded an economic boom for the City, sparked in part by the oil being pumped in the hills to the north. Building permits soared to a record $2 million, and the City launched an impressive (by 1920s standards) $150,000 public works program to make street, water, and sewer system improvements.

Fullerton's industrial destiny was secured in 1932 with the opening of Val Vita Food Products in the west end of town. Starting out as a small citrus juice plant, Val Vita, by 1941, had grown into the largest canning company in the nation. In 1943, it merged with another firm to become Hunt-Wesson Foods Co. With the establishment of the southeast industrial area as an "all manufacturing zone," additional industries started to appear. Before the 1950s had concluded,

the City had 142 industries producing a variety of goods, and employing 18,500 persons. Today, the City boasts more than 10,000 businesses and industries.

Fullerton's last big "boom" period began in the late 1940s as veterans returning from World War II began demanding homes for their families. In 1948, permit valuations reached $2.5 million, and, in 1949, set a record $3.2 million, which was more than doubled in 1950. In 1956, the building permit valuation skyrocketed to $114 million. By the 1970s, the rapid pace of growth which characterized Fullerton in the post-war years had slowed considerably. The City was now able to concentrate on providing the amenities all those new families and businesses demanded. New libraries were built, a cultural center and a museum were opened, parks and community centers were developed, recreational trails were provided, human service programs were instituted, and general municipal services were expanded to meet the needs of businesses and residents alike. Work also began on revitalizing the older business areas of town.

The last two decades of the 20th century saw Fullerton's citizens and the City Council, joining forces in an effort to restore the traditional "heart" of the City – the downtown business district - which had begun to decline. This effort became known as "Fullerton 2000 and Beyond," and brought about a "renaissance" of the downtown, which included restoration of more than 70 historic buildings through a commercial building rehabilitation and seismic loan program funded by the Fullerton Redevelopment Agency, and the formulation and implementation of a master plan and vision statement for the downtown.

2.2 Geography and Climate

Orange County is a geographically diverse area of mountains, hills, flatlands, and shoreline. The City of Fullerton is located in the northwest portion of Orange County, northwest of the Santa Ana Mountains and southeast of the West Coyote Hills. The City of Fullerton is located along the fringe of the coastal plain of Los Angeles County and Orange County. Specifically, Fullerton is located within the central lowland coastal plain of Orange County, which stretches northeasterly from the vicinity of Irvine, past Santa Ana and Garden Grove, and into Los Angeles County.

According to the City of Fullerton 2006-2014 Housing Element the City of Fullerton covers an area of over 23 square miles within the northern portion of Orange County, California. It is bordered by the cities of Anaheim, Placentia, Brea, La Habra, La Mirada, and Buena Park.

Topographically the City is divided into two distinct geological areas. The southerly portion of the City is mostly flat, with a gradual downward slope to the south and west. The northerly part of the City consists of gently rising foothills, steep slopes, scenic drives and roadside vista points. The following descriptions of Fullerton's geological conditions are taken from the Existing Conditions Report, Fullerton General Plan Update:

Fullerton is located within the central block of the Los Angeles basin. There are three natural geologic-geographic divisions of the basin represented in the City: the central plain, Coyote Hills, and a small area north of Coyote Hills. The central plain, which extends from the south City limits northerly to the south edge of Coyote Hills, makes up about one-half of the City. The Coyote Hills which cover the northern portion of Fullerton, also makes up about one-half of the City.

Most of the geologic structures in the City trend roughly east to west. The major groups of geologic strata in the Fullerton area consist of Basement Complex schist, which underlies the Puente Hills at depth; over this basement rock is the Puente Formation, which is a series of shales and sandstone of Miocene Age (approximately 15 million years old). South of the Whittier Fault, the Puente Formation is present at great depth, below the Fernando Formation. The Fernando Formation consists of beds of sandstone and silty sandstone of Pliocene-Age (age range of 3 to 12 million years old). Overlying the Fernando is the Quaternary group consisting of the San Pedro, Coyote Hills, and La Habra formations, with alluvium on top. The Quaternary group represents the last three million years on the geologic time scale. These formations consist of sandstone, siltstone, and conglomerate beds that are not strongly jointed together.

The City of Fullerton is underlain by three formations: surficial formations, terrace deposits, and alluvium. Alluvium underlays the southern portion of the City, those areas south of Chapman/Malvern Avenue. The terrace and surficial deposits are interspersed in the northern portion of the City.

The West Coyote Hills are located in the northeastern part of the Los Angeles basin and are part of a chain of low hills extending from Yorba Linda on the east to Santa Fe Springs on the west. These hills are geologically young features that are still in the process of forming under regional tectonic stresses.

The City of Fullerton climate is usually hot and dry in the summer and has mild winters. Data from the Western Regional Climate Center, from 1912 to 2007, shows the record maximum temperatures were a high of 114°F (in September of 1955) and a low of 20°F (on December 30, 1918). Average summer highs range from the lower to upper 80s. Average winter lows range from the lower to upper 40s. Fullerton averages 47 days each year with temperatures exceeding 90°F. Storms between November and April provide the majority of the annual precipitation. Of the total average yearly rainfall of 14.63 inches, 13.09 inches fall between November and April. There is little precipitation in the City during the summer months.

2.3 Economy

The most comprehensive economic data available for the City of Fullerton comes from the U.S. Census Bureau by way of the American Community Survey. Select estimates of economic characteristics for City of Fullerton are shown in Table 2.1.

Table 2.1 The City of Fullerton's Economic Characteristics, 2008

Characteristic	City of Fullerton
Families below Poverty Level	6.4%
All People below Poverty Level	10.8%
Median Family Income	$77,343
Median Household Income	$66,010
Per Capita Income	$23,370
Population in Labor Force	69,008
Population Employed*	3,654
Unemployment	5.3%

Source: U.S. Census Bureau American Community Survey, 2008, www.census.gov/
*Excludes armed forces

More recent data from the California Employment Development Department indicates that, in 2009, there were 72,500 people in the City of Fullerton labor force. Of these, 65,000 were employed; 7,500 were not. The unemployment rate was 10.4 percent. This is a large increase over the early 2000s, where unemployment ranged from 3.8 to 5.6%. This trend follows the recent trend for the State of California.

Table 2.2 illustrates the breakdown of employment by industry in City of Fullerton in 2008, and Table 2.3 lists the City's major employers.

Table 2.2 The City of Fullerton's Employment by Industry, 2006-2008*

Industry	# Employed	% Employed
Agriculture, Forestry, Fishing , Mining	185	0.3
Construction	4,340	6.6
Manufacturing	9,158	14.0
Transportation and warehousing, and utilities	1,664	2.6
Information	1,336	2.0
Wholesale Trade	3,240	5.0
Retail Trade	7,823	12.0
Finance, Insurance, Real Estate	5,367	8.2
Arts, entertainment, and recreation, and accommodation, and food services	6,750	10.3
Educational and Health Services	12,220	18.7

Industry	# Employed	% Employed
Professional, scientific, and management, and administrative and waste management services	7,988	12.2
Other Professional and Related Services	3,227	4.9
Public Administration	1,468	2.2
Totals	**65,265**	**100.0**

Source: U.S. Census Bureau American Community Survey, 2006/2008, www.census.gov/
*Civilian population 16 or older

Table 2.3 The City of Fullerton's Major Employers

Employer	Products and Services	# of Employees
California State University, Fullerton	Government	5,634
St. Jude Medical Center	HealthCare	2,750
Raytheon Systems Company	Defense	1,500
Fullerton School District	Education	1,452
Fullerton Joint Union High School District	Education	1,410
Beckman Coulter	Laboratory Supplies	1,300
Fullerton College	Education	1,123
Alcoa Fastening Systems	Commercial Fasteners	1,000
City of Fullerton	Government	964
Albertsons	Grocery	920
FoxConn	Technology	800
St. Jude Heritage Health	HealthCare	750
Target	Grocery and Textile	650
Kraft Foods	Food	475
Kimberly Clark	Textiles	450

Source: City of Fullerton Housing Element 2006-2014 (May 2008 Draft)

2.4 Population

The City of Fullerton has an estimated 130,963 residents (2006-2008), according to the U.S. Census Bureau. The City of Fullerton is urbanized and primarily built out. Table 2.4 breaks down Fullerton's demographics.

Table 2.4 The City of Fullerton's Demographic and Social Characteristics, 2008

Characteristic	City of Fullerton
Gender/Age	
Male	52.9%
Female	47.1%
Median Age	32.9
Under 5 Years	8.0%

Characteristic	City of Fullerton
65 Years and Over	11.3%
Race/Ethnicity**	
White	51.1%
Some Other Race	21.7%
Asian	20.6%
Black or African American	2.9%
American Indian/Alaska Native	0.5%
Hispanic or Latino (Any Race)	33.0%
Education	
High School Graduate or Higher	84.7%

Source: U.S. Census Bureau American Community Survey, 2006, www.census.gov/
**Of the 97.0 % reporting one race

More demographic information and information on growth can be found in Section 4.3.2 Growth and Development Trends.

3 PLANNING PROCESS

Requirements §201.6(b) and §201.6(c)(1): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and

1) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

The City of Fullerton recognized the need and importance of a Local Hazard Mitigation Plan (LHMP) and initiated its development. After receiving a grant from the Federal Emergency Management Agency (FEMA), which served as the primary funding source for this plan, the County contracted with AMEC Earth and Environmental (AMEC) to facilitate and develop the plan. AMEC's role was to:

- Assist in establishing the Hazard Mitigation Planning Committee (HMPC) as defined by the Disaster Mitigation Act (DMA),
- Meet the DMA requirements as established by federal regulations and following FEMA's planning guidance,
- Support objectives under the National Flood Insurance Program's Community Rating System and the Flood Mitigation Assistance program,
- Facilitate the entire planning process,
- Identify the data requirements that HMPC participants could provide and conduct the research and documentation necessary to augment that data,
- Assist in facilitating the public input process,
- Produce the draft and final plan documents, and
- Coordinate the California Emergency Management Agency (CAL EMA) and FEMA Region IX plan reviews.

3.1 Local Government Participation

The DMA planning regulations and guidance stress that each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC
- Detail areas within the planning area where the risk differs from that facing the entire area
- Identify potential mitigation actions
- Formally adopt the plan

For the City of Fullerton planning area's HMPC, "participation" meant the following:

- Attending and participating in the HMPC meetings;
- Providing facilities for meetings;
- Completing and returning the AMEC Data Collection Guide;
- Collecting and providing other requested data (as available);
- Managing administrative details;
- Making decisions on plan process and content;
- Identifying mitigation actions for the plan;
- Reviewing and providing comments on plan drafts;
- Informing the public, local officials, and other interested parties about the planning process and providing opportunity for them to comment on the plan;
- Advertising, coordinating, and participating in the public input process; and
- Coordinating the formal adoption of the plan by the governing board.

The City of Fullerton met all FEMA's requirements for plan participation. The City brought together a local planning team to help collect data, identify mitigation actions and implementation strategies and review and provide data on plan drafts. Appendix A provides additional information and documentation of the planning process.

3.2 The 10-Step Planning Process

AMEC established the planning process for the City of Fullerton Local Hazard Mitigation Plan using the DMA planning requirements and FEMA's associated guidance. This guidance is structured around a four-phase process:

1) Organize Resources
2) Assess Risks
3) Develop the Mitigation Plan
4) Implement the Plan and Monitor Progress

Into this process, AMEC integrated a more detailed 10-step planning process used for FEMA's Community Rating System (CRS) and Flood Mitigation Assistance programs. Thus, the modified 10-step process used for this plan meets the requirements of six major programs: FEMA's Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, Community Rating System, Flood Mitigation Assistance Program, Severe Repetitive Loss program, and new flood control projects authorized by the U.S. Army Corps of Engineers.

Table 3.1 shows how the modified 10-step process fits into FEMA's four-phase process.

Table 3.1 Mitigation Planning Processes Used to Develop the City of Fullerton's Multi-Hazard Mitigation Plan

DMA Process	Modified CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan

3.2.1 Phase 1: Organize Resources

Planning Step 1: Organize the Planning Effort

With the City of Fullerton's commitment to participate in the DMA planning process, AMEC worked with the City's Community Development Department, Planning Division to establish the framework and organization for development of the plan. Organizational efforts were initiated with the City and other stakeholders to inform and educate the plan participants of the purpose and need for a Local Hazard Mitigation Plan. An initial meeting was held with key community representatives to discuss the plan development process including the need to organize a Hazard Mitigation Planning Committee. (HMPC). The initial kick-off meeting was held on December 17, 2008. Invitations to this kickoff meeting were extended to representatives from key City departments, representatives from City special districts, as well as to other federal, state, and

local stakeholders that might have an interest in participating in the planning process. The list of initial invitees is included in Appendix A. The HMPC was established as a result of these efforts. The HMPC, which included key City and other local government and stakeholder representatives, developed the plan with leadership from the City's Community Development Department, Planning Division, and facilitation by AMEC. The following participated on the HMPC:

City of Fullerton

- Administration
- Community Development Department, Planning Division
- Community Development Department, Building Division
- Community Development Department – Geographic Information Systems (GIS) Division
- Engineering Department
- Fire Department
- Human Resources Department – Risk Management Division
- Library
- Maintenance Services Department – Streets Division
- Maintenance Services Department – Landscape Division
- Parks and Recreation
- Police Department

Other Government and Stakeholder Representatives:

- Orange County Animal Care
- National Weather Service
- RBF Consulting

A list of participating HMPC representatives is included in Appendix A. This list details all HMPC members that attended one or more HMPC meetings detailed in Table 3.2. The City also utilized the support of many other City staff in order to collect and provide requested data and to conduct timely reviews of draft documents. Note, that the core HMPC group was also supplemented by input from other government and stakeholder representatives that contributed to the planning process as identified in Planning Step 3: Coordinate with Other Department and Agencies.

The planning process officially began with a kick-off meeting on December 17th, 2008. The meeting covered the scope of work and an introduction to the DMA requirements. Participants were provided with a Data Collection Guide, which included worksheets to facilitate the collection of information necessary to support development of the plan. Using FEMA guidance, AMEC designed these worksheets to capture information on past hazard events, identify hazards of concern to the jurisdiction, quantify values at risk to identified hazards, inventory existing capabilities, and record possible mitigation actions. A copy of AMEC's Data Collection Guide

for this project is included in Appendix A. The City completed and returned the worksheets in the data collection guide to AMEC for incorporation into the plan document.

During the planning process, the HMPC communicated through face-to-face meetings, email, telephone conversations, and a file transfer protocol (ftp) website. Draft documents were posted on this website so that the HMPC members could easily access and review them. The HMPC met five times during the planning period (December 17, 2008-July 2010). The dates and purposes of these meetings are described in Table 3.2.

Table 3.2 Schedule of Planning Meetings

Meeting Type	Meeting Topic	Meeting Date(s)
HMPC #1	Kick-off meeting: introduction to DMA, the planning process, and hazard identification	December 17, 2008
HMPC #2	Risk assessment overview and work session	August 27, 2009
HMPC #3	Development of mitigation goals and objectives	December 15, 2009
HMPC #4	Development and prioritization of mitigation recommendations	December 16, 2009
HMPC #5	Review and public and final team comments	July 14, 2010

Agendas and for each of the meetings and lists of attendees are included in Appendix A.

Planning Step 2: Involve the Public

Early discussions with the City of Fullerton Planning Department established the initial plan for public involvement. At the kick-off meeting, the HMPC discussed additional options for public involvement and agreed to an approach using established public information mechanisms and resources within the community. Public outreach was initiated during the plan development process with an informational press release to inform the public of the purpose of DMA and the hazard mitigation planning process for the City of Fullerton. Public involvement activities included press releases, website postings, public meetings, and the collection of public comments on the draft plan. Mediums used to advertise the public meeting are listed below.

- City of Fullerton Twitter page
- City of Fullerton Facebook page
- City of Fullerton cable channel
- AmericanTowns.com
- NGUOI VIET Online
- The Azteca News
- Daily Titan
- Farandula USA
- Korea Daily
- Korean Times

- LA Opinion
- Los Angeles Times
- Miniondas Newspaper
- The Observer News

A formal public meeting was held during the draft-plan development process and prior to finalizing the plan as further described in Table 3.3. This public meeting was held in conjunction with the monthly planning commission meeting. No formal stakeholder and public comments were received during the plan development process, including the sections that address mitigation goals and strategies. All press releases and website postings are on file with the City of Fullerton Community Development Department, Planning Division (see Figure 3.1 for an example of the press releases). The plan is available online at http://www.cityoffullerton.com/depts/dev_serv/development_activity/default.aspwww. The public outreach activities described here were coordinated and fully supported by the City of Fullerton.

Table 3.3 Public Meetings

Meeting Topic	Meeting Dates	Meeting Locations
Public meeting: plan overview and public comments	July 14, 2010	Council Chambers of Fullerton City Hall

Figure 3.1 Example of Press Releases Used to Involve the Public

Press Release

City of Fullerton
Public Information Office

303 W. Commonwealth
Fullerton, CA 92832
Phone: (714) 738-6317

2/23/2010

ADD THIS

FOR IMMEDIATE RELEASE

PRESS RELEASE #05210

Subject : **City preparing local hazard mitigation plan**

Contact : Heather Allen, Senior Planner, Fullerton Community Development Department (714) 738-6884
Sylvia Palmer Mudrick, Public Information Coordinator, Fullerton City Manager's Office (714) 738-6317

The City of Fullerton is in the process of developing a plan for identifying potential local natural hazards and mitigating their impact on residents.

City Senior Planner Heather Allen, who is coordinating the project, explained the goal of the "Local Hazard Mitigation Plan" (LHMP) is to guide hazard mitigation planning "to better protect the citizens and property of the City of Fullerton from the effects of natural hazard events before they occur."

She added having an LHMP will also allow the city to maintain its eligibility for funding from the Federal Emergency Management Agency (FEMA).

"The plan will demonstrate the city's commitment to reducing risks from hazards, and will serve as a tool to help decision-makers direct mitigation activities and resources to better serve the citizens," Allen said.

There are four steps in developing an LHMP, Allen explained. First, staff needs to identify all potential local natural hazards that may pose a risk to the community. Next, an assessment must be made of the potential impacts of those hazards on lives and property.

The third step, Allen continued, is for staff to develop goals and strategies to reduce the potential impacts. Finally, the city must prioritize and implement those mitigation strategies.

Allen said a draft of the LHMP will be available for public review and comment in early spring. A community meeting on the draft will also be scheduled then.

Once the public comments have been incorporated into the document, the plan will be submitted to both FEMA and the California Emergency Management Agency. Once FEMA has approved the plan, it will come to the Fullerton City Council for adoption, and then will be implemented.

Further information about the LHMP process may be obtained by calling either Allen at (714) 738-6884, or by email at heathera@ci.fullerton.ca.us.

Inquiries on the plan may also be directed to Jeanine Foster of AMEC Earth and Environment, which is consulting on the process, at (303) 742-5332, or by email at jeanine.foster@amec.com.

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Planning Step 3: Coordinate with Other Departments and Agencies

Early in the planning process, the HMPC determined that data collection, mitigation strategy development, and plan approval would be greatly enhanced by inviting state and federal agencies and organizations to participate in the process. Based on their involvement in hazard mitigation planning, their landowner status in the County, and/or their interest as a neighboring jurisdiction, representatives from the following agencies were invited to participate on the HMPC:

- American Red Cross
- Cal EMA
- CAL FIRE
- California Department of Water Resources
- California Geological Survey
- FEMA Region IX – Hazard Mitigation
- National Weather Service
- Orange County Agricultural Commissioner
- Orange County Animal Care
- Orange County Assessor
- Orange County Fire Authority
- Orange County Floodplain Manager
- Orange County Information Services/GIS
- Orange County Office of Emergency Services
- Orange County Parks and Recreation
- Orange County Planning and Development
- Orange County Public Works
- Salvation Army
- US Army Corp of Engineers
- US Bureau of Reclamation
- US Forest Service

The HMPC also used technical data, reports, and studies from the following agencies and groups:

- American Red Cross
- California Department of Finance
- California Department of Fish and Game
- California Department of Forestry and Fire Protection (Cal Fire)
- California Department of Parks and Recreation Office of Historic Preservation
- California Department of Public Health
- California Department of Water Resources
- California Emergency Management Agency

- California Geological Survey
- Orange County Health Department
- U.S. Army Corps of Engineers
- U.S. Center for Disease Protection
- U.S. Bureau of Land Management
- U.S. Bureau of Reclamation
- U.S. Fish and Wildlife Service
- U.S. Forestry Service
- U.S. Geological Survey
- U.S. Census Bureau
- Federal Emergency Management Agency
- National Weather Service
- National Oceanic and Atmospheric Administration, National Climatic Data Center
- National Resource Conservation Service

Several opportunities were provided for the above groups to participate in the planning process. At the beginning of the planning process, invitations were extended to these groups to actively participate on the HMPC. Specific participants from these groups are detailed in Appendix A. Others assisted in the process by providing data directly as requested in the Data Collection Guide or through data contained on their websites or as maintained by their offices. These groups were also invited to participate through the public outreach process which included public meetings as previously described. Further as part of the HMPC and public outreach processes, all groups were invited to review and comment on the plan prior to submittal to Cal EMA and FEMA.

Other Community Planning Efforts and Hazard Mitigation Activities

Coordination with other community planning efforts is paramount to the success of this plan. Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. The City of Fullerton uses a variety of comprehensive planning mechanisms, such as general plans and ordinances, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. The development of this plan incorporated information from the following existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

- City of Fullerton Existing Conditions Report
- City of Fullerton General Plan and Background Report
- City of Fullerton Drainage Master Plan
- City of Fullerton Flood Insurance Study
- City of Fullerton Urban Water Management Plan

- City of Fullerton Water Supply Shortage Conservation Plan
- Orange County Extreme Heat Plan
- Orange County Emergency Plan Care and Shelter Annex
- South California Edison Emergency Preparedness and Hazard Mitigation Planning
- State of California Multi-Hazard Mitigation Plan

Other documents were reviewed and considered, as appropriate, during the collection of data to support Planning Steps 4 and 5, which include the hazard identification, vulnerability assessment, and capability assessment. Appendix B References identifies additional documents and community planning efforts utilized in the development of this plan.

3.2.2 Phase 2: Assess Risks

Planning Steps 4 and 5: Identify the Hazards and Assess the Risks

AMEC led the HMPC in an exhaustive research effort to identify and document all the hazards that have, or could, impact the planning area. Data collection worksheets were developed and used in this effort to aid in determining hazards and vulnerabilities and where risk varies across the planning area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities. The HMPC also conducted a capability assessment to review and document the planning area's current capabilities to mitigate risk and vulnerability from hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the HMPC could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. Using this information, AMEC developed the risk assessment portion of the plan, which contained the hazard identification, the vulnerability assessment, and the capability assessment. A more detailed description of the risk assessment process and the results are included in Chapter 4 Risk Assessment.

3.2.3 Phase 3: Develop the Mitigation Plan

Planning Steps 6 and 7: Set Goals and Review Possible Activities

AMEC facilitated brainstorming and discussion sessions with the HMPC that described the purpose and the process of developing planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Chapter 5 Mitigation Strategy. Additional documentation on the process the HMPC used to develop the goals and strategy is in Appendix C: Mitigation Categories, Alternatives, and Selection Criteria.

Planning Step 8: Draft an Action Plan

Based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, AMEC produced a complete first draft of the plan. This

complete draft was posted for HMPC review and comment on the project ftp site. HMPC and agency comments were integrated into the second draft, which was advertised and distributed to collect public input and comments. AMEC integrated comments and issues from the public and stakeholders, as appropriate, along with additional agency and other stakeholder internal review comments and produced a final draft for the Cal EMA and FEMA Region IX to review and approve, contingent upon final adoption by Fullerton City Council.

3.2.4 Phase 4: Implement the Plan and Monitor Progress

Planning Step 9: Adopt the Plan

In order to secure buy-in and officially implement the plan, the plan was reviewed by the Planning Commission and adopted by the City Council of the City of Fullerton on the dates included in the corresponding resolutions in Appendix D: Adoption Resolution.

Planning Step 10: Implement, Evaluate, and Revise the Plan

The true worth of any mitigation plan is in the effectiveness of its implementation. Up to this point in the planning process, all of the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Each recommended action includes key descriptors, such as a lead manager and possible funding sources, to help initiate implementation. An overall implementation strategy is described in Chapter 7 Plan Implementation and Maintenance.

Finally, there are numerous organizations within the City of Fullerton's planning area whose goals and interests interface with hazard mitigation. Coordination with these other planning efforts, as addressed in Planning Step 3, is paramount to the ongoing success of this plan and mitigation in City of Fullerton and is addressed further in Chapter 7. A plan update and maintenance schedule and a strategy for continued public involvement are also included in Chapter 7.

4 RISK ASSESSMENT

Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage."

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of a jurisdiction's potential risk to hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

This risk assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses* (FEMA 386-2, 2002), which breaks the assessment into a four-step process:

1) Identify hazards
2) Profile hazard events
3) Inventory assets
4) Estimate losses

Data collected through this process has been incorporated into the following sections of this chapter:

- **Section 4.1 Hazard Identification: Natural Hazards** identifies the natural hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.
- **Section 4.2 Hazard Profiles** discusses the threat to the planning area and describes previous occurrences of hazard events and the likelihood of future occurrences.
- **Section 4.3 Vulnerability Assessment** assesses the City's total exposure to natural hazards, considering assets at risk, critical facilities, and future development trends.
- **Section 4.4 Capability Assessment** inventories existing mitigation activities and policies, regulations, and plans that pertain to mitigation and can affect net vulnerability.

This risk assessment covers the entire geographical extent of the City of Fullerton.

4.1 Hazard Identification: Natural Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

The City of Fullerton HMPC conducted a hazard identification study to determine the hazards that threaten the planning area.

4.1.1 Methodology and Results

Using existing natural hazards data and input gained through planning meetings, the HMPC agreed upon a list of natural hazards that could affect the City of Fullerton. Hazards data from Cal EMA, FEMA, the National Oceanic and Atmospheric Administration, and many other sources were examined to assess the significance of these hazards to the planning area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries and property and economic damage. The natural hazards evaluated as part of this plan include those that occurred in the past or have the potential to cause significant human and/or monetary losses in the future. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 4.3 Vulnerability Assessment.

In alphabetical order, the natural hazards identified and investigated for the City of Fullerton Local Hazard Mitigation Plan include:

- Dam Failure
- Drought
- Seismic and Geologic Hazards
  - Earthquake
  - Landslide
  - Liquefaction
  - Lateral Spreading
  - Subsidence
  - Settlement
- Flood
  - 100/500-year flood
  - Stormwater flood
- Human Health Hazards
  - Epidemic/Pandemic
  - West Nile Virus
- Landslide (non-seismic)
- Severe Weather
  - Extreme Temperatures

    - Extreme Cold/Freeze
    - Extreme Heat
  - Fog
  - Heavy Rain/Thunderstorm/Hail/Lightning
  - Tornado
  - Wind
- Soil Hazards
  - Erosion
  - Subsidence (non-seismic)
- Volcano
- Wildfire

The HMPC eliminated the natural hazards listed below from further consideration in this risk assessment because they occur rarely or not at all in the City of Fullerton.

- Agricultural
- Coastal Erosion
- Coastal Storm
- Hurricane
- Severe Weather
  - Snow
- Tsunami

4.1.2 Disaster Declaration History

One method the HMPC used to identify hazards was the researching of past events that triggered federal and/or state emergency or disaster declarations in the planning area. Federal and/or state disaster declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors. This section focuses on state and federal disaster and emergency declarations.

Fullerton is among the many communities in California that are susceptible to disaster. Details on federal and state disaster declarations were obtained by the HMPC, FEMA, and Cal EMA and compiled in chronological order in Table 4.1. *Note*: *most disaster declarations are issued on a county-wide basis*. In some (limited) instances a city or area within a county is specifically designated. A review of state and federal declared disasters indicates that the City of Fullerton itself never received a disaster declaration. However, Orange County received 36 state declarations between 1950 and November 2008, 26 of which also received federal disaster declarations. Of the 36 state declarations, 14 were associated with severe winter storms, heavy rains, or flooding; 11 for wildfires, 2 for heavy surf and coastal storms; 2 for earthquake, 2 for gasoline shortages, 2 for Exotic Newcastle Disease Epidemic, 1 for Mediterranean Fruit Fly outbreak; 1 for energy emergency, and 1 for Hurricane Katrina Evacuations.

This disaster history (combined federal and state) suggests that Orange County (and the City of Fullerton) experiences a major event worthy of a disaster declaration every 1.6 years. The County has a 62.1 percent chance of receiving a disaster declaration in any given year. With the exception of the declarations for earthquake and wildfire, every declaration resulted directly or indirectly from severe weather. Similarly, most disaster-related injuries to people and damage to property resulted from severe weather.

Table 4.1. The City of Fullerton's State and Federal Disaster Declarations, 1950-2007

Hazard Type	Disaster #	Year	State Declaration	Federal Declaration	Location	Damage*
Floods	CDO 50-01	1950	11/21/50	--	Statewide	9 deaths; $32,183,000
Floods	DR-47	1955	12/22/55	12/23/55	Statewide	74 deaths; $200,000,000
Storm & Flood Damage	--	1958	4/2/58	4/4/58	Statewide	13 deaths; several injuries $24,000,000
High Tides and Heavy Surf	-	1963	2/63	-	Orange County (and City of Redondo Beach)	5 deaths; $500,000
Major and Widespread Fires (Woodsen Fire)	-	1967	1/7/67	-	Orange County (and 3 other counties)	17,500 acres and 30 buildings destroyed $11,345,000
1969 Storms	DR-253	1969	1/25/69	1/26/69	Orange County (and 39 other counties)	47 deaths 161 injuries $300,000,000
Exotic Newcastle Disease Epidemic	-	1972	4/10/72	-	Orange County (and 6 other counties)	$10,000,000
Gasoline Purchasing Problems	-	1974	2/28/74	-	Orange County (and 8 other counties)	N/A

Hazard Type	Disaster #	Year	State Declaration	Federal Declaration	Location	Damage*
Storms	DR-547	1978	2/13/78	2/15/78	Orange County (and 13 other counties)	14 deaths; at least 14 injured; 2538 homes destroyed; $117,802,785
Gasoline Shortage Emergency	-	1979	11/13/79	-		N/A
1980 Winter Storms	DR-615	1980	2/19/80	2/21/80	Orange County (and 6 other counties)	Not available
Southern California Fires	DR-635	1980	11/18/80	11/18/80	Orange County (and 3 other counties)	420 buildings, 46,945 acres destroyed; $64,795,200
Orange Fire	DR-657	1982	4/21/82	4/21/82	Orange County	$50,877,040
Dayton Hills Fire		1982	10/10/82	-	Orange County (and 2 other counties)	57,000 acres and 65 buildings destroyed; $19,277,102
Winter Storms	DR-682	1982/ 1983	1/31/83	2/9/83	Orange County (and 43 other counties)	$523,617,032
Whittier Earthquake	DR-799	1987	10/5/87	10/7/87	Orange County (and 1 other county and 2 cities)	9,164 homes and 1,455 businesses damaged or destroyed; $358,052,144
Coastal Storms	DR-812	1988	1/21/88	2/5/88	Orange County (and 2 other counties and 2 cities)	Not available
Mediterranean Fruit Fly	-	1989	11/20/89	-	Orange County	Damage was avoided
1992 Winter Storms	DR-935	1992	2/19/92	2/25/92	Orange County (and 4 other counties and 1 city)	5 deaths $123,240,531
1992 Late Winter Storms	DR-979	1992	1/19/93	1/15/93	Orange County (and 23 other counties and 2 cities)	20 deaths; 10 injuries; $600,000,000
Southern California Firestorms	DR-1005	1993	10/27/93	10/28/93	Orange County (and 5 other counties)	4 deaths; 162 injuries; 1078 structures and 193,814 acres destroyed; $1 billion
Northridge Earthquake	DR-1008	1994	1/24/94	1/17/94	Orange County (and 4 other counties)	57 deaths; 11,846 injuries; $40 billion+

Hazard Type	Disaster #	Year	State Declaration	Federal Declaration	Location	Damage*
Severe Winter Storms	DR-1044	1995	1/6/95	1/13/95	Orange County (and 44 other counties)	11 deaths $741,400,000
Late Winter Storms	DR-1046	1995	--	1/10/95	Orange County (and all other counties except Del Norte)	17 deaths $1,100,000,000
Southern California Firestorms	EM-3120	1996	10/96	10/96	Orange County (and 1 other county)	5 injuries; 344 homes damaged or destroyed; $40,000,000
El Nino	DR-1203	1998	-	2/2/98	Orange County (and 39 other counties)	17 deaths' $550,000,000
Energy Emergency	GP 2001	2001	1/1/01	-	Orange County (and all 57 other counties)	Not available
Antonio Fire	FM-2405	2002	-	5/13/02	Orange County	$467,678
Exotic Newcastle Disease Epidemic	GP 2003		1/3/07	-	Orange County (and all 5 other counties)	Not available
2005 January Winter Storms	DR-1577	2005	1/12/05	2/4/05	Orange County (and all 7 other counties)	$291,368,772
2005 February Storms	DR-1585	2005	3/16/05	4/14/05	Orange County (and all 6 other counties)	$76,128,144
Hurricane Katrina Evacuations	EM-3248	2005	-	9/13/05	Orange County (and all 57 other counties)	$763,576
Sierra Fire	FM-2630	2006	-	2/6/06	Orange County (and 1 other county)	$161,790
241 Fire	FM-2683	2007	--	3/11/07	Orange County	Not available
Wildfires	DR-1731	2007-8		10/24/07	Orange County (and all 6 other counties)	Not available
2008 Wildfires	DR-1810	2008	-	11/18/08	Orange County (and all 3 other counties)	Not available

Source: California Emergency Management Agency, www.oes.ca.gov/
*Damage amount and deaths and injuries reflect totals for all impacted counties

4.2 Hazard Profiles

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

The hazards identified in Section 4.1 Hazard Identification: Natural Hazards are profiled individually in this section. In general, information provided by planning team members is integrated into this section with information from other data sources, such as those mentioned in Section 4.1. These profiles set the stage for Section 4.3 Vulnerability Assessment, where the vulnerability is quantified, where possible, for each of the priority hazards.

Each hazard is profiled in the following format:

- **Hazard/Problem Description**—This section gives a description of the hazard and associated issues followed by details on the hazard specific to the City of Fullerton planning area. Where known, this includes information on the hazard extent, seasonal patterns, speed of onset/duration, and magnitude and/or secondary effects.
- **Past Occurrences**—This section contains information on historical incidents, including impacts where known. The extent or location of the hazard within or near the City of Fullerton planning area is also included here. Historical incident worksheets and other data sources were used to capture information on past occurrences.
- **Frequency/Likelihood of Future Occurrence**—The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of an event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:

  - **Highly Likely**—Near 100 percent chance of occurrence in next year or happens every year.
  - **Likely**—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.
  - **Occasional**—Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
  - **Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

Section 4.2.18 Natural Hazards Summary provides an initial assessment of the profiles and assigns a level of significance to each hazard. Those hazards determined to be of high significance were characterized as priority hazards that required further evaluation in Section 4.3

Vulnerability Assessment. Those hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, and economic damage. This assessment was used by the HMPC to prioritize those hazards of greatest significance to the planning area; thus enabling the City to focus resources where they are most needed.

The following sections provide profiles of the natural hazards that the HMPC identified in Section 4.1 Identifying Hazards. The severe weather hazards are discussed first because it is the secondary hazards generated by severe weather (e.g., flood and wildfire) that can result in the most significant losses. The other hazards follow alphabetically.

4.2.1 Severe Weather: General

Severe weather is generally any destructive weather event, but usually occurs in the City of Fullerton planning area as localized thunderstorms that bring heavy rain, hail, and lightning.

The National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database tracks severe weather events on a county basis and contains data on the following: all weather events from 1993 to current (except from 6/1993-7/1993); and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). This database contains 292 severe weather events that occurred in Orange County between January 1, 1950, and March 31, 2009. Table 4.2 summarizes these events.

Table 4.2. NCDC Hazard Event Reports for the Orange County* 1950-2009

Type	# of Events	Property Loss ($)	Crop Loss ($)	Deaths	Injuries
Dense Fog	13	15,000	0	0	4
Flash Floods	30	1,995,000	0	0	0
Floods	62	56,320,000	0	4	7
Funnel Clouds	32	0	0	0	0
Hail	9	75,000	0	1	0
Heavy Rain	13	36,113,000	0	1	5
High Winds	35	10,139,000	35,825,000	6	74
Lightning	3	60,000	0	0	0
Thunderstorm/Wind	21	785,000	20,000	0	0
Tornado: F0	16	5,719,000	0	0	3
Tornado: F1	9	5,270,000	0	0	4
Tornado: F2	1	3,000	0	0	0
Tornado: F3	1	2,500,000	0	0	6
Urban/Small Stream Flood	23	4,710,00	242,000	0	3
Wildfires	24	164,575,000	0	0	29
Totals**	**292**	**283,573,710**	**36,087,000**	**12**	**135**

Source: National Climatic Data Center Storm Events Database, www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms
*Note any reference to a coastal type weather event for Orange County has been excluded from this table.
**Losses reflect totals for all impacted areas, inclusive or Orange County

The HMPC supplemented NCDC data with data from SHELDUS (Spatial Hazard Events and Losses Database for the United States). SHELDUS is a county-level data set for the United States that tracks 18 types of natural hazard events along with associated property and crop losses, injuries, and fatalities for the period 1960-2005. Produced by the Hazards Research Lab at the University of South Carolina, this database combines information from several sources (including the NCDC). From 1960 to 1995, only those events that generated more than $50,000 in damage were included in SHELDUS. For events that covered multiple counties, the dollar losses, deaths, and injuries were equally divided among the affected counties (e.g., if four counties were affected, then a quarter of the dollar losses, injuries, and deaths were attributed to each county). From 1995 to 2005, all events that were reported by the NCDC with a specific dollar amount are included in SHELDUS.

SHELDUS contains information on 263 severe weather events that occurred in Orange County between 1960 and 2007. Table 4.3 summarizes these events.

Table 4.3. SHELDUS Hazard Event Reports for the Orange County*, 1960-2007

Type	# of Events	Property Loss ($)	Crop Loss ($)	Deaths	Injuries
Earthquake	1	360,000	0	0	0
Flooding	35	112,466,193	722,000	3	8.67
Flooding, Severe Storm, Thunderstorm	5	227,873	12,685,379	0	6
Fog	2	5,000	0	0	1.66
Fog - Severe Storm/Thunder Storm - Wind - Winter Weather	1	500	0	2	0
Hail	1	75,000	0	0	0
Hail, Lightning	1	5,000	0	0	0
Hail, Severe Storm/ Thunderstorm	2	86	0	.02	.73
Heat	4	0	0	5.51	7.78
Landslide	8	51,858,500	0	1	0
Landslide – Severe Storm	1	5,000	0	0	0
Lightning	8	169,404	28,676	1.06	1.33
Lightning – Severe Storm	3	805	50,407	0.8	0
Lightning - Wind,	1	294	0	0	.06
Severe Storm, Thunderstorm	34	37,724,119	21,536	7	20.65
Severe Storm, Thunderstorm, Wind	21	1,313,606	520,086	1.39	.93
Severe Storm, Thunderstorm, Winter Weather	3	1,676,149	175,287	0.6	.07
Tornado	12	1,701,050	0	5	0
Wildfire	17	454,289,286	0	.75	76
Wind	82	5,774,609	9,717,586	6	34.6
Wind – Winter Weather	1	500	0	0	0
Winter Weather	20	5,264,709	9,147,317	4.95	33.73
Totals**	**263**	**672,917,683**	**33,068,274**	**39.08**	**192.21**

Source: SHELDUS, Hazards Research Lab, University of South Carolina, www.sheldus.org/

*Note any reference to a coastal type weather event for Orange County has been excluded from this table.

**Events may have occurred over multiple cities, so damage may represent only a fraction of the total event damage and may not be specific to Orange County and City of Fullerton

The NCDC and SHELDUS tables above summarize severe weather events that occurred in Orange County. Only a few of the events actually resulted in state and federal disaster declarations. It is interesting to note that different data sources capture different events during the same time period, and often different information specific to the same events. While the HMPC

recognizes these inconsistencies, it is the value this data provides in depicting the County's "big picture" hazard environment.

As previously mentioned, all of the City of Fullerton's state and federal disaster declarations have been a result of severe weather. For this plan, severe weather is broken down as follows:

- Extreme Temperatures
  - Extreme Cold/Freeze
  - Extreme Heat
- Fog
- Heavy Rain/Thunderstorm/Hail/Lightning
- Tornado
- Wind

4.2.2 Severe Weather: Extreme Temperatures

Hazard/Problem Description

Extreme temperature events, both cold and hot, can have severe impacts on human health and mortality, natural ecosystems, and agriculture and other economic sectors.

Extreme Cold/Freeze

Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to cold can cause frostbite or hypothermia and can be life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Freezing temperatures can also cause significant damage to the agricultural industry, which is very limited within the City.

In 2001, the National Weather Service implemented an updated Wind Chill Temperature index (see Figure 4.1). This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Figure 4.1. National Weather Service Wind Chill Chart

Wind (mph)	Temperature (°F)																	
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Source: National Weather Service Forecast Office, San Joaquin Valley/Hanford, California, www.wrh.noaa.gov/hnx/

Extreme Heat

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the NWS, among natural hazards, only the cold of winter—not lightning, hurricanes, tornadoes, floods, or earthquakes—takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died. Extreme heat can also affect the agricultural industry.

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise, and heat-related illness may develop. The elderly, small children, patients with chronic medical conditions, those on prescription medication therapy, and people with weight and alcohol problems are particularly susceptible to heat reactions.

According to the Western Regional Climate Center, the average high and low temperatures for the City of Fullerton in August are 88.4°F and 58.5°F, respectively. Temperatures that are 10

degrees above normal are considered excessive. The NWS has in place a system to initiate alert procedures (advisories, watches, and warnings) when high temperatures are expected to have a significant impact on public safety. The expected severity of the heat determines which type of alert is issued.

The City of Fullerton begins to experience hot weather in May or June of each year, and the heat continues throughout the summer months. The City of Fullerton is a participating jurisdiction in the Orange County Operational Area Emergency Operations Plan, Extreme Heat Weather Annex. As indicated in the plan, using historical weather and mortality data, the NWS and the California Department of Public Health have identified five major types of climate regions within California to account for climate differences among regions in order to recognize what constitutes an excessive heat event in each of the regions. When temperatures spike for two or more consecutive days without an adequate drop in nighttime temperature to cool the outdoor and indoor environments, there is a significant increase in the risk to vulnerable populations. The San Diego office of the NWS, using these climate-region-specific criteria, will predict an excessive heat event, then issue alerts in the form of a Special Weather Statement that is based on how far in advance of the event they are making the prediction. The Extreme Heat Weather Annex (profiled in the Section 4.4 Capabilities) includes the following alerts:

- An **Excessive Heat Outlook** is issued 3-7 days in advance of an event to give advance notice of the possibility of excessively hot conditions. Criteria match those of an Excessive Heat Warning. If predicted weather conditions are maintained, an Excessive Heat Outlook may become an Excessive Heat Watch.
- An **Excessive Heat Watch** is issued 36 to 48 hours in advance of an event to give advance notice of the possibility of excessively hot conditions. Criteria match those of an Excessive Heat Warning.
- An **Excessive Heat Warning** is issued 0-36 hours in advance of an excessive heat event that is expected to last 2 days or more. Criteria consists of a heat index of at least 105°F for more than 3 hours per day for 2 consecutive days, or heat index more than 115°F for any period of time.

Any heat related response will be carried out in consultation and coordination with the Orange County Operational Area partners, which includes Fullerton, using the following phases and thresholds as guidelines to determine the most appropriate level of response for the affected Orange County areas. The Orange County Extreme Heat Weather Annex provides a three phase approach to mitigate and reduce the effects of extreme heat.

- **Phase One – Readiness**: This is executed when NWS issues a special or hazardous weather forecast predicting hot weather.
- **Phase Two – Heat Alert**: This is triggered when on or more of the following occur:
  - NWS issues a Heat Watch predicting excessive hot weather for 3 days or less.
  - California Independent System Operator (CALISO) issues a Stage 3 Electrical Emergency or rotating blackouts.

- Orange County Health Officer provides information from the state or other reporting measures within the Health Care Agency (HCA), Emergency Medical Services, Orange County Sherriff's Department Coroner's Office, etc.

- **Phase Three – Heat Emergency**: This is triggered when on or more of the following occur:
  - Weather conditions with a credible weather forecast of excessively hot weather for more than three days with one or more of the following:
    - Heat index of over 105°F;
    - High daytime air temperature greater than 105°; or
    - Nighttime temperature of 85° or greater.
  - NWS Heat Warning issued for more than three days.
  - CALISO issues a Stage 3 Electrical Emergency
  - Increased reports of heat related illnesses, medical emergencies, or mortality reported by EMS or other credible sources.
  - Orange County Health Officer provides any other information received from the state or other reporting measures within the Health Care Agency, Emergency Medical Services, Orange County Sherriff's Department Coroner's Office, etc. and makes a recommendation.

Forecasting and monitoring of extreme heat conditions will be done by the Orange County Sherriff's Department and Emergency Management Bureau with support from the HCA.

Past Occurrences

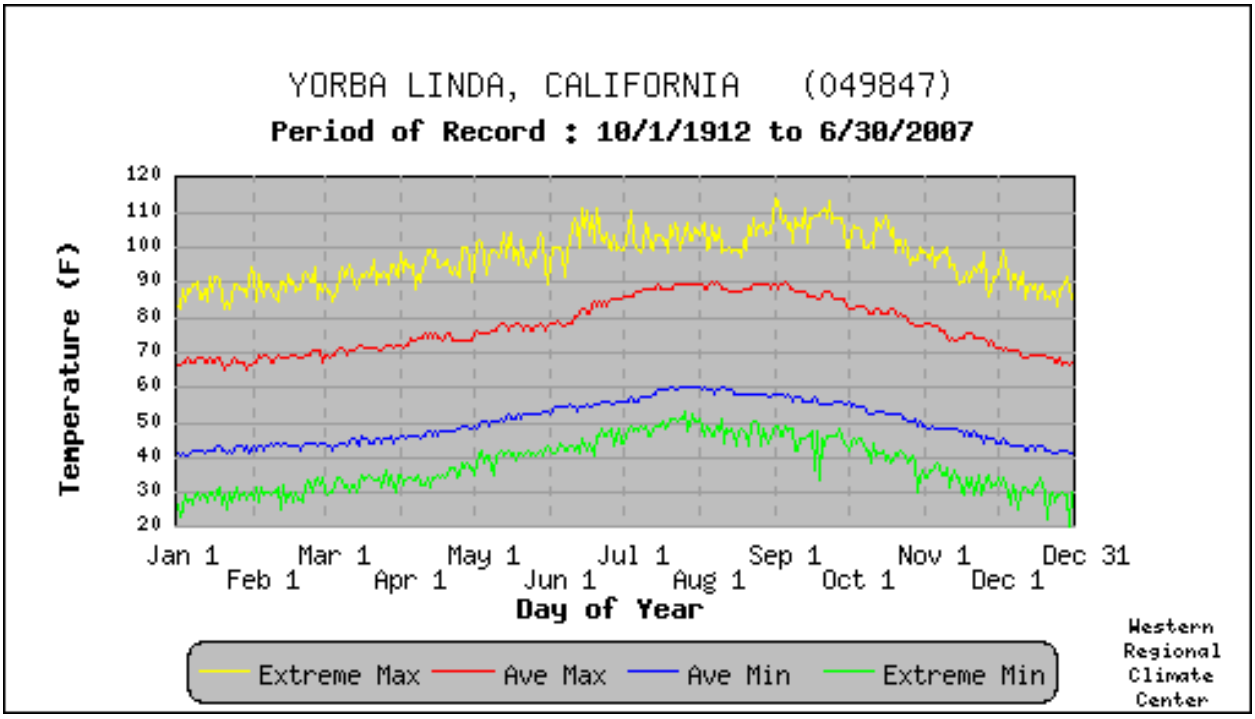
According to the Orange County Extreme Heat Annex, typical summer temperatures in California contribute to approximately 20 deaths per year. The July 2006 heat wave in California was responsible for the death of 140 people over a 13 day period.

Information from the closest weather station with the most comprehensive data, the Yorba Linda Weather Station (33° 53′ by 117° 49′, 40 ft above mean sea level (msl)), is summarized below and in Figure 4.2.

The City of Fullerton (Yorba Linda Weather Station, Period of Record 1948 to 2007)

In the City of Fullerton, monthly average maximum temperatures in the warmest months (May through October) range from the mid 70s to the upper 80s. Monthly average minimum temperatures from November through April range from the mid 60s to low 70s. The highest recorded daily extreme was 114°F on September 1, 1955. The lowest recorded daily extreme was -20°F on December 18, 1920. In a typical year, maximum temperatures do not exceed 90°F and minimum temperatures do not fall below 40°F.

Figure 4.2. The City of Fullerton's Daily Temperature Averages and Extremes



Source: Western Regional Climate Center, www.wrcc.dri.edu/

The HMPC identified the following events related to extreme temperatures in the City of Fullerton planning area:

Events of Note

Extreme Cold/Freeze

January 15-18, 1987 - A very cold air mass remained over the region. It was 10° at Mt. Laguna, 17° at Bonsall, 22° at Valley Center, 24° in Poway, 26° in El Cajon, 31° in Chula Vista and 36° at San Diego. On 1.17 it was 24° in Fallbrook, 28° in Del Mar. Substantial avocado crop loss in the millions of dollars. Two homeless died of hypothermia on January17.

December 24-30, 1988 - A week of subfreezing temperatures in Southern California. 5 people died as a result of the cold.

Extreme Heat

June 11, 1887 - 112°F observed in Los Angeles. It would be an all time record, but official records did not begin to be track until 20 days later.

July 25, 1891 – 109°F observed in Los Angeles.

April 23, 1910 - 100°F observed in Los Angeles, a record for April.

October 14, 1961 - Hot Santa Ana winds drove the temperature to 110° in Long Beach, the hottest in the nation, 107° in San Diego, 105° in LA, and over 100° in many coastal and inland locations.

October 20-29, 1965 - A very long heat wave. LA had 10 consecutive days with afternoon highs reaching 100°F.

October 3-4, 1987 - 108° in LA on both days, a record for October.

July 16-22, 2006— Strong high pressure centered over the southwest United States and monsoon moisture during the last half of July led to numerous daily high minimum and high maximum temperature records, some of which were all time records. The strong subsidence over Southern California caused an unprecedented heat wave and widespread surface dew point temperatures from the upper 60s to the mid 70s resulted in record warm overnight temperatures and abnormally high humidity levels. The heat wave reached its peak on the 22nd. The heat was particularly hard on the elderly and those without air conditioning. Power outages made for an even more dangerous situation. While high temperatures near the end of the month did not exceed excessive heat criteria, low temperatures remained at record warm levels. This was particularly problematic for residents who do not have air conditioning and were unable to cool their homes at night. The NCDC database reported 16 heat related deaths in southern California during this heat wave, though it does not denote whether any fatalities occurred in Fullerton.

September 2007— Strong high pressure and easterly flow brought hot, humid weather to much of Southern California. Temperatures exceeded 95° along the coast and in the mountains, 105° in the Orange and San Diego County valleys, 110° in the Inland Empire and high deserts, and 115° in the lower deserts. Humidity levels were quite high for the region, especially in the lower deserts where periodic gulf surges would raise the dew point into the 70s. At least 6 people died of heat related causes; however the actual number of deaths could be higher than indicated.

Likelihood of Future Occurrences

Highly Likely—Temperature extremes are likely to continue to occur annually in the City of Fullerton planning area.

4.2.3 Severe Weather: Fog

Hazard/Problem Description

Fog results from air being cooled to the point where it can no longer hold all of the water vapor it contains. For example, rain can cool and moisten the air near the surface until fog forms. A cloud-free, humid air mass at night can lead to fog formation, where land and water surfaces that have warmed up during the summer are still evaporating water into the atmosphere. This is called radiation fog. A warm moist air mass blowing over a cold surface also can cause fog to form, which is called advection fog.

Fog contributes to transportation accidents and is a significant life safety hazard. These accidents can cause multiple injuries and deaths and could have serious implications for human health and the environment if a hazardous or nuclear waste shipment were involved. Other disruptions from fog include delayed emergency response vehicles and school closures.

Past Occurrences

Between 1960 and 2009, the NCDC Storm Events Database and SHELDUS recorded 13 incidents of fog in Orange County, collectively responsible for 2 deaths, 4 injuries, and $20,500 in property losses. Most of these incidents occurred between November and March; one was in May.

According to the HMPC, fog is an occasional occurrence within the planning area, but damages have been limited. Notable, regional fog incidents reported by the HMPC include the following:

November 25-26, 2000 - Dense fog moved north along the coast during the evening hours and inland after sunset. Visibility was less than 100 feet over the coastal waters, major airports, and highways between San Diego and Los Angeles. Marine and air transportation into and out of the region was shut down. Several recreational boaters became lost in the fog.

December 9-14, 2004 - Patchy dense fog reduced visibility to less than 100 feet at times during the late night and early morning hours. Most of the fog was confined to the coast and extreme southwestern Riverside and San Bernardino County valleys.

December 1, 2008 - Dense fog caused several injury accidents that led to significant traffic delays on Orange County freeways. The fog also caused numerous flight delays at John Wayne Airport. Dense fog resulted in flight delays and auto accidents during a busy holiday weekend. In Fullerton, five automobile accidents were linked to this fog incident.

Likelihood of Future Occurrences

Occasional—Based on the NCDC and SHELDUS data, 13 major fog incidents over a 48-year period equates to a major fog event every 3.7 years and a 27.1 percent chance of a major fog event in any given year in the Orange County area. This would amount to a Likely rating for likelihood of future occurrence. However, since there have been no identified damaging fog events specific to Fullerton, and the NCDC and SHELDUS data is all based on County figures, the actual rating is much more likely occasional. Based on input from the HMPC, it is likely that minor fog events will continue to occur annually in the City of Fullerton planning area.

4.2.4 Severe Weather: Heavy Rain/Thunderstorm/Hail/Lightning

Hazard/Problem Description

Storms in the City of Fullerton planning area are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado.

Hail is formed when water droplets freeze and thaw as they are thrown high into the upper atmosphere by the violent internal forces of thunderstorms. Hail is sometimes associated with severe storms within the City of Fullerton planning area. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 miles per hour (mph). Severe hailstorms can be quite destructive, causing damage to roofs, buildings, automobiles, vegetation, and crops.

Lightning is defined as any and all of the various forms of visible electrical discharge caused by thunderstorms. Thunderstorms and lightning are usually (but not always) accompanied by rain. Cloud-to-ground lightning can kill or injure people by direct or indirect means. Objects can be struck directly, which may result in an explosion, burn, or total destruction. Or, damage may be indirect, when the current passes through or near an object, which generally results in less damage.

Tornadoes (see Section 4.2.5 Tornado) and funnel clouds can also occur during these types of storms.

Past Occurrences

Heavy rains and severe storms occur in the City of Fullerton planning area primarily during the late fall, winter, and spring, but have been documented in every month of the year. According to information obtained from the NCDC, the majority of precipitation is produced by storms during the winter months. Precipitation during the summer months is in the form of rain showers and is rare. The City of Fullerton receives about 14 inches of rain per year. Snowstorms, hailstorms, and ice storms occur infrequently in the City of Fullerton and severe occurrences of any of these are very rare. Damaging winds can accompany winter storm systems moving through the area. Often these winds cause tree damage severe enough to warrant removal of limbs and branches by the Maintenance Services Department. A description of past heavy rains and severe storms occurring within the Orange County, and where noted, the Fullerton area follows:

October 1957 - Widespread thunderstorms were reported. Hail drifted to 18” in East LA.

January 31, 1979 – Hail 1.25 - 2 inches in diameter fell in the area.

January 29, 1980 – Heavy rains fell in the Fullerton area causing an unusual problem – oil from an underground fault in Tonner Canyon washed down a county flood control channel and into streams through the golf course. Although it was undetermined how much oil washed through the channel during the heavy rains, there was no immediate danger to wildlife or coastal recreation downstream. Damages to the golf course took a month to clean up.

February 14, 1998 - An exceptionally strong westerly jet-stream aloft, coupled with a deep upper-level trough of low pressure off the coast, steered a barrage of weather systems through southern California for several days. The action started off with high winds and then heavy rain on the sixth. Rainfall up to three inches caused widespread flooding, stranding motorists, and resulting in sporadic road closures. The Fullerton Golf Course suffered when a bridge on the course was washed out. The City spent $5,000 for sandbags and sand for distribution, and another $30,000 for pothole repair as a result of this storm.

October 27, 2000 - The first significant rainfall of the season brought over an inch of rain to the coastal sections during the morning hours. Storm drains were quickly clogged by debris that had accumulated during the preceding months.

February 11, 2001 - Between 2 and 5 inches of rain fell over Orange County and the western end of the Inland Empire. A fast moving squall line behind the main frontal band knocked down trees and power lines in Orange County and the western end of the Inland Empire. Over $250,000 in damages were reported.

October 20, 2004 – An unseasonable October rainstorm dropped 3.11 inches of rain, a record for the date in Fullerton. Streets were flooded with up to 4 inches of water, causing road closures and long delays. The roof of a Staples office supply store in Fullerton split open under the weight of the rainwater, sending employees running into the parking lot. Parks in the City were closed through the week due to the soggy conditions.

December 29, 2004 – A thunderstorm passed over Fullerton in the early morning of December 29. The storm was accompanied by high winds. Numerous trees were blown down, causing property damage in excess of $20,000.

January 7, 2005 - A storm lasting five days dropped heavy rain across all of southern California. Flash flooding and mudslides caused millions of dollars of damage to homes, businesses, vehicles, parks, roads and bridges. This rain event is suspected to have caused damage to a storm drain pipe at the Eastside Christian Church on Yorba Linda Boulevard. The storm drain pipe caused a sinkhole under the church parking lot. The Eastside Christian School, housed in the church, sustained damage to the parking lot and the lunch area patio. The parking lot was closed, and the lunch area patio was destroyed.

December 15, 2008 - A pair of winter storms associated with a vigorous, cold upper-low brought periods of high winds, heavy rain, and snow to the region from late on the 13th through the 17th. The first storm brought rain to the lower elevations and gusty winds and very heavy

snow to the mountains and deserts. The second storm on the 17th was notable for its significant rains in the low deserts and heavy snowfall in the mountains and high deserts. Heavy rain caused significant flooding in the Tijauna River valley. Surface offshore pressure gradients and mid-level easterly flow brought dry air into the region, resulting in widespread evaporative cooling and snow levels down to the desert floor. In Fullerton, many trees were downed, including one that fell on a home on Arbol Drive.

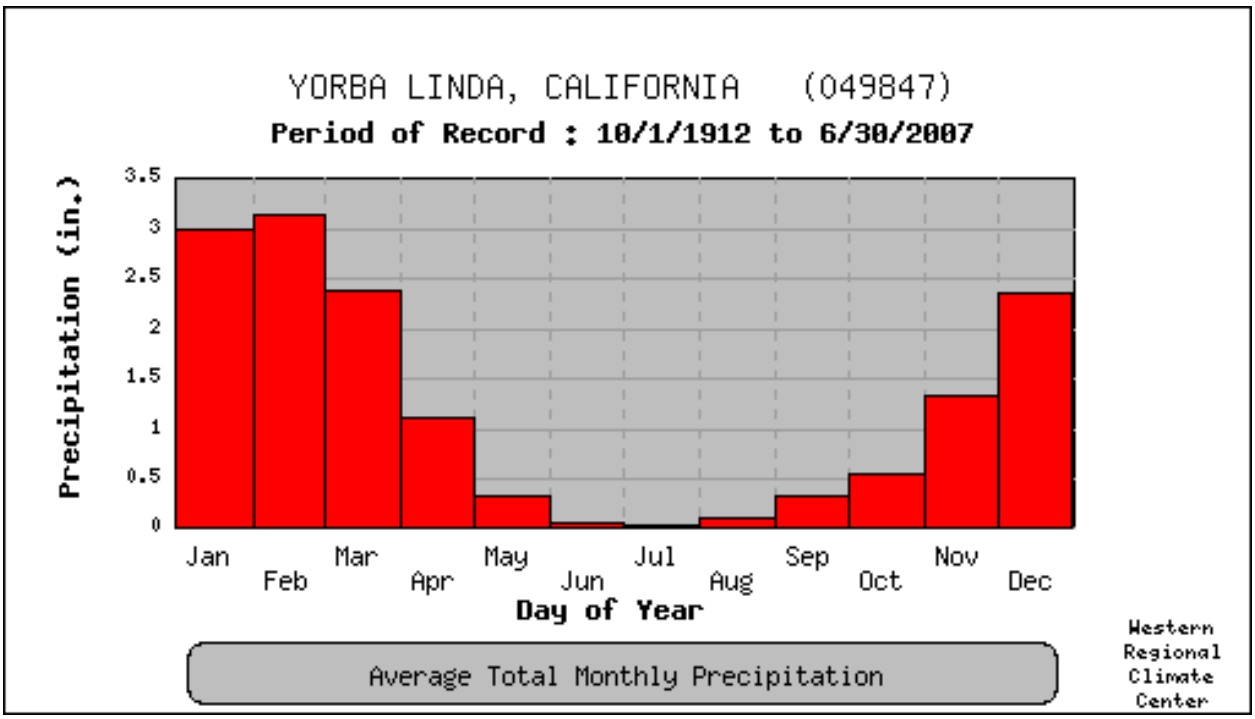
January 18, 2009 - During the third week of January, a 180 to 210 kt jet stretched across the Pacific and into Southern California, bringing a series of powerful winter storms to the region. The first storm made its way through the region on January 18th. Heavy rain, mountain snow, and strong winds contributed to widespread damage and urban flooding, as well as a few flash floods with minor debris flows. In Fullerton, many trees were downed, including one that fell on the roof a home on Seaview Drive.

According to the HMPC, short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. With the increased growth of the area, the lack of adequate drainage systems has become more of an issue. Information from the Yorba Linda weather station is summarized below in Figure 4.3 and Figure 4.4.

City of Fullerton—Yorba Linda Weather Station (Period of Record 1912 to 2007)

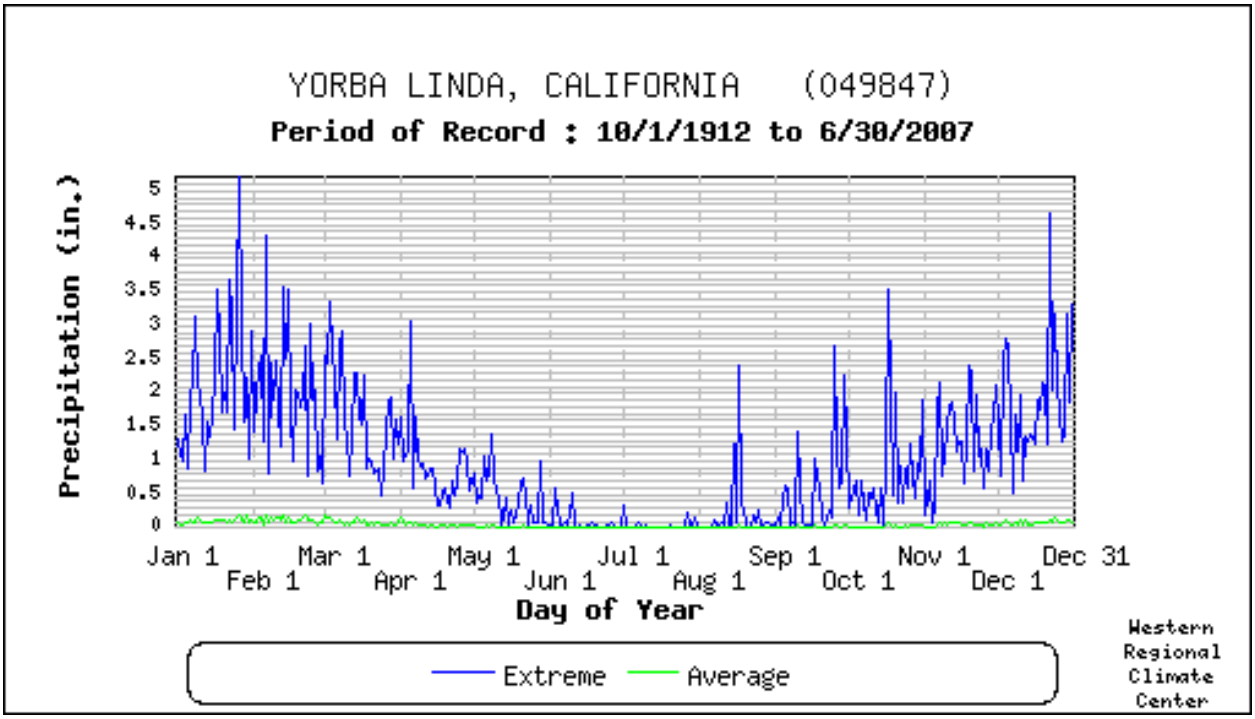
Information from the closest weather station with the most comprehensive data, the Yorba Linda Weather Station (33° 53′ by 117° 49′, 40 ft above mean sea level (msl)), is summarized below in Figure 4.3 and Figure 4.4. Average annual precipitation in the City of Fullerton is 14.40 inches per year. The highest recorded annual precipitation was 34.86 inches in 1942; the highest recorded precipitation for a 24-hour period is 5.2 inches on January 26, 1956. The lowest recorded annual precipitation was 3.62 inches in 1947.

Figure 4.3. The City of Fullerton's Monthly Average Total Precipitation



Source: Western Regional Climate Center, www.wrcc.dri.edu/

Figure 4.4. The City of Fullerton's Daily Precipitation Average and Extreme



Source: Western Regional Climate Center, www.wrcc.dri.edu/

Severe weather events associated with heavy rain/thunderstorm/hail/lightning include those listed in Table 4.2 and Table 4.3 in Section 4.2.1 Severe Weather: General.

Likelihood of Future Occurrences

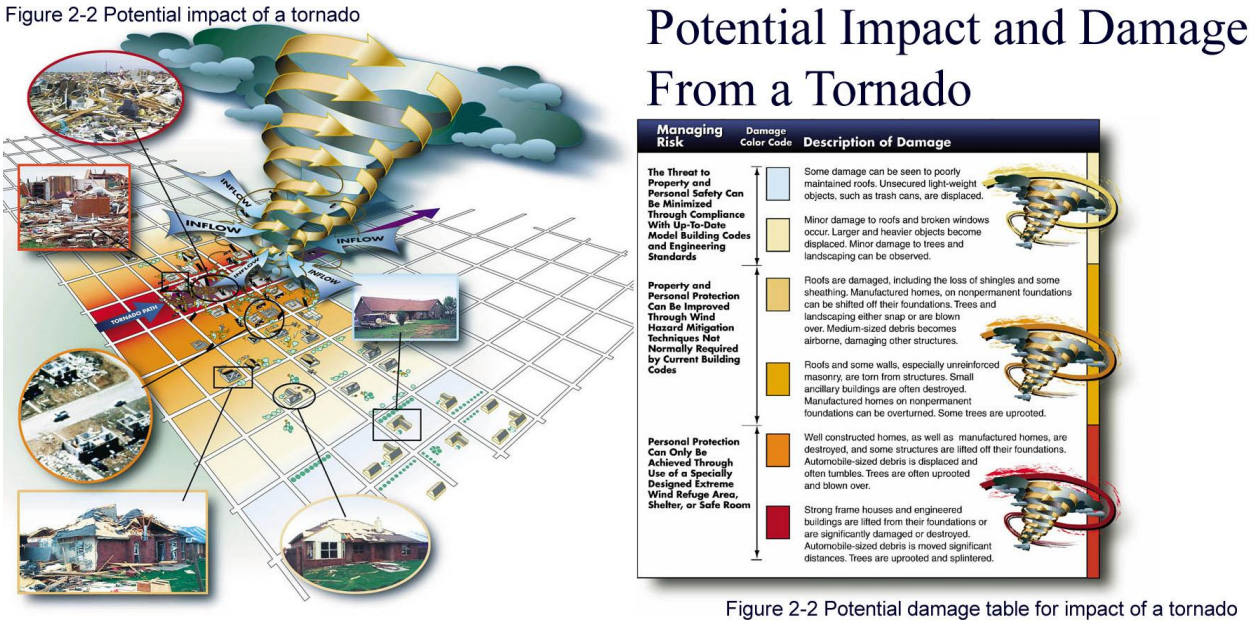
Highly Likely—Heavy rain, thunderstorms, hail, and wind are well-documented seasonal occurrences that will continue to occur annually in the City of Fullerton planning area.

4.2.5 Severe Weather: Tornado

Hazard/Problem Description

Tornadoes are another severe weather hazard that can affect the City of Fullerton, primarily during the rainy season. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential that fuels 300-mile-wide hurricanes across a path only 300-yards wide or less. Figure 4.5 illustrates the potential impact and damage from a tornado.

Figure 4.5. Potential Impact and Damage from a Tornado



Source: FEMA: *Building Performance Assessment: Oklahoma and Kansas Tornadoes*

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between

damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. Table 4.4 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 4.5 shows the wind speeds associated with the Enhanced Fujita Scale ratings. The Enhanced Fujita Scale's damage indicators and degrees of damage can be found online at www.spc.noaa.gov/efscale/ef-scale.html.

Table 4.4. Original Fujita Scale

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/f-scale.html

Table 4.5. Enhanced Fujita Scale

Enhanced Fujita (EF) Scale	Enhanced Fujita Scale Wind Estimate (mph)
EF0	65-85
EF1	86-110
EF2	111-135
EF3	136-165
EF4	166-200
EF5	Over 200

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/ef-scale.html

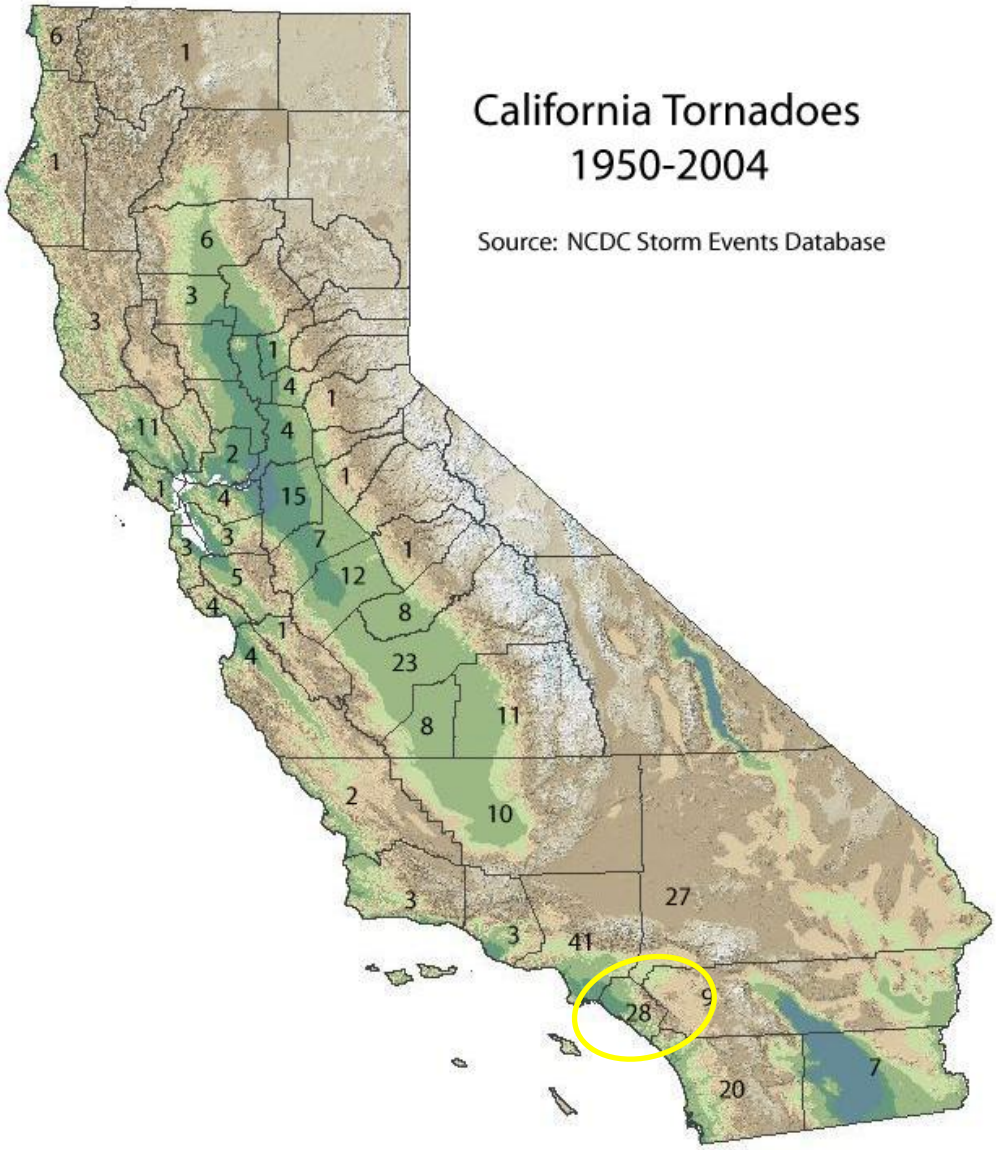
Tornadoes can cause damage to property and loss of life. While most tornado damage is caused by violent winds, most injuries and deaths result from flying debris. Property damage can include damage to buildings, fallen trees and power lines, broken gas lines, broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may also be damaged or

destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response.

