City of El Monte 2017 Hazard Mitigation Plan

June 19, 2017

Prepared under contract with:
Emergency Planning Consultants
San Diego, California
Carolyn J. Harshman, CEM

Credits

Special Thanks

*City of El Monte Planning Team**

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* **ELEMENT A: PLANNING PROCESS | A1**

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))

Acknowledgements

City of El Monte City Council

- ✓ Andre Quintero, Mayor
- ✓ Jerry Velasco, Mayor Pro Tem
- ✓ Juventino “J” Gomez, Councilmember
- ✓ Norma Macias, Councilmember
- ✓ Victoria Martinez, Councilmember
- ✓ Jesus Gomez, City Manager

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Notes

The maps in this plan were provided by the City of El Monte, County of Los Angeles, Federal Emergency Management Agency (FEMA), or were acquired from public Internet sources. Care was taken in the creation of the maps contained in this Plan, however they are provided "as is". The City of El Monte cannot accept any responsibility for any errors, omissions or positional accuracy, and therefore, there are no warranties that accompany these products (the maps). Although information from land surveys may have been used in the creation of these products, in no way does this product represent or constitute a land survey. Users are cautioned to field verify information on this product before making any decisions.

Mandated Contents

In an effort to assist the reader and reviewer of this document the jurisdiction has inserted the mandated contents as identified in the Disaster Mitigation Act of 2000 (Public Law – 390), as specifically identified in the Local Multi-Hazard Mitigation Planning Guidance (July 1, 2008), the updated guidance contained in the Local Mitigation Plan Review Guide (October 1, 2012), and the Local Mitigation Planning Handbook (March 2013). Following is an example of those references – inserted as footnotes throughout the plan.

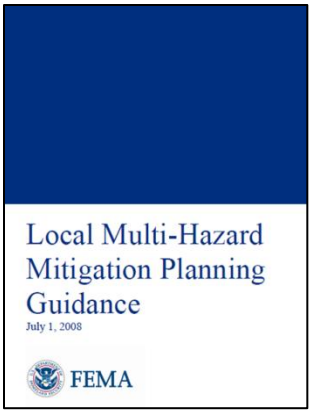
EXAMPLE

ELEMENT A: PLANNING PROCESS | A1

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))

PART 1: BACKGROUND

Executive Summary



The Mitigation Plan was prepared in response to Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 (also known as Public Law 106-390) requires state and local governments to prepare Mitigation Plans to document their Mitigation Planning process, and identify hazards, potential losses, mitigation needs, goals, and strategies. This type of planning supplements the City's comprehensive emergency management program. This document is a federally mandated update to the City's 2007 Hazard Mitigation Plan (FEMA-approved on January 12, 2007). The update satisfies all of the required content standards identified in the Local Multi-Hazard Mitigation Planning Guidance (July 1, 2008), the updated guidance contained in the Local Mitigation Plan Review Guide (October 1, 2012), and the Local Mitigation Planning Handbook (March 2013).

Under DMA 2000, each state and local government must have a federally approved Mitigation Plan to be eligible for hazard mitigation grant funding.

The Disaster Mitigation Act of 2000 (DMA 2000) is intended to facilitate cooperation between state and local governments, prompting them to work together. Through collaboration, mitigation needs can be identified before disasters strike, resulting in faster allocation of resources and more effective risk reduction projects.

Mitigation Planning Benefits

Planning ahead helps residents, businesses, and government agencies effectively respond when disasters strike; and keeps public agencies eligible for Hazard Mitigation Grant Program (HMGP) funding. The long-term benefits of mitigation planning include:

- ✓ Greater understanding of hazards faced by a community
- ✓ Use of limited resources on hazards with the greatest effect on a community
- ✓ Financial savings through partnerships for planning and mitigation
- ✓ Reduced long-term impacts and damages to human health and structures, and lower repair costs
- ✓ More sustainable, disaster-resistant communities

Hazard Land Use Policy in City of El Monte

Planning for hazards is an integral element of the City's land use planning program. The City has a General Plan and the implementing ordinances that are required to comply with statewide land use planning regulations.

The continuing challenge faced by local officials is to keep the network of local plans effective in responding to the changing conditions and needs of diverse communities, particularly in light of the very active seismic region in which we live.

Planning for hazards requires a thorough understanding of the various hazards facing the City and region as a whole. Additionally, it is important to take an inventory of the structures and

contents of various City holdings. These inventories should include the compendium of hazards facing the City, the built environment at risk, the personal property that may be damaged by hazard events and most of all, the people who live in the shadow of these hazards.

Planning Team Resources

The City of El Monte created a Planning Team charged with the responsibility of creating this Hazard Mitigation Plan. The Team utilized the resources of a variety of regional, state, and federal agencies. Some of the key agency resources included:

- ✓ California Office of Emergency Services (Cal OES) is responsible for disaster mitigation, preparedness, response, recovery, and the administration of federal funds after a major disaster declaration;
- ✓ Southern California Earthquake Center (SCEC) gathers information about earthquakes, integrates information on earthquake phenomena, and communicates this to end-users and the public to increase earthquake awareness, reduce economic losses, and save lives.
- ✓ California Department of Forestry and Fire Protection (CAL FIRE) is responsible for all aspects of wildland fire protection on private and state properties, and administers forest practices regulations, including landslide mitigation, on non-federal lands.
- ✓ California Division of Mines and Geology (DMG) is responsible for geologic hazard characterization, public education, and the development of partnerships aimed at reducing risk.
- ✓ California Division of Water Resources (DWR) plans, designs, constructs, operates, and maintains the State Water Project; regulates dams; provides flood protection and assists in emergency management. It also educates the public, serves local water needs by providing technical assistance
- ✓ FEMA provides hazard mitigation guidance, resource materials, and educational materials to support implementation of the capitalized DMA 2000.
- ✓ United States Census Bureau (USCB) provides demographic data on the populations affected by natural disasters.
- ✓ United States Department of Agriculture (USDA) provides data on matters pertaining to land management.

Planning Approach*

The Team consisted of City staff from various departments that worked with Emergency Planning Consultants using the following approach to create the 2017 Mitigation Plan:

- ✓ Identify hazards posing a significant threat
- ✓ Profile these hazards
- ✓ Estimate inventory at risk and potential losses associated with these hazards
- ✓ Review and incorporate existing documents, data, and technical information pertaining to hazards and present mitigation activities
- ✓ Utilize existing HAZUS data and mapping resources
- ✓ Develop mitigation strategies and goals that address these hazards
- ✓ Develop plan maintenance procedures for implementation after the joint review by Cal OES and FEMA approval.

*** ELEMENT A: PLANNING PROCESS | A1**

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))

Planning Process Phases*†

Throughout the project, the City followed its traditional approach to developing policy documents, including preparation of the First Draft Plan, then making the First Draft Plan available to the public and outside agencies electronically to encourage questions and answers from the public and stakeholders, creation of a Second Draft Plan incorporating the input from the public and stakeholders, distribution of the Second Draft Plan to Cal OES and FEMA for review and approval, and presentation of the Third Draft Plan incorporating any federally mandated revisions to the City Council for adoption. Forward Final Draft Plan to FEMA to lift the conditional approval and issue a final approval and incorporate into Final Plan.

PLANNING PHASES				
Plan Writing Phase (First and Second Draft Plan)	**Plan Review Phase (Third Draft Plan)**	**Plan Approval Phase (Fourth Draft Plan)**	**Plan Approval Phase (Final Draft and Final Plan)**	**Plan Implementation Phase**
• Planning Team input – research, meetings, writing, review of First Draft Plan • Incorporate revisions and post Second Draft Plan on City's website encouraging questions and comments • Invite outside agencies to review Second Draft Plan • Invite City department heads to review Second Draft Plan	• Incorporate input into Third Draft Plan • Submit to Cal OES and FEMA for review and conditional approval • Amend Plan as required by FEMA regulations • Receive FEMA conditional approval (pending City Council adoption)	• Public notice of upcoming City Council public meeting • Distribute Fourth Draft Plan and staff report to the City Council in advance of the public meeting • Present Fourth Draft Plan to the City Council for adoption	• Incorporate input from the City Council public meeting into Final Draft Plan • Submit Final Draft Plan to FEMA to lift conditional approval • FEMA issues Final Approval • Incorporate final approval into Final Plan.	• Conduct Planning Team meetings to integrate mitigation action items into budget, CIP and other planning mechanisms (funding and strategic documents)

*** ELEMENT A: PLANNING PROCESS | A1**

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))

† ELEMENT A: PLANNING PROCESS | A3

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))

How the Plan is Organized

The structure of the plan enables people to use a section of interest to them and allows the City to review and update sections when new data is available. The ease of incorporating new data into the plan will result in a Mitigation Plan that remains current and relevant to the City of El Monte.

Following is a description of each of the sections of the plan:

Part 1: Background

Executive Summary

The Executive Summary provides a very general overview of mitigation planning, the planning process, and the steps involved in implementing the plan.

Introduction

The Introduction describes the background and purpose of developing the Mitigation Plan for the City of El Monte.

Community Profile

The section presents the history, geography, demographics, and socioeconomics of the City of El Monte. It provides valuable information on the demographics and history of the region.

Planning Process

This section describes the mitigation planning process including 1) Planning Team involvement, 2) extended Planning Team support, 3) public involvement (including citizens and external agencies), and 4) integration of existing data and plans.

Part 2: Hazard Analysis

This section provides information on the process used to assess the demographics and development patterns for the community along with an assessment of the hazards.

Risk Assessment

This section provides information on hazard identification, vulnerability and risk associated with hazards in the City of El Monte.

Hazard Detailed Evaluation

The Hazard Detailed Evaluation section includes a discussion on the five hazards identified as posing significant threats to the community. The five hazards include:

- Earthquake
- Flooding
- Windstorm
- Dam Failure
- Drought

Each hazard detailed evaluation includes information on the history, hazard causes, hazard characteristics, and hazard assessment.

Part 3: Mitigation Strategies
Mitigation Strategies
This section highlights the Mitigation Actions Matrix and: 1) past accomplishments; 2) planning approach; 3) goals and objectives; 4) identification, analysis, and implementation of mitigation activities; 5) prioritized mitigation activities; and 6) status since original plan.

Plan Maintenance
This section provides information on plan implementation, monitoring and evaluation.

Part 4: Appendix
The plan appendix is designed to provide users of the Mitigation Plan with additional information to assist them in understanding the contents of the mitigation plan, and potential resources to assist them with implementation.

Benefit/Cost Analysis
This section describes FEMA's requirements for benefit cost analysis in hazards mitigation, as well as various approaches for conducting economic analysis of proposed mitigation activities.