Past Occurrences

Based on data from 1950 to 1995, California ranks 32nd among the 50 states for frequency of tornadoes, 36th for injuries, and 31st for cost of damages. When compared to other states by the frequency per square mile, California ranks 44th for frequency and injuries per area and 40th for cost of damage per area. Figure 4.6 shows tornado frequency by California county using NCDC data from 1950 to 2004.

Figure 4.6. California Tornadoes, 1950-2004



Source: Golden Gate Weather Services, http://ggweather.com/ca-tornado.jpg

According to the HMPC, during the rainy season, the City of Fullerton planning area is prone to relatively strong thunderstorms, sometimes accompanied by funnel clouds and tornadoes. While tornadoes do occur occasionally, most often they are of F0 or F1 intensity. Documented incidents of tornadoes in the Orange County planning area from the NCDC Storm Events Database are listed in Table 4.6.

Table 4.6. Orange County Tornadoes, 1950-2008

Type	# of Events	Property Loss ($)	Crop Loss ($)	Deaths	Injuries
Tornado: F0	16	5,719,000	0	3	0
Tornado: F1	9	5,270,000	0	4	0
Tornado: F2	1	3,000	0	0	0
Tornado: F3	1	2,500,000	0	6	0
Totals	**27**	**13,492,000**	**0**	**13**	**0**

Source: National Climatic Data Center Storm Events Database, www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms

Likelihood of Future Occurrences

Occasional—27 tornadoes occurred in Orange County over 58 years of record keeping, which equates to one tornado every 2.1 years, on average, and a 46.7 percent chance of a tornado occurring in any given year, leading to a Likely rating. However, given the fact that there have been no damaging tornado events identified as specific to Fullerton, couple with the fact that all data regarding tornado is county specific, the actual rating should be occasional. Historical tornado activity within the planning area indicates that the area will likely continue to experience the formation of funnel clouds and low intensity tornadoes during adverse weather conditions. The actual risk to the City is dependent on the nature and location of any given tornado.

4.2.6 Severe Weather: Winds

Hazard/Problem Description

High winds, often accompanying severe thunderstorms, can cause significant property damage threaten public safety, and have adverse economic impacts from business closures and power loss. Windstorms in the City of Fullerton are typically straight-line winds, known as Santa Ana winds. Straight-line winds are generally any thunderstorm wind that is not associated with rotation (i.e., is not a tornado).

The Santa Ana winds are strong, extremely dry offshore winds that characteristically sweep through in Southern California and northern Baja California in late fall into winter. They can range from hot to cold, depending on the prevailing temperatures in the source regions, the Great Basin and upper Mojave Desert. It is these winds, which can exceed 100 mph that are responsible for most wind damage in the region. These winds can overturn mobile homes, tear roofs off of houses, topple trees, snap power lines, shatter windows, and sandblast paint from

cars. Other associated hazards include utility outages, arcing power lines, debris blocking streets, dust storms, and an occasional structure fire.

Past Occurrences

According to the NCDC, most high wind events occur between November and March. Although summer winds are a frequent occurrence, with afternoon winds of 10 to 20 mph being common, it is the winds experienced during the winter storms that result in the most wind-related damage. In addition strong winds, when combined with saturated ground conditions, can down very mature trees. Based on data from 1950 to 2009, Orange County has experienced numerous high wind events, most often associated with Santa Ana winds. A description of major high wind events in Orange County and the Fullerton planning area follows.

December 14, 1996 - Strong Santa Ana winds toppled trees and electric poles, smashed windows, blew out signs, and knocked out power to tens of thousands across scattered areas of Southern California. In Orange County, gusts at Fremont Canyon were measured as high as 111 mph.

December 17, 1996 - Gusty Santa Ana winds redeveloped across parts of Southern California resulting in spotty reports of downed trees and power poles. Winds of 66 knots were recorded.

January 6, 1997 - A deep cut-off low aloft, coupled with strong, surface high pressure over northern Nevada, funneled gusty Santa Ana winds through the passes and canyons of southern California. Wind gusts reached 99 mph through Fremont Canyon of Orange County on the morning of the sixth. The winds toppled trees onto homes, cars, and freeways, blew trucks off the road, and mowed down utility poles, shutting off electric and phone service to hundreds of thousands. Several TV and radio stations were knocked off the air as well.

January 29, 1997 - Surface high pressure building into the Great Basin, combined with favorable northeast winds aloft, to produce gusty offshore winds through and below the Cajon Pass and Fremont Canyon. Wind gusts peaked at 100 mph through Fremont Canyon on the morning of January 29.

December 21, 1999 - Strong Santa Ana winds hit Southwestern California on the evening of 12/21 and lasted through most of the following day. Widespread power and phone outages occurred from falling trees knocking down lines and snapped poles. Wind speeds of 86 knots were reported and $227,000 of damages was incurred.

December 25, 2000 - Wind gusts greater than 58 mph continued for 25 consecutive hours in the Santa Ana Mountains. In Orange County, power poles, power lines, and many trees were knocked down. Police, firefighters, power crew and tree-trimmers spent much of Christmas day clearing traffic hazards and battling small brush fires to keep them from spreading. Winds of 76 knots were reported, as well as 4 injuries and over $665,000 in property damages.

January 10, 2001 - This was a two day storm event that began late in the day on January 10 with strong winds and contained several moderate to heavy rain bands. The first rain band dropped a half to one inch of rain on Orange County during the late afternoon and evening of January 10, resulting in street flooding in several locations. Between 2 and 4 inches of rain fell during the early morning hours of January 11 as a much stronger rain band moved slowly east across the area. Wind speeds of 62 knots were reported, and property damages of $300,000 were sustained.

May 3, 2001 - Santa Ana winds approaching 66 knots were reported and blew several large trees over. Downed power lines affected 40,000 customers in Los Alamitos, Westminister, Newport Beach, La Habra, Fountain Valley, Fullerton, Santa Ana, Garden Grove, Orange, Costa Mesa, Huntington Beach, Tustin, and Buena Park.

December 7, 2001 - Moderate to strong Santa Ana winds affected most of Southwest California. Trees, power lines, and signs were toppled. Power outages affected about 40,000 customers. Winds of 87 knots were reported, and damages of $250,000 were sustained.

February 9, 2002 - Santa Ana winds began on the morning of 2/9/02, diminished slightly during the following night, but then increased in strength the following morning, peaking around midday on 2/10/02. Signs, trees, power poles, and fences were blown down in many communities. The roofs of several houses were damaged. The high winds also caused the numerous brush fires, started by downed power lines, to grow rapidly in the high winds. Wind speeds of 89 knots were recorded, and 2 injuries and $2 million in property damages were sustained.

November 25, 2002 – Winds of 53 knots damaged trees and power lines. Damages of $900,000 were reported.

November 26, 2002 – Winds of 70 knots damaged trees and power lines. Damages of $290,000 were reported.

January 5, 2003 - Throughout this three day Santa Ana wind event, numerous trees and power poles were blown down. A commuter train was delayed for several hours in Orange County when power poles were blown down onto the track. Many houses and at least 300 parked automobiles were damaged by falling trees. 2 fatalities and 11 injuries were reported. Over $3.3 million in damages to property were reported, as were wind speed of 87 knots.

March 28, 2003 - This two day wind event began with strong northwest winds following a cold front moving across Southwest California. Then as high pressure built over the Great Basin, a Santa Ana wind developed. Most of the wind damage in Fullerton was from trees blowing onto roads, and falling on cars and power lines.

March 27, 2007 - Although the Fullerton airport ASOS only measured a 30 mph wind gust with this storm, other meteorological observations in conjunction with damage and spotter reports indicate that wind gusts with this microburst were likely in excess of 45 mph. Strong post-

frontal flow combined with a 130 knot jet aloft and an upper level low over Nevada resulted in strong onshore flow and isolated thunderstorms. A thunderstorm over Fullerton airport produced a damaging microburst that removed a large section of roof laminate from the Orange County Fire Authority's aviation building. Pieces of the roof landed on four cars. The Maintenance Services Division received 107 calls to remove downed trees and tree limbs.

October 21, 2007 - Santa Ana winds toppled trees, brought down power lines, and knocked out power to thousands in many parts of Orange County. The strong winds downed countless trees and power poles, damaged many roofs, damaged fences, damaged or destroyed outbuildings, damaged or destroyed road signs, overturned several high-profile vehicles, generated large dust storms, and fanned the flames of several large and devastating wildfires. Wind speeds of over 56 knots were reported, and $5 million in damages were sustained.

Likelihood of Future Occurrences

Highly Likely — 53 high wind or thunderstorm wind events occurred in the City of Fullerton vicinity over 58 years of record keeping, which equates to one event every 1.1 years, on average, and a 91.3 percent chance of a high wind event occurring in any given year. Historical Santa Ana activity within the planning area indicates that the area will likely continue to experience high wind events.

4.2.7 Dam Failure

Hazard/Problem Description

Dams are manmade structures built for a variety of uses, including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they usually are engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped and fail. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failures can also result from any one or a combination of the following causes:

- Earthquake
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage or piping or rodent activity
- Improper design
- Improper maintenance
- Negligent operation
- Failure of upstream dams on the same waterway

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Associated water quality and health concerns could also be issues. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

In general, there are three types of dams: concrete arch or hydraulic fill, earth-rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously: the flood wave builds up rapidly to a peak then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach: a flood wave will build gradually to a peak and then decline until the reservoir is empty. And, a concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

Common practice among federal and state dam safety offices is to classify a dam according to the potential impact a dam failure (breach) or mis-operation (unscheduled release) would have on upstream and/or downstream areas or at locations remote from the dam. The three classification levels are as follows:

- **Low Hazard Potential** - Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's personal property. As such, these dams will not be profiled in greater detail in this plan.
- **Significant Hazard Potential** - Dams assigned the significant hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure. There is one significant hazard dams that directly threaten property in the City of Fullerton, and will be profiled in greater detail to the extent that data is available.
- **High Hazard Potential** - Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life. These dams will be profiled in greater detail in this plan.

According to the HAZUS and data from the City of Fullerton, there are two dams in the City of Fullerton and five dams outside of the City that pose a risk should the dam fail. Six of these dams have been classified as High Hazard dams based on the National Inventory of Dams. One dam, the Yorba Dam is classified as Significant. The Prado Dam, is located in Riverside County (see Table 4.7). The other five dams, Brea, Carbon Canyon, Fullerton, Diemer, Orange County,

and Yorba all lie in Orange County. All of these dams are located to the east or northeast of the City as illustrated in Figure 4.25 in Section 4.3.3.

Table 4.7. Dams with Potential to Cause Damaging Floods in the City of Fullerton

Dam (Dam Number)	Hazard Class	Owner	Stream	Type	Purpose	Capacity (Acre-feet)*	Normal Capacity (Acre-feet)*
Brea (CA10016)	High	U.S Army Corps of Engineers	Brea Creek	Earthen-rockfill	Flood Control	7,420	1
Carbon Canyon (CA10017)	High	U.S Army Corps of Engineers	Carbon Canyon Creek	Earthen-rockfill	Flood Control	12,063	1
Fullerton (CA00018)	High	U.S Army Corps of Engineers	Fullerton Creek	Earthen-rockfill	Flood Control	1,342	1
Prado (CA10022)	High	U.S Army Corps of Engineers	Santa Ana River	Earthen-rockfill	Flood Control	295,581	1
Diemer Reservoir (CA00221)	High	Metropolitan Water District	Offstream	Other	Water Supply	98	80
Orange County Reservoir (CA00218)	High	Metropolitan Water District	Tributary of Fullerton Creek	Earthen-rockfill	Water Supply	240	217
Yorba (CA00831)	Significant	Orange County	Tributary of Santa Ana River	Earthen-rockfill	Flood Control	1,722	1,200

Source: HAZUS-MH MR3, National Performance of Dams
*One acre-foot=326,000 gallons

Past Occurrences

According to the City of Fullerton, there was only one dam failure in the City's history. The failures were due to excessive rain. The main impact from this failure was damage to a storm channel. Details of this failure are:

February 22, 2005 – The Brea Dam failed following a large rain storm. An extended period of very wet weather dumped more than 6.8 inches at the Fullerton Airport. The dam was overtopped, flooding the Fullerton Golf Course and Bastanchury Road. The road remained closed for a day, while the golf course was closed for a few days. The golf course sustained damage, as did a storm channel that was eroded as a result of the flooding.

Likelihood of Future Occurrences

Occasional—The City remains at risk to dam failures from the six high hazard and one significant hazard dams that protect the City and surrounding areas. Given the density of

population, the large area that would be affected by flooding, and the varying ages and conditions of these dams, the potential exists for future dam failures which would result in large amounts of property damage and possible loss of life. Nonetheless, it should be noted that there have not been any major failures of dams in the City of Fullerton area.

4.2.8 Drought

Hazard/Problem Description

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

Drought is a complex issue involving many factors—it occurs when a normal amount of moisture is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

- **Meteorological** drought is usually defined by a period of below average water supply.
- **Agricultural** drought occurs when there is an inadequate water supply to meet the needs of the state's crops and other agricultural operations such as livestock.
- **Hydrological** drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- **Socioeconomic** drought occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

The California Department of Water Resources (DWR) says the following about drought:

> One dry year does not normally constitute a drought in California. California's extensive system of water supply infrastructure—its reservoirs, groundwater basins, and inter-regional conveyance facilities—mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.

The drought issue in California is further compounded by water-rights. Water is a commodity possessed under a variety of legal doctrines. The prioritization of water rights between farming and federally protected fish habitats in California is part of this issue.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in the planning area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Also, during a drought, allocations go down, which results in reduced water availability. Voluntary conservation measures are typically implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

According to Fullerton's Existing Conditions Report, Fullerton General Plan Update, the City relies on two major water supply sources, which includes imported water from the Metropolitan Water District (MWD) and local groundwater from the Orange County Water District (OCWD). Approximately 75 percent of the City's water supply is provided by 11 groundwater wells. The groundwater comes from a natural underground reservoir that stretches from the Prado Dam and fans across the northwestern portion of Orange County, excluding the communities of Brea and La Habra, and extending as far south as the El Toro 'Y' according to the City of Fullerton website.

While the City of Fullerton has methods of controlling service area water demands, the City has virtually no control over water supply. The City is fully dependent on MWD and OCWD for water supply. Fortunately, these agencies have provided adequate, reliable water supplies to serve the City's needs. The City is optimistic that its current water supply from MWD and OCWD will be adequate to meet essential water demands for the next 20 years.

From 1971 to 2005, the City's water demand ranged from 25,620 AF (1971/72) to 34,926 AF (1986/87). Conservation measures such as hardware installation, the reduction of industrial consumption, and education programs have significantly assisted the reduction in water usage within the City. According to the 2005 Urban Water Management Plan of Fullerton, the projected water demand for 2009/10 is 33,100 AF.

Three key factors that have an effect on water demands in Fullerton are climatic, demographic, and economic. The following three factors have influenced water demands in the past and will continue to do so in the future:

- **Climatic**. The weather in Fullerton is mild with an average mean temperature of 63.8 degrees (F). Average annual rainfall over the last 70 years has been 14.9 inches per year. Climate has the most dramatic annual effect on water demands. Severe deviations from normal temperatures and average rainfall can increase or decrease annual water demands by as much as 15 percent. This climate effect is more prominent in Fullerton because of the many acres of landscape and turf areas associated with all classes of water users, especially residential. The effect that annual rainfall has on the City's annual water production is that there is a direct correlation between the two. As rainfall increases, production decreased due to lower demands.

- **Demographic**. Since water use is related to demographics, an accurate description of population and housing stock in the service area can serve as a basis for water planning activities described in the Urban Water Management Plan. Population projections for the City indicate an increase from approximately 135,700 in the year 2005 to approximately 144,700 by 2030, or an increase of approximately 9,000 for an average increase of about 360 per year, with larger increases occurring in the earlier years.

  Multi-family housing units are expected to increase at a faster rate than single-family housing units. In the old areas of Fullerton, multi-family and mixed use units are increasingly replacing older single-family dwellings. As a result of this trend, the household occupancy size (total population divided by total occupied dwelling units) in the City's service area is expected to increase from 2.92 to 3.03 persons per household from 2005 to 2030.

  California State University, Fullerton (CSUF) occupies 236 acres within the east-central part of Fullerton. Fullerton participates with CSUF on its sub-area master planning to determine the effects of planned improvements on the City's water and sewer system.

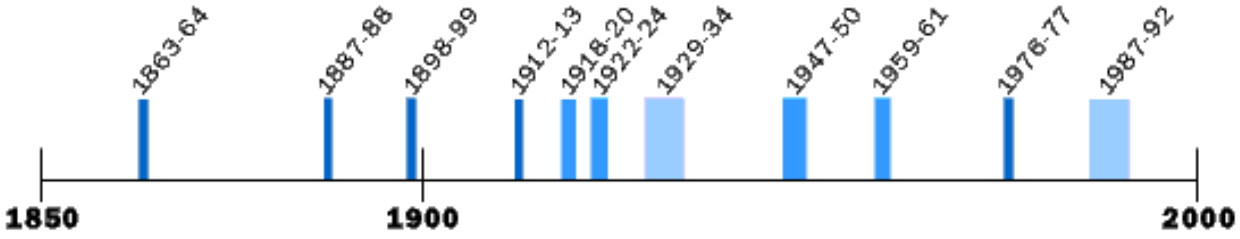
- **Economic**. In the early 1990's, the rate of economic growth declined due to the severity and duration of the recession. The recession affected declines in the manufacturing sector, particularly in the defense and aerospace. During the late 1990's and early 2000's, the economy was strong and had an effect on increased water usage. However, even with the strong economy, industrial demands decreased. This has been partly due to changes in operation such as installation of on-site recycled water system. In addition, several large companies have moved out of the area and have been replaced with different sectors whose water usage is lower.

In order to meet short-term water demand deficiencies, and short or long-term drought conditions, the City has to implement the policies and requirements of MWD and OCWD. It is difficult to project future City water supplies unless the restriction and allocation assignments placed on Fullerton by wholesalers are known.

Past Occurrences

Historically, California has experienced multiple severe droughts. According to the DWR, droughts exceeding three years are relatively rare in Northern California, the source of much of the state's developed water supply. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large Northern California reservoirs. The driest single year of California's measured hydrologic record was 1977. Figure 4.7 depicts California's multi-year historical dry periods, 1850-2000.

Figure 4.7. California's Multi-Year Historical Dry Periods, 1850-2000



Source: California Department of Water Resources, www.water.ca.gov/
Notes: Dry periods prior to 1900 estimated from limited data; covers dry periods of statewide or major regional extent

The HMPC identified the following droughts as having significant impacts on the planning area:

1947-1950—This drought was in effect for the entire State from 1947- 49. The most extreme drought areas were in the south, affecting the Fullerton area.

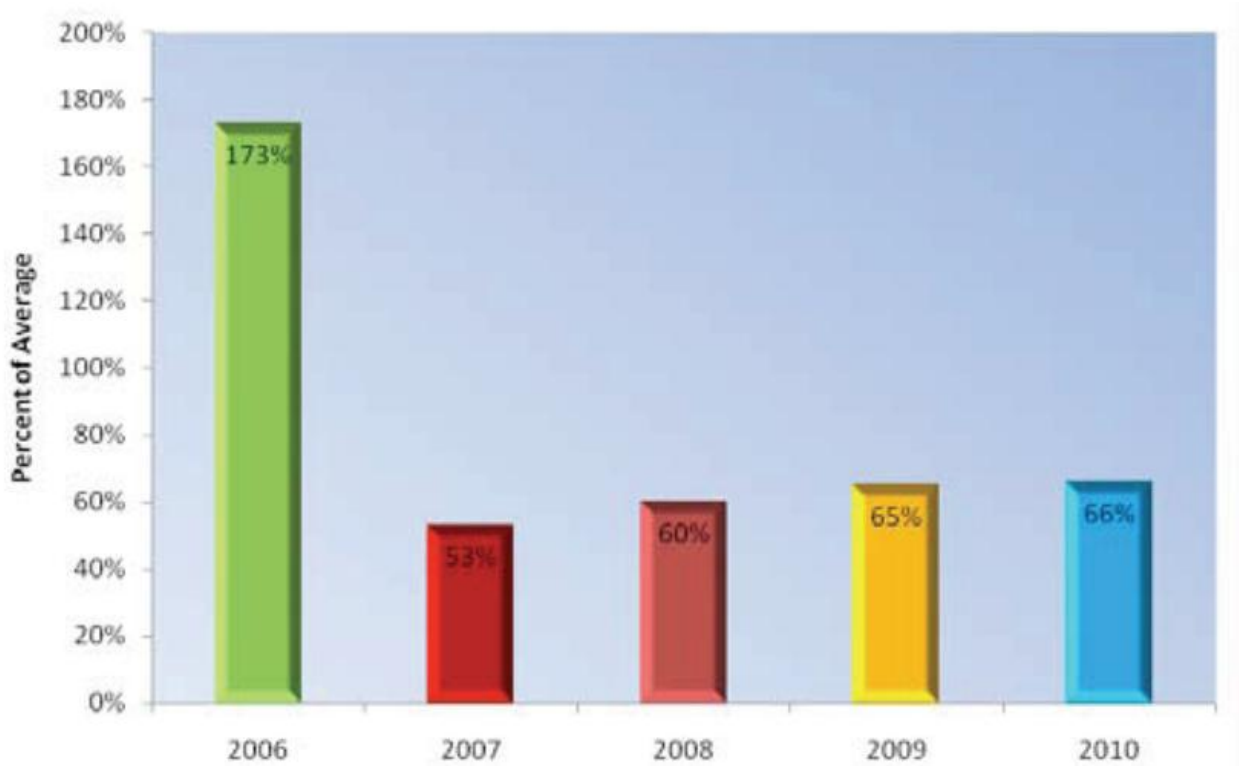
1959-1961—This drought was in effect for the entire State from 1959-1962. The most extreme drought conditions existed in the Sierra Nevada and central coast. The Fullerton planning area was affected by this drought.

1976—A federal disaster declaration was declared as a result of a drought affecting the City of Fullerton and much of California. This was the driest two years in California history.

1987-1992—The City of Fullerton also suffered adverse effects resulting from this statewide drought.

2007-present—Water year 2007 was unusually dry across much of California. Water year 2006-2007 ended with 53 percent of normal runoff for the State (see Figure 4.8). Winter snow levels in 2007-2008 were about 65 percent of average. Compounding the drought situation was the spring of 2008, which was the driest spring on record for the state. Water year 2007-2008 ended with 60 percent of normal runoff for the State. January of 2009 was the 8th driest January on record for the state and snow sensors indicated water content in the Sierra statewide snowpack at 60 percent of average.

Figure 4.8. Statewide Runoff in California during Present Drought



Source: April 30, 2010 California Drought Update

These factors have lead to excessively dry conditions in Fullerton and the surrounding areas. These conditions led to the following orders in Table 4.8 from Gov. Schwarzenegger to combat drought conditions.

Table 4.8. Governor's Executive Orders and Proclamations

Governor's Order	Date	Order Summary
Executive Order S-11-09	6/19/09	The California Emergency Management Agency, Department of Social Services, Labor and Workforce Development Agency, and California Department of Food and Agricultural were ordered to develop a comprehensive strategy by July 15, 2009, to provide adequate nutrition for those individuals who were temporarily unable to afford food as a result of the drought conditions.
State of Emergency	2/27/09	Due to continuing drought conditions, it was ordered that all agencies of the state government utilize and employ state personnel, equipment and facilities for the performance of any and all activities consistent with the direction of the California Emergency Management Agency (CalEMA) and the State Emergency Plan. The Governor ordered that the California Department of Water Resources (DWR), in partnership with other appropriate agencies, launch a statewide water conservation campaign calling for all Californians to immediately decrease their water use. The Governor requested that all urban water users immediately increase their water conservation activities in an effort to reduce individual water use by twenty percent.

Governor's Order	Date	Order Summary
State of Emergency	6/12/08	It was ordered that all agencies of the state government utilize and employ state personnel, equipment, and facilities for the performance of any and all activities consistent with the direction of the Office of Emergency Services (OES) and the State Emergency Plan, and that OES provide local government assistance under the authority of the California Disaster Assistance Act.
Executive Order S-06-08	6/04/08	The Governor proclaimed a statewide drought. The Governor ordered the Department of Water Resources (DWR) to take immediate action to address the serious drought conditions and water delivery limitations that existed in California. The DWR and Department of Public Health (DPH) were ordered to prioritize the processing of loan and grant contracts for water suppliers and public water systems demonstrating drought related hardship. DWR and DPH were also ordered to work with local water districts to evaluate system interconnections among the state's large water purveyors, review the status or availability of mutual aid agreements among those large water purveyors, and work with the parties to those mutual aid agreements to correct any deficiencies that restrict the movement of water in an emergency situation. DWR was also ordered to coordinate with the California Public Utilities Commission to identify investor-owned water utility systems at risk of experiencing health and safety impacts due to drought conditions and water delivery limitations, and to mitigate such impacts. In additions, the DWR was ordered to work with the Department of Food and Agriculture (CDFA), the United States Department of Agriculture and the United States Bureau of Reclamation to identify potential federal funding for local water agencies and farmers to facilitate the rapid installation of best available irrigation management and conservation systems. The CDFA was ordered to work with county Agricultural Commissioners and others as necessary to identify and gather data on crop losses and other adverse economic impacts caused by the drought and, when necessary, transmit that information to the appropriate federal and state agencies.

Source: California Department of Water Resources: http://www.water.ca.gov/drought/gov.cfm

In late 2009 and early 2010, rainfall levels increased and drought conditions began to subside. It is too early to tell if this drought has ended, or has simply taken a hiatus. The April 2010 Drought Update produced by the California Department of Water Resources reported that:

> Even with the above average seasonal precipitation this winter and spring, Southern California reservoir levels have not improved significantly.

Figure 4.9 provides a "snapshot in time" of the drought conditions in California in May 2010 from the National Drought Mitigation Center. This map considers several factors, including the Palmer Drought Index, Soil Moisture Models, U.S. Geological Survey Weekly Streamflows, Standardized Precipitation Index, and Satellite Vegetation Health Index.

Figure 4.9. U.S. Drought Monitor for California, May 18, 2010

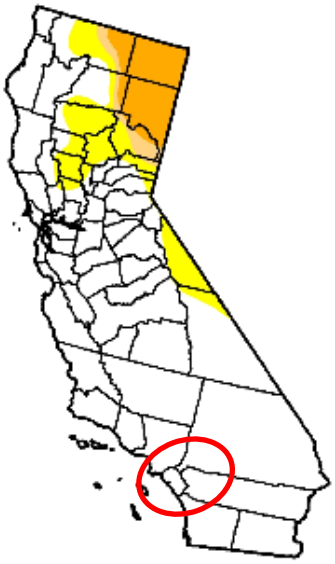
U.S. Drought Monitor

California

May 18, 2010
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	81.3	18.7	8.6	7.0	0.0	0.0
Last Week (05/11/2010 map)	72.8	27.2	9.1	7.1	0.0	0.0
3 Months Ago (02/23/2010 map)	64.6	35.4	10.7	4.3	0.0	0.0
Start of Calendar Year (01/05/2010 map)	6.6	93.4	72.8	9.0	0.0	0.0
Start of Water Year (10/06/2009 map)	0.0	100.0	73.4	45.8	0.0	0.0
One Year Ago (05/19/2009 map)	3.6	96.4	72.1	35.3	0.0	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

http://drought.unl.edu/dm

Released Thursday, May 20, 2010
Author: Eric Luebehusen, U.S. Department of Agriculture

Source: National Drought Mitigation Center

Likelihood of Future Occurrences

Occasional—Historical drought data for the City of Fullerton planning area indicates there have been five significant droughts in the last 79 years. This equates to a drought every 15.8 years on average or a 6.3 percent chance of a drought in any given year. Based on this data, droughts will occasionally affect the planning area.

4.2.9 Seismic and Geologic Hazards

Hazard/Problem Description

California is a seismically active area with numerous faults throughout the region. An active fault is defined by the California Geological Survey (CGS) as a fault that has had surface rupture or displacement within the last 11,000 years (Holocene times). This does not mean, however, that faults having no evidence of surface displacement within the last 11,000 years are necessarily inactive. For example, the 1975 Oroville earthquake, the 1983 Coalinga earthquake, and the 1987 Whittier Narrows earthquakes occurred on faults not previously recognized as active. Potentially active faults are those that have shown displacement within the last 1.8 million years (Quaternary), but have not moved within the Holocene times. Any fault older than Pleistocene (>1.8 million years) is considered inactive.

All of the faults that could result in earthshaking and damage in Fullerton are shown in Figure 4.10 and described below in Table 4.9.

Figure 4.10. Fullerton Faults and Earthquake Epicenters

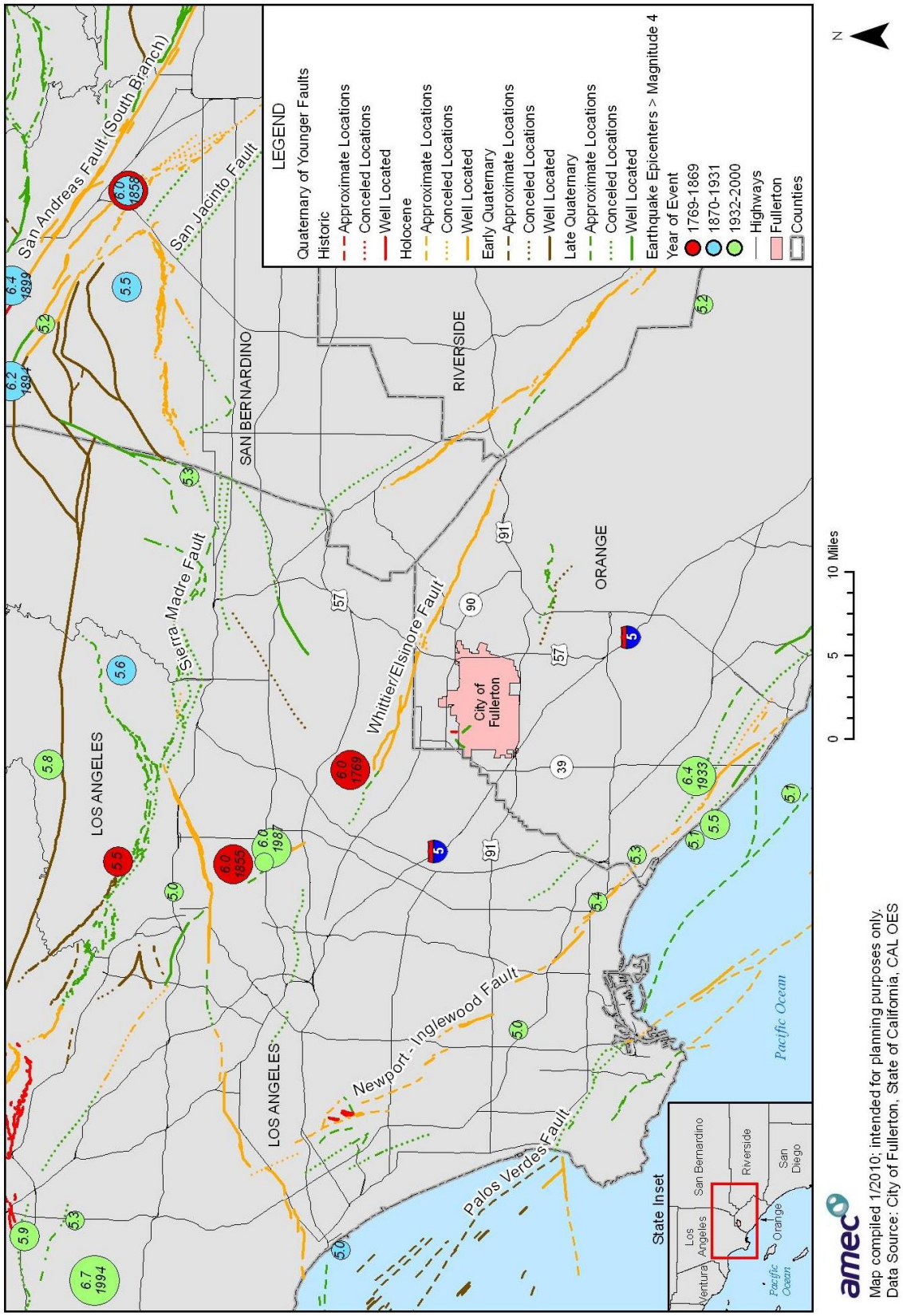


Table 4.9. The City of Fullerton's Proximity Fault Lines

Faults Within Close Proximity to the City of Fullerton				
Fault	Distance from City to Fault (miles)[1]	Length of Fault (miles)[2]	Richter Magnitude of Historical Earthquakes (Greater than 5.0)[3]	Potential Probable Earthquake Magnitude[4]
Norwalk	0	17	4.70 (1929)[4]	6.3
Puente Hills	0	25[5]	7.2 to 7.5 (over past 11,000 years)[6]	6.65 to 7.45[7]
Whittier[3]/Elsinore	1.6 miles northeast	135-145	6.00 (1910) 5.00 (1920) 5.10 (1940) 5.90 (1987)	6.0 to 7.2 for the Whittier Fault segment 6.5 to 7.5 for the Elsinore Fault segment
Newport/Inglewood	9.8 miles southwest	50-86	6.30 (1933) 5.40 (1941)	6.0 to 7.2 or greater
Sierra Madre/San Fernando/Santa Susana	14 miles north	61-69	6.40 (1971) 5.80 (1971) 5.80 (1991)[4]	6.0 to 7.0
Palos Verdes	20 miles southwest	45	5.40 (1941)	6.0 to 7.0 or greater
San Jacinto	36	130-242	7.00 (1899) 6.80 (1981) 6.00 (1937) 6.20 (1954) 6.40 (1958) 6.50 (1968) 5.50 (1980) 6.10 (1980) 6.40 (1987)	6.5 to 7.5
San Andreas (south & central)	37	300-320	8.00 (1857) 6.50 (1948) 5.60 (1986)	6.8 to 8.0

1,2,3 City of Fullerton General Plan, Community Health and Safety Element, prepared by the Planning Center, February 11, 1997.
4 Southern California Earthquake Data Center, supported by the U.S. Geological Survey, Seismological Laboratory, California Institute of Technology, and SCEC, http://www.data.scec.org/fault_index/alphadex.html, accessed October 2009.
5 *Science, Recognition of Paleoearthquakes on the Puente Hills Blind Thrust Fault, California* article, Volume 300, Issue 4, April 2003.
6 *Earthquake Spectra, Loss Estimates for a Puente Hills Blind-Thrust Earthquake in Los Angeles, California*, Article, Volume 21, No. 2. Earthquake Engineering Research Institute, May 2005.
7 *Revised Draft Environmental Impact Report, Volume 1 (SCH NO. 1997051056), West Coyote Hills Specific Plan and Robert E. Ward Nature Preserve Memo*, prepared by Dr. Edward (Ned) H. Field, United States Department of the Interior, May 22, 2006.

Source: City of Fullerton General Plan Update – Earth Resources

Norwalk Fault. The Norwalk Fault traverses the central and southeastern portion of Fullerton. This fault extends approximately 17 miles from Norwalk to Coyote Hills. West of the Coyote Hills, the evidence of the fault's existence becomes vague. It is doubtful the fault extends west of the San Gabriel River. East of the Coyote Hills, the fault may trend along the base of the East Coyote Hills and bend northeasterly, trending near the intersection of State College Boulevard and Yorba Linda Boulevard, and then continuing northeasterly through the vicinity of Carbon

Canyon Dam to join the Whittier Fault, north of the dam. The fault is noted as the possible source of a magnitude 4.7 earthquake occurring on July 8, 1929, which caused significant damage in Whittier and Norwalk. Microseismic activity along the Norwalk Fault is high; the fault may be capable of generating a magnitude 6.3 earthquake on the Richter scale. The Norwalk Fault is one of two faults located within the City; however no surface faulting has been associated with this fault.

Puente Hills Fault. Within the City of Fullerton, the Puente Hills Fault, or Puente Hills thrust system, underlies the East and West Coyote Hills, located in the northern and western portions of the City. The Coyote Hills were most likely created by repeated Puente Hills earthquakes as the rupture includes the Coyote Hills fault. The fault is often referred to as a "blind thrust fault" due to lack of superficial ground features normally associated with thrust faults that have recently experienced seismic activity. The Puente Hills Fault comprises three distinct fault segments: the Los Angeles, Santa Fe Springs, and Coyote Hills segments, from west to east, respectively. The fault dips gently northeastward and terminates upward at a depth of approximately 2 miles, extending for 25 to 30 miles from northern Orange County, beneath downtown Los Angeles, to nearby Beverly Hills. The active fault zone encompasses several hundred square miles of densely populated urban areas. A subsequent study of shallow sediment folding near the surface projection of the fault inferred at least four large earthquakes with magnitudes ranging from 7.2 to 7.5 occurred over the past 11,000 years. Since 2002, the United States Geological Survey (USGS) National Seismic Hazard Maps have included this fault as active, with a magnitude range of 6.65 to 7.45.

Whittier-Elsinore Fault. The Whittier-Elsinore Fault is located approximately 1.6 miles northeast of the City of Fullerton, at its closest point. The fault extends northwest trending approximately 145 miles from the Mexican border to the northern edge of the Santa Ana Mountains. The Whittier section of the Elsinore Fault Zone extends over 20 miles, from the Whittier Narrows southeasterly to the Santa Ana River, where it merges with the southeasterly trending Elsinore fault and other smaller faults. The unexpected, moderate-sized Whittier Narrows earthquake of October 1, 1987, occurred on the Elysian Park Fault, a buried thrust fault which is a northern extension of the Whittier fault. Movement on this fault occurs as a right-lateral strike-slip (movement is parallel to the direction or trend of the fault plane) with some reverse slip. The Whittier Fault and Elsinore Fault segments are considered capable of generating earthquakes with a magnitude of 6.0 to 7.2 and 6.5 to 7.5, respectively, on the Richter scale. This fault is considered active by the State of California and an Alquist-Priolo Special Study Zone has been established around this fault.

Newport-Inglewood Fault Zone. The Newport-Inglewood Fault Zone is located approximately 9.8 miles southwest of the City of Fullerton at its closest point. The Newport-Inglewood Fault Zone is a series of echelon northwest-trending and vertically-dipping faults extending approximately 50 miles from the southern edge of the Santa Monica Mountains southeastward to the offshore area near Newport Beach; the fault zone continues offshore southeasterly past Oceanside and is known as the Offshore Zone of Deformation. This fault has right-lateral

movement, with a local reverse slip associated with fault steps. The zone is seismically active with a number of recorded earthquakes, including the historic 6.3 magnitude Long Beach Earthquake of 1933. This fault zone could generate a magnitude 6.0 to 7.2 on the Richter scale or greater credible earthquake.

Sierra Madre Fault/San Fernando/Santa Susana. The Sierra Madre/San Fernando/Santa Susana Fault is located approximately 14 miles north of the City of Fullerton at its closest point. The central portion of this system is the San Fernando fault while the Santa Susana lies to the west and the Sierra Madre to the east. The Sierra Madre Fault is classified as a "master" fault and consists of five primary segments and thousands of feet of vertical and significant left-lateral offsets located along the base of the San Gabriel Mountains and southward up and over the San Gabriel Mountains. The fault extends for approximately 47 miles, west to east, from San Fernando to San Dimas-Claremont. The Sierra Madre Fault Zone segments consist of northdipping reverse thrust faults. The slip rate is between approximately 0.36 and 4.0 millimeters per year (mm/yr) and may be greater at its western terminus of the fault. The Sierra Madre Fault has an expected magnitude of 6.0 to 7.0 on the Richter scale.

Palos Verdes Hills Fault. The Palos Verdes Hills Fault is located approximately 20 miles southwest of Fullerton at its closest point. The fault extends approximately 45 miles in a northwest and southeast direction. The fault has an onshore extent of about 9 miles that extends across the Palos Verdes peninsula. Cities close to the Palos Verdes Hills Fault include San Pedro, Palos Verdes Estates, Torrance, and Redondo Beach. This fault is considered capable of generating earthquakes in the magnitude of 6.0 to 7.0 on the Richter scale or greater. Fault geometries may allow only partial rupture during an earthquake event.

San Jacinto Fault Zone. The San Jacinto Fault is located approximately 36 miles east of Fullerton at its closest point. Segments of this fault extend from San Bernardino southeast approximately 130 miles through the Imperial Valley, and into northern Baja California. At the northern end of this fault, a right-lateral strike-slip fault appears to merge with the San Andreas Fault. Over the past century, the San Jacinto Fault has produced at least ten earthquakes, all with approximate magnitudes of 6.5 or greater on the Richter scale. Geologic, geodetic, and seismologic observations generally point to an average slip rate of eight to 12 mm/yr during Quaternary time. This fault is considered capable of generating earthquakes in the magnitude of 6.5 to 7.5 on the Richter scale.

San Andreas Fault. The San Andreas fault system is the dominant active fault in southern California, and is believed to be the boundary between two moving subterranean crustal plates; the Pacific Plate to the southwest and the North American Plate to the northeast. The San Andreas Fault is located approximately 37 miles northeast of the City of Fullerton at its closest point. The San Andreas Fault extends more than 745 miles over the length of California. The fault is divided into segments. The San Andreas Fault has a right-lateral strike-slip movement. An earthquake along the San Andreas Fault could affect most of southern California. Several earthquakes have been historically attributed to this fault. It is estimated by geologists that this

fault may be capable of generating an earthquake of magnitude 6.8 to 8.0 on the Richter scale, which is the estimated maximum credible earthquake potential.

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards. The City of Fullerton is not listed within a State designated Alquist-Priolo Earthquake Fault Zone

Seismic risk is not limited to identified faults. A significant fraction of small to moderately large earthquakes occurs on faults not previously recognized. Such earthquakes are characterized as "background seismicity" or "floating earthquakes," which mean that the expected sources and locations of such earthquakes are unknown.

Seismic Zones

All of the City of Fullerton is located in a "High Seismic Zone" as defined by the 2007 edition of the California Uniform Building Code and ASCE7-05. Stronger construction standards for buildings in "High Seismic Zones" have been adopted in the ASCE7-05 and the Uniform Building Code.

Seismic Hazards

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface (see Table 4.10). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4.10. Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors, by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.

MMI	Felt Intensity
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: Multi-Hazard Identification and Risk Assessment, FEMA, 1997

Earthquakes generate two general types of hazards. Primary hazards are surface rupture along faults, ground shaking, and associated building failure. Secondary hazards result from the interaction of ground shaking with existing ground instabilities and include liquefaction, settlement and landslides. The following analysis of regional faults and seismic hazards from the Existing Conditions Report prepared for the City of Fullerton General Plan Update (2009) discusses some of these factors in more detail.

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. The degree of damage depends on many interrelated factors. Among these are the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction. Seismic hazards and their potential to affect the City are discussed in more detail below.

Ground Shaking

When movement occurs along a fault, the energy generated is released as waves, which cause ground shaking. Ground shaking intensity varies with the magnitude of the earthquake, the distance from the epicenter, and the type of rock or sediment through which the seismic waves move. The geological characteristics of an area thus can be a greater hazard than its distance to the earthquake epicenter.

Fullerton is subject to seismic ground shaking due to the close proximity and potential earthquake magnitude of nearby faults. The extent of ground shaking depends on the magnitude of the earthquake and the distance between the City and the earthquake epicenter. While the Norwalk Fault and Puente Hills Faults have the greatest potential of causing the greatest extent of ground shaking in the City, the Whittier-Elsinore Fault and Newport-Inglewood Fault could also result in significant ground shaking. Although newer structures, constructed in accordance with current earthquake codes, would be anticipated to survive such ground shaking with little or no structural damage, the City does have some older structures which have not yet been

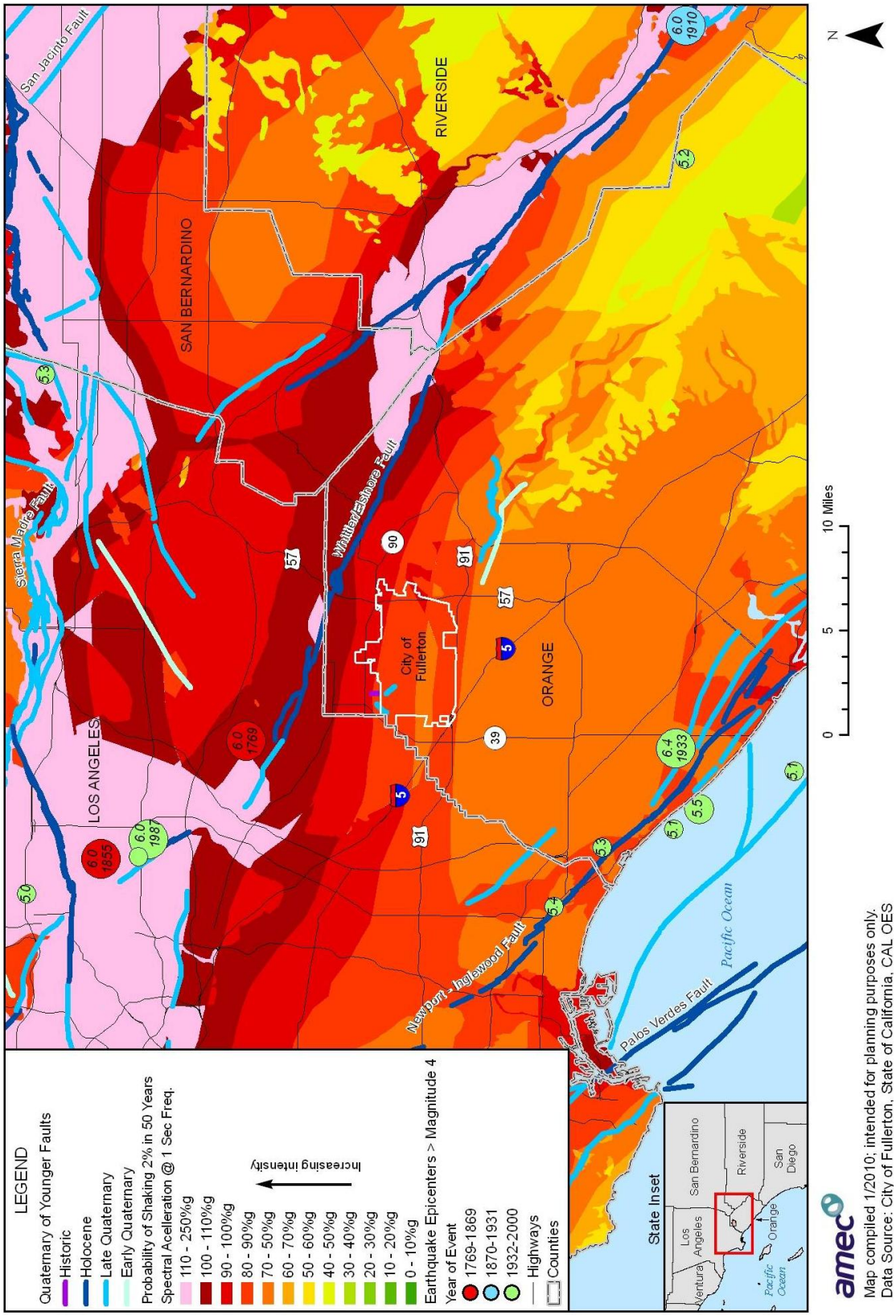
retrofitted for seismic safety. These older structures may suffer major damage or collapse with the occurrence of a strong earthquake. Older masonry buildings without seismic reinforcement (unreinforced masonry) are the most susceptible to the type of structural failure that causes injury or death.

The susceptibility of a structure to damage from ground shaking is also related to the underlying foundation material. A foundation of rock or very firm material can intensify short-period motions, which affect low-rise buildings more than tall, flexible ones. A deep layer of water-logged soft alluvium can cushion low-rise buildings, but it can also accentuate the motion in tall buildings. The amplified motion resulting from softer alluvial soils can also severely damage older masonry buildings.

Other potentially dangerous conditions include, but are not limited to, building architectural features that are not firmly anchored, such as parapets and cornices; roadways, including column and pile bents and abutments for bridges and overcrossings; and above-ground storage tanks and their mounting devices. Such features could be damaged or destroyed during strong or sustained ground shaking.

Figure 4.11 is an earthquake shaking map of the City of Fullerton that is based on analyses of these faults, soils, topography, groundwater, and the potential for earthquake shaking sufficiently strong to trigger landslide and liquefaction. It supports the conclusion that the City of Fullerton planning area is at risk to future damaging earthquake hazards.

Figure 4.11. The City of Fullerton's Earthquake Shaking Potential



Landslide

A landslide is the descent of earth and rock down a slope. Landslides often occur along pre-existing zones of weakness within bedrock (i.e., previous failure surfaces). Additionally, landslides have the potential to occur on over-steepened slopes, especially where weak layers, such as thin clay layers, are present and dip out-of-slope. Landslides can also occur on anti-dip slopes, along other planes of weakness such as faults or joints. Local flooding of bedrock or fracturing due to faulting can add to the potential for slope failure. Groundwater is very important in contributing to slope instability and landsliding. Additionally, other factors that contribute to slope failure include undercutting by stream action and subsequent erosion, as well as the mass movement of slopes caused by seepage or cyclical wetting and drying.

Earthquakes may cause landslides, particularly during the wet season, in areas of high water or saturated soils. The most likely areas for earthquake-induced landslides are the same areas of high landslide potential discussed in Section 4.2.13 Landslide. Landslide potential in Fullerton is considered to be low due to the flat topography in most areas of the City. However, there is the potential for landslides in the steeper portions of the East and West Coyote Hills area due to the sloping topography. Additionally, small soil slips can occur throughout the Coyote Hills in the newly developed portions. Figure 4.12 illustrates these areas susceptible to seismic induced landslides.

Lateral Spreading

Lateral spreading is defined as the finite, lateral displacement of gently sloping ground as a result of pore pressure build-up or liquefaction in a shallow underlying deposit during an earthquake. The conditions occur when blocks of mostly intact surficial soil are displaced down slope along a sheer zone that has formed within liquefied sediment. Lateral spreads most commonly occur on gentle sloping ground, and can have lateral displacement of several feet. Large displacement can occur if soil conditions have the potential for liquefaction and if seismically induced ground shaking is of a sufficient duration. According to the CGS, lateral spreading is commonly induced by liquefaction of material during an earthquake. Due to the high susceptibility of liquefaction within the southwest portions of the City, the potential exists for lateral spreading.

Liquefaction Potential

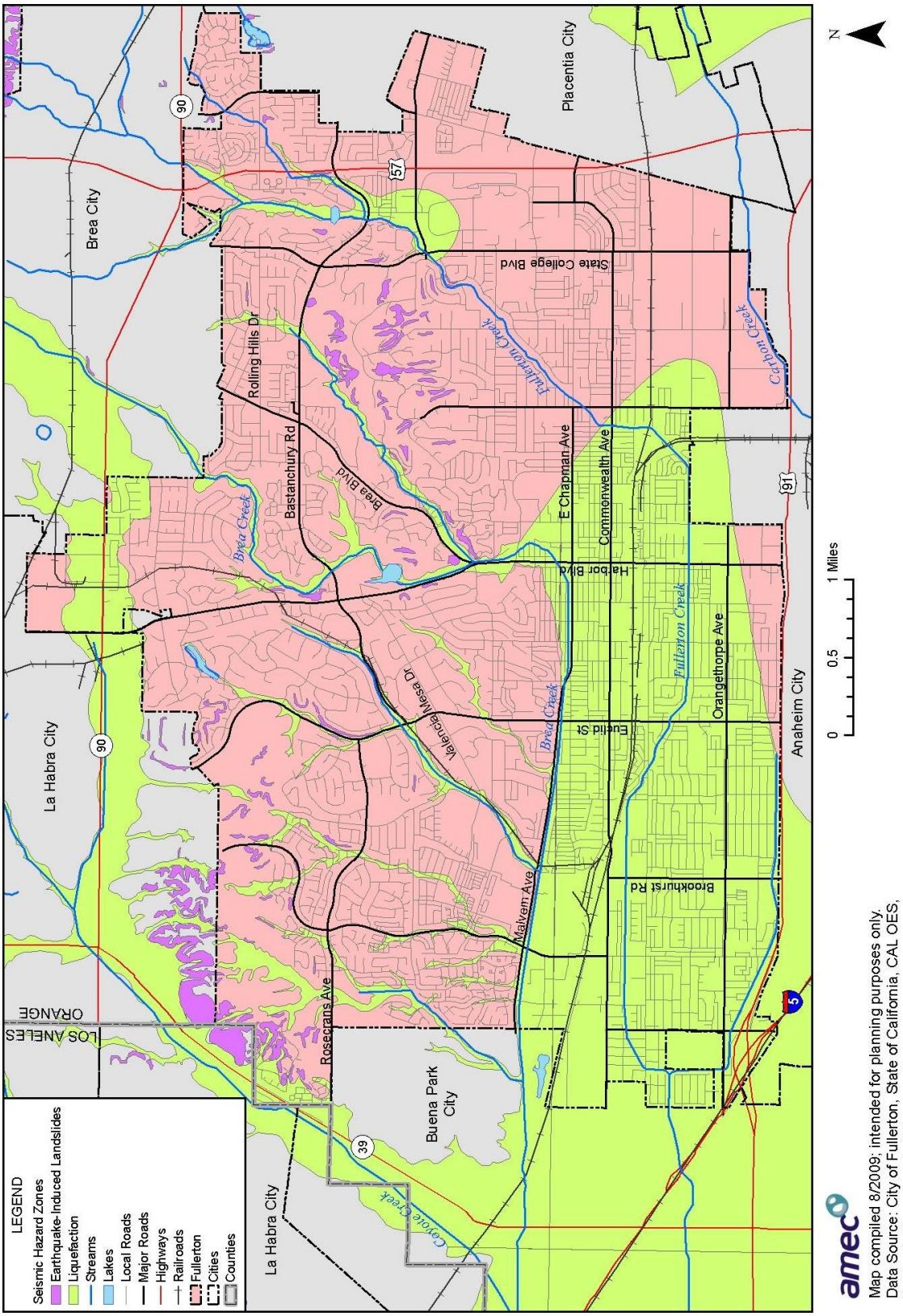
Liquefaction can be defined as the loss of soil strength or stiffness due to a buildup of pore-water pressure during a seismic event and is associated primarily with relatively loose, saturated fine- to medium-grained unconsolidated soils. Seismic ground shaking of relatively loose, granular soils that are saturated or submerged can cause the soils to liquefy and temporarily behave as a dense fluid. If this layer is at the surface, its effect is much like that of quicksand for any structure located on it. If the liquefied layer is in the subsurface, the material above it may slide laterally depending on the confinement of the unstable mass. Liquefaction is caused by a sudden temporary increase in pore-water pressure due to seismic densification or other displacement of submerged granular soils. Liquefiable soil conditions are not uncommon in alluvial deposits in moderate to large canyons and could also be present in other areas of alluvial soils where the

groundwater level is shallow (i.e., 50 feet below the surface). Bedrock units, due to their dense nature, are unlikely to present a liquefaction hazard.

Liquefaction during major earthquakes has caused severe damage to structures on level ground as a result of settling, titling, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation. Also of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted.

The CGS maintains Seismic Hazards Zone Maps that depict seismic hazards such as liquefaction and landslides. According to these maps, liquefaction susceptibility is considered high throughout the City and especially within the southwestern portions. These areas of potential liquefaction are delineated based on areas of historic occurrence, and local geological, geotechnical and groundwater conditions that indicate a potential for permanent ground displacement. Locations within the City which have the potential for liquefaction hazards are shown on Figure 4.12.

Figure 4.12. The City of Fullerton's Landslide and Liquefaction Map



Subsidence

Settlement of under-consolidated soils may occur during earthquake shaking. This process can result in a slight lowering of the ground surface which can vary in amount from place to place. Damage from subsidence is likely to be greatly overshadowed by damage resulting from groundshaking. Subsidence is discussed further in Section 4.2.15 Soil Hazards.

Settlement

Differential settlement refers to settlement occurring under conditions of static load, where subsurface densification occurs by compaction or consolidation of loose cohesionless sediment due to strong motion. Settlement is characterized by surface cracking and topographic depressions ranging from a few inches to several feet and horizontal distributed over a few feet to thousands of feet. Soil conditions subject to settlement include unconsolidated soils or areas where weak soils of variable thickness overlie firm soil or bedrock. The type of materials that would most likely experience seismically-induced settlement and differential compaction are deposits of alluvium, clays, silts, and possibly poorly constructed manmade fills. If structures were built on such soil conditions, settlement damage could result in the event of strong seismic shaking.

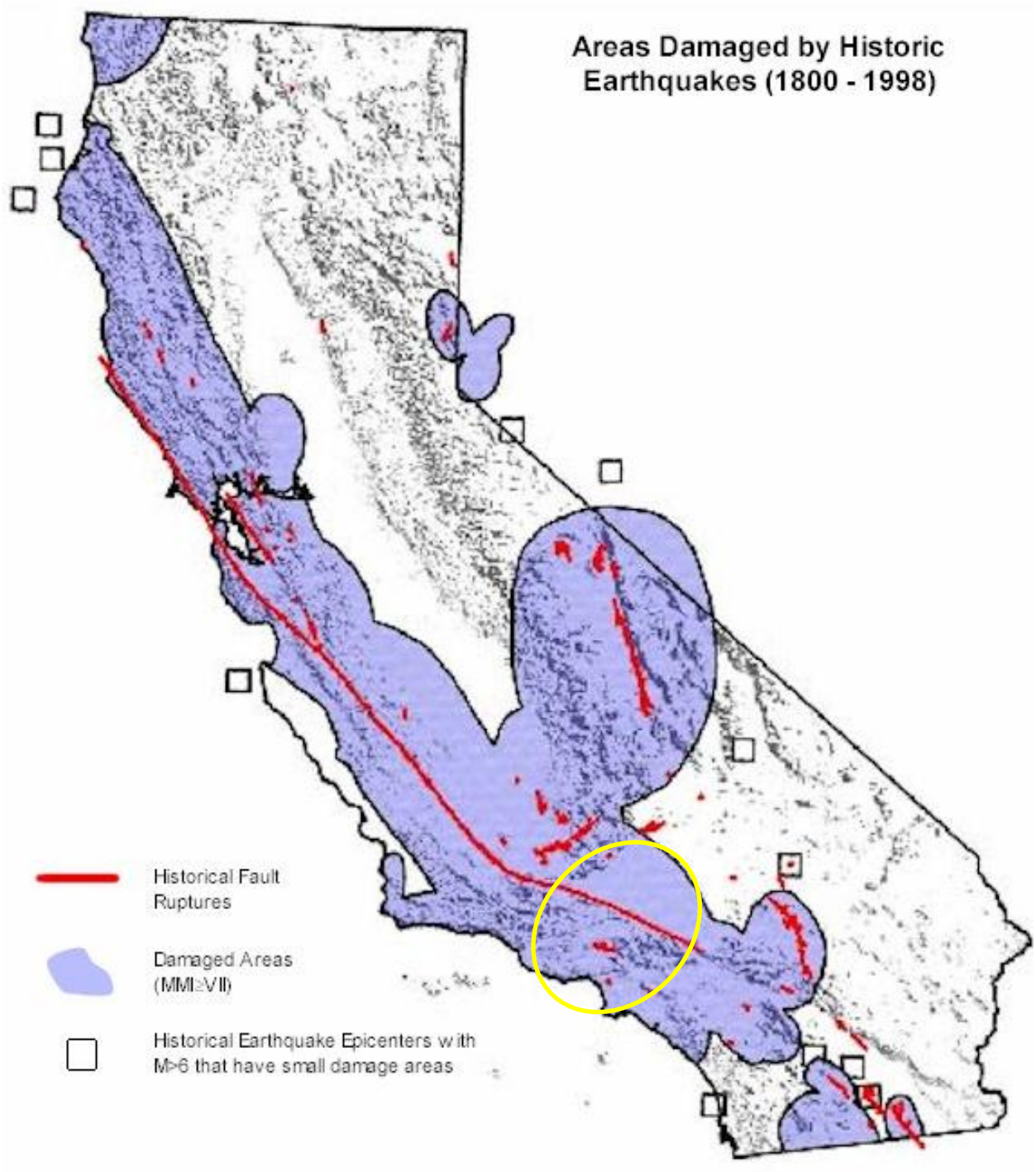
Other Hazards

Earthquakes can also cause seiches and dam failures. A seiche is a periodic oscillation of a body of water resulting from seismic shaking or other causes that can cause flooding. Earthquake-induced seiches are not considered a risk in the City of Fullerton. Finally, earthquakes can cause dams to fail. See Section 4.2.7 Dam Failure for more information on this hazard.

Past Occurrences

Earthquakes have occurred in the City of Fullerton in the past. Figure 4.13 illustrate areas of California historically damaged by earthquakes. Figure 4.11 depicts the earthquake shaking potential of the area also identified epicenters of historical earthquakes. According to the US Geological Survey, the CGS has identified a minimum of 15 magnitude 5.0 or greater earthquakes that caused damaging shaking in the City of Fullerton between 1920 and 2008. Details on some of these events follow.

Figure 4.13. Areas Damaged by Historical Earthquakes, 1800-1998



Source: California Geological Survey, www.consrv.ca.gov/CGS/rghm/psha/ofr9608/index.htm#Faults%20in%20California

March 11, 1933 – A magnitude 5.4 earthquake shook the Fullerton area. The epicenter was in Long Beach, which had 60 fatalities. The City of Fullerton became a haven for refugees from Long Beach, Compton, Los Angeles, Bellflower, and other cities. The City of Fullerton

sustained heavy damage. Chimneys were tumbled and windows broken. Most of the City's schools required major rebuilding. The Wilshire School was declared unsafe, and was subsequently razed. All told, this earthquake claimed 132 victims, though none in Fullerton.

February 9, 1971 – A magnitude 6.6 earthquake, with an epicenter in Sylmar, shook the Fullerton area. No injuries or loss of life was reported in Fullerton.

October 1, 1987 – A magnitude 6.1 earthquake shook the Fullerton area. The epicenter was in Pasadena, but effects were felt in Fullerton. An elementary school needed to be closed as the structure of the school had been affected. City Hall and the main branch of the City Public Library sustained minor damage. Water mains were broken, traffic signals malfunctioned, and power outages occurred. No injuries or loss of life was reported.

January 17, 1994 – A 6.6 magnitude earthquake, whose epicenter was in Northridge, woke residents and caused minor damage in the City of Fullerton. No injuries were reported. Water lines at a warehouse were broken, and several residents reported broken windows.

October 17, 1999 – A magnitude 7.0 earthquake struck in the Mojave Desert, about 120 miles northeast of Fullerton. The quake broke a water main, causing 30 homes to be without water for part of a day. Several power outages occurred, but no injuries or fatalities were reported.

July 30, 2008 – A magnitude 5.4 earthquake struck five miles northeast of Yorba Linda. Buildings in Fullerton sustained minor damage. Firefighters were called to respond to a natural gas leak at Cal State Fullerton. The school was closed while inspectors assessed cracks in some of the older buildings on campus. No injuries or fatalities were reported.

It is unknown to what extent earthquakes occurring outside of the planning area were felt by Fullerton residents. There is also no direct data indicating past damage to the planning area from other seismic induced hazards such as liquefaction, settlement, landslides, or any other seismic-related issue.

Likelihood of Future Occurrences

Earthquake

Likely—According to the City of Fullerton General Plan, the faults and fault systems that lie along the eastern and western boundaries of Fullerton, as well as other regional faults, have the potential to produce high magnitude earthquakes throughout the City. With 15 magnitude 5.0 or greater earthquakes identified causing damage in the City of Fullerton between 1920 and 2008, this amounts to an earthquake every 5.9 years, or a 16.9% chance of a 5.0 magnitude or greater earthquake.

Landslide

Occasional - There is currently no record of seismically induced landslide occurrence in the City of Fullerton. However; based on the combination of a 16.9% chance for a 5.0 magnitude or

greater earthquake discussed above, topography, and soil conditions in the City of Fullerton, a seismically induced landslide may occur in the City.

Lateral Spreading

Occasional - There is currently no record of seismically induced lateral sliding occurring in the City of Fullerton. However; based on the combination of a 16.9% chance for a 5.0 magnitude or greater earthquake discussed above, topography, and soil conditions in the City of Fullerton, seismically induced lateral sliding may occur in the City.

Liquefaction

Occasional - There is currently no record of seismically induced liquefaction occurring in the City of Fullerton. However; based on the combination of a 16.9% chance for a 5.0 magnitude or greater earthquake discussed above, topography, and soil conditions in the City of Fullerton, seismically induced liquefaction may occur in the City.

Settlement

Occasional - There is currently no record of seismically induced settlement occurring in the City of Fullerton. However; based on the combination of a 16.9% chance for a 5.0 magnitude or greater earthquake discussed above, topography, and soil conditions in the City of Fullerton, seismically induced settlement may occur in the City.

Subsidence

Occasional - There is currently no record of seismically induced subsidence occurring in the City of Fullerton. However; based on the combination of a 16.9% chance for a 5.0 magnitude or greater earthquake discussed above, topography, and soil conditions in the City of Fullerton, seismically induced subsidence may occur in the City.

4.2.10 Flood

Hazard/Problem Description

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss and are usually caused by weather events. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Certain health hazards are also common to flood events. Standing water and wet materials in structures can become breeding grounds for microorganisms such as bacteria, mold, and viruses. This can cause disease, trigger allergic reactions, and damage materials long after the flood. When floodwaters contain sewage or decaying animal carcasses, infectious disease becomes a concern. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts.

The area adjacent to a channel is the floodplain. Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage, the floodplain most often refers to the area that is inundated by the 100-year flood, the flood that has a one percent chance in any given year of being equaled or exceeded. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the National Flood Insurance Program. The 500-year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. A 500-year flood event would be slightly deeper and cover a greater area then a 100-year flood event. The potential for flooding can change and increase through various land use changes and changes to land surface, which can result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity. The City of Fullerton planning area is susceptible to various types of flood events as described below.

- **Riverine flooding—**Riverine flooding, defined as when a watercourse exceeds its "bank-full" capacity, generally occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. This type of flood occurs in river systems whose tributaries may drain large geographic areas and include one or more independent river basins. The onset and duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. In the City of Fullerton planning area, riverine flooding is largely caused by heavy and continued rains, increased outflows from upstream dams, and heavy flow from tributary streams. These intense storms can overwhelm the local waterways as well as the integrity of any flood control structures. The warning time associated with slow rise floods assists in life and property protection.
- **Flash Flooding—**Flash flooding describes localized floods of great volume and short duration. This type of flood usually results from a heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the winter and spring. Flash floods often require immediate evacuation.
- **Localized flooding—**Localized flooding problems are often caused by flash flooding, severe weather, or an unusual amount of rainfall. Flooding from these intense weather events usually occurs in areas experiencing an increase in runoff from impervious surfaces associated with development and urbanization as well as inadequate storm drainage systems.
- **Dam failure flooding**—Flooding from failure of one or more upstream dams is also a concern to the City of Fullerton planning area. A catastrophic dam failure could easily overwhelm local response capabilities and require mass evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result, and there could be associated health concerns as well as problems with the identification and burial of the deceased. Dam failure is further addressed in Section 4.2.7 Dam Failure.

The City of Fullerton Waterway and Flood Control Systems

The City of Fullerton is located within the San Gabriel Coyote Creek Watershed. The Coyote Creek Watershed covers approximately 41.3 square miles in the northwest corner of Orange County and also includes portions of the cities of Brea, Buena Park, Fullerton, La Habra, and La Palma. The main tributary of this watershed, Coyote Creek, flows from Riverside County and empties into the San Gabriel River.

Two distinct geographical features characterize the drainage conditions of Fullerton. The southerly portion of the City consists primarily of a flat, plainer type area with a gradual slope to the south and west. The northerly part of the City consists of abruptly rising foothills with the City boundary terminating at approximately the crest of these hills.

Regional Drainage Facilities

The City of Fullerton, Drainage Master Plan Update, 1996 and the Community Health and safety Element of the General Plan, 1997, characterize the drainage facilities of significance to the planning area:

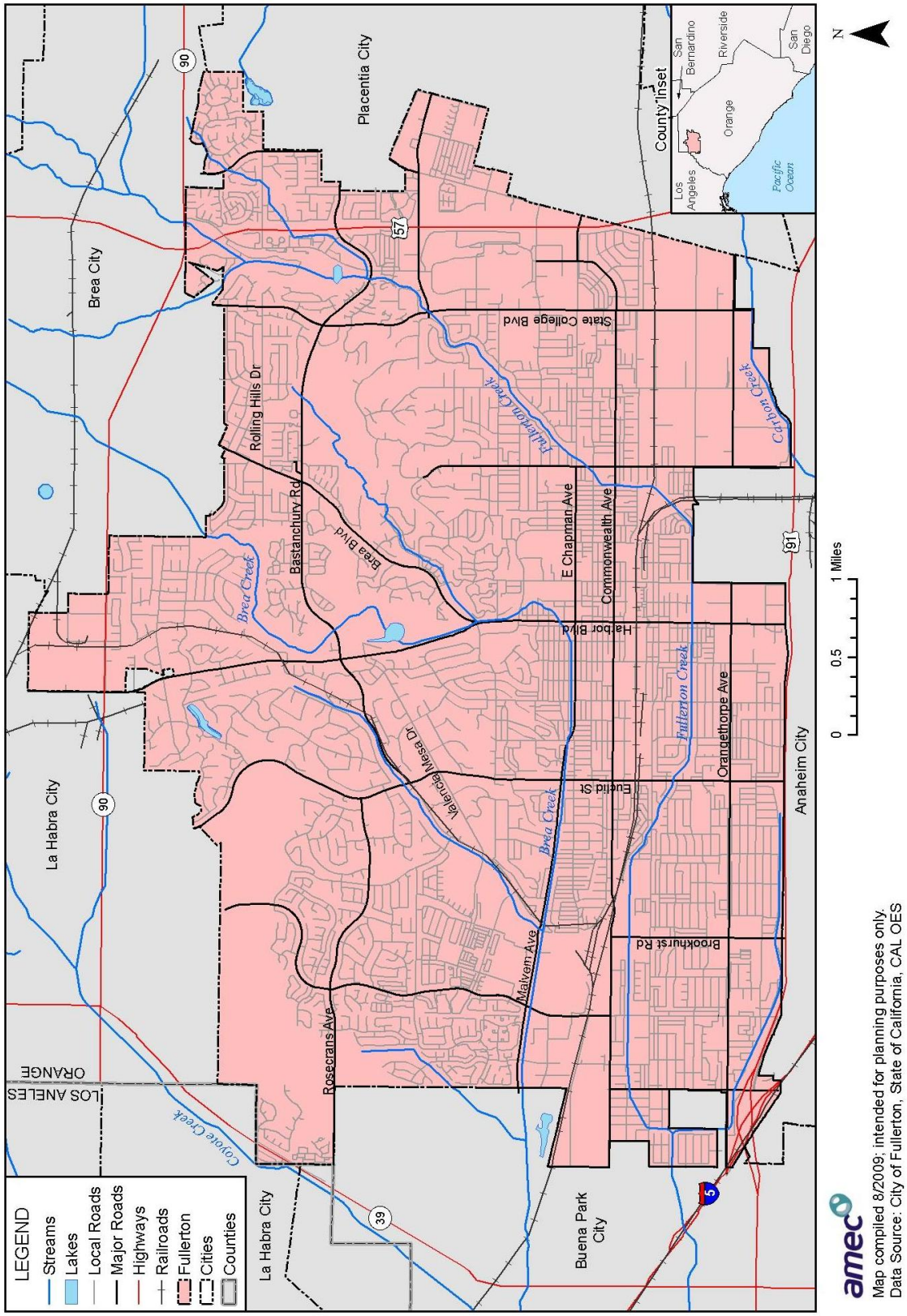
Several major watercourses and dam facilities provide protection against major flood flows from runoff generated in watersheds north and east of the City. The most significant of these facilities are: Imperial Channel which lies southerly and parallel to Imperial Highway on the north boundary of the City; Brea Creek Reservoir and Brea Creek Channel (running along the base of the foothills) which are maintained by the U.S. Army Corps of Engineers and the Orange County Flood Control District (OCFCD), respectively; and Fullerton Reservoir and Fullerton Creek (which runs from the East to West through the center of the City), Houston Storm Channel (along the southerly boundary of the City), Placentia Storm Channel (along the easterly boundary of the City), and Carbon Creek Channel (in the southeast corner of the City), all operated by the OCFCD. All of these facilities have insufficient capacity for a 100- year storm.

Local Drainage Facilities

Smaller drainage facilities which drain into the major channels and reservoirs are the responsibility of the City for construction, operation and maintenance. For the most part, the existing local drainage facilities within the City of Fullerton have capacity to carry flood flows from storms of less than a 10-year recurrence interval. Those facilities constructed in the late 1950's, and subsequent to that time, generally have capacities approximating a 10-year frequency storm. There are many drainage deficiencies within the City, particularly in the flatter areas, from the foothills south. The majority of the current drainage deficiencies are addressed in the 25-year Capital Improvement Program for design and construction. The construction of the Commonwealth/State College Storm Drain project has removed the threat of flooding from major portions of the eastern section of the City.

Figure 4.14 illustrates natural and manmade waterways in the City.

Figure 4.14. The City of Fullerton's Waterways



Floodplain Mapping

FEMA established standards for floodplain mapping studies as part of the National Flood Insurance Program (NFIP). The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Floodplain studies that may be approved by FEMA include federally funded studies; studies developed by state, city, and regional public agencies; and technical studies generated by private interests as part of property annexation and land development efforts. Such studies may include entire stream reaches or limited stream sections depending on the nature and scope of a study. A general overview of floodplain mapping is provided in the following paragraphs.

Flood Insurance Study (FIS)

The FIS develops flood-risk data for various areas of a community that is used to establish flood insurance rates and to assist the community in its efforts to promote sound floodplain management. The current City of Fullerton FIS is dated December 3, 2009.

Flood Insurance Rate Map (FIRM)

The FIRM is designed for flood insurance and floodplain management applications. For flood insurance, the FIRM designates flood insurance rate zones to assign premium rates for flood insurance policies. The designated flood zones are based on flood risk in the area. For floodplain management, the FIRM delineates 100- and 500-year floodplains, floodways, and the locations of selected cross sections used in the hydraulic analysis and local floodplain regulations. Land areas that are high risk, within the 100-year floodplain (or with a one percent annual chance of flooding), are called Special Flood Hazard Areas (mapped as A zones.). In communities that participate in the National Flood Insurance Program (NFIP), mandatory flood insurance purchase requirements apply to all Zones A (i.e., those areas subject to a 100-year flood event). The City FIRMs have been replaced by new digital flood insurance rate maps as part of FEMA's Map Modernization program, which is discussed further below.

Letter of Map Revision (LOMR) and Map Amendment (LOMA)

LOMRs and LOMAs represent separate floodplain studies dealing with individual properties or limited stream segments that update the FIS and FIRM data between periodic FEMA publications of the FIS and FIRMs.

Digital Flood Insurance Rate Maps (DFIRM)

As part of their Map Modernization program, FEMA is converting paper FIRMS to digital FIRMs (DFIRMS). These digital maps:

- Incorporate the latest updates (LOMRs and LOMAs),
- Utilize community supplied data,
- Verify the currency of the floodplains and refit them to community supplied base maps,

- Upgrade the FIRMs to a GIS database format to set the stage for future updates and to enable support for GIS analyses and other digital applications, and
- Solicit community participation.

DFIRMs, dated December 2004 were finalized for the City of Fullerton and were used for the flood analysis in this plan. Since completion of the flood analysis, newer December 3, 2009 DFIRMs have been adopted by the City.

Major Sources of Flooding

General rainfall floods, primarily associated with general winter storms and thunderstorms, can occur in the City of Fullerton during winter and spring months. This type of flood results from prolonged heavy rainfall over tributary areas and is characterized by high peak flows of moderate duration. Flooding is more severe when antecedent rain has resulted in saturated ground conditions.

In the more developed areas of the City, flood problems intensify because open land available to absorb rainfall and runoff is being used for new development, which increases the amount of paved areas (i.e., impervious surfaces). The decrease in the amount of open land increases the volume of water that must be carried away by waterways.

The FEMA DFIRMS for Fullerton indicate a potential flooding predominantly for the sourtherly portions of Fullerton, generally limited to areas southerly of Brea Creek Channel. According to FEMA, the majority of Fullerton is within designated Flood Zones A, AO, X, and X500; for more detail, refer to Figure 4.29.

Localized Flooding Problem Areas

Localized flooding also occurs throughout the Fullerton planning area with several areas of primary concern. According to the City of Fullerton, Drainage Master Plan Update, existing storm flow facilities are often inadequate in providing drainage protection to the City. The Drainage Master Plan is focused on achieving City flood protection goals for the 10-year and 100-year storm events.

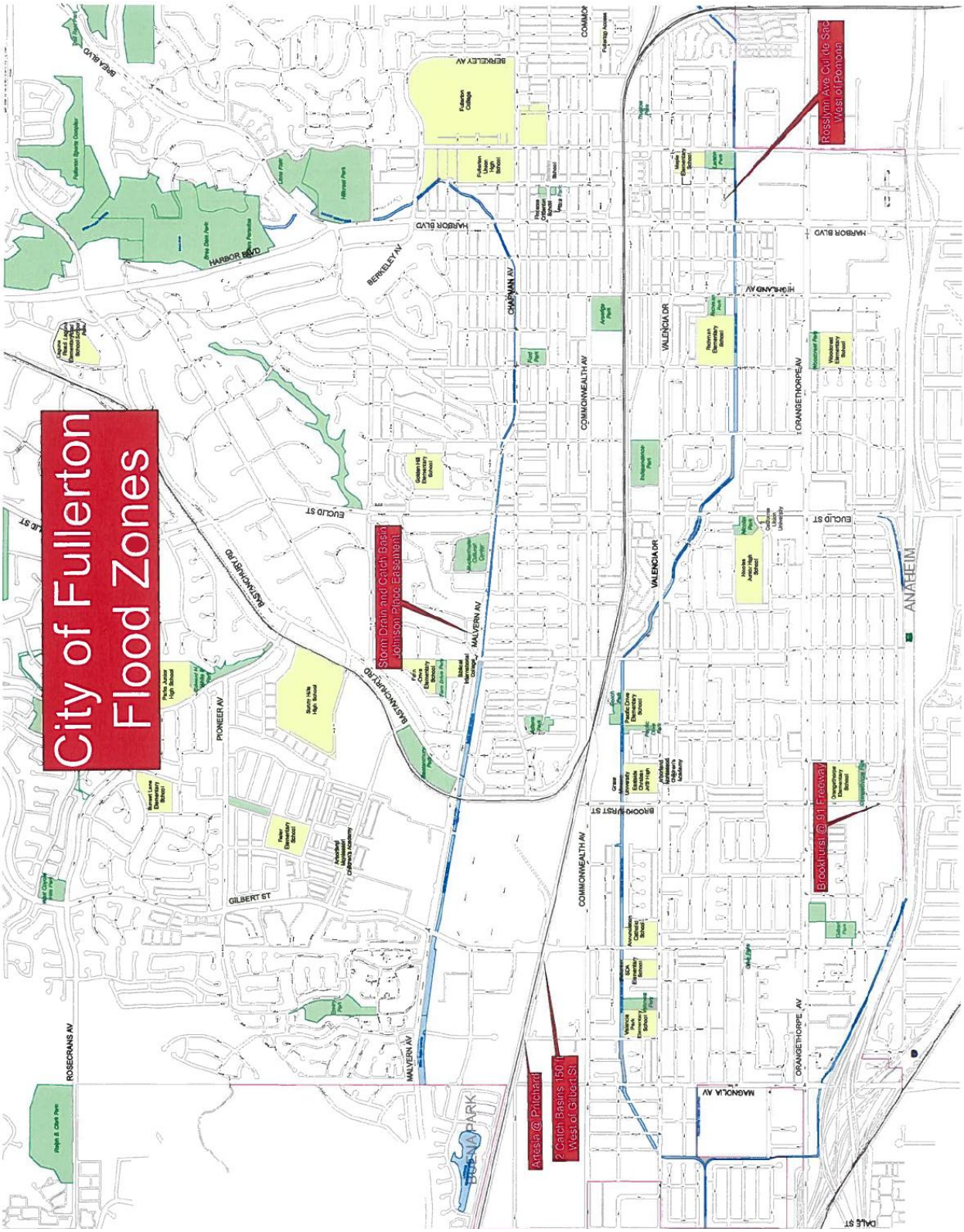
According to the Drainage Master Plan and the City's Maintenance Services Department, numerous roads, both arterial and local residential streets, throughout the City are subject to flooding in heavy rains. In addition to flooding, damage to these areas during heavy storms includes pavement deterioration, washouts, landslides/mudslides, debris areas, and downed trees. The amount and type of damage or flooding that occurs varies from year to year, depending on the quantity of runoff. Localized flooding problems areas identified in Table 4.11 and illustrated in Figure 4.15.

Table 4.11. The City of Fullerton's Localized Flood Problem Areas

Location	Flooding	Debris Areas	Downed Trees
South Brookhurst and 91 Freeway	X	X	X
Artesia Avenue West of Gilbert Street	X	X	X
South Euclid Street at 91 Freeway	X	X	X
100 Block of East Rosslyn Avenue	X	X	X
1417 West Malvern Avenue	X	X	X

Source: City of Fullerton Street Maintenance

Figure 4.15. City of Fullerton Flood Zones



Source: City of Fullerton Street Maintenance

Levees

In many locations in California, levees and flood control facilities have been built and are maintained by various public and private entities, including water, irrigation, and flood control districts; other state and local agencies; and private interests. Some of these facilities were constructed with flood control as secondary or incidental to their primary purpose. The City of Fullerton does not own, operate, maintain, or have responsibility to maintain any levees within the planning area.

Past Occurrences

The City of Fullerton has a history of flooding, but little definitive data is available for specific floods, particularly on the smaller streams. Historical records are not complete, but do indicate that significant flood events occurred in The City of Fullerton between the 1840s and 1900. The HMPC provided information on flood events, which are detailed below.

1861-1862 - The flood of 1861-62 has been called the "great flood" and the "Noachian deluge of California floods." During the flood period in 1862 the entire valley area from Los Angeles to the ocean, both toward San Pedro and toward Ballona, was a great lake. The Los Angeles River in the City of Los Angeles extended from Alameda Street to the bluff on Pico Heights side. A little below Vernon, about where Vernon Avenue now is, the river split, and part of it went through Los Cienagas grant into Ballona Creek. In San Bernardino, Riverside, and Orange Counties, the Santa Ana River became a raging torrent during the flood of 1862. The prosperous colonies along the banks of the river were completely inundated, and vineyards, orchards, and grain fields were transformed into a barren waste. In the town of Anaheim, four miles from the river, the water ran four feet deep and spread in an unbroken sheet to the Coyote Mills, three miles beyond present Fullerton.

1884 – The flood of 1884 ranks among the major floods – in fact there were two floods in 1884. The first came in the latter part of February. It did little damage, but a great quantity of water fell, apparently utilizing much of the absorptive capacity of the ground. A second flood came within 6 or 8 days after the first and did a great deal of damage. All the bridges across the Los Angeles River were washed out except one, the old Downey Avenue Bridge. Many houses were washed away, and several people drowned. San Fernando Valley was flooded from Chatsworth to Glendale. The Santa Ana River cut a new channel to the sea, Beginning at a point below where Santiago Creek enters the Santa Ana River, the river cut through the fertile lands east of the old channel and discharged into the ocean about three miles southeast of its former outlet. According to Brown and Boyd, the year of 1884 proved to be the great flood year of later times, and 37.50 inches were reported during the season for San Bernardino, while over 48 inches were registered at Los Angeles and more at other points.

1916 – The 1916 flood in Orange County accounted for the loss of four lives and property damage estimated at $520,500.

1937 – The 1937 flood in Orange County accounted from property damage estimated to be $750,000. No loss of life was reported.

March 1938 – The largest flood in Fullerton history came as 5.16 inches of rain fell in 36 hours, including 2.9 in a 24-hour period. The City was hit from the east when the Santa Ana River overflowed at 3 a.m. on March 3 and coursed into the southern part of the City. The earthen walls of both Fullerton and Brea creeks caved in and the water topped the bridges that covered them. An eight foot wall of water hit Atwood and then spread over Fullerton and Anaheim. The water left a gorge with 20 foot vertical banks through the heart of Fullerton. Photos of the aftermath show houses hanging over the edge of the creeks along with mud a foot deep in many parts of southeast Fullerton. The floods caused the loss of 87 lives and damages of over $78 million (1938 dollars). The damage from the flood prompted federal money, including Works Project Administration funds, to help with construction of the Fullerton and Brea dams and the concrete lining of the creek channels throughout the city to alleviate the danger of erosion and channeling of water downstream.

September 1939 - "El Cordonazo" or "The Lash of St. Francis" a tropical storm hit Southern California and caused the greatest September rainfall ever. The storm lost hurricane status shortly before moving onshore at San Pedro at tropical storm strength. Torrential rains hit the LA area, with 5.42" falling in 24 hours. 45 killed in floods all over Southern California, and 48 more at sea. 2 million dollars in damage was done to structures along the coast and to crops. Californians were generally unprepared and were alerted to their vulnerability to tropical storms. In response, the weather bureau established a forecast office for southern California, which began operations in February of 1940.

January and February 1969 – Beginning on January 18, the first of two back to back tropical storms hit the area. With the exception of a short break on January 22 and 23, the record books show that heavy rain occurred during most of the period from January 18-26, with an especially intense downpour on January 25. For this nine day period, rainfall totals ranged from 10-20 inches in the lowlands and 20-50 inches on the mountain areas. After the wettest January on record, more storms came in February. By February 27, rain had fallen on 23 of 36 days. In Fullerton, the municipal golf course was flooded, and at one point stood nearly 50 feet deep.

February 18, 1980 – A week of almost constant rain inundated the Fullerton area. This rain came only weeks after heavy rains in late January. Craig Park was completely underwater. The golf course and St. Jude Hospital sustained flooding as well. Mud inundated the streets in northeast Fullerton. An oil well pump directly north of the Brea Dam was underwater.

December 6, 1997 – A slow moving low pressure center off the coast, spawned late night showers and thunderstorms. The showers continuously developed off the coast, and moved inland over central portions of Orange County, starting before daybreak on the sixth, and lasting until the early morning hours on the seventh. Rainfall generally ranged from four to eight inches across the area, resulting in widespread flooding.

February 6, 1998 - Exceptionally strong westerly jet-stream aloft, and a deep upper-level trough of low pressure off the coast, steered a barrage of weather systems through southern California for several days. The action started off with high winds and then heavy rain on the sixth. Rainfall up to three inches caused widespread flooding, stranding motorists, and resulting in sporadic road closures. Numerous swift-water and standing-water rescues were made as water quickly surrounded homes and cars. Gusty winds easily pushed over trees whose shallow root systems were anchored in water-logged soil, damaging homes and automobiles, and causing sporadic power outages. Sink holes began to open up, undermining some roadways. Over $4.3 million in damages were sustained.

February 23, 1998 - powerful Pacific storm fed by warmer than normal El Nino conditions in the eastern Pacific, slammed into southern California with strong winds, thunderstorms, and very heavy rain. This was the final in a series of heavy storms which pummeled the region this month. In many areas the ground was nearly saturated and some reservoirs were nearing or exceeding their capacity. The two to five inches of rain which ensued locally caused widespread flooding and property damage. Strong winds gusting over 40 mph at times felled trees, whose support was weakened in the water-logged soils, which snapped utility lines, resulting in sporadic power outages. Damages in excess of $29.7 million were reported.

February 11, 2001 - Many of the major roadways were flooded for several hours. Between two and five inches of rain fell over Orange County and the western end of the Inland Empire. A fast moving squall line behind the main frontal band knocked down trees and power lines, causing over $250,000 in damages.

January 7, 2005 - A storm lasting 5 days dropped heavy rain across all of southern California. Flash flooding and mudslides caused millions of dollars of damage to homes, businesses, vehicles, parks, roads and bridges.

January 20, 2010 - During the third week of January, a 180 to 210 kt jet stretched across the Pacific and into Southern California, bringing a series of powerful winter storms to the region. The first storm made its way through the region on January 18th. Heavy rain, mountain snow, and strong winds contributed to widespread damage and urban flooding, as well as a few flash floods with minor debris flows.

Localized Flooding

In addition to the major historical flood events described above, as previously described, the City of Fullerton planning area remains at risk to annual localized flooding.

Likelihood of Future Occurrences

100-Year Flood

Occasional—The 100-year flood is the flood that has a one percent chance in any given year of being equaled or exceeded.

<100-Year Flood/Outside the 100-Year Floodplain

Highly Likely—Based on historical data, flooding events less severe than a 100-year flood and those outside of the 100-year floodplain occur frequently during periods of heavy rains.

4.2.11 Human Health Hazards: Epidemic/Pandemic

Hazard/Problem Description

Epidemics occur when an infectious disease spreads beyond a local population, lasting longer and reaching people in a wider geographical area. When that disease reaches global proportions, it is considered a pandemic. Several factors determine whether an outbreak will explode into an epidemic or pandemic: the ease with which a microbe moves from person-to-person and the behavior of individuals and societies.

A pandemic flu occurs when a new influenza virus emerges for which people have little or no immunity, and for which there is no vaccine. This disease spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in a very short time. The U.S. Centers for Disease Control and Prevention has been working closely with other countries and the World Health Organization to strengthen systems to detect outbreaks of influenza that might cause a pandemic and to assist with pandemic planning and preparation.

Recently, health professionals have been concerned by the possibility of an avian (or bird) flu pandemic associated with a highly pathogenic avian H5N1 virus. Since 2003, avian influenza has been spreading through Asia. A growing number of human H5N1 cases contracted directly from handling infected poultry have been reported in Asia, Europe, and Africa, and more than half the infected people have died. There has been no sustained human-to-human transmission of the disease, but the concern is that H5N1 will evolve into a virus capable of human-to-human transmission.

Most recently, the 2009 H1N1 flu virus created cause for concern. 2009 H1N1 (sometimes called “swine flu”) is a new influenza virus causing illness in people. This new virus was first detected in people in the United States in April 2009. This virus is spreading from person-to-person worldwide, probably in much the same way that regular seasonal influenza viruses spread. This virus was originally referred to as “swine flu” because laboratory testing showed that many of the genes in this new virus were very similar to influenza viruses that normally occur in pigs (swine) in North America. But further study has shown that this new virus is very different from what normally circulates in North American pigs. It has two genes from flu viruses that normally circulate in pigs in Europe and Asia and bird (avian) genes and human genes. Scientists call this a “quadruple reassortant” virus. On June 11, 2009, the World Health Organization (WHO) signaled that a pandemic of 2009 H1N1 flu was underway. In Orange County, swine flu cases were tracked by the Orange County Health Care Agency. Table 4.12 shows the affect of H1N1 on Orange County.

Table 4.12. Reported Cases of H1N1 in Orange County

Recent Pandemic H1N1 Influenza (Swine Flu) Cases in Orange County, CA*	
Severe (ICU and fatal) cases**	222
Fatal Cases (confirmed/probable)	54

Source: Orange County Public Health Agency Website
*As of January 30, 2010 the Public Health Agency will no longer be tracking and reporting all cases of Pandemic H1N1.
**Six severe cases, including four deaths, were confirmed positive for influenza A but are not included in the numbers above because sub-typing was not completed or was inconclusive.

An especially severe influenza pandemic could lead to high levels of illness, death, social disruption, and economic loss. Impacts could range from school and business closings to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines.

Past Occurrences

There were three acknowledged pandemics in the twentieth century and one in the twenty first century:

1918-19 Spanish flu (H1N1)—This flu is estimated to have sickened 20-40 percent of the world's population. Over 20 million people lost their lives. Between September 1918 and April 1919, 500,000 Americans died. The flu spread rapidly; many died within a few days of infection, others from secondary complications. The attack rate and mortality was highest among adults 20-50 years old; the reasons for this are uncertain. By late September 1918, over 35,000 people throughout California had contracted influenza. According to state officials, influenza was most prevalent in the southern part of California, but the death toll was high across the state.

1957-58 Asian flu (H2N2)—This virus was quickly identified due to advances in technology, and a vaccine was produced. Infection rates were highest among school children, young adults, and pregnant women. The elderly had the highest rates of death. A second wave developed in 1958. In total, there were about 70,000 deaths in the United States. Worldwide deaths were estimated between 1 and 2 million.

1968-69 Hong Kong flu (H3N2)—This strain caused approximately 34,000 deaths in the United States and more than 700,000 deaths worldwide. It was first detected in Hong Kong in early 1968 and spread to the United States later that year. Those over age 65 were most likely to die. This virus returned in 1970 and 1972 and still circulates today.

2009 Swine Flu (H1N1)—This strain caused more than 14,700 deaths worldwide to date, according to the WHO. It was first detected in the United States in early 2009 and spread to the world later that year. About 70 percent of people who have been hospitalized with this 2009 H1N1 virus have had one or more medical conditions previously recognized as placing people at "high risk" of serious seasonal flu-related complications. This included pregnancy, diabetes, heart disease, asthma, and kidney disease. Young children were also at high risk of serious

complications from 2009 H1N1, just as they are from seasonal flu. And while people 65 and older were the least likely to be infected with 2009 H1N1 flu, if they got sick, they were also at "high risk" of developing serious complications from their illness.

Likelihood of Future Occurrences

Occasional—According to historical data, four influenza pandemics have occurred since 1918. This averages out to a pandemic every 23 years or a 4.34 percent chance of a pandemic outbreak in any given year. Although scientists cannot predict when the next influenza or other type of pandemic will occur or how severe it will be, wherever and whenever it starts, everyone around the world will be at risk. If an influenza pandemic does occur, it is likely that many age groups would be seriously affected. The greatest risks of hospitalization and death—as seen during the last two pandemics in 1957 and 1968 as well as during annual outbreaks of influenza—will be to infants, the elderly, and those with underlying health conditions. However, in the 1918 pandemic, most deaths occurred in young adults. Few people, if any, would have immunity to a new virus.

4.2.12 Human Health Hazards: West Nile Virus

Hazard Problem Description

The impact to human health that wildlife, and more notably, insects, can have on an area can be substantial. Mosquitoes transmit the potentially deadly West Nile virus to livestock and humans alike. West Nile virus first struck the western hemisphere in Queens, New York, in 1999 and killed four people. Since then, the disease has spread across the United States. In 2003, West Nile virus activity occurred in 46 states and caused illness in over 9,800 people.

Most humans infected by the virus have no symptoms. A small proportion develops mild symptoms that include fever, headache, body aches, skin rash, and swollen lymph glands. Less than 1 percent of those infected develop more severe illness such as meningitis or encephalitis, symptoms of which include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. Of the few people who develop encephalitis, fewer than 1 out of 1,000 infected die as a result.

There is no specific treatment for the infection or a vaccine to prevent it. Treatment of severe illness includes hospitalization, use of intravenous fluids and nutrition, respiratory support, prevention of secondary infections, and good nursing care. Medical care should be sought as soon as possible for persons who have symptoms suggesting severe illness. People over 50 years of age appear to be at high risk for the severe aspects of the disease.

West Nile virus is a concern in the City of Fullerton planning area. Excess standing water, which can be found in many of the local channels and drainage areas, provides a breeding area for mosquitoes.

The City of Fullerton is "property owner" on 294 properties throughout the City that the City has specific responsibility to control the mosquito population on those properties. In order to control mosquitos, the City contracts with the Orange County Vector Control District. The District operates to prevent the spread of the virus through focused efforts on reducing the mosquito population and educating the public. Several types of preventive methods lower mosquito populations to levels that reduce chances for the spread of disease. The County also has an active surveillance program and maintains records for all identified cases of the virus.

Past Occurrences

The virus first appeared in California in 2002 with the identification of one human case. In 2003, three human cases occurred in California, and the virus was detected in six southern California counties. By 2004, the virus was in all 58 counties in California; 830 human infections were identified. According to the California West Nile Virus Surveillance Information Center sponsored by the California Department of Health Services, 28 California residents died from the virus in 2004. Most of these deaths were in Southern California.

In 2006, the number of human cases in California was 278, including 7 deaths, which was down significantly from 2005. In response to the increased activity of the virus in California, in August of 2007, Governor Schwarzenegger signed an emergency proclamation and commitment of more than $10 million in emergency funding to fight the virus. In 2007, there were 380 human cases in California, including 18 deaths. In 2009, 19 of the 58 California counties reported some West Nile virus activity and 105 human cases were reported, which included 4 deaths from 4 counties. Table 4.13 compares and summarizes reported West Nile virus cases in California and Orange County for the years 2004 through 2009. According to the table, there has been a steady reduction in the number of cases of West Nile Virus in California and in Orange County.

Table 4.13. Summary of West Nile Virus in California and the Orange County, 2004-2009

	Humans		Birds		Mosquitoes		Horses		Sentinel Flock	
Year	CA	Orange County	CA	Orange County	CA	Orange County	CA	Orange County	CA	Orange County
2004	830	64	3,232	225	1,136	164	540	2	805	3
2005	935	17	3,046	302	1,242	83	456	0	1,053	2
2006	278	6	1,446	49	832	14	58	0	640	0
2007	380	9	1,395	43	1,007	27	28	0	510	1
2008	445	71	2,569	639	2,003	361	32	2	585	3
2009	105	3	515	10	1,063	16	18	0	443	0
Totals	2,973	170	12,203	1,268	7,283	665	1132	4	4,036	9

Source: California West Nile Virus Web Site, www.westnile.ca.gov/

Likelihood of Future Occurrences

Highly Likely—Based on historical data, Orange County has experienced 168 human cases of West Nile virus since its discovery in California in 2003. This is an average of 24 cases per year. Chronic breeding sources created by standing water in street catch basins, subdivision drains, roadside ditches, flood channels, ravines and similar places on public right-of-ways puts the planning area at future risk of West Nile virus

4.2.13 Landslide (non-seismic)

Hazard/Problem Description

A landslide is the descent of earth and rock down a slope. Landslides often occur along preexisting zones of weakness within bedrock (i.e., previous failure surfaces). Additionally, landslides have the potential to occur on over-steepened slopes, especially where weak layers, such as thin clay layers, are present and dip out-of-slope. Landslides can also occur on antidip slopes, along other planes of weakness such as faults or joints. Local folding of bedrock or fracturing due to faulting can add to the potential for slope failure. Groundwater is very important in contributing to slope instability and landsliding. The susceptibility of an area to landslides depends on many variables, including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas.

Landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

Landslides often accompany other natural hazard events, such as floods, wildfires, or earthquakes. Landslides can occur slowly or very suddenly and can damage and destroy structures, roads, utilities, and forested areas and cause injuries and death. Seismic induced landslides are discussed in Section 4.2.9 Seismic and Geologic Hazards and illustrated in Figure 4.12. This section discusses other non-seismic induced landslides.

The Community and Health and Safety section of the City of Fullerton General Plan describes areas in Fullerton that are particularly prone to landslides. Landslide potential in Fullerton is considered to be low due to the flat topography in most areas of the City. However, there is the potential for landslides in the steeper portions of the East and West Coyote Hills area due to the sloping topography. Additionally, small soil slips can occur throughout the Coyote Hills in the newly developed portions of Coyote Hills.

Past Occurrences

There has been no disaster declarations associated with landslides in the City of Fullerton. Notable landslides of record include the following:

January 9, 2005 - A storm lasting 5 days dropped heavy rain across all of southern California. Flash flooding and mudslides caused millions of dollars of damage to homes, businesses, vehicles, parks, roads and bridges. The City of Fullerton sustained a slope failure due to the rain event. A slope slide occurred at the 2000 block of North Euclid Avenue. The hillside sustained damage, and a City owned multi-use equestrian trail was damaged. Mud on roadways caused slippery and dangerous conditions, though no accidents or injuries were reported.

A slope failure also occurred between the 1700 and 1900 blocks of Harbor Boulevard. The hillside was damaged from the slope slide but no City property was damaged. Mud on roadways caused slippery and dangerous conditions, though no accidents or injuries were reported.

Likelihood of Future Occurrences

Occasional—Based on data provided by the HMPC, minor landslides have occurred in the past, probably over the last several hundred years, as evidenced both by past deposits exposed in erosion gullies and recent landslide events. With significant rainfall, additional failures are likely within the identified landslide hazard areas. Given the nature of localized problems identified within the City, minor landslides will likely continue to impact the area when heavy precipitation occurs, as they have in the past.

4.2.14 Soil Hazards: Erosion

Hazard/Problem Description

Erosion is the general process whereby rocks and soils are broken down, removed by weathering, or fragmented and then deposited in other places by water or air. The rate of erosion depends on many variables, including the soil or rock texture and composition, soil permeability, slope, extent of vegetative cover, and precipitation amounts and patterns. Erosion increases with increasing slope and precipitation and with decreasing vegetative cover, which includes areas where protective vegetation has been removed by fire, construction, or cultivation. Significant erosion can cause degradation and loss of agricultural land, degradation of streams and other water habitats, and rapid silting of reservoirs.

According to the City of Fullerton, General Plan, Environmental Impact Report, Fullerton is urbanized and primarily built out. Surface soils in the City may no longer reflect the natural soil associations and characteristics identified below since topsoil in the City has been predominately developed. Fill material of unknown origin and varying composition currently occurs over most of the developed area of the City.

In certain areas of the City, the natural topography has been altered significantly over the years by oil field activities. These alterations generally consist of graded roads, well pads, canyon fills, and step cuts into natural slopes.

According to the United States Department of Agriculture Soil Conservation Service (as detailed in the City of Fullerton, General Plan, Environmental Impact Report, soil types and characteristics subject to erosion within Fullerton include the following:

- *Alo clay*, 9 to 15 percent slopes. This strongly sloping soil generally occurs on ridges and toe slopes in the foothills. If the soil is bare, runoff is medium and the erosion hazard is moderate. The soil has an available water capacity of 3.5 to 7.0 inches.
- *Alo clay*, 15 to 30 percent slopes. This moderately steep soil generally occurs on broad ridgetops in the foothills. If the soil is bare, runoff is rapid and the erosion hazard is high. The soil has an available water capacity of 3.5 to 6.0 inches.
- *Cieneba sandy loam*, 30 to 75 percent slopes. This steep to very steep eroded soil generally occurs on or near ridgetops. In many places it is cut by gullies and intermittent drainage channels. Geologic erosion is active, and small landslips are common. If the soil is bare, runoff is rapid and the erosion hazard is high. The soil has an available water capacity of 0.75 to 2.5 inches.
- *Myford sandy loam*, 9 to 15 percent slopes. This strongly sloping soil generally occurs on side slopes of terraces. If the soil is bare, runoff is medium to rapid and the erosion hazard is moderate to high. The soil has an available water capacity of 2.0 to 4.0 inches.
- *Myford sandy loam*, 15 to 30 percent slopes. This moderately steep soil generally occurs on side slopes of terraces. If the soil is bare, runoff is rapid and the erosion hazard is high. The soil has an available water capacity of 2.0 to 4.0 inches.
- *Myford sandy loam*, 9 to 30 percent slopes, eroded. This strongly sloping to moderately steep shallow soil generally occurs on side slopes of terraces. If the soil is bare, runoff is rapid and the erosion hazard is high. The soil has an available water capacity of 1.5 to 3.5 inches.
- *Rincon clay loam*, 9 to 15 percent slopes. This strongly sloping soil generally occurs on terraces. If the soil is bare, runoff is medium and the erosion hazard is moderate.
- *Xerorthents loamy, cut and fill areas*, 15 to 30 percent slopes. The slope of these areas was determined from the undisturbed landscape. Present land use is primarily single family homes. Runoff is rapid, and the erosion hazard is high.

Past Occurrences

According to the HMPC, there have been no significant erosion events within the City.

Likelihood of Future Occurrences

Occasional—Based on input from the HMPC, significant erosion problems are limited within the planning area. Given the nature of erosion problems identified within by the HMPC, minor

erosion will continue to occur on a periodic basis, but significant impacts are expected to be minimal.

4.2.15 Soil Hazards: Land Subsidence (non-seismic)

Hazard/Problem Description

Land subsidence is defined as the vertical sinking of the land over manmade or natural underground voids. Subsidence, usually as a direct result of groundwater withdrawal or oil and gas withdrawal, is common in several areas of California. Weight, including surface developments such as roads, reservoirs, and buildings, and manmade vibrations from such activities as blasting and heavy truck or train traffic can accelerate the natural processes of subsidence.

Subsidence can result in serious structural damage to buildings, roads, irrigation ditches, canals, streams, underground utilities, and pipelines. It can disrupt and alter the flow of surface or underground water. Improper use of land subject to subsidence can result in excessive economic losses: direct economic losses as well as indirect losses (e.g., increased taxes and decreased property values).

Settlement, or subsidence, of under-consolidated soils may also occur during earthquake shaking as discussed in Section 4.2.9 Seismic and Geologic Hazards. Although not considered a major problem, areas subject to subsidence resulting from consolidation include the central and northern portions of Fullerton. Other parts of the City may experience minor subsidence from a major earthquake. Damage from subsidence is likely to be greatly overshadowed by damage resulting from groundshaking or possible liquefaction of identified problem areas.

Past Occurrences

Fullerton has not experienced any significant subsidence issues, either seismic related or attributed to other causes, within the planning area.

Likelihood of Future Occurrences

Occasional—Historically, land subsidence issues in Fullerton have been limited. However, given historical problems and the geology of the area, the potential exists for subsidence to be an issue in the future.

4.2.16 Volcano

The State of California Multi-Hazard Mitigation Plan identifies volcanoes as one of the hazards that can adversely impact the state. However, there have been few losses in California from volcanic eruptions. Of the approximately 20 volcanoes in the state, only a few are active and pose a threat. The U.S. Geological Survey identifies the Amboy Crater and Salton Buttes area

located to the east and southeast of The City of Fullerton as the only known volcanic hazard to the City. The Amboy Crater is considered to be inactive, while the Salton Buttes Volcano is considered to be dormant. Figure 4.16 shows volcanoes in or near California and the location of the Amboy Crater and Salton Buttes areas relative to the City of Fullerton.

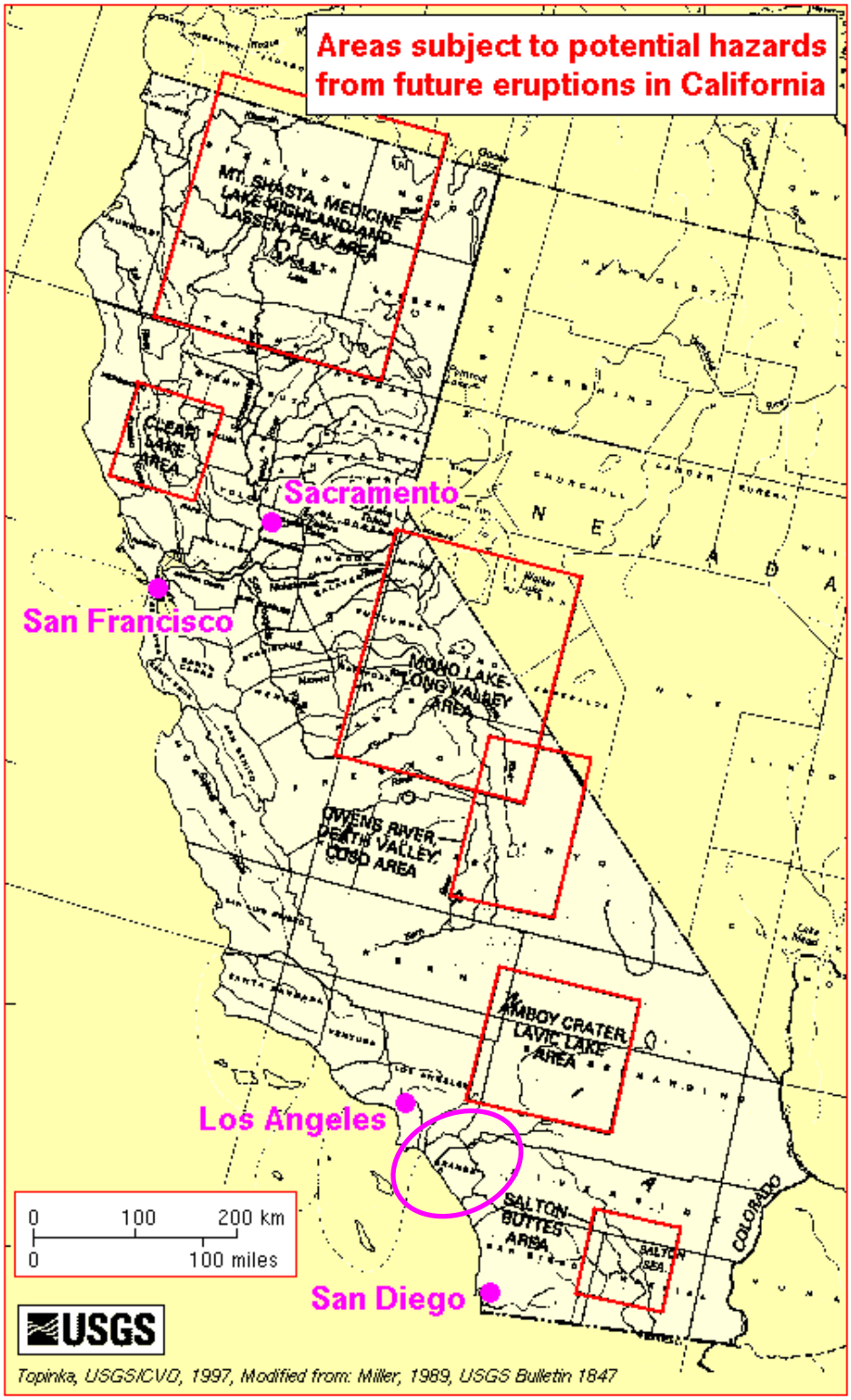
Figure 4.16. Volcanoes in or near California

Populations living near volcanoes are most vulnerable to volcanic eruptions and lava flows, although volcanic ash can travel and affect populations many miles away and cause problems for aviation. However, the City of Fullerton planning area is not very susceptible to volcanic hazards, including ash fall, associated with its proximity to the Amboy Crater and Salton Buttes areas as further described below and illustrated in Figure 4.17 below.

Ash

With most volcanic eruptions, a significant amount of ash is released into the atmosphere. The location and thickness of ash in any given area is generally a function of the volume erupted and wind speed and direction. Looking at historical data from past ash falls, the majority of ash beds from volcanic eruptions in California lie east of their source vents. Other studies of Mount Rainier and Mount St. Helens show that more than 90 percent of the ash beds deposited from volcanic eruptions during the last 10,000 years lie to the east of those volcanoes. This data suggest that most ashfall from future eruptions, including those from either Amboy or Salton Buttes, would also be deposited to the east of the source. As a result of prevailing west winds, the ash clouds effect on the City of Fullerton would most likely be minor.

Figure 4.17. Areas Subject to Potential Volcanic Hazards from Future Eruptions in California



Source: U.S. Geological Survey, Cascades Volcano Observatory, http://vulcan.wr.usgs.gov/Volcanoes/California/

Past Occurrences

According to the U.S. Geological Survey, the Salton Buttes most recent eruption was silicic pyroclastic and extrusive eruptions at four vents approximately 16,000 years ago (Potassium-Argon dating). The Amboy Crater's most recent eruption was mafic cinder cones and lava flows of apparent Holocene age (approximately 10,000 years ago).

As recently as 1980, four large earthquakes (greater than magnitude 6 on the Richter Scale) and numerous relatively shallow earthquakes occurred in the area. Since then, earthquakes and associated uplift in the region have continued. Because such activities are common precursors of volcanic eruptions, the U.S. Geological Survey closely monitors the unrest in the region.

Likelihood of Future Occurrences

Unlikely—According to the U.S. Geological Survey, there is little likelihood that either area will experience volcanic activity in the near future. For the Amboy Crater, the most probable future potential hazard (based on consideration of size, frequency, and severity of event) is the formation of cinder cones, small volumes of tephra, and lava flows; phreatic explosions. For the Salton Buttes area, the most probable future potential hazard is explosive and extrusive rhyolitic eruptions; phreatic and phreato-magmatic eruptions. This volcanic activity is not likely to impact the Fullerton planning area.

4.2.17 Wildfire

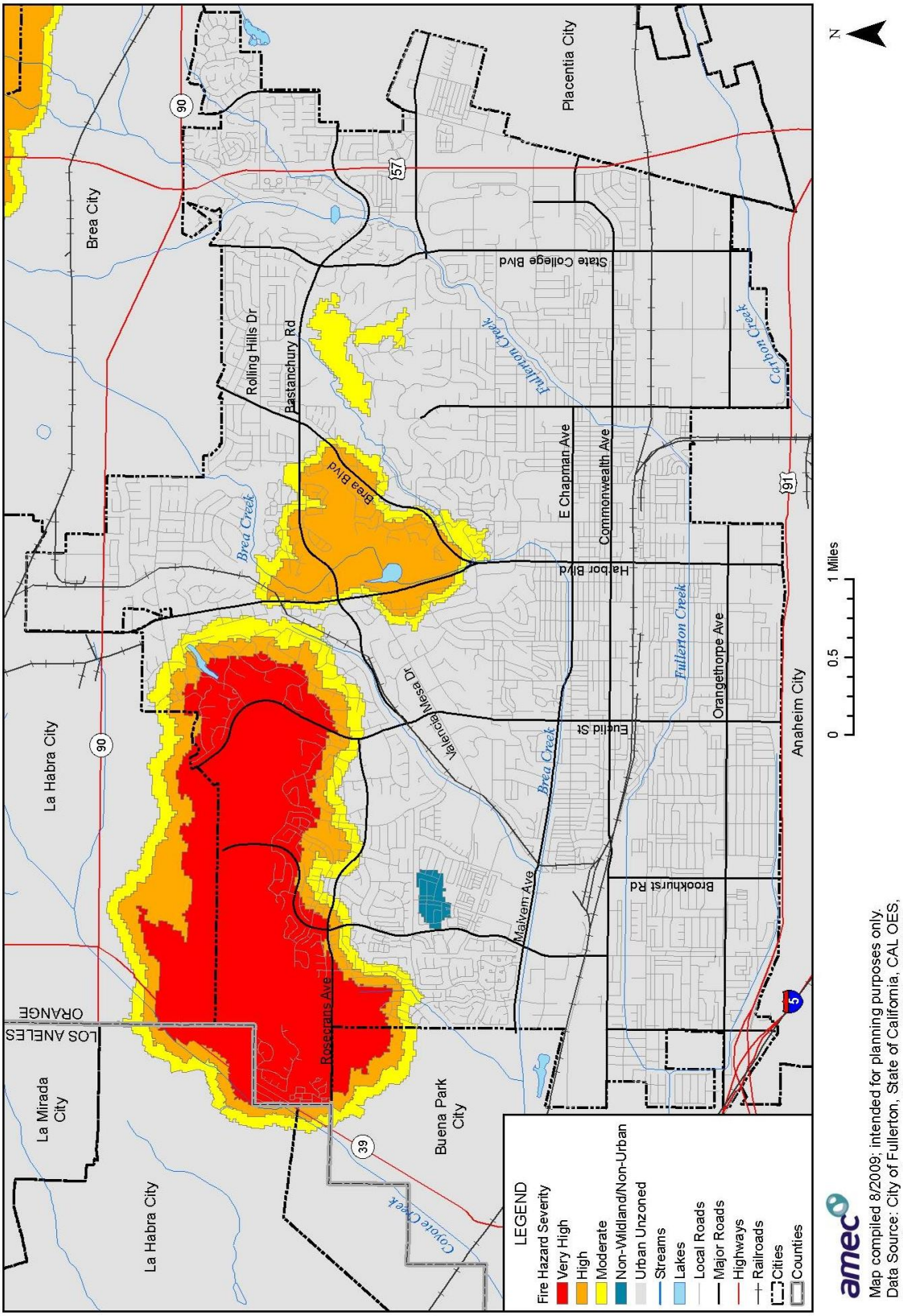
Hazard/Problem Description

Wildfires are a significant concern throughout California. In recent years wildfires have occurred in the densely vegetated areas in the vicinity of the City of Fullerton. However, due to its urbanized nature, wildfire is of a lessor concern for the City of Fullerton planning area. With that said, wildfires in surrounding areas can create significant impacts to the city, including issues created by intense smoke and high pollutant levels, as well as restrictions on regional traffic. Generally, the fire season extends from June through October of each year during the hot, dry months. Fire conditions arise from a combination of high temperatures, intense sunlight, low rainfall and humidity, an accumulation of vegetation, and high winds.

Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. While wildfire risk is predominantly associated with wildland-urban interface areas, significant wildfires can also occur in heavily populated areas. The wildland-urban interface is a general term that applies to development adjacent to landscapes that support wildfire. Wildfires affect grass, forest, and brushlands, as well as any structures located within them. Where there is human access to wildland areas the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. In other areas, large concentrations of highly flammable brush located in flat open

spaces are also quite susceptible to wildfire. Figure 4.18 illustrates the City of Fullerton's wildfire threat.

Figure 4.18. The City of Fullerton's Wildfire Threat



Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Economic losses could also result. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are fuel, topography, and weather.

- **Fuel—**Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control. Fuel types within the City of Fullerton planning area include seasonal grasses, deciduous and evergreen oaks, and heavy brush, grass, and conifers.
- **Topography—**An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.
- **Weather**—Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will more readily ignite and burn more intensely. Thus, during periods of drought, the threat of wildfire increases. Wind is the most treacherous weather factor. The greater a wind, the faster a fire will spread and the more intense it will be. Winds, such as the Santa Ana winds as previously described, can be significant at times in the City of Fullerton planning area during the fire season. Lightning also ignites wildfires, often in difficult-to reach terrain for firefighters.

Past Occurrences

Wildfires are of significant concern throughout California. According to the California Department of Forestry and Fire Protection (CAL FIRE), vegetation fires occur within their jurisdiction on a regular basis; most are controlled and contained early with limited damage. For those ignitions that are not readily contained and become wildfires, damage can be extensive. There are many causes of wildfire, from naturally caused lightning fires to human-caused fires linked to activities such as smoking, campfires, debris burning, equipment use, and arson. Recent studies conclude that the greater the population density in an area, the greater the chance of an ignition.

Although not fully representative of annual fire activity or limited to wildland fires, the City of Fullerton reported to the National Fire Protection Association for the year of 2008 (the most

recent report available) as to the number of fires affecting the City of Fullerton. Table 4.14 shows a summary of fires that occurred in the City in 2008.

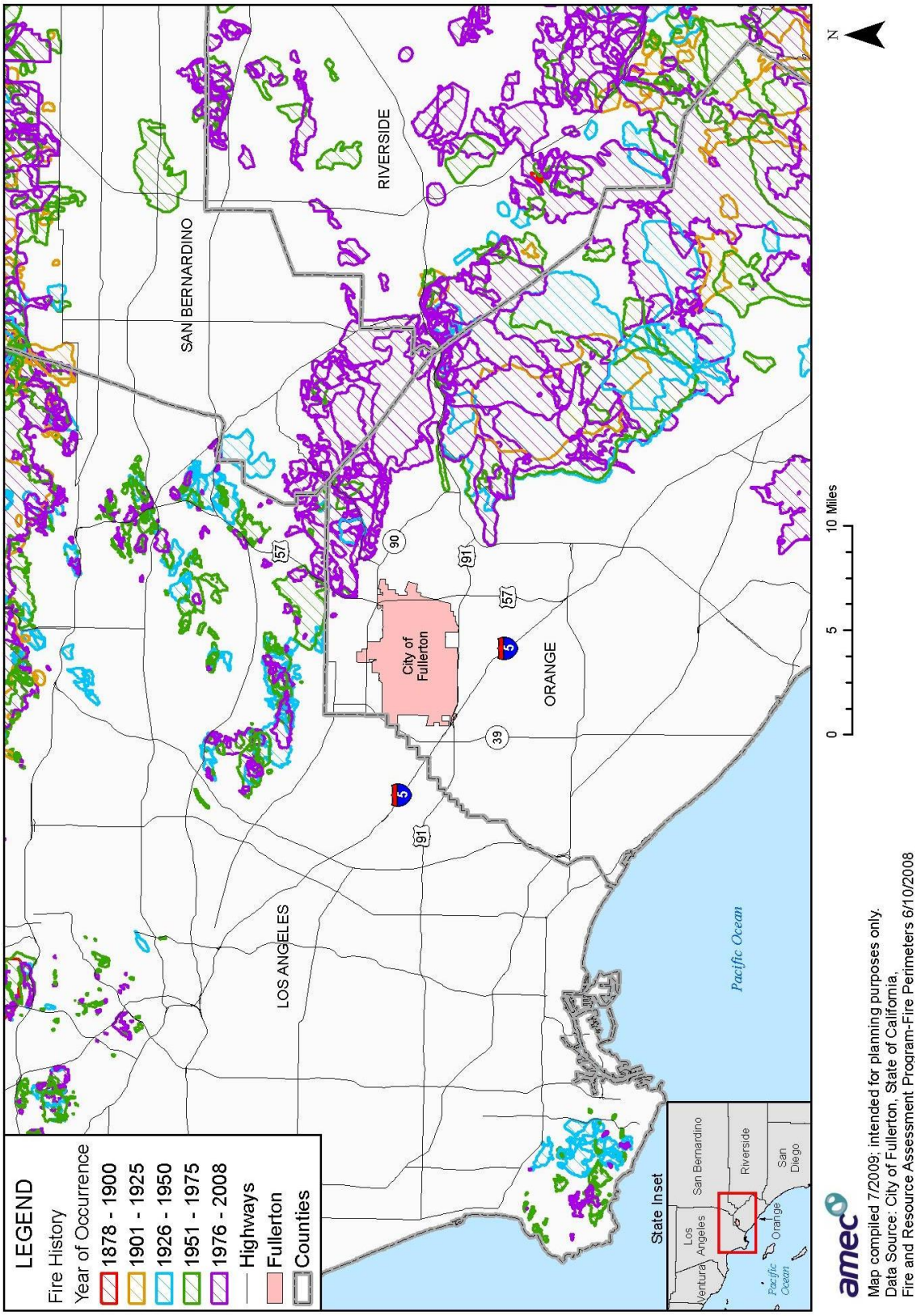
Table 4.14. The City of Fullerton's 2008 Fire Summary

Fires in Structures by Fixed Property Use (Occupancy)	Number of Fires
Private Dwellings (1 or 2 family)	34
Apartments (3 or more families)	14
Hotels and Motels	1
All other Residential (dormitories, boarding houses, tents, etc.)	4
Total Residential Fires	**53**
Public Assembly (church, restaurants, clubs, etc.)	4
Schools and Colleges	2
Health Care and Penal Institutions (hospitals, nursing homes, prisons, etc.)	1
Stores and Offices	9
Industry, Utility, Defense, Laboratories, Manufacturing	9
Storage in Structures (barns, vehicle storage garages, general storage, etc.)	2
Other Structures (outbuildings, bridges, etc.)	6
Totals for Structure Fires	**33**
Fires in Highway Vehicles (autos, trucks, buses, etc.)	54
Fires in Other Vehicles (planes, ships, trains, construction or farm vehicles, etc.)	3
Fires outside of Structures with Value Involved, but not Vehicles (outside storage, crops, etc.)	24
Fires in Brush, Grass, Wildland (excluding crops and timber), with no value involved	13
Fires in Rubbish, including dumpsters (outside of structures) with no value involved	87
All other fires	32
Total for Non-Structure Fires	**213**
Total for Fires	**299**

Source: 2008 City of Fullerton report to the National Fire Protection Association

The foothills and mountain areas of Southern California have experienced numerous devastating fires over the last 100 years, with the fire risk significantly increasing in recent years due to high fuel loads and expansion of development into the WUI areas. Utilizing Cal Fire data, historic fires surrounding the Fullerton planning area are illustrated in Figure 4.19. There have been no significant wildfires within the City of Fullerton planning area in recent times.

Figure 4.19. The City of Fullerton's Fire History Map



Of particular interest to this hazard mitigation plan are the fires that occur inside the City of Fullerton that are non-structure fires. Many of these fires are suppressed quickly and do not spread, but during times of drought or times of high wildfire hazard, including high winds, these fires pose the risk of spreading and creating a wildland fire.

The HMPC identified the following as notable wildfires in the City of Fullerton planning area.

October 13, 1997 - Santa Ana winds of 30 to 40 mph with frequent gusts over 60 mph developed below the Cajon Pass, through canyons in the Santa Ana Mountains, and valley areas of San Bernardino County. The wind quickly drove an illegal scrap metal burn out of control in an isolated area north of Santiago Canyon. The fire raced through Orange County's eastern canyons, destroying two buildings, causing voluntary evacuations, closing schools, and torching almost 6000 acres before it was brought under control. Elsewhere, trees and power lines were blown down in Rialto and Fontana, and a Highway Patrol shed on the Banning/Beaumont city border was destroyed. Several wind gusts to 80 mph were recorded at Fremont Canyon.

Likelihood of Future Occurrences

Highly Likely—Given the fuels, terrain, and weather conditions combined with the increased development in WUI areas, damaging fires will continue to occur on an annual basis in WUI areas surrounding the City of Fullerton planning area. However, with the small amounts of open space areas and limited fuels, a damaging wildland fire within the City of Fullerton is unlikely.

4.2.18 Natural Hazards Summary

Table 4.15 summarizes the results of the hazard identification and hazard profile for the City of Fullerton planning area based on the hazard identification data and input from the HMPC. For each hazard profiled in Section 4.2, this table includes the likelihood of future occurrence and whether the hazard is initially considered a priority hazard for the City of Fullerton planning area.

Table 4.15. Hazard Identification/Profile Summary and Determination of Priority Hazard

Hazard	Likelihood of Future Occurrence	Priority Hazard
Dam Failure	Occasional	Yes
Drought	Occasional	Yes
Seismic and Geologic Hazards		
Earthquake	Likely	Yes
Landslide	Occasional	Yes
Lateral Spreading	Occasional	No
Liquefaction	Occasional	Yes
Subsidence	Occasional	Yes
Settlement	Occasional	No

Hazard	Likelihood of Future Occurrence	Priority Hazard
Flood		
100-Year Flood	Occasional	Yes
<100-Year Flood	Highly Likely	Yes
Human Health Hazards:		
Epidemic/Pandemic	Occasional	No
West Nile Virus	Highly Likely	No
Landslide (non-seismic)	Occasional	No
Severe Weather		
Extreme Temperatures	Highly Likely	No
Fog	Occasional	No
Heavy Rain/Thunderstorm/ Hail/Lightning	Highly Likely	Yes
Tornado	Occasional	No
Wind	Highly Likely	No
Soil Hazards:		
Erosion	Occasional	No
Subsidence (non-seismic)	Occasional	No
Volcano	Unlikely	No
Wildfire	Highly Likely	Yes

Source: HMPC, 2009

The HMPC determined that dam failure, drought, seismic and geologic hazards (earthquake, landslide, liquefaction), flood, heavy rain/thunderstorm/hail/lightning, and wildfire are the most significant hazards in the planning area. The assets at risk and estimated potential losses associated with these hazards are discussed in Section 4.3 Vulnerability Assessment. Only those hazards determined to be priority hazards are discussed further in this plan.

4.3 Vulnerability Assessment

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

With the City of Fullerton's hazards identified and profiled, the HMPC conducted a vulnerability assessment to describe the impact that each hazard would have on the City. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to natural hazards and estimates potential losses. This section focuses on the risks to the City as a whole.

This vulnerability assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses*. The vulnerability assessment first describes the total vulnerability and values at risk and then discusses vulnerability by hazard.

Data used to support this assessment included the following:

- City GIS data (hazards, base layers)
- County GIS data (assessor's data)
- Statewide GIS datasets compiled by the California Emergency Management Agency (Cal EMA) to support mitigation planning
- California Department of Forestry and Fire Protection GIS datasets
- FEMA's HAZUS-MH MR3 GIS-based inventory data
- Written descriptions of inventory and risks provided by participating jurisdictions
- Existing plans and studies
- Personal interviews with planning team members and staff from the City

4.3.1 The City of Fullerton Vulnerability and Assets at Risk

As a starting point for analyzing the planning area's vulnerability to identified hazards, the HMPC used a variety of data to define a baseline against which all disaster impacts could be compared. This section describes significant assets at risk in the planning area. Data used in this baseline assessment included:

- Total values at risk
- Critical facility inventory
- Historic, cultural, and natural resources
- Growth and development trends

Total Values at Risk

The following data from the City of Fullerton GIS department is based on the Orange County Assessor's roll values for 2007. This data should only be used as a guideline to overall values in the City, as the information has some limitations.

The parcels were segregated by property type and a land use code table was joined to the parcel layer. A detailed description is given in Table 4.16

Table 4.16. The City of Fullerton's Land Use Code Zones

Land Use Description	Land Use Summary	Land Use Code
Amusement Park	Commercial	C
Auto Dealership	Commercial	C
Auto Repair Shop	Commercial	C
Auto Service	Commercial	C
Auto Used Car Lot	Commercial	C
Car Wash	Commercial	C
Church Building	Commercial	C
Cold Storage Plant	Industrial	I
Commercial - Misc	Commercial	C
Discount Store	Commercial	C
Financial - Bank, S&L, Etc.	Commercial	C
Fraternal - Elks, Moose, Etc.	Commercial	C
Funeral Home	Commercial	C
Hospital	Commercial	C
Hotel/Motel	Commercial	C
Industrial - 4+ Buildings	Industrial	I
Industrial - Factory	Industrial	I
Industrial - Misc	Industrial	I

Land Use Description	Land Use Summary	Land Use Code
Industrial - Steel Building	Industrial	I
Industrial Waterfront Property	Industrial	I
Light Industrial	Industrial	I
Medical - Low Rise	Commercial	C
Mini-Warehouse	Industrial	I
Miscellaneous	Miscellaneous	M
Mobile Home	Residence	R
Mobile Home Park - Conventional	Residence	R
Mult Res - Misc	Residence	R
Mult Res 10-24 Units	Residence	R
Mult Res 2-4 Units	Residence	R
Mult Res 25 + Units	Residence	R
Mult Res 5-9 Units	Residence	R
Nursery	Commercial	C
Nursing Home/Convalescent	Commercial	C
Office - Condo	Residence	R
Office - Conv Residence	Residence	R
Office - High Rise	Commercial	C
Office - Low Rise	Commercial	C
Parking Lot - Paved	Commercial	C
Preschool, Nursery, Childcare	Commercial	C
Private School	Commercial	C
Restaurant	Commercial	C
Rural - Improved	Rural	RU
Rural - Vacant	Rural	RU
Service Station	Commercial	C
Shopping Center - Community	Commercial	C
Shopping Center - Convenience	Commercial	C
Shopping Center - Neighborhood	Commercial	C
Single Family Residence	Residence	R
Stores - Other	Commercial	C
Supermarket/Convenience Store	Commercial	C
Theater	Commercial	C
Vacant - Commercial	Commercial	C
Vacant - Mult Res	Residence	R
Vacant - Residential	Residence	R
Vacant Industrial	Industrial	I
Warehouse	Industrial	I
Wholly - Improved	Miscellaneous	M

Land Use Description	Land Use Summary	Land Use Code
Wholly - Vacant	Miscellaneous	M
<NULL>	Miscellaneous	M

Source: The City of Fullerton

The codes were simplified into the five categories that are shown in Table 4.17.

Table 4.17. The City of Fullerton's Land Use Code Table

Code	Description
C	Commercial Properties
I	Industrial Properties
M	Miscellaneous
R	Residential Properties
RU	Rural

Source: The City of Fullerton

Three main limitations to this method were identified:

- A City of Fullerton parcel layer from the Orange County Assessor's Office was used. It was joined to an assessor's parcel data table based on assessor's parcel numbers (APN). There were 1,518 parcel APNs that did not match up between the parcel layer and the assessor's table. This assumption is that these 1,518 parcels were not developed, road right of ways or condominiums, so they were not included in the analysis.
- Another assessor table was provided that only contained condominium data. This table could not be joined to the parcel layer since the APN's did not match up. This table contained 3,826 records that had total improved value of $332,399,322. These records and values were not included in this analysis.
- Given the 2007 data, note that in 2009 the Assessor reassessed parcel values and adjusted many of them downward. This is not reflected in the data for this plan.

The values represented in the Assessor's data is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is likely low and does not reflect current market value of properties within the City. It is also important to note, in regard to a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table 4.18 shows the 2007 Orange County Assessor's roll values for the entire the City of Fullerton planning area (e.g., the total values at risk).

Table 4.18. The City of Fullerton's 2007 Total Roll Values

Property Type	Units Improved	Total Improved Value ($)	Total Improved Land Value ($)	Units Unimproved	Total Unimproved Land Value ($)	Units	Value ($)
Commercial	904	876,147,574	810,249,972	39	22,408,919	943	1,708,806,465
Industrial	307	445,417,761	532,696,380	15	8,327,953	322	986,442,094
Miscellaneous	280	631,752,540	321,572,369	1,792	38,440,755	2,072	991,765,664
Residential	26,092	3,801,170,940	6,030,254,471	267	24,597,265	26,359	9,856,022,676
Rural	1	242,440	168,197	6	237,827	7	648,464
Total	27,584	5,754,731,255	7,694,941,389	2,119	94,012,719	29,703	13,543,685,363

Source: The City of Fullerton GIS/Orange County Assessor Data

Critical Facility Inventory

Of significant concern with respect to any disaster event is the location of critical facilities in the planning area. The City of Fullerton HMPC developed the following definition of Critical Facilities for purposes of this LHMP:

A critical facility is any property that, if adversely affected during a hazard event, would result in severe consequences to public health and safety. Critical facilities include, but are not limited to:

- Police stations, fire stations, vehicle and equipment storage facilities, emergency operations centers, and other facilities that are needed for response and recovery activities before, during, and after a hazard event;
- Public and private utility facilities that are vital to maintaining or restoring normal services to affected areas before, during, and after a hazard event;
- Hospitals, nursing homes, and housing likely to have occupants who may not be sufficiently mobile to avoid injury or death during a hazard event;
- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, and/or water-reactive materials;
- Schools, dams, and other key publicly or privately controlled resources essential to public health and safety and to the minimal operations of the economy and government.

An inventory of critical facilities in the planning area based on data from the City of Fullerton GIS is provided in Table 4.19 and illustrated in Figure 4.20.

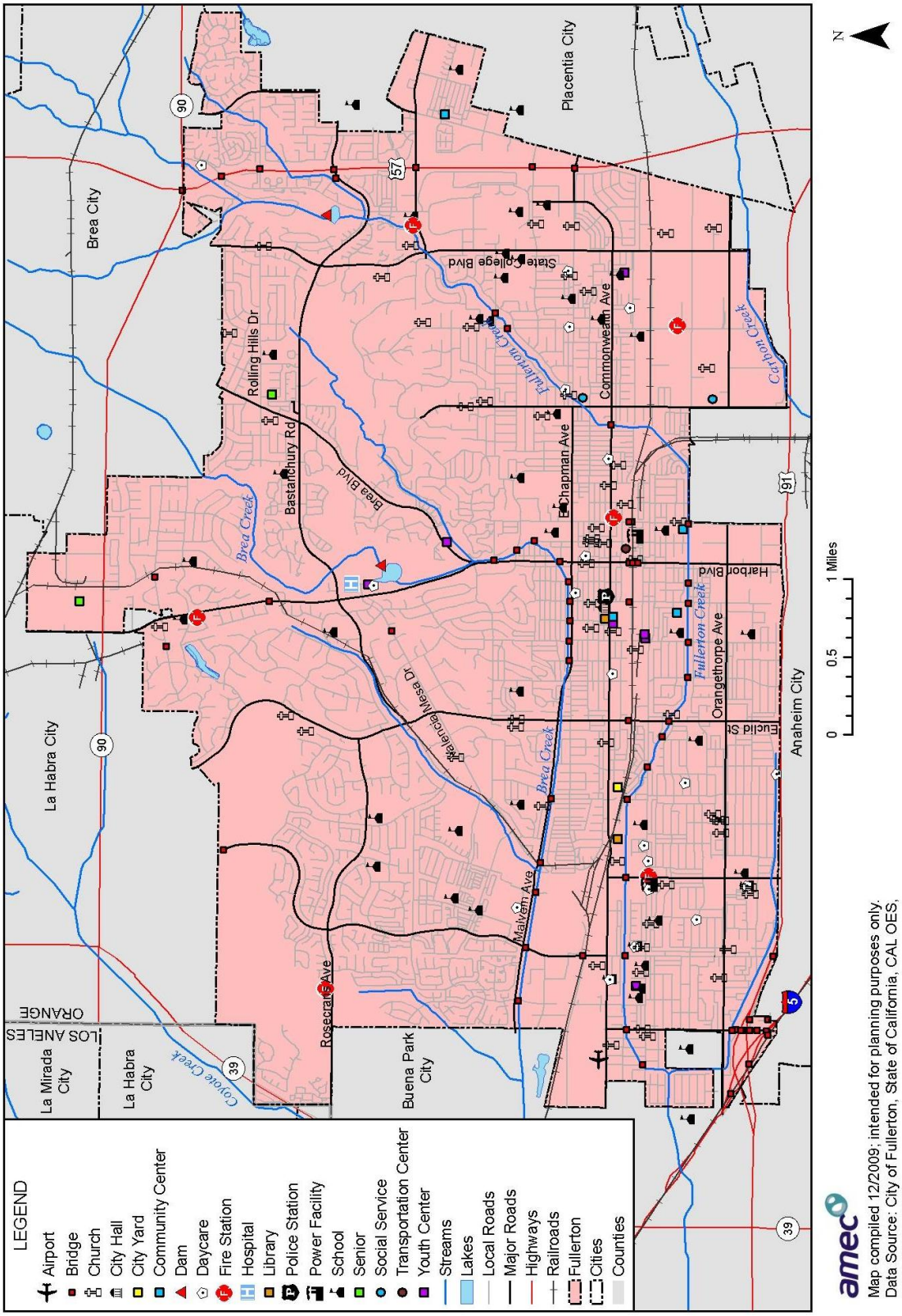
Table 4.19. The City of Fullerton's Critical Facilities

Critical Facilities Type	Totals
Airport	1
Bridges	69
Churches	59

Critical Facilities Type	Totals
City Hall	1
City Yard	1
Community Centers	4
Dams	4
Daycares	20
Fire Stations	6
Hospital	1
Libraries	2
Police Station	1
Power Facilities	2
Schools	46
Senior Facilities	2
Social Services	2
Transportation Center	1
Youth Centers	7
Total	**229**

Source: The City of Fullerton GIS

Figure 4.20. The City of Fullerton's Critical Facilities



Historic, Cultural, and Natural Resources

Assessing the vulnerability of the City of Fullerton to disaster also involves inventorying the historic, cultural, and natural assets of the area. This step is important for the following reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- If these resources are impacted by a disaster, knowing so ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, for example, wetlands and riparian habitat help absorb and attenuate floodwaters.

Historic and Cultural Resources

The City of Fullerton has a large stock of historically significant homes, public buildings, and landmarks. To inventory these resources, the HMPC collected information from a number of sources. The California Department of Parks and Recreation Office of Historic Preservation (OHP) and the City of Fullerton General Plan Cultural Resources Existing Conditions Report were the primary source of information.

Office of Historic Preservation

The OHP is responsible for the administration of federally and state mandated historic preservation programs to further the identification, evaluation, registration, and protection of California's irreplaceable archaeological and historical resources. OHP administers the National Register of Historic Places, the California Register of Historical Resources, the California Historical Landmarks, and the California Points of Historical Interest programs. Each program has different eligibility criteria and procedural requirements.

- The **National Register of Historic Places** is the Nation's official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.
- The **California Register of Historical Resources** program encourages public recognition and protection of resources of architectural, historical, archeological and cultural significance; identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under the California Environmental Quality Act. The register is the authoritative guide to the state's

significant historical and archeological resources. There are currently no buildings in Fullerton that fall under this category.

- **California Historical Landmarks** are sites, buildings, features, or events that are of **statewide** significance and have anthropological, cultural, military, political, architectural, economic, scientific, technical, religious, experimental, or other value. There are currently no buildings in Fullerton that fall under this category.
- **California Points of Historical Interest** are sites, buildings, features, or events that are of **local (city or county)** significance and have anthropological, cultural, military, political, architectural, economic, scientific, technical, religious, experimental, or other value. Points designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register. There are currently no buildings in Fullerton that fall under this category.

Historical resources included in the programs above are identified in Table 4.20.

Table 4.20. The City of Fullerton's Historical Resources

Name (Landmark Plaque Number)	National Register	Date Listed
Chapman Building	X	09/22/1983
Clark, Dr. George C., House (N461)	X	12/12/1976
Elephant Packing House (N1246)	X	9/21/83
Farmers And Merchants Bank Of Fullerton (N1863)	X	4/19/94
Fox Fullerton Theatre Complex (N2345)	X	10/25/2006
Fullerton City Hall (N2202)	X	5/22/2003
Fullerton First Methodist Episcopal Church (N2122)	X	2/13/2001
Fullerton Odd Fellows Temple (N2168)	X	4/26/2002
Fullerton Union Pacific Depot (N1252)	X	10/12/1983
Hetebrink House (N1834)	X	7/1/1993
Hillcrest Park (N2256)	X	8/11/2004
Masonic Temple (N1904)	X	3/31/1995
Muckenthaler House (N864)	X	5/31/1980
Pierotti, Attlio And Jane, House (N1843)	X	9/2/1993
Plummer, Louis, Auditorium (N1847)	X	9/30/1993
Santa Fe Railway Passenger And Freight Depot (N1749)	X	2/5/1992

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets. There are currently no Historic American Building Survey (HABS) or Historic American Engineering Record (HAER) buildings in Fullerton.

City of Fullerton General Plan Cultural Resources Existing Conditions Report

The City of Fullerton General Plan Cultural Resources Existing Conditions Report identifies the following, some of which are already mentioned above, as historic properties in The City of Fullerton. See Table 4.21 for the complete list of these properties.