Mitigation Planning Process

The process for creating the 2017 Mitigation Plan started with identifying members for the Planning Team. Each team member represented different City department and specific divisions within those departments with a role in mitigation efforts. The Team met and identified characteristics and consequences of natural, technological, and human-caused hazards with significant potential to affect the City. It is important to note that the City Council adopted the City's first Hazard Mitigation Plan in 2004 and later approved by FEMA in 2007. The Team utilized the contents as much as possible from the 2007 Plan to create the updated document.

Hazard mitigation strategy and goals were developed by understanding the risk posed by the identified hazards. The group also determined hazard mitigation activities and priorities to include scenarios for both present and future conditions. The final Mitigation Plan will be implemented through various projects, changes in day-to-day city operations, and through continued hazard mitigation development.

Through a series of Team meetings, Mitigation Action Items identified in the 2007 Plan were reviewed and status information documented.

Participating Organizations

For mitigation planning to be successful; like all community planning; it requires collaboration with, and support from, federal, state, local, and regional governments; citizens; the private sector; universities; and non-profit organizations. The Team consulted a variety of sources to ensure that the planning process results in practicable actions tailored to local needs and circumstances. Organizations and agencies outside of the City were invited to participate in the review of the Draft Hazard Mitigation Plan. The list of agencies is located in the Planning Process Section.

Mitigation Plan Jurisdiction and Scope

The City's Mitigation Plan affects the areas within the City boundaries, with emphasis on City owned facilities and land. This plan provides a framework for planning for natural hazards. The

resources and background information in the plan address existing and future land development throughout the City of El Monte.

Risk Assessment

Risk assessment is the identification of risks posed by a hazard and the corresponding impacts to the community. This process involves five steps: identify hazards, profile hazards, inventory critical assets, assess risks, and assess vulnerability of future development.

Step 1: Identify Hazards

The Team identified the hazards that could significantly impact the City by referencing the City's General Plan (2011), County of Los Angeles All-Hazard Mitigation Plan (2014), the City's Emergency Operations Plan (2013), and a long list of internet resources from regional, state, and federal agencies.

The Team ranked the hazards based on the probability, magnitude/severity, warning time, and duration.

That analysis yielded the following hazards as posing the *greatest* threat to the City of El Monte: earthquake, flooding, windstorm, and drought.

Step 2: Profile Hazards

Hazard profiles determine the extent to which each hazard could impact the City. Each hazard profile contains the following information:

- ✓ Background and local conditions
- ✓ Historic frequency and probability of occurrence
- ✓ Severity
- ✓ Historic losses and impacts
- ✓ Designated hazard areas

Other factors considered include potential impact, onset, frequency, hazard duration, cascading effects, and recovery time for each hazard. Using this information, the Team assessed the relative risk of each hazard ranging from severe risk to no risk. Where applicable, the source(s) of information, data, and maps showing vulnerable areas and relevant community components are provided.

Step 3: Inventory Critical Assets

Once hazards and profiles were established, locations of critical facilities were plotted and analyzed. To estimate losses from each hazard (number of structures, value of structures and number of people), the Team used local resources; Census data; Hazards U.S.-Multi-Hazard (HAZUS-MH), a Geographic Information System (GIS) risk assessment methodology; and other GIS capabilities.

The inventory of assets shows a range of resources that could be lost or damaged for each hazard such as population, general building stock (residential and commercial), critical facilities (hospitals, police and fire stations, and transportation systems), and utilities.

Step 4: Assess Risks

Estimated losses to structures and their contents, as well as the losses to structure use and function, were identified (as data was available).

Step 5: Vulnerability Analysis of Future Development

This step provides a general description of City facilities and contents in relation to the identified hazards so that mitigation options can be considered in land use planning and future land use decisions. This Mitigation Plan provides a comprehensive description of the character of the City of El Monte in the Community Profile Section. This description includes the geography and environment, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns. Analyzing these components of the City of El Monte helps to identify potential problem areas and serves as a guide for incorporating the goals and ideas contained in this mitigation plan into other community development plans.

Mitigation Goals

The risk assessment and public input involved a review of past mitigation actions, future goals, and appropriate mitigation strategies. The Team identified five mitigation goals that summarize the hazard reduction outcome the City wants to achieve:

- ✓ Protect Life and Property
- ✓ Enhance Public Awareness
- ✓ Preserve Natural Systems
- ✓ Encourage Partnerships and Implementation
- ✓ Strengthen Emergency Services

These goals guided the development and implementation of specific mitigation activities. Many of the mitigation objectives and action items come from current programs. Emphasis was placed on the effectiveness of the activities with respect to their estimated cost.

Opportunities to Participate

The Team was dedicated to including as many perspectives and stakeholders as possible in the plan-writing phase. The availability of the Plan during the writing phase was announced to citizens and businesses via the City's website, City's Facebook page, and hard copies at both Libraries.

External agencies were informed via email of the opportunity to participate during the plan-writing phase. The email included a link to the website along with an attached pdf version of the Plan. The following external agencies were informed: special districts serving El Monte; the El Monte/South El Monte Chamber of Commerce; Los Angeles County Fire Department; City Emergency Services Coordinators within DMAC Area D; El Monte City School District, El Monte Union High School District, Mountain View School District; and nine Water Districts serving the City. A specific list is located at the end of the Planning Process section.

Plan Approval

The Mitigation Plan was submitted to Cal OES and FEMA for a joint review on January 6, 2016. FEMA issued a conditional approval on October 14, 2016. Following City Council's adoption, the Plan was resubmitted to FEMA to lift the conditional approval. Final approval was issued by FEMA on June 14, 2017.

Plan Adoption*

Following receipt of FEMA's conditional approval, the Mitigation Plan was posted and noticed for a City Council public meeting on May 2, 2017. The Council voted 4-0 to adopt the Fourth Draft Plan. A copy of the City Council Resolution is located in the Planning Process Section.

Point of Contact

To request information or provide comments regarding this mitigation plan, please contact:

Contact	**Lieutenant Pete Rasic** **El Monte Police Department**
Mailing Address	**11333 Valley Boulevard** **El Monte, Ca. 91731**
Telephone Number	**(626) 580-2118**
Email	**prasic@elmontepd.org**

Plan Maintenance

Mitigation Planning is an ongoing process involving changes as new hazards occur, as the area develops, and as more is learned about hazards and their impacts. The Team will monitor changing conditions, help implement mitigation activities, annually review the plan to determine if City goals are being met, and provide an update to Cal OES and FEMA every five years. In addition, the Team will review After-Action Reports generated after any disaster that impacts the City, and revise the plan, as needed.

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* **ELEMENT E: PLAN ADOPTION | E1**

E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))

Introduction

Why Develop a Mitigation Plan?

As the costs of damage from disasters continue to increase regionally and nationwide, the City realizes the importance of identifying effective ways to reduce vulnerability to disasters. Mitigation plans assist communities in reducing risk from hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the City.

The plan provides a set of action items to reduce risks from hazards through education and outreach programs and to foster the development of partnerships, and implementation of preventative activities such as land use programs that restrict and control development in areas subject to damage from hazards.

The resources and information within the Mitigation Plan:

- ✓ Establish a basis for coordination and collaboration among agencies and the public of City of El Monte;
- ✓ Identify and prioritize future mitigation projects; and
- ✓ Assist in meeting the requirements of federal assistance programs.

The Mitigation Plan works in conjunction with other City plans, including the Emergency Operations Plan, General Plan, and Capital Improvement Plan.

Why Plan for Hazards in City of El Monte

Hazards impact residents, businesses, property, the environment, and the economy of the City. The hazards have exposed the City of El Monte to the possibility of financial and emotional costs of recovery. The risk associated with hazards increases as more people move to areas affected by hazards.

The inevitability of hazards, and the growing population and activity within the City create an urgent need to develop strategies, coordinate resources, and increase public awareness to reduce risk and prevent loss from future hazard events. Identifying the risks posed by hazards, and developing strategies to reduce the impact of a hazard event can assist in protecting life and property of citizens and communities. Local residents and businesses can work together with the City to create a Mitigation Plan that addresses the potential impacts of hazard events.

"Floods and hurricanes happen. The hazard itself is not the disaster – it's our habits, it's how we build and live in those areas…that's the disaster."

Craig Fugate, FEMA Director

Hazard Mitigation Legislation and Grants

Relevant hazard mitigation legislation and grants are highlighted below.

Hazard Mitigation Grant Program

In 1974, Congress enacted the Robert T. Stafford Disaster Relief and Emergency Act, commonly referred to as the Stafford Act. In 1988, Congress established the Hazard Mitigation Grant Program

(HMGP) via Section 404 of the Stafford Act. Regulations regarding HMGP implementation based on the DMA 2000 were initially changed by an Interim Final Rule (44 CFR Part 206, Subpart N) published in the Federal Register on February 26, 2002. A second Interim Final Rule was issued on October 1, 2002.

The HMGP helps states and local governments implement long-term hazard mitigation measures for natural hazards by providing federal funding following a federal disaster declaration. Eligible applicants include state and local agencies, Indian tribes or other tribal organizations, and certain nonprofit organizations.

In California, the HMGP is administered by Cal OES. Examples of typical HMGP projects include:

- ✓ Property acquisition and relocation projects
- ✓ Structural retrofitting to minimize damages from earthquake, flood, high wind, wildfire, or other natural hazards
- ✓ Elevation of flood-prone structures
- ✓ Vegetative management programs, such as:
- ✓ Brush control and maintenance
- ✓ Fuel break lines in shrubbery
- ✓ Fire-resistant vegetation in potential wildland fire areas

Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation Program (PDM) was authorized by §203 of the Stafford Act, 42 United States Code (USC), as amended by §102 of the DMA 2000. Funding is provided through the National Pre-Disaster Mitigation Fund to help state and local governments (including Indian tribal governments) implement cost-effective hazard mitigation activities that complement a comprehensive mitigation program.

In Fiscal Year 2009, two types of grants (planning and competitive) were offered under the PDM Program. Planning grants allocate funds to each state for Mitigation Plan development. Competitive grants distribute funds to states, local governments, and federally recognized Indian tribal governments via a competitive application process. FEMA reviews and ranks the submittals based on pre-determined criteria. The minimum eligibility requirements for competitive grants include participation in good standing in the National Flood Insurance Program (NFIP) and a FEMA-approved Mitigation Plan.
(Source: http://www.fema.gov/fima/pdm.shtm)

Flood Mitigation Assistance Program

The Flood Mitigation Assistance (FMA) Program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101). Financial support is provided through the National Flood Insurance Fund to help states and communities implement measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP.

Three types of grants are available under FMA: planning, project, and technical assistance. Planning grants are available to states and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for project grants to implement measures to reduce flood losses. Technical assistance grants in the amount of 10 percent of the project grant are available to the state for program administration.