Table 4.21. The City of Fullerton's Historic Properties

Address	Name	Status
1731 N Bradford Avenue	Pierotti House	National Register
201 E Chapman Avenue	Plummer Auditorium	National Register
515 E Chapman Avenue	Hetebrink House	National Register
122 N Harbor Boulevard	Farmers & Merchants Bank/Landmark Plaza	National Register
1201 W Malvern Avenue	Muckenthaler Cultural Center	National Register
2501 E Nutwood Avenue	Heritage House - CSUF Campus	National Register
110 E Santa Fe Avenue	Union Pacific Depot - relocated from 105 W Truslow	National Register
110 E Wilshire Avenue	Chapman Building	National Register
120 E Santa Fe Avenue	Santa Fe Depot	National Register
201 W. Truslow Avenue	Elephant Packing House	National Register
146 E Amerige Avenue	Church of Religious Science	Potential National Register
201 E Amerige Avenue	Fullerton General Hospital	Potential National Register
142 E Chapman Avenue	Self-Realization Fellowship Church	Potential National Register
213 Claire Avenue	Noutary House	Potential National Register
2501 E Nutwood Avenue	Hetebrink House - CSUF Campus	Potential National Register
314 N Pomona Avenue	Pomona Bungalow Court	Potential National Register
142 E Amerige Avenue	Methodist Parsonage	Local Landmark
315 E Amerige Avenue	Cusick House	Local Landmark
520 W Amerige Avenue	Ruddock House	Local Landmark
126 N Balcom Avenue	Otto House	Local Landmark
720 Barris Drive	Dauser House -- relocated from 117 S. Pomona Ave	Local Landmark
Chapman Park	Chapman Ranch	Local Landmark
2025 E Chapman Avenue	Hale House	Local Landmark
112 E Commonwealth Avenue	Williams Building	Local Landmark
130 E Commonwealth Avenue	Pacific Electric Depot	Local Landmark
300 E Commonwealth Avenue	Amerige Realty Office	Local Landmark
329 E Commonwealth Avenue	Loumagne's Market	Local Landmark
1510 E Commonwealth Avenue		Local Landmark
237 W Commonwealth Avenue	Fullerton Police Station	Local Landmark
302 W Commonwealth Avenue	Stone Pillars in Amerige Park	Local Landmark
305 N Harbor	Boulevard California Hotel--Villa del Sol	Local Landmark
510 N Harbor Boulevard	Fox Fullerton Theater	Local Landmark

Address	Name	Status
604 N Harbor Boulevard	Benchley House	Local Landmark
834 N Woods Avenue	Starbuck House	Local Landmark
1300 N Harbor Boulevard	Hillcrest Park	Local Landmark
412 S Harbor Boulevard	Allen Hotel	Local Landmark
771 W Orangethorpe Avenue	Porter House	Local Landmark
301 N Pomona Avenue	Fullerton Museum Center	Local Landmark
112 E Walnut Avenue	Crystal Ice House	Local Landmark
315 E Wilshire Avenue	Wilshire Junior High School	Local Landmark
124 W Wilshire Avenue		Local Landmark
434 W Amerige Avenue	Klose House	Potential Local Landmark
516 W Amerige Avenue	Russell House	Potential Local Landmark
538 W Amerige Avenue	Richman House	Potential Local Landmark
201 E Chapman Avenue	Fullerton High School	Potential Local Landmark
321 E Chapman Avenue	Fullerton College	Potential Local Landmark
901 E Chapman Avenue	Kroeger House	Potential Local Landmark
2208 E Chapman Avenue		Potential Local Landmark
109-123 E Commonwealth Avenue	Amerige Block	Potential Local Landmark
118 E Commonwealth Avenue		Potential Local Landmark
202 E Commonwealth Avenue	U.S. Post Office	Potential Local Landmark
341 E Commonwealth Avenue		Potential Local Landmark
520 E Commonwealth Avenue		Potential Local Landmark
524 E Commonwealth Avenue		Potential Local Landmark
1530 E Commonwealth Avenue		Potential Local Landmark
2223 E Commonwealth Avenue		Potential Local Landmark
303 W Commonwealth Avenue	Wood Bench at n/w/c Highland and Commowealth	Potential Local Landmark
353 W Commonwealth Avenue	Hitching Posts	Potential Local Landmark
419 W Commonwealth Avenue		Potential Local Landmark
1731 W Commonwealth Avenue	Hunt Wesson Office	Potential Local Landmark
213-215 W Commonwealth Avenue		Potential Local Landmark
845 N Euclid Street	Hunter House	Potential Local Landmark
109 N Harbor Boulevard	Stedman Jewelers' Street Clock	Potential Local Landmark
201 N Harbor Boulevard	Masonic Temple	Potential Local Landmark
219 N Harbor Boulevard		Potential Local Landmark
500 N Harbor Boulevard		Potential Local Landmark
501 N Harbor Boulevard	Masonic Temple	Potential Local Landmark
616 N Harbor Boulevard	Amerige House	Potential Local Landmark
111-113 N Harbor Boulevard	Dean Block	Potential Local Landmark
423-427 S Harbor Boulevard		Potential Local Landmark
719-723 S Harbor Boulevard		Potential Local Landmark

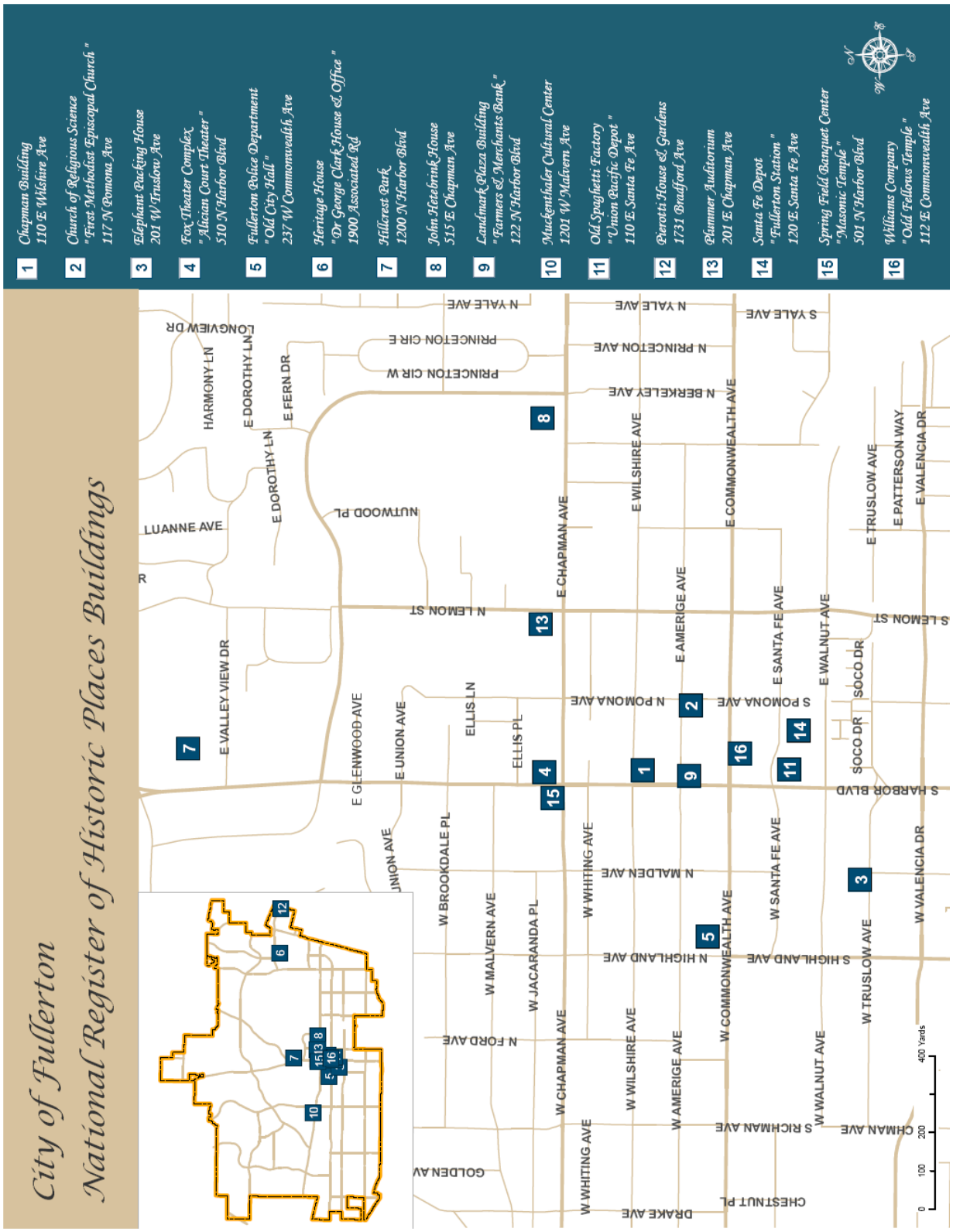
Address	Name	Status
419 E Las Palmas Drive		Potential Local Landmark
150 Marion Boulevard	Davies House	Potential Local Landmark
2501 E Nutwood	Mahr House	Potential Local Landmark
327 W Orangethorpe Avenue	Wintter House	Potential Local Landmark
1155 W Orangethorpe Avenue		Potential Local Landmark
1155 W Orangethorpe Avenue	Pump Houses	Potential Local Landmark
1400 W Orangethorpe Avenue	Spencer House	Potential Local Landmark
1520 W Orangethorpe Avenue		Potential Local Landmark
1330 N Placentia Avenue	Old Fullerton Library	Potential Local Landmark
321 N Pomona Avenue	Y.W.C.A.	Potential Local Landmark
1313 N Raymond Avenue	Gamble House	Potential Local Landmark
120 N Richman Avenue	Klose Market	Potential Local Landmark
701 N Richman Avenue		Potential Local Landmark
705 N Richman Avenue		Potential Local Landmark
225 W Santa Fe Avenue		Potential Local Landmark
229 W Santa Fe Avenue		Potential Local Landmark
119-125 W Santa Fe Avenue		Potential Local Landmark
324 W Truslow Avenue		Potential Local Landmark
123 E Valencia Drive		Potential Local Landmark
1600 W Valencia Drive		Potential Local Landmark
126 W Whiting Avenue	Westwood Apartments	Potential Local Landmark
130 W Whiting Avenue		Potential Local Landmark
232 E Wilshire Avenue	Dewella Apartments	Potential Local Landmark
Downtown Area	Concrete Street Lights	Potential Local Landmark
Richman Avenue/Fern Drive	Iron Street Lights	Potential Local Landmark
Skyline Park Area	Iron Street Lights	Potential Local Landmark

Source: City of Fullerton General Plan Existing Conditions Report – Resource Management Element.

It should be noted that these lists may not be complete, as they may not include all properties currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Figure 4.21 shows the location of historic properties and historic districts within the City of Fullerton.

Figure 4.21. The City of Fullerton's Historic District and Historic Properties



Source: The City of Fullerton's website.

Natural Resources

Natural resources are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for mitigation projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as stores and reduces the force of floodwaters.

According to the Fullerton General Plan Update Existing Conditions Report – Biological Resources, The City of Fullerton is largely urbanized and is surrounded by other urbanized cities (La Habra, La Palma, and portions of Yorba Linda and Anaheim). In the northern region of Orange County, there are limited areas of natural habitats. Two major open space areas within the City, East Coyote Hills and West Coyote Hills, contain the City's remaining significant biological resources. The eastern and western areas of the City include the Coyote Hills which contain limited amounts of costal sage scrub and riparian scrub habitats. The topography in these open space areas consists of hillsides and ridges dissected by canyons, as well as several blue-line streams. Although the Coyote Hills East Specific Plan has been developed, a Habitat Conservation Plan has been approved for this area that mitigates impacts to the threatened California gnatcatcher.

Vegetation

According to the Fullerton General Plan Update Existing Conditions Report – Biological Resources, Coastal Sage Scrub is found throughout the Coyote Hills East and West areas, and the Unocal Imperial property. The coastal sage scrub community in these areas consists of low-growing, soft-woody, aromatic shrubs and herbaceous plants that grow on steep slopes, ridgelines, and gentle hillsides in thin, rocky soils. Coastal sage scrub is considered sensitive by resource conservation agencies because it provides habitat for several sensitive species, including the San Diego horned lizard, the California gnatcatcher, and the San Diego cactus wren. Urbanization is rapidly diminishing this habitat throughout Southern California. Though disturbed in some areas because of past oil drilling operations, the coastal sage scrub habitat within Fullerton is of relatively high quality as wildlife habitat.

Cactus scrub is a unique plant community in the West Coyote Hills. It is characterized by patches of several locally distinctive forms of cactus (morphotypes) that vary in height from two to five feet, in color of the pads, and other features. Although limited portions of the Coyote Hills West have been developed, cactus scrub remains in several areas.

Live-oak trees (*Quercus agrifolia*) that form a sparse oak woodland have been reported in the West Coyote Hills.

Riparian Woodland is a community of shrubs and trees associated with seasonally dry creek beds and drainages. This community is found in scattered locations in the West Coyote Hills but may not remain due to proposed development of the area. Mulefat Riparian Scrub is found along a narrow drainage area which runs from the northeastern corner of Coyote Hills East through the

disturbed areas, and exits the southwest corner of the site. The average width of the drainage is approximately 20 feet and is dominated by mulefat. Several areas of the drainage support stands of arroyo willow and black willow. Two areas of the willow riparian plant community occur in the southwestern portion of the Unocal Imperial property. Table 4.22 summarizes sensitive vegetation in the City.

Tree Resources

One notable characteristic that sets Fullerton apart from surrounding communities is its trees. Fullerton is recognized as a national Tree City with a well-established street tree network and numerous other public and private areas that support a wide variety of mature trees. The intent of the City is to plant additional trees and to maintain existing street, park and other public and private trees to enhance the City's overall character and sense of place. Table 4.22 summarizes sensitive tree resources in the City.

Table 4.22. The City of Fullerton's Sensitive Plant Species and Communities

Species	Federal Status	State/Local Status	Comments
Plants			
Chorizanthe parryi var. fernandina San Fernando Valley spineflower Polygonaceae		CNPS 1B.1	Occurs in dry sandy places to 2500 feet, located from San Fernando Valley to Orange and San Diego County. The blooming period is from April to June
Cordylanthus maritimus ssp. Maritimus salt marsh bird's-beak		CNPS 1B.2	This subspecies is an inhabitant of the coastal salt marshes, howeverthis plant is rarely discovered very far from the highest high tide elevations, usually on the upper ecotonal edge with the surroundinghabitat (coastal scrub, housing developments).
Dudleya multicaulis Many-stemmed dudleya	FC2	CNPS 1B	Occurs on clay or rocky substrates in Los Angeles, Orange and Riverside Counties. This species has been reported in Brea Canyon, the Peralta Hills, and Weir Canyon. Potentially occurs in East and West Coyote Hills.
Calochortus catalinae Catalina mariposa lily		CNPS 4	Found in grasslands of Orange and Los Angeles Counties and north to Santa Cruz. Potentially occurs in Coyote Hills.
Calochortus weedii var. intermedius Foothill mariposa lily		CNPS 1B	Occurs in dry openings of sage scrub or chaparral habitats. Historical and recent records have noted this species in the Chino-Puente Hills and in the Carbon Canyon area. Potentially occurs in Coyote Hills.
Plant Communities			
Southern coast live-oak and cotton wood, willow riparian forests, southern willow scrub	Mulefat riparian scrub is located in the Coyote Hills area.		
California walnut woodland	Reported from La Habra quadrangle, 1.5 miles south of SR-60 on Fullerton Road; Brea, Tonner, Carbon and Soquel Canyons; known from west side of Fullerton Road (1 mile southwest of Rowland Heights) in Puente Hills.		
Oak woodland	Oak woodlands occur along many stream courses in the Specific Plan areas. The community is dominated by coast live oak, with California sycamores interspersed.		
Riversidean coastal sage scrub	Relatively undisturbed stands of coastal sage scrub are found in the Coyote Hills area, with the most contiguous, highest quality habitat occurring on eastern slopes.		

CNPS 1B California Native Plant Society list of endangerment; plants rarely threatened or endangered in California and elsewhere.
CNPS 4 California Native Plant Society list of endangerment; plants of limited distribution - a "watch" list.
FC2 Federal Candidate 2. Species which are currently considered vulnerable to being threatened or endangered, but not enough data have been collected to support a proposal for listing.

Source: California Native Plant Society, Inventory of Rare and Endangered Vascular Plants of California, http://cnps.web.aplus.net/cgibin/ inv/inventory.cgi/Html?item=checkbox.htm, accessed October 2009
California Department of Fish and Game Official Website, Biogeographic Data Branch Home, http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp, accessed October 2009.

Wildlife

The City's open spaces support wildlife species typical of suburban cities that retain large natural and landscaped areas. Most of these species are common, widespread, and highly adaptable to urbanization and human presence. Willow riparian and coastal sage scrub communities typically support diverse and abundant wildlife populations; however, because of the isolation of Fullerton's open space and oil activities within these areas, these communities offer limited wildlife habitat. Table 4.23 identifies sensitive wildlife species in the City.

The coastal sage scrub habitat provides nesting, foraging, and cover opportunities for a variety of bird species. The California gnatcatcher, which is listed as threatened by the U.S. Fish and Wildlife Service (USFWS), is found in the City, largely in the East and West Coyote Hills. Other sensitive species such as the San Diego cactus wren also occur in these areas.

Special-Status Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the planning area. An endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed.

Information from the U.S. Fish and Wildlife Service and the California Natural Diversity Database, a program that inventories the status and locations of rare plants and animals in California, was combined to create an inventory of special-status species in The City of Fullerton. The full inventory, along with information about habitat requirements and distribution where available from the City of Fullerton General Plan Update, is available in the Biological Resources Existing Conditions Report. Table 4.23 lists national and state endangered, threatened, rare, and candidate species in The City of Fullerton by species type.

Table 4.23. The City of Fullerton's Sensitive Animal Species

Common Name	Scientific Name	Federal Status	California Status
Mammals			
Los Angeles pocket mouse	*Perognathus longimembris brevinasus*	FC2	CSSC
San Diego desert woodrat	*Lepus californicus bennettii*	FC2	-
San Diego desert woodrat	*Neotoma lepida intermedia*	FC2	-
Birds			
Long-eared owl	*Asio otus*	None	CSSC

Common Name	Scientific Name	Federal Status	California Status
Cooper hawk	*Accipter cooperi*	None	CSSC
Sharp-shinned hawk	*Accipter striatus*	None	CSSC
San Diego cactus wren (coastal population)	*Campylorhynchus brunneicapillus cousei*	FC2	CSSC
California gnatcatcher	*Polioptila californica californica*	T	CSSC
Burrowing owl	*Athene cunicularia*	None	CSSC
Loggerhead shrike	*Lanius ludovicianus*	FC2	
Reptiles and Amphibians			
San Diego coast horned lizard	*Phrynosoma coronatum blainvillei*	FC2	CSSC
Orange-throated whiptail lizard	*Cnemidophorus hyperythrus*	FC2	CSSC

CSSC California Species of Special Concern. Species considered by the Department of Fish and Game to be declining or vulnerable to extinction and may be considered for listing or special management and protection measures.
T Threatened. Listed as threatened by state or federal agencies for species likely to become endangered in the foreseeable future if declining population trends continue.
FC2 Federal Candidate 2. Species which are currently considered vulnerable to being threatened or endangered, but not enough data have been collected to support a proposal for listing.

Source: California Department of Fish and Game Official Website, Biogeographic Data Branch Home, http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp, accessed October 2009.

Petroleum Resources

Fullerton's petroleum resources are in the form of oil deposits. This non-renewable resource is formed through a slow geologic process and is associated with a number of sub-surface geologic structures in the Los Angeles sedimentary basin. The on-shore fields are aligned with the Newport-Inglewood and Whittier fault zones which have facilitated the entrapment of petroleum resources.

Oil extraction, which began in 1897 in Orange County, has been declining on the whole over the past decade due to depletion in the fields. Oil extraction in Fullerton is also declining as resources are depleted, cost returns are diminishing and development pressure continues to exist. The City of Fullerton has oil fields located in the Coyote Hills East and West areas. The Coyote Hills West oil field has 79 producing wells, and according to the Division of Oils and Gas, produced 567 million barrels of oil between 1990 and 1994. The Coyote Hills East oil field has 94 operating wells and has produced 560 million barrels of oil between 1990 and 1994.

4.3.2 Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability. Information from the City of Fullerton General Plan 2006-2014 Housing Element and the California Department of Finance form the basis of this discussion.

Current Status and Past Development

In January of 2009, the California Department of Finance estimated that the City of Fullerton's population was 137,624. This was an increase of 7.4 percent from the 2000 census population of 128,155. Fullerton's population growth placed it 42nd of all cities in California, placing it at the 93rd percentile amongst its peers in the state. Table 4.24 and Table 4.25 illustrate past growth in the City of Fullerton in terms of population and housing units.

Table 4.24. The City of Fullerton's Population Growth 1950-2009

	1950	1960	1970	1980	1990	2000	2009
Total	13,958	56,180	85,286	102,034	114,144	128,155	137,624
Change	-	42,222	29,106	16,748	12,110	14,011	9,469
Percent Change (%)	-	302%	53%	19%	12%	12%	7.4%

Source: Social Science Data Analysis Network (Census 2000 data), www.censusscope.org/; California Department of Finance, www.dof.ca.gov/Research/

Table 4.25. The City of Fullerton's Growth in Housing Units 2000-2009

2000 # of Housing Units	2009 Estimated # of Housing Units	Estimated Percent Change 2000-2009
44,716	47,092	5.3%

Source: California Department of Finance, www.dof.ca.gov/Research/

Current Status and Past Development Summary

- The City of Fullerton is a predominantly suburban/urban community characterized by a variety of land uses. Approximately 90 percent of the City is developed, exclusive of open space and parks and recreational facilities.

Future Development

As indicated in the previous section, the City of Fullerton has been steadily growing over the last four decades, and this growth is projected to continue at a slowing pace through the middle of the century. Table 4.26 shows the population projections for the City through 2030.

Table 4.26. The City of Fullerton's Population Projections 2000-2030

	2000	2010	2020	2030
Population	126,003	142,939	148,862	152,495
Percent Change (%)		13.4%	4.1%	2.4%

Source: 2009 City of Fullerton General Plan Update 2006-2014 Housing Element

Housing Needs

The City of Fullerton General Plan Update Housing Element Initial Study and Mitigated Negative Declaration estimated future housing needs in the City of Fullerton for the planning

period 2006 to 2014. This provides a general measure of Fullerton's responsibility for the provision of housing to meet those needs.

For this 2007 Regional Housing Needs Assessment (RHNA) cycle, the estimated City housing need number is 1,768 units. This determination projects the minimum housing need to be accommodated in the City over the planning period. But, in light of the rate of population growth in Fullerton, it is recommended that the City consider planning for housing needs above the minimum determination. Table 4.27 provides the estimated basic construction need for the City for the 7½ year planning period. Basic construction need is the number of new housing units that must be constructed to provide housing for the anticipated population.

Table 4.27. The City of Fullerton's Basic Construction Needs 2006-2014

	Dwelling Units		
Income Category	**2006-2014 RHNA Need**	**Construction Achievements[1]**	**Adjusted RHNA Needed**
Extremely Low Income	199	0	199[2]
Very-low Income	398	0	398
Low Income	329	2	327
Moderate Income	376	1	375
Above Moderate Income	807	139	667
Total[3]	**1,910**	**142**	**1,768**

1. Based on building permits through December, 2008. Does not include projects currently under construction or in the review and entitlement process.
2. The extremely-low income need is a subset equal to 50 percent of the very-low income need and is therefore not included in the total RHNA allocation.
3. SCAG allows communities to choose one of the four income categories it will adjust by one unit to accommodate the one units rounding difference and maintain consistency with the approved total housing need. Fullerton has chosen to adjust the above-moderate income category by one unit.

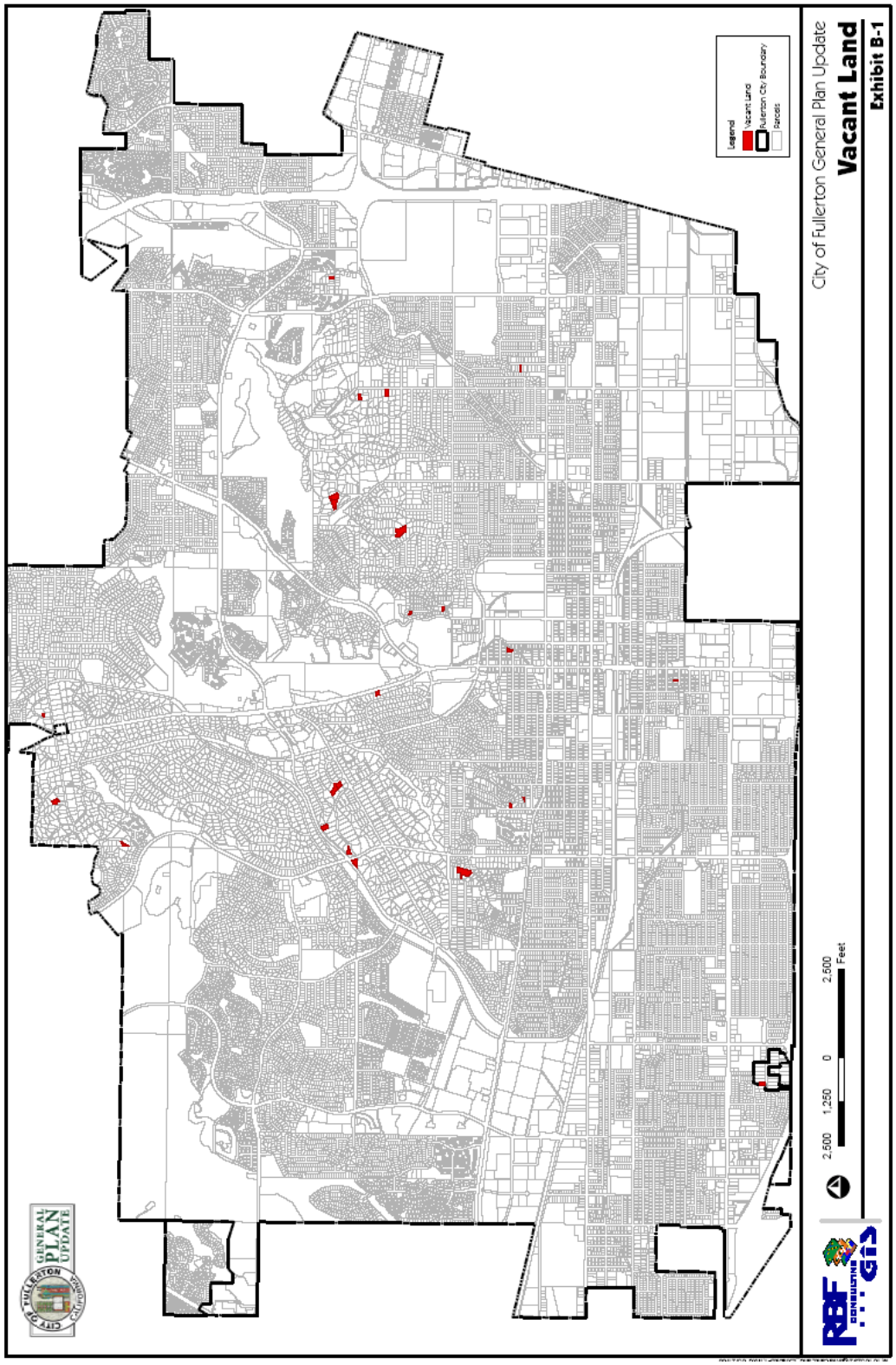
Source: City of Fullerton General Plan Update 2006-2014 Housing Element Initial Study and Mitigated Negative Declaration.

Vacant Land

According to the City of Fullerton 2006-2014 Housing Element Initial Study and Mitigated Negative Declaration, the majority of vacant land within the City is in the area known as West Coyote Hills. The General Plan land use designation of West Coyote Hills is currently "Greenbelt Concept," which allows limited residential development, as specified in the approved Coyote Hills West Master (Specific) Plan MP - 2A. The current zoning does not permit residential development; however, an active application is in process to complete the master plan concept.

The remainder of vacant land is sparsely located over approximately 73 residential and commercial lots, and may have the potential for infill development. The existing vacant land permitting residential construction (approximately 12.9 acres) is illustrated in Figure 4.22. Remnant vacant parcels, too small to allow construction of a dwelling unit (less than 4,000 square feet), have not been listed. However, of the vacant residential parcels found to be potentially feasible for construction of residential units, a conservative calculation was taken to determine potential units that may be feasibly constructed on-site. It is assumed that a potential of 36 dwellings units on these vacant parcels will be comprised of market-rate residential units.

Figure 4.22. The City of Fullerton's Vacant Land Inventory



Source: City of Fullerton General Plan Update, Housing Element 2006-2014

Based on the City's existing available land, there is insufficient vacant land to meet the future growth needs.

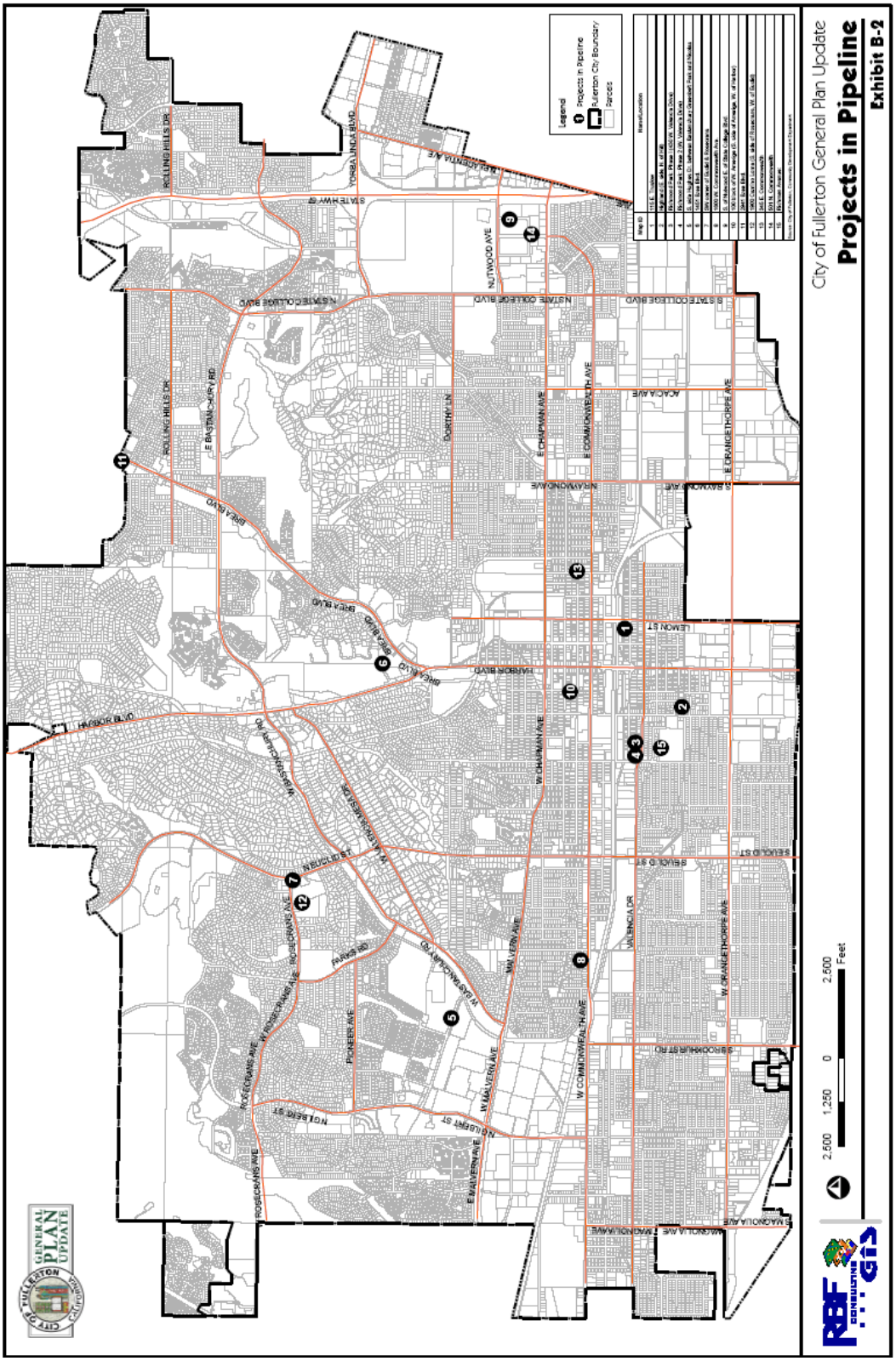
Underutilized Land.

There are number of parcels within the City that are zoned R-2, R-2P, R-3, or R-3R and are developed with fewer residential units than the maximum allowed by the respective zone. These underutilized parcels provide opportunities for units to be constructed in addition to the existing unit(s) or opportunities for redeveloping the entire site with a greater number of units. The total development potential of these parcels is an additional 823 units.

Current Projects

The City of Fullerton has a number of projects under construction, planning entitlements, or in the process of acquiring entitlements. These "in-the-pipeline" projects are illustrated in Figure 4.23. A total of 867 units are currently entitled or under construction. An additional 843 dwelling units are in the process of obtaining entitlement.

Figure 4.23. The City of Fullerton's Projects in the Pipeline



Source: City of Fullerton General Plan Update, Housing Element 2006-2014

Land Use

The City of Fullerton General Plan Existing Land Use Summary includes 22 public, residential, commercial, industrial, and other that exist throughout the City (see Table 4.28). More recent information is being developed for the Land Use Element of the General Plan Update, but was unavailable at the time of the creation of this plan.

Table 4.28. The City of Fullerton's Land Use by Generalized Land Use Categories, 1997

Generalized Land Use Category	Acres*	Percent (%)
Residential	5,719.94	40.2
Commercial	1,628.11	11.4
Industrial	1,241.15	8.7
Public Lands	935.52	6.6
Other Uses	1612.93	11.3
Circulation/Right of Way	3,101.43	21.8
City Totals	**14,239.08**	**100.00**

Source: The City of Fullerton General Plan, 1997;

The City is primarily residential with moderate commercial development. The residential land use designation encompasses a number of uses that have distinctly different densities, which is important to consider in development and hazard mitigation activities. Figure 4.24 illustrates the City's existing land use.

Figure 4.24. The City of Fullerton's Current Land Use

Source: The City of Fullerton

Future Development Summary

- According to the projections in Table 4.26, all areas of the City will continue to grow, but the percentage of growth will decrease over time, through 2030.
- In evaluating the residential growth potential based on development on vacant sites in the unincorporated areas, the City of Fullerton recognizes the governmental, environmental, and economic influences that may impact the provision of new housing or maintenance of existing housing.
- The Land Resources Inventory verifies that there is a shortage of potentially developable land in The City of Fullerton. The General Plan anticipates a total of 49,138 dwelling units at buildout. The Department of Finance reports that, as of January 2009, there are 47,092 units developed. A map showing land inventory is included as Figure 4.22.

4.3.3 Vulnerability of the City of Fullerton to Specific Hazards

The Disaster Mitigation Act regulations require the HMPC to evaluate the risks associated with each of the hazards identified in the planning process. This section summarizes the possible impacts and quantifies, where data permits, the City's vulnerability to each of the hazards identified as a priority hazard in Section 4.2.18 Natural Hazards Summary. The hazards evaluated further as part of this vulnerability assessment include, in alphabetical order:

- Dam Failure
- Drought
- Seismic and Geologic Hazards
  - Earthquake
  - Landslide
  - Liquefaction
- Flood
  - 100 year flood
  - <100 year flood
- Severe Weather
  - Heavy Rain/Thunderstorm/Hail/Lightning
- Wildfire

An estimate of the vulnerability of the City to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. The potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread and catastrophic impact.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Further, other information can be

collected in regard to the hazard area, such as the location of critical community facilities (e.g., a fire station), historic structures, and valued natural resources (e.g., an identified wetland or endangered species habitat). Together, this information portrays the impact, or vulnerability, of that area to that hazard.

The HMPC identified four primary hazards in the planning area for which specific geographical hazard areas have been defined, and for which sufficient data exists to support a vulnerability analysis. These four hazards are: dam failure; seismic and geologic hazards (seismically induced landslide and liquefaction); flood; and wildfire. For dam failure, seismically induced landslide and liquefaction, flood, and wildfire, the HMPC inventoried the following for each community, to the extent possible, to quantify vulnerability in identified hazard areas:

- General hazard-related impacts, including impacts to life, safety, and health
- Values at risk (i.e., types, numbers, and value of improvements)
- Identification of critical facilities and resources at risk
- Cultural and Natural Resources at risk
- Development trends within the identified hazard area
- Overall Community Impact

The HMPC used FEMA's loss estimation software, HAZUS-MH, to analyze the City's vulnerability to earthquakes. Using this methodology resulted in a different approach to quantify the vulnerability of the planning area to earthquakes. Thus the vulnerability of cultural and natural resources and critical facilities could not be quantified. Values and populations at risk are also categorized differently and presented in Table 4.33 as defined by the HAZUS model.

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analysis are discussed in more general terms in alphabetical order following the discussion on wildfire.

Hazards with Geographical Limits

Vulnerability to Dam Failure

Likelihood of Future Occurrence—Occasional
Vulnerability—High

Dam failure flooding can occur as the result of partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall and flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam.

A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is generally confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions.

Methodology

Based on the inundation mapping provided by the City of Fullerton, of the seven dams with a potential to impact the planning areas identified in the hazard profiles (see Table 4.7), four of them pose the greatest threat should a failure occur: Brea, Carbon Canyon, Fullerton, and Prado. A catastrophic failure of any of these dams could have a significant impact on the City of Fullerton. The failure of any of these dams would cause downstream flooding and would likely result in loss of life and property. The potential magnitude of a dam failure depends on the time of year and the base flow of the stream when the failure occurs. During the winter months, when stream flows are higher, the impact to the area would be much greater and evacuation times much less. It is possible that the remaining two High Hazard dams, Diemer and Orange County, as well as the one Significant hazard dam, Yorba, could also impact the City of Fullerton, based on their classification; however, inundation mapping was not available to substantiate the level of potential impact.

Table 4.29. Major Dams with Potential to Significantly Impact the City of Fullerton Planning Area

Dam	Stream	Capacity (Acre-Feet)	Population Threatened
Brea	Brea Creek	7,420	52,475
Carbon Canyon	Carbon Canyon Creek	12,063	54,097
Fullerton	Fullerton Creek	1,342	30,645
Prado	Santa Ana River	295,581	57,158

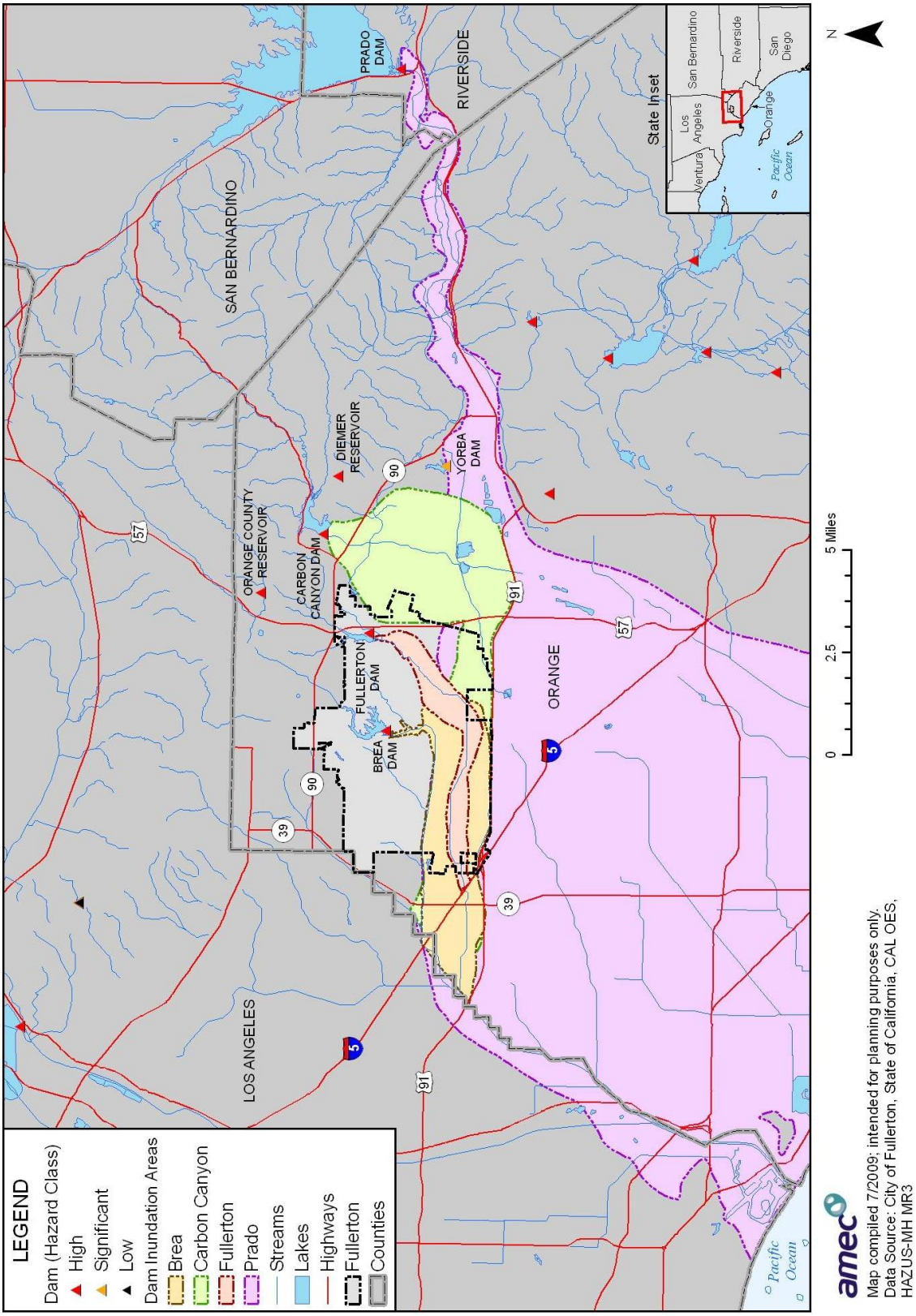
Source: City of Fullerton GIS/HAZUS-MH

The dam inundation data, available for the four dams, was acquired from the City of Fullerton. The City's parcel layer was used as the basis for the inventory of developed parcels. In some cases, there were parcels in multiple inundation zones. Due to this, GIS was used to overlay the inundation layer with the parcel layer and where the inundation zone intersected a parcel boundary it was assigned that hazard zone for the entire parcel. More than likely all four dams would not breach at once so individual analysis was performed on each dam. For purposes of this analysis, it was assumed that every parcel with an improved value greater than zero was developed in some way. Only improved parcels and the value of their improvements were analyzed. The parcels were segregated by property type and joined to the parcel layer by a simplified land use code as further detailed in Table 4.17.

Dam failure flooding would vary in the City depending on which dam fails and the nature and extent of the dam failure and associated flooding. As Figure 4.25 illustrates, there is a significant dam failure hazard in the middle to lower portions of the City.

Dam failure flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, and the local and regional economies.

Figure 4.25. The City of Fullerton's Dams of Concern and Inundation Areas



Map compiled 7/2009; intended for planning purposes only.
Data Source: City of Fullerton, State of California, CAL OES, HAZUS-MH MR3

Values at Risk

Once the number of parcels and their values were determined, contents values were estimated (based on 50 percent of the assessed value) to determine total values at risk by hazard zone. Overlaying the dam inundation layer with the City parcel layer, it is evident that the Fullerton planning area has significant assets at risk to dam failure as detailed in Table 4.30. Since these inundation areas are overlapping a grand total could not be calculated since some parcels could be counted multiple times. Also, it is important to remember that the assessed values are well below the actual market values. Thus, the actual value of assets at risk may be significantly higher than those included herein. Therefore according to this analysis, the City of Fullerton's planning area would be affected in the following manner: a Brea inundation would affect 9,937 improved parcels valued at roughly $2 billion; a Carbon Canyon inundation would affect 9,077 improved parcels valued at roughly $2.5 billion; Fullerton inundation would affect 6,301 improved parcels valued at roughly $1.5 billion; and a Prado inundation would affect 10,522 improved parcels valued at roughly $3 billion.

Table 4.30. The City of Fullerton's Dam Inundation by Property Type

Property Type	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
Brea Inundation				
Commercial	644	346,006,206	173,003,103	519,009,309
Industrial	162	162,470,064	81,235,032	243,705,096
Miscellaneous	186	184,717,853	92,358,927	277,076,780
Residential	8,945	893,375,051	446,687,526	1,340,062,577
Rural	-	-	-	-
Total	**9,937**	**1,586,569,174**	**793,284,587**	**2,379,853,761**
Carbon Canyon Inundation				
Commercial	430	270,261,706	135,130,853	405,392,559
Industrial	264	377,231,581	188,615,791	565,847,372
Miscellaneous	156	307,919,202	153,959,601	461,878,803
Residential	8,227	767,432,428	383,716,214	1,151,148,642
Rural	-	-	-	-
Total	**9,077**	**1,722,844,917**	**861,422,459**	**2,584,267,376**
Fullerton Inundation				
Commercial	247	157,892,831	78,946,416	236,839,247
Industrial	59	20,626,015	10,313,008	30,939,023
Miscellaneous	55	139,901,534	69,950,767	209,852,301
Residential	5,940	675,913,576	337,956,788	1,013,870,364
Rural	-	-	-	-
Total	**6,301**	**994,333,956**	**497,166,978**	**1,491,500,934**

Property Type	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
Prado Inundation				
Commercial	632	346,445,450	173,222,725	519,668,175
Industrial	298	392,706,313	196,353,157	589,059,470
Miscellaneous	184	330,732,700	165,366,350	496,099,050
Residential	9,408	938,385,775	469,192,888	1,407,578,663
Rural	-	-	-	-
Total	**10,522**	**2,008,270,238**	**1,004,135,119**	**3,012,405,357**

Source: City of Fullerton GIS

Populations at Risk

Of greatest concern in the event of a dam failure is the potential for loss of life. City of Fullerton Census 2000 population data, aggregated by census block, was acquired from HAZUS-MH MR3. The total population from the census block layer is 126,446. A proportional division was performed to account for parcels that were split by the different Dam Inundation boundaries, and to better model population counts in the inundation area. For example, a census block that was split by an inundation boundary (40 percent in, 60 percent out) had its population attributes multiplied by 0.40. The results can not be totaled because the values would be inflated due to overlapping inundation layers, census blocks would be counted more than one time Table 4.31 shows population at risk if a particular dam should fail.

Table 4.31. The City of Fullerton's Population at Risk by Dam Inundation Area

Inundation Risk by Dam	Population
Brea	52,475
Carbon Canyon	54,097
Fullerton	30,645
Prado	57,158
Population Not at Risk	52,206

Source: City of Fullerton GIS

Critical Facilities at Risk

Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. An analysis was performed using GIS to determine where critical facilities are located within dam inundation areas. Figure 4.26 and Table 4.32 shows the critical facilities in the City of Fullerton that would be affected by a failure of the Brea, Carbon Canyon, Fullerton, or Prado Dam.

Figure 4.26. Fullerton Dam Inundation and Critical Facilities

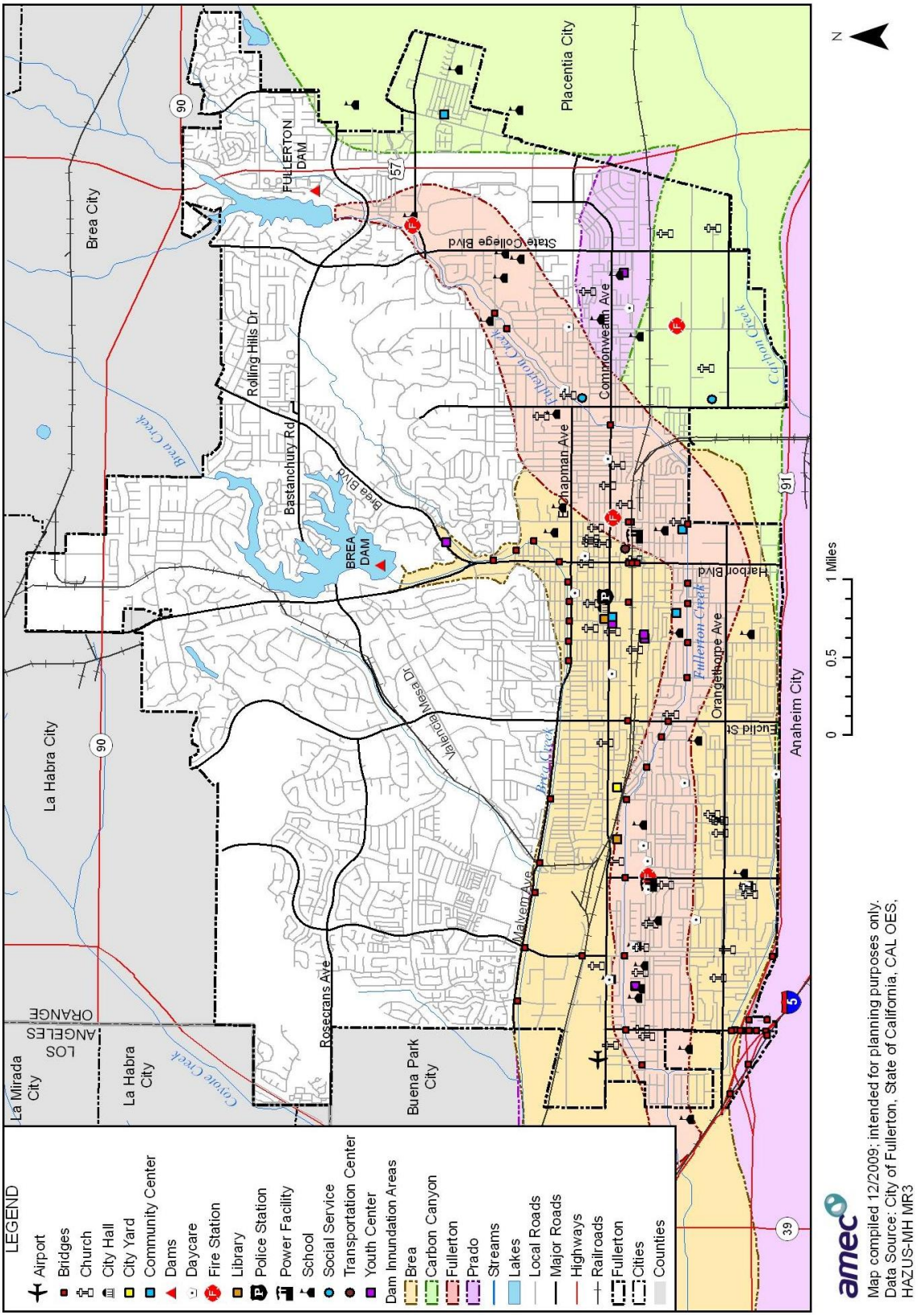


Table 4.32. The City of Fullerton's Critical Facilities in Dam Inundation Areas

Facility Type	Count
Brea Dam	
Airport	1
Bridge	39
Church	34
City Hall	1
City Yard	1
Community Center	3
Daycare	12
Fire Station	2
Library	2
Police Station	1
Power Facility	2
School	17
Transportation Center	1
Youth Center	5
Total	**121**
Carbon Canyon Dam	
Airport	1
Bridge	26
Church	27
City Yard	1
Community Center	3
Daycare	10
Fire Station	2
Library	1
Power Facility	2
School	19
Social Service	1
Transportation Center	1
Youth Center	3
Total	**97**
Fullerton Dam	
Bridge	18
Church	15
Community Center	2

Facility Type	Count
Daycare	8
Fire Station	3
Library	1
Power Facility	2
School	16
Social Service	1
Youth Center	1
Total	**67**
Prado Dam	
Airport	1
Bridge	43
Church	37
City Hall	1
City Yard	1
Community Center	3
Daycare	12
Fire Station	3
Library	2
Police Station	1
Power Facility	2
School	18
Social Service	2
Transportation Center	1
Youth Center	5
Total	**132**
Grand Total	**417**

Source: City of Fullerton GIS

Historic, Cultural, and Natural Resources at Risk

The City of Fullerton planning area has significant historic, cultural, and natural resources located throughout the City as previously described. Vulnerability analysis of these resources was not possible due to data limitations.

Development Trends

Population growth and development in the City of Fullerton is on the rise. Additional growth and development within dam inundation areas will continue to increase the risk and vulnerability of the planning area to a dam failure.

Overall Community Impact

The overall impact to the community from a dam failure includes:

- Injury and loss of life;
- Commercial and residential structural damage;
- Decreased water quality in area watersheds;
- Increase in post-failure hazards such as flooding, sedimentation, and mudslides;
- Damage to natural resource habitats and other resources, such as timber and rangeland;
- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents;
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures;
- Negative impact on commercial and residential property values;
- Loss of churches, which could severely impact the social fabric of the community;
- Loss of schools, which could severely impact the entire school system and disrupt families and teachers, as temporary facilities and relocations would likely be needed; and
- Impact on the overall mental health of the community.

Vulnerability to Earthquake

Likelihood of Future Occurrence—Likely
Vulnerability—High

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicentral location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

Fault rupture itself contributes very little to damage unless the structure or system element crosses the active fault. In general, newer construction is more earthquake resistant than older construction because of improved building codes and their enforcement. Manufactured housing is very susceptible to damage because rarely are their foundation systems braced for earthquake motions. Locally generated earthquake motions, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry.

Common impacts from earthquakes include damage to infrastructure and buildings (e.g., crumbling of unreinforced masonry, failure of architectural facades, rupturing of underground utilities, and road closures). Earthquakes also frequently trigger secondary hazards, such as dam failures, landslides and rock falls, explosions, and fires that can become disasters themselves.

Methodology: Estimating Potential Losses

Earthquake losses will vary across the City of Fullerton planning area depending on the source and magnitude of the event. To evaluate potential losses associated with earthquake activity in the planning area, a HAZUS-MH probabilistic earthquake scenario was run with the latest version of HAZUS-MH (MR3 released in October 2007).

The methodology used probabilistic seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the 2002 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500 year return period analyzes ground shaking estimates from the various seismic sources in the area with a 2 percent probability of being exceeded in 50 years.

The results of the scenario are captured in Table 4.33. Key losses included the following:

- Total economic loss estimated for the earthquake was $4.56 billion, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $4.4 billion.
- Over 67 percent of the buildings in the City were at least moderately damaged. 2,480 buildings were completely destroyed.
- Over 58 percent of the building- and income-related losses were residential structures.
- 15 percent of the estimated losses were related to business interruptions.
- The mid-day earthquake caused the most casualties: 2,723.
- 99 percent of the households experienced a loss of potable water the first day after the earthquake.

Table 4.33. HAZUS-MH Earthquake Loss Estimation: 2,500-Year Scenario Results

Type of Impact	Impacts to City
Total Buildings Damaged	Slight: 9,606 Moderate: 15,369 Extensive: 5,189 Complete: 2,481
Building and Income Related Losses	$4.4 billion 58 percent of damage related to residential structures 15 percent of loss due to business interruption
Total Economic Losses (Includes building, income and lifeline losses)	$4.56 billion

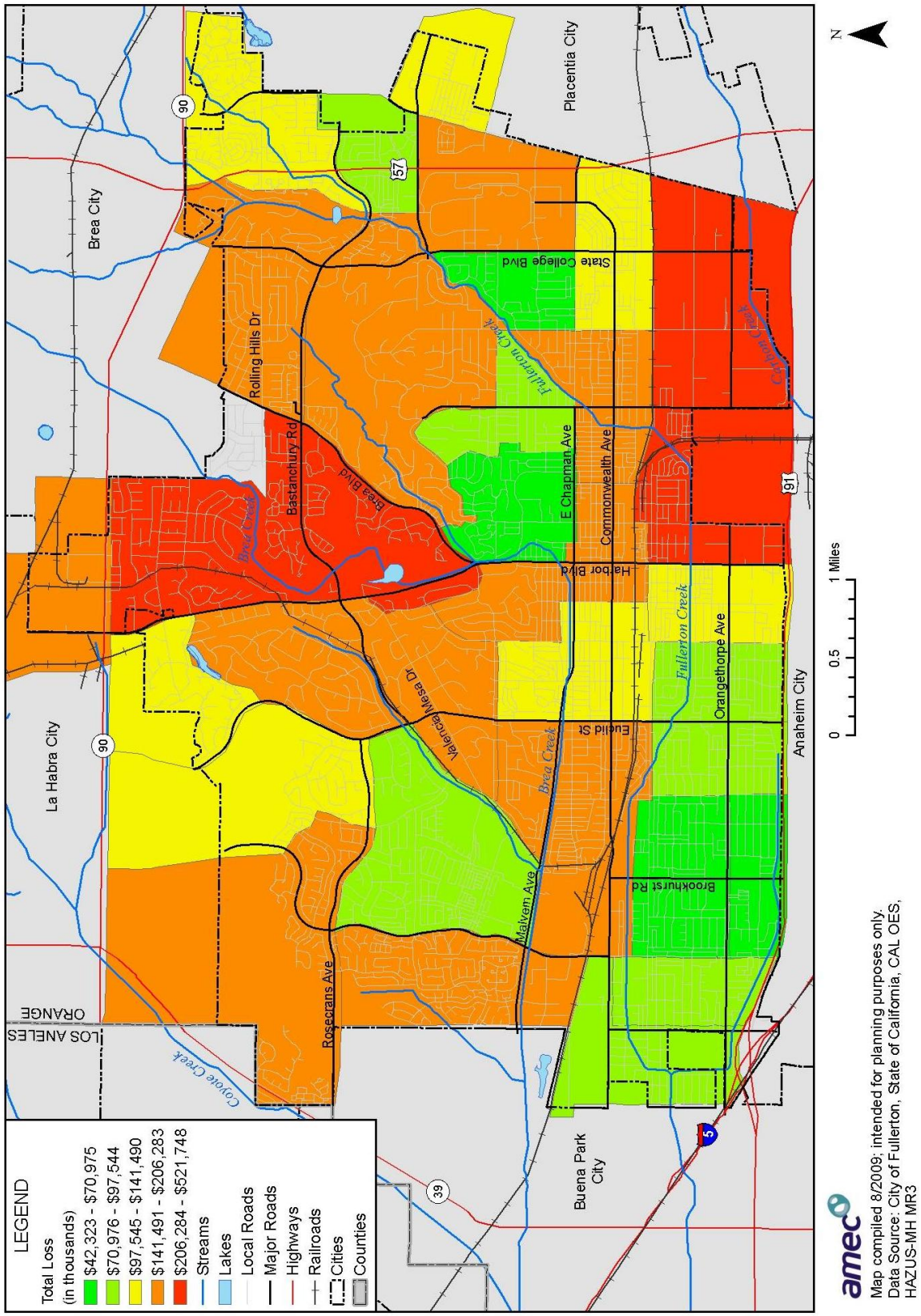
Type of Impact	Impacts to City
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 1,126 Requiring hospitalization: 257 Life threatening: 26 Fatalities: 48
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 1,890 Requiring hospitalization: 561 Life threatening: 94 Fatalities: 178
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 1,545 Requiring hospitalization: 476 Life threatening: 143 Fatalities: 140
Damage to Transportation Systems	2 highway bridges, complete damage 47 highway bridges, moderate damage 1 airport facilities, moderate damage 1 bus facility, moderate damage $23.8 million in economic losses
Damage to Essential Facilities	32 schools, 1 police stations, 1 fire station at least moderately damaged
Damage to Utility Systems	1 electrical power system, moderate damage Potable water breaks: 471 Waste water breaks: 372 Natural gas breaks: 398 $90.4 million economic losses
Households without Power/Water Service (Based on 49,386 total households)	Power loss, Day 1: 42,189 Power loss, Day 3: 31,420 Power loss, Day 7: 16,993 Power loss, Day 30: 4,380 Power loss, Day 90: 49 Water loss, Day 1: 48,803 Water loss, Day 3: 48,555 Water loss, Day 7: 47,542 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	6,161
Shelter Requirements	4,510
Debris Generation	1 million tons

Source: HAZUS-MH MR3

Although a different methodology was used for the earthquake analysis (as explained in the introduction to Section 4.3.3), it should be noted that older buildings, including those of historical and cultural significance, and unreinforced masonry (URM) might be more susceptible to earthquake affects.

A map showing the peak ground accelerations by census tract for this earthquake scenario is shown in Table 4.31. The warm color tones indicate damaging levels of shaking. All of the City would sustain damage due to Fullerton's proximity to the San Andreas fault and other regional faults. Peak ground acceleration and location of faults is shown in Figure 4.11 and explained in further detail in Table 4.9 in Section 4.2.9 Earthquake.

Figure 4.27. The City of Fullerton's Probabilistic Damage from Earthquake



Vulnerability to Seismically Induced Landslide

Likelihood of Future Occurrence—Occasional
Vulnerability—Low

Seismic hazards like seismically induced landslides are a hazard of concern in the City of Fullerton. The City is divided into three seismic hazard quadrangle layers: Anaheim, La Habra, and Yorba Linda. Impacts from seismic hazards primarily involve damage to infrastructure, utility systems, and roads. Road closures can further impact emergency response and evacuation efforts and interrupt business and school activities. Historically, landslides resulting in significant losses have been limited within the City of Fullerton planning area, with identified past occurrences being non-seismic related. Specific problem areas were previously identified in Section 4.2.13. Based on historical data, landslides will likely continue to occur in sloped areas within the City, but the overall vulnerability of Fullerton planning area remains low.

Methodology

According to the California Department of Conservation there are landslide seismic hazards appearing sporadically through the middle of Fullerton with a potential to impact the planning area (see Figure 4.12).

The landslide data was acquired from the California Department of Conservation. The City's parcel layer was used as the basis for the inventory of developed parcels. GIS was used to overlay the seismic hazard layers with the parcel layer and where the seismic landslide data intersected a parcel boundary it was assigned that hazard for the entire parcel. For purposes of this analysis, it was assumed that every parcel with an improved value greater than zero was developed in some way. Only improved parcels and the value of their improvements were analyzed. The parcels were segregated by property type and joined to the parcel layer by a simplified land use code as further detailed in Table 4.17

Values at Risk

Once the number of parcels and their values were determined, content values were estimated (based on 50 percent of the assessed value) to determine total values at risk by landslide area. Overlaying the seismically induced landslide layer with the City parcel layer, it is evident that the Fullerton planning area has some assets at risk to seismic induced landslides. Table 4.34 illustrates the estimated damages Fullerton residents would sustain from a landslide in the La Habra or Yorba Linda areas. Also, it is important to remember that the assessed values are well below the actual market values. Thus, the actual value of assets at risk may be significantly higher than those included herein.

Table 4.34. The City of Fullerton's Parcels at Risk from Seismically Induced Landslide

Property Type	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
La Habra Landslide				
Commercial	6	33,910,431	16,955,216	50,865,647
Industrial	-	-	-	-
Miscellaneous	3	751,390	375,695	1,127,085
Residential	431	128,035,756	64,017,878	192,053,634
Rural	1	242,440	121,220	363,660
Total	**441**	**162,940,017**	**81,470,009**	**244,410,026**
Yorba Linda Landslide				
Commercial	-	-	-	-
Industrial	-	-	-	-
Miscellaneous	-	-	-	-
Residential	2	376,604	188,302	564,906
Rural	-	-	-	-
Total	**2**	**376,604**	**188,302**	**564,906**

Source: HAZUS-MH MR3

Since these seismic hazard areas are overlapping a grand total could not be calculated since some parcels could be counted multiple times. Therefore according to this analysis, the City of Fullerton's planning area would be affected in the following manner. A La Habra landslide could affect 441 improved parcels valued at roughly $244 million. A Yorba Linda landslide could affect 2 improved residential parcels valued at roughly $565,000. There are no landslide hazards within the Anaheim quadrangle area.

Populations at Risk

Seismic induced landslide risk is greatest to those individuals residing in these landslide hazard areas. Using 2000 population data aggregated by census block data from HAZUS-MH and GIS, an estimate was made of populations within the landslide hazard areas. The total population from the census block layer is 126,446. A proportional division was performed to account for parcels that were split by Landslide and Liquefaction boundaries and to better model population counts in the seismic hazards. For example, a census block that was split by a landslide boundary (40 percent in, 60 percent out) had its population attributes multiplied by 0.40. Table 4.35 shows population at risk from a potential seismic-induced landslide area. The results can not be totaled because the values would be inflated due to overlapping inundation layers, census blocks would be counted more than one time.

Table 4.35. The City of Fullerton's Populations at Risk from a Seismically Induced Landslide

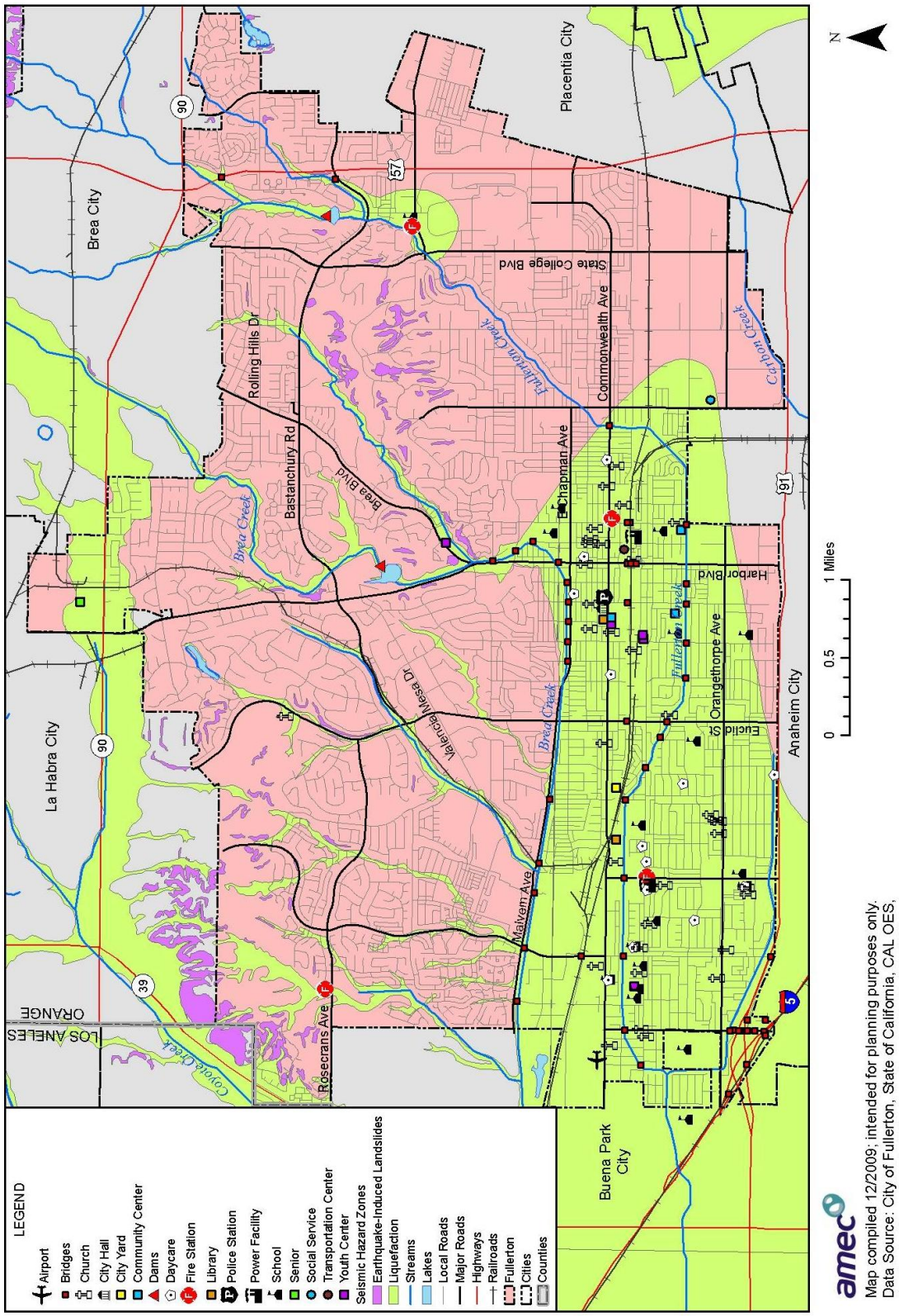
Hazard Type	Population
Landslide	452

Source: HAZUS-MH MR3

Critical Facilities at Risk

Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. An analysis was performed using GIS to determine where critical facilities are located within the seismic induced landslide areas. Figure 4.28 shows that there are no critical facilities at risk to landslide in the City of Fullerton.

Figure 4.28. Fullerton Seismically Induced Landslides and Liquefaction Hazard Zones and Critical Facilities



Historic, Cultural, and Natural Resources at Risk

The City of Fullerton planning area has significant historic, cultural, and natural resources located throughout the City as previously described. Vulnerability analysis of these resources was not possible due to data limitations.

Development Trends

Population growth and development in the City of Fullerton is on the rise. Additional growth and development within landslide risk areas will continue to increase the risk and vulnerability of the planning area to damaging landslides.

Overall Community Impact

The overall impact to the community from a landslide includes:

- Injury and loss of life;
- Commercial and residential structural damage;
- Damage to natural resource habitats and other natural resources
- Loss of roads and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents;
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures;
- Negative impact on commercial and residential property values;
- Impact on the overall mental health of the community.

Vulnerability to Seismically Induced Liquefaction

Likelihood of Future Occurrence—Occasional
Vulnerability—Medium

Seismic hazards like earthquake induced liquefactions are an identified hazard of concern in the City of Fullerton. The City is divided into three seismic hazard quadrangle layers: Anaheim, La Habra, and Yorba Linda. Impacts from liquefaction primarily involve life safety concerns and damage to infrastructure, utility systems, and roads. Road closures can further impact emergency response and evacuation efforts and interrupt business and school activities. Historically, liquefactions resulting in losses have not occurred within the City of Fullerton planning area. Specific problem areas were previously identified in Section 4.2.13 and are detailed in Figure 4.28 above. As Figure 4.28 illustrates, there are large liquefaction areas in the southern portion of Fullerton with branches that follow the stream areas. Based on available hazard data, the potential for liquefactions to occur within the planning area exist and given the size of the areas at risk, the vulnerability of Fullerton planning area is medium.

Methodology

According to the California Department of Conservation there are liquefaction seismic hazards with a potential to impact the planning area (see Table 4.36). The liquefaction data was acquired

from the California Department of Conservation. The City's parcel layer was used as the basis for the inventory of developed parcels. GIS was used to overlay the seismic liquefaction hazard layer with the parcel layer and where the seismic zones intersected a parcel boundary, it was assigned that hazard zone for the entire parcel. Individual analysis was performed on each seismic hazard (see Table 4.36). For purposes of this analysis, it was assumed that every parcel with an improved value greater than zero was developed in some way. Only improved parcels and the value of their improvements were analyzed. The parcels were segregated by property type and joined to the parcel layer by a simplified land use code as further detailed in Table 4.17.

Values at Risk

Once the number of parcels and their values were determined, contents values were estimated (based on 50 percent of the assessed value) to determine total values at risk by hazard area. Overlaying the liquefaction layer with the City parcel layer, it is evident that the Fullerton planning area has significant assets at risk to liquefaction. Table 4.36 illustrates the estimated damages Fullerton residents would sustain from an Anaheim or La Habra liquefaction. Also, it is important to remember that the assessed values are well below the actual market values. Thus, the actual value of assets at risk may be significantly higher than those included herein.

Table 4.36. The City of Fullerton's Seismically Induced Liquefaction Potential Analysis

Property Type	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
Anaheim Liquefaction				
Commercial	590	284,170,472	142,085,236	426,255,708
Industrial	197	171,081,020	85,540,510	256,621,530
Miscellaneous	171	192,399,905	96,199,953	288,599,858
Residential	8,320	822,841,282	411,420,641	1,234,261,923
Rural	-	-	-	-
Total	**9,278**	**1,470,492,679**	**735,246,340**	**2,205,739,019**
La Habra Liquefaction				
Commercial	83	124,717,990	62,358,995	187,076,985
Industrial	23	68,914,667	34,457,334	103,372,001
Miscellaneous	34	160,825,061	80,412,531	241,237,592
Residential	1,790	356,398,568	178,199,284	534,597,852
Rural	-	-	-	-
Total	**1,930**	**710,856,286**	**355,428,143**	**1,066,284,429**

Source: HAZUS-MH MR3

According to this analysis, the City of Fullerton's planning area would be affected in the following manner. La Habra liquefaction would affect 1,930 improved parcels valued at roughly $1 billion. There are no parcels within the Yorba Linda liquefaction hazard. Anaheim liquefaction would affect 9,278 improved parcels valued at roughly $2 billion.

Populations at Risk

Seismic induced liquefaction risk is greatest to those individuals residing in identified liquefaction hazard areas. Using 2000 population data aggregated by census block data from HAZUS-MH and GIS, an estimate was made of populations within the liquefaction hazard areas. The total population from the census block layer is 126,446. A proportional division was performed to account for parcels that were split by Landslide and Liquefaction boundaries and to better model population counts in the seismic hazards. For example, a census block that was split by a landslide boundary (40 percent in, 60 percent out) had its population attributes multiplied by 0.40. Table 4.37 shows actual population at risk from a particular seismic-induced liquefaction area. The results can not be totaled because the values would be inflated due to overlapping inundation layers; census blocks would be counted more than one time.

Table 4.37. The City of Fullerton's Population at Risk to Seismically Induced Liquefaction

Hazard Type	Population Ratio
Liquefaction	56,452

Source: HAZUS-MH MR3

Critical Facilities at Risk

Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. An analysis was performed using GIS to determine where critical facilities are located within the seismic induced liquefaction areas. Figure 4.28 and Table 4.38 shows the critical facilities in the City of Fullerton that would be affected by a seismic induced liquefaction event.

Table 4.38. The City of Fullerton's Critical Facilities at Risk to Seismically Induced Liquefaction

Facility Type	Count
Airport	1
Bridge	54
Church	35
City Hall	1
City Yard	1
Community Center	3
Dam	2
Daycare	13
Fire Station	4
Library	2
Police Station	1
Power Facility	2
School	18

Facility Type	Count
Senior Facility	1
Social Service	1
Transportation Center	1
Youth Center	5
Total	**145**

Source: City of Fullerton GIS

Historic, Cultural, and Natural Resources at Risk

The City of Fullerton planning area has significant historic, cultural, and natural resources located throughout the City as previously described. Vulnerability analysis of these resources was not possible due to data limitations.

Development Trends

Population growth and development in the City of Fullerton is on the rise. Additional growth and development within liquefaction risk areas will continue to increase the risk and vulnerability of the planning area to damaging liquefaction.

Overall Community Impact

The overall impact to the community from liquefaction includes:

- Injury and loss of life;
- Commercial and residential structural damage;
- Loss of roads and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents;
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures;
- Negative impact on commercial and residential property values;
- Impact on the overall mental health of the community.

Vulnerability to Flood

100-Year Flood:

Likelihood of Future Occurrence—Occasional
Vulnerability—High

<100-Year Flood/Localized Flooding:

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Historically, the City of Fullerton planning area has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control

measures. But, occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage.

Flooding has occurred in the past: within the 100-year floodplain and in other localized areas. In addition to damage to area infrastructure, other problems associated with flooding include erosion, sedimentation, degradation of water quality, loss of environmental resources, and certain health hazards.

Methodology

The City of Fullerton has mapped flood hazard areas as previously described. GIS was used to identify and quantify the possible impacts of flooding within the City of Fullerton planning area. The following methodology was followed in creating these flood vulnerability maps and determining values at risk to the 100-year and 500-year flood events.

The 2004 FEMA DFIRMs, provided by the City, were used as the floodplain layer. This data set was the most comprehensive, electronic representation of the 100- and 500-year floodplains for the entire planning area. Table 4.39 summarizes the flood zones included on these maps.

Table 4.39. The City of Fullerton's Flood Zones

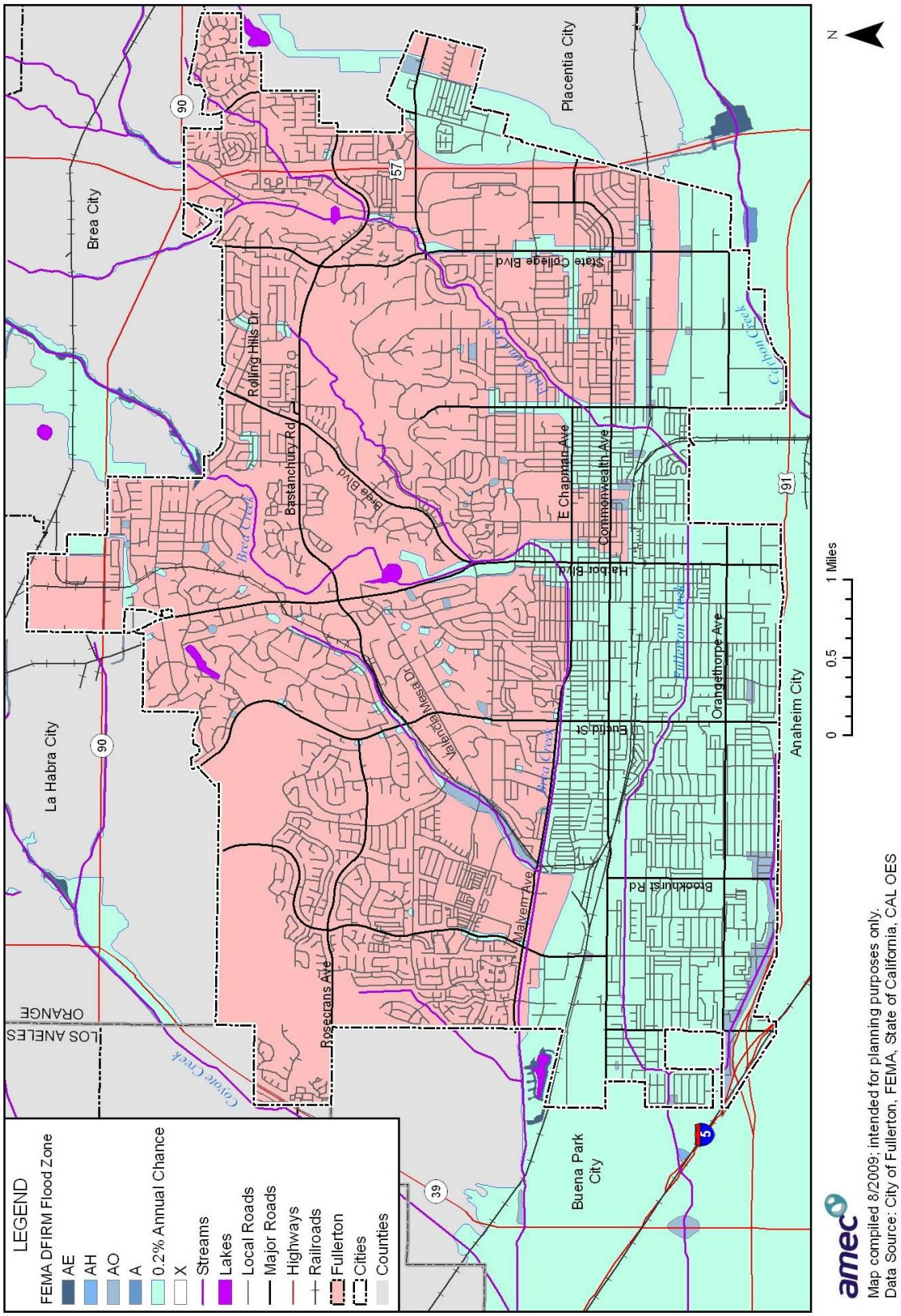
Flood Zone	Definition
Special Flood Hazard Areas (SFHA) Subject to Inundation by 100-Year Flood	
Zone A	No base flood elevations determined
Zone AE	Base flood elevations determined
Zone AH	Flood depths of 1-3 feet (usually areas of ponding); base flood elevations determined
Zone AO	Flood depths of 1-3 feet (usually sheet flow on sloping terrain); average depths determined; for areas of alluvial fan flooding, velocities also determined
Zone AR	SFHA formerly protected from the 1 percent annual chance flood by a flood control system that was subsequently decertified; zone AR indicates that the former flood control system is being restored to provide protection from the 1 percent annual chance or greater flood
Zone A99	Area to be protected from 1 percent annual chance flood by a federal flood protection system under construction; no base flood elevations determined
Other Flood Areas	
Zone X (with color coding)	Areas of 0.2 percent annual chance flood (i.e., 500-year flood); areas of 1 percent annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1 percent annual chance flood
Other Areas	
Zone B and X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
Zone C and X (with no shading)	Areas determined to be outside the 0.2 percent annual chance floodplain
Zone D	Areas in which flood hazards are undetermined, but possible

Source: 2004 Draft Digital Flood Insurance Rate Maps, the City of Fullerton

The City's parcel layer was used as the basis for the inventory of developed parcels. In some cases, there are parcels in multiple flood zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon. The layer was then overlaid on the floodplain layer. For the purposes of this analysis, the flood zone in which the centroid was located was assigned as the flood zone for the entire parcel. This model assumed that every parcel with an improved value greater than zero was developed in some way. Only improved parcels and the value of their improvements were analyzed. In order to assess the land use type by flood zone, a simplified land use code table was joined to the parcel layer as previously detailed in Table 4.17.

Following this methodology, flood maps were created that illustrate where flooding is most likely to happen in the City of Fullerton (see Figure 4.29).

Figure 4.29. The City of Fullerton's 100- and 500-Year Flood Risk



Values at Risk

Table 4.40 through Table 4.42 summarizes the values at risk in the City of Fullerton's floodplain. Three tables are used to depict the flood hazard.

- The first table, Table 4.40, is a detailed analysis that shows the count and improved value of parcels that fall in a floodplain by flood zone and property type.
- The second table, Table 4.41, summarizes the information in the first table by the 100-year flood, 500-year flood, and total flood (100-year and 500-year floods combined).
- The third table, Table 4.42, shows potential loss estimates by flood utilizing FEMA guidance. Based on this guidance, contents value is estimated at 50 percent of the improved value. Estimated losses assume that a flood is unlikely to cause total destruction. Losses are related to a variety of factors, including flood depth, flood velocity, building type, and construction. Using FEMA's recommendations, average damage is estimated to be 20 percent of the total building value.

While there are several limitations to this model, it does allow for potential loss estimation. It should be noted that the model may have included structures in the floodplains that are elevated at or above the level of the base-flood elevation, which will likely mitigate flood damage. Also, it is important to remember that the assessed values are well below the actual market values. Thus, the actual value of assets at risk may be significantly higher than those included herein.

Table 4.40. The City of Fullerton's Count and Improved Value of Parcels in Floodplain by Zone

Property Type	Zone AE		Zone AO		Zone X500		Zone X	
	# of Parcels	Improved Value ($)	# of Parcels	Improved Value	# of Parcels	Improved Value ($)	# of Parcels	Improved Value ($)
Commercial	-	-	10	2,951,281	668	360,914,479	226	512,281,814
Industrial	-	-	7	1,801,183	249	314,679,197	51	128,937,381
Miscellaneous	-	-	2	1,205,073	186	334,609,017	92	128,937,381
Residential	2	313,452	238	35,723,070	9,006	825,374,120	16,846	2,939,760,298
Rural	-	-	-	-	-	-	1	242,440
Totals	**2**	**313,452**	**257**	**41,680,607**	**10,109**	**1,835,576,813**	**17,216**	**3,710,159,314**

Source: The City of Fullerton GIS; Orange County Assessor's 2007 Roll Values; FEMA 2004 DFIRMs,

Table 4.41. The City of Fullerton's Count and Improved Value of Parcels in Floodplain by Type of Flood

Property Type	Total 100-Year Flood*		Total 500-Year Flood		Total Flood**	
	# of Parcels	Improved Value ($)	# of Parcels	Improved Value ($)	# of Parcels	Improved Value ($)
Commercial	10	2,951,281	668	360,914,479	678	363,865,760
Industrial	7	1,801,183	249	314,679,197	256	316,480,380

Property Type	Total 100-Year Flood*		Total 500-Year Flood		Total Flood**	
	# of Parcels	Improved Value ($)	# of Parcels	Improved Value ($)	# of Parcels	Improved Value ($)
Miscellaneous	2	1,205,073	186	334,609,017	188	335,814,090
Residential	240	36,036,522	9,006	825,374,120	9,246	861,410,642
Total	**259**	**41,994,059**	**10,109**	**1,835,576,813**	**10,368**	**1,877,570,872**

Source: The City of Fullerton GIS; Orange County Assessor's2007 Roll Values; FEMA 2004 DFIRMs,
*Includes Zones AE and AO
**Includes Shaded Zone X (500-year) and all 100-year flood zones

Table 4.42. The City of Fullerton's Flood Loss Estimates

Flood Event	# of Parcels	Improved Value ($)	Estimated Contents Value ($)	Total Value ($)	Loss Estimate ($)
100-Year Flood	259	41,994,059	20,997,030	62,991,089	12,598,218
500-Year Flood	10,109	1,835,576,813	917,788,407	2,753,365,220	550,673,044
Total Flood*	**10,368**	**1,877,570,872**	**938,785,436**	**2,816,356,308**	**563,271,262**

Source: The City of Fullerton GIS; Orange County Assessor's; 2007 Roll Values, FEMA 2004 DFIRMs,
*Includes 500-year and 100-year flood data

According to this information, the City of Fullerton planning area has 259 improved parcels valued at roughly $42 million in the 100-year floodplain. An additional 10,109 improved parcels valued at roughly $2 billion fall within the 500-year floodplain for a combined total of approximately $2 billion.

Applying the 20 percent damage factor as previously described, there is a 1 percent chance in any given year of a 100-year flood causing roughly $13 million in damage in the City of Fullerton planning area and a .2 percent chance in any given year of a 500-year flood causing roughly $600 million in damage (combined damage from both floods).

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Fullerton joined the National Flood Insurance Program (NFIP) on July 5, 1977. The City does not participate in the Community Rating System (CRS). NFIP insurance data indicates that as of January 21, 2010, there were 281 policies in force in the City, resulting in $51,946,600 of insurance in force. Of these, 197 are for parcels located in various types of A zones; 84 are for parcels in the B, C and X zones.

There have been six closed paid losses totaling $12,949. Of these losses, three were in the A zones and two were in the B, C, and X zones. All of these losses were associated with pre-FIRM structures. Information was not provided on the other claim.

Based on this analysis of insurance coverage, Fullerton has limited assets at risk to the 100-year and greater floods. Of the 259 improved parcels within the 100-year floodplain, 197 (or 76 percent) of those parcels maintain flood insurance.

According to the January 2010 data from the state on NFIP communities, Fullerton does not have any repetitive loss buildings located anywhere within the planning area.

Populations at Risk

Of greatest concern in the event of a flood is the potential for loss of life. Using 2000 population data aggregated by census block data from HAZUS-MH and GIS, an estimate was made of populations within the 100- and 500-year floodplains. To account for parcels that were split by flood boundaries, a proportional division was performed to better reflect population counts in the floodplain. For example, a census block that was split by a floodplain (40 percent in, 60 percent out) had its population attributes multiplied by .40. Results are provided in Table 4.43

Table 4.43. The City of Fullerton's Population by Flood Event

	100-Year Flood	500-Year Flood	Total
Fullerton	2,089	61,296	63,285

Source: HAZUS-MH MR3 (Census 2000); The City of Fullerton GIS, FEMA 2004 DFIRMs

Critical Facilities at Risk

Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. An analysis was performed using GIS software to determine critical facilities in the City of Fullerton's floodplain. The DFIRM flood layer previously discussed was used to identify the 100- and 500-year floodplains. Figure 4.30 illustrates the locations of critical facilities relative to the floodplain in the City. Table 4.44 provides an inventory of these facilities. The impact to the community could be great if these critical facilities were damaged or destroyed during a flood event.

Figure 4.30. The City of Fullerton's Critical Facilities in the 100- and 500-Year Floodplains

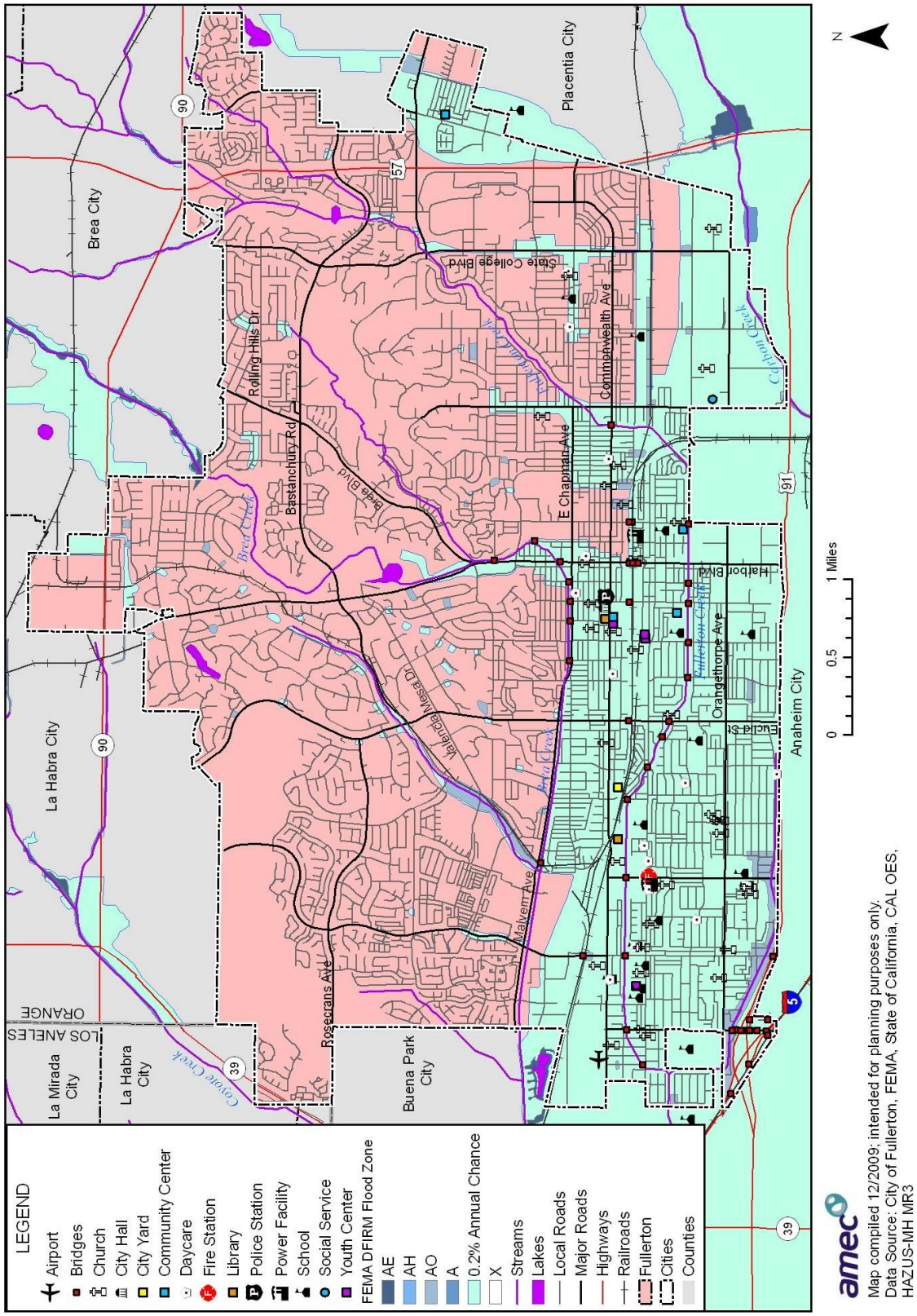


Table 4.44. The City of Fullerton's Critical Facilities in the 100- and 500-Year Floodplains

Facility Type	Total
100-Year	
Bridge	1
Total	**1**
500-Year	
Airport	1
Bridge	45
Church	34
City Hall	1
City Yard	1
Community Center	4
Daycare	15
Fire Station	1
Library	2
Police Station	1
Power Facility	2
School	18
Social Service	1
Youth Center	4
Total	130
Total Facilities	**131**

Source: The City of Fullerton GIS

Historic, Cultural, and Natural Resources at Risk

The City of Fullerton planning area has significant historic, cultural, and natural resources located throughout the City as previously described. Risk analysis of these resources was not possible due to data limitations. However, natural areas within the floodplain often benefit from periodic flooding as a naturally recurring phenomenon. These natural areas often reduce flood impacts by allowing absorption and infiltration of floodwaters.

Development Trends

The development trend in the City of Fullerton planning area is steady, slowing growth. Census projections from the California State University Fullerton expect the City's population to grow to 152,495 by 2030. This is an increase of 26,492 people from the 2000 census estimate of 126,003. As state in Section 4.3.2, there is currently insufficient land, both in undeveloped areas and in areas where infill is possible to accommodate this growth.

The potential for flooding may increase as stormwater is channelized due to land development. Such changes can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. Floodplain modeling and master planning should be based on buildout land use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative affects can have a negative impact on the floodplain.

Local floodplain management ordinances require that new construction be built with the lowest floor elevated to or above the base flood (100-year) elevation. New development that adheres to the elevation requirements in addition to other requirements for maintaining elevation certificates and implementing stormwater program elements and erosion or sediment controls for all new development in the floodplain may help protect development from 100-year floods.

The amount of growth in the City and nearby communities can also strain the limits of the entire water management system, which includes water supply in addition to water control. When flood drainage and control structures are overwhelmed, the result is not only severe flooding. Significant losses to the water supply system may also occur.

Overall Community Impact

Floods and their impacts will vary by location and severity and will likely only affect certain areas of the City at any one time. Based on the risk assessment, it is evident that floods will continue to have potentially severe economic impacts to certain areas of the City. However, many of the floods in the City are minor, localized flood events that are more of a nuisance than a disaster. Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural damage;
- Disruption of and damage to public infrastructure;
- Health hazards associated with mold and mildew;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) upon the community;
- Negative impact on commercial and residential property values; and
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.

Vulnerability to Wildfire

Likelihood of Future Occurrence—Highly Likely
Vulnerability—High

Due to the highly urbanized nature of the City of Fullerton planning area, the City's wildfire risk and vulnerability within City limits is a concern, with some areas of the planning area being at

greater risk than others as described further in this section. The City is also vulnerable to the impacts associated with wildfires occurring in and around the more urbanized areas in the region as seen recently with all of the devastating Southern California fires. The impacts to air quality create a significant health concern to all communities in the vicinity of these fires.

High fuel loads in and around the planning area, along with geographical and topographical features create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. During the May to October fire season, the dry vegetation and hot and sometimes windy weather combined with a more dense population results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire.

Methodology

In 2007, CAL FIRE updated its fire hazard severity zone maps for California. The fire hazard model considers wildland fuels, topography, weather, crown fire potential, and ember production and movement. This model does not consider risk. The end product is the identification of fire hazard severity zones rated moderate, high, or very high fire hazard. Specifically, wildfire hazard zones represent areas of variable size ranging from 20 acres in urbanized areas to at least 200 acres in wildland areas, with relatively homogeneous characteristics regarding expected burn probability and potential fire behavior attributes based on climax fuel conditions over a 30-50 year time horizon.

Using CAL FIRE's 2007 fire hazard severity zones, an initial assessment of wildfire risk in the City of Fullerton planning area was made following the methodology detailed below. The results are summarized in the tables and maps that follow.

The wildfire data was acquired from the CAL FIRE, Fire and Resource Assessment Program; the layer used was the Fire Hazard Severity Zones DRAFT, 9-2007, Very High zones in LRA. The City's parcel layer was used as the basis for the inventory of developed parcels. In some cases, there were parcels in multiple wildfire hazard zones. Due to this, GIS was used to overlay the wildfire layer with the parcel layer and where the wildfire hazard zone intersected a parcel boundary it was assigned that hazard zone for the entire parcel. The lower hazards were intersected first and given the fire hazard designation. Then sequentially after that where the higher fire hazard had precedence over the lower hazard designation. For purposes of this analysis, it was assumed that every parcel with an improved value greater than zero was developed in some way. Only improved parcels and the value of their improvements were analyzed. The parcels were segregated by property type and joined to the parcel layer by a simplified land use code as further detailed in Table 4.17.

As Figure 4.18 in Section 4.2.17 Wildfire illustrates, there is a significant fire hazard in the northwest and central portions of the City.

Values at Risk

Once the number of parcels and their values were determined, contents values were estimated (based on 50 percent of the assessed value) to determine total values at risk by hazard zone. Overlaying the fire hazard severity zone map with the City parcel layer, it is evident that the Fullerton planning area has assets at risk to wildfire as detailed in Table 4.45. According to this analysis, the City of Fullerton planning area has 2,227 improved parcels valued at roughly $1 billion in the Moderate to Very High Fire Hazard.

Table 4.45. The City of Fullerton's Values at Risk from Wildfire

Property Type	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
Urban Unzoned				
Commercial	861	743,043,173	371,521,587	1,114,564,760
Industrial	306	444,066,911	222,033,456	666,100,367
Miscellaneous	266	562,973,570	281,486,785	844,460,355
Residential	22,627	3,058,305,691	1,529,152,846	4,587,458,537
Rural	-	-	-	-
Total	**24,060**	**4,808,389,345**	**2,404,194,673**	**7,212,584,018**
Non-Wildland/Non-Urban				
Commercial	1	457,266	228,633	685,899
Industrial	-	-	-	-
Miscellaneous	-	-	-	-
Residential	79	2,958,925	1,479,463	4,438,388
Rural	-	-	-	-
Total	**80**	**3,416,191**	**1,708,096**	**5,124,287**
Moderate				
Commercial	14	8,692,240	4,346,120	13,038,360
Industrial	-	-	-	-
Miscellaneous	6	3,833,136	1,916,568	5,749,704
Residential	902	175,421,941	87,710,971	263,132,912
Rural	1	242,440	121,220	363,660
Total	**923**	**188,189,757**	**94,094,879**	**282,284,636**
High				
Commercial	24	119,370,588	59,685,294	179,055,882
Industrial	1	1,350,850	675,425	2,026,275
Miscellaneous	4	62,396,975	31,198,488	93,595,463
Residential	1,263	270,811,646	135,405,823	406,217,469
Rural	-	-	-	-
Total	**1,292**	**453,930,059**	**226,965,030**	**680,895,089**
Very High				
Commercial	4	4,584,307	2,292,154	6,876,461

Property Type	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
Industrial	-	-	-	-
Miscellaneous	4	2,548,859	1,274,430	3,823,289
Residential	4	267,052,737	133,526,369	400,579,106
Rural	-	-	-	-
Total	**12**	**274,185,903**	**137,092,952**	**411,278,855**
Grand Total	**26,367**	**5,728,111,255**	**2,864,055,628**	**8,592,166,883**

Source: City of Fullerton GIS; California Department of Forestry and Fire Protection

Populations at Risk

Wildfire risk is of greatest concern to populations residing in the moderate, high, and very high wildfire hazard zones. The City of Fullerton Census 2000 population data from HAZUS-MH, aggregated by census block, and GIS was used to estimate populations within the hazard zones. A proportional division was performed to account for parcels that were split by wildfire hazard class boundaries and to better model population counts in the hazard classes. For example, a census block that was split by a hazard class boundary (40 percent in high, 60 percent in moderate) had its "high" population attribute multiplied by .40 and its "moderate" population attribute multiplied by .60. Table 4.46 shows the population residing in each hazard zone.

Table 4.46. The City of Fullerton's Parcels at Risk to Wildfire

Fire Hazard Class	Population Ratio
Very High	4,358
High	3,323
Moderate	2,993
Non-Wildland/Non-Urban	40
Urban Unzoned	115,733
Total	126,446

Source: HAZUS-MH MR3 (Census 2000); California Department of Forestry and Fire Protection

Critical Facilities at Risk

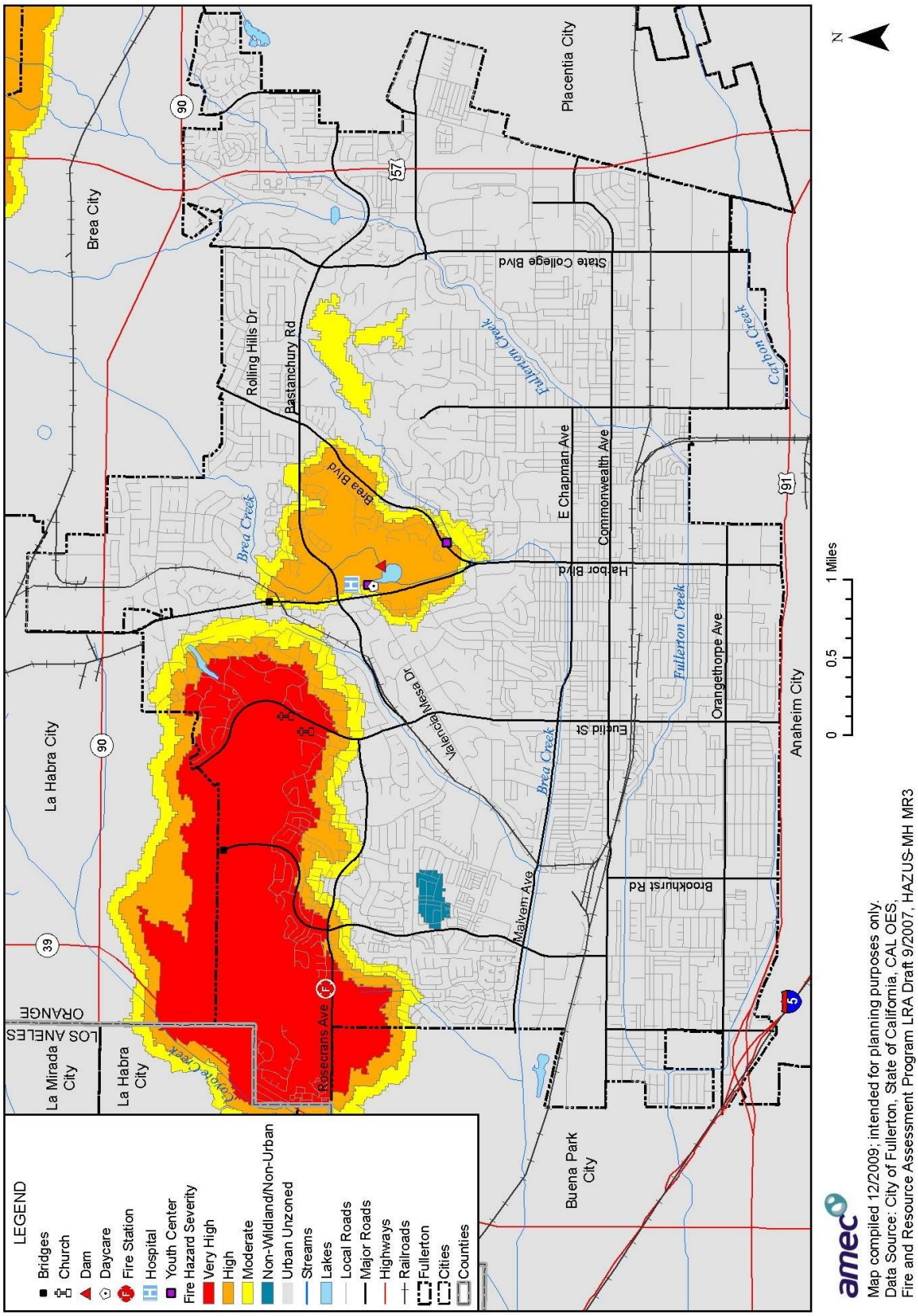
Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. An analysis was performed using GIS software to determine where critical facilities are located within wildfire threat zones. Only those facilities located in moderate, high, or very high risk areas are profiled. Figure 4.31 shows the critical facilities located in the City. Table 4.47 details the types of facilities. A detailed description of all of the critical facilities at risk is located in Appendix E in Table E.9.

Table 4.47. The City of Fullerton's Critical Facilities at Risk to Wildfire

Facility Type	Count
Very High	
Bridge	1
Church	2
Fire Station	1
Total	**4**
High	
Daycare	1
Hospital	1
Youth Center	2
Total	**4**
Moderate	
Bridge	1
Total	**1**
Total Facilities	**9**

Source: City of Fullerton GIS

Figure 4.31. The City of Fullerton's Critical Facilities at Risk to Wildfire



Historic, Cultural, and Natural Resources at Risk

The City of Fullerton planning area has substantial cultural and natural resources located throughout the City as previously described. Wildfires also cause watershed and ecosystem losses. These losses include impacts to water supplies and water quality as well as air quality. Another loss is to the aesthetic value of the area. Major fires that result in visible damage detract from that value. Other natural resources at risk from wildfire include recreation areas, wildlife and habitat areas, rangeland, and timber resources. The loss to these natural resources could be significant.

Development Trends

Population growth and development in the City of Fullerton is on the rise. However; since the City lies in an urban area and is almost built out, additional growth and development should not affect wildfire risk to the citizens of Fullerton. This coupled with increased fire prevention standards put in place by the Fullerton Fire Department for future developments mitigates wildfire risk.

Overall Community Impact

The overall impact to the community from a severe wildfire includes:

- Injury and loss of life;
- Commercial and residential structural damage;
- Decreased water quality in area watersheds;
- Decreased air quality to the region;
- Increase in post-fire hazards such as flooding, sedimentation, and mudslides;
- Damage to natural resource habitats and other resources;
- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents;
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures;
- Negative impact on commercial and residential property values;
- Loss of churches, which could severely impact the social fabric of the community;
- Loss of schools, which could severely impact the entire school system and disrupt families and teachers, as temporary facilities and relocations would likely be needed; and
- Impact on the overall mental health of the community.

Other Hazards

For the other hazards identified as significant in Section 4.2, information is provided here where the potential impacts could be developed or inferred. Losses and impacts cannot be tied to specific locations based on available information. To some extent, most of the planning hazard area is subject to these hazards. The following sections describe the vulnerability of the City of Fullerton planning area to drought and severe weather (heavy rain/thunderstorm/hail/lightning).

Vulnerability to Drought

Likelihood of Future Occurrence—Occasional
Vulnerability—Medium

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Based on historical information, the occurrence of drought in California, including the City of Fullerton, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability of the City of Fullerton to drought is City-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels.

Vulnerability to Severe Weather: Heavy Rain/Thunderstorm/Hail/Lightning

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

According to historical hazard data, severe weather is an annual occurrence in the City of Fullerton. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the City. Wind and lightning often accompany these storms and have caused damage in the past. However, actual damage associated with the primary effects of severe weather has been limited. It is the secondary hazards caused by weather, such as floods and fire that have had the greatest impact on the City. The risk and vulnerability associated with these secondary hazards are discussed in other sections.

Table 4.48. Summary of Hazard Vulnerability

Hazard	Likelihood of Future Occurrence	Vulnerability	Priority Hazard
Dam Failure	Occasional	High	Yes
Seismic Hazards			
Earthquake	Likely	High	Yes
Landslide	Occasional	Low	No
Liquefaction	Occasional	Medium	Yes
Flood			
100 year	Occasional	High	Yes
<100 year	Highly Likely	Medium	Yes
Drought	Occasional	Medium	Yes
Severe Weather: Heavy Rain/Thunderstorm/Hail/Lightning	Highly Likely	Medium	Yes
Wildfire	Highly Likely	High	Yes

4.4 The City of Fullerton's Mitigation Capabilities

Thus far, the planning process has identified the hazards posing a threat to the City of Fullerton and described, in general, the vulnerability of the City to these risks. The next step is to assess what loss prevention mechanisms are already in place. This part of the planning process is the mitigation capability assessment. Combining the risk assessment with the mitigation capability assessment results in the City's "net vulnerability" to disasters and more accurately focuses the goals, objectives, and proposed actions of this plan.

The HMPC used a two-step approach to conduct this assessment for the City. First, an inventory of common mitigation activities was made through the use of a matrix. The purpose of this effort was to identify policies and programs that were either in place, needed improvement, or could be undertaken, if deemed appropriate. Second, the HMPC reviewed existing policies, regulations, plans, and programs to determine if they contributed to reducing hazard-related losses or if they inadvertently contributed to increasing such losses.

This section presents the City of Fullerton's mitigation capabilities: programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. It also identifies select state and federal departments/agencies that can supplement the City's mitigation capabilities. This assessment is divided into three sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, and fiscal mitigation capabilities.

4.4.1 The City of Fullerton's Regulatory Mitigation Capabilities

Table 4.49 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Fullerton. Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more detail on existing mitigation capabilities.

Table 4.49. The City of Fullerton's Regulatory Mitigation Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	Yes	Update in progress – intend for the LHMP to be used to update hazard information/maps and natural hazard elements
Zoning ordinance	Yes	
Subdivision ordinance	Yes	
Growth management ordinance	No	
Floodplain ordinance	Yes	

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Other special purpose ordinance (e.g., stormwater, steep slope, wildfire)	Yes	Just adopted fire prevention – Ordinance 3129/Resolution 09-25: High Fire Hazard Severity Zone/Brush Clearance Ordinance
Building code	Yes	Version CBC 2007
Fire department ISO rating	Yes	Rating: 2
Erosion or sediment control program	Yes	
Stormwater management program	Yes	Fire department is responsible for commercial/industrial enforcement
Site Plan Review Requirements	Yes	Part of the planning process.
Capital improvements plan	Yes	
Economic development plan	Yes	
Local emergency operations plan	Yes	Currently under revision
Other special plans	Yes	In progress – Continuity of Operations Plan Hazardous Materials Area Plan
Flood insurance study or other engineering study for streams	Yes	Flood Insurance Study effective 12/03/2009
Elevation certificates	No	
Other	Yes	OC Animal Care – Shelter Annex

Source: HMPC Data Collection Guide

As indicated in the table above, The City of Fullerton has several plans and programs that guide the City's development in hazard-prone areas. Starting with the City of Fullerton General Plan, which is the most comprehensive of the City's plans when it comes to mitigation, some of these are described in more detail below.

The City of Fullerton General Plan

California State law requires each city to adopt of comprehensive, long-range plan for its physical development. City staff, elected officials and the community use the General Plan as a blueprint for future growth and development. The General Plan outlines goals, policies, and programs process and sets forth an implementation plan to guide future land use decisions.

The City of Fullerton General Plan is primarily comprised of the Plan itself and the supporting Environmental Impact Report Document. In July 2006, the City began the process of a comprehensive update to the 1996 General Plan. The General Plan Update will be organized into four master elements, each reflecting the basic fabric of the community: Physical, economic, social, and natural. Each pertains to The Fullerton Vision – Our City, Our Vision, and Our Guiding Principles – as approved by the City Council on February 17, 2009. Each master element and its requisite sub-elements are summarized below.

The Fullerton Built Environment (Physical)

The Fullerton Built Environment master element addresses the physical dimensions of the community's districts and neighborhoods, including the mobility connections and public infrastructure that occurs within and between them. The following sections will provide goals, policies, and actions requisite to achieve the Fullerton Vision:

- Community Development and Design
- Housing
- Historic Preservation
- Mobility
- Bicycle Transit and Recreation
- Growth Management
- Noise

The Fullerton Economy

The Fullerton Economy master element addresses the economic dimensions of the community that contribute to a prosperous quality of life for the residents, businesses, and other organizations within the City. The following sections will provide the goals, policies, and actions requisite to achieve the Fullerton Vision:

- Economic Development
- Redevelopment and Revitalization

The Fullerton Community (Social)

The Fullerton Community master element addresses the dimensions of the community that reinforce civic participation and contribute to a safe, healthful, and enriching quality of life for residents and visitors within the City. The following sections will ultimately provide the goals, policies, and actions requisite to achieve the Fullerton Vision:

- Public Safety
- Public Health
- Parks and Recreation
- Arts and Culture
- Education
- Community Involvement

The Fullerton Natural Environment

The Fullerton Natural Environment master element addresses the natural resources, open space, natural hazards, and related topics pertaining to the community's quality of life. The following sections will provide the goals, policies, and actions requisite to achieve the Fullerton Vision:

- Water

- Air Quality and Climate Change
- Integrated Waste Management
- Open Space
- Natural Resources
- Natural Hazards

Each of these elements contain community goals, policies and plans for implementation, many of which focus on reducing hazard impacts and mitigating the risk and vulnerability of the community to identified natural hazards. Since this Update is ongoing, the HMPC determined that it was premature to include mitigation related goals and policies from the Plan Update. The formal update to this LHMP will include a summary of Updated General Plan mitigation goals and policies from their new General Plan. It should be noted that the HMPC is closely coordinating the development of this LHMP with the General Plan Update, as well as the development of the Natural Hazards Element.

The City of Fullerton Ordinances

The following ordinances adopted by the City of Fullerton are among the most important tools for implementing the General Plan and/or are critical to the mitigation of hazards identified in this plan.

Disaster Organization (Title 2, Chapter 2.08)

The declared purposes of this chapter are to provide for the preparation and carrying out of plans for the protection of persons and property within the City in the event of an emergency; the direction of the emergency organization; and the coordination of the emergency functions of the County with all other public agencies, corporations, organizations, and affected private persons.

Health and Sanitation (Title 5)

This chapter delineates how food handling, solid waste, hazardous materials, and recycling are to be done in the City of Fullerton. Of particular interest to this plan are:

- Hazardous Materials Cleanup (*Chapter 5.25*)
- Underground Storage of Hazardous Materials (*Chapter 5.30*)
- Hazardous Materials Management (*Chapter 5.35*)

These sections of code fall under the jurisdiction of the City of Fullerton Fire Chief and the City of Fullerton Fire Department.

Water and Sewer Management (Title 12)

This chapter protects the City's important groundwater resources and establishes the Fullerton Municipal Water Utility.

Building Code (Title 14, Chapter 14.03)

This chapter adopts the California Building Code, including the appendices, as referenced, except as otherwise provided in the 2007 California Building Standards Code and the Uniform Building Code Standards.

Weed Abatement Ordinance (Title 13, Chapter 13.18)

The purpose of this ordinance is to reduce possible wildfire fuels provided by weeds and rubbish. All weeds and rubbish existing on or in front of any real property in the City, in such a condition as to be detrimental to the health, safety or welfare of the inhabitants of such property, or of any adjoining property, are hereby declared to be a public nuisance.

Fire Prevention Standards (Title 13, Chapter 13.19)

This chapter adopts fuel modification plans for the City of Fullerton. Fire hazard severity zones have been established and declared to be those areas designated by the State Director of Forestry and Fire Protection within the jurisdiction of the City. These zones include very high, high, and moderate fire hazard severity zones. Owners of property within fire hazard severity zones must comply with the Fire Department's Fire Prevention Standard on Fuel Modification Plans and Maintenance, as adopted by resolution by the City Council.

Protection areas may be designated by the Fire Department and adopted by resolution by the City Council. Owners of properties within protection areas, as identified by the Fire Chief or his or her designated representative, must comply with the Fire Department's Fire Prevention Standard on Brush Clearance, as adopted by resolution by the City Council. Any failure to comply with the requirements of this chapter that results in a fire hazard is hereby declared to be a public nuisance and subject to the provisions set forth in the public nuisance ordinance.

Fire Code (Title 13, Chapter 13.20)

This chapter adopts the California Fire Code as referenced in the 2007 California Fire Code.

Flood Hazard Areas (Title 14, Chapter 14.01)

It is the purpose of this chapter to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; and streets and bridges located in areas of special flood hazard;

- Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- Ensure that potential buyers are notified that property is in an area of special flood hazard; and
- Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

This chapter includes methods and provisions to:

- Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Control filling, grading, dredging, and other development that may increase flood damage; and
- Prevent or regulate the construction of flood barriers that will unnaturally divert floodwaters or that may increase flood hazards in other areas.

Requirements of this chapter apply to all new development, substantial improvements, minor improvements, and conversions of existing nonresidential structures to residential uses within flood hazard areas. Notably, it requires that a development permit be obtained before start of construction or beginning of development within any area of special flood hazard. It appoints the City Engineer to administer and implement the chapter by granting or denying development permit applications in accordance with its provisions.

This chapter addresses the following for construction in areas of special flood hazard:

- Standards of construction
- Standards for storage of materials and equipment
- Standards for utilities
- Standards for subdivisions
- Standards for manufactured homes and manufactured home parks and subdivision
- Provisions for floodway development

Subdivisions (Title 16)

The City of Fullerton's subdivision ordinance is deemed necessary to protect the public health, safety, and general welfare. It addresses orderly growth and development of the City; beneficial use of land in the public interest; and conservation, stabilization, and protection of property values and assures adequate provision for necessary utilities, public roads, and other public

conveniences in subdivided areas. The subdivision ordinance regulates the design and improvement of land divisions and the dedication of public improvements needed in connection with land divisions.

The City of Fullerton Zoning Ordinance (Title 15)

An official land use plan for the City of Fullerton is hereby adopted and established to serve the public health, safety, and general welfare and to provide the economic and social advantages resulting from any orderly planned use of land resources. The Zoning Ordinance implements the City's General Plan.

Open Space Zone

One of the zones created by the ordinance is the Open Space Zone (Section 15.27). The Open Space (O-S) zone is intended to permit and recognize areas within the City boundaries that provide for an aesthetic, recreational or environmental benefit to the community. The intent of the zone is to provide for permanent open space in the community by limiting development in areas which are so located, configured or possessed of such natural, geologic or wildlife resources that total development thereof would compromise the health, safety and general welfare of the community.

Uses in the Open Space (O-S) zone shall be limited to the following:

- Non-commercial agricultural uses.
- Flood control facilities.
- Public parks, playgrounds and recreational areas.
- Public educational facilities.
- Existing oil production facilities (when a long-term overall phasing plan to eliminate such facilities and convert to another use permitted by this chapter is submitted and on file).
- Installation of new oil wells or other oil field facilities more than 300 feet from a property with a residential zone classification, subject to approval by the Director of Development Services. The Director shall approve new facilities proposed within 150 feet of a wildlife habitat sub-zone only when a finding may be made that there will be no substantial adverse impact upon, and specifically no "take" of, the wildlife habitat. The Director's decision may be appealed to the Planning Commission pursuant to Chapter 15.76 of the City of Fullerton Municipal Code.

Public Land Zone

Another one of the zones created by this ordinance is the Public Land zone (Section 15.25). A Public Land (P-L) zone is established to identify land reserved for public purposes. Property with a Public Land (P-L) zone reflects the actual or planned use of such property for a public facility. Public land includes land, excluding designated rights-of-way such as public streets and alleys, flood control channels, and railroad lines, that is owned by the federal, state, county, or city

governments. The following uses are permitted in a Public Land (P-L) zone, subject to the provisions of this chapter:

- Flood control reservoir areas.
- Public parks and open space areas.
- Public educational facilities.
- Public buildings including administrative buildings, libraries, fire stations, reservoirs, and maintenance facilities.
- Public parking facilities.
- Public transportation facilities.
- Public golf courses.
- Other similar public facilities when in conformance with the purpose of this zone when recommended by the Director of Development Services, and approved by the City Council.

The following non-public uses or activities are permitted in a Public Land (P-L) zone when approved by and subject to conditions of the City Council:

- Commercial stables, subject to the development requirements, provisions and conditions of Subsection 15.55.030.C of this title.
- Open-air marketing activities including, but not limited to such activities as a cooperatively sponsored farmers market or swap meet.
- Commercial agricultural production and non-retail plant nursery operations.

Commercial Greenbelt Zone

The Commercial Greenbelt (C-G) zone is intended to be applied only to areas designated on the land use element of the Fullerton general plan as "Greenbelt Concept." The zone shall be used to identify property where, due to its scenic environment and proximity to residential areas, only restrictive commercial activities should be allowed to take place. The Commercial Greenbelt (C-G) zone shall require that proposed development consist of only highly aesthetic, unobtrusive buildings or structures and related improvements, blended into a heavily landscaped setting.

Oil-Gas Zone

Another one of the zones created by this ordinance is the Oil-Gas zone (Section 15.45). The Oil-Gas (O-G) zone is intended to provide for areas where present and future drilling for and production of oil, gas, and other hydrocarbon substances can be established and operate while establishing certain limitations on said oil drilling and production for the purpose of insuring their compatibility with present and future surrounding land uses.

Planned Residential Development Zone (Section 15.20)

The planned residential development zone (PRD) zone is intended to minimize grading and facilitate development in hillside and other areas, where achieving a higher unit density under the existing zoning and traditional development patterns would normally result in the loss of natural

terrain or other important site features. The height of the buildings shall be considered as part of the concept plan approval, subject to a maximum of two stories or 30 feet in height, except that a building constructed into hillside of greater than 20 percent slope may be a maximum of three stories or 40 feet in height.

Grading Ordinance (Title 16.05.040)

Drainage facilities shall be provided and installed as necessary to protect the lots, parcels, buildings or structures involved from flooding and to prevent excessive flooding of the public streets therein or abutting. The facilities shall be designed to prevent flooding of the first floor level, as defined by the Federal Insurance Administration from storm runoff emanating from a one hundred-year frequency storm. Public streets shall be protected from flooding from runoffs of a ten-year frequency storm, in accordance with policies and criteria determined by the City Engineer. Protection to higher levels may be required by the City Engineer, dependent upon the degree of flood risk involved, the topography, location, local drainage patterns, and the requirements of the Orange County Flood Control District. Hydrologic and hydraulic calculations and studies for all such facilities shall be subject to the review and approval, of the City Engineer.

All grading done in conjunction with the development of the tract or property concerned shall be performed in conformance with the City Building and Grading Code and with good engineering practices. On and off-site storm drain facilities and the site grading shall be so designed and constructed to prevent undue erosion of the site or off-site properties and to prevent excessive deposits of mud, silt or debris upon any public street or easement or within any channel, storm drain facility, swale or water course. Fees may be required as a condition of the final approval of a subdivision map, parcel map or the issuance of a building or use permit, for the purpose of defraying the actual or estimated costs of constructing planned drainage facilities for the removal of surface and storm drain waters from local or neighborhood drainage areas. The fee, if any, shall be set by the Council at the time of the approval of the development based upon the cost of the system required, the contributing drainage area and the flooding potential involved.

Erosion Control Ordinance (Title 14.03.190)

All fill and cut slopes in designated hillside areas which are determined by the Building Official to be subject to erosion shall be planted and irrigated with an irrigation system to promote the growth of ground cover plants to protect the slopes against erosion, as required in this section. The owner shall be responsible for planting and maintaining all slopes where such is required in this section. The protection for the slopes shall be installed as soon as practical and prior to calling for final approval. A landscaping and irrigation plan shall be submitted for approval with the grading plan.

Unreinforced Masonry Building Ordinance (Title 14.11.010)

The purpose of this chapter is to promote public safety and welfare by reducing the risk of death or injury that may result from the effects of earthquakes on unreinforced masonry bearing wall

buildings and multi-story in-fill unreinforced masonry buildings constructed prior to 1934. Such buildings have been widely recognized for sustaining life-hazardous damage, including partial or complete collapse during moderate to strong earthquakes.

All unreinforced masonry walls utilized to carry vertical loads and seismic forces parallel and perpendicular to the wall plane shall be tested as specified in this subsection. All masonry quality shall equal or exceed the minimum standards established herein or shall be removed and replaced by new materials. Alternate methods of testing may be approved by the Building Official. The quality of mortar in all masonry walls shall be determined by performing in-place shear tests or by testing eight-inch diameter cores. Alternative methods of testing may be approved by the Building Official. Nothing shall prevent pointing with mortar of all masonry wall joints before the tests are first made. Prior to any pointing the mortar joints must be raked and cleaned to remove loose and deteriorated mortar. Mortar for pointing shall be Type S or M except that masonry cements shall not be used. All preparation and mortar pointing shall be done under the continuous inspection of a Registered Deputy Building Inspector. At the conclusion of the inspection, the Inspector shall submit a written report to the licensed engineer and/or architect responsible for the seismic analysis of the building setting forth the result of the work inspected. Such report shall be submitted to the Building Official for approval as part of the structural analysis. All testing shall be performed in accordance with the requirements specified in this subsection by a testing agency approved by the Building Official. An accurate record shall be kept of all such tests and of their locations in the building, and these results shall be submitted to the Building Official for approval as part of the structural analysis.

City of Fullerton: Other Regulatory Mitigation Capabilities, Plans and Studies

Southern California Edison (SCE) Emergency Preparedness and Hazard Mitigation Planning

SCE is committed to providing reliable electric service to their customers. The company has an emergency preparedness program in place to address pre- and post-disaster planning needs. Additionally, the company has developed the necessary plans to allow it to communicate post-disaster with the jurisdictions served and, as necessary, to integrate its response with those jurisdictions. Finally, the company has assessed the vulnerability of their equipment to hazards and has taken steps to mitigate that vulnerability.

City of Fullerton's Urban Water Management Plan, 2005

The City of Fullerton's Urban Water Management Plan, 2005 (Plan) regards an adequate supply of water as an essential service to ensure public health and safety, community well being, and economic growth. Water supply goals of the City are as follows:

- Quality – to provide water to the customer that complies with State and Federally mandated water quality regulations;

- Reliability – to provide water service with minimum interruptions at acceptable pressures; and
- Efficient Operation – to operate the Water Utility at the lowest feasible cost.

Emergency Water Conservation Plan (EWCP)

The City passed Fullerton's EWCP on March 6, 1991. The purpose of the EWCP is to provide a permanent mechanism that allows the City to deal with extended water shortages in a timely and systematic manner. The EWCP provides procedures, rules, and regulations for mandatory water conservation that gain results while minimizing the effect of a water shortage on the City's water customers. It is helpful, that at a minimum, there will be sufficient supply of water available for domestic use, safety, and sanitation.

Water Supply Shortage Conservation Plan

The Fullerton City Council established Municipal Code Chapter 12.06, Water Supply Shortage Conservation Plan, to provide procedures, rules, and regulations for mandatory water conservation to minimize the effect of a water supply shortage emergency on the City's water customers.

Section 12.04, Water Regulations, of the Municipal Code, lists water regulations within the City of Fullerton. Section 12.06.090, Prohibited Uses of Water at All Times, lists prohibited uses of water. Section 12.06.100, Water Supply Shortage Phases, of the City's Municipal Code allows the City to implement a four phase water conservation program that may increase water rates, by an amount necessary, as determined by the City Council. The increase in water rates, which could average approximately up to 10 percent above the pre-water shortage rates for Phase I; up to 10 to 15 percent for Phase 2; up to 15 to 20 percent for Phase 3; and an increase in rates up to the City Council, in its sole discretion.

Orange County Emergency Plan Care and Shelter Annex

The purpose of this plan annex is to:

- Provide a written plan to prepare Orange County agencies (including the City of Fullerton) to manage and respond to a care and shelter incident that is a multi-disciplinary effort.
- Address operational area, county, city, state, special district, discipline specific, and mutual aid operations.

The care and shelter function has responsibilities and will function during all phases of an emergency, including establishing shelters when there is a potential for evacuation, but will be most effective in the emergency response and post emergency response/recovery phases. This plan will be put into place during major natural disasters addressed in this hazard mitigation plan.

Orange County Extreme Heat Plan

Administered by Orange County, the Extreme Heat Plan was developed to reduce the incidence of morbidity and mortality associated with local extreme heat events. Each jurisdiction or County agency with a responsibility for a population is tasked with outreach in their respective area before, during, and after an extreme heat event. The plan describes County, as well as local jurisdictional (including Fullerton), operations during heat-related emergencies and provides guidance for City departments and personnel.

City of Fullerton Drainage Master Plan

Within a community which is almost fully developed and is either experiencing periodic flooding or has the potential for further development and re-development, (and therefore an increased demand on the capacity of the existing flood control system), it is important for the safety and well being of the members of the community to develop a master plan of drainage. This City of Fullerton Drainage Master Plan enables the community to develop an efficient network of flood control facilities and provides a basis for establishing funding mechanisms and prioritizing system improvements.

4.4.2 The City of Fullerton's Administrative/Technical Mitigation Capabilities

Table 4.50 identifies the City personnel responsible for activities related to mitigation and loss prevention in The City of Fullerton.

Table 4.50. The City of Fullerton's Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Y	Director Community Development (Community Development)
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Y	Chief Building Official (Community Development) City Engineer (Engineering)
Planner/engineer/scientist with an understanding of natural hazards	Y	Director Community Development Chief Building Official (Community Development) City Engineer (Engineering)
Personnel skilled in GIS	Y	GIS Specialist (Community Development)
Full-time building official	Y	Chief Building Official (Community Development)
Floodplain manager	Y	Senior Civil Engineer
Emergency manager	Y	Fire Marshall/Division Chief (Fire Department)
Grant Writer	Y	Typically use outside consultants

Personnel Resources	Yes/No	Department/Position
GIS data—Hazard areas	Y	GIS Specialist (Community Development)
GIS data—Critical facilities	Y	GIS Specialist (Community Development)
GIS data—Building footprints	Y	GIS Specialist (Community Development)
GIS data—Land use	Y	GIS Specialist (Community Development)
GIS data—Assessor's data	Y	GIS Specialist (Community Development)
Warning Systems/Service (Reverse 911, cable override, outdoor warning signals)	Y	Alert OC – A City-wide mass notification system: Reverse 911 City cable channel

Source: HMPC Data Collection Guide

City Administrative Office

The Administrative Services Department provides an extensive number of financial and other services to both City departments and citizens of the community. The department is comprised of seven primary programs:

Administration

Administration is responsible for management of the department's divisions and coordination with other City departments. It establishes policies and procedures for the overall direction of the department

Fiscal Services

Fiscal Services includes both the Budget and Accounting functions, including Payroll, Accounts Payable/Receivable, General Accounting Services, and coordinating the preparation of the City's two-year budget. Fiscal Services is also responsible for the preparation of the City's Comprehensive Annual Financial Report, the Budget which represents the City's detailed financial management plan, the Annual Report of the Redevelopment Agency, and a number of other reports to federal, state, and county governments.

Information Technology (IT)

IT is responsible for the administration and operation of the City's management information systems and resources. This program oversees the day-to-day operations of the City's computer center, maintenance and support of software applications, training and support of personal computers, central computer and network server maintenance, and planning for future system/software resource requirements in the City.

Legal Services

The City contracts for City Attorney services, and this program provides for the administration of the contract and serves as the cost center for City Attorney services. The City Attorney cannot provide legal advice to private citizens.

Purchasing

Purchasing provides a wide range of services which support the operating needs of City departments, including contracting for supplies, equipment, and services at competitive costs. Reprographic and mail services for City departments are also the responsibility of this program.

Refuse Collection (contract administration)

The City has an exclusive franchise with MG Disposal for collection of residential and commercial rubbish. Since July 1994, all rubbish has been delivered to Taormina Industries for processing at their Material Recovery Facility to comply with the 50% diversion goals mandated by the state of California in AB 939. Residential pickup is weekly, with special pickups available for bulky items. Effective July 1, 1999, the City entered into a new ten-year contract with MG Disposal and amended its contract with Taormina Industries. MG was continue to provide refuse collection and disposal services to the City until June 30, 2009. A new contract signed in 2009 extends this exclusive franchise. As part of the terms of the contracts, City residents now receive a green waste program at no cost for the life of the contracts. In addition, the City receives a franchise fee from the hauler.

Revenue & Utility Services

The primary Revenue responsibilities are investment of City and Redevelopment Agency monies; establishment and maintenance of banking/broker relationships and accounts; administration of the Business Registration Program; and the collection of the transient occupancy taxes, oil extraction taxes, and airport fixed-based operator (FBO) leases, including other revenue-producing contracts. The state-mandated (SB 90) cost reimbursement program is also part of the division.

The primary Utility Services responsibilities are administration of the City wide water accounts including customer service, meter reading, billing and collection; management of the franchise agreements for refuse, gas, and electricity; centralized cashiering. The division also handles the paramedic subscription and donation programs.

The City of Fullerton Maintenance Services Department

The Maintenance Services Department protects the investment the community has made in its infrastructure - the streets, buildings, parks, and other facilities that belong to all Fullerton residents. Maintenance Services is responsible for a wide range of functions, including maintaining the City's automotive equipment, sidewalks, buildings, landscapes, parks, trees, streets, sewers, streetlights, graffiti removal, and the maintenance and operation of the water system.

The City of Fullerton Engineering Department

The Engineering Department provides administration, design, and construction management for the City’s Capital Improvement Program (CIP). This responsibility also includes deficiency

surveys of the existing infrastructure system, coordination of CIP projects with other City departments, and administration of several special funding sources, such as Measure M, Gas Tax, and Sanitation funds.

The Engineering Department contributes to mitigation of the flood hazard. Engineering performs floodplain administration including maintaining FEMA Flood Insurance Rate Maps (FIRM); providing flood depth for special flood hazard areas to property owners, developers, and potential buyers; amending the FIRM (modifying flood areas) in accordance with FEMA LOMA/LOMR process. The flood depth serves as a vase for establishing a Finish Floor Elevation (FFE) for new construction.

The Engineering Department developed a Master Drainage Plan (mentioned earlier) that identifies storm drain system deficiencies. Based on hydrology and hydraulic studies, storm drain improvements are proposed in various areas throughout the City. Currently, a number of deficiencies are still present due to the feasibility and/or budget constraints. The Plan, the condition of existing storm drain system, public and private flooding incident data dictate the priorities for including storm drain improvements in the 5-year Capital Improvement Program.

The scope of proposed storm drain improvements depends on funding availability and may vary from small miscellaneous repairs of existing storm drains to the installation of new storm drain mains. The most recent significant storm drain improvements include installation of new storm improvements on Titan Drive between Hermosa and Las Palmas and on Lawrence Avenue between Commonwealth and the Balcom Channel. These projects will improve the drainage of nearby streets, street intersections, and adjacent private properties.

The Engineering Department reviews and provides conditions of approval for private development projects which also assist in mitigation potential flood hazards. Development projects are analyzed in view of their potential impacts on public infrastructure and surrounding properties. If impacts are identified, developments are conditioned by installing on-site drainage systems, utilizing best management practices (BMP) for reducing the intensity and volume of storm water flow, and, if necessary, constructing new public storm drain improvements.

Community Development

The Community Development Department assists residents, businesses and others with their efforts to grow within our community in a safe, orderly and healthful manner that respects Fullerton's heritage while sustaining opportunity for present and future generations. All of the services provided by the Community Development Department are designed to ensure orderly and safe development within the City and provide for future growth. The department administers and enforces the City’s Zoning Ordinance, General Plan, and adopted Building Codes. Permit issuance, plan checking, and construction inspection services are provided. The Department includes four divisions, including the Building, Community Preservation, Planning, and Housing.

Building and Safety Division

The Building and Safety Division includes Plan Check, Permit Services, and Inspection Services. The Plan Check section reviews construction plans to ensure compliance with applicable building and safety codes. This section is also responsible for implementation of the City's earthquake building safety programs. The Permit Services section is responsible for issuing construction permits and routing plans through the plan check process. The Inspection Services section inspects construction projects at various stages to ensure field compliance with the approved plans.

Community Preservation

The purpose of this division is to promote and maintain a safe and desirable living, and working environment within the City of Fullerton. The Community Preservation Division enforces regulations related to the following:

- Conditions of an existing structure that constitutes a clear and present danger to the public
- Construction without appropriate building permits
- Violations of the Fullerton Municipal Code
- Land use requirements
- Weeds on private property
- Signs
  - Signs must be placed on private property, with the consent of the property owner. Signs may not be on public property (utility poles, street lights, parks, parkways, etc.).
  - A sign relating to or identifying a function sponsored by a public agency or non-profit organization, provided that the sign is not installed any earlier than 30 days prior to the event and is removed within three days after the event.
- Inoperable and abandoned vehicles on private property
- Trash cans stored in public view
- Blight on private properties (Old furniture, car parts, appliances, etc.)
- Lawn Parking
- Property Maintenance issues

Planning Division

The purpose of this division is to promote and maintain a safe and desirable living, and working environment within the City of Fullerton. The Planning Division handles matters related to building and zoning. The Planning Division enforces regulations related to the following:

- The City of Fullerton Zoning Code
- The City of Fullerton Landscape Ordinance

In addition, the Planning Division handles the following applications

- Application for Abandonment

- Application for Appeal of Decision
- Application for Conditional Use Permit
- Application for Development Project Review and ARUP
- Application for General Plan Revision
- Application for Landmark Property Project
- Application for Planned Residential Development
- Application for Security Fencing Plan Review
- Application for Specific Plan
- Application for Tentative Tract of Parcel Map
- Application for Variance
- Application for Zoning Amendment
- Application to Revert Subdivided Land

The City of Fullerton Planning Division also is charged with the creation of plan documents for the City. These documents include:

- Airport Master Plan
- The City of Fullerton General Plan

Fire Department

The Fullerton Fire Department provides a variety of programs designed to protect the lives and property of the inhabitants of the City of Fullerton from the adverse effects of fires, sudden medical emergencies, or exposure to dangerous conditions. The department is composed of three sections; Administration, Operations/Training, and the Fire Prevention Division.

Administration

Administration is responsible for the overall coordination and direction of the department. Additionally, Administration oversees the City's disaster preparedness plan.

Operations/Training

Operations/Training is responsible for providing continuous service for fire control and suppression, rescue, and medical aid, and the Paramedic Subscription Program. Operations/Training also provides emergency response for controlling Hazardous Materials Incidents. Operations/Training is responsible for providing: state and federally mandated training, ongoing continuing education related to hazardous materials, Emergency Medical Technician (EMT) and paramedic recertification. Additionally, the training function includes updating personnel in new technologies and methodologies to ensure preparedness for the broad range of situations to which the Fire Department responds.

Fire Prevention Division

The Fire Prevention Division conducts ongoing inspections for the purpose of life safety, reduction in property loss, weed and rubbish abatement, and the enforcement of federal, state and local fire regulations. The Fire Prevention Division is also responsible for determining fire cause and investigating suspicious fires. The Fire Prevention Division conducts inspections related to hazardous materials and underground storage tank regulations.

Police Department

The Fullerton Police Department is charged with the enforcement of local, state, and federal laws, and with providing around-the-clock protection of the lives and property of the public. The Police Department functions both as an instrument of public service and as a tool for the distribution of information, guidance and direction.

It is the mission of the Police Department to facilitate and administer the laws of governing bodies, the orders of the courts, and to direct all energies and resources toward maintaining the health, welfare and safety of citizens.

The City of Fullerton Public Library

The City of Fullerton Public Library provides collections and services through its Main Library, Hunt branch, and book mobile to citizens of Fullerton, as well as all California residents. The Library is governed by the Library Board of Trustees who are appointed by the Fullerton City Council. The library is an excellent resource for information about hazards and emergency preparedness.

The City of Fullerton Commissions and Committees

There are a number of local boards, commissions, and committees in The City of Fullerton. Those that have responsibilities related to hazard mitigation are described briefly below.

- **City Lights SRO Committee**—This committee is responsible for reviewing the operation and maintenance of the single room occupancy apartments at 224 E. Commonwealth Avenue and to report the committee's observations and recommendations to the Redevelopment Agency.
- **Community Development Citizens Committee**—This committee provides input on the development, implementation, and evaluation of the Community Development Block Grant Program. The committee also reviews and makes recommendations to the City Council on issues relating to housing needs, community development program priorities, and proposed expenditures.
- **Energy and Resource Management**—The committee acts as an advisory body to the City Council on matters relating to energy and resource recovery.

- **General Plan Advisory Committee**—The General Plan Advisory Committee (GPAC) will have the responsibility of reviewing General Plan goals and objectives during the General Plan Update process
- **Planning Commission**—This commission makes recommendations to the Council for the regulation of future growth, development and beautification of the City in relation to its public buildings, streets, grounds, and vacant lots; to study, prepare and recommend a master or general plan or amendment thereto for the physical development of Fullerton and any land abutting its boundaries; and to review the Capital Improvement Program as it relates to the General Plan.
  - **Redevelopment Design Review**—This committee advises the Planning Commission on matters relating to physical design including architecture, site design, signs, and landscaping for all major development projects on properties in the redevelopment areas. It also has the authority to approve or disapprove minor development projects.

Orange County and Regional Programs

Municipal Water District of Orange County

The Municipal Water District of Orange County (MWDOC) is dedicated to ensuring water reliability for the communities we serve. Some 28 retail water agencies and cities (including Fullerton) rely on MWDOC for the imported water -- supplies from Northern California and the Colorado River -- MWDOC provides their customers. Approximately half of Orange County's water supply is imported. These countywide water utilities, known as MWDOC client agencies, also rely on the Municipal Water District to represent their interests on federal, state and regional levels. MWDOC is a member of the Metropolitan Water District of Southern California (MET), which supplies imported water to six Southern California counties. As a MET member, MWDOC represents the interests of its 28 Orange County client agencies.

Residential water use surveys, the ultra low-flush toilet rebate program, the landscape certification program and the ET (outdoor irrigation system) rebate program are just some of MWDOC's ongoing efforts to help maximize our water resources. These programs help save more than 2.9 billion gallons of water each year - water that can be used to meet increasing demands without developing new supplies. The Municipal Water District of Orange County, headquartered in Fountain Valley, is governed by an elected seven-member Board of Directors, each Board member representing a specific area of the County.

Orange County Water District (OCWD)

OCWD, a client of MWDOC, operates a system of diversion structures and recharge basins along the Santa Ana River (SAR) that capture most of the storm runoff as well as reclaimed water from reclamation facilities in Riverside and San Bernardino counties. Reclamation programs in the upper SAR watershed could reduce SAR base flows and impact the amount of water captured and spread in Orange County. Based on projections by the Santa Ana Watershed Project Authority (SAWPA), wastewater discharges to the SAR are expected to increase from

the 170,000 AFY in 2002 to over 240,000 AFY in 2025. The water, which would otherwise flow into the Pacific Ocean, is allowed to percolate into the underlying aquifers and is later pumped for local use.

OCWD has many ongoing projects, such as the Groundwater Replenishment System (GWR System), aimed at increased recharge of Santa Ana River flows, and expanded recycling of wastewater and additional well head treatment. The projects will reduce Fullerton and other OCWD member's needs for imported water.

The Orange County Vector Control District

The Orange County Vector Control District (OCVCD) is a special district and is one of over 100 agencies statewide specifically dedicated to protecting public health by controlling rats, flies, mosquitoes, fire ants, and other vector related problems. As mentioned in Section 4.2.12, the City of Fullerton contracts with the OCVCD to control mosquitoes and West Nile Virus.

The District was formed in 1947, originally as the Orange County Mosquito Abatement District, in accordance with local authority provided by the Mosquito Abatement Act of 1915 and further supported by the California Health and Safety Codes. The District was responsible for protecting the growing population of Orange County from mosquitoes and mosquito-born diseases. In 1975, the Orange County Board of Supervisors conducted an efficiency study that concluded that the District could effectively assume the responsibility for comprehensive vector control. Consequently, fly and rat control, formerly part of the Orange County Health Department, was transferred to the District. At that time the name of the District was changed to the Orange County Vector Control District. In 2004, the District reestablished a Red Imported Fire Ant program after the State quit funding the program they had established in 2000.

Orange County Flood Control Division

The Flood Control Division is tasked with the ultimate goal of protecting Orange County from the threat of floods by designing and constructing channels, storm drains, dams, pump stations and other drainage-related facilities. The Flood Control Programs section is comprised of four sub-sections (Advance Planning, Programming, Development Support, and Hydrology) whose primary function is managing the County's floodplains. This section provides development support to developers and other agencies and manages the Flood Control Capital Improvement Program. The Flood Control Division assists in managing the floodplain in the City of Fullerton.

Orange County Sanitation District

The Orange County Sanitation District (OCSD) operates the third largest wastewater agency west of the Mississippi River. For over 50 years, it has safely collected, treated, and disposed of and or reclaimed the wastewater generated by 2.5 million people living and working in central and northwestern Orange County, including the City of Fullerton. OCSD facilities include 580 miles of sewer pipes that snake throughout the county and two treatment plants – one in Fountain

Valley and the other in Huntington Beach – where wastewater is treated in accordance with strict state and federal standards 24 hours-a-day.

Santa Ana Regional Water Quality Control Board

Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Water Quality Order 99-08-DWQ expired August 19, 2004 but remains in effect until a new General Permit is adopted. There is currently a 2009 Draft National Pollutant Discharge Elimination System (NPDES) Construction General Permit in the process of being adopted, which would replace the 99-08-DWQ. Construction activity subject to this permit includes demolition, clearing, grading and disturbances to the ground such as stockpiling, or excavation. The Construction General Permit requires development and implementation of a storm water pollution prevention plan (SWPPP). The SWPPP must list BMPs the discharger would use to protect stormwater runoff and the placement of those BMPs. Section A of the Construction General Permit describes the elements that must be contained in a SWPPP. The Construction General Permit requirements must be satisfied prior to beginning construction.

State and Federal Programs

A number of state and federal programs exist to provide technical and financial assistance to local communities for hazard mitigation. Some of the primary agencies/departments that are closely involved with local governments in the administration of these programs include:

- California Emergency Management Agency
  - State of California Multi-Hazard Mitigation Plan
- California Department of Water Resources (Southern District)
- California Department of Forestry and Fire Protection (Contracted through Orange County)
- California Department of Fish and Game
- California Department of Transportation (Caltrans)
- California Highway Patrol
- California State Parks and Recreation Department
- California State Lands Commission
- Federal Emergency Management Agency (Region IX)
- U.S. Army Corps of Engineers
- Bureau of Reclamation (Southern California Area Office)
- USDA Forest Service (Pacific Southwest Region)
- National Parks Service (Pacific West Region)
- USDA Natural Resources Conservation Service (Riverside Service Center)
- U.S. Environmental Protection Agency (Region IX)
- American Red Cross

4.4.3 The City of Fullerton's Fiscal Mitigation Capabilities

Table 4.51 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table 4.51. The City of Fullerton's Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Yes	
Capital improvements project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric services	Yes	
Impact fees for new development	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Incur debt through private activities	Yes	
Withhold spending in hazard prone areas	No	

Source: HMPC Data Collection Guide

4.4.4 Mitigation Outreach and Partnerships

The City of Fullerton works cooperatively and has many mutual aid agreements in place with various federal, state, and local agencies, groups, and districts. Examples include:

- Southern California Edison partners with the City of Fullerton Maintenance Services Department to trim trees for line clearance as a safeguard against power outages. This tree trimming also mitigates possible wildfire from limbs touching power lines. Trees can burn, dropping hot embers onto the ground, which can potentially spark wildfires.

4.4.5 Other Mitigation Capabilities

The City has many completed, planned and ongoing projects and programs focused on minimizing future losses associated with identified hazards. Many of these projects are sponsored and implemented by one or more City departments and/or other state and local agencies and organizations. These projects and programs include those listed below in this section.

All Hazard

- Public Outreach - City's home page as Emergency

- Preparedness Link - please see items under link for further information - slot of good info here http://www.cityoffullerton.com/depts/fire/emergency_preparedness/default.asp
- Mutual Aid Agreements - Police and Fire
- Cross-jurisdictional training - Police and Fire
- Reverse 9-1-1 System
- City cable channel
- Facebook, Twitter, RSS feeds
- COOP Plan
- Evacuation Plan
- CERT (see website link above)
- Disaster Supply Kit (see website link above)
- Outreach to schools and afterschool programs by Police and Fire
- Search and rescue team

Flood

- Flood Ordinance
- Stormwater Management Ordinances
- Erosion Control Ordinance
- Participation in regional watershed efforts

Landslide

- Building Codes
- Drainage Control Regulations
- Grading Ordinances
- Hillside Development Ordinances
- Subdivision Ordinances
- Sanitary System Codes
- Erosion Control Ordinance
- Slope Stabilization Improvements - Brea Blvd

Severe Weather

- Utility Underground Ordinance

Extreme Temperature

- Heating and Cooling Centers
- County Plan (previously provided to Jeanine from Fire Department)

Subsidence

- Building Codes

Earthquake

- Unreinforced Masonry Building Ordinance - 1991 - all buildings reinforced except 1 Tiltup Concrete Building Constructed prior to 1971 - all buildings reinforced City Hall, Police Department & Jail retrofitted with FEMA funds
- Building Codes

Drought

- Water Supply Shortage Convervation Plan
- Landscape Ordinance
- Water Regulations
- Water Quality Ordinance
- Building Code/Plumbing Code

Wildfire

- Fuel Modification Zones
- Weed Abatement
- Fire Prevention Standards
- Building Code/Fire Code

Structure Fires

- Building Code/Fire Code

Hazardous Materials

- Registry with Fire Department
- Building Code/Fire Code
- Participate in County disposal program for residential household hazardous waste to encourage proper
- Fire - Trained responders to low level hazardous materials incidents
- Party to JPA for hazardous materials response which provides level one haz mat response team with one phone call

Public Health

- Pandemic vaccine distribution points

City of Fullerton, Water Conservation Program

The City of Fullerton recognizes water conservation as a priority in its water use planning. The long-term goal of the City's water conservation program is to achieve and maintain water use efficiency in the City's service area. Objectives for achieving this goal include the following as detailed in the Urban Water Management Plan:

- Elimination of wasteful practices in water use;
- Continued development of information on both current and potential water conservation practices;
- Ongoing implementation of conservation practices.

The list below summarizes the water conservation, water management activities, and distribution system management that have historically and/or currently being implemented by the City of Fullerton. More information regarding each list point may be found in the Urban Water Management Plan, City of Fullerton, dated 2005.