Communities that receive planning and/or project grants must participate in the NFIP. Examples of eligible projects include elevation, acquisition, and relocation of NFIP-insured structures. (Source: http://www.fema.gov/fima/fma.shtm)

Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 (DMA 2000) was signed by President Clinton on October 30, 2000 (Public Law 106-390). Section 322 primarily deals with the development of Mitigation Plans. The Interim Final Rule for planning provisions (44 CFR Part 201) was published in the Federal Register twice: February 26, 2002 and October 1, 2002. The Mitigation Planning requirements are implemented via 44 CFR Part 201.6.

DMA 2000 was designed to establish a national program for pre-disaster mitigation, streamline disaster relief at the federal and state levels, and control federal disaster assistance costs. Congress believed these requirements would produce the following benefits:

- ✓ Reduce loss of life and property, human suffering, economic disruption, and disaster costs.
- ✓ Prioritize hazard mitigation at the local level with increased emphasis on planning and public involvement, assessing risks, implementing loss reduction measures, and ensuring critical facilities/services survive a disaster.
- ✓ Promote education and economic incentives to form community-based partnerships and leverage non-federal resources to commit to and implement long-term hazard mitigation activities.

Under DMA 2000 state and local government (each city, county, and special district), and tribal government must develop a Mitigation Plan to be eligible to receive HMGP funds. Every mitigation plan, which must be reviewed by the state and approved by FEMA, should address the following items:

- ✓ Plan Promulgation
- ✓ Planning Process including Public Involvement
- ✓ Hazard Identification and Risk Assessment
- ✓ Mitigation Strategy
- ✓ Plan Implementation and Maintenance Procedures
- ✓ Specific State Requirements

State and Federal Support

While the City has primary responsibility for developing and implementing hazard mitigation strategies, they are not alone. Various state and federal partners and resources help local agencies with mitigation planning.

Cal OES is the lead agency for mitigation planning support to local governments. In addition, FEMA offers grants, tools, and training.

The Team utilized the following regulations and guidance in preparing the Hazard Mitigation Plan:

- ✓ DMA 2000 (Public Law 106-390, October 10, 2000)

- ✓ 44 CFR Parts 201 and 206, Mitigation Planning and Hazard Mitigation Grant Program, Interim Final Rule, October 1, 2002
- ✓ 44 CFR Parts 201 and 206, Mitigation Planning and Hazard Mitigation Grant Program, Interim Final Rule, February 26, 2002
- ✓ How-To Guide for Using HAZUS-MH for Risk Assessment, (FEMA 433), February 2004
- ✓ Mitigation Planning "How-to" Series (FEMA 386-1 through 9 available at: http://www.fema.gov/fima/planhowto.shtm)
- ✓ Getting Started: Building Support For Mitigation Planning (FEMA 386-1)
- ✓ Understanding Your Risks: Identifying Hazards and Estimating Losses (FEMA 386-2)
- ✓ Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies (FEMA 386-3)
- ✓ Bringing the Plan to Life: Implementing the Mitigation Plan (FEMA 386-4)
- ✓ Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5)
- ✓ Integrating Historic Property and Cultural Resource Considerations into Mitigation Planning (FEMA 386-6)
- ✓ Integrating Manmade Hazards Into Mitigation Planning (FEMA 386-7)
- ✓ Multi-Jurisdictional Mitigation Planning (FEMA 386-8)
- ✓ Using the Mitigation Plan to Prepare Successful Mitigation Projects (FEMA 386-9)
- ✓ State and Local Plan Interim Criteria Under the DMA 2000, July 11, 2002, FEMA
- ✓ Mitigation Planning Workshop For Local Governments-Instructor Guide, July 2002, FEMA
- ✓ Report on Costs and Benefits of Natural Hazard Mitigation, Document #294, FEMA
- ✓ LHMP Development Guide – Appendix A - Resource, Document, and Tool List for Local Mitigation Planning, December 2, 2003, Cal OES
- ✓ Local Mitigation Plan Review Guide, effective October 1, 2012, FEMA
- ✓ Local Multi-Hazard Mitigation Planning Guidance, July 1, 2008, FEMA
- ✓ Local Mitigation Planning Handbook, March 2013, FEMA

Hazards U.S. – Multi-Hazard

In 1997, FEMA developed a standardized model for estimating losses caused by an earthquake. Hazards U.S. (HAZUS) addressed the need for more effective national, state, and local planning and the need to identify areas that face the highest risk and potential for loss.

Hazards U.S. Multi-Hazard (HAZUS-MH) provides models to estimate potential losses from floods (coastal and riverine) and winds (hail, hurricane, tornado, tropical cyclone, and thunderstorm). HAZUS-MH applies engineering and scientific risk calculations developed by hazard and information technology experts to provide defensible damage and loss estimates. This methodology provides a consistent framework for assessing risk across a variety of hazards.

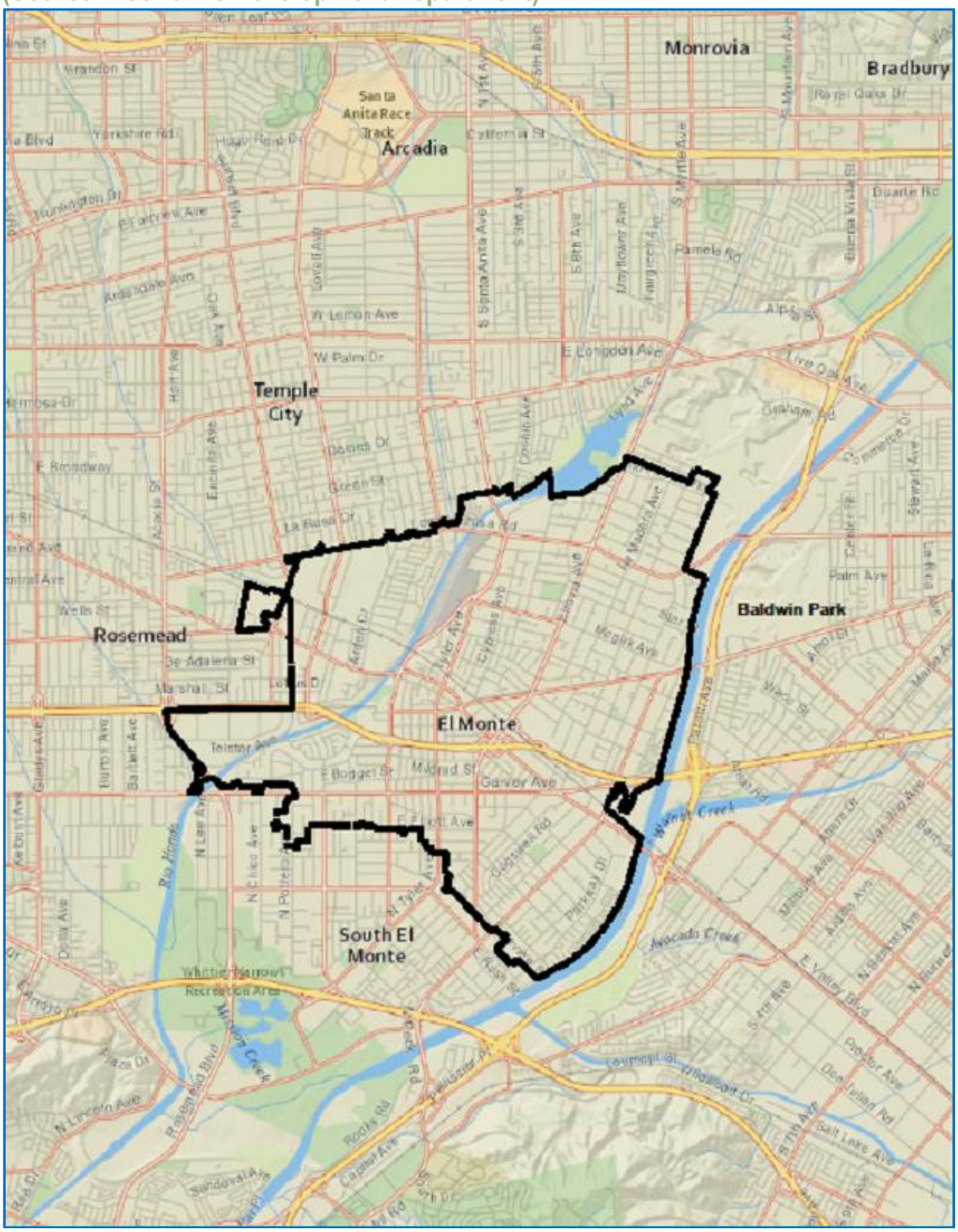
HAZUS-MH uses Geographic Information System technology to produce detailed maps and analytical reports on physical damage to building stock, critical facilities, transportation systems, and utilities. The damage reports cover induced damage (debris, fire, hazardous material, and inundation) and direct economic and social losses (casualties, shelter requirements, and economic impacts), promoting standardization.

HAZUS maps contained in this document were created by the County of Los Angeles and are included in the Hazard Detailed Evaluation Sections.

Who Does the Mitigation Plan Affect?

The Mitigation Plan affects the areas within the City of El Monte boundaries and City owned facilities and land. This plan provides a framework for planning for natural hazards. The resources and background information in the plan are applicable Citywide and to City-owned facilities outside of the City boundaries, and the goals and recommendations provide groundwork for local mitigation plans and partnerships. See Map: Regional Proximity of the City below.

Map: Regional Proximity of the City of El Monte
(Source: Economic Development Department)



Community Profile

Location of City

The City of El Monte is located approximately 12 miles east of downtown Los Angeles. It is central to San Gabriel Valley where two major freeways, Interstates 605 and 10 intersect. It has an area of 10 square miles and is the ninth largest city in Los Angeles County. The Los Angeles County region encompasses a highly varied natural setting that includes the high desert, coastal areas, mountains, fertile valleys, and coastal plains. The plains and valleys within the Los Angeles basin, which includes the City, were cleared of natural vegetation as part of the region's urbanization.

Environmental Setting

Major Rivers

The nearest major river is the San Gabriel River, which runs south along the entire eastern border of the City. This River does have potential impact on the City of El Monte. Normally this river channel is dry and only carries a significant water flow during a major rainstorm. The Rio Hondo runs through the northwestern part of the City.

Climate

Average temperatures in the City range from 43 degrees in the winter months to 89 degrees in the summer months. However, the temperatures can vary over a wide range, particularly when the Santa Ana winds blow, bringing higher temperatures and very low humidity. Temperatures often exceed 90 degrees in the summer months (June - September), and rarely drop below 30 degrees in the winter months (November-March).

Rainfall in the City averages 14.4 inches of rain per year. However, the term "average rainfall" is misleading because over the recorded history of rainfall in the Los Angeles Basin, amounts have ranged from approximately 4-6 inches in some years to 32-34 inches of rain in very wet years.

Furthermore, actual rainfall in Southern California tends to fall in large amounts during sporadic and often heavy storms rather than consistently over storms at somewhat regular intervals. In short, rainfall in Southern California might be characterized as feast or famine within a single year. Because the metropolitan basin is largely built out, water originating in higher elevation communities can have a sudden impact on adjoining communities that have a lower elevation.

Minerals and Soils

The characteristics of the minerals and soils present in City of El Monte indicate that potential types of hazards that may occur. Rock hardness and soil characteristics can determine whether an area will be prone to geologic hazards such as earthquakes, liquefaction and landslides.

Localities most susceptible to liquefaction-induced damage are underlain by loose, water-saturated, granular sediment within 40 feet of the ground surface. These conditions exist for El Monte and the surrounding areas. The City of El Monte is in a 10 square mile area that is made up of loose sandy soil, gravel, sediment and silt layers.

Other Significant Geologic Features

The City of El Monte, like most of the Los Angeles Basin, lies over the area of one or more known earthquake faults, and potentially many more unknown faults, particularly so-called lateral or blind thrust faults.

The faults that have the potential to affect the City of El Monte are the:

San Andreas
San Gabriel
San Jacinto
Newport-Inglewood
Palos Verdes
Whittier
Santa Monica
Sierra Madre
San Jose
Clamshell-Sawpit
Puente Hills Blind Thrust
Raymond Hill
Workman Hill

The Los Angeles Basin has a history of powerful and relatively frequent earthquakes, dating back to the powerful 8.0+ 1857 San Andreas Earthquake which did substantial damage to the relatively few buildings that existed at the time. Paleoseismological research indicates that large (8.0+) earthquakes occur on the San Andreas fault at intervals between 45 and 332 years with an average interval of 140 years. Other lesser faults have also caused very damaging earthquakes since 1857. Notable earthquakes include the 1933 Long Beach Earthquake, the 1971 San Fernando Earthquake, the 1987 Whittier Narrows Earthquake and the 1994 Northridge Earthquake.

In addition, many areas in the Los Angeles Basin have sandy soils that are subject to liquefaction. The City of El Monte is in an area identified as being prone to liquefaction following an earthquake. See Earthquake Hazard later in the Plan for additional information.

The City of El Monte also has areas in the southern part of the city, which can be susceptible to minor land slippage.

Infrastructure

This section provides an overview of the critical infrastructure that serves the City. The City is generally well served by major freeways and arterial roadways.

Regional Freeways

The City is served by the 605 Freeway running north-south and the 10 Freeway running east-west.

Local Roadways

Major arterial highways include Ramona Boulevard running east-west; and Valley Boulevard, Tyler Avenue, Peck Road, and Santa Anita all running north-south.

Utilities

All utility services for the City of El Monte are adequate and readily available to accommodate future growth. However, many of the water utilities within the San Gabriel Valley groundwater basin are pumping at full capacity pursuant to water rights agreements. As a result, they typically must purchase additional water, or lease additional water rights, to accommodate demand. Major utility services in the City include the following:

Electricity

Southern California Edison Company (SCE) provides basic electrical service for all residential and non-residential customers within the City. Power is available to most service areas, with underground lines situated along several of the major streets. There are no under-served areas, and there are no constraints to additional electric service needed for future development.

Natural Gas

The Southern California Gas Company (SCG) provides basic residential and business gas services. The SCG maintains lines ranging in size from 2-inch medium pressure lines to 8-inch high-pressure lines to serve El Monte customers. There are no under-served areas, and the company does not foresee any constraints to substantial future development within the City.

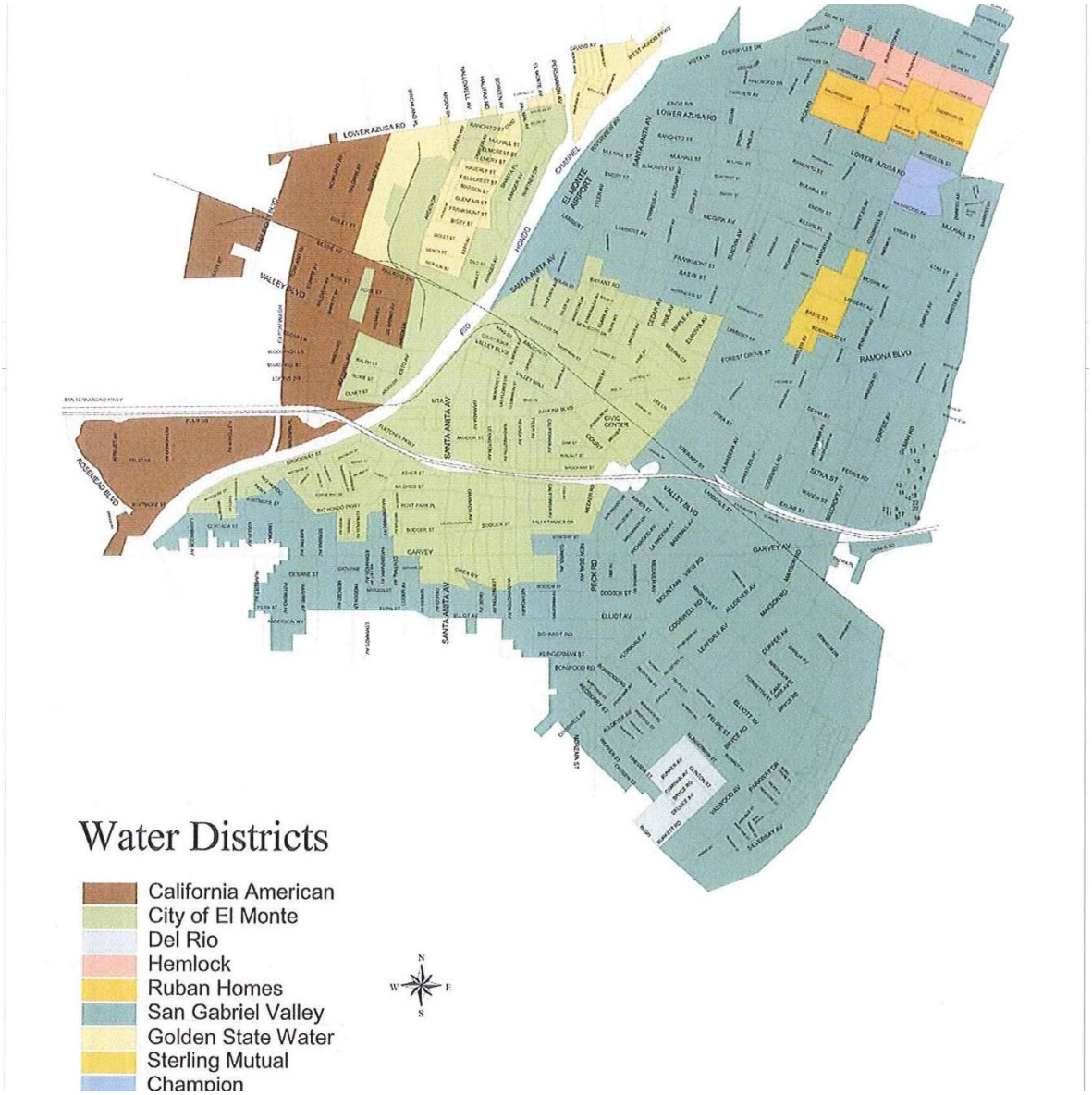
Communications

Various companies provide home and business phone service, as well as offering fiber optics capabilities. Video and data lines are also accessible to each residence via an existing network. There are currently no under-served areas.

Water

Nine different water companies serve the City. San Gabriel Valley serves largest portion of El Monte. City of El Monte serves much of the central portion of the city. Golden State Water System serves small areas in the north. Sterling Mutual and Hemlock serves a small area in the northeast area of the City.

El Monte Water Service Map
(Source: El Monte Economic Development Department)



Population and Demographics

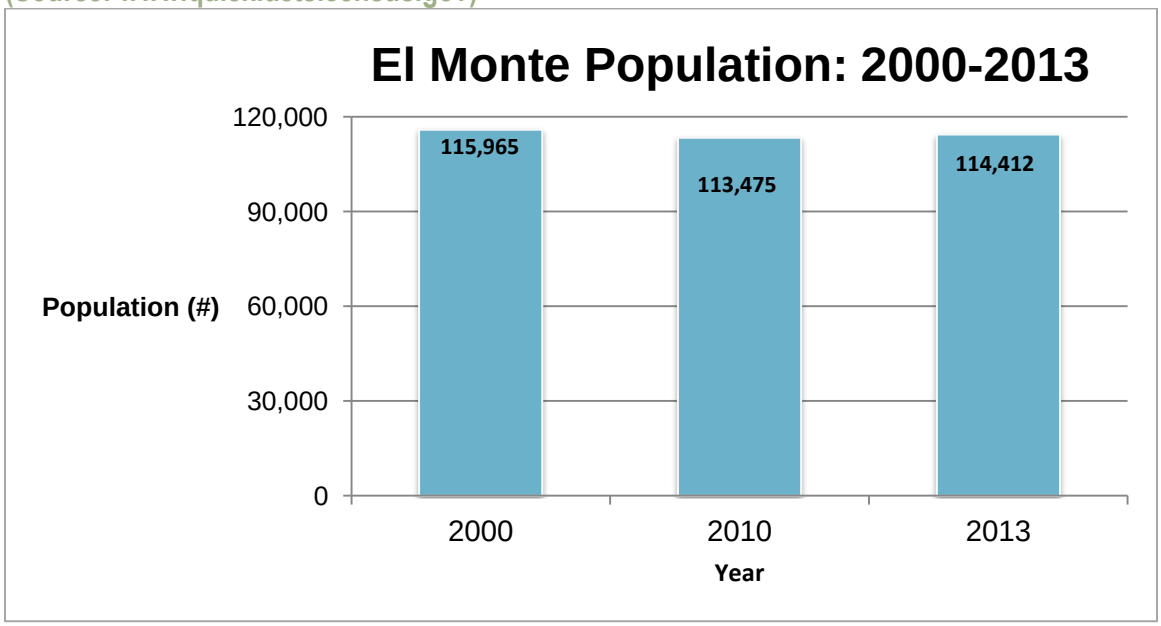
(Source: www.quickfacts.census.gov)

Knowing the population and demographics is critical in creating an effective emergency planning and mitigation plan. The 2010 census and 2013 American Community Survey 5-Year Estimates identified some important facts about the demographics of El Monte, including:

- 24.3% of the population has income under the poverty level
- 10.1% of the overall population has a disability
- 36.8% of non-institutionalized residents over 65 years of age have a disability
- 43.7% speak a language other than English at home; of those, 19.4% speak English less than "very well"

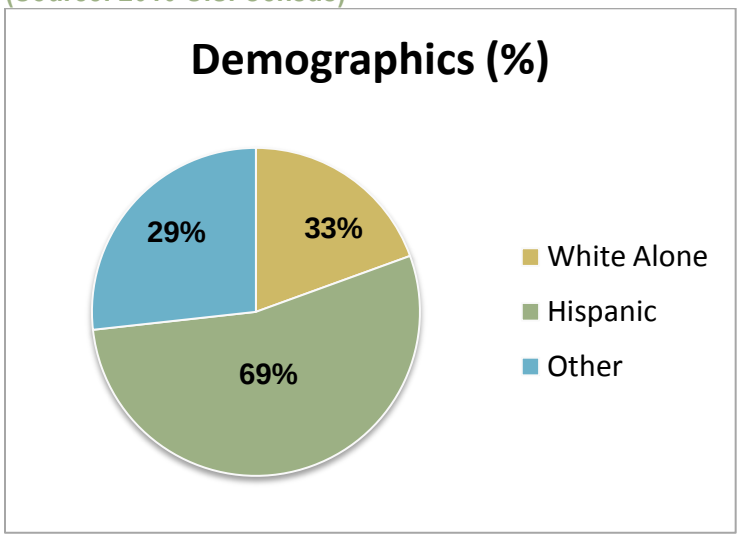
The population of El Monte has steadily increased from the early 1900's through 2000, and increased 2.1% from 2000 to 2010 according to the 2010 Census.