- Education and Public Information
  - Films and Videos
  - School Programs
  - Information Brochures
  - Billing
  - Press Releases
  - Speakers Bureau
  - Water Awareness Month and the Fullerton Market
  - Cable TV Messages
  - Tours
  - Awards and Recognition
- Promotional Measures
  - Water Conservation Kits
  - Work with Other Agencies
    - State Agencies
    - Other Organizations
  - Demonstration of Low- Water-Using Landscapes
  - Landscape Classes
- Distribution System Management
  - Water Audit
  - Meter Program
  - Corrosion Control
  - Valve Maintenance
  - Leak Detection Program
  - Pipeline Replacement
- Water Management
  - Advisory Committee
  - Pricing
  - Landscape Ordinance
  - City's General Plan

The BMPs that have, and are being employed by the City, as identified below, are generally thought of as conservation practices that are established and considered to be cost effective. The two groups that created these BMPs were comprised of various interest group representatives meeting to reach a consensus on a process to resolve the water conservation issues for the Bay/Delta hearings. Under the BMP process, participating urban water suppliers would agree to use "good faith efforts" to implement proven water conservation measures, and study additional conservation measures, implementing those that prove to be effective. In return for this commitment, participating environmental organizations would agree to recommend to the State Water Regional Control Board (SWRCB) that implementing the BMP process is a sufficient water conservation program and the SWRCB should use only reliable estimates of conservation savings for the agreed-upon BMPs in its water rights decisions for the Bay/Delta hearings. Other significant advantages of implementation of the BMPs will be the increased reliability of water supplies to the southern California area.

The City of Fullerton became a signatory to the agreement in January 1996. One of the City's obligations as a signatory to the MOU is to submit a Best Management Practices Retail Water Agency Report Filing (report) to the California Urban Water Conservation Council (CUWCC). The MOU established the CUWCC to monitor implementation of the BMPs. The report to the CUWCC details the City's progress in implementing the 14 BMPs as currently specified in the MOU:

1) Residential Water Surveys
2) Residential Plumbing Retrofits
3) System Water Audits, Leak Detection
4) Metering and Commodity Rates
5) Large Landscape Audits
6) High Efficiency Washing Machines
7) Public Information
8) School Education
9) Commercial, Industrial, and Institutional
10) Wholesale Agency Assistance
11) Conservation Pricing
12) Conservation Coordinator
13) Water Waste Prohibition
14) Residential ULFT Replacements

More detailed information related to these BMPs may be found in the Urban Water Management Plan, City of Fullerton, dated 2005.

Community Emergency Response Team (CERT)

The City of Fullerton offers the CERT program. The CERT program educates people about disaster preparedness for hazards that may impact their area and trains them in basic disaster

response skills such as fire safety, basic search and rescue, disaster medical operations, and fire safety. Using the training learned in the classroom and during exercises, CERT members can assist others in their neighborhoods or workplaces following an event when professional responders are not immediately available to help. CERT members are also encouraged to support emergency response agencies by taking a more active role in emergency preparedness projects within their community.

In addition to the above, the City of Fullerton has the following mitigation capabilities:

- All City facilities have evacuation and disaster plans
- The City maintains a fully operational Emergency Operations Center
- The Fullerton Fire Department offers educational programs in:
  - Responsible water use;
  - Earthquake and fire safety;
  - Household preparedness; and
  - Environmental education.
- All local school districts have disaster plans and training.

Past Mitigation Projects

Water Main Replacement Program

The Water Main Replacement program is part of a continuing effort to repair deteriorated infrastructure and providing safe and reliable source of water for Fullerton's citizens. The City has replaced 1.5 miles of pipeline each fiscal year. The locations were determined from a list compiled by the Engineering and Maintenance Services departments. Besides the water main replacement program the City has rehabilitated other infrastructure such as reservoirs and pump stations on an as needed basis.

Storm Drain Improvements

The most recent significant storm drain improvements include installation of new storm improvements on Titan Drive between Hermosa and Las Palmas and on Lawrence Avenue between Commonwealth and the Balcom Channel. These projects will improve the drainage of nearby streets, street intersections, and adjacent private properties.

Street and Sewer Improvements

The City has maintained 5 year street rehabilitation plans for paving and reconstructing arterial streets. The plan was generated with the aid of a sophisticated Pavement Management System developed by the Metropolitan Transportation Commission. Residential street reconstruction has been done in conjunction with sewer replacement projects. Streets that have been scheduled for sewer replacement have been evaluated for street reconstruction or rehabilitation.

Unreinforced Masonry Ordinance

The City passed an Unreinforced Masonry (URM) Building Ordinance in 1991. Since then, all URM buildings in the City, except one tiltup concrete building constructed prior to 1971, have been reinforced. This includes the City Hall, Police Department, and City Jail that were all retrofitted with FEMA funds.

5 MITIGATION STRATEGY

Requirement §201.6(c)(3): [The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section describes the mitigation strategy process and mitigation action plan for the City of Fullerton Hazard Mitigation Plan. It describes how the City met the requirements for the following from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

5.1 Mitigation Strategy: Overview

The results of the planning process, the risk assessment, the goal setting, the identification of mitigation actions, and the hard work of the HMPC led to the action plan in Section 5.4 Mitigation Action Plan. Taking all of the above into consideration, the HMPC developed the following overall mitigation strategy:

- **Communicate** the hazard information collected and analyzed through this planning process as well as HMPC success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- **Implement** the action plan recommendations of this plan.
- **Use** existing rules, regulations, policies, and procedures already in existence. Given the flood hazard in the planning area, an emphasis should be placed on continued compliance with the National Flood Insurance Program.
- **Monitor** multi-objective management opportunities so that funding opportunities may be shared and packaged and broader constituent support may be garnered.

5.1.1 Continued Compliance with NFIP

Given the flood hazard in the planning area, an emphasis will be place on continued compliance with the National Flood Insurance Program (NFIP). Detailed below is a summary description of the City of Fullerton's flood management program to ensure continued compliance with the NFIP.

City of Fullerton's Flood Management Program

The City of Fullerton has participated in the Regular Phase of the NFIP since 1977. Since then, the City has administered floodplain management regulations that meet the minimum requirements of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country. The City most recently updated their flood zone development ordinance in 2009 to reflect the current status of Special Flood Hazard Areas (SFHA) that exist within the community.

The Community Rating System (CRS) was created in 1990. It is designed to recognize floodplain management activities that are above and beyond the NFIP's minimum requirements. If a community implements public information, mapping, regulatory, loss reduction and/or flood preparedness activities and submits the appropriate documentation to the FEMA, then its residents can qualify for a flood insurance premium rate reduction. The City of Fullerton will evaluate the overall value of joining CRS in the future during the implementation phase of this LHMP.

Presently, the City of Fullerton manages its floodplains in compliance with NFIP requirements and implements a floodplain management program designed to protect the people and property of the City. These floodplain management activities implemented by the City include:

Public Information Activities

The City of Fullerton conducts a variety of public information and outreach activities which include providing map information services, public outreach programs, hazard disclosure, and flood protection information and assistance.

Mapping and Regulatory Activities

The City of Fullerton implements a variety of mapping and regulatory activities that apply to both existing and new development. These activities include maintaining current flood maps and data for the City and implementing a Citywide stormwater management program.

Flood Damage Reduction Activities

The City takes a proactive approach to flood damage reduction on the existing built environment. Flood damage reduction activities undertaken by the City include, development of a comprehensive floodplain management plan, as part of this LHMP and their Stormwater Management Plan: implementing flood protection measures for existing structures, and maintaining drainage systems.

As a result of implementing the floodplain management activities described above, the City's current floodplain management program provides multiple benefits to the community:

- Enhanced public safety;
- A reduction in damage to property and public infrastructure;

- Avoidance of economic disruption and losses;
- Reduction of impacts and losses; and
- Protection of the environment.

5.2 Goals and Objectives

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Up to this point in the planning process, the HMPC has organized resources, assessed hazards and risks, and documented mitigation capabilities. The resulting goals, objectives, and mitigation actions were developed based on these tasks. The HMPC held a series of meetings and exercises designed to achieve a collaborative mitigation strategy as described further throughout this section.

During the initial goal-setting meeting, the HMPC reviewed the results of the hazard identification, vulnerability assessment, and capability assessment with the HMPC. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPC to formulate planning goals and objectives and the ultimate mitigation strategy for the City of Fullerton planning area.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community;
- Encompass all aspects of community, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- Are time-independent, in that they are not scheduled events.

Goals are stated without regard to implementation. Implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used as means to achieve the goals. Objectives (policies) define strategies to attain the goals and are more specific and measurable.

HMPC members were given a list of sample goals to consider. They were told that they could use, combine, or revise the statements provided or develop new ones, keeping the risk assessment in mind. Each member was each given three index cards and asked to write a goal statement on each card. Goal statements were collected and grouped into similar themes and pasted onto the wall of the meeting room. The goal statements were then grouped into similar topics. New goals from the HMPC were discussed until the team came to consensus. Some of the statements were determined to be better suited as objectives or actual mitigation actions and were

set aside for later use. Next, the HMPC developed objectives that summarized strategies to achieve each goal.

Based on the risk assessment review and goal setting process, the HMPC identified the following goals and policies, which provide the direction for reducing future hazard-related losses within the City of Fullerton planning area.

GOAL 1: Protection of People, Natural and Built Environments and Economy from Natural Hazards

- Policies:
  - General: Identify the natural hazards to which people, natural and built environments and the economy are at risk; assess the potential impacts of those hazards; develop goals and strategies to reduce impacts; and prioritize and implement those mitigation strategies.
  - Regional: Coordinate with other jurisdictions and agencies with shared hazards and/or mitigation responsibility.
  - City Wide: Provide protection to public and other critical facilities, including infrastructure.
  - Area/District: Increase community awareness of, vulnerability to, and mitigation available for priority hazards.
  - Project: Build consideration of hazard risk and mitigation into decision making process.

5.3 Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

In order to identify and select mitigation actions to support the mitigation goals, each hazard in Section 4.1 Identifying Hazards: Natural Hazards was evaluated. Only those hazards that were determined to be a priority hazard at the completion of the Vulnerability Assessment were considered further in the development of hazard-specific mitigation actions. These priority hazards are:

- Dam Failure
- Drought
- Seismic and Geologic Hazards
  - Earthquake
  - Liquefaction
- Flood
  - 100 year flood
  - 500-year flood

- Severe Weather
  - Heavy Rain/Thunderstorm/Hail/Lightning/Wind
- Wildfire

The HMPC eliminated the hazards identified below from further consideration in the development of mitigation actions because the risk of a hazard event in the City is unlikely or nonexistent, the vulnerability of the City is low, or capabilities are already in place to mitigate negative impacts. The eliminated hazards are:

- Seismic and Geologic Hazard
  - Landslide
  - Lateral Spreading
  - Subsidence
  - Settlement
- Human Health Hazards
  - Epidemic/Pandemic
  - West Nile Virus
- Landslide (non-seismic)
- Severe Weather
  - Extreme Temperatures
  - Fog
  - Tornado
  - Wind
- Soil Hazards
  - Erosion
  - Subsidence (non-seismic)
- Volcano

It is important to note, however, that all the hazards addressed in this plan are included in the City's multi-hazard public awareness mitigation action as well as in other multi-hazard actions.

Once it was determined which hazards warranted the development of specific mitigation actions, the HMPC analyzed viable mitigation options that supported the identified goals and policies. The HMPC was provided with the following list of categories of mitigation actions, which originate from the Community Rating System:

- Prevention
- Property protection
- Structural projects
- Natural resource protection
- Emergency services
- Public information

The HMPC was also provided with examples of potential mitigation actions for each of the above categories. The HMPC was also instructed to consider both future and existing buildings in considering possible mitigation actions. A facilitated discussion then took place to examine and analyze the options. This was followed by a brainstorming session that generated a list of preferred mitigation actions by hazard.

5.3.1 Prioritization Process

Once the mitigation actions were identified, the HMPC was provided with several decision-making tools, including FEMA's recommended prioritization criteria, STAPLEE sustainable disaster recovery criteria; Smart Growth principles; and others, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- Social: Does the measure treat people fairly? (e.g., different groups, different generations)
- Technical: Is the action technically feasible? Does it solve the problem?
- Administrative: Are there adequate staffing, funding, and other capabilities to implement the project?
- Political: Who are the stakeholders? Will there be adequate political and public support for the project?
- Legal: Does the jurisdiction have the legal authority to implement the action? Is it legal?
- Economic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- Environmental: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. Other criteria used to assist in evaluating the benefit-cost of a mitigation action includes:

- Does the action address hazards or areas with the highest risk?
- Does the action protect lives?
- Does the action protect infrastructure, community assets or critical facilities?
- Does the action meet multiple objectives (Multiple Objective Management)?
- What will the action cost?
- What is the timing of available funding?

The mitigation categories, multi-hazard actions, and criteria are included in Appendix C: Mitigation Categories, Alternatives, and Selection Criteria.

With these criteria in mind, HMPC members were each given a set of eighteen colored dots, six each of red, blue, and yellow. The dots were assigned red for high priority (worth five points), blue for medium priority (worth three points), and yellow for low priority (worth one point). The

team was asked to use the dots to prioritize actions with the above criteria in mind. The point score for each action was totaled. Appendix C contains the total score given to each identified mitigation action.

The process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to collectively prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. After completing the prioritization exercise, some team members expressed concern that prioritizing all the actions as a group is not very effective, since many of the actions are department-specific. However, the team agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support.

Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed below in Section 5.4. Specifically, each action developed for this plan contains a description of the problem and proposed project, the entity with primary responsibility for implementation, any other alternatives considered, a cost estimate, expected project benefits, potential funding sources, and a schedule for implementation. Development of these project details for each action led to the determination of a High, Medium, or Low priority for each.

Recognizing the limitations in prioritizing actions from multiple departments and the regulatory requirement to prioritize by benefit-cost to ensure cost-effectiveness, the HMPC decided to pursue:

- Mitigation action strategy development and implementation according to the nature and extent of damages;
- The level of protection and benefits each action provides;
- Political support;
- Project cost;
- Available funding; and
- Individual department priority

The process drove the development of a prioritized action plan for the City of Fullerton planning area. Cost-effectiveness will be considered in greater detail through a formal benefit-cost analysis when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

5.4 Mitigation Action Plan

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

This action plan was developed to present the recommendations developed by the HMPC for how the City of Fullerton planning area can reduce the vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. Emphasis was placed on both future and existing development. The action plan summarizes who is responsible for implementing each of the prioritized actions as well as when and how the actions will be implemented. Each action summary also includes a discussion of the benefit-cost review conducted to meet the regulatory requirements of the Disaster Mitigation Act. This can be found in the Benefits (losses avoided) section of each action summary. Table 5.1 identifies the mitigation actions and lead department for each action.

It is important to note that the City of Fullerton has numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents, such as their Master Drainage Plan and capital improvement budgets and reports. These actions are considered to be part of this plan, and the details, to avoid duplication, should be referenced in their original source document. The City of Fullerton planning area also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this plan.

Table 5.1. City of Fullerton Mitigation Actions

Mitigation Action Title	Priority	Cost Estimate	Schedule	Responsible Party	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
Multi-Hazard							
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	High	Staff time	As soon as possible	City of Fullerton Planning Division	X	X	X
Tree Master Plan Update	Medium	Unknown	summer/fall 2010	Maintenance Services, Landscape Division	X	X	
Community Forest Master Plan Update	High	Unknown	summer/fall 2010	Maintenance Service, Landscape Division	X	X	
Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program	High	$5,000-$20,000	Part of seasonal multi-hazard public awareness campaign	City of Fullerton Community Development Department, Fullerton Public Information Office, Fullerton Chamber of Commerce, and the American Red Cross.	X	X	X
Hazardous Materials GIS improvements	Medium to High	Staff time	Unknown at this time	Fire Department and GIS staff	X	X	X
Acacia Grade Separation	High	Unknown	Upon funding availability	Engineering Department/Design Division	X	X	
State College Grade Separation	High	$62,083,000	June 2012	Engineering Department/Design Division	X	X	
Raymond Grade Separation	High	$64,539,000	June 2012	Engineering Department/Design Division	X	X	
Data Gathering and GIS Tracking of Police and Fire Calls for Service in Response to Natural Hazard Events	Low	Staff time	Unknown at this time	Community Development Department to coordinate with Police and Fire representatives	X	X	
GIS Integration	Medium	Staff time	Unknown at this time	Community Development Department with City Manager's Office	X	X	

Mitigation Action Title	Priority	Cost Estimate	Schedule	Responsible Party	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
GIS tracking of Historic, Cultural, and Natural Resources	Low	Staff time	As soon as possible	GIS staff	X	X	
Multi-hazard: flood, liquefaction							
Structure Buy Out Program and Conversion (Southwest Fullerton) to Open Space	Low	Less than $50,000	Phase 1: Develop understanding of Community Land Trusts (CLT) and the steps required to establish and operate a 501(c)3. Phase 2: Identity potential organizers and partners for establishing the CLT. Phase 3: Prepare a feasibility analysis for establishing and operating the CLT. Phase 4: Prepare the case statement for the CLT and its mission. Phase 5: Establish the 501(c)3 and begin pursuit of mission	Planning Division, in coordination with other divisions and departments	X	X	X
Dam Failure							
Brea Dam Safety and Maintenance Plan	Medium	Staff time	As soon as possible	Parks and Recreation	X	X	X
Drought							
Convert Lions Field/Richmond Park to Artificial Turf	Medium	$1,100,000 – $2,475,000	Lions Field – Sept. 2010, Richman Park – August 2010	Parks and Recreation Department	X		
Water Main Replacement	High	$1,600,000	June 2010 for Lois Lane area and November 2010 for Coronado area	Engineering Department/Water Division	X	X	
Water Allocation Study	High	$2,000,000	Unknown due to lack of funding	Water Engineering	X	X	
Water Meter Replacement	High	$6,000,000	Unknown due to lack of funding	Water Engineering	X		
Park and Recreation Master Plan	Medium	$25,000 to $250,000	FY 2011-12	Parks and Recreation Department	X	X	

Mitigation Action Title	Priority	Cost Estimate	Schedule	Responsible Party	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
Drought and Earthquake							
Reservoir Rehabilitation	High	$2,200,000	February 2010 for Las Palmas and July 2010 for Tank Farm #5	Engineering Department/Water Division	X	X	
Earthquake							
Seismic Compliance/Retro Fit for Existing Structures – Public and Critical Facilities	Medium	Unknown	Phase 1: Develop an inventory of qualifying structures. Phase 2: Develop a cost estimate to complete upgrades/retro fits. Phase 3: Examine the feasibility of a regulatory- and voluntary-based system for private facilities while exploring funding mechanisms for both public and private locations.	Building Division	X		
Seismic Compliance/Retro Fit for Existing Structures – Private	Medium	Unknown	Phase 1: Develop an inventory of qualifying structures. Phase 2: Develop a cost estimate to complete upgrades/retro fits. Phase 3: Examine the feasibility of a regulatory- and voluntary-based system, exploring funding mechanisms.	Building Division	X		
Earthquake /Erosion/Flood							
Harbor Slope Stabilization	High	$3,130,000	Upon funding availability	Engineering Department/Design Division	X		X
Erosion/Flood							
Bastanchury Storm Drain Improvements	High	$400,000	June 2010	Engineering Department/Design Division	X	X	X
Flood							
Olive Street Storm Drain Improvements	High	$2,100,000	Upon funding availability	Engineering Department/Design Division	X	X	X

Mitigation Action Title	Priority	Cost Estimate	Schedule	Responsible Party	Addresses Current Development	Addresses Future Development	Continued Compliance with NFIP
Evaluate status of floodplain management program	High	Staff time	3-5 years	Engineering	X	X	X
WIldfire							
Modifying/Enforcing Fuels Modification Plans and Weed Abatement on Public Lands	High	$75,000	Dependent on funding	Fullerton Fire Department Fire Prevention Bureau	X	X	
Study for Protection of Existing EOC	High	$25,000	Dependent on funding	Fullerton Fire Department/Engineering	X	X	
Purchase Type 3 Engine	High	$350,000	Dependent on funding	Fullerton Fire Department Fire Prevention Bureau	X	X	

Multi-Hazard Mitigation Actions

1. Action: Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Issue/Background: Local jurisdiction reimbursement for mitigation projects and cost recovery after a disaster is guided, in part, by AB 2140. Specifically, this bill requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the safety element of its general plan. Adoption into the safety element of the general plan may be by reference or incorporation.

Other Alternatives: No action

Responsible Office: City of Fullerton Planning Division.

Priority (High, Medium, Low): High

Cost Estimate: Staff time

Potential Funding: Existing budget for General Plan Update.

Benefits (Losses Avoided): Adoption and coordination of planning documents will help the City maximize potential for state reimbursement.

Schedule: As soon as possible

2. Action: Tree Master Plan Update

Issue/Background: Replacement of problematic tree species listed in the current Master Street Tree Plan / List could be expanded to include and promote the use of additional drought tolerant species. List should eliminate species found to have susceptibility to structural failure, likelihood to cause hard scape damage or high maintenance requirements.

Other Alternatives: None identified

Existing Planning Mechanism(s) through which project will be implemented:

- Master Street Tree Plan update
- Annual tree planting program as part of divisional goals and objectives
- Annual Arbor Day Tree Planting (Laguna Lake) March 13, 2010 California Native Tree / public educational program
- Lions Field Sports Complex upgrade/ utilization of California native tree and plant species
- City Hall Demonstration Garden

Responsible Office: Maintenance Services, Landscape Division

Priority: Medium

Cost Estimate: Unknown

Benefits (avoided Losses): Sustainable, healthier urban forest which provides benefits including the ability to withstand severe wind, provide shading/cooling benefits in extreme temperature situations, reduce run-off during flood events, and require less irrigation water in response to drought conditions.

Potential funding:

- Sanitation Fund
- Grant Funding

Schedule: summer/fall 2010

3. Action: Community Forest Master Plan Update

Issue/Background: Community Forest Master Plan Update (CFMP) requires updating in order to facilitate successful management and sustainability of the urban forest. The goal being to:

- Establish and maintain optimal tree cover;
- Maintain trees in a healthy condition through good cultural practices;
- Establish and maintain an optimal level of age and species diversity;

(A concerted effort to focus on maintaining the age and species diversity component of the master plan should be emphasized.)

- Provide suitable locations for and select, situate and maintain street trees to minimize hazard, nuisance, hardscape damage, and maintenance costs, with special consideration given to compatibility in commercial areas with regard to aesthetics and sign visibility.

Other Alternatives: None identified.

Existing Planning Mechanism(s) through which project will be implemented:

- Current CFMP
- Community Forestry Ordinance
- Public Education Programs

Responsible Office: Maintenance Service, Landscape Division

Priority (High, Medium, Low): High

Cost Estimate: Unknown

Benefits (avoided Losses): Sustainable, healthier urban forest which provides benefits including the ability to withstand severe wind, provide shading/cooling benefits in extreme temperature situations, reduce run-off during flood events, and require less irrigation water in response to drought conditions.

Potential funding:

- Sanitation Fund
- Grant Funding

Schedule: summer/fall 2010

4. Action: Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program

Issue/Background: The City of Fullerton is subject to several natural hazards. Each poses a different degree of risk and associated vulnerability. Some hazards have a combination of attributes, including a high likelihood of occurrence, a specific location that would likely be impacted, and proven approaches that could reduce the impact. For other hazards, where either the likelihood of occurrence is very low, the area of likely impact is not specifically known, or there is very little that can be done to reduce the impacts, the HMPC has determined that the best approach is public awareness. People should have information describing historical events and losses, the likelihood of future occurrences, the range of possible impacts, appropriate actions to save lives and minimize property damage, and where additional information can be found. Any information provided through this effort should be accurate, specific, timely, and consistent with current and accepted local emergency management procedures as promoted by the California Emergency Management Agency (CAL EMA) and the American Red Cross. This public outreach effort should be conducted annually and should include:

- Using a variety of information outlets, including local news media;
- Creating and printing (where applicable) brochures, leaflets, water bill inserts, websites, and public service announcements;
- Displaying current brochures and flyers in City office buildings, libraries, and other public places; and
- Developing public-private partnerships and incentives to support public education activities.

Other Alternatives: Continue public information activities currently in place

Responsible Office: City of Fullerton Community Development Department, Fullerton Public Information Office, Fullerton Chamber of Commerce, and the American Red Cross.

Priority (High, Medium, Low): High

Cost Estimate: $5,000-20,000 annually, depending on printing and mailing costs, level of volunteer participation, and scope and frequency of events

Potential Funding: FEMA's Hazard Mitigation Grant Program, City of Fullerton funds, other available grants

Benefits (Avoided Losses): Life safety, reduction in property losses, relatively low cost

Schedule: Part of seasonal multi-hazard public awareness campaign

5. Action: Hazardous Materials GIS Improvements

Issue/Background: Currently, records of the locations of businesses which use or store hazardous materials are not available as a GIS data layer. The Fire Department maintains an Excel spreadsheet of business name and addresses of any location that stores/uses a hazardous material. A separate source of data lists the actual type of hazardous material at the location. The two lists are maintained separately.

A visually mapped layer containing both the address location and the hazardous material types would aid in preparing for disasters and responding to them.

Other Alternatives: Combine the two lists without benefit of GIS or continue the same method.

Existing Planning Mechanism(s) through which project will be implemented: General Plan Update implementation.

Responsible Office: Fire Department and GIS staff

Priority (High, Medium, Low): Medium to High

Cost Estimate: Software solutions already exist, only the cost of staff hours would be needed to accomplish this project. An intern could complete some of the work matching the two existing databases together.

Benefits (avoided Losses): Since the current listing by address does not distinguish between types of hazardous materials, by combining these databases in a GIS format, this data can be overlayed with natural hazards layers to ensure that the appropriate precautions given the nature of the materials, and the hazard risk can be taken. Additionally, having data in a GIS format would result in better allocation of personnel in an emergency situation since a level of danger could be assessed by location and material type. Having a GIS data layer of mapped locations would make the information easily visible for localized emergencies and could assist in mapping plumes or areas to be evacuated and could help identify areas where a potential for dangerous combinations of materials might exist.

Potential funding: Unknown at this time

Schedule: Unknown at this time

6. Action: Acacia Grade Separation

Issue/Background: Acacia Avenue is a north-south secondary arterial street that carries traffic resulting from commercial, industrial, and residential zoning. Acacia Avenue serves as one of the primary accesses connecting the residents to the elementary schools, junior high schools, and high schools within the City. Acacia is also an alternate route for State Route 57 (SR-57) during times of heavy congestion. The Burlington Northern Santa Fe (BNSF) crossing has approximately 82 trains per day. The purpose of the project is to eliminate an at-grade railroad crossing on Acacia Avenue. The project will increase safety and reduce the frequency of accidents on the road caused by the presence of an at-grade railroad crossing.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Engineering Department/Design Division

Priority (High, Medium, Low): High

Cost Estimate: Not available

Benefits (avoided Losses): Elimination of an at-grade crossing at Acacia Avenue will benefit City residents, commuters, and facilitate better movement of transporting goods. By improving traffic conditions along one of the City's key vehicular routes, the project will contribute to mitigation of various hazards including fire, earthquake, and flooding.

Potential funding: Unfunded

Schedule: Upon funding availability

7. Action: State College Grade Separation

Issue/Background: The State College Boulevard corridor is a north-south Congestion Management Plan route that carries heavy commuter traffic resulting from commercial and industrial zoning. State College Boulevard serves as one of the primary accesses to California State University, Fullerton and is the primary alternate route for State Route 57 (SR-57) during times of heavy congestion. The Burlington Northern Santa Fe (BNSF) crossing has approximately 82 trains per day. The purpose of the project is to eliminate an at-grade railroad

crossing on State College Boulevard. The project will increase safety and reduce the frequency of accidents on the road caused by the presence of an at-grade railroad crossing.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Engineering Department/Design Division

Priority (High, Medium, Low): High

Cost Estimate: $62,083,000

Benefits (avoided Losses): Elimination of an at-grade crossing at State College Boulevard will benefit City residents, commuters, and facilitate better movement of transporting goods. By improving traffic conditions along one of the City's key vehicular routes, the project will contribute to mitigation of various hazards including fire, earthquake, and flooding.

Potential funding: Redevelopment Agency, Measure "M", Proposition 1B, Federal, State.

Schedule: June 2012

8. Action: Raymond Grade Separation

Issue/Background: Raymond Avenue is a north-south primary arterial street that carries commuter traffic resulting from commercial, industrial, and residential zoning. Raymond Avenue serves as one of the primary accesses connecting the residential areas in the northern part of the City to the Riverside 91 Freeway. Raymond is also an alternate route for State Route 57 (SR-57) during times of heavy congestion. The Burlington Northern Santa Fe (BNSF) crossing has approximately 82 trains per day. The purpose of the project is to eliminate an at-grade railroad crossing on Raymond Avenue. The project will increase safety and reduce the frequency of accidents on the road caused by the presence of an at-grade railroad crossing.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Engineering Department/Design Division

Priority (High, Medium, Low): High

Cost Estimate: $64,539,000

Benefits (avoided Losses): Elimination of an at-grade crossing at Raymond Avenue will benefit City residents, commuters, and facilitate better movement of transporting goods. By improving traffic conditions along one of the City's key vehicular routes, the project will contribute to mitigation efforts of various hazards including fire, earthquake, and flooding.

Potential funding: Measure "M", Proposition 1B, Federal, State.

Schedule: June 2012

9. Action: Data Gathering and GIS tracking of Police and Fire calls for service in response to natural hazard events

Issue/Background: Currently, Police and Fire response records do not include information that would provide historical data as to whether the response was required because of a natural hazard event.

Other Alternatives: Continue current record keeping system

Existing Planning Mechanism(s) through which project will be implemented: General Plan Update implementation

Responsible Office: Community Development Department to coordinate with Police and Fire representatives

Priority (High, Medium, Low): Low

Cost Estimate: Software solutions already exist, only the cost of staff hours would be needed to accomplish this project.

Benefits (avoided Losses): More specific local information as to natural hazard events and damages could be maintained for

Potential funding: Unknown at this time

Schedule: Unknown at this time

10. Action: GIS Integration

Issue/Background: Currently, GIS data is maintained by various/separate departments and not shared/stored in one database for coordinated use and analysis. Graphical data is also maintained on multiple platforms which can not be integrated.

Other Alternatives: Continued missed opportunities for information sharing and coordinated analysis and planning

Existing Planning Mechanism(s) through which project will be implemented: General Plan Update implementation

Responsible Office: Community Development Department with City Manager's Office

Priority (High, Medium, Low): Medium

Cost Estimate: Software solutions already exist, only the cost of staff hours would be needed to accomplish this project.

Benefits (avoided Losses): Ability to perform a more comprehensive analysis on a regular basis of hazard risks associated with potential new development projects.

Potential funding: Unknown at this time

Schedule: Unknown at this time

11. Action: GIS Tracking of Historic, Cultural, and Natural Resources

Issue/Background: Currently, records of the locations of historic, cultural and natural resources are not available as a GIS data layer.

Other Alternatives: Continued future risk analysis without all potential losses identified

Existing Planning Mechanism(s) through which project will be implemented: General Plan Update implementation

Responsible Office: GIS staff

Priority (High, Medium, Low): Low

Cost Estimate: Software solutions already exist, only the cost of staff hours would be needed to accomplish this project.

Benefits (avoided Losses): As noted in the Risk Assessment, vulnerability analysis of historic, cultural and natural resources was not possible due to these data limitations. Having GIS data would allow for a more complete understanding/valuation of risk within the City. Plan updates could address future mitigation actions, if needed.

Potential funding: Unknown at this time

Schedule: As soon as possible

Multi-Hazard/Liquefaction Mitigation Actions

12. Action: Structure Buy Out Program and Conversion Program (Southwest Fullerton) to Open Space

Issue/Background: Area contains two primary multi-hazards: flooding and liquefaction. Additionally, the area has a significant deficiency in parks and open space.

Other Alternatives: None identified

Existing Planning Mechanism(s) through which project will be implemented: Facilitate the establishment of a Southwest Fullerton Community Land Trust [i.e., a private non-profit corporation – 501(c)3] with the purpose of acquiring, holding and developing land for the benefit of providing secure open space, including parks, community gardens, etc., for community residents. Areas most vulnerable to flooding and liquefaction would be identified for acquisition and conversion to open space.

Responsible Office: Planning Division, in coordination with other divisions and departments

Priority (High, Medium, Low): Low

Cost Estimate: Under $50,000 for public outreach and administration to facilitate the establishment of the 501(c)3 (not including in-kind services, such as City staff time, etc.). Once the 501(c)3 is established, the organization would be responsible for pursuing funding necessary to achieve its mission.

Benefits (avoided Losses): Reduced property damage due to flooding and liquefaction. Potential for reduced loss of life and injury due to flooding and liquefaction. Increased open space for public health and wellness.

Potential funding: Caltrans Environmental Justice Grants and similar

Schedule:

- Phase 1: Develop understanding of Community Land Trusts (CLT) and the steps required to establish and operate a 501(c)3.
- Phase 2: Identity potential organizers and partners for establishing the CLT.
- Phase 3: Prepare a feasibility analysis for establishing and operating the CLT.
- Phase 4: Prepare the case statement for the CLT and its mission.
- Phase 5: Establish the 501(c)3 and begin pursuit of mission

Dam Failure Mitigation Actions

13. Action: Brea Dam Safety and Maintenance Plan

Issue/Background:

- Obtaining and updating dam safety and maintenance plan for the Brea Dam from the Operations Center at the US Army Corps of Engineers - Los Angeles District
- Maintain contact with the Operations Center for updated information pertaining to potential hazards

Other Alternatives: None identified

Existing Planning Mechanism(s) through which project will be implemented: License agreement with the USACE for the Brea Dam Basin

Responsible Office: Parks and Recreation

Priority (High, Medium, Low): Medium

Cost Estimate: Staff time

Benefits (avoided Losses):

- Ability to prepare and/or evacuate residents in case of dam breach, failure or emergency closure
- Reduce potential injuries, loss of life and loss of personal property

Potential funding: Undetermined

Schedule: As soon as possible

Drought Mitigation Actions

14. Action: Convert Lions Field and Richmond Park to Artificial Turf

Issue/Background: Replace natural grass athletic fields with artificial turf to reduce the amount of water used.

Other Alternatives: None identified

Existing Planning Mechanism(s) through which project will be implemented:

- 5-year Capital Improvement Project
- Projects included in the current CIP budget are: Lions Field and Richman Park

Responsible Office: Parks and Recreation Department

Priority (High, Medium, Low): Medium

Cost Estimate: $1,100,000 to $2,475,000 per facility

Benefits (avoided Losses): Reduces the need for water for non life- and business-sustaining activities in response to drought conditions.

Potential funding: Park Dwelling Fund, Redevelopment Agency, HUD, State water grants

Schedule: Lions Field – Sept. 2010, Richman Park – August 2010

15. Action: Water Main Replacement

Issue/Background: The City has some areas with leaking and deteriorating water mains which need to be replaced. These deficient water mains are responsible for a higher water loss than is customary in the City. In addition, these areas have main breaks that occur more often, which wastes water.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Engineering Department/Water Division

Priority (High, Medium, Low): High

Cost Estimate: $1,600,000

Benefits (avoided Losses): Replacement of these water mains will help in the City's conservation efforts by retaining more system water by replacing the old leaking mains. The efficient water main system is a must-have attribute in mitigating the negative impacts of drought.

Potential funding: Water fund

Schedule: June 2010 for Lois Lane area and November 2010 for Coronado area.

16. Action: Water Allocation Study

Issue/Background: The goal of conservation through tiered water rate structure does not provide the financial incentive to motivate residential customers to reduce water consumption.

However, many utilities who have implemented water budget based tiered rate structure are finding positive shifts in the way residential customers use the water budgeted to them due to the high financial costs associated with exceeding established water budgets. Based on this information the City plans to conduct a water allocation study that will establish a water budget for each residential customer based on the landscaped area of the property, size of the home, and other considerations. Commercial and Industrial customers would be evaluated to establish a water budget for landscaped areas only.

Other Alternatives: Institute a fixed percentage reduction requirement to all rate payers based on past water usage. However, this alternative will be complicated by the fact that some customers have already cut back water consumption and would be expected reduce usage beyond a reasonable expectation. In addition, those customers who have consistently over-watered will not experience the effect of reducing water usage as compared to other customers who have managed their water consumption and will now be required to reduce further.

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Water Engineering

Priority (High, Medium, Low): High

Cost Estimate: $2 Million

Benefits (avoided Losses): The use of a water budget based tiered rate structure would provide the City with a conservation tool that is considered fair and effective. The project‘s water conservation potential will assist the City in maintaining the required level of water supply during drought periods.

Potential funding: Water Fund

Schedule: Unknown due to lack of funding

17. Action: Water Meter Replacement

Issue/Background: The existing water meters in the City of Fullerton require water consumption to be manually collected by City staff on a daily basis to prepare the monthly and bi-monthly water bills to customers. The City plans to upgrade these existing meters with AMR (Automatic Meter Reading) systems that will enable the City to collect consumption data from water meters remotely and automatically via fixed communications network. The primary purpose of the data collected through AMR systems is monthly customer billing, and reduced costs. AMR systems typically comprise meters fitted with communication modules, collection systems (including handheld computers, drive-by systems and fixed network technology), as well as supporting software to manage collection of the data. The City will be able to use the

data collected to spot anomalies which can indicate potential system leaks, potential leaks at customer sites, damaged or broken meters, and tampering or theft. Overall, the water conservation potential via AMR provides a reasonable payback of investment expectation.

Other Alternatives: Hire additional staff and purchase additional equipment to collect the same quantity and frequency of water meter consumption data. This approach would be a permanent addition to the City's budget with no payback potential.

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Water Engineering

Priority (High, Medium, Low): High

Cost Estimate: $6 Million

Benefits (avoided Losses): The cost savings, efficiency gains, customer service improvements and revenue cycle enhancements provided by automation of the meter reading are expected benefits to the City. The project's water conservation potential will assist the City in maintaining the required level of water supply during time of drought.

Potential funding: Water Fund

Schedule: Unknown due to lack of funding

18. Action: Park and Recreation Master Plan

Issue/Background:

- Reducing the amount of water used for irrigation/operation by recapturing run off for reuse for landscaping and recirculating water at spray grounds
- Plant native drought tolerant trees in park

Other Alternatives: None identified

Existing Planning Mechanism(s) through which project will be implemented:

- 5-year Capital Improvement Project
- Projects included in the current CIP budget are: Replacement of Valencia Park Sprayground Pump, Laguna Lake Park Improvements, Lions Field, Hillcrest Park, Union Pacific Trail, Lemon Park, Independence Park, Fullerton Community Center, Hiltscher Trail, and Richman Athletic Field,

Responsible Office: Parks and Recreation Department

Priority (High, Medium, Low): Medium

Cost Estimate: $25,000 - $250,000 each project

Benefits (avoided Losses): Reduces the need for water for non life- and business-sustaining activities in response to drought conditions.

Potential funding: Park Dwelling Fund, Water Fund

Schedule: FY 2011-12

Drought/Earthquake Mitigation Actions

19. Action: Reservoir Rehabilitation

Issue/Background: Las Palmas 3B and Tank Farm 2D-#5 tanks were built in the late 1960's. These tanks are in need of seismic upgrades to prevent a catastrophic loss during a seismic event and extend the life of the storage facilities. The City completed an Engineer's assessment of the tanks and the following items are at risk in a seismic event: Roof damage due to sloshing waves; shell damage from hydrodynamic forces; piping connection failure at the shell and; bottom piping penetration failure. The report also concluded that the tanks are at the end of their service life on both the interior coating and exterior painting. These systems are also no longer used because of lead content and VOC regulations.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Engineering Department/Water Division

Priority (High, Medium, Low): High

Cost Estimate: $2,200,000

Benefits (avoided Losses): The upgrade of these reservoirs protect the community from seismic and drought events. The piping retrofits will offer protection from a catastrophic failure of the tanks during a seismic event. Also, by removing the existing coating systems, the service life of the tanks will be extended and the water may be utilized during drought periods.

Potential funding: Water Fund

Schedule: February 2010 for Las Palmas and July 2010 for Tank Farm #5.

Earthquake Mitigation Actions

20. Action: Seismic Compliance/Retro Fit for Existing Structures – Public and Critical Facilities

Issue/Background: Area is seismically active. As building and safety codes have evolved, three areas have been identified as benefiting from seismic upgrades/retrofits. These are residences without anchored foundations, soft story structures, and masonry structures constructed prior to 1976. Additionally included are existing structures within liquefaction zones. Certain City facilities as well as privately owned facilities which could be critical in the event of a natural hazard could fall into these categories.

Other Alternatives: None identified

Existing Planning Mechanism(s) through which project will be implemented: General Plan/Capital Improvement Plan

Responsible Office: Building Division along with Engineering and Fire Departments

Priority (High, Medium, Low): Medium

Cost Estimate: Unknown

Benefits (avoided Losses): Life safety and continuity of operations as well as reduced losses.

Potential funding: Grants

Schedule:

- Phase 1: Develop an inventory of qualifying structures.
  - Initial list includes:
    - City Fire Stations
    - Fullerton Municipal Airport Control Tower
    - Locations identified to provide emergency shelter
    - Locations which store and distribute food and water
    - Locations which store and handle hazardous materials
- Phase 2: Develop a cost estimate to complete upgrades/retro fits.
- Phase 3: Examine the feasibility of a regulatory- and voluntary-based system for private facilities while exploring funding mechanisms for both public and private locations.

21. Action: Seismic Compliance/Retro Fit for Existing Structures – Private

Issue/Background: Area is seismically active. As building and safety codes have evolved, three areas have been identified as benefiting from seismic upgrades/retrofits. These are residences

without anchored foundations, soft story structures, and masonry structures constructed prior to 1976. Additionally included are existing structures within liquefaction zones.

Other Alternatives: None identified

Existing Planning Mechanism(s) through which project will be implemented: General Plan

Responsible Office: Building Division

Priority (High, Medium, Low): Medium

Cost Estimate: Unknown

Benefits (avoided Losses): Reduced property damage due earthquakes.

Potential funding: Grants

Schedule:

- Phase 1: Develop an inventory of qualifying structures.
- Phase 2: Develop a cost estimate to complete upgrades/retro fits.
- Phase 3: Examine the feasibility of a regulatory- and voluntary-based system, exploring funding mechanisms.

Earthquake/Erosion/Flood

22. Action: Harbor Slope Stabilization

Issue/Background: Harbor Boulevard is classified by Caltrans as a principal arterial highway traversing north and south connecting various urban cities in northern part of Orange County such as La Habra, Fullerton, and Anaheim. Harbor Boulevard also provides access to the 91-Riverside freeway. Within the City of Fullerton, Harbor Boulevard is a 4 to 6 lane major and a primary arterial that spans the entire City with high traffic volume (31,600 vehicles/day along the project section per 2008 traffic study) accessing the Fullerton Transportation Center (Metrolink and Amtrak depot), the booming and bustling downtown Fullerton businesses, the North Orange County Court House, and the St. Jude hospital. Harbor Boulevard is a well known, well traveled street that was built in the early 1930's. Due to limited technology, knowledge, and equipment, the slope adjacent to the street was not properly graded. Over the years, this slope began to slough and erode, hinting at localize instability issues. This project's main purpose is to stabilize the slope and to minimize storm water run-off by construction of a retaining wall, construction of slope interceptor drains and down drains, provide landscaping on the slope to reduce erosion, and provide a walkway along the street for pedestrian access.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Engineering Department/Design Division

Priority (High, Medium, Low): High

Cost Estimate: $3,130,000

Benefits (avoided Losses): Stabilizing the existing slope will safeguard the roadway from the event of a slope failure due to flood, erosion, or earthquake; offer protection during the rain season; and prevent the unforeseen closing down of Harbor Boulevard due to a slope failure event that would gravely affect residents and businesses. Additionally, this project will provide ADA access along Harbor Boulevard and create a safer environment for pedestrians to travel. Furthermore, the slope improvements will preserve the structural integrity of the existing Army Corp of Engineers' property situated on top of the slope, which consists of a single story North Orange County Young Mens Christian Association (YMCA) building, an asphalt parking lot, a fitness yard, and the Brea Dam Recreational Area.

Potential funding: Sewer and Drainage Fund, Measure "M" Regional Fund, Federal

Schedule: Upon funding availability

Erosion/Flood Mitigation Actions

23. Action: Bastanchury Storm Drain Improvement

Issue/Background: Bastanchury Storm Drain channel is an earthen trapezoidal ditch streaming along the west side of Bastanchury Road that carries storm runoff in excess of 2,000 cfs (cubic feet/sec) for the 100-year storm event. Over the years, storm flow has significantly carved out the easterly bank of the channel causing the earthen toe of the embankment to become a near vertical slope. Dirt and debris sloughing off from the eroded slope further decrease the capacity of the channel. This project proposes to stabilize the embankment by means of grading, rock slope protection fabric, and placing rock rip-rap to return the channel to its designed storm water carrying capacity.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Engineering Department/Design Division

Priority (High, Medium, Low): High

Cost Estimate: $400,000

Benefits (avoided Losses): Improving the channel will protect the health, safety, and welfare of the community from continued erosion of the east bank and undermining of the sidewalk and street. By eliminating dirt and debris, the quality of storm runoff from this channel would improve since the amount of suspended solids is lessened. This project will eliminate the need and costly expense of recurring maintenance. By restoring storm water carrying capacity of the channel, the project will benefit overall efficiency of the City's storm drain system, which will assist in mitigating potential flood hazard.

Potential funding: Sewer and Drainage Fund

Schedule: June 2010

Flood Mitigation Actions

24. Action: Olive Street Storm Drain Improvements

Issue/Background: Olive Avenue from Magnolia Avenue to Courtney Avenue is a residential street that serves as a storm drain passage way that carries water runoff during rain events. The tributary area that Olive Avenue serves exceeds 40 acres consisting mostly of residential homes. During the rain season, Olive Avenue becomes an almost impassable road due to the high volume of water that overflows beyond the street gutter onto the travel lanes. This project proposes to install a storm drain system consisting of underground pipes and catch basins to collect storm water along Olive Avenue.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: Capital Improvement Program

Responsible Office: Engineering Department/Design Division

Priority (High, Medium, Low): High

Cost Estimate: $2,100,000

Benefits (avoided Losses): An underground storm drain system in Olive Avenue will improve the drainage of the neighborhood, protect the homes from getting flooded due to heavy rains, alleviate traffic accidents due to hydroplaning, extend the longevity of street pavement, curb and gutter since less water is flowing on the street, and eliminate localize ponding areas, which in turn resolve the vector control issue.

Potential funding: Unfunded

Schedule: Upon funding availability

25. Action: Evaluate status of floodplain management program/Consider Joining CRS

Issue/Background: The City of Fullerton joined the National Flood Insurance Program (NFIP) on July 5, 1977. The City does not participate in the Community Rating System (CRS). The CRS was created in 1990 and was developed to recognize floodplain management activities that are above and beyond the NFIP's minimum requirements. If a community implements public information, mapping, regulatory, loss reduction and/or flood preparedness activities and submits the appropriate documentation to FEMA, then its residents can quality for a flood insurance premium rate reduction.

Information developed for this LHMP indicates that the City has 259 (240 residential) parcels located within the 100-year floodplain and 10,109 (9,006 residential) parcels located within the 500-year floodplain. Using 2000 Census data, 2,089 people reside in the 100-year floodplain and 61,296 people reside in the 500-year floodplain. There is also 1 critical facility located within the 100-year floodplain and 130 critical facilities located within the 500 year floodplain. Given the assets at risk, the city is evaluating its floodplain management program to determine what activities it can and should implement in order to more proactively manage its floodplains for the protection of both existing and future development within the City. In addition to evaluating the effectiveness of the existing program, the City will look at additional activities and programs to enhance their overall approach to sound floodplain management. This will include evaluating the benefit-cost to the community of participating in the CRS program.

Other Alternatives: No action – maintain status quo

Existing Planning Mechanism(s) through which project will be implemented: Safety or Natural Hazards Element of General Plan

Responsible Office: Engineering

Priority: High

Cost Estimate: Staff time

Benefits (avoided Losses): Life Safety, property protection, potential reduction in flood insurance premiums

Potential funding: Local funds

Schedule: 3-5 years.

Wildfire Mitigation Actions

26. Action: Modify and Enforce Fuel Modification and Weed Abatement of Public Lands

Issue/Background: Fullerton has areas in the City designated by the State of California to be Very High Fire Severity Zones. Fullerton is located in Southern California. Southern California is subject to dry, hot and windy conditions. These conditions create hazards in areas where dry brush and vegetation exist. Fuel Modification Plans and brush clearance are necessary to reduce the hazards of extreme fire conditions to protect lives and property.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: Existing Fuel Modification/Brush Clearance Ordinance. Utilizing State laws, codes and local ordinances.

Responsible Office:

- Fullerton Fire Department
- Fire Prevention Bureau

Priority (High, Medium, Low): High

Cost Estimate: $75,000 annually

Benefits (avoided Losses): This program protects lives and property. Excessive brush and fuel contribute to fire and its spread. Fuel Modification Plans set specific guidelines for planting and clearing in relationship to a structure. Brush clearance eliminates fuel which contributes to fires and fire spread. Properly executed programs reduce the hazards and protect lives and property.

Potential funding: Unknown/Grant funding, if available

Schedule: Dependent on funding

27. Action: Study for Protection of Emergency Operations Center (EOC)

Issue/Background: In 2004, the City of Fullerton built a new fire station in the 2600 block of Rosecrans, Fullerton. When it was built, the station included the infrastructure for a new EOC. Since occupying the station, the area surrounding the EOC/station has been designated as a Very High Fire Severity Zone by the State of California. This designation indicates that the EOC is now subject to increased danger due to wildfires. This poses a critical problem at the site for both the structure and the occupants that would occupy it during emergencies/activation. The Study is required to determine modifications to the site and surroundings, including access, which remedy the location and its designation.

Other Alternatives: Move the station/EOC

Existing Planning Mechanism(s) through which project will be implemented: None identified

Responsible Office: Fullerton Fire Department/Engineering

Priority (High, Medium, Low): High

Cost Estimate: $25,000 (study only)

Benefits (avoided Losses): As a critical facility, this building must be protected. Fifty to one hundred people could be working in this facility when activated. Loss of this facility would greatly hinder the City's ability to respond and react to large scale emergencies within the City and Southern California.

Potential funding: Unknown/Grant funding, if available

Schedule: Dependent on funding

28. Action: Purchase Type 3 Fire Engine

Issue/Background: Fullerton has areas in the City designated by the State of California to be Very High Fire Severity Zones. Fullerton is located in Southern California. Southern California is subject to dry, hot and windy conditions. These conditions create hazards in areas where dry brush and vegetation exist. Many areas of the City of Fullerton are in areas that could be subject to life threatening wildfires. Traditional fire apparatus are unable to navigate the uneven and rugged terrain where a majority of fuel exists. The only apparatus available to fight these types of fires is a "Type 3" engine. These come equipped with the tools necessary to fight fire and protect lives and property.

Other Alternatives: None

Existing Planning Mechanism(s) through which project will be implemented: None currently exist

Responsible Office:

- Fullerton Fire Department
- Fire Prevention Bureau

Priority (High, Medium, Low): High

Cost Estimate: $350,000

Benefits (avoided Losses): The potential loss from uncontrolled wildfires could be disastrous. The department needs additional resources to fight a wildfire primarily due to the terrain. A Type 3 vehicle is paramount in fighting wildfires. The ability to get through uneven terrain with a properly equipped vehicle will save lives and has the potential for saving millions of dollars in property loss.

Potential funding: Unknown/Grant funding, if available

Schedule: Dependent on funding

6 PLAN ADOPTION

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in from the City of Fullerton, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of DMA 2000. This adoption also establishes compliance with AB 2140 requiring adoption by reference or incorporation into the safety element of the general plan. The governing board for the City of Fullerton has adopted this Local Hazard Mitigation Plan by passing a resolution. A copy of the generic resolution and the executed copy (pending) are included in Appendix A: Adoption Resolution.

7 PLAN MAINTENANCE AND IMPLEMENTATION

Requirement §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This chapter provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

7.1 Implementation

Once adopted, the plan faces the truest test of its worth: implementation. While this plan contains many worthwhile actions, the City of Fullerton will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms, such as the general plan for City of Fullerton. The City already implements policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms.

Implementation will be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the City of Fullerton community and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or

participation requirements. When funding does become available, the City will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, special district budgeted funds, state and federal earmarked funds, and other grant programs, including those that can serve or support multi-objective applications.

7.1.1 Role of Hazard Mitigation Planning Committee in Implementation and Maintenance

With adoption of this plan, the City of Fullerton will be tasked with plan implementation and maintenance. The City of Fullerton, led by the City's Community Development Department, Planning Division, agrees to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended changes to the City of Fullerton City Council; and
- Inform and solicit input from the public.

The primary duty of the City is to see the plan successfully carried out and to report to its City Council and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the City website.

7.2 Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

7.2.1 Maintenance Schedule

The City of Fullerton Community Development Department, Planning Division is responsible for initiating plan reviews. In order to monitor progress and update the mitigation strategies identified in the action plan, the Community Development Department, Planning Division will revisit this plan annually and after a hazard event. As part of the maintenance process, they will submit a five-year written update to the state and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

7.2.2 Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions,
- Increased vulnerability as a result of failed or ineffective mitigation actions, and/or
- Increased vulnerability as a result of new development (and/or annexation).

Updates to this plan will:

- Consider changes in vulnerability due to action implementation,
- Document success stories where mitigation efforts have proven effective,
- Document areas where mitigation actions were not effective,
- Document any new hazards that may arise or were previously overlooked,
- Incorporate new data or studies on hazards and risks,
- Incorporate new capabilities or changes in capabilities,
- Incorporate growth and development-related changes to inventories, and
- Incorporate new action recommendations or changes in action prioritization.

In order to best evaluate any changes in vulnerability as a result of plan implementation, the City will adhere to the following process:

- A representative from the responsible office identified in each mitigation measure will be responsible for tracking and reporting on an annual basis to the City lead on action status and provide input on whether the action as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- If the action does not meet identified objectives, the City lead will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will also be reviewed during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the City of Fullerton Community Development Department, Planning Division deems appropriate and necessary, and as approved by the City of Fullerton City Council. In keeping with the process of adopting the plan, a public involvement process to receive public comment on plan maintenance and updating will be held during the annual review period or after a hazard occurence, and the final product will be adopted by the City Council.

7.2.3 Incorporation into Existing Planning Mechanisms

Another important mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other City plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. As previously stated in Section 7.1 of this plan, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. This point is re-emphasized here. As described in this plan's capability assessment, the City already implements policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- City General Plan
- City Emergency Operations Plan
- City ordinances
- Flood/stormwater management/drainage master plans
- Drought plans
- Capital improvement plans and budgets
- Other plans, regulations, and practices with a mitigation focus

HMPC members involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, etc, as appropriate. As described in Section 7.1, Implementation, incorporation into existing planning mechanisms will be done through the routine actions of:

- Monitoring other planning/program agendas
- Attending other planning/program meetings
- Participating in other planning processes
- Monitoring community budget meetings for other community program opportunities

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community.

Examples of incorporation of the LHMP into existing planning mechanisms include:

1) As recommended by Assembly Bill 2140, the City should adopt (by reference or incorporation) this LHMP into the Safety Element of their General Plan. Evidence of such adoption (by formal, certified resolution) shall be provided to Cal EMA and FEMA. This is underway. The goals, policies and mitigation strategies for this LHMP have been designed to be consistent with those of the General Plan. This plan is also using information

developed for the General Plan Update; likewise, the General Plan Update is using new data and information developed for this LHMP.

2) Integration of flood actions identified in this mitigation strategy with the actions and implementation priorities established in the City of Fullerton Master Drainage Plan. This is already in process. Specifically, key people responsible for development of the Master Drainage Plan participated as a member of the HMPC in the development of this LHMP. They identified key projects from the Drainage Master Plan and Capital Improvement Program and integrated them into the Mitigation Strategy of this LHMP. Likewise, actual implementation of these flood projects will likely occur through the Master Drainage Plan and Capital Improvement Program implementation process through the efforts of these same individuals.
3) Using the risk assessment information to update the hazard analysis in the City of Fullerton Emergency Operations Plan.

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this Local Hazard Mitigation Plan.

7.2.4 Continued Public Involvement

Continued public involvement is imperative to the overall success of the plan's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stores from the plan implementation and seek additional public comment. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public hearings.

When the HMPC reconvenes for the update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the plan. In reconvening, the HMPC plans to identify a public outreach subcommittee, which will be responsible for coordinating the activities necessary to involve the greater public. The subcommittee will develop a plan for public involvement and will be responsible for disseminating information through a variety of media channels detailing the plan update process. As part of this effort, a series of public meetings will be held and public comments will be solicited on the plan update draft.

Appendix A. PLANNING PROCESS DOCUMENTATION

Table A.1 List of Invitees to Join HMPC

Name	Department	Email	Address
City of Fullerton			
Hadi Tabatabaee	Building Department	hadit@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
John Godlewski Heather Allen Al Zelinka	Community Development	johng@ci.fullerton.ca.us heather@ci.fullerton.ca.us alz@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Don Hoppe Thuy Nguyen Yelena Voronel	Engineering	donh@ci.fullerton.ca.us thuyn@ci.fullerton.ca.us yelenav@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Chief Knable Julie Kunze	Fire	wolfgangk@ci.fullerton.ca.us jkunze@fullertonfire.org	312 W Commonwealth, Fullerton CA
Diana McCarthy	GIS	dianam@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Darryl Phillips	Human Resources	darrylp@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Maureen Gebelein Cathy Thomas Tim Mountain	Library	maureeng@ci.fullerton.ca.us cathyt@ci.fullerton.ca.us tmountain@ci.fullerton.ca.us	353 W Commonwealth, Fullerton CA
Bob Savage Lyman Otley Dan Diaz Dennis Quinlivan	Maintenance Services	bobs@ci.fullerton.ca.us lyman@ci.fullerton.ca.us dand@ci.fullerton.ca.us dennis@ci.fullerton.ca.us	1580 W Commonwealth, Fullerton CA
Tom Schultz	OES	tomsc@fullertonfire.org	312 W Commonwealth, Fullerton CA
Joe Flez Alice Loya	Parks and Recreation	joef@ci.fullerton.ca.us alicel@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Chief McKinley Tom Basham John Petruples Alex Basteri Steve Rubio	Police	chiefpat@fullertonpd.org tbasham@fullertonpd.org jpetruples@fullertonpd.org rbasteri@fullertonpd.org srubio@fullertonpd.org	237 W Commonwealth, Fullerton CA
Rob Zur Schmiede	Redevelopment/Community Development	robertz@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Orange County			
Rick LeFeuvre	Agricultural Commissioner	-	1750 S. Douglass Road, Bldg. D Anaheim, CA

Name	Department	Email	Address
Molly McLaren Craig	Animal Care	mcraig@ochca.com	561 The City Drive Orange CA 92868
Webster Guillory	Assessor	625 N. Ross Street	Santa Ana, CA
Mike Ferdig	Orange County Fire Authority	mike.ferdig@ocfa.org	1 Fire Authority Road, Irvine, CA
Nadeem Majaj	Floodplain Manager	nadeem.majaj@rdmd.ocgov.com	-
Brian Anderson	Information Services/GIS	brian.anderson@rdmd.ocgov.com	-
Donna Boston	OES (OC Sheriff's - Emergency Management Bureau)	dlboston@ocsd.org	-
Raymond Cheung	OES (OC Sheriff's - Emergency Management Bureau)	rcheung@ocsd.org	-
Steve Franks	Parks, Recreation, and Community Services	steve.franks@hcs.ocgov.com	-
Ruby Maldonado	Planning and Development	ruby.maldonado@rdmd.ocgov.com	-
Bryan Speegle	Public Works	bryan.speegle@ocgov.com	-
Ignacio Ochoa	Public Works	ignacio.ochoa@rdmd.ocgov.com	-
Other			
-	FEMA Region IX - Hazard Mitigation	-	1111 Broadway, Suite 1200, Oakland, CA
Lynda McClanahan	CA-OES - Hazard Mitigation Branch	Lynda_McClanahan@oes.ca.gov	3650 Schriever Ave., Mather, CA
-	CA-DWR Floodplain Management Program	-	P.O. Box 219000 Sacramento, CA
-	Cal Fire - Wildlife Program	-	2524 Mulberry Street, Riverside, CA
-	CA Geological Survey - Earthquake Program	-	888 S. Figueroa Street, Suite #475, Los Angeles, CA
Jim Purpura	National Weather Service San Diego Weather Forecast Office	jim.purpura@noaa.gov	11440 W Bernardo Court Suite 230, San Diego, CA
Edwin Clark	National Weather Service San Diego Weather Forecast Office	edwin.clark@noaa.gov	11440 W Bernardo Court Suite 230, San Diego, CA
-	Red Cross	-	601 N. Golden Circle Drive, Santa Ana, CA
-	US Army Corps of Engineers Los Angeles District	-	915 Wilshire Blvd., Suite 980, Los Angeles, CA
Jack Simes	US Bureau of Reclamation Southern California Area Office	jsimes@lc.usbr.gov	27708 Jefferson Ave., Ste. 202 Temecula, CA

Name	Department	Email	Address
-	US Forest Service Pacific Southwest Region	-	1323 Club Drive Vallejo, CA 94592
Michelle Kou	RBF Consulting	mkou@rbf.com	14725 Alton Parkway, Irvine, CA

Figure A.1 Organizing Resources – Forming the HMPC

Memo

To	**Heather Allen**	File no	
From	**Jeanine Foster**	cc	
Tel	**303-742-5332**		
Fax	**303-935-6505**		
Date	**November 25, 2008**		

Subject **Local Hazard Mitigation Plan (LHMP): Hazard Mitigation Planning Committee**

Heather.

As discussed, I am providing you with recommendations for the makeup of the Hazard Mitigation Planning Committee (referred to as the HMPC). We recommend being inclusive rather than exclusive for a couple of reasons. First, a larger, diverse group of people generally results in more comprehensive information for the plan development process. Second, the FEMA planning process requires coordination and incorporation of information from a wide-range of stakeholders.

The Disaster Mitigation Act of 2000 (DMA 2000) places a great emphasis on the planning process in the development of the LHMP. The regulations require establishing a planning committee as well as coordinating with other departments and agencies. To best meet the DMA requirements and to facilitate plan development, we suggest the following people be invited to be part of the HMPC and/or attend the meetings as an interested party.

HMPC

City of Fullerton
- Administrative Services
- Community Development
- Emergency Services
- Engineering
- Environmental Health
- Facilities
- Fire
- Floodplain Manager
- GIS
- Library
- Maintenance Services
- OES
- Parks and Recreation
- Police
- Public Works
- Redevelopment/Economic Development

Orange County
- Agricultural Commissioner
- Assessor
- Fire
- Floodplain Manager
- Housing and Redevelopment
- Historic Preservation
- Information Services: GIS
- OES
- Parks, Recreation, and Community Services
- Planning & Development
- Police Department
- Public Works

Other
County Watershed and Coastal Resources
Relevant Flood Control Districts
Relevant Fire Protection Districts
Fire Safe Councils
Community-based residential facilities
Child-care facilities
Salvation Army

It is important to invite everyone to the initial meeting. This will allow us and them to determine their level of interest and possible assistance with the plan development process. Please expand this list to include others that might be interested and/or helpful. Keep in mind that we will want to document this list of initial invites to include in the planning process section of the LHMP.

Coordination with other Departments/Agencies

It is also recommended that the following agencies be invited to participate in the HMPC meetings and to be part of the LHMP development process.

FEMA Region IX – Hazard Mitigation
CA-OES
CA-DWR Floodplain Management Program
Cal Fire– Wildfire Program
CGS – Earthquake Program
National Weather Service
Red Cross
U.S. Army Corps of Engineers
U.S. Bureau of Reclamation
U.S. Forest Service

Please call if you would like to discuss this further. I am looking forward getting this project kicked-off.

Thanks and talk to you soon.

Jeanine Foster
Project Manager
AMEC Earth & Environmental
(303) 742-5332

Figure A.2 Organizing Resources: Forming the HMPC Sample Invitation Letters

Heather Allen

From: Heather Allen

Sent: Friday, December 05, 2008 2:22 PM

To: Chris Meyer; John Godlewski; Don Hoppe; Wolfgang Knabe; Maureen Gebelein; Bob Savage; Joe Felz; PAT MCKINLEY; Robert M. Zur Schmiede

Cc: Julie Kunze; Cathy Thomas; Lyman Otley; Tom Schultz; Diana McCarthy

Subject: City of Fullerton Local Hazard Mitigation Plan

The City of Fullerton has received funding to develop a Local Hazard Mitigation Plan (LHMP). The purpose of this plan is to reduce or eliminate long-term risk to the people and property of the City of Fullerton from the effects of natural hazard events. The Disaster Mitigation Act of 2000 requires all local governments to assess their risks to natural hazards and identify actions that can be taken in advance to reduce future losses. The law requires all local governments and districts to have an approved Local Hazard Mitigation Plan after November 1, 2004, to be eligible for certain federal disaster assistance and hazard mitigation funding programs.

The City of Fullerton, Community Development Department has taken the lead in developing this plan. The City has hired a consultant, AMEC Earth and Environmental, to manage the planning project. AMEC will facilitate the planning process, collect the necessary data, and perform other technical services, including preparing the risk assessment and plan document. However, the department and AMEC will need our help to successfully complete this project.

The hazard mitigation planning process is heavily dependent on the participation of representatives from local government agencies and departments, the public, and other stakeholder groups. A Hazard Mitigation Planning Committee will be formed to support this project and will include representatives from the city, county, communities, special districts, and other local, state, and federal agencies in or that serve the City of Fullerton.

Your department's participation on the committee is requested due to your ability to contribute needed information, technical knowledge, or other valuable experience to the plan. Please designate a representative to serve on the committee and attend the kickoff meeting, which will discuss the benefits of developing a hazard mitigation plan, the project schedule, and the hazards that affect the City of Fullerton, such as wildfire, floods, drought, and more.

City of Fullerton Local Hazard Mitigation Plan Kickoff Meeting
Wednesday, December 17, 2008
9:00 am-12:00 pm
City of Fullerton Main Library
Meeting Room B (Osborne Auditorium)

Please respond as to whether or not you or your representative will be able to attend the kickoff meeting by contacting Heather Allen at x6884 or HeatherA@ci.fullerton.ca.us. Thank you for your early attention and response to this important project. I look forward to seeing you on December 17.

Sincerely,
Heather

Heather Allen
Senior Planner
City of Fullerton
Community Development Department

12/5/2008

CITY OF FULLERTON

Community Development Department

December 8, 2008

FEMA Region IX - Hazard Mitigation
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

RE: City of Fullerton Local Hazard Mitigation Plan

The City of Fullerton has received funding to develop a Local Hazard Mitigation Plan (LHMP). The purpose of this plan is to reduce or eliminate long-term risk to the people and property of the City of Fullerton from the effects of natural hazard events. The Disaster Mitigation Act of 2000 requires all local governments to assess their risks to natural hazards and identify actions that can be taken in advance to reduce future losses. The law requires all local governments and districts to have an approved Local Hazard Mitigation Plan after November 1, 2004, to be eligible for certain federal disaster assistance and hazard mitigation funding programs.

The City of Fullerton, Community Development Department has taken the lead in developing this plan. The City has hired a consultant, AMEC Earth and Environmental, to manage the planning project. AMEC will facilitate the planning process, collect the necessary data, and perform other technical services, including preparing the risk assessment and plan document. However, the department and AMEC will need your help to successfully complete this project.

The hazard mitigation planning process is heavily dependent on the participation of representatives from local government agencies and departments, the public, and other stakeholder groups. A Hazard Mitigation Planning Committee will be formed to support this project and will include representatives from the city, county, communities, special districts, and other local, state, and federal agencies in or that serve the City of Fullerton.

Your organization's participation on the committee is requested due to your ability to contribute needed information, technical knowledge, or other valuable experience to the plan. Please designate a representative to serve on the committee and attend the kickoff meeting, which will discuss the benefits of developing a hazard mitigation plan, the project schedule, and the hazards that affect the City of Fullerton, such as wildfire, floods, drought, and more.

City of Fullerton Local Hazard Mitigation Plan Kickoff Meeting
Wednesday, December 17, 2008
9:00 am-12:00 pm
City of Fullerton Main Library
Meeting Room B
353 W. Commonwealth Avenue
Fullerton, CA 92832

THE EDUCATION COMMUNITY

303 West Commonwealth Avenue, Fullerton, California 92832-1775
(714) 738-6540 • Fax (714) 738-3110 • Web Site: www.ci.fullerton.ca.us

Please respond as to whether or not you or your representative will be able to attend the kickoff meeting by contacting Heather Allen at (714) 738-6884 or HeatherA@ci.fullerton.ca.us. Thank you for your early attention and response to this important project. I look forward to seeing you or your representative on December 17.

Sincerely,

Heather Allen, Senior Planner
City of Fullerton, Community Development Department

Heather Allen

From: Heather Allen

Sent: Tuesday, December 09, 2008 10:31 AM

To: 'mike.ferdig@ocfa.org'; 'nadeem.majaj@rdmd.ocgov.com'; 'brian.anderson@rdmd.ocgov.com'; 'dlboston@ocsd.org'; 'rcheung@ocsd.org'; 'steve.franks@hcs.ocgov.com'; 'tim.neely@rdmd.ocgov.com'; 'ruby.maldonado@rdmd.ocgov.com'; 'bryan.speegle@ocgov.com'; 'ignacio.ochoa@rdmd.ocgov.com'

Subject: City of Fullerton Local Hazard Mitigation Plan

You are receiving this letter as a member of the Orange County Hazard Mitigation Plan Task Force. We understand that you are currently in the process of updating the County's Hazard Mitigation Plan. We would like to invite you to also provide input in the hazard planning efforts about to start in the City of Fullerton.

The City of Fullerton has received funding to develop a Local Hazard Mitigation Plan (LHMP). As you are aware, the purpose of this plan is to reduce or eliminate long-term risk to the people and property of the City of Fullerton from the effects of natural hazard events. The Disaster Mitigation Act of 2000 requires all local governments to assess their risks to natural hazards and identify actions that can be taken in advance to reduce future losses. The law requires all local governments and districts to have an approved Local Hazard Mitigation Plan after November 1, 2004, to be eligible for certain federal disaster assistance and hazard mitigation funding programs.

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Table A.2 HMPC Member List

Name	Department	Email	Address
City of Fullerton			
Hadi Tabatabaee	Building Department	hadit@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Heather Allen	Community Development	heather@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
John Godlewski	Community Development	johng@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Al Zelinka	Community Development	alz@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Thuy Nguyen	Engineering	thuyn@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Yelena Voronel	Engineering	yelenav@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Julie Kunze	Fire	jkunze@fullertonfire.org	312 W Commonwealth, Fullerton CA
Diana McCarthy	GIS	dianam@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Darryl Phillips	Human Resources	darrylp@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Tim Mountain	Library	tmountain@ci.fullerton.ca.us	353 W Commonwealth, Fullerton CA
Dan Diaz	Maintenance Services	dand@ci.fullerton.ca.us	1580 W Commonwealth, Fullerton CA
Dennis Quinlivan	Maintenance Services	dennis@ci.fullerton.ca.us	1580 W Commonwealth, Fullerton CA
Alice Loya	Parks and Recreation	alicel@ci.fullerton.ca.us	303 W Commonwealth, Fullerton CA
Tom Basham	Police	tbasham@fullertonpd.org	237 W Commonwealth, Fullerton CA
John Petruples	Police	jpetruples@fullertonpd.org	237 W Commonwealth, Fullerton CA
Alex Basteri	Police	rbasteri@fullertonpd.org	237 W Commonwealth, Fullerton CA
Steve Rubio	Police	srubio@fullertonpd.org	237 W Commonwealth, Fullerton CA
Orange County			
Molly McLaren Craig	Animal Care	mcraig@ochca.com	561 The City Drive Orange CA 92868
Other			
Jim Purpura	National Weather Service - San Diego Weather Forecast Office	jim.purpura@noaa.gov	11440 W Bernardo Court Suite 230, San Diego, CA
Michelle Kou	RBF Consulting	mkou@rbf.com	14725 Alton Parkway, Irvine, CA

Figure A.3 City of Fullerton Data Collection Guide

MULTI-HAZARD MITIGATION PLAN
DATA COLLECTION GUIDE

For

City of Fullerton
HAZARD MITIGATION PLANNING COMMITTEE (HMPC)

Prepared by

AMEC Earth and Environmental, Inc.

December 2008

WHAT IS MITIGATION?

Mitigation is one of four basic phases of disaster management, the other three including preparedness, response, and recovery. Mitigation is predicated on the principles that many losses are preventable through better community design and that each event should teach us how to reduce losses in the next disaster.

Mitigation generally means reducing long-term risk from hazards to acceptable levels through predetermined measures accompanying physical development, for example: strengthening structures to withstand earthquakes; prohibiting or limiting development in flood-prone areas; clearing defensible space around residences in Wildfire Urban Interface (WUI) areas; or designing development away from areas of geological instability.

Mitigation is different from emergency preparedness. The latter concentrates on activities which make a person, place, or organization ready to respond to a disaster with emergency equipment, food, emergency shelter, and medicine.

OVERVIEW

The contents of this workbook have been designed to assist the City of Fullerton in collecting necessary background information to support the hazard mitigation planning process pursuant to the Federal Disaster Mitigation Act (DMA) of 2000. This includes a hazard identification and vulnerability assessment, an assessment of the City's current hazard mitigation capabilities, and an identification of potential mitigation projects that, if undertaken, could prevent or reduce future losses.

The essential information needed to support the planning process includes background information about the City of Fullerton; plans, technical studies, and data related to hazards and risks; current governing codes, ordinances, regulations, and procedures whose intent is to minimize future losses; and an assessment of the City's technical and organizational capabilities to perform hazard mitigation/loss prevention functions. It is important that the plan shows what the City of Fullerton is doing now to limit future disaster losses.

The planning process is heavily dependent on existing data to be supplied by each of the participants represented on the Hazard Mitigation Planning Committee (HMPC). The DMA plan development process does not require the development of new data, but requires *existing data only*.

The goal of this process is to produce a hazard mitigation plan that meets the City's needs, as well as the requirements of DMA 2000 and that contains a list of projects that may be eligible for streamlined federal mitigation funding pre or post disaster.

PARTICIPATION

The DMA planning regulations and guidance stress that each entity seeking the required FEMA approval of their mitigation plan must:

- Participate in the process;

- Detail areas within the planning area where the risk differs from that facing the entire area;
- Identify specific projects to be eligible for funding; and
- Have the governing board formally adopt the plan.

For HMPC members, 'participation' means the planning committee representatives will:

- Attend and participate in HMPC meetings;
- Provide available data that is requested of the HMPC coordinator;
- Review and provide/coordinate comments on the draft plans;
- Advertise, coordinate and participate in the public input process; and
- Coordinate the formal adoption of the plan by the governing board.

DATA COLLECTION GUIDE

This guide contains an explanation of the types of hazard mitigation/loss prevention data that is needed for the hazard mitigation planning process. This guide identifies specific requirements for the Risk Assessment Process, which includes the Hazard Identification, Vulnerability, and Capability Assessments as well as defines requirements for development of the Mitigation Strategy.

The worksheets have been developed to assist with the data collection. These need to be completed by each person participating on the HMPC and will serve two purposes:

1) They will help facilitate the collection of the necessary information, and
2) They will function as evidence of "participation" in the planning process.

The Risk Assessment Process

The risk assessment process includes three components: 1) Hazard Identification, 2) Vulnerability Assessment, and 3) Capability Assessment. Data needs and worksheets for each of the risk assessment components are included in the following pages.

City of Fullerton Multi-Hazard Mitigation Plan

WORKSHEET #1: HAZARD IDENTIFICATION

Name of Department/Jurisdiction:_____

Use this worksheet to identify possible hazards that may impact your jurisdiction. Please rank according to the guidelines that follow the table. Use the Hazard Event Worksheet #2 to to justify your conclusions.

Hazard	Frequency of Occurrence	Spatial Extent	Potential Magnitude	Significance	Hazard Map? (paper/GIS/ source)
Dam Failure					
Drought					
Earthquake					
Flood: 100-year					
Flood: Stormwater <100-year flood					
Human Health: Epidemic/Pandemic					
Human Health: West Nile Virus					
Landslide					
Severe Weather: Extreme Cold/ Freeze					
Severe Weather: Extreme Heat					
Severe Weather: Fog					
Severe Weather: Heavy Rains/Thunderstorm /Hail/Lightning					
Severe Weather: Tornado					
Severe Weather: Wind					
Soil Hazards: Erosion					
Soil Hazards: Liquifaction					
Soil Hazards: Subsidence					

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Volcano					
Wildfire					

Guidelines

Frequency of Occurrence:
Highly Likely: Near 100% probability in next year.
***Likely*:** Between 10 and 100% probability in next year or at least one chance in ten years.
***Occasional*:** Between 1 and 10% probability in next year or at least one chance in next 100 years.
***Unlikely*:** Less than 1% probability in next 100 years.

Potential Magnitude
***Catastrophic*:** More than 50% of area affected
***Critical*:** 25 to 50%
Limited: 10 to 25%
***Negligible*:** Less than 10%

Spatial Extent
***Limited*:** Less than 10% of planning area
***Significant*:** 10-50% of planning area
***Extensive*:** 50-100% of planning area

Significance (your subjective opinion)
Low, Medium, High

Prepared by:
Phone:
Email:

City of Fullerton Multi-Hazard Mitigation Plan

WORKSHEET #2: HISTORIC HAZARD EVENT

Name of Department/Jurisdiction:_____

Please fill out one sheet for each significant hazard event with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Opinion on likelihood of occurring again	
Source of information	
Comments	

Prepared by: _____
Phone: _____
Email: _____
Date:_____

Please return worksheets by mail, email, or fax to:
Jeanine Foster, AMEC Earth & Environmental
355 S. Teller St, Suite 300
Lakewood, CO 80226
fax: (303) 935-6575
email: jeanine.foster@amec.com

City of Fullerton Multi-Hazard Mitigation Plan

WORKSHEET #3: VULNERABILITY ASSESSMENT

Name of Department/Jurisdiction:_____

The purpose of this worksheet is to assess the vulnerable buildings, populations, critical facilities, infrastructure, and other important assets in your community by using the best available data to complete the table and questions that follow. Use the table on the next page to compile a detailed inventory of specific assets at risk including critical facilities and infrastructure; natural, cultural, and historical assets; and economic assets as defined below. These may include hospitals, fire stations, or historic buildings. Attach supporting documentation, such as photographs, reports, or plans if possible. In the hazard specific column of the asset inventory table, indicate if there is a specific hazard to which the asset is at risk.

Critical Facilities

FEMA generally defines four kinds of critical facilities:

- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, and/or water-reactive materials
- Hospitals, nursing homes, and housing likely to have occupants who may not be sufficiently mobile to avoid injury or death during a hazard event
- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for emergency response activities before, during, and after a hazard event
- Public and private utility facilities that are vital to maintaining or restoring normal services to hazard areas before, during, and after a hazard event

FEMA's HAZUS-MH loss estimation software uses the following three categories of critical assets. 'Essential facilities' are those that if damaged would have devastating impacts on disaster response and/or recovery. 'High potential loss facilities' are those that would have a high loss or impact on the community. Transportation and lifeline facilities are third category of critical assets; examples are provided below.

Essential Facilities	High Potential Loss Facilities	Transportation and Lifeline
▪ Hospitals and other medical facilities ▪ Police stations ▪ Fire station ▪ Emergency Operations Centers	▪ Power plants ▪ Dams/levees ▪ Military installations ▪ Hazardous material sites ▪ Schools ▪ Shelters ▪ Day care centers ▪ Nursing homes ▪ Main government buildings	▪ Highways, bridges, and tunnels ▪ Railroads and facilities ▪ Bus facilities ▪ Airports ▪ Water treatment facilities ▪ Natural gas facilities and pipelines ▪ Oil facilities and pipelines ▪ Communications facilities

Natural, Cultural, and Historical Assets

Natural resource assets may include wetlands, threatened and endangered species, or other environmentally sensitive areas. Historical assets include state and federally listed historic sites.

Economic Assets

Economic assets at risk may include major employers or primary economic sectors, such as agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster.

Asset Inventory

Name of Asset	Type	Replacement Value	Occupancy / Capacity #	Hazard Specific Info

Additional Vulnerability Questions

1. Number of flood insurance policies

2. Number of repetitive loss properties

3. Average depth of 100-year floodplain

4. Number of unreinforced masonry buildings

5. Hospitals built before 1973

6. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.

7. Describe development trends and expected growth areas and how they relate to hazard areas and vulnerability concerns/issues.

Prepared by: _____
Phone: _____
Email: _____
Date: _____

Please return worksheets by mail, email, or fax to:
Jeanine Foster, AMEC Earth & Environmental
355 S. Teller St, Suite 300
Lakewood, CO 80226
fax: (303) 935-6575
email: jeanine.foster@amec.com

City of Fullerton Multi-Hazard Mitigation Plan

WORKSHEET #4: CAPABILITY ASSESSMENT

Name of Department/Jurisdiction: _____

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete this worksheet and provide supporting documentation if possible.

Regulatory

The following planning and land management tools are typically used by local jurisdictions to implement hazard mitigation activities. Please indicate which of the following your jurisdiction has in place. If your jurisdiction does not have this capability or authority, please indicate in the comments column if a higher level of government has the authority. Also use the comments column to indicate how we can obtain a copy of the plan or document (i.e. available on the web, will put on ftp, will email or mail).

Regulatory Tool (ordinances, codes, plans)	Y/N	Comments
General plan		
Zoning ordinance		
Subdivision ordinance		
Growth management ordinance		
Floodplain ordinance		
Other special purpose ordinance (stormwater, steep slope, wildfire)		
Building code		Version:
BCEGS Rating		
Fire department ISO rating		Rating:
Erosion or sediment control program		
Stormwater management program		
Site plan review requirements		
Capital improvements plan		
Economic development plan		
Local emergency operations plan		
Other special plans		
Flood insurance study or other engineering study for streams		
Elevation certificates		
Other		

Administrative/Technical

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your jurisdiction. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, please indicate so in the comments column.

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with knowledge of land development/land management practices			
Engineer/Professional trained in construction practices related to buildings and/or infrastructure			
Planner/Engineer/Scientist with an understanding of natural hazards			
Personnel skilled in GIS			
Full time building official			
Floodplain Manager			
Emergency Manager			
Grant writer			
Other personnel			
GIS Data – Hazard areas			
GIS Data - Critical facilities			
GIS Data – Building footprints			
GIS Data – Land use			
GIS Data – Links to Assessor's data			
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)			
Other			

Fiscal

Identify whether your jurisdiction has access to or is eligible to use the following financial resources for hazard mitigation

Financial Resources	Accessible/Eligible to Use (Y/N)	Comments
Community Development Block Grants		
Capital improvements project funding		
Authority to levy taxes for specific purposes		
Fees for water, sewer, gas, or electric services		
Impact fees for new development		
Incur debt through general obligation bonds		
Incur debt through special tax bonds		
Incur debt through private activities		
Withhold spending in hazard prone areas		
Other		

Additional Capabilities Questions

1. Does your community have any hazard-related certifications, such as Storm Ready certification or Firewise Communities certification?

2. List any past or ongoing public education or information programs, such as for responsible water use, earthquake or fire safety, household preparedness, or environmental education.

3. List any other past or ongoing projects or programs designed to reduce disaster losses. These may include projects to protect critical facilities.

Prepared by: _____
Phone: _____
Email: _____
Date:_____

Please return worksheets by mail, email, or fax to:
Jeanine Foster, AMEC Earth & Environmental
355 S. Teller St, Suite 300
Lakewood, CO 80226
fax: (303) 935-6575
email: jeanine.foster@amec.com

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The Mitigation Strategy

One of the planning process' last activities will be for HMPC members to prepare brief descriptions of proposed mitigation projects that would effectively reduce future disaster losses. This section provides guidance on the categories of mitigation measures to be considered and a mitigation project outline with one example projects.

Categories of Mitigation Measures

PREVENTION: Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- ***Planning***
- ***Zoning***
- ***Open Space Preservation***
- ***Land Development Regulations***
  - ***Subdivision regulations***
  - ***Building Codes***
    - ***Fire-Wise Construction***
  - ***Floodplain development regulations***
  - ***Geologic Hazard Areas development regulations (for roads too!)***
- ***Storm Water Management***
- ***Fuels Management, Fire-Breaks***

EMERGENCY SERVICES measures protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- ***Warning*** (flooding, tornadoes, winter storms, geologic hazards, fire)
  - NOAA Weather Radio
  - Sirens
  - "Reverse 911" (Emergency Notification System)
- ***Emergency Response***
  - ***Evacuation & Sheltering***
  - ***Communications***
  - ***Emergency Planning***
    - Activating the EOC (emergency management)
    - Closing streets or bridges (police or public works)
    - Shutting off power to threatened areas (utility company)
    - Holding/releasing children at school (school district)
    - Passing out sand and sandbags (public works)
    - Ordering an evacuation (mayor)
    - Opening emergency shelters (Red Cross)
    - Monitoring water levels (engineering)
    - Security and other protection measures (police)
- ***Critical Facilities Protection (Buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)***

        - Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
        - Lifeline Utilities Protection
    - ***Post-Disaster Mitigation***
        - Building Inspections
        - ID mitigation opportunities & funding before reconstruction

PROPERTY PROTECTION: Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- ***Retrofitting/disaster proofing***
    - ***Floods***
        - Wet/Dry floodproofing (barriers, shields, backflow valves)
        - Relocation/Elevation
        - Acquisition
        - Retrofitting
    - ***High Winds/Tornadoes***
        - Safe Rooms
        - Securing roofs and foundations with fasteners and tie-downs
        - Strengthening garage doors and other large openings
    - ***Winter Storms***
        - Immediate snow/ice removal from roofs, tree limbs
        - "Living" snow fences
    - ***Geologic Hazards (Landslides, earthquakes, sinkholes)***
        - Anchoring, bracing, shear walls
        - Dewatering sites, agricultural practices
        - Catch basins
    - ***Drought***
        - Improve water supply (transport/storage/conservation)
        - Remove moisture competitive plants (Tamarisk/Salt Cedar)
        - Water Restrictions/Water Saver Sprinklers/Appliances
        - Grazing on CRP lands (no overgrazing-see Noxious Weeds)
        - Create incentives to consolidate/connect water services
        - Recycled wastewater on golf courses
    - ***Wildfire, Grassfires***
        - Replacing building components with fireproof materials
            - Roofing, screening
        - Create "Defensible Space"
        - Installing spark arrestors
        - Fuels Modification
    - ***Noxious Weeds/Insects***
        - Mowing
        - Spraying

- Replacement planting
- Stop overgrazing
- Introduce natural predators

o ***Insurance***

NATURAL RESOURCE PROTECTION: Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- o storage of floodwaters
- o absorption of flood energy
- o reduction in flood scour
- o infiltration that absorbs overland flood flow
- o groundwater recharge
- o removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- o habitat for flora and fauna
- o recreational and aesthetic opportunities

Methods of protecting natural resources include:

- o ***Wetlands Protection***
- o ***Riparian Area/Habitat Protection/Threatened-Endangered Species***
- o ***Erosion & Sediment Control***
- o ***Best Management Practices***

  Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:

1. Avoidance: setting construction projects back from the stream.
2. Reduction: Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
3. Cleanse: Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained

- o ***Dumping Regulations***
- o ***Set-back regulations/buffers***
- o ***Fuels Management***

- ***Water Use Restrictions***
- ***Landscape Management***
- ***Weather Modification***

STRUCTURAL PROJECTS have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they "stop" flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.

- They disturb the land and disrupt natural water flows, often destroying habitats or requiring Environmental Assessments.

- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.

- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.

- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- ***Detention/Retention structures***
- ***Erosion and Sediment Control***
- ***Basins/Low-head Weirs***
- ***Channel Modifications***
- ***Culvert resizing/replacement/Maintenance***
- ***Levees and Floodwalls***
- ***Anchoring, grading, debris basins (for landslides)***
- ***Fencing (for snow, sand, wind)***
- ***Drainage System Maintenance***
- ***Reservoirs(for flood control, water storage, recreation, agriculture)***
- ***Diversions***
- ***Storm Sewers***

PUBLIC INFORMATION: A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- ***Hazard Maps and Data***
- ***Outreach Projects*** (mailings, media, web, speakers bureau, displays)

- ***Library Resources***
- ***Real Estate Disclosure***
- ***Environmental Education***

Mitigation Strategy Worksheet
(To Demonstrate Continued Compliance with the NFIP)

Status/activities of current NFIP/CRS programs:

Specific activities that the jurisdiction will undertake to ensure continued compliance with the NFIP/CRS:

Mitigation Action Worksheet

Instructions: Use this guide to record potential mitigation projects (1 page per project) identified during the planning process. Provide as much detail as possible and use additional pages as necessary. These will be collected following HMPC meetings on mitigation goals and measures and included in the plan.

Mitigation Action:
Jurisdiction:

Action Title:

Priority:

Background/Issue:

Ideas for Implementation:

Responsible Agency:

Partners:

Potential Funding:

Cost Estimate:

Benefits:
(Losses Avoided)

Timeline:

Worksheet Completed by:

Figure A.4 HMPC Meeting Agendas and Sign In Sheets

AGENDA
City of Fullerton
Local Hazard Mitigation Planning Project
Kickoff Meeting

HAZARD MITIGATION PLANNING COMMITTEE MEETING (HMPC) #1
December 17, 2008

1. Introductions
2. Mitigation, Mitigation Planning, & the Disaster Mitigation Act Requirements
3. The Role of the Hazard Mitigation Planning Committee (HMPC)
4. Planning for Public Input
5. Coordinating with Other Agencies
6. Introduction to Hazard Identification
7. Data Collection Needs (Handout)
8. Questions and Answers/Adjourn

SIGN-IN SHEET
CITY OF FULLERTON
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC #1 – Kickoff Meeting

December 17, 2008 @ 9:00 am

Name/Title	Jurisdiction/Organization/Citizen	Address	Phone	E-mail
Heather Allen SR Planner	City of Fullerton	303 W. Commonwealth Av. Fullerton CA 92832	714 738 6584	heatherc@ci.fullerton.ca.us
TIM BASHAM	CITY OF FULLERTON	237 W. C/W FULLERTON 92832	738-6817	TBASHAM@FULLERTONPD.ORG.
Dan Diaz	COF	1580 W. Commonwealth Full	738-6725	DaDD@ci.fullerton.ca.us
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AGENDA
City of Fullerton
Hazard Mitigation Planning Project
HMPC #2
August 27, 2009

1. Introductions
2. LHMP Project Status
3. Risk Assessment Summary
4. Risk Assessment Work Session
5. Data Collection Needs
6. Next Steps

SIGN-IN SHEET
City of Fullerton
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Meeting #2

August 27, 2009

Name	Jurisdiction/Organization/Citizen	Address	Phone	E-mail
Heather Allen	CofF - Planning	303 W. Commonwealth	714. 738. 6884	heathera@ci.fullerton.ca.us
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AGENDA
City of Fullerton
Local Hazard Mitigation Project
Team Meetings #3 & 4
December 15 & 16, 2009

December 15: Afternoon

1) Introductions

2) Status of the DMA Planning Process

3) Review of Risk Assessment Summary

4) Develop Plan Goals and Objectives

5) Review of Mitigation Alternatives

6) Review Mitigation Selection Criteria

December 16: Afternoon

1) Finalize Goals and Objectives

2) Identify Mitigation Projects

3) Prioritize Mitigation Projects

4) Develop Mitigation Projects

5) Review of Schedule/Data Needs

SIGN-IN SHEET
City of Fullerton
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Meeting #3

December 15, 2009

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John Godlewski	FULLERTON PLANNING		6554	JOHNG@ "
Heather Allen	COF		6884	heatherA@ "
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SIGN-IN SHEET
City of Fullerton
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Meeting #4

December 16, 2009

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Heather Allen	Planning	City Hall	6804	heatherallen

Figure A.5 City of Fullerton Public Meeting Press Release

Press Release

City of Fullerton

Press release 15510
Subject: Public meeting set on draft local hazard mitigation plan
Contact: Heather Allen
Senior Planner
(714) 738-6884
or
Sylvia Palmer Mudrick
Public Information Coordinator
(714) 738-6317

Release date: July 1, 2010

Meeting set on draft local hazard mitigation plan

The draft of the "Local Hazard Mitigation Plan" for the City of Fullerton will be presented for public input at the Wednesday, July 14, meeting of the Fullerton Planning Commission.

The meeting will be held at 7 p.m. in the Council Chamber of Fullerton City Hall, 303 W. Commonwealth Ave.

Fullerton Senior Planner Heather Allen, who is coordinating preparation of the draft, explained the plan will be presented as an informational item only; no action will be taken on it at the meeting.

"We are presenting the plan to get public input," Allen said. "The public's comments will be welcomed and valued in this important project."

Allen explained the "Local Hazard Mitigation Plan" (LHMP) addresses "a comprehensive list of hazards ranging from earthquakes and wildfires to severe weather events such as drought and winter storms, and will assess the likely impacts of these hazards on the city.

"In addition, it will set goals and prioritize projects to reduce the impacts of future disasters on people and property in the city."

She added having the LHMP will allow the city to maintain its eligibility for funding from the Federal Emergency Management Agency (FEMA).

Allen said the draft of the LHMP has been placed on the City of Fullerton website – www.ci.fullerton.ca.us. It is also available for public review in the Community Development Department of the second floor of Fullerton City Hall, 303 W. Commonwealth Ave., and at the Fullerton Main Library, 353 W. Commonwealth.

Once the public comments have been incorporated into the document, the plan will be submitted to both FEMA and the California Emergency Management Agency. Once FEMA has approved the plan, it will come to the Fullerton City Council for adoption, and then will be implemented.

Citizens unable to attend the July 14 meeting may drop off their written comments at the Community Development Department, or fax them to Jeanine Foster of AMEC Earth and Environment, consultants on the process, at (303) 935-6575.

Comments may also be emailed to Allen at HeatherA@ci.fullerton.ca.us, or to Foster at jeanine.foster@amec.com.

Further information about the plan or the meeting may be obtained by emailing Allen or calling her at (714) 738-6884.

Persons requiring special accommodations to attend the meeting are asked to notify Allen prior to July 14.

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Figure A.6 Public Meeting Agenda and Sign in Sheets

CITY OF FULLERTON
PLANNING COMMISSION/LANDMARKS COMMISSION
REGULAR MEETING AGENDA
JULY 14, 2010 - 7:00 P.M.
Council Chambers
303 West Commonwealth Avenue, Fullerton, California

Persons addressing the Planning Commission/Landmarks Commission shall be limited to 3 minutes for matters not appearing on the agenda and 5 minutes for agenda items, unless an extension of time is granted by the Chair, subject to approval of the Planning Commission/Landmarks Commission. When any group of persons wishes to address the Commission, it shall be proper for the Chair to request that a spokesman be chosen to represent the group.

Public comment will be allowed on items on this agenda at the time the item is considered.

Public comment will be allowed on matters not appearing on the agenda but within the Planning Commission's/Landmarks Commission's jurisdiction, at the beginning of the agenda. No action may be taken on off-agenda items except as provided by law.

The Planning Commission's/Landmarks Commission's approval or denial of any action on this agenda shall become final and effective ten working days after its decision, unless an appeal is made in writing within this ten-day period to the City Council by either an applicant or an opponent. The filing of an appeal within such time limit shall stay the effective date of the order of the Planning Commission/Landmarks Commission until such time as the City Council has acted on the appeal. Anyone interested in making an appeal should contact the Community Development Department for assistance.

ROLL CALL

PLEDGE OF ALLEGIANCE

CONSENT CALENDAR

Minutes: Regular Meetings of June 9, 2010 and June 23, 2010

PUBLIC COMMENTS

PUBLIC HEARINGS

1. PRJ10-00399 – ZON10-00115 – ZON10-00076. APPLICANT: CRANE ARCHITECTURAL GROUP; PROPERTY OWNER: GEOFFREY AND COURTNEY PRICE. A request for a Conditional Use Permit and Development Project to construct a two-story detached structure on a property with an existing residence identified as historically significant (Henry Kroger House) in the City's historical building survey and located at 609 N. Raymond Avenue. The proposed structure would measure approximately 1,100 square feet and consists of a two-car garage and a limited second dwelling. The development includes the demolition of an existing detached garage. (located on the west side of Raymond Avenue between

Any writings or documents provided to a majority of the Planning Commission/Landmarks Commission regarding any item on this agenda will be made available for public inspection in the Community Development Department, City Hall, 303 West Commonwealth Avenue, 2nd Floor, Fullerton, California, during normal business hours, or on the City's website at www.ci.fullerton.ca.us.

approximately 25 feet and 125 feet south of Riverside Drive). (R-1-7.2 zone) (Mitigated Negative Declaration) (Staff Planner: Andrew Kusch).

RECOMMENDED ACTION: Approval, subject to conditions

2. PRJ10-00571 – CUP-484A. APPLICANT AND PROPERTY OWNER: JENCKS ENTERPRISES. A request to modify an existing Conditional Use Permit for 722, 736 and 748 West Commonwealth Avenue and 719, 729, 735, 741, and 749 Williamson Avenue to allow the auto sales, service and vehicle storage uses, in the locations approved under CUP-484, to be operated by one auto dealership or multiple business entities; specifically auto sales, on the West Commonwealth properties and service and vehicle storage on the Williamson properties. (generally between 305 feet and 645 feet west of Woods). (C-H zone) (Categorically exempt under Section 15301 of CEQA Guidelines) (Staff Planner: Heather Allen).

RECOMMENDED ACTION: Approval, subject to conditions

OTHER MATTERS

A. GENERAL PLAN CONSISTENCY - A request for a report from the Planning Commission regarding General Plan conformity with respect to the vacation of a 20 foot wide segment of right-of-way between Euclid Street and La Mesa Drive, with the recommendation to adopt the resolution finding General Plan conformity.

B. LOCAL HAZARD MITIGATION PLAN - Request for public input on the City of Fullerton Local Hazard Mitigation Plan (LHMP). The LHMP addresses a comprehensive list of hazards ranging from earthquakes and wildfires to severe weather events such as drought and winter storms and assesses the likely impacts of these hazards on the city. The LHMP then sets goals and prioritizes projects to reduce the impacts of future disasters on people and property in the City. The LHMP will also allow the City to maintain its eligibility for funding from the Federal Emergency Management Agency (FEMA). Once the public comments have been incorporated into the document, the plan will be submitted to both FEMA and the California Emergency Management Agency. Once FEMA has approved the plan, it will come to the Fullerton City Council for adoption, and then will be implemented.

C. COMMISSION/STAFF COMMUNICATION

D. REVIEW OF COUNCIL ACTIONS

E. AGENDA FORECAST

F. ADJOURNMENT. The next regularly-scheduled meeting of the Fullerton Planning Commission/Landmarks Commission will be August 11, 2010 at 7:00 p.m. at 303 West Commonwealth Avenue, Fullerton, California. **The July 28, 2010 meeting has been canceled.**

Planning Commission/Landmarks Commission meetings are rebroadcast at 6 p.m. the Thursday and Monday immediately following the meeting on the City's Government Cable Channel, Channel 3. Meetings are also streamed live on the City's website at www.ci.fullerton.ca.us.

Any writings or documents provided to a majority of the Planning Commission/Landmarks Commission regarding any item on this agenda will be made available for public inspection in the Community Development Department, City Hall, 303 West Commonwealth Avenue, 2nd Floor, Fullerton, California, during normal business hours, or on the City's website at www.ci.fullerton.ca.us.

AGENDA
City of Fullerton
Local Hazard Mitigation Planning Project
Public Meeting

July 14, 2010

1. Introductions
2. Mitigation, Disaster Mitigation Act Requirements, and the Planning Process
3. City of Fullerton: Local Hazard Mitigation Plan Overview
4. Project Schedule
5. Questions and Answers/Adjourn

SIGN-IN SHEET
CITY OF FULLERTON
LOCAL HAZARD MITIGATION PLANNING PROJECT
Public Meeting

July 14, 2010

Name	Jurisdiction/Organization/Citizen	Address	Phone	E-mail
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Appendix B. REFERENCES

American Red Cross. www.redcross.org

California Building Code. 2008. http://www.fire.ca.gov/fire_prevention/downloads/ICC_2009_Ch7A_2007_rev_1Jan09_Supplement.pdf

California Department of Finance. www.dof.ca.gov/Research/.

California Department of Fish and Game. www.dfg.ca.gov

California Department of Forestry and Fire Protection. http://www.fire.ca.gov.

California Department of Parks and Recreation Office of Historic Preservation. http://ohp.parks.ca.gov/.

California Department of Public Health. www.westnile.ca.gov.

California Department of Water Resources. www.water.ca.gov/.

California Emergency Management Agency. www.oes.ca.gov/.

California Employment Development Department. www.edd.ca.gov.

California Environmental Quality Act. http://ceres.ca.gov/ceqa/

California Geological Survey. www.conservation.ca.gov/CGS/.

California Historical Landmarks. http://ohp.parks.ca.gov/default.asp?page_id=21387

California Natural Diversity Database. www.dfg.ca.gov/biogeodata/cnddb/.

California Points of Historical Interest. http://ohp.parks.ca.gov/?page_id=21750

California Register of Historic Places. http://ohp.parks.ca.gov/default.asp?page_id=21238

California Volcanoes and Volcanics. U.S. Geological Survey, Cascades Volcano Observatory. http://vulcan.wr.usgs.gov/Volcanoes/California/.

Census 2000. U.S. Census Bureau. www.census.gov/.

Cities/Counties Ranked by Size, Numeric, and Percent Change. State of California Department of Finance. 2006. www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/ReportsPapers.php.

City of Fullerton. http://www.ci.fullerton.ca.us/

City of Fullerton Existing Conditions Report (2010).

City of Fullerton Drainage Master Plan (1996).

City of Fullerton Urban Water Management Plan (2005).

City of Fullerton Water Conservation Plan (EWCP).

City of Fullerton Water Supply Shortage Conservation Plan (2008).

California Fire Alliance. www.cafirealliance.org/communities_at_risk/.

Community Rating System. Federal Emergency Management Agency National Flood Insurance Program. www.fema.gov/business/nfip/crs.shtm.

Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies. Federal Emergency Management Agency. FEMA 386-3. 2003. www.fema.gov/plan/mit planning/howto3.shtm.

Disease Maps 2007. U.S. Geological Survey. http://diseasemaps.usgs.gov/.

Enhanced Fujita Scale. National Oceanic and Atmospheric Administration Storm Prediction Center. 2007. www.spc.noaa.gov/efscale/.

Federal Emergency Management Agency. www.fema.gov/news/disasters_state.fema?id=6.

FEMA Region IX. http://www.fema.gov/about/regions/regionix/index.shtm

Future Eruptions in California's Long Valley Area—What's Likely? U.S. Geological Survey. Fact Sheet 073-97. 1997. http://pubs.usgs.gov/fs/fs073-97/.

Getting Started: Building Support for Mitigation Planning. Federal Emergency Management Agency. FEMA 386-1. 2002. www.fema.gov/plan/mitplanning/howto1.shtm.

Golden Gate Weather Service. http://ggweather.com/ca-tornado.jpg.

The Great Pandemic: The United States in 1918-1919. U.S. Department of Health and Human Services. http://1918.pandemicflu.gov/your_state/california.htm.

Hazard Mitigation Planning and Hazard Mitigation Grant Program. Federal Register. Interim Final Rule. February 26, 2002. www.fema.gov/plan/mitplanning/interim_final_rules.shtm.

HAZUS-MH MR3. Federal Emergency Management Agency. 2007. www.fema.gov/plan/ prevent/hazus/index.shtm.

Influenza. World Health Organization Epidemic and Pandemic Alert and Response. www.who.int/csr/disease/influenza/en/.

Introduction to Hazard Mitigation. Federal Emergency Management Agency. FEMA IS-393.A. 2006. training.fema.gov/EMIWeb/IS/is393A.asp.

The Library of Congress, American Memory. http://memory.loc.gov/ammem/collections/habs_haer/.

Multi-Hazard Identification and Risk Assessment. Federal Emergency Management Agency. 1997. www.fema.gov/library/index.jsp.

National Climatic Data Center Storm Events Database. www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms.

National Flood Insurance Program. Federal Emergency Management Agency. www.fema.gov/about/programs/nfip/index.shtm.

Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities. National Institute of Building Science Multi-Hazard Mitigation Council. 2005. www.nibs.org/MMC/mmcactiv5.html.

National Environmental Policy Act. http://www.epa.gov/compliance/nepa/

National Institute of Building Science Multi-Hazard Mitigation Council. http://www.nibs.org/index.php/MMC/mmcactiv4.html

National Inventory of Dams. https://rsgis.crrel.usace.army.mil/apex/f?p=397:1:555098485465862.

National Oceanic and Atmospheric Administration National Climatic Data Center. www.noaa.gov.

National Register Information System. www.nr.nps.gov/.

National Register of Historic Places. www.nationalregisterofhistoricplaces.com.

National Resource Conservation Service. www.nrcs.usda.gov.

National Response Center. www.nrc.uscg.mil/.

National Weather Service. www.nws.noaa.gov

The Online Tornado FAQ. National Oceanic and Atmospheric Administration Storm Prediction Center. www.spc.noaa.gov/faq/tornado/.

Orange County Extreme Heat Plan.

Orange County Emergency Plan Care and Shelter Annex.

Oregon State University Spatial Climate Analysis Service, 2002. www.climatesource.com.

Original Fujita Scale. National Oceanic and Atmospheric Administration Storm Prediction Center. www.spc.noaa.gov/faq/tornado/f-scale.html.

PandemicFlu.gov. U.S. Department of Health and Human Services. www.pandemicflu.gov/.

Population and Housing Estimates for Cities, Counties and the State, 2001-2007, with 2000 Benchmark. State of California Department of Finance. 2007. www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/ReportsPapers.php.

Population, Housing Units, Area, and Density: 2000 (GCT-PH1). U.S. Census Bureau. 2000. www.census.gov/.

Population Projections for California and Its Counties 2000-2050, by Age, Gender and Race/Ethnicity. State of California Department of Finance. 2007. www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/ReportsPapers.php.

Probabilistic Seismic Hazard Assessment for the State of California. California Geological Survey. Open-File Report 96-08. 1996. www.consrv.ca.gov/CGS/rghm/psha/ofr9608/Pages/index.aspx.

Robert T. Stafford Disaster Relief and Emergency Act. Public Law 93-288, as amended, 42 U.S.C. 5121-5207. June 2007. www.fema.gov/pdf/about/stafford_act.pdf.

SHELDUS, Hazards Research Lab. University of South Carolina, www.sheldus.org/.

Social Science Data Analysis Network (Census 2000 data), www.censusscope.org/.

Southern California Edison (SCE) Emergency Preparedness and Hazard Mitigation Plan

Spatial Hazard Events and Losses Database for the United States. University of South Carolina Hazards Research Lab. www.cas.sc.edu/geog/hrl/SHELDUS.html.

State of California Department of Conservation Farmland Mapping and Monitoring Program. www.conservation.ca.gov/.

State of California Multi-Hazard Mitigation Plan. California Emergency Management Agency. 2007. www.hazardmitigation.oes.ca.gov/.

Storm Events Database. National Climatic Data Center. www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms.

Understanding Your Risks: Identifying Hazards and Estimating Losses. Federal Emergency Management Agency. FEMA 386-2. 2001. www.fema.gov/plan/mitplanning/howto2.shtm.

U.S. Army Corps of Engineers. www.usace.army.mil

U.S. Bureau of Land Management. www.blm.gov.

U.S. Bureau of Reclamation. Press Release: "*Reclamation Commissioner Connor Announces Contract for Dam Safety Work of Folsom Reservoir's Dikes 4 and 6*." August 19, 2009. http://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=29501

U.S. Center for Disease Protection. www.cdc.gov

U.S. Drought Monitor. University of Nebraska-Lincoln National Drought Mitigation Center. http://drought.unl.edu/dm/.

U.S. Fish and Wildlife Service. www.fws.gov/sacramento/.

U.S. Forestry Service. http://www.fs.fed.us.

U.S. Geological Survey. http://pubs.usgs.gov/fs/fs073-97/eruptions.html.

Western Regional Climate Center. www.wrcc.dri.edu/.

Appendix C. MITIGATION CATEGORIES, ALTERNATIVES, SELECTION CRITERIA

C.1 Categories of Mitigation Measures Considered

The following categories are based on the Community Rating System. To accommodate other hazards, multi-hazard examples were added:

Prevention

- Planning and zoning
- Open space preservation
- Land development regulations
- Stormwater management
- Fuels management

Property Protection

- Firewise construction
- Defensible space/fuels modification
- Water supply
- Flood protection

Natural Resource Protection

- Erosion and sediment control
- Wetlands protection
- Threatened and endangered species protection
- Fuels management

Emergency Services

- Warning and evacuation
- Communications
- Critical facilities protection
- Lifeline utilities protection
- Health and safety maintenance

Structural Projects

- Detention/retention structures
- Sediment basins/low-head weirs

- Channel modifications
- Culvert resizing/replacement/maintenance
- Floodwalls

Public Information

- Hazard maps
- Outreach programs (mailings, media, web, speakers bureau)
- Education program (children/adults)

C.2 Alternative Mitigation Measures per Category

Prevention

Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open space preservation
- Land development regulations
  - Subdivision regulations
  - Floodplain development regulations
- Stormwater management
- Fuels management, fire breaks
- Building codes
  - Firewise construction
- (also see Property Protection)

Emergency Services

Emergency services protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (floods, tornadoes, ice storms, hail storms, dam failures)
  - NOAA weather radio all hazards
  - Sirens
  - Reverse 911
- Evacuation and sheltering
- Communications
- Emergency planning

  - Activating the emergency operations room (emergency management)
  - Closing streets or bridges (police or public works)
  - Shutting off power to threatened areas (utility company)
  - Holding children at school/releasing children from school (school district)
  - Passing out sand and sandbags (public works)
  - Ordering an evacuation (mayor)
  - Opening evacuation shelters (red cross)
  - Monitoring water levels (engineering)
  - Security and other protection measures (police)
- Monitoring of conditions (dams)
- Critical facilities protection (buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)
  - Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
  - Lifeline utilities protection
  - Health and safety maintenance

Property Protection

Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- Retrofitting/disaster proofing
  - Floods
    - Wet/dry floodproofing (barriers, shields, backflow valves)
    - Relocation
    - Acquisition
  - Tornadoes
    - Safe rooms
    - Securing roofs and foundations with fasteners and tie-downs
    - Strengthening garage doors and other large openings
  - Drought
    - Improve water supply (transport/storage/conservation)
    - Remove moisture competitive plants (tamarisk/salt cedar)
    - Water restrictions/water saver sprinklers/appliances
    - Grazing on CRP lands (no overgrazing—see noxious weeds)
    - Create incentives to consolidate/connect water services
    - Recycled wastewater on golf courses

- Earthquakes
  - Removing masonry overhangs, bracing, and other parts
  - Tying down appliances, water heaters, bookcases, and fragile furniture so they will not fall over during a quake.
  - Installing flexible utility connections that will not break during shaking (pipelines, too)
- Wildland fire
  - Replacing building components with fireproof materials (roofing, screening)
  - Creating "defensible space"
  - Installing spark arrestors
  - Fuels modification
- Noxious weeds/insects
  - Mowing
  - Spraying
  - Replacement planting
  - Stop overgrazing
  - Introduce natural predators

- Insurance

Natural Resource Protection

Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- Storage of floodwaters
- Absorption of flood energy
- Reduction in flood scour
- Infiltration that absorbs overland flood flow
- Groundwater recharge
- Removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Erosion and sediment control
- Wetlands protection
- Riparian area/habitat protection
- Threatened and endangered species protection
- Fuels management
- Set-back regulations/buffers

- Best management practices—Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:
  - Avoidance—Setting construction projects back from the stream.
  - Reduction—Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
  - Cleanse—Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained
- Dumping regulations
- Water use restrictions
- Weather modification
- Landscape management

Structural Projects

Structural projects have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they "stop" flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/retention structures
- Erosion and sediment control

- Basins/low-head weirs
- Channel modifications
- Culvert resizing/replacement/maintenance
- Levees and floodwalls
- Fencing (for snow, sand, wind)
- Drainage system maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm sewers

Public Information

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard maps and data
- Outreach projects (mailings, media, web, speakers bureau)
- Library resources
- Real estate disclosure
- Environmental education
- Technical assistance

C.3 Mitigation Alternative Selection Criteria

The following criteria were used to select and prioritize proposed mitigation measures:

STAPLE/E

- **Social**—Does the measure treat people fairly? (different groups, different generations)
- **Technical**—Will it work? (Does it solve the problem? Is it feasible?)
- **Administrative**—Do you have the capacity to implement and manage project?
- **Political**—Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?
- **Legal**—Does your organization have the authority to implement? Is it legal? Are there liability implications?
- **Economic**—Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?
- **Environmental**—Does it comply with environmental regulations?

Sustainable Disaster Recovery

- Quality of life
- Social equity
- Hazard mitigation
- Economic development
- Environmental protection/enhancement
- Community participation

Smart Growth Principles

- Infill versus sprawl
- Efficient use of land resources
- Full use of urban resources
- Mixed uses of land
- Transportation options
- Detailed, human-scale design

Other

- Does measure address area with highest risk?
- Does measure protect …
  - The largest # of people exposed to risk?
  - The largest # of buildings?
  - The largest # of jobs?
  - The largest tax income?
  - The largest average annual loss potential?
  - The area impacted most frequently?
  - Critical infrastructure (access, power, water, gas, telecommunications)?
- What is timing of available funding?
- What is visibility of project?
- Community credibility

City of Fullerton Local Hazard Mitigation Project

Initial Prioritization Process

HMPC Meeting #4

December 16, 2009

Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Multi-Hazard	
Tree Master Plan Update	Multi-hazard	9/Complete
Community Forest Master Plan Update	Multi-hazard	NEW/Complete
Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program	Multi-hazard	12/Complete
Hazardous Materials GIS improvements	Multi-hazard	5/Complete
Acacia Grade Separation	Multi-hazard	NEW/Complete
State College Grade Separation	Multi-hazard	NEW/Complete
Raymond Grade Separation	Multi-hazard	NEW/Complete
Data Gathering and GIS Tracking of Police and Fire Calls for Service in Response to Natural Hazard Events	Multi-hazard	NEW/Complete
GIS Integration	Multi-hazard	NEW/Complete
GIS tracking of Historic, Cultural,and Natural Resources	Multi-hazard	NEW/Complete
Structure Buy Out Program and Conversion (Southwest Fullerton) to open space	Multi-hazard: flood, liquefaction	0/Complete
Brea Dam Safety and Maintenance Plan	Dam	2/Complete
Convert Lions Field/Richmond Park to Artificial Turf	Drought	0/Complete
Reservoir Rehabilitation	Drought & Earthquake	NEW/Complete
Water Main Replacement	Drought	NEW/Complete
Water Allocation Study	Drought	NEW/Complete
Water Meter Replacement	Drought	NEW/Complete
Park and Recreation Master Plan	Drought	0/Complete
Seismic Compliance/Retro Fit for Existing Structures – Public and Critical Facilities	Earthquake	5/Complete
Seismic Compliance/Retro Fit for Existing Structures – Private	Earthquake	14/Complete
Bastanchury Storm Drain Improvements	Flood/Erosion	9/Complete
Olive Street Storm Drain Improvements	Flood	NEW/Complete

Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
Harbor Slope Stabilization	Flood/Erosion/ Earthquake	8/Complete
Evaluate status of floodplain management program	Flood	8/Complete
Consider joining CRS	Flood	5/Complete
Modifying/Enforcing Fuels Modification Plans and Weed Abatement on Public Lands	Wildfire	0/Complete
Study for Protection of Existing EOC	Wildfire	1/Complete
Purchase Type 3 Engine	Wildfire	0/Complete

23 overall points for earthquake; 3 for multi-hazard; 20 for wildfire

Appendix D. ADOPTION RESOLUTIONS

Note to Reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region IX, the adoption resolutions will be signed by the participating jurisdictions and added to this appendix. A model resolution is provided below:

Resolution # _____

Adopting the City of Fullerton Local Hazard Mitigation Plan

Whereas, (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

Whereas, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, (Name of Government/District/Organization) fully participated in the FEMA-prescribed mitigation planning process to prepare this local hazard mitigation plan; and

Whereas, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the City of Fullerton Local Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body;

Whereas, the (Name of Government/District/Organization) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the City of Fullerton Local Hazard Mitigation Plan;

Whereas, adoption by the governing body for the (Name of Government/District/Organization), demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this Local Hazard Mitigation Plan.

Whereas, adoption of this legitimacies the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

Now, therefore, be it resolved, that the (Name of Government/District/Organization) adopts the City of Fullerton Local Hazard Mitigation Plan as an official plan; and

Be it resolved, that the (Name of Government/District/Organization) adopts the City of Fullerton Local Hazard Mitigation Plan by reference into the safety element of their general plan in accordance with the requirements of AB 2140, and

Be it further resolved, (Name of Government/District/Organization) will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000 and to establish conformance with the requirements of AB 2140.

Passed:_____
(date)

_____
Certifying Official

Appendix E. CRITICAL FACILITIES

This appendix serves to give greater detail regarding the properties and critical facilities that are at risk to the natural hazards described in Chapter 4 of the main plan.

Table E.1 gives detailed descriptions of all of the critical facilities located in the City of Fullerton.

Table E.1 Fullerton Critical Facilities

Facility Type	Facility Name	Facility Address
Airport	Fullerton Airport	4011 W Commonwealth Ave
Bridge	CA025591	Orangethorpe Ave
Bridge	CA025593	Magnolia Ave
Bridge	CA025728	Route 91 WB
Bridge	CA025732	S5-E91/N5 Sep
Bridge	CA025733	W91-N5 Conn Ramp
Bridge	CA025735	State Route 91 WB
Bridge	CA025737	State Route 91 EB
Bridge	CA025994	Route 57
Bridge	CA026006	State Route 57
Bridge	CA026008	Route 57
Bridge	CA026010	Route 57
Bridge	CA026012	Yorba Linda Blvd
Bridge	CA026014	Route 90
Bridge	CA026021	E91-Magnolia Av Of
Bridge	CA026035	State Route 57
Bridge	CA026056	N5-W91 Connector R
Bridge	CA026058	Route 91 EB
Bridge	CA026620	Brookhurst Rd
Bridge	CA026685	Basque Ave
Bridge	CA026686	Richman Ave
Bridge	CA026687	Ford Ave
Bridge	CA026688	Highland Ave
Bridge	CA026689	Malden Ave
Bridge	CA026690	Union Ave
Bridge	CA026691	Valley View Dr
Bridge	CA026692	Valencia Drive
Bridge	CA026693	Edward Ave
Bridge	CA026694	Gilbert St

Facility Type	Facility Name	Facility Address
Bridge	CA026695	Basque Ave
Bridge	CA026696	Valencia Dr
Bridge	CA026697	Citrus Ave
Bridge	CA026701	Woods Ave
Bridge	CA026702	Richman Ave
Bridge	CA026703	Malden Ave
Bridge	CA026733	Berkley Ave
Bridge	CA026734	Gilbert St
Bridge	CA026736	Malvern Ave
Bridge	CA026737	Magnolia Ave
Bridge	CA026738	Euclid Ave
Bridge	CA026739	Highland Ave
Bridge	CA026740	Lemon St
Bridge	CA026750	Walnut Ave
Bridge	CA026779	Associated Rd
Bridge	CA026815	Harbor Blvd
Bridge	CA026841	Commonwealth Ave
Bridge	CA026923	Chevron Service Rd
Bridge	CA026979	Valencia Mesa Dr
Bridge	CA026980	E Las Palmas Dr
Bridge	CA026991	Burning Tree Rd
Bridge	CA027000	Magnolia Avenue
Bridge	CA027017	Las Palmas Drive
Bridge	CA026814	Harbor Blvd
Bridge	-	Acacia Ave Oc On Flood Channel
Bridge	-	Dorothy Ln Oc On Flood Channel
Bridge	-	Industrial Park Access On Flood Channel
Bridge	-	Bridgeport Cr Oc On Flood Channel
Bridge	-	Berkeley Ave Oc On Flood Channel
Bridge	-	Railroad Oc On Lemon St
Bridge	-	Railroad Oc On Harbor Blvd
Bridge	-	Walnut Ave Oc On Harbor Blvd
Bridge	-	Pedestrian Oc On Harbor Blvd
Bridge	-	Railroad Oc On Highland Ave
Bridge	-	Railroad Oc On Euclid St
Bridge	-	Railroad Oc On Gilbert Ave
Bridge	-	SR91 Oc On Gilbert St
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	SR91 Oc On Magnolia Ave

Facility Type	Facility Name	Facility Address
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	Magnolia Ave Oc Above Flood Channel
Church	United Pentecostal Church	1201 W Commonwealth Ave
Church	First Presbyterian Church	511 S Brookhurst Rd
Church	Morningside Presbyterian Church	1201 E Dorothy Ln
Church	Church Of Jesus Christ Of Lds	2225 N Euclid St
Church	Great Light Zoeun Church	2001 N State College Blvd
Church	First Presbyterian Church Of Fullerton	838 N Euclid St
Church	Grace Korean Church	1645 W Valencia Dr
Church	St Philip Benizi Church	235 S Pine Dr
Church	First Christian Church Of Fullerton	109 E Wilshire Ave
Church	St Mary's Catholic Church	400 W Commonwealth Ave
Church	First Evangelical Free Church Of Fullerton	2801 Brea Blvd
Church	First Church Of Christ Scientist	1300 N Raymond Ave
Church	St Andrews Episcopal Church	1231 E Chapman Ave
Church	Fullerton Alliance Church	620 S Roosevelt Ave
Church	Temple Baptist Church	1601 W Malvern Ave
Church	St Paul Lutheran Church	111 W Las Palmas Dr
Church	The Church Of Jesus Christ Of Latter Day	2470 Nutwood Ave
Church	Temple Beth Tikvah	1600 N Acacia Ave
Church	Church Of Jesus Christ Of Latter Day Saints	801 N Raymond Ave
Church	Congregational Church Of Fullerton	845 N Euclid St
Church	Emmanuel Episcopal Church	1145 W Valencia Mesa Dr
Church	Seventh Day Adventist Church	2355 W Valencia Dr
Church	St Luke's Lutheran Church	2000 W Valencia Dr
Church	Western Fullerton Baptist Church	3635 W Valencia Dr
Church	The True Light Mission Church	3710 W Valencia Dr
Church	Faith Deliverance Apostolic Church	1145 W Commonwealth Ave
Church	Jehovah Witnesses (Spanish And Filipino)	121 N Gilbert St
Church	New Wine Church	1425 S Brookhurst Rd
Church	First Korean Baptist Church	1425 S Brookhurst Rd
Church	Cornerstone Christian Fellowship	1465 W Orangethorpe Ave
Church	Cavalry Community Church	1465 W Orangethorpe Ave
Church	New Life Mission Church	112 E Walnut Ave
Church	Centerpoint Foursquare Church	412 E Commonwealth Ave
Church	Newsong Community Church	505 E Commonwealth Ave
Church	Fullerton First United Methodist Church	114 N Pamona Ave
Church	Wilshire Ave Community Church	212 E Wilshire Ave
Church	First Lutheran Church Of Fullerton	215 N Lemon St

Facility Type	Facility Name	Facility Address
Church	Orangethorpe Christian Church Of Fullerton	2200 W Orangethorpe Ave
Church	Grace Bible Chapel	1119 S Lambert Dr
Church	Eden Presbyterian Church	2200 W Orangethorpe Ave
Church	Orangethorpe United Methodist Church	2351 W Orangethorpe Ave
Church	True Love Korean Lutheran Church	1521 W Orangethorpe Ave
Church	Korean Methodist Church Of Southern Cali	214 N Highland Ave
Church	Majesty International Center	417 S Richman Ave
Church	Christian Life Center	404 W Wilshire Ave
Church	Central Korean Church	706 S Lemon St
Church	First Baptist Church Of Fullerton	212 E Wilshire Ave
Church	Jesus Grace Church	656 E Commonwealth Ave
Church	Hanmaum Presbyterian Church	3125 Laurel Ave
Church	The Church Of Jesus Christ Of Latter Day	2850 N State College Blvd
Church	Dongshin Presbyterian Church	2121 E Wilshire Ave
Church	St Stephen's Lutheran Church	2311 E Chapman Ave
Church	St Juliana Falconieri Church	1316 N Acacia Ave
Church	Fullerton Church Of Christ	2475 E Orangethorpe Ave
Church	Seeker's Chapel	1521 E Orangethorpe Ave
Church	God's House	598 S State College Blvd
Church	Ethiopian Christian Church	2545 E Chapman Ave Suite #216
Church	Eastside Christian Church	2505 Yorva Linda Blvd
Church	Sunny Hills Church Of Christ	2255 N Euclid St
City Hall	City Hall	303 W Commonwealth Ave
City Yard	City Yard	1580 W Commonwealth Ave
Community Center	Fullerton Senior Center	340 W Commonwealth Ave
Community Center	Maple Community Center	701 S Lemon St
Community Center	Garnet Community Center	3012 Garnet Ln
Community Center	Richman Community Center	320 W Elm Ave
Dams	Brea Dam	Brea Reservoir
Dams	Carbon Canyon Dam	Carbon Canyon Lake
Dams	Fullerton Dam	Fullerton Lake
Dams	Prado Dam	Prado Lake
Daycare	First Christian Church And Child Care	115 E Wilshire Ave
Daycare	My Own Home Day Care	227 W Whiting Ave
Daycare	Little Flower Montessori	703 E Commonwealth Ave
Daycare	Daystar Education Center	626 W Commonwealth Ave
Daycare	Little Wonder Daycare	1324 W Elm Ave
Daycare	Amerige Heights Shopping Center	
Daycare	Amalie Academy	1231 E Chapman Ave

Facility Type	Facility Name	Facility Address
Daycare	Fullerton Child Development	1701 E Chapman Ave
Daycare	Little Prints Family Daycare	1912 E Santa Fe Ave
Daycare	Mary's Family Daycare	1236 W Houston Ave
Daycare	Color Our World Daycare Ed Ctr	1613 W Valencia Dr
Daycare	St Stephen's Pre-School	2311 E Chapman Ave
Daycare	Arborland Montessori & Education	1700 W Valencia Dr
Daycare	Kids Adventure Learning Ctr	1834 W Valencia Dr
Daycare	Little Blessings Preschool	1425 S Brookhurst Rd
Daycare	Glow's Happy Child Daycare	2001 W Cherry Ave
Daycare	YMCA	2000 Youth Way
Daycare	Bumble Bee Christian Learning	2353 Williamson Ave
Daycare	Kinder Care Learning Ctr	3223 Associated Rd
Daycare	St Phillip's School Ext Day Care	215 S Pine Dr
Fire Station	Station 1	312 E Commonwealth Ave
Fire Station	Station 2	1732 W Valencia Dr
Fire Station	Station 3	700 S Acacia Ave
Fire Station	Station 4	3251 N Harbor Blvd
Fire Station	Station 5	2555 E Yorba Linda Blvd
Fire Station	Station 6	2691 Rosecrans Ave
Hospital	Saint Jude Medical Center	101 E Valencia Mesa Dr
Library	Main Library	353 W Commonwealth Ave
Library	Hunt Branch Library	201 S Basque Ave
Police Station	Police Station	237 W Commonwealth Ave
Power Facility	Southern California Edison	1851 W Valencia Dr
Power Facility	Southern California Edison	218 E Walnut Ave
School	Bumble Bee Christian Learning	2353 Williamson Ave
School	St. Phillips Elementary School	215 Pine Dr
School	Buena Park High School	6521 Magnolia Ave
School	James A. Whitaker Elementary	8401 Montana Ave
School	Laguna Road Elementary School	300 Laguna Rd
School	Woodcrest Elementary School	455 W Baker Ave
School	Nicolas Junior High School	1100 W Olive Ave
School	Golden Hill Elementary School	732 Barris Dr
School	D Russell Parks Jr High School	1710 Rosecrans Ave
School	Fern Drive Elementary School	1400 W Fern Dr
School	Fisler Elementary School	1350 Starbuck St
School	Cal State Fullerton	800 N State College Blvd
School	Arborland Montessori & Education	2121 Hughes Dr
School	Pacific Drive Elementary School	1501 W Valencia Dr

Facility Type	Facility Name	Facility Address
School	Seventh Day Adventist Church Elem	2353 W Valencia Dr
School	Sunset Lane Elementary School	2030 Sunset Ln
School	Valencia Park Elementary School	3441 W Valencia Dr
School	Hope University / Nutwood East	2500 E Nutwood Ave Bldg D
School	Fullerton College Children's Center	321 E Chapman Ave #1800
School	Hermosa Drive Elementary School	400 E Hermosa Dr
School	Orangethorpe Elementary School	1400 S Brookhurst Rd
School	Richman Elementary School	700 S Richman Ave
School	Sunny Hills High School	1801 Warburton Way
School	Fullerton College	321 E Chapman Ave
School	Boys And Girls Club	2435 W Valencia Dr
School	North Orange County Rop	1548 E Walnut Ave
School	Beechwood Elementary School	780 Beechwood Ave
School	Fullerton High School	201 E Chapman Ave
School	Maple Elementary School	244 E Valencia Dr
School	Troy High School	2200 E Dorothy Ln
School	S.Cal College Of Optometry	2575 Yorba Linda Blvd
School	Ladera Vista Junior High School	1700 E Wilshire Ave
School	Rolling Hills Elementary School	1460 E Rolling Hills Dr
School	Raymond Elementary School	517 N Raymond Ave
School	Western State Univ College Of Law	1111 N State College Blvd
School	Acacia Elementary School	1200 N Acacia Ave
School	St Juliana Falconieri School	1316 N Acacia Ave
School	Sierra Vista Elementary School	1811 N Placentia Ave
School	Commonwealth Elementary School	2200 E Commonwealth Ave
School	Topaz Elementary School	3232 Topaz Ln
School	Ruby Drive Elementary	601 Ruby Dr
School	Ivycrest Montessori	2025 E Chapman Ave
School	Head Start/Preschool	325 Courtney Ave
School	Christ Lutheran School	3401 N Harbor Blvd
School	Little Blessings Preschool	1425 S Brookhurst Rd
School	Endeavor School	951 N State College Blvd
Senior	Independent Living Partners	2820 Willow Ave
Senior	Orange Caregiver Resource Ctr	251 E Imperial Hwy # 460
Social Service	Salvation Army	318 N Raymond Ave
Social Service	Salvation Army	1020 S Raymond Ave # F
Transportation Center	Transportation Center	120 E Santa Fe Ave
Youth Center	Boys & Girls Club-Commonwealth Main Club	348 W Commonwealth Ave
Youth Center	Child Guidance Ctr - Family Ctr	2050 Youth Way

Facility Type	Facility Name	Facility Address
Youth Center	Boys & Girls Club - Commonwealth School	2200 E Commonwealth Ave
Youth Center	Boys & Girls Club - Richman	410 S Richman Ave
Youth Center	Boys & Girls Club - Valencia Park	2435 W Valencia Dr
Youth Center	Kiwanis Youth Park Scout Troop	386 W Truslow Ave
Youth Center	Fullerton Hills Softball	1440 Brea Blvd

Table E.2 lists all of the properties in the City of Fullerton that use or store hazardous materials on a day-to-day basis. These hazardous materials may be spilled or loosed into the environment during an occurrence of a natural hazard.

Table E.2 City of Fullerton Hazardous Materials Site List

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
BIMBO BAKERIES USA	366	S	Acacia	St		92831
WD & J MACHINE	443	S	Acacia	Ave		92831
ESNA LOGISTICS	500	S	Acacia	Ave		92831
SOLUTIONS UNLIMITED	501	S	Acacia	Ave		92831
YOKOHAMA TIRE	601	S	Acacia	Ave		92831
UPS FREIGHT	650	S	Acacia	Ave		92831
UPS FREIGHT	650	S	Acacia	Ave		92831
PLASTICOLOR	801	S	Acacia	Ave		92831
NORTON PRO DIAMOND	1345	S	Acacia	Ave		92831
D M STEEL	1355	S	Acacia	Ave		92831
OLSON-ECOLOGIC	1370	S	Acacia	Ave		92831
POWERTECH ENGINES	1410	S	Acacia	Ave	B	92831
ENVIRONMENTAL SYSTEMS PRODUCTS	1410	S	Acacia	Ave	A	92831
ABC CONSTRUCTION	1410	S	Acacia	Ave	C	92831
ADVANCED IMAGE DIRECT	1415	S	Acacia	Ave		92831
AEROFIT INC	1425	S	Acacia			92831
AT&T MOBILITY	1600	N	Acacia	Ave		92831
TIME WARNER CABLE	2011	N	Acacia	Ave		92831
WS PACKAGING	531		Airpark			92833
ANDERCO INC	540		Airpark	Dr		92833
PACIFIC BELL	143	E	Amerige	Ave		38232
PACIFIC BELL	143	E	Amerige	Ave		38232
ALLIANCE METALS	2410		Artesia	Ave		32833

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
GOSSCO MFG	2430		Artesia	Ave		32833
NATIONAL SIGNAL INC.	2440		Artesia	Ave		92833
SOCKET SOURCE	3801		Artesia	Ave		32833
STEIN INDUSTRIES	4005		Artesia	Ave		32833
SPECIALTY LIFT TRUCKS INC	4240		Artesia			92833
KEN GRODY AUTOMOTIVE	4325		Artesia	Ave		92833
TIKAL AUTO BODY	1100	E	Ash	Ave	F	92831
HI-JAY LAMINATES	1101	E	Ash	Ave	D	92831
SHREEJI PLATING AND COATING INC	1151	E	Ash	Ave		92831
ADVANCED IRON CONCEPTS	1165	E	Ash	Ave		92831
RAYMAC GRINDING	1207	E	Ash	Ave		92831
FAIRWEATHER ROOFING	1212	E	Ash	Ave		92831
KRYLER CORP	1217	E	Ash	Ave		92831
SANTANA SERVICES	1224	E	Ash	Ave		92831
KRYLER CORPORATION	1225	E	Ash	Ave		92831
NICKOLAS STEEL	1229	E	Ash	Ave		92831
AT & T MOBILITY	3245		Associated	Rd		92835
NEXTEL CA/PROPERTY SERVICES	3249		Associated	Rd		92835
C W POSS INC	201	S	Balcom	Ave		92831
C W POSS INC	201	S	Balcom	Ave		92831
SUNNY HILLS AUTOMOTIVE CENTER	100	W	Bastanchury	Rd		92835
SUNNY HILLS AUTOMOTIVE CENTER	100	W	Bastanchury	Rd		92835
GREENLEAF CARE CENTER	330	W	Bastanchury	Rd		92835
FULL SPECTRUM DERMOTOLOGY	333	W	Bastanchury	Rd	110	92835
LOMA VISTA MEMORIAL PARK INC	701	E	Bastanchury	Rd		92835
COYOTE DRY CLEANERS	1030	E	Bastanchury	Rd		92835
STATER BROTHERS	1040	E	Bastanchury	Rd		92835

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
COYOTE HILLS GOLF COURSE	1440	E	Bastanchury	Rd		92835
BREITBURN ENERGY CO	1450	E	Bastanchury	Rd		92835
CALIFORNIA MOLD	218		Berkeley	Cir		92832
BERKELEY CLEANERS	1182	N	Berkeley	Ave		92832
CO OF ORANGE/NORTH JUSTICE CTR	1275	N	Berkeley	Ave		92832
MODULAR SYSTEMS	4100		Bonita	Pl	A	92835
VIKING SUPPLY NET	4100		Bonita	Pl	B	92835
HOUDINI INC	4101		Bonita	Pl		92835
B I TECHNOLOGIES	4200		Bonita	Pl		92835
AT&T MOBILITY	1451	N	Brea	Blvd		92835
PARK VISTA MORNINGSIDE	2525	N	Brea	Blvd		92835
SUNNY SIDE CAR CARE CENTER	2701	N	Brea	Blvd		92835
SUNNY SIDE CAR CARE CENTER	2701	N	Brea	Blvd		92835
PLATINUM CLEANERS	3012	N	Brea	Blvd		92835
AT & T MOBILITY	167	S	Brookhurst	Rd		92833
MBM	500		Burning tree	Rd		92833
BERGER TRANSFER	501		Burning tree	Rd		92833
LABEL-AIRE INC	550		Burning tree	Rd		92833
COMANT INDUSTRIES	577		Burning tree	Rd		92833
IDEARC MEDIA COPR	701		Burning tree	Rd		92833
CONCRETE SOLUTIONS & SUPPLY	1220		Burt	Pl		92831
ORCO	1221		Burt			92831
CINGULAR WIRELESS / PCS LLC	1900		Camino Loma			92833
CITY POINT	130	E	Chapman	Ave		92832
FULLERTON UNION HIGH SCHOOL	201	E	Chapman	Ave		92832
FULLERTON COMMUNITY COLLEGE	321	E	Chapman	Ave		92832
PETRUSSE-NORRIS PAINTING	801	E	Chapman	Ave	208	92831

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
FULLERTON VALERO	1124	E	Chapman	Ave		92831
FULLERTON VALERO	1124	E	Chapman	Ave		92831
WALLGREENS	1250	E	Chapman	Ave		92831
NOBEL'S POOL & SPA	1340	E	Chapman	Ave		92831
NEXTEL CA/PROPERTY SERVICES	1342	E	Chapman	Ave		92831
AT&T MOBILITY	2311	E	Chapman	Ave		92831
VERIZON WIRELESS	2555	E	Chapman	Ave	409	92831
TRIGEN ENERGY CORP/COLLEGE PARK	2501	E	College	Pl		92831
B R B PROPERTIES	229	W	Commonwealth	Ave		92832
ROLLINGS AUTOMOTIVE	242	W	Commonwealth	Ave		92832
SUNNYHILLS ORTHOPEDIC	332	E	Commonwealth	Ave		92832
MULLAHEY CHEVROLET/FULLERTON KIA	600	W	Commonwealth	Ave		92832
HK AUTO MASTER	623	W	Commonwealth	Ave		92832
IMESA DENTAL LAB	626	E	Commonwealth	Ave		92831
MC COY MILLS FORD	700	W	Commonwealth	Ave		92832
J M O	709	W	Commonwealth			92832
ALLENS FORMAL WEAR INC	721	W	Commonwealth	Ave		92832
HERBS VOLVO INDEPENDENT	810	W	Commonwealth	Ave		92832
ECONO LUBE N TUNE #2	901	W	Commonwealth	Ave		92832
U-HAUL CENTER FULLERTON	920	W	Commonwealth	Ave		92832
COMMONWEALTH FULLERTON CAR WASH	1001	W	Commonwealth	Ave		92833
BIG O TIRES #587	1010	W	Commonwealth	Ave	A	92833
SUPER 8 ~FA0052786	1101	W	Commonwealth	Ave		92832
SUPER 8 ~FA0052786	1101	W	Commonwealth	Ave		92832
BOB'S 76 / CONOCOPHILLIPS #254851 ~ FA0052496	1133	E	Commonwealth	Ave		92831
BOB'S 76 / CONOCOPHILLIPS #254851 ~	1133	E	Commonwealth	Ave		92831

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
FA0052496						
CUSTOM RIDE	1404	W	Commonwealth	Ave		92833
SONS AUTO BODY AND REPAIR	1808	W	Commonwealth	Ave		92833
TRI-CHEM	1875	W	Commonwealth	Ave	F	92833
COMPLETE AUTO	1890	W	Commonwealth	Ave	4	92833
DJ WAGNER TOUCH OF CLASS	2013	W	Commonwealth	Ave	D	92833
RANDALL AASE MOTORS	2017	W	Commonwealth	Ave	G	92833
ERNEST C LADNER INC	2041	W	Commonwealth	Ave		92833
MARK UNION 76	2043	W	Commonwealth	Ave		92833
MARK UNION 76	2043	W	Commonwealth	Ave		92833
JIMENEZ BROTHERS ART & IRON WORKS	2311	W	Commonwealth	Ave		92833
FULLERTON TRANSMISSION SERVICE	2315	W	Commonwealth	Ave		92833
HARTE HANKS	2337	W	Commonwealth	Ave		92833
ADVANCED EQUIPMENT CORP	2401	W	Commonwealth	Ave		92833
RENAISSANCE FRENCH DOORS	2425	W	Commonwealth	Ave		92833
TEE MAX	3517	W	Commonwealth	Ave	A	92833
DNB ENGINEERING	3519	W	Commonwealth	Ave	G	92833
DNB ENGINEERING	3535	W	Commonwealth	Ave		92833
EXCALIBER	3621	W	Commonwealth	Ave		92833
TONYS GARAGE	3906	W	Commonwealth	Ave		92833
J & J AUTO SERVICE	3910	W	Commonwealth	Ave		92833
GENERAL AVIATION COMPANY	3915	W	Commonwealth	Ave		92833
GENERAL AVIATION COMPANY	3915	W	Commonwealth	Ave		92833
GRACE AUTO CARE	3950	W	Commonwealth	Ave		92833
FEDERAL AVIATION ADMIN	4111	W	Commonwealth	Ave		92833
AVIATION FACILITIES INC	4119	W	Commonwealth	Ave		92833
AVIATION FACILITIES INC	4119	W	Commonwealth	Ave		92833

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
AT & T MOBILITY	4128	W	Commonwealth	Ave		92833
PACIFIC PRESS CO	2418		Cypress	Way		92831
ROHNER MACHINERY	2430		Cypress	Way		92831
FOAM CRAFT	2441		Cypress	Way		92831
STARBUCK TRUCK REFINISHING	2442		Cypress	Way		92831
FUTURE FOAM	2451		Cypress	Way		92831
FUTURE FOAM	2451		Cypress	Way		92831
ANAHEIM POLICE DEPARTMENT HELIPORT	236	N	Dale	Pl		92833
EXPRESS PACKAGING	1826		Dawns	Way		92831
T & T INDUSTRIES	1835		Dawns	Way		92831
PIC INDUSTRIES	1851		Dawns	Way		92831
AT & T MOBILITY	1535		Deerpark	Dr		92831
TROY HIGH SCHOOL	2200		Dorothy	Ln		92831
ROYAL WELDING	1000	E	Elm	Ave		92831
ROMCO MFG	1010	E	Elm	Ave		92831
NELSON GRINDING	1014	E	Elm	Ave		92831
LANGE PRECISION	1110	E	Elm	Ave		92831
BRITALIA AUTO IMPORTS	1121	E	Elm	Ave		92831
R H SERVICES	1130	E	Elm	Ave		92831
S & H RUBBER INC	1141	E	Elm	St		92831
E & B SCRAP METAL	1147	E	Elm	Ave		92831
FULLERTON CUSTOM WORKS INC	1163	E	Elm	Ave		92831
AUTO ZONE #5523	102	N	Euclid	St		92832
G & S TRANSMSN & AUTO REP CTR	133	S	Euclid	St		92832
CVS PHARMACY	312	N	Euclid	St		92832
DRY CLEAN EXPRESS	322	N	Euclid	St		92832
STATER BROTHERS	333	N	Euclid	St		92832

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
GEHRINGER AUTOMOTIVE	700	S	Euclid	Ave	A	92832
RENICK CADILLAC	1100	S	Euclid	St		92832
AT & T MOBILITY	1415	S	Euclid	St		92832
CVS PHARMACY	1751	N	Euclid	St		92835
SUN RISE CLEANERS	1801	N	Euclid	St		92835
AT & T MOBILITY	3151	N	Euclid	St		92835
A-1 MACHINE & WELDING	2454	E	Fender	Ave	B	92831
AARCO DISPLAY PRODUCTS	2454	E	Fender	Ave		92831
PAINTING BY JIM & CO	2478	E	Fender	Ave	A	92831
JIMENES ORNAMENTAL IRON	2478	E	Fender	Ave	D	92831
MARTEC	2488	E	Fender	Ave	E	92831
DERMAGEN INC	2500	E	Fender	Ave	J	92831
CARNIVAL FUMIGATION	2512	E	Fender	Ave	G	92831
ESOTERIC WOODCRAFT	2524	E	Fender	Ave	I	92831
JB MACHINING	2524	E	Fender	Ave	D	92831
G & L MUSICAL INSTRUMENTS	2548	E	Fender	Ave	C	92831
D & A COATINGS AND RESTORATION	2560	E	Fender	Ave	G	92831
THOMPSON ENG	2560	E	Fender	Ave	A	92831
LEEPER MFG	2560	E	Fender	Ave	C	92831
REFRIGERATION TECHNOLOGIES	2584	E	Fender	Ave	C	92831
UNITED TOYS	119	N	Gilbert	St		92833
MILLERS AUTOMOTIVE	120	N	Gilbert	St		92833
LAM HOME FURNITURE	131	N	Gilbert	St		92833
JAY AUTO CENTER	502	N	Gilbert	St		92833
QUALITY TRANSMISSION	512	N	Gilbert	St		92833
CHOIS AUTO REPAIR	516	N	Gilbert	St		92833
WEST TEC COLLISION	518	N	Gilbert	St		92833