Figure: Historical Population
(Source: www.quickfacts.census.gov)



According to the 2010 Census figures, the demographic makeup of the City is as follows:

Figure: City Demographics
(Source: 2010 U.S. Census)



- Hispanic - 78,317 (69.0%)
- White alone -38,502 (33.9%)
- Asian alone – 28,503 (25.1%)
- Two or more races – 3,625 (3.2%)
- Black alone -870 (0.80%)
- American Indian -1,083 (1%)
- Native Hawaiian and other Pacific Islander alone - 131 (0.1)

Age of the City's Population

The age characteristics are important in determining emergency preparedness and mitigation planning actions (e.g. varying needs of young versus seniors). Between 2000 and 2010, there was a drop in residents under 5 through age 34. On the contrary, the population of those ages 55 to 65+ has increased significantly.

Table: Population Age Characteristics for El Monte (2000-2010)
(Source: U.S. Census - 2010)

Age Category	2000	2010	Change (#)	Change (%)
Under 5	11,553	8,993	-2,560	**- 22.2%**
5-19	31,961	27,085	-4,876	**- 15.3%**
20-34	30,246	26,169	-3,977	**- 13.1%**
35-54	27,557	30,179	2,622	**09.5%**
55-64	6,630	10,452	3,822	**57.6%**
65+	8,018	10,597	2,579	**32.2%**
Total:	72,878	113,475	40,597	**55.7%**

Housing Characteristics

Following is a summary of housing types located in El Monte. This is a factor in emergency preparedness because search and rescue operations are much more challenging in a high-density neighborhood.

Table: Housing Characteristics
(Source: U.S. Census – 2007-2011 American Community Survey)

Unit Type	Units - #	Units - %
Single-Family	20,772	70.5%
Multiple-Family	7,384	25.0%
Mobile Home	1,331	04.5%
Total	29,437	100.0%

The Table below depicts the 2010 U. S. Census statistics indicating the age of the housing units within El Monte. Age of housing stock is important because older buildings are generally more vulnerable to the effects of strong ground motion during earthquakes.

Table: Age of Housing Stock
(Source: U.S. Census – 2013 American Community Survey Estimates)

Year Unit Constructed	Units - #	Units - %
Built 2010 or later	35	0.10%
Built 2000 to 2009	1,977	6.40%
Built 1990 to 1999	2,336	7.50%
Built 1980 to 1989	3,794	12.2%
Built 1970 to 1979	3,066	9.90%
Built 1960 to 1969	5,642	18.2%
Built 1950 to 1959	8,153	26.3%
Built 1940 to 1949	4,167	13.4%
Built 1939 or earlier	1,828	05.9%
Total	30,998	100%

Land Use and Development

(Source: City of El Monte Economic Development Department website)

The City contains 10 square miles. Of the City's area, 58% is zoned for residential uses, 11% retail, 10% industrial, 7 percent office/retail, and 14 percent other of amenities. In this predominantly residential City, there are currently 24,897 housing units occupied by a population of 114,412 persons. The City is 12 miles from downtown Los Angeles, and it is convenient to the Port of Los Angeles and Los Angeles International Airport.

The City's General Plan addresses the use and development of private land, including residential and commercial areas. This plan is one of the City's most important tools in addressing environmental challenges including transportation and air quality; growth management; conservation of natural resources; clean water and open spaces

The environment of most Los Angeles County cities is nearly identical with that of their immediate neighbors and the transition from one incorporated municipality to another is seamless to most people. Seamless too are the exposures to the natural hazards that affect all of Southern California.

*Changes in Development**

Since the adoption of the 2007 Plan, there have been no significant alterations to the development pattern of the City in the hazard areas. There has been rehabilitation of areas downtown with regards to aesthetics. In June 2011, the City Council adopted a resolution approving a new General Plan. The Land Use element of the new General Plan established new land use designations and made changes to existing land uses in order to implement the Community's vision for the various commercial corridors in the City. The new land use designations include Mixed/Multi-Use, Regional Commercial, Office Professional, and Airport.

* **ELEMENT D. MITIGATION STRATEGY | D1**

D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))

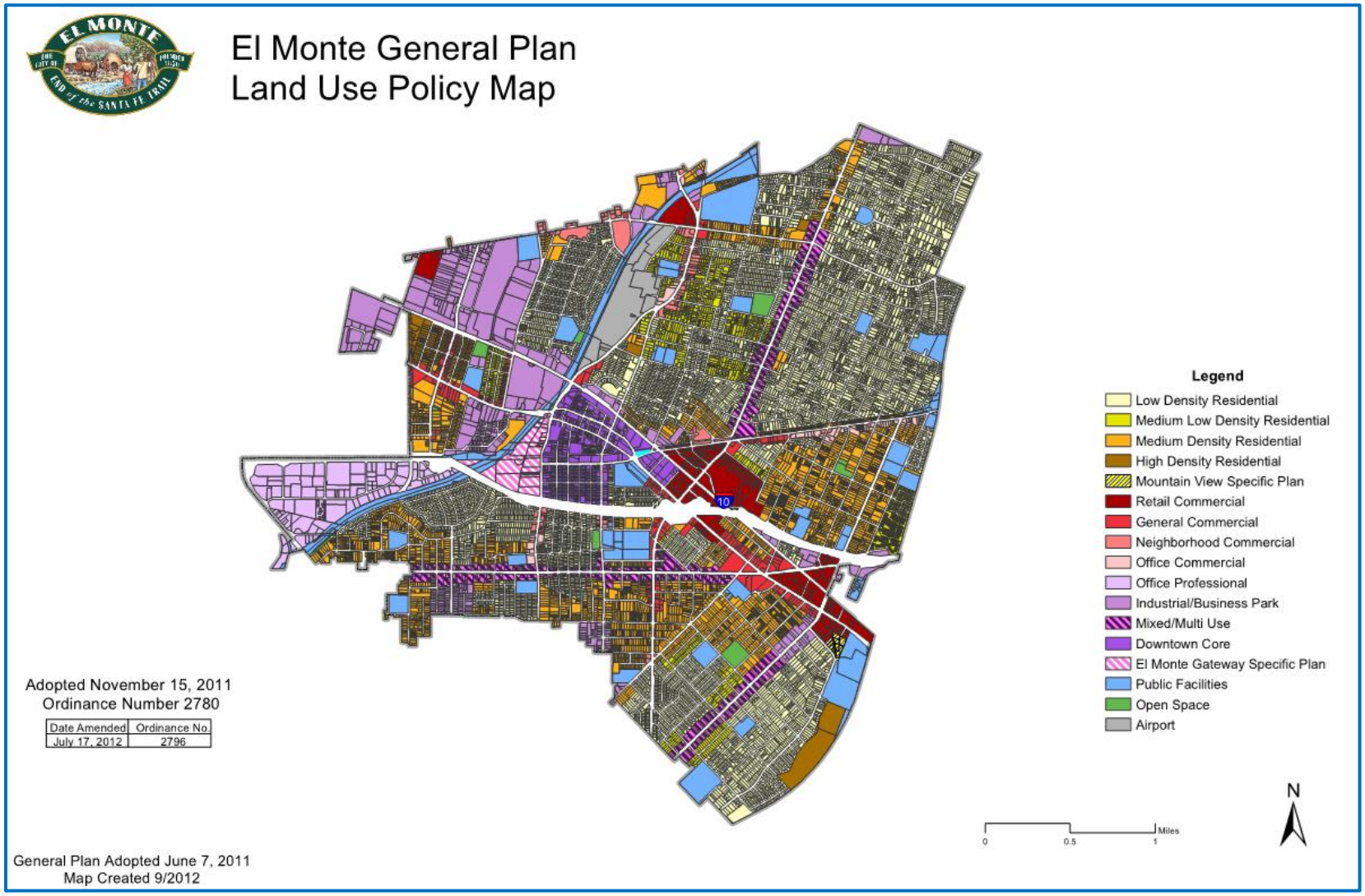
Impacts to Types of Land Uses

City of El Monte's General Plan identifies a broad range of land uses and the Building Code identifies several building types. In general terms, land uses are categorized as residential, commercial, industrial, open space, and other (utilities, public, institutional, etc.).

Table: Impacts to Types of Land Uses
(Source: City of El Monte General Plan – Analysis by Emergency Planning Consultants)

Land Use Categories	Earthquake	Flood	Dam Failure	Windstorm	Drought
Agricultural Residential	X	X	X	X	X
Commercial	X		X	X	X
High Density Residential	X		X	X	X
Industrial	X		X	X	X
Low Density Residential	X		X	X	X
Medium Density Residential	X		X	X	X
Open Space	X	X	X	X	X
Public Space	X		X	X	X
Senior Citizen Housing	X		X	X	X
Single Family Residential	X	X	X	X	X

Map: City of El Monte Land Use Map
(Source: City of El Monte General Plan)



Industries and Occupations

Educational services, health care and social assistance are the principal employment activities in the City of El Monte, as indicated below:

Table: City of El Monte Industry
(Source: U.S. Census – 2013 American Community Survey Estimates)

Industry	Number	Percent %
Civilian employed Population	46,080	100.0%
Agriculture, forestry, fishing and hunting, and mining	180	0.0039%
Construction	3,498	7.6%
Manufacturing	8,180	17.8%
Wholesale Trade	2,652	5.8%
Retail Trade	5,368	11.6%
Transportation and Warehousing, and Utilities	2,328	0.05%
Information	895	0.019%
Finance and insurance, and real estate and rental and leasing	2,011	0.043%
Professional, scientific, and management, and administrative and waste management services	4,154	0.090%
Educational services, and health care and social assistance	7,199	0.156%
Arts, entertainment, and recreation, and accommodation and food services	4,596	0.100%
Other services, except public administration	3,513	0.76%
Public administration	1,168	0.025%

The majority of employees working within El Monte are within educational, retail, and manufacturing occupations.

Planning Process

Plan Methodology*

DMA 2000 emphasizes the importance of participatory planning in the development of Mitigation Plans. This Mitigation Plan was written using the best available information from a wide variety of sources.

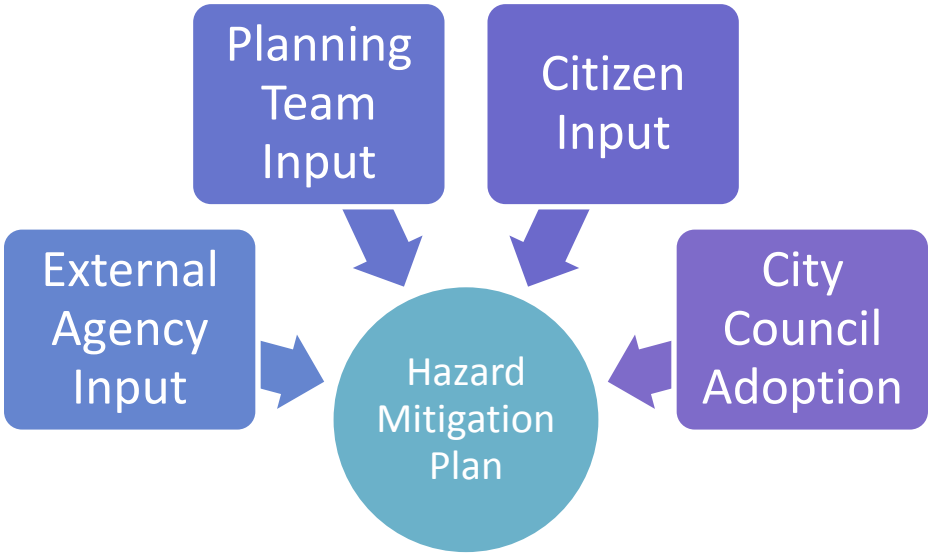
Throughout the planning process, the City made a concerted effort to gather information from City and County departments, as well as state and federal agencies, the local business community, El Monte residents, and other stakeholders.

The Team solicited information from internal and external departments and agencies with specific knowledge of natural hazards and past historical events, as well as planning and zoning codes, ordinances, and recent planning decisions. The hazard mitigation strategies contained in this plan were developed through an extensive planning process involving local businesses and residents.

The rest of this section describes the mitigation planning process including 1) Planning Team involvement and extended support from other City staff, 2) public and outside agencies; and 3) integration of existing data and plans.

Who Participated in Developing the Plan?

The Mitigation Plan is the result of a collaborative planning effort between City of El Monte staff, public, outside agencies, Disaster Management Area Coordinators, and state and federal organizations. Public participation played a key role in development of goals and action items.



* **ELEMENT A: PLANNING PROCESS | A1**

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))

Planning Team

A Planning Team guided the process of developing the Plan. The Team first met on December 10, 2014 to review the updated requirements associated with DMA 2000, review the hazards and vulnerability, and developed a work plan for creating the 2015 Mitigation Plan. The Team met again on February 4, 2015, March 18, 2015, and April 28, 2015 to assess the status of the mitigation action items identified in the 2007 Plan, discuss the strategy for the public and outside agency involvement during the plan writing phase, and to discuss preparations for the City Council meeting.

Public Participation*

The planning process included opportunities for input from a wide range of private citizens, business owners, City staff, and other public agency representatives. Supporting materials from those announcements and input are located in this Section.

To facilitate communication between the Team and El Monte residents, and to involve the public in ongoing planning and evaluation, this plan will continue to be available to the public through a variety of venues including the City's website, Facebook, and Twitter, City Hall, and Libraries within El Monte.

The Planning Team recognizes that community involvement increases the likelihood that hazard mitigation will become a standard consideration in the City's evolution.

Notice of Availability of Draft Plan†

Following input from the Planning Team on the First Draft Plan and input gathered from public and external agency distribution of the Second Draft Plan. Solicitation of input by the public was accomplished by posting the Second Draft Plan on the City's website and utilizing a range of social media and other traditional posting methods including: noticing at City Hall, City's Facebook, and placing copies of the Plan at all of the public Libraries in El Monte. See **Attachment: City Website and Facebook Screenshots**. Solicitation of input by external agencies was accomplished by sending an email (see **Attachment: Email Soliciting Input from External Agencies** - neighboring communities and other pertinent external agencies as listed in **Attachment: Email Notice of Availability of Second Draft Plan).**

Following incorporation of comments gathered during the review of the Second Draft Plan as identified above, the Third Draft Plan was forwarded to FEMA for a Conditional Approval (pending City Council adoption). Following FEMA's review, the Final Draft Plan, incorporating any federally mandated revisions, was posted for public review according to customary practices including a posted notice at City Hall, City's website, Facebook, and public libraries within El Monte. Additionally, an email was distributed to the same external agencies utilized previously.

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* **ELEMENT A: PLANNING PROCESS | A2**

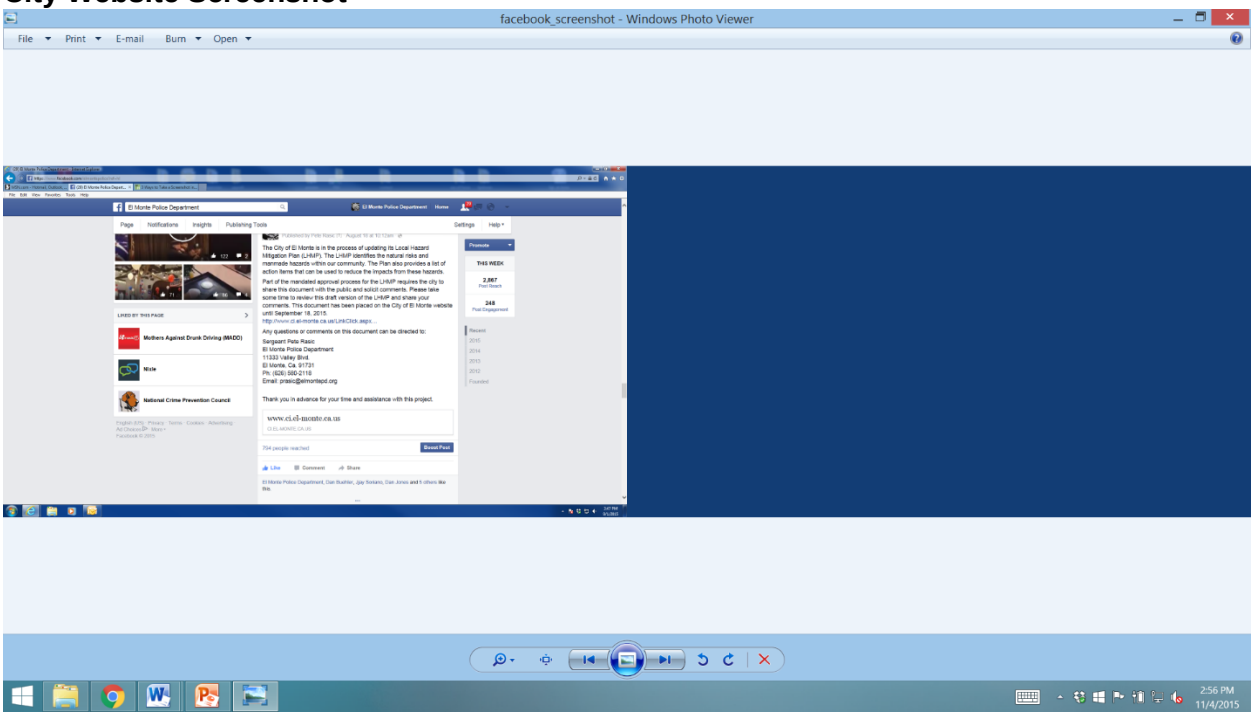
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))

† **ELEMENT A: PLANNING PROCESS | A3**

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))

Attachment: City Website and Facebook Screenshots*

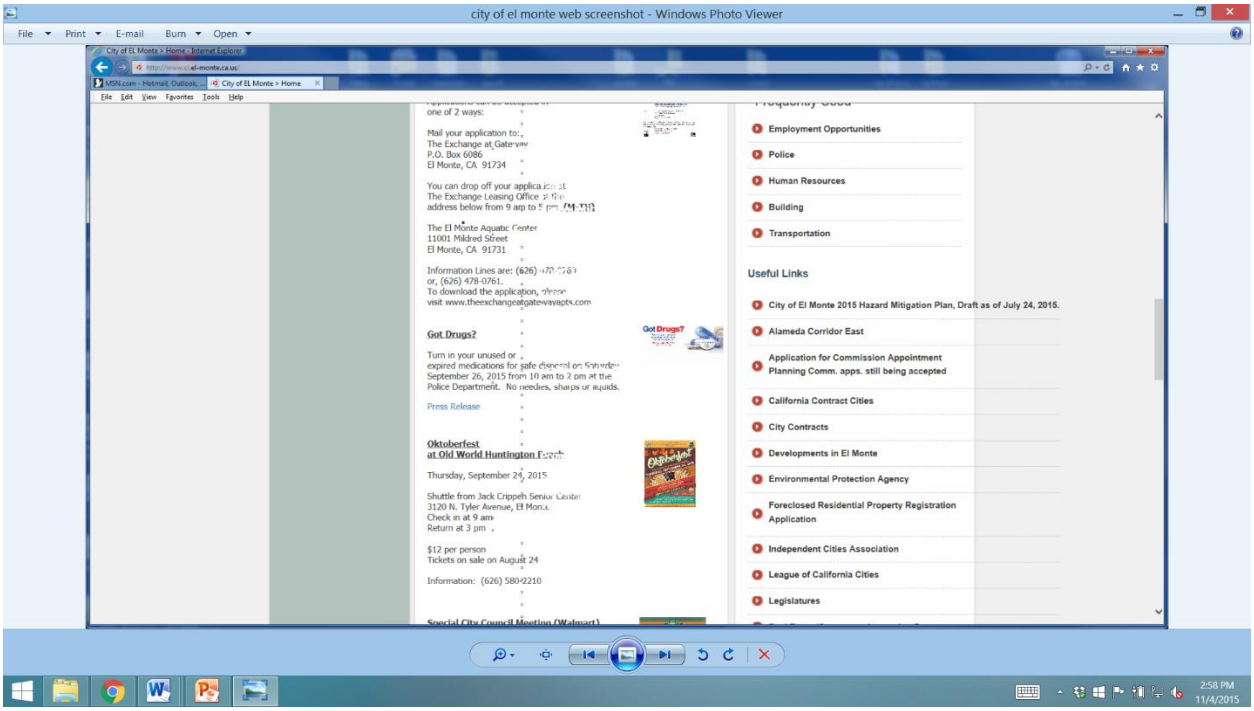
City Website Screenshot



*** ELEMENT A: PLANNING PROCESS | A2**

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))