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
DR SMITH CARBURETOR	526	N	Gilbert	St		92833
AT & T MOBILITY	530	N	Gilbert	St		92833
CARGILL	550	N	Gilbert	St		92833
TNT FIREWORKS	555	N	Gilbert	St		92833
ULTRA WHEEL	570	N	Gilbert	St	A	92833
HEXCEL ENFORCEMENT	580	N	Gilbert	St		92833
CARGILL	600	N	Gilbert	St		92833
CARGILL	600	N	Gilbert	St		92833
DAESHIN	610	N	Gilbert	St		92833
OC SHERIFF COMMUNICATIONS	3001	N	Gilbert	St		92833
BLUE LINE DISTRIBUTING	330	S	Hale	Ave		92831
JACO ENVIRONMENTAL INC	331	S	Hale	St		92831
ARCO OF FULLERTON	519	S	Harbor	Blvd		92832
ARCO OF FULLERTON	519	S	Harbor	Blvd		92832
BANK REPO AUTOS	770	S	Harbor	Blvd		92832
FULLERTON CLASSIC HANDWASH INC	800	N	Harbor			92832
FULLERTON CLASSIC HANDWASH INC	800	N	Harbor			92832
COSTCO	900	S	Harbor	Blvd		92832
COSTCO GAS	910	S	Harbor	Blvd		92832
COSTCO GAS	910	S	Harbor	Blvd		92832
CHEVRON JOYCE/CARCOS KHALIL	1000	N	Harbor	Blvd		92832
CHEVRON JOYCE/CARCOS KHALIL	1000	N	Harbor	Blvd		92832
G & M OIL #136	1001	N	Harbor	Blvd		92832
G & M OIL #136	1001	N	Harbor	Blvd		92832
GREEN-O-CLEANERS	1101	N	Harbor	Blvd		92832
RALPHS #072	1121	N	Harbor	Blvd		92832
CEC / ATTN: LICENSING (Chuck E Cheese)	1134	S	Harbor	Blvd		92832

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
CONTINENTAL 1 HR CLEANERS	1428	S	Harbor	Blvd		92832
DUNN EDWARDS	1440	S	Harbor	Blvd		92832
HENRYS MARKET	1447	S	Harbor	Blvd		92832
PEP BOYS #642	1530	S	Harbor	Blvd		92832
SIMA SHELL #68812	1625	S	Harbor	Blvd		92832
SIMA SHELL #68812	1625	S	Harbor	Blvd		92832
ST JUDE MEDICAL	2151	N	Harbor	Blvd		92835
CVS PHARMACY	2200	N	Harbor	Blvd		92835
EVERGREEEN OF FULLERTON	2222	N	Harbor	Blvd		92835
AT & T MOBILITY	2222	N	Harbor	Blvd		92835
C & H CLEANERS	2231	N	Harbor	Blvd		92835
FULLERTON SURGICAL CENTER LLP	2240	N	Harbor	Blvd	100	92835
FULLERTON GOLF COURSE	2700	N	Harbor	Blvd		92835
ST ELIZABETH HEALTHCARE & REHAB	2800	N	Harbor	Blvd		92835
EXXONMOBIL OIL #11590	3950	N	Harbor	Blvd		92835
EXXONMOBIL OIL #11590	3950	N	Harbor	Blvd		92835
EZ LUBE #17	4002	N	Harbor	Blvd		92835
ALBERTSON'S # 6143	4100	N	Harbor	Blvd		92835
EXPRESS 1 CLEANERS	4120	N	Harbor	Blvd		92835
AT&T MOBILITY	4200	N	Harbor	Blvd		92835
BECKMAN COULTER INC	4300	N	Harbor	Blvd		92835
OEM PRESS SYSTEMS INC	311	S	Highland	Ave		92832
BILLS BODY WORKS INC	320	S	Highland	Ave		92832
FREEKS GARAGE INC	321	S	Highland	Ave		92832
AT & T MOBILITY	222	W	Houston	Ave		92832
WYNDAM HOTEL	222	W	Houston	Ave		92832
RAYTHEON CO	1801		Hughes	Dr		92833

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RAYTHEON CO	1801		Hughes	Dr		92833
NEXTELL CA/PROPERTY SERVICES	223		Imperial	Hwy	175	92835
VERIZON WIRELESS	369		Imperial	Hwy		92835
EXXONMOBIL OIL CORP #18-793 (11430)	2800	E	Imperial	Hwy		92835
EXXONMOBIL OIL CORP #18-793 (11430)	2800	E	Imperial	Hwy		92835
ARCO #82689 DBA: NIMEH INC	2840	E	Imperial	Hwy		92835
ARCO #82689 DBA: NIMEH INC	2840	E	Imperial	Hwy		92835
ORANGE COUNTY METAL PROCESSING	1711		Kimberly	Ave		92834
FEDERAL EXPRESS CORPORATION	2500		Kimberly	Ave		92831
PCE INDUSTRY INC	458		Lambert	Rd		92835
Q-RUN CORPORATION	486	E	Lambert	Rd		92835
WHITE BEAR CLEANERS	122	N	Lemon	St		92832
NEW LIFE SERVICE COMPANY	148	S	Lloyd	Ave	D	92833
CARS UNLIMITED	148	S	Lloyd	Ave	A	92833
JIMS AUTO CENTER/BRIDGES PARTS	300	S	Magnolia	Ave		92833
ROBERT MONZON GARAGE	112	N	Malden	Ave		92832
HYDRAFLOW	1881	W	Malvern	Ave		92833
TARGET STORE #1383	1893	W	Malvern	Ave		92833
INTERNATIONAL MERCHADISING	1928	W	Malvern	Ave		92833
PHYSICIANS SALES & SERVICE	1938	W	Malvern	Ave		92833
ALBERTSONS EXPRESS GAS - FA0048138	2211	W	Malvern	Ave		92833
ALBERTSONS EXPRESS GAS - FA0048138	2211	W	Malvern	Ave		92833
AMERIGE CLEANERS	2261	W	Malvern	Ave		92833
ALBERTONS #6165	2291	W	Malvern	Ave		92833
SUNJEEN INC	1340	S	Manhattan	Ave		92831
AIR DUCT PRODUCTS PECOS VENTURES LLC	1351	S	Manhattan	Ave		92831
ALBERTSONS INC	1421	S	Manhattan	Ave		92831

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
ELEGUZA TILES INC	1428		Manhattan	Ave		92831
VICTORY SCREEN	1450	S	Manhattan	Ave		92831
COOK EQUIPMENT COMPANY - ORANGE	1451		Manhattan	Ave		92831
PRECISION PLASTIC PRINTING	1456	S	Manhattan	Ave		92831
AMTREND CORPORATION	1458	S	Manhattan	Ave		92831
UNI FILTER INC	1468		Manhattan	Ave		92831
PULMUONE	2315		Moore	Ave		92833
UNITED PHARMA LCC	2317		Moore	Ave		92833
VAN LAW FOOD PRODUCTS	2325		Moore	Ave		92833
SASCO	2750		Moore	Ave		92833
MORNINGSIDE OF FULLERTON	800		Morningside	Cir		92833
T-MOBIL USA INC	2600	E	Nutwood	Ave		92831
MARRIOTT HOTEL	2701	E	Nutwood	Ave		92831
CHASE SUITES	2932	E	Nutwood	Ave		92831
NEXTELL CA/PROPERTY SERVICES	2932	E	Nutwood	Ave		92831
CHEVRON USA #96091/G. KIMURA	2950	E	Nutwood	Ave		92831
CHEVRON USA #96091/G. KIMURA	2950	E	Nutwood	Ave		92831
DOLLAR TREE	221		Orangefair			92832
EL TORITO RESTAURANT # 178	101	E	Orangethorpe	Ave		92832
LIZS TAYLORING & CLEANERS	121	W	Orangethorpe	Ave		92832
METRO CLEANERS	130	W	Orangethorpe	Ave		92832
TARGET #1418/ENV. COMP	200	W	Orangethorpe	Ave		92832
DISCOUNT TIRE CENTERS	301	W	Orangethorpe	Ave		92832
KRAGEN AUTO PARTS	904	W	Orangethorpe	Ave		92832
FOOD 4 LESS	914	W	Orangethorpe	Ave		92832
G & M OIL INC #10	944	W	Orangethorpe	Ave		92832
G & M OIL INC #10	944	W	Orangethorpe	Ave		92832

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
7 - ELEVEN # 33257	1000	W	Orangethorpe	Ave		92833
7 - ELEVEN # 33257	1000	W	Orangethorpe	Ave		92833
FOX SERVICE CENTER	1018	W	Orangethorpe	Ave		92833
FULLERTON DODGE	1110	W	Orangethorpe	Ave		92833
NAPA AUTO PARTS	1111	W	Orangethorpe	Ave		92833
MRS CLEANERS	1129	W	Orangethorpe	Ave		92833
G & M OIL CO INC #5	1201	E	Orangethorpe	Ave		92831
G & M OIL CO INC #5	1201	E	Orangethorpe	Ave		92831
ARCO STATION (ARCO #82540)	1202	E	Orangethorpe	Ave		92831
ARCO STATION (ARCO #82540)	1202	E	Orangethorpe	Ave		92831
SUPERIOR WALL SYSTEMS	1232	E	Orangethorpe	Ave		92831
HEADS UP PERFORMANCE	1246	E	Orangethorpe	Ave		92831
ENS-KITCHEN & BATH	1301	E	Orangethorpe	Ave		92831
ENS-KITCHEN & BATH	1301	E	Orangethorpe	Ave		92831
COMPLETE WELDING	1311	E	Orangethorpe	Ave		92831
TRENCH SHORING CO	1400	E	Orangethorpe	Ave		92831
McEngineering AC Products	1400	E	Orangethorpe	Ave	B	92831
INSITUFORM	1400	E	Orangethorpe	Ave	A	92831
NELCO PRODUCTS INC	1411	E	Orangethorpe	Ave		92831
FEDERAL EXPRESS	1430	E	Orangethorpe	Ave		92831
FEDERAL EXPRESS	1430	E	Orangethorpe	Ave		92831
AFC CABLE SYSTEMS	1600	E	Orangethorpe	Ave		92831
PACIFIC COLLISION CENTERS	1621	E	Orangethorpe	Ave		92831
ALL BRITE SUNKIST CLEANERS	1667	W	Orangethorpe	Ave		92833
FULLERTON OIL	1730	W	Orangethorpe	Ave		92833
FULLERTON OIL	1730	W	Orangethorpe	Ave		92833
SHELL OIL #68536	1800	W	Orangethorpe	Ave		92833

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SHELL OIL #68536	1800	W	Orangethorpe	Ave		92833
AUTO ZONE #5522	1801	W	Orangethorpe	Ave		92833
SPRINT UNITED	1805	W	Orangethorpe	Ave		92833
TRAFFIC CONTROL SERVICES	1818	E	Orangethorpe	Ave		92831
CVS PHARMACY #9754	1823	W	Orangethorpe	Ave		92833
3E COMPANY/ WALGREENS #6215	1826	W	Orangethorpe	Ave		92833
KIMBERLY CLARK WORLDWIDE INC	2001	E	Orangethorpe	Ave		92831
VISTA PAINT	2020	E	Orangethorpe	Ave		92831
EXECUTIVE RV CENTER	2100	E	Orangethorpe	Ave		92831
NEXTELL CA/PROPERTY SERVICES	2200	W	Orangethorpe	Ave		92833
PETES ROAD SERVICE INC	2230	E	Orangethorpe	Ave		92831
COAST ROOF CO INC	2301	E	Orangethorpe	Ave		92831
KIMS IRON WORKS	2331	E	Orangethorpe	Ave		92831
DISCOUNT TIRE STORES	2341	E	Orangethorpe	Ave		92831
ARCO #9677	2351	E	Orangethorpe	Ave		92831
ARCO #9677	2351	E	Orangethorpe	Ave		92831
VM AUTO REPAIR	2426	W	Orangethorpe	Ave		92833
K & S AUTO REPAIR	2430	W	Orangethorpe	Ave		92833
FULLERTON RESIDENTIAL MANOR	2441	W	Orangethorpe	Ave		92833
OFIS	2467	E	Orangethorpe	Ave		92831
RPW SERVICES	2473	E	Orangethorpe	Ave		92831
FMH CERTIFIED WELDING	2479	E	Orangethorpe	Ave		92831
QUAKER OATS	2501	E	Orangethorpe	Ave		92831
KIMS IMPORT CAR SERVICE	2507	W	Orangethorpe	Ave	113	92833
TRANMISSION CENTER	2507	W	Orangethorpe	Ave	107	92833
BENGAL AUTO REPAIRS	2507	W	Orangethorpe	Ave	106	92833
OILYS LUBE N TUNE	2507	W	Orangethorpe	Ave	101	92833

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B & S AUTOMOTIVE	2507	W	Orangethorpe	Ave	112	92833
TIRE TRACK	2551	E	Orangethorpe	Ave		92831
HARLEY DAVIDSON OF FULLERTON	2655	W	Orangethorpe	Ave		92833
AT&T MOBILITY	2736	W	Orangethorpe	Ave		92833
AT&T WIRELESS SERVICES	2742	W	Orangethorpe	Ave		92833
INET AIRPORT SYSTEMS	4111	N	Palm	St		92835
STAUBER PERFORMANCE	4120	N	Palm	St		92835
ADAMS RITE AEROSPACE	4141	N	Palm	St		92835
LBA REALTY FUND LII	4150	N	Palm	St		92835
LBA REALTY FUND LII	4150	N	Palm	St		92835
HOUDINI INC	4225	N	Palm	St		92835
CARAN PRECISION ENG & MFG CORP	4275	N	Palm	St		92835
FULLERTON 76	351	N	Placentia	Ave		92831
FULLERTON 76	351	N	Placentia	Ave		92831
ARCO #97	401	N	Placentia	Ave		92831
ARCO #97	401	N	Placentia	Ave		92831
HOME DEPOT # 682 / 3E CO. ENVIR. CONS	601	S	Placentia	Ave		92831
SAMS CLUB #6616	629	S	Placentia	Ave		92831
MIDWEST AIRTECHNOLOGIES	675	S	Placentia	Ave		92831
PLEASER USA INC	679	S	Placentia	Ave		92831
ALCOA GLOBAL FASTENERS INC	801	S	Placentia	Ave		92831
WORLD OIL #107	901	N	Placentia	Ave		92831
WORLD OIL #107	901	N	Placentia	Ave		92831
APPLIED CHEMICAL TECHNOLOGIES	1001	S	Placentia	Ave		92831
THE BUGMAN	1111	S	Placentia	Ave		92831
BUILDERS TERMIT & PEST CONTROL	1139	S	Placentia	Ave	B	92831
ALBERTSONS #6119	1930	N	Placentia	Ave		92835

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
FIRESTONE COMPL AUTO CARE #650196	1933	N	Placentia	Ave		92831
CROWN CLEANERS	1956	N	Placentia	Ave		92831
DR SMOOTHIE	1730		Raymer	Ave		92833
BETHEL PLASTICS	1900		Raymer	Ave		92833
DELCO SALES	1930		Raymer	Ave		92833
DELCO SALES	1950		Raymer	Ave		92833
MIKE HANSEN FABRICATIONS	2007		Raymer	Ave	D	92833
IMPERIAL PLATING	2007		Raymer	Ave	N	92833
SAMCO METAL PRODUCTS	2007		Raymer	Ave	S	92833
SPECTRUM PACKAGING	2009		Raymer	Ave		92833
WESTERN YARN DYING	2011		Raymer	Ave		92833
PACIFIC MINIATURES INC	2021		Raymer	Ave		92833
AMERICAN POWER SOLUTIONS	2091		Raymer	Ave	A	92833
AT & T MOBILITY	2325		Raymer	Ave		92833
SALMAN INC	2330		Raymer	Ave		92833
M & M CLEANERS	104	N	Raymond	Ave	A-3	92831
AT&T MOBILITY	104	N	Raymond	Ave		92831
ALBERTSONS #6118	120	N	Raymond	Ave		92831
AUTO ZONE #2898	146	N	Raymond	Ave		92831
TOPLINE PAINT & BODY	500	S	Raymond	Ave	I	92831
BETOS AUTO BODY & PAINT INC	500	S	Raymond	Ave	D	92831
LABELS INCORPORATED	503	S	Raymond	Ave		92831
OCB	528	S	Raymond	Ave		92831
E J WHITNEY CO	529	S	Raymond	Ave		92831
BAVARIAN AUTO TECHS	551	S	Raymond	Ave		92831
ACME DOOR CLOSER & SERVICE	600	S	Raymond	Ave		92831
AMERICOLD	700	S	Raymond	Ave		92831

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
AMERICOLD	700	S	Raymond	Ave		92831
FROZSUN	700	S	Raymond	Ave		92831
FROZSUN	700	S	Raymond	Ave		92831
THE SPACER CONNECTION	711	S	Raymond	Ave	A	92831
ROYS TRANSMISSION SERVICE INC	715	S	Raymond	Ave		92831
CHRISTALL DENTAL LAB	1100	S	Raymond	Ave	D	92831
NEXTELL CA/PROPERTY SERVICES	1500	S	Raymond	Ave		92831
CROWN PLAZA RESORT	1500	S	Raymond	Ave		92831
SCIENTIFIC SPRAY FINISHES INC	315	S	Richman	Ave		92832
MENDOZAS ORNAMENTAL IRON	439	S	Richman	Ave		92832
SENIOR LIVING COMMUNITY	312		Roosevelt	Ave		92832
AT&T MOBILITY	2238		Rosecrans	Ave		92833
AT & T MOBILITY	2270		Rosecrans	Ave		92833
RAYNE WATER CONDITIONING	1702	E	Rosslynn	Ave		92831
ORANGE COUNTY PAINT	1710	E	Rosslynn	Ave		92831
METALCLAD	1818	E	Rosslynn	Ave		92831
ST HART CONTAINER CORP	1901	E	Rosslynn	Ave		92831
CORRU-KRAFT	1911	E	Rosslynn	Ave		92831
CAROLINA LOGISTICS	701		Sally	Pl	A	92831
CAMBRIDGE LEE	701		Sally	Pl	B	92831
ELLINGSON INCORPORATED	119	W	Santa Fe	Ave		92832
FISK AUTOMOTIVE	147	W	Santa Fe	Ave		92832
WILL-MANN INC	225	E	Santa Fe	Ave		92832
TERRYS AUTOMOTIVE	250	E	Santa Fe	Ave		92832
BNSF RAILWAY COMPANY	308	E	Santa Fe	Ave		92832
CVS PHARMACY	455	N	State College	Blvd		92831
KAIRAK	500	S	State College	Blvd		92831

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
PICK-UP STIX	501	N	State College	Blvd		92831
EXXON MOBIL OIL #18-FHE	506	N	State College	Blvd		92831
EXXON MOBIL OIL #18-FHE	506	N	State College	Blvd		92831
SOUTH COAST CONTAINER CORP	540	S	State College	Blvd		92831
HEIDEN'S	544	S	State College	Blvd		92831
ROZAK ENGINEERING INC	556	S	State College	Blvd		92831
ALCOA GLOBAL FASTENERS INC	561	S	State College	Blvd		92831
INMAN WELDING	580	S	State College	Blvd		92831
ECO INDUSTRIES	584	S	State College	Blvd		92831
JUNIORS PROFESSIONAL IRON WORKS	597	S	State College	Blvd		92831
US ANALYTICAL	600	S	State College	Blvd		92831
AURIDENT INC.	610	S	State College	Blvd		92831
SO CALIF PRECISION MACHINE	641	S	State College	Blvd		92831
BEN'S POOL & SPA SUPPLIES	645	S	State College	Blvd	E	92831
H S PRODUCTS	707	S	State College	Blvd	L	92831
M & C FORKLIFT REPAIR	727	S	State College	Blvd	C	92831
COLORCHEM	751	S	State College	Blvd	52	92831
CALIFORNIA STATE UNIVERSITY	800	N	State College	Blvd		92831
NEXTELL CA/PROPERTY SERVICES	800	N	State College	Blvd		92831
ALCOA FASTENING SYSTEMS FULLERTON	800	S	State College	Blvd		92831
ALCOA FASTENING SYSTEMS FULLERTON	800	S	State College	Blvd		92831
STATE COLLEGE PROJECT	1050	S	State College	Blvd		92831
WESTERN STATE UNIVERSITY	1111	N	State College	Blvd		92831
BENNER METALS	1220	S	State College	Blvd		92831
WINNONICS	1257	S	State College	Blvd		92831
WINNONICS	1257	S	State College	Blvd		92831

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
UNITED RENTALS INC	1301	S	State College	Blvd		92831
CRAIG REGIONAL PARK	3300	N	State College	Blvd		92835
ST JUDE OUT PATIENT SURGERY	1835		Sunnycrest	Dr		92832
GARYS RADIATOR	225	W	Truslow	Ave	B	92832
A-1 SAW & TOOL	1110	E	Truslow	Ave		92831
JERRY ROSE CO	1125	E	Truslow	Ave		92831
FULLER LABORATORIES	1135	E	Truslow	Ave		92831
EXPRESS AUTO REPAIR MOTOR SPORT	537	W	Valencia	Dr	B	92832
YOSEMITE WATERS	601	W	Valencia	Dr		92833
ARCO #1023	1000	W	Valencia	Dr		92833
ARCO #1023	1000	W	Valencia	Dr		92833
DISPLAYS BY JACK	1030	E	Valencia	Dr		92831
PLASTIC SUPPLIES	1040	E	Valencia	Dr		92831
FBI EXPRESS	1050	E	Valencia	Dr		92831
MALONEY CO	1104	E	Valencia	Dr		92831
GLASS TECH SUPPLIES	1128	E	Valencia	Dr		92831
GOLDEN WEST TECHNOLOGY	1132	E	Valencia	Dr		92831
GOLDEN WEST TECHNOLOGY	1180	E	Valencia	Dr		92831
FULLERTON SCHOOL DISTRICT	1401	W	Valencia	Dr		92833
FULLERTON SCHOOL DISTRICT	1401	W	Valencia	Dr		92833
ACUTEK	1488	E	Valencia	Dr		92831
BATESVILLE CASKET COMPANY	1500	E	Valencia	Dr		92831
JBJ DISTRIBUTING-VEG LAND	1518	E	Valencia	Dr	A	92831
NATIONAL TECHNICAL SYSTEM	1536	E	Valencia	Dr		92831
GRAPHICS 2000	1600	E	Valencia	Dr		92831
GRACE MINISTRIES	1645	W	Valencia	Dr		92833
HI TEK AUTO REPAIR	1735	W	Valencia	Dr		92833

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
PROFESSIONAL PLASTICS	1810	E	Valencia	Dr		92831
VIELE & SONS	1820	E	Valencia	Dr		92831
SOUTHERN CALIF. EDISON/NOC SERVICE CENTER	1851	W	Valencia	Dr		92833
COR-O-VAN MOVING & STORAGE	2100	E	Valencia	Dr		92833
SO CALIF PRECISION MACHINE	2300	E	Valencia	Dr		92831
MESA SURGICENTER	100	E	Valencia Mesa	Dr	303	92831
NEXTELL CA/PROPERTY SERVICES	100	E	Valencia Mesa	Dr		92835
ST JUDE MEDICAL CENTER	101	E	Valencia Mesa	Dr		92835
ST JUDE MEDICAL CENTER	101	E	Valencia Mesa	Dr		92835
TRICO CONVERTING INC	1801		Via Burton			92831
UNITED SALES ASSOCIATES	1801		Via Burton		B	92831
FULLERTON CULTURED SPECIALTIES	1901		Via Burton			92831
FULLERTON CULTURED SPECIALTIES	1901		Via Burton			92831
GARLANDS PRECISION INC	144	W	Walnut		C	92832
CERTIFIED WELDING	144	W	Walnut	Ave	C-2	92832
BAUGHMAN & TURNER	275	E	Walnut	Ave		92832
US FOODS	392	W	Walnut	Ave		92832
US FOODS	392	W	Walnut	Ave		92832
SUNSET BEACH COMPANY	410	E	Walnut	Ave	D	92832
SERVICE ROOFING COMPANY	440	E	Walnut	Ave		92832
SERVICE ROOFING COMPANY	440	E	Walnut	Ave		92832
PREMIER AUTO BODY & PAINT	501	E	Walnut	Ave		92832
RELIABLE SHEET METAL	524	E	Walnut	Ave		92832
HAWAIIAN AIR CORP	600	E	Walnut	Ave		92832
ACE RESTORATION	620	E	Walnut	Ave		92832
ANGELUS PACIFIC COMPANY	700	E	Walnut	Ave		92831
NELSON & NELSON GRADING INC	800	E	Walnut	Ave		92831

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
MIKES HEATING/AIR CONDITIONING	828	E	Walnut	Ave	C	92832
ROBS TRUCK & AUTO	900	E	Walnut	Ave	M	92831
F ZIEBARTH	920	E	Walnut	Ave		92831
YEATS APPLIANCE DOLLY MFG CO	924	E	Walnut	Ave		92831
STEEL FABRICTORS & ERECTORS	1000	E	Walnut	Ave		92832
WEST COAST CLASSICS	1002	E	Walnut	Ave	A	92831
US DELIVERY	1250	E	Walnut	Ave		92832
MERCER TOOL	1400	E	Walnut	Ave		92832
AVALON TILE WHOLESALER	1404	E	Walnut	Ave	A	92832
Value Plus Service	1404	E	Walnut	Ave		92832
FULLERTON FOODS	1500	E	Walnut	Ave		92831
MIHMS TRUCK REPAIR	1526	E	Walnut	Ave		92831
TACONY/RICCAR	1800	E	Walnut	Ave		92832
S W H CORPORATION	1820	E	Walnut	Ave		92832
NORDSTROM	2200	E	Walnut	Ave		92831
NEXTEL OF CALIFORNIA	2200	E	Walnut	Ave	B	92832
SIMPLOT PARTNERS	2320	E	Walnut	Ave		92832
AT & T MOBILITY	2356	E	Walnut	Ave		92832
EMIL CERAMICA	2356	E	Walnut	Ave		92832
NEW CENTURY DOORS	2384	E	Walnut	Ave		92832
SUNNY HILLS HIGH SCHOOL	1801		Warburton	Way		92833
FIX AUTO BODY WORK	628		Williamson	Ave		92832
RENICK SPORT RACING	633		Williamson	Ave	A	92832
FIX AUTO PAINT	633		Williamson	Ave	B	92832
MC COY MILLS FORD	700		Williamson	Ave		92832
NEXTELL CA/PROPERTY SERVICES	722	W	Williamson	Ave		92832
BEST BUY IMPORTS	749	W	Williamson	Ave		92832

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
GUERRERO AUTO SERVICE	806	W	Williamson	Ave	A	92832
ORIHUELA AUTO REPAIR	806	W	Williamson	Ave	D	92832
AT&T MOBILITY	812	W	Williamson	Ave	A	92832
STANDARD RADIATOR	812		Williamson	Ave		92832
MAGIC TOUCH AUTO BODY	819		Williamson	Ave		92832
MC COY MILLS	820		Williamson	Ave		92832
PHILLIPS CHICKEN PIES	830		Williamson	Ave		92832
M D AUTO SERVICE	1020	W	Williamson	Ave		92833
AT & T MOBILITY	110	E	Wilshire	Ave		92832
FULLERTON ELITE CLEANERS	138	W	Wilshire	Ave		92832
FULLERTON MOTORS	146	W	Wilshire	Ave		92832
WINDSOR GARDEN CARE	245	E	Wilshire	Ave		92832
AT & T MOBILITY	2505		Yorba Linda	Blvd		92831
COLLEGE PARK MOBIL OIL #18-LCC	2601		Yorba Linda	Blvd		92831
COLLEGE PARK MOBIL OIL #18-LCC	2601		Yorba Linda	Blvd		92831
VERIZON WIRELESS	2920		Yorba Linda	Blvd		92831
TARGET STORE #0293	2920		Yorba Linda	Blvd		92831
UNIVERSITY SHELL HC INT	2960		Yorba Linda	Blvd		92831
UNIVERSITY SHELL HC INT	2960		Yorba Linda	Blvd		92831
CHEVRON OIL CORP.	2961		Yorba Linda	Blvd		92831
CHEVRON OIL CORP.	2961		Yorba Linda	Blvd		92831
KRAGEN AUTO PARTS #731	2978		Yorba Linda	Blvd		92831
UNION SERVICE CENTER	3001		Yorba Linda	Blvd		92831
UNION SERVICE CENTER	3001		Yorba Linda	Blvd		92831
AT&T MOBILITY	3121		Yorba Linda	Dr		92831
RALPHS GROCER STORE #67	3330		Yorba Linda	Blvd		92831
VERIZON WIRELESS	2050		Youth	Way		92835

Facility Name	Street Number	Facility Direction	Facility Street	Facility Street Type	Facility Street Unit	Zip
New sites in Fullerton billed after July 2009						
Nextel of California	4128	W	Commonwealth	Ave		92833
Nextel of California	1110	W	Orangethorpe	Ave		92833
Nextel of California	530	N	Gilbert	St		92833
Sprint United	1110	W	Orangethorpe	Ave		92833
Sprint United	2100	N	Gilbert	St		92833
Sprint United	222		Houston	Ave		92832
Sprint United	2932	E	Nutwood	Ave		92831
Sprint United	2742	W	Orangethorpe	Ave		92833
Sprint United	1355	S	Acacia	Ave		92831
Sprint United	3250		Associated	Rd		92835
Sprint United	1000	E	Bastanchury	Rd		92835
Sprint United	1900		Camino loma			92833
Sprint United	312	E	Commonwealth	Ave		92832
Sprint United	4011	W	Commonwealth	Ave		92833
Sprint United	3151	N	Euclid	St		92833
Sprint United	530	N	Gilbert	St		92833
Sprint United	1300	N	Raymond	Ave		92831
Sprint United	800	N	St College	Blvd		92831
Sprint United	100	E	Valencia mesa	Dr		92835
Sprint United	722		Williamson			92832
Sprint United	3300		Yorba Linda	Blvd		92831
Chapman Coast Roof Inc	2301	E	Orangethorpe	Ave		92831
Bootleggers Brewery	401	S	Richman	Ave		92832

Tables E.3 through E.6 give detailed description of the critical facilities that would be damaged in the event of a Brea, Carbon Canyon, Fullerton, or Prado dam failure. Detailed information regarding the methodology for these tables, as well as a summary table, can be found in Section 4.2.7 of the main plan.

Table E.3 Brea Dam Inundation

Facility Type	Facility Name	Facility Address
Airport	Fullerton Airport	4011 W Commonwealth Ave
Bridge	CA026620	Brookhurst Rd
Bridge	CA026685	Basque Ave
Bridge	CA026686	Richman Ave
Bridge	CA026687	Ford Ave
Bridge	CA026688	Highland Ave
Bridge	CA026689	Malden Ave
Bridge	CA026690	Union Ave
Bridge	CA026691	Valley View Dr
Bridge	CA026693	Edward Ave
Bridge	CA026694	Gilbert St
Bridge	CA026695	Basque Ave
Bridge	CA026696	Valencia Dr
Bridge	CA026697	Citrus Ave
Bridge	CA026701	Woods Ave
Bridge	CA026702	Richman Ave
Bridge	CA026703	Malden Ave
Bridge	CA026734	Gilbert St
Bridge	CA026736	Malvern Ave
Bridge	CA026737	Magnolia Ave
Bridge	CA026738	Euclid Ave
Bridge	CA026739	Highland Ave
Bridge	CA026740	Lemon St
Bridge	CA026750	Walnut Ave
Bridge	CA026841	Commonwealth Ave
Bridge	CA026991	Burning Tree Rd
Bridge	CA026814	Harbor Blvd
Bridge	-	Industrial Park Access On Flood Channel
Bridge	-	Bridgeport Cr Oc On Flood Channel
Bridge	-	Berkeley Ave Oc On Flood Channel
Bridge	-	Railroad Oc On Lemon St
Bridge	-	Railroad Oc On Harbor Blvd

Facility Type	Facility Name	Facility Address
Bridge	-	Walnut Ave Oc On Harbor Blvd
Bridge	-	Pedestrian Oc On Harbor Blvd
Bridge	-	Railroad Oc On Highland Ave
Bridge	-	Railroad Oc On Euclid St
Bridge	-	Railroad Oc On Gilbert Ave
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	Magnolia Ave Oc Above Flood Channel
Church	United Pentecostal Church	1201 W Commonwealth Ave
Church	First Presbyterian Church	511 S Brookhurst Rd
Church	Grace Korean Church	1645 W Valencia Dr
Church	St Philip Benizi Church	235 S Pine Dr
Church	First Christian Church Of Fullerton	109 E Wilshire Ave
Church	St Mary's Catholic Church	400 W Commonwealth Ave
Church	Fullerton Alliance Church	620 S Roosevelt Ave
Church	Seventh Day Adventist Church	2355 W Valencia Dr
Church	St Luke's Lutheran Church	2000 W Valencia Dr
Church	Western Fullerton Baptist Church	3635 W Valencia Dr
Church	The True Light Mission Church	3710 W Valencia Dr
Church	Faith Deliverance Apostolic Church	1145 W Commonwealth Ave
Church	Jehovah Witnesses (Spanish And Filipino)	121 N Gilbert St
Church	New Wine Church	1425 S Brookhurst Rd
Church	First Korean Baptist Church	1425 S Brookhurst Rd
Church	Cornerstone Christian Fellowship	1465 W Orangethorpe Ave
Church	Cavalry Community Church	1465 W Orangethorpe Ave
Church	New Life Mission Church	112 E Walnut Ave
Church	Centerpoint Foursquare Church	412 E Commonwealth Ave
Church	Newsong Community Church	505 E Commonwealth Ave
Church	Fullerton First United Methodist Church	114 N Pamona Ave
Church	Wilshire Ave Community Church	212 E Wilshire Ave
Church	First Lutheran Church Of Fullerton	215 N Lemon St
Church	Orangethorpe Christian Church Of Fullerton	2200 W Orangethorpe Ave
Church	Grace Bible Chapel	1119 S Lambert Dr
Church	Eden Presbyterian Church	2200 W Orangethorpe Ave
Church	Orangethorpe United Methodist Church	2351 W Orangethorpe Ave
Church	True Love Korean Lutheran Church	1521 W Orangethorpe Ave
Church	Korean Methodist Church Of Southern Cali	214 N Highland Ave
Church	Majesty International Center	417 S Richman Ave
Church	Christian Life Center	404 W Wilshire Ave

Facility Type	Facility Name	Facility Address
Church	Central Korean Church	706 S Lemon St
Church	First Baptist Church Of Fullerton	212 E Wilshire Ave
Church	Jesus Grace Church	656 E Commonwealth Ave
City Hall	City Hall	303 W Commonwealth Ave
City Yard	City Yard	1580 W Commonwealth Ave
Community Center	Fullerton Senior Center	340 W Commonwealth Ave
Community Center	Maple Community Center	701 S Lemon St
Community Center	Richman Community Center	320 W Elm Ave
Daycare	First Christian Church And Child Care	115 E Wilshire Ave
Daycare	My Own Home Day Care	227 W Whiting Ave
Daycare	Little Flower Montessori	703 E Commonwealth Ave
Daycare	Daystar Education Center	626 W Commonwealth Ave
Daycare	Little Wonder Daycare	1324 W Elm Ave
Daycare	Color Our World Daycare Ed Ctr	1613 W Valencia Dr
Daycare	Arborland Montessori & Education	1700 W Valencia Dr
Daycare	Kids Adventure Learning Ctr	1834 W Valencia Dr
Daycare	Little Blessings Preschool	1425 S Brookhurst Rd
Daycare	Glow's Happy Child Daycare	2001 W Cherry Ave
Daycare	Bumble Bee Christian Learning	2353 Williamson Ave
Daycare	St Phillip's School Ext Day Care	215 S Pine Dr
Fire Station	Station 1	312 E Commonwealth Ave
Fire Station	Station 2	1732 W Valencia Dr
Library	Main Library	353 W Commonwealth Ave
Library	Hunt Branch Library	201 S Basque Ave
Police Station	Police Station	237 W Commonwealth Ave
Power Facility	Southern California Edison	1851 W Valencia Dr
Power Facility	Southern California Edison	218 E Walnut Ave
School	Bumble Bee Christian Learning	2353 Williamson Ave
School	St. Phillips Elementary School	215 Pine Dr
School	Buena Park High School	6521 Magnolia Ave
School	James A. Whitaker Elementary	8401 Montana Ave
School	Woodcrest Elementary School	455 W Baker Ave
School	Nicolas Junior High School	1100 W Olive Ave
School	Pacific Drive Elementary School	1501 W Valencia Dr
School	Seventh Day Adventist Church Elem	2353 W Valencia Dr
School	Valencia Park Elementary School	3441 W Valencia Dr
School	Orangethorpe Elementary School	1400 S Brookhurst Rd
School	Richman Elementary School	700 S Richman Ave
School	Fullerton College	321 E Chapman Ave

Facility Type	Facility Name	Facility Address
School	Boys And Girls Club	2435 W Valencia Dr
School	Fullerton High School	201 E Chapman Ave
School	Maple Elementary School	244 E Valencia Dr
School	Head Start/Preschool	325 Courtney Ave
School	Little Blessings Preschool	1425 S Brookhurst Rd
Transportation Center	Transportation Center	120 E Santa Fe Ave
Youth Center	Boys & Girls Club-Commonwealth Main Club	348 W Commonwealth Ave
Youth Center	Boys & Girls Club - Richman	410 S Richman Ave
Youth Center	Boys & Girls Club - Valencia Park	2435 W Valencia Dr
Youth Center	Kiwanis Youth Park Scout Troop	386 W Truslow Ave
Youth Center	Fullerton Hills Softball	1440 Brea Blvd

Table E.4 Carbon Canyon Dam Inundation

Facility Type	Facility Name	Facility Address
Airport	Fullerton Airport	4011 W Commonwealth Ave
Bridge	CA026620	Brookhurst Rd
Bridge	CA026685	Basque Ave
Bridge	CA026693	Edward Ave
Bridge	CA026694	Gilbert St
Bridge	CA026695	Basque Ave
Bridge	CA026696	Valencia Dr
Bridge	CA026697	Citrus Ave
Bridge	CA026701	Woods Ave
Bridge	CA026702	Richman Ave
Bridge	CA026703	Malden Ave
Bridge	CA026737	Magnolia Ave
Bridge	CA026738	Euclid Ave
Bridge	CA026739	Highland Ave
Bridge	CA026740	Lemon St
Bridge	CA026750	Walnut Ave
Bridge	-	Industrial Park Access On Flood Channel
Bridge	-	Bridgeport Cr Oc On Flood Channel
Bridge	-	Railroad Oc On Lemon St
Bridge	-	Railroad Oc On Harbor Blvd
Bridge	-	Walnut Ave Oc On Harbor Blvd
Bridge	-	Pedestrian Oc On Harbor Blvd
Bridge	-	Railroad Oc On Highland Ave
Bridge	-	Railroad Oc On Euclid St

Facility Type	Facility Name	Facility Address
Bridge	-	Railroad Oc On Gilbert Ave
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	Magnolia Ave Oc Above Flood Channel
Church	United Pentecostal Church	1201 W Commonwealth Ave
Church	First Presbyterian Church	511 S Brookhurst Rd
Church	Grace Korean Church	1645 W Valencia Dr
Church	St Philip Benizi Church	235 S Pine Dr
Church	Fullerton Alliance Church	620 S Roosevelt Ave
Church	Seventh Day Adventist Church	2355 W Valencia Dr
Church	St Luke's Lutheran Church	2000 W Valencia Dr
Church	Western Fullerton Baptist Church	3635 W Valencia Dr
Church	The True Light Mission Church	3710 W Valencia Dr
Church	Faith Deliverance Apostolic Church	1145 W Commonwealth Ave
Church	Jehovah Witnesses (Spanish And Filipino)_	121 N Gilbert St
Church	New Wine Church	1425 S Brookhurst Rd
Church	First Korean Baptist Church	1425 S Brookhurst Rd
Church	Cornerstone Christian Fellowship	1465 W Orangethorpe Ave
Church	Cavalry Community Church	1465 W Orangethorpe Ave
Church	New Life Mission Church	112 E Walnut Ave
Church	Centerpoint Foursquare Church	412 E Commonwealth Ave
Church	Orangethorpe Christian Church Of Fullerton	2200 W Orangethorpe Ave
Church	Grace Bible Chapel	1119 S Lambert Dr
Church	Eden Presbyterian Church	2200 W Orangethorpe Ave
Church	Orangethorpe United Methodist Church	2351 W Orangethorpe Ave
Church	True Love Korean Lutheran Church	1521 W Orangethorpe Ave
Church	Majesty International Center	417 S Richman Ave
Church	Central Korean Church	706 S Lemon St
Church	Fullerton Church Of Christ	2475 E Orangethorpe Ave
Church	Seeker's Chapel	1521 E Orangethorpe Ave
Church	God's House	598 S State College Blvd
City Yard	City Yard	1580 W Commonwealth Ave
Community Center	Maple Community Center	701 S Lemon St
Community Center	Garnet Community Center	3012 Garnet Ln
Community Center	Richman Community Center	320 W Elm Ave
Daycare	Daystar Education Center	626 W Commonwealth Ave
Daycare	Little Wonder Daycare	1324 W Elm Ave
Daycare	Mary's Family Daycare	1236 W Houston Ave
Daycare	Color Our World Daycare Ed Ctr	1613 W Valencia Dr
Daycare	Arborland Montessori & Education	1700 W Valencia Dr

Facility Type	Facility Name	Facility Address
Daycare	Kids Adventure Learning Ctr	1834 W Valencia Dr
Daycare	Little Blessings Preschool	1425 S Brookhurst Rd
Daycare	Glow's Happy Child Daycare	2001 W Cherry Ave
Daycare	Bumble Bee Christian Learning	2353 Williamson Ave
Daycare	St Phillip's School Ext Day Care	215 S Pine Dr
Fire Station	Station 2	1732 W Valencia Dr
Fire Station	Station 3	700 S Acacia Ave
Library	Hunt Branch Library	201 S Basque Ave
Power Facility	Southern California Edison	1851 W Valencia Dr
Power Facility	Southern California Edison	218 E Walnut Ave
School	Bumble Bee Christian Learning	2353 Williamson Ave
School	St. Phillips Elementary School	215 Pine Dr
School	Buena Park High School	6521 Magnolia Ave
School	James A. Whitaker Elementary	8401 Montana Ave
School	Woodcrest Elementary School	455 W Baker Ave
School	Nicolas Junior High School	1100 W Olive Ave
School	Pacific Drive Elementary School	1501 W Valencia Dr
School	Seventh Day Adventist Church Elem	2353 W Valencia Dr
School	Valencia Park Elementary School	3441 W Valencia Dr
School	Orangethorpe Elementary School	1400 S Brookhurst Rd
School	Richman Elementary School	700 S Richman Ave
School	Boys And Girls Club	2435 W Valencia Dr
School	North Orange County Rop	1548 E Walnut Ave
School	Maple Elementary School	244 E Valencia Dr
School	Sierra Vista Elementary School	1811 N Placentia Ave
School	Topaz Elementary School	3232 Topaz Ln
School	Ruby Drive Elementary	601 Ruby Dr
School	Head Start/Preschool	325 Courtney Ave
School	Little Blessings Preschool	1425 S Brookhurst Rd
Social Service	Salvation Army	1020 S Raymond Ave # F
Transportation Center	Transportation Center	120 E Santa Fe Ave
Youth Center	Boys & Girls Club - Richman	410 S Richman Ave
Youth Center	Boys & Girls Club - Valencia Park	2435 W Valencia Dr
Youth Center	Kiwanis Youth Park Scout Troop	386 W Truslow Ave

Table E.5 Fullerton Dam Inundation

Facility Type	Facility Name	Facility Address
Bridge	CA026620	Brookhurst Rd
Bridge	CA026693	Edward Ave
Bridge	CA026694	Gilbert St
Bridge	CA026695	Basque Ave
Bridge	CA026696	Valencia Dr
Bridge	CA026697	Citrus Ave
Bridge	CA026701	Woods Ave
Bridge	CA026702	Richman Ave
Bridge	CA026703	Malden Ave
Bridge	CA026737	Magnolia Ave
Bridge	CA026738	Euclid Ave
Bridge	CA026739	Highland Ave
Bridge	CA026740	Lemon St
Bridge	CA026750	Walnut Ave
Bridge	CA026841	Commonwealth Ave
Bridge	-	Acacia Ave Oc On Flood Channel
Bridge	-	Dorothy Ln Oc On Flood Channel
Bridge	-	Railroad Oc On Lemon St
Church	First Presbyterian Church	511 S Brookhurst Rd
Church	Grace Korean Church	1645 W Valencia Dr
Church	St Philip Benizi Church	235 S Pine Dr
Church	St Andrews Episcopal Church	1231 E Chapman Ave
Church	Fullerton Alliance Church	620 S Roosevelt Ave
Church	Church Of Jesus Christ Of Latter Day Saints	801 N Raymond Ave
Church	Seventh Day Adventist Church	2355 W Valencia Dr
Church	St Luke's Lutheran Church	2000 W Valencia Dr
Church	Western Fullerton Baptist Church	3635 W Valencia Dr
Church	The True Light Mission Church	3710 W Valencia Dr
Church	Centerpoint Foursquare Church	412 E Commonwealth Ave
Church	Newsong Community Church	505 E Commonwealth Ave
Church	First Lutheran Church Of Fullerton	215 N Lemon St
Church	Central Korean Church	706 S Lemon St
Church	Jesus Grace Church	656 E Commonwealth Ave
Community Center	Maple Community Center	701 S Lemon St
Community Center	Richman Community Center	320 W Elm Ave
Daycare	Little Flower Montessori	703 E Commonwealth Ave
Daycare	Little Wonder Daycare	1324 W Elm Ave

Facility Type	Facility Name	Facility Address
Daycare	Amalie Academy	1231 E Chapman Ave
Daycare	Fullerton Child Development	1701 E Chapman Ave
Daycare	Color Our World Daycare Ed Ctr	1613 W Valencia Dr
Daycare	Arborland Montessori & Education	1700 W Valencia Dr
Daycare	Kids Adventure Learning Ctr	1834 W Valencia Dr
Daycare	St Phillip's School Ext Day Care	215 S Pine Dr
Fire Station	Station 1	312 E Commonwealth Ave
Fire Station	Station 2	1732 W Valencia Dr
Fire Station	Station 5	2555 E Yorba Linda Blvd
Library	Hunt Branch Library	201 S Basque Ave
Power Facility	Southern California Edison	1851 W Valencia Dr
Power Facility	Southern California Edison	218 E Walnut Ave
School	St. Phillips Elementary School	215 Pine Dr
School	Buena Park High School	6521 Magnolia Ave
School	James A. Whitaker Elementary	8401 Montana Ave
School	Pacific Drive Elementary School	1501 W Valencia Dr
School	Seventh Day Adventist Church Elem	2353 W Valencia Dr
School	Valencia Park Elementary School	3441 W Valencia Dr
School	Richman Elementary School	700 S Richman Ave
School	Boys And Girls Club	2435 W Valencia Dr
School	Maple Elementary School	244 E Valencia Dr
School	Troy High School	2200 E Dorothy Ln
School	S.Cal College Of Optometry	2575 Yorba Linda Blvd
School	Raymond Elementary School	517 N Raymond Ave
School	Western State Univ College Of Law	1111 N State College Blvd
School	Acacia Elementary School	1200 N Acacia Ave
School	Head Start/Preschool	325 Courtney Ave
School	Endeavor School	951 N State College Blvd
Social Service	Salvation Army	318 N Raymond Ave
Youth Center	Boys & Girls Club - Valencia Park	2435 W Valencia Dr

Table E.6 Prado Dam Inundation

Facility Type	Facility Name	Facility Address
Airport	Fullerton Airport	4011 W Commonwealth Ave
Bridge	CA025591	Orangethorpe Ave
Bridge	CA025593	Magnolia Ave
Bridge	CA025728	Route 91 WB
Bridge	CA025732	S5-E91/N5 Sep

Facility Type	Facility Name	Facility Address
Bridge	CA025733	W91-N5 Conn Ramp
Bridge	CA025735	State Route 91 WB
Bridge	CA025737	State Route 91 EB
Bridge	CA026021	E91-Magnolia Av Of
Bridge	CA026056	N5-W91 Connector R
Bridge	CA026058	Route 91 EB
Bridge	CA026620	Brookhurst Rd
Bridge	CA026685	Basque Ave
Bridge	CA026693	Edward Ave
Bridge	CA026694	Gilbert St
Bridge	CA026695	Basque Ave
Bridge	CA026696	Valencia Dr
Bridge	CA026697	Citrus Ave
Bridge	CA026701	Woods Ave
Bridge	CA026702	Richman Ave
Bridge	CA026703	Malden Ave
Bridge	CA026734	Gilbert St
Bridge	CA026737	Magnolia Ave
Bridge	CA026738	Euclid Ave
Bridge	CA026739	Highland Ave
Bridge	CA026740	Lemon St
Bridge	CA026750	Walnut Ave
Bridge	CA026841	Commonwealth Ave
Bridge	CA026991	Burning Tree Rd
Bridge	CA027000	Magnolia Avenue
Bridge	-	Industrial Park Access On Flood Channel
Bridge	-	Bridgeport Cr Oc On Flood Channel
Bridge	-	Railroad Oc On Lemon St
Bridge	-	Railroad Oc On Harbor Blvd
Bridge	-	Walnut Ave Oc On Harbor Blvd
Bridge	-	Pedestrian Oc On Harbor Blvd
Bridge	-	Railroad Oc On Highland Ave
Bridge	-	Railroad Oc On Euclid St
Bridge	-	Railroad Oc On Gilbert Ave
Bridge	-	SR91 Oc On Gilbert St
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	SR91 Oc On Magnolia Ave

Facility Type	Facility Name	Facility Address
Bridge	-	Magnolia Ave Oc Above Flood Channel
Church	United Pentecostal Church	1201 W Commonwealth Ave
Church	First Presbyterian Church	511 S Brookhurst Rd
Church	Grace Korean Church	1645 W Valencia Dr
Church	St Philip Benizi Church	235 S Pine Dr
Church	St Mary's Catholic Church	400 W Commonwealth Ave
Church	Fullerton Alliance Church	620 S Roosevelt Ave
Church	Seventh Day Adventist Church	2355 W Valencia Dr
Church	St Luke's Lutheran Church	2000 W Valencia Dr
Church	Western Fullerton Baptist Church	3635 W Valencia Dr
Church	The True Light Mission Church	3710 W Valencia Dr
Church	Faith Deliverance Apostolic Church	1145 W Commonwealth Ave
Church	Jehovah Witnesses (Spanish And Filipino)	121 N Gilbert St
Church	New Wine Church	1425 S Brookhurst Rd
Church	First Korean Baptist Church	1425 S Brookhurst Rd
Church	Cornerstone Christian Fellowship	1465 W Orangethorpe Ave
Church	Cavalry Community Church	1465 W Orangethorpe Ave
Church	New Life Mission Church	112 E Walnut Ave
Church	Centerpoint Foursquare Church	412 E Commonwealth Ave
Church	Newsong Community Church	505 E Commonwealth Ave
Church	Fullerton First United Methodist Church	114 N Pamona Ave
Church	Wilshire Ave Community Church	212 E Wilshire Ave
Church	First Lutheran Church Of Fullerton	215 N Lemon St
Church	Orangethorpe Christian Church Of Fullert	2200 W Orangethorpe Ave
Church	Grace Bible Chapel	1119 S Lambert Dr
Church	Eden Presbyterian Church	2200 W Orangethorpe Ave
Church	Orangethorpe United Methodist Church	2351 W Orangethorpe Ave
Church	True Love Korean Lutheran Church	1521 W Orangethorpe Ave
Church	Korean Methodist Church Of Southern Cali	214 N Highland Ave
Church	Majesty International Center	417 S Richman Ave
Church	Christian Life Center	404 W Wilshire Ave
Church	Central Korean Church	706 S Lemon St
Church	First Baptist Church Of Fullerton	212 E Wilshire Ave
Church	Jesus Grace Church	656 E Commonwealth Ave
Church	Dongshin Presbyterian Church	2121 E Wilshire Ave

Facility Type	Facility Name	Facility Address
Church	Fullerton Church Of Christ	2475 E Orangethorpe Ave
Church	Seeker's Chapel	1521 E Orangethorpe Ave
Church	God's House	598 S State College Blvd
City Hall	City Hall	303 W Commonwealth Ave
City Yard	City Yard	1580 W Commonwealth Ave
Community Center	Fullerton Senior Center	340 W Commonwealth Ave
Community Center	Maple Community Center	701 S Lemon St
Community Center	Richman Community Center	320 W Elm Ave
Daycare	Little Flower Montessori	703 E Commonwealth Ave
Daycare	Daystar Education Center	626 W Commonwealth Ave
Daycare	Little Wonder Daycare	1324 W Elm Ave
Daycare	Little Prints Family Daycare	1912 E Santa Fe Ave
Daycare	Mary's Family Daycare	1236 W Houston Ave
Daycare	Color Our World Daycare Ed Ctr	1613 W Valencia Dr
Daycare	Arborland Montessori & Education	1700 W Valencia Dr
Daycare	Kids Adventure Learning Ctr	1834 W Valencia Dr
Daycare	Little Blessings Preschool	1425 S Brookhurst Rd
Daycare	Glow's Happy Child Daycare	2001 W Cherry Ave
Daycare	Bumble Bee Christian Learning	2353 Williamson Ave
Daycare	St Phillip's School Ext Day Care	215 S Pine Dr
Fire Station	Station 1	312 E Commonwealth Ave
Fire Station	Station 2	1732 W Valencia Dr
Fire Station	Station 3	700 S Acacia Ave
Library	Main Library	353 W Commonwealth Ave
Library	Hunt Branch Library	201 S Basque Ave
Police Station	Police Station	237 W Commonwealth Ave
Power Facility	Southern California Edison	1851 W Valencia Dr
Power Facility	Southern California Edison	218 E Walnut Ave
School	Bumble Bee Christian Learning	2353 Williamson Ave
School	St. Phillips Elementary School	215 Pine Dr
School	Buena Park High School	6521 Magnolia Ave
School	James A. Whitaker Elementary	8401 Montana Ave
School	Woodcrest Elementary School	455 W Baker Ave
School	Nicolas Junior High School	1100 W Olive Ave
School	Pacific Drive Elementary School	1501 W Valencia Dr
School	Seventh Day Adventist Church Elem	2353 W Valencia Dr
School	Valencia Park Elementary School	3441 W Valencia Dr
School	Orangethorpe Elementary School	1400 S Brookhurst Rd
School	Richman Elementary School	700 S Richman Ave

Facility Type	Facility Name	Facility Address
School	Boys And Girls Club	2435 W Valencia Dr
School	North Orange County Rop	1548 E Walnut Ave
School	Maple Elementary School	244 E Valencia Dr
School	Ladera Vista Junior High School	1700 E Wilshire Ave
School	Commonwealth Elementary School	2200 E Commonwealth Ave
School	Head Start/Preschool	325 Courtney Ave
School	Little Blessings Preschool	1425 S Brookhurst Rd
Social Service	Salvation Army	318 N Raymond Ave
Social Service	Salvation Army	1020 S Raymond Ave # F
Transportation Center	Transportation Center	120 E Santa Fe Ave
Youth Center	Boys & Girls Club-Commonwealth Main Club	348 W Commonwealth Ave
Youth Center	Boys & Girls Club - Commonwealth School	2200 E Commonwealth Ave
Youth Center	Boys & Girls Club - Richman	410 S Richman Ave
Youth Center	Boys & Girls Club - Valencia Park	2435 W Valencia Dr
Youth Center	Kiwanis Youth Park Scout Troop	386 W Truslow Ave

Table E.7 gives detailed information regarding the critical facilities in the City of Fullerton that lie in the 100- and 500-year floodplain. Detailed information on the methodology regarding this table, as well as a summary table, can be found in Section 4.2.10 of the main plan.

Table E.7 Critical Facilities in the Floodplain

Facility Type	Facility Name	Facility Address
100-Year		
Bridge	Magnolia Ave Oc Above Flood Channel	Magnolia Ave
500-Year		
Airport	Fullerton Airport	4011 W Commonwealth Ave
Bridge	CA025591	Orangethorpe Ave
Bridge	CA025593	Magnolia Ave
Bridge	CA025728	Route 91 WB
Bridge	CA025732	S5-E91/N5 Sep
Bridge	CA025733	W91-N5 Conn Ramp
Bridge	CA025735	State Route 91 WB
Bridge	CA025737	State Route 91 EB
Bridge	CA026021	E91-Magnolia Av Of
Bridge	CA026056	N5-W91 Connector R
Bridge	CA026058	Route 91 EB
Bridge	CA026620	Brookhurst Rd
Bridge	CA026687	Ford Ave
Bridge	CA026688	Highland Ave
Bridge	CA026689	Malden Ave
Bridge	CA026690	Union Ave
Bridge	CA026691	Valley View Dr
Bridge	CA026693	Edward Ave
Bridge	CA026694	Gilbert St
Bridge	CA026695	Basque Ave
Bridge	CA026696	Valencia Dr
Bridge	CA026697	Citrus Ave
Bridge	CA026701	Woods Ave
Bridge	CA026702	Richman Ave
Bridge	CA026703	Malden Ave
Bridge	CA026736	Malvern Ave
Bridge	CA026737	Magnolia Ave
Bridge	CA026738	Euclid Ave

Facility Type	Facility Name	Facility Address
Bridge	CA026739	Highland Ave
Bridge	CA026740	Lemon St
Bridge	CA026750	Walnut Ave
Bridge	CA026841	Commonwealth Ave
Bridge	CA027000	Magnolia Avenue
Bridge	CA026814	Harbor Blvd
Bridge	-	Bridgeport Cr Oc On Flood Channel
Bridge	-	Railroad Oc On Lemon St
Bridge	-	Railroad Oc On Harbor Blvd
Bridge	-	Walnut Ave Oc On Harbor Blvd
Bridge	-	Pedestrian Oc On Harbor Blvd
Bridge	-	Railroad Oc On Highland Ave
Bridge	-	Railroad Oc On Euclid St
Bridge	-	Railroad Oc On Gilbert Ave
Bridge	-	SR91 Oc On Gilbert St
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	SR91 Oc On Magnolia Ave
Church	United Pentecostal Church	1201 W Commonwealth Ave
Church	First Presbyterian Church	511 S Brookhurst Rd
Church	Grace Korean Church	1645 W Valencia Dr
Church	St Philip Benizi Church	235 S Pine Dr
Church	First Christian Church Of Fullerton	109 E Wilshire Ave
Church	St Mary's Catholic Church	400 W Commonwealth Ave
Church	Fullerton Alliance Church	620 S Roosevelt Ave
Church	Church Of Jesus Christ Of Latter Day Saints	801 N Raymond Ave
Church	Seventh Day Adventist Church	2355 W Valencia Dr
Church	St Luke's Lutheran Church	2000 W Valencia Dr
Church	Western Fullerton Baptist Church	3635 W Valencia Dr
Church	The True Light Mission Church	3710 W Valencia Dr
Church	Faith Deliverance Apostolic Church	1145 W Commonwealth Ave
Church	Jehovah Witnesses (Spanish And Filipino)	121 N Gilbert St
Church	New Wine Church	1425 S Brookhurst Rd
Church	First Korean Baptist Church	1425 S Brookhurst Rd
Church	Cornerstone Christian Fellowship	1465 W Orangethorpe Ave
Church	Cavalry Community Church	1465 W Orangethorpe Ave
Church	New Life Mission Church	112 E Walnut Ave

Facility Type	Facility Name	Facility Address
Church	Centerpoint Foursquare Church	412 E Commonwealth Ave
Church	Newsong Community Church	505 E Commonwealth Ave
Church	Orangethorpe Christian Church Of Fullerton	2200 W Orangethorpe Ave
Church	Grace Bible Chapel	1119 S Lambert Dr
Church	Eden Presbyterian Church	2200 W Orangethorpe Ave
Church	Orangethorpe United Methodist Church	2351 W Orangethorpe Ave
Church	True Love Korean Lutheran Church	1521 W Orangethorpe Ave
Church	Korean Methodist Church Of Southern Cali	214 N Highland Ave
Church	Majesty International Center	417 S Richman Ave
Church	Christian Life Center	404 W Wilshire Ave
Church	Central Korean Church	706 S Lemon St
Church	Jesus Grace Church	656 E Commonwealth Ave
Church	St Stephen's Lutheran Church	2311 E Chapman Ave
Church	Fullerton Church Of Christ	2475 E Orangethorpe Ave
Church	Seeker's Chapel	1521 E Orangethorpe Ave
City Hall	City Hall	303 W Commonwealth Ave
City Yard	City Yard	1580 W Commonwealth Ave
Community Center	Fullerton Senior Center	340 W Commonwealth Ave
Community Center	Maple Community Center	701 S Lemon St
Community Center	Garnet Community Center	3012 Garnet Ln
Community Center	Richman Community Center	320 W Elm Ave
Daycare	First Christian Church And Child Care	115 E Wilshire Ave
Daycare	My Own Home Day Care	227 W Whiting Ave
Daycare	Little Flower Montessori	703 E Commonwealth Ave
Daycare	Daystar Education Center	626 W Commonwealth Ave
Daycare	Little Wonder Daycare	1324 W Elm Ave
Daycare	Fullerton Child Development	1701 E Chapman Ave
Daycare	Mary's Family Daycare	1236 W Houston Ave
Daycare	Color Our World Daycare Ed Ctr	1613 W Valencia Dr
Daycare	St Stephen's Pre-School	2311 E Chapman Ave
Daycare	Arborland Montessori & Education	1700 W Valencia Dr
Daycare	Kids Adventure Learning Ctr	1834 W Valencia Dr
Daycare	Little Blessings Preschool	1425 S Brookhurst Rd
Daycare	Glow's Happy Child Daycare	2001 W Cherry Ave
Daycare	Bumble Bee Christian Learning	2353 Williamson Ave
Daycare	St Phillip's School Ext Day Care	215 S Pine Dr
Fire Station	Station 2	1732 W Valencia Dr

Facility Type	Facility Name	Facility Address
Library	Main Library	353 W Commonwealth Ave
Library	Hunt Branch Library	201 S Basque Ave
Police Station	Police Station	237 W Commonwealth Ave
Power Facility	Southern California Edison	1851 W Valencia Dr
Power Facility	Southern California Edison	218 E Walnut Ave
School	Bumble Bee Christian Learning	2353 Williamson Ave
School	St. Phillips Elementary School	215 Pine Dr
School	Buena Park High School	6521 Magnolia Ave
School	James A. Whitaker Elementary	8401 Montana Ave
School	Woodcrest Elementary School	455 W Baker Ave
School	Nicolas Junior High School	1100 W Olive Ave
School	Pacific Drive Elementary School	1501 W Valencia Dr
School	Seventh Day Adventist Church Elem	2353 W Valencia Dr
School	Valencia Park Elementary School	3441 W Valencia Dr
School	Orangethorpe Elementary School	1400 S Brookhurst Rd
School	Richman Elementary School	700 S Richman Ave
School	Boys And Girls Club	2435 W Valencia Dr
School	North Orange County Rop	1548 E Walnut Ave
School	Maple Elementary School	244 E Valencia Dr
School	Ruby Drive Elementary	601 Ruby Dr
School	Ivycrest Montessori	2025 E Chapman Ave
School	Head Start/Preschool	325 Courtney Ave
School	Little Blessings Preschool	1425 S Brookhurst Rd
Social Service	Salvation Army	1020 S Raymond Ave # F
Youth Center	Boys & Girls Club-Commonwealth Main Club	348 W Commonwealth Ave
Youth Center	Boys & Girls Club - Richman	410 S Richman Ave
Youth Center	Boys & Girls Club - Valencia Park	2435 W Valencia Dr
Youth Center	Kiwanis Youth Park Scout Troop	386 W Truslow Ave

Table E.8 gives details of the critical facilities in the City of Fullerton that are at risk to the seismic hazards of landslide and liquefaction. A detailed description of liquefaction can be found in Section 4.2.9 of the main plan, and Table 4.31 in Chapter 4 summarizes the information below. A detailed description of landslide can be found in Section 4.2.13 of the main plan.

Table E.8 Critical Facilities in Seismic Hazard Zones

Facility Type	Facility Name	Facility Address
Landslide	-	-
Liquefaction		
Airport	Fullerton Airport	4011 W Commonwealth Ave
Bridge	CA025591	Orangethorpe Ave
Bridge	CA025593	Magnolia Ave
Bridge	CA025728	Route 91 WB
Bridge	CA025732	S5-E91/N5 Sep
Bridge	CA025733	W91-N5 Conn Ramp
Bridge	CA025735	State Route 91 WB
Bridge	CA025737	State Route 91 EB
Bridge	CA026010	Route 57
Bridge	CA026021	E91-Magnolia Av Of
Bridge	CA026056	N5-W91 Connector R
Bridge	CA026058	Route 91 EB
Bridge	CA026620	Brookhurst Rd
Bridge	CA026685	Basque Ave
Bridge	CA026686	Richman Ave
Bridge	CA026687	Ford Ave
Bridge	CA026688	Highland Ave
Bridge	CA026689	Malden Ave
Bridge	CA026690	Union Ave
Bridge	CA026691	Valley View Dr
Bridge	CA026693	Edward Ave
Bridge	CA026694	Gilbert St
Bridge	CA026695	Basque Ave
Bridge	CA026696	Valencia Dr
Bridge	CA026697	Citrus Ave
Bridge	CA026701	Woods Ave
Bridge	CA026702	Richman Ave
Bridge	CA026703	Malden Ave
Bridge	CA026734	Gilbert St
Bridge	CA026736	Malvern Ave

Facility Type	Facility Name	Facility Address
Bridge	CA026737	Magnolia Ave
Bridge	CA026738	Euclid Ave
Bridge	CA026739	Highland Ave
Bridge	CA026740	Lemon St
Bridge	CA026750	Walnut Ave
Bridge	CA026779	Associated Rd
Bridge	CA026841	Commonwealth Ave
Bridge	CA026991	Burning Tree Rd
Bridge	CA027000	Magnolia Avenue
Bridge	CA026814	Harbor Blvd
Bridge	-	Industrial Park Access On Flood Channel
Bridge	-	Bridgeport Cr Oc On Flood Channel
Bridge	-	Berkeley Ave Oc On Flood Channel
Bridge	-	Railroad Oc On Lemon St
Bridge	-	Railroad Oc On Harbor Blvd
Bridge	-	Walnut Ave Oc On Harbor Blvd
Bridge	-	Pedestrian Oc On Harbor Blvd
Bridge	-	Railroad Oc On Highland Ave
Bridge	-	Railroad Oc On Euclid St
Bridge	-	Railroad Oc On Gilbert Ave
Bridge	-	SR91 Oc On Gilbert St
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	SR91 Oc On Magnolia Ave
Bridge	-	Magnolia Ave Oc Above Flood Channel
Church	United Pentecostal Church	1201 W Commonwealth Ave
Church	First Presbyterian Church	511 S Brookhurst Rd
Church	Grace Korean Church	1645 W Valencia Dr
Church	St Philip Benizi Church	235 S Pine Dr
Church	First Christian Church Of Fullerton	109 E Wilshire Ave
Church	St Mary's Catholic Church	400 W Commonwealth Ave
Church	Fullerton Alliance Church	620 S Roosevelt Ave
Church	Seventh Day Adventist Church	2355 W Valencia Dr
Church	St Luke's Lutheran Church	2000 W Valencia Dr
Church	Western Fullerton Baptist Church	3635 W Valencia Dr
Church	The True Light Mission Church	3710 W Valencia Dr
Church	Faith Deliverance Apostolic Church	1145 W Commonwealth Ave
Church	Jehovah Witnesses (Spanish And Filipino)	121 N Gilbert St
Church	New Wine Church	1425 S Brookhurst Rd

Facility Type	Facility Name	Facility Address
Church	First Korean Baptist Church	1425 S Brookhurst Rd
Church	Cornerstone Christian Fellowship	1465 W Orangethorpe Ave
Church	Cavalry Community Church	1465 W Orangethorpe Ave
Church	New Life Mission Church	112 E Walnut Ave
Church	Centerpoint Foursquare Church	412 E Commonwealth Ave
Church	Newsong Community Church	505 E Commonwealth Ave
Church	Fullerton First United Methodist Church	114 N Pamona Ave
Church	Wilshire Ave Community Church	212 E Wilshire Ave
Church	First Lutheran Church Of Fullerton	215 N Lemon St
Church	Orangethorpe Christian Church Of Fullerton	2200 W Orangethorpe Ave
Church	Grace Bible Chapel	1119 S Lambert Dr
Church	Eden Presbyterian Church	2200 W Orangethorpe Ave
Church	Orangethorpe United Methodist Church	2351 W Orangethorpe Ave
Church	True Love Korean Lutheran Church	1521 W Orangethorpe Ave
Church	Korean Methodist Church Of Southern Cali	214 N Highland Ave
Church	Majesty International Center	417 S Richman Ave
Church	Christian Life Center	404 W Wilshire Ave
Church	Central Korean Church	706 S Lemon St
Church	First Baptist Church Of Fullerton	212 E Wilshire Ave
Church	Jesus Grace Church	656 E Commonwealth Ave
Church	Sunny Hills Church Of Christ	2255 N Euclid St
City Hall	City Hall	303 W Commonwealth Ave
City Yard	City Yard	1580 W Commonwealth Ave
Community Center	Fullerton Senior Center	340 W Commonwealth Ave
Community Center	Maple Community Center	701 S Lemon St
Community Center	Richman Community Center	320 W Elm Ave
Dams	Brea Dam	Brea Reservoir
Dams	Fullerton Dam	Fullerton Lake
Daycare	First Christian Church And Child Care	115 E Wilshire Ave
Daycare	My Own Home Day Care	227 W Whiting Ave
Daycare	Little Flower Montessori	703 E Commonwealth Ave
Daycare	Daystar Education Center	626 W Commonwealth Ave
Daycare	Little Wonder Daycare	1324 W Elm Ave
Daycare	Mary's Family Daycare	1236 W Houston Ave
Daycare	Color Our World Daycare Ed Ctr	1613 W Valencia Dr
Daycare	Arborland Montessori & Education	1700 W Valencia Dr
Daycare	Kids Adventure Learning Ctr	1834 W Valencia Dr
Daycare	Little Blessings Preschool	1425 S Brookhurst Rd
Daycare	Glow's Happy Child Daycare	2001 W Cherry Ave

Facility Type	Facility Name	Facility Address
Daycare	Bumble Bee Christian Learning	2353 Williamson Ave
Daycare	St Phillip's School Ext Day Care	215 S Pine Dr
Fire Station	Station 1	312 E Commonwealth Ave
Fire Station	Station 2	1732 W Valencia Dr
Fire Station	Station 5	2555 E Yorba Linda Blvd
Fire Station	Station 6	2691 Rosecrans Ave
Library	Main Library	353 W Commonwealth Ave
Library	Hunt Branch Library	201 S Basque Ave
Police Station	Police Station	237 W Commonwealth Ave
Power Facility	Southern California Edison	1851 W Valencia Dr
Power Facility	Southern California Edison	218 E Walnut Ave
School	Bumble Bee Christian Learning	2353 Williamson Ave
School	St. Phillips Elementary School	215 Pine Dr
School	Buena Park High School	6521 Magnolia Ave
School	James A. Whitaker Elementary	8401 Montana Ave
School	Woodcrest Elementary School	455 W Baker Ave
School	Nicolas Junior High School	1100 W Olive Ave
School	Pacific Drive Elementary School	1501 W Valencia Dr
School	Seventh Day Adventist Church Elem	2353 W Valencia Dr
School	Valencia Park Elementary School	3441 W Valencia Dr
School	Orangethorpe Elementary School	1400 S Brookhurst Rd
School	Richman Elementary School	700 S Richman Ave
School	Fullerton College	321 E Chapman Ave
School	Boys And Girls Club	2435 W Valencia Dr
School	Fullerton High School	201 E Chapman Ave
School	Maple Elementary School	244 E Valencia Dr
School	S.Cal College Of Optometry	2575 Yorba Linda Blvd
School	Head Start/Preschool	325 Courtney Ave
School	Little Blessings Preschool	1425 S Brookhurst Rd
Senior	Orange Caregiver Resource Ctr	251 E Imperial Hwy # 460
Social Service	Salvation Army	1020 S Raymond Ave # F
Transportation Center	Transportation Center	120 E Santa Fe Ave
Youth Center	Boys & Girls Club-Commonwealth Main Club	348 W Commonwealth Ave
Youth Center	Boys & Girls Club - Richman	410 S Richman Ave
Youth Center	Boys & Girls Club - Valencia Park	2435 W Valencia Dr
Youth Center	Kiwanis Youth Park Scout Troop	386 W Truslow Ave
Youth Center	Fullerton Hills Softball	1440 Brea Blvd

Table E.9 gives a detailed description of the critical facilities in the City of Fullerton that are located in a wildfire risk zone. A description of wildfire can be found in Section 4.2.17 of the main plan. Table 4.45 in the Chapter 4 summarizes the facilities below. Only those properties located in the moderate, high, or very high wildfire zones are shown.

Table E.9 Detailed Critical Facilities in the Wildfire Risk Zone

Facility Type	Facility Name	Facility Address
Very High		
Bridge	CA026923	Chevron Service Rd
Church	Church Of Jesus Christ Of LDS	2225 N Euclid St
Church	Sunny Hills Church Of Christ	2255 N Euclid St
Fire Station	Station 6	2691 Rosecrans Ave
High		
Daycare	YMCA	2000 Youth Way
Hospital	Saint Jude Medical Center	101 E Valencia Mesa Dr
Youth Center	Child Guidance Ctr - Family Ctr	2050 Youth Way
Youth Center	Fullerton Hills Softball	1440 Brea Blvd
Moderate		
Bridge	CA026815	Harbor Blvd