Facebook Screenshot



Attachment: Email Distribution List*

Name	Agency	Position Title
Barry Spriggs	City of Arcadia	Emergency Services Coordinator
Yvonne Benner	City of Irwindale	Emergency Services Coordinator
Brad Dover	City of Monrovia	Emergency Services Coordinator
A.D. Hall	City of Industry	Emergency Services Coordinator
George Munoz	City of South El Monte	Emergency Services Coordinator
Mandy Wong	City of Rosemead	Emergency Services Coordinator
Bryan Ariizumi	City of Temple City	Emergency Services Coordinator
Brenda Hunemiller	Los Angeles County Disaster Management Area Coordinators	Area D Coordinator
Celia Carvajal	El Monte City School District	Manager of Business Support Services
Cynthia Sheih	El Monte Union High School District	Superintendent of Human Resources
George Schonborn	Mountain View School District	Coordinator of Pupil Personnel Services
Tom Jenkins	San Gabriel Valley Water District	Safety Coordinator
Susan Ojeda	Golden State Water District	Water Conservation Associate
Ken Rausch	El Monte / South El Monte Chamber of Commerce	Executive Director

* **ELEMENT A: PLANNING PROCESS | A2**

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))

Attachment: Email Soliciting Input by External Agencies*

From: Rasic, Peter
Sent: Thursday, July 30, 2015 10:05 AM
To: 'ccarvajal@emcsd.org'
Subject: City of El Monte - LHMP

Good Morning Celia,

The City of El Monte is in the process of updating its Local Hazard Mitigation Plan (LHMP). The LHMP identifies the natural risks and manmade hazards within our community. The Plan also provides a list of mitigation action items that can be used to reduce the impacts from these hazards.

Part of the mandated approval process for the LHMP requires the City to share this document with key organizations within the community and solicit comments during the plan writing phase. I am asking you to please review this draft version of the LHMP (attached) and share your comments with me by August 20, 2015. If you are not able to provide your comments by this date, I will move forward with the understanding that you do not have any concerns and you are comfortable with the Plan as it is written. As a colleague in the field of emergency preparedness, I am sure you understand the importance of sharing this information and I hope you will be able to find the time to assist me with this task.

I will thank you in advance for your time and assistance with this project. I look forward to reading your comments.

Pete

Pete Rasic, Sergeant
El Monte Police Department, Professional Standards Unit
11333 Valley Blvd.
El Monte, Ca. 91731
prasic@elmontepd.org
Desk: (626) 580-2118
Fax:(626) 258-8813

Attachment: El Monte Hazard Mitigation Plan.pdf

* **ELEMENT A: PLANNING PROCESS | A2**

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))

Table: Planning Team Timeline*

	December 2014	January 2015	February	March	April	May	June	July	August	September	October	November	December	January 2016	February-September	October	November-December	January 2017	February-April	May	June
Research and Writing of 2017 Plan	X	X	X	X	X																
Planning Team Meetings	X		X	X	X																
Review and Comment on First Draft Plan by Planning Team					X																
Post Second Draft Plan on City Website and announce availability							X														
Incorporate Comments and Revisions into the Third Draft Plan								X													
Submit Third Draft Plan to Cal OES and FEMA for review. Address any mandated amendments.														X	X						

* **ELEMENT A: PLANNING PROCESS | A2**

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))

	December 2014	January 2015	February	March	April	May	June	July	August	September	October	November	December	January 2016	February-September	October	November-December	January 2017	February-April	May	June
Received FEMA Conditional Approval																X					
Post Notice and Present Fourth Draft Plan to City Council																				X	
Submit City Council Resolution to FEMA and Receive FEMA Final Approval																					X

Table: Planning Team Level of Participation*

	Issue Request for Proposal	Contract with EPC	Kickoff Meeting with EPC	Research and Writing of 2015 Plan	Planning Team Meeting (12/10/14)	Planning Team Meeting (2/4/15)	Planning Team Meeting (3/18/15)	Planning Team Meeting (4/28/15)	Review and Comments on Draft Plan by Planning Team	Post Draft Plan on City Website	Submit Third Draft Plan to Cal OES/FEMA Review and Approval	Attend City Council Public Meeting
City of El Monte												
Nathalie Adourian							X		X			
Victoria Burl	X	X	X	X	X	X	X					
Betty Donavanik							X		X			
Dorna Farhadi						X	X					
Victor Jimenez							X					
Peter Lim					X		X					
Pete Rasic					X	X	X	X	X	X	X	

*** ELEMENT A: PLANNING PROCESS | A1**

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))

	Issue Request for Proposal	Contract with EPC	Kickoff Meeting with EPC	Research and Writing of 2015 Plan	Planning Team Meeting (12/10/14)	Planning Team Meeting (2/4/15)	Planning Team Meeting (3/18/15)	Planning Team Meeting (4/28/15)	Review and Comments on Draft Plan by Planning Team	Post Draft Plan on City Website	Submit Third Draft Plan to Cal OES/FEMA Review and Approval	Attend City Council Public Meeting
Mike Rodriguez					X	X		X				
Cesar Roldan					X		X					
Debbie Scott-Leistra					X	X						
Cathleen Serrano					X	X						
Abby Shields						X						
Michelle Solorzano							X					
Minh Thai					X	X						
David Vautrin						X	X	X				
Steve Willkomm						X			X			
Los Angeles County												
Nicholas Duvally					X		X					

	Issue Request for Proposal	Contract with EPC	Kickoff Meeting with EPC	Research and Writing of 2015 Plan	Planning Team Meeting (12/10/14)	Planning Team Meeting (2/4/15)	Planning Team Meeting (3/18/15)	Planning Team Meeting (4/28/15)	Review and Comments on Draft Plan by Planning Team	Post Draft Plan on City Website	Submit Third Draft Plan to Cal OES/FEMA Review and Approval	Attend City Council Public Meeting
Maggie Valdivia							X					
Emergency Planning Consultants												
Carolyn Harshman				X	X	X	X	X	X			X

Planning Team Involvement

The Planning Team was responsible for the following tasks:

- ✓ Establish plan development goals
- ✓ Prepare timetable for plan completion
- ✓ Ensure plan meets DMA 2000 requirements, and federal and state guidelines
- ✓ Organize and oversee public involvement
- ✓ Solicit participation of government agencies, businesses, residents, and other stakeholders
- ✓ Gather information (such as existing data and reports)
- ✓ Develop, revise, adopt, and maintain plan
- ✓ Participate in Team meetings and City public meeting

The Team, with support from other City staff and local organizations, identified and profiled hazards; determined hazard rankings; estimated potential exposure or losses; evaluated development trends and specific risks; and developed mitigation goals, objectives, and activities.

During its meetings, the Team gathered and shared information, assessed risks, identified critical facilities, developed mitigation strategies, and provided continuity throughout plan development to ensure the plan addresses jurisdiction-specific hazard vulnerabilities and mitigation strategies. Members communicated regularly by phone and email between group meetings.

The Team will meet annually following adoption and approval of the plan. Members will provide project direction and oversight, assist with plan evaluation, and convene supplementary meetings as needed.

State and Federal Guidelines and Requirements for Mitigation Plans

Following are the Federal requirements for approval of a mitigation plan:

- ✓ Open public involvement, with public meetings that introduce the process and project requirements.
- ✓ The public must be afforded opportunities for involvement in identifying and assessing risk, drafting a plan, and public involvement in approval stages of the plan.
- ✓ Community cooperation with an opportunity for other local government agencies, the business community, educational institutions, and non-profits to participate in the process.
- ✓ Incorporation of local documentation including the local General Plan, the Zoning Ordinance, the Building Codes, and other pertinent documents.

The following components must be part of the planning process:

- ✓ Complete documentation of the planning process
- ✓ A detailed risk assessment on hazard exposures in the City
- ✓ A comprehensive mitigation strategy, which describes the goals and objectives, including proposed strategies, programs and actions to avoid long-term vulnerabilities

- ✓ A plan maintenance process, which describes the method and schedule of monitoring, evaluating and updating the plan and integration of the Mitigation Plan into other planning mechanisms
- ✓ Formal adoption by the City Council
- ✓ Plan review by Cal OES
- ✓ Plan approval by FEMA

These requirements are identified in greater detail in the following plan sections and supporting documentation.

Public participation opportunities were created through use of a public workshop and meetings with representatives from businesses and school districts. In addition, the makeup of a Planning Team ensured a constant exchange of data and input from outside organizations. Through its consultant, Emergency Planning Consultants, the City had access to numerous existing mitigation plans from around the country, as well as current FEMA Mitigation Planning standards (386 series) and the State of California Mitigation Plan Guidance.

Other reference materials consisted of state, county, and city mitigation plans, including:

- ✓ County of Los Angeles All-Hazards Mitigation Plan (2014)
- ✓ State of California Multi-Hazard Mitigation Plan (2013)

Hazard specific research: City staff collected data and compiled research on six hazards: earthquake, flooding, wildfire, dam failure, windstorm, drought and hazardous/toxic chemical release. Additionally, the Team opted to include a discussion on technological and human-caused hazards, even though these events pose a lesser threat to the planning area.

Research materials came from the City's General Plan, the City's Hazard Analysis contained in the Emergency Operations Plan, and state agencies including Cal OES and CAL FIRE. The City of El Monte staff conducted research by referencing long time City of El Monte employees and locating City of El Monte information in historical documents. Information was also incorporated from after-action documentation provided for previous proclaimed and declared disasters. The City of El Monte staff identified current mitigation activities, resources, and programs, and potential action items from research materials and discussion with the Planning Team.

Hazard Mitigation Programs

The City of El Monte adheres to the Stafford Act, the California Emergency Services Act, and DMA 2000, which require local governments to develop and implement Mitigation Plans. Cities and counties have intimate knowledge of local geography, and they are on the front line with personnel and equipment during a disaster. Local governments are in the best position to assess their strengths, weaknesses, opportunities, and constraints.

Coordination with Federal Policies

The City is involved in the NFIP, which helps the City receive funding for flood insurance and flood mitigation projects. Data from the NFIP was used in the risk assessment, resulting in a number of mitigation activities. The City's continued involvement in NFIP supports this plan.

National Flood Insurance Program

Established in 1968, the NFIP provides federally backed flood insurance to homeowners, renters, and businesses in communities that adopt and enforce floodplain management ordinances to reduce future flood damage. According to the Economic Development Department, the City of El Monte adopted a floodplain management ordinance 2471 and maintains FEMA Flood Insurance Rate Maps (FIRM) that show the entire community designated as "area of undetermined flood hazard" – in other words not as floodways, 100-year flood zones, or 500-year flood zones. The Los Angeles County Department of Public Works Director is designated as floodplain administrator.

The City of El Monte, under NFIP, has created standards and policies to ensure flood protection. These policies address development and redevelopment, compatibility of uses, required predevelopment drainage studies, compliance with discharge permits, enhancement of existing waterways, cooperation with the US Army Corps of Engineers (Corps) and the Los Angeles County Department of Public Works for updating, and method consistency with the Regional Water Quality Control Board and proposed Best Management Practices.

*NFIP Participation**

The City of El Monte participates in NFIP. Unfortunately, FEMA flood maps are not entirely accurate. These studies and maps represent flood risk at the point in time when FEMA completed the studies, and does not incorporate planning for floodplain changes in the future due to new development. Although FEMA is considering changing that policy, it is optional for local communities.

The FEMA FIRM map panels for the City of El Monte were last updated September 26, 2008. According to the General Plan EIR, currently, the City of El Monte is classified as No Special Flood Hazard Areas (NSFHA), that is, in flood hazard Zone X, meaning that no part of the City is in a 100-year flood zone. Map: Flood Zone Determination Website represents the current status of the FIRM map (see Flood Section). Human-caused and natural changes to the environment have changed the dynamics of storm water run-off since then. The City's maintains its participation in NFIP by reviewing each building permit and land use discretionary permit for the project's proximity on the FIRM maps.

Current Mitigation Programs

The City intends to incorporate mitigation planning as an integral component of daily operations; the Team will work to integrate mitigation strategies into the general operations of the City and partner organizations. After conducting a capability assessment (Risk Assessment), the Team will identify additional policies, programs, practices, and procedures that could be modified to address mitigation activities. In addition, the City intends to implement the plan through its involvement in FEMA and Cal OES programs. The following "Table: Existing Processes and Programs" identifies existing processes/programs through which the plan could be implemented.

*** ELEMENT C. MITIGATION STRATEGY | C2**

C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))

Table: Existing Processes and Programs*†

Process	Action	*Implementation of Plan*
Administrative	Departmental or organizational work plans, policies, and procedural changes	✓ *City Manager's Office* ✓ *Economic Development Department* ✓ *Public Works Department* ✓ *Other departments as appropriate*
Administrative	Other plans	✓ *Reference plan in Emergency Operations Plan* ✓ *Address plan findings and incorporate mitigation activities in General Plan*
Budgetary	Capital and operational budgets	✓ *Include line item mitigation measures in budget as appropriate*
Regulatory	Executive orders, ordinances, and other directives	✓ *Building Code* ✓ *Capital Improvement Plan (Require hazard mitigation in design of new construction)* ✓ *General Plan (Institutionalize hazard mitigation in land use and new construction)* ✓ *National Flood Insurance Program* ✓ *Storm Water Management Plan* ✓ *Zoning Ordinance*
Funding	Traditional and nontraditional sources	✓ *Once plan is approved, seek authority to use bonds, fees, loans, and taxes to finance projects* ✓ *Seek assistance from federal and state government, foundation, nonprofit, and private sources, such as Hazard Mitigation Grant Program* ✓ *Research grant opportunities through U.S. Department of Housing and Urban Development, Community Development Block Grant*
Partnerships	Creative funding and initiatives	✓ *Community volunteers* ✓ *In-kind resources* ✓ *Public-private partnerships* ✓ *State support*
Partnerships	Advisory bodies	✓ *Disaster Council (city and county)* ✓ *Disaster Management Area Coordinators*

*** ELEMENT C. MITIGATION STRATEGY | C1**

C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))

† ELEMENT C. MITIGATION STRATEGY | C6

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))

Use of Existing Data*

The Team gathered and reviewed existing data and plans during plan development. Numerous electronic and hard copy documents were used to support the planning process:

- ✓ City of El Monte 2020 General Plan (2011)
- ✓ County of Los Angeles General Plan (2014)
- ✓ County of Los Angeles All-Hazards Mitigation Plan (2014)
- ✓ HAZUS reports
- ✓ Historic GIS maps and local inventory data
- ✓ Local Flood Insurance Rate Maps

These documents are updated as needed to reflect the mitigation strategies identified in the Mitigation Strategies section.

Federal Data

A variety of federal data was collected and used throughout the mitigation planning process:

- ✓ Census data
- ✓ FEMA "How To" Mitigation Series (386-1 to 386-9)
- ✓ National Oceanic and Atmospheric Administration statistics

The length of this list demonstrates the importance of mitigation planning in existing programs. Implementing the plan through existing programs is identified as a mitigation action in the Mitigation Strategies Section. The description of the implementation process and potential funding sources is provided.

Plan Approval and Adoption

Plan Approval

The Plan was forwarded to Cal OES for review and approval by FEMA. On October 14, 2016 FEMA sent the Letter of Conditional Approval pending adoption by the City Council. Following the City Council's adoption on May 2, 2017, the resolution was forwarded to FEMA. FEMA issued a final approval on June 14, 2017.

Plan Adoption

Invitation Process

Upon receipt of FEMA's Letter of Conditional Approval, the Team identified possible public notice sources. The agenda item concerning this Plan was posted on the City website, City's Facebook page, City Hall and both Libraries within El Monte.

City Council Public Meeting

The Team prepared the staff report for City Council, including an overview of the Hazard Analysis, Mitigation Goals, and Mitigation Actions. The staff report included a summary of the input received during the public and external review of the document. The meeting participants were encouraged to present their views and make suggestions on possible mitigation actions.

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* **ELEMENT A: PLANNING PROCESS | A4**

A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))

The Council was supportive of the overall goal established by the Team to become a more disaster resilient community. The City Council commended the Planning Team members for their dedication and efforts to satisfy the DMA 2000 requirements.

Plan Adoption

Adoption of the plan by the local governing body demonstrates the City's commitment to meeting mitigation goals and objectives. Governing body approval legitimizes the plan and authorizes responsible agencies to execute their responsibilities.

The City Council adopted the Mitigation Plan on May 2, 2017 by a vote of 4-0. The resolution of adoption by the City Council is in the Planning Process section.

Attachment: FEMA Letter of Approval

U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

June 14, 2017

Sergeant Pete Rasic
City of El Monte Police Department
11333 Valley Boulevard
El Monte, CA 91731

Dear Sergeant Rasic:

We have completed our final review of the *City of El Monte Hazard Mitigation Plan*, officially adopted by the City of El Monte on May 2, 2017, and found the plan to be in conformance with Title 44 Code of Federal Regulations (CFR) Part 201.6 *Local Mitigation Plans*.

The approval of this plan ensures the City of El Monte's continued eligibility for project grants under FEMA's Hazard Mitigation Assistance programs, including the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program. All requests for funding, however, will be evaluated individually according to the specific eligibility, and other requirements of the particular program under which applications are submitted.

Also, approved hazard mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Additional information regarding the CRS can be found at https://www.fema.gov/national-flood-insurance-program-community-rating-system or through your local floodplain manager.

FEMA's approval of the *City of El Monte Hazard Mitigation Plan* is for a period of five years, effective starting the date of this letter. Prior to June 14, 2022, El Monte is required to review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding.

If you have any questions regarding the planning or review processes, please contact Alison Kearns, Lead Community Planner, at (510) 627-7125 or by email at alison.kearns@fema.dhs.gov.

Sincerely,

for

Jeffrey D. Lusk
Division Director
Mitigation Division
FEMA Region IX

Attachment: Staff Report and City Council Resolution*

RESOLUTION NO. 9758

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF EL MONTE, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA ADOPTING ITS 2017 LOCAL HAZARD MITIGATION PLAN UPDATE

WHEREAS, the El Monte City Council as adopted the City's Local Hazards Mitigation Plan (LHMP) on November 2, 2004, under City Council Resolution No. 8544, pursuant to the Federal Disaster Mitigation Act of 2000; and

WHEREAS, the City's Local Hazards Mitigation Plan focuses on the potential impacts of earthquakes, floods, wildfires, and drought, in addition, including an assessment of these local hazards, a plan to mitigate them, and methods of monitoring, evaluating and continuing to update the City's Local Hazards Mitigation Plan at least every five (5) years; and

WHEREAS, the City's 2017 Local Hazards Mitigation Plan formally noticed to the community of its availability for public review and comment through a variety of different outlets such as: the City's website, social media outlets, within El Monte City Hall itself and in all City of El Monte Libraries (between August 2015 and October 2015). This Plan was also mailed to adjacent cities, business groups, local water and school districts to solicit input into the City's LHMP update; and

WHEREAS, the City's 2017 Local Hazards Mitigation Plan project has been determined to be Categorically Exempt pursuant to Section 15308 (Class 8 – Actions by Regulatory Agencies for Protection of the Environment) of the California Environmental Quality Act; and

WHEREAS, the City Council reviewed the City's 2017 Local Hazards Mitigation Plan update during its public meeting on May 2, 2017, in conjunction with receiving all public comments on the document.

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF EL MONTE, CALIFORNIA, DOES HEREBY FIND, DETERMINE AND RESOLVE AS FOLLOWS:

SECTION 1. The City Council has determined that the 2017 City of El Monte Local Hazards Mitigation Plan update is complete and adequate and complies with all State and Federal requirements.

SECTION 2. The City Council does hereby authorize the City Manager to initiate implementation of the Local Hazards Mitigation Plan in addition to making any necessary corrections or modification to the document as required by changes in hazards or the City's capability to mitigate against hazards.

SECTION 3. The City Council does authorize the City Clerk to certify to the passage and adoption of this Resolution for the City's 2017 Local Hazards Mitigation Plan update and to forward a copy to Cal OES and FEMA for approval.

PASSED, APPROVED, AND ADOPTED by the City Council of the City of El Monte at its regular meeting on this 2nd day of May 2017.

Andre Quintero, Mayor
City of El Monte

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* ELEMENT E: PLAN ADOPTION | E1

E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))

ATTEST:

Jonathan Hawes, City Clerk
City of El Monte

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES) SS:
CITY OF EL MONTE)

I, Jonathan Hawes, City Clerk of the City of El Monte, do hereby certify that the above and foregoing Resolution No. 9758 was passed, approved, and adopted by the City Council of the City of El Monte, signed by the Mayor and attested by the City Clerk at a meeting of said City held on this 2nd day of May 2017, and that said Resolution was adopted by the following votes to wit:

AYES: Mayor Quintero, Mayor Pro Tem Velasco, Councilmembers Gomez and Macias

NOES: None

ABSTAIN: None

ABSENT: Councilmember Martinez

Jonathan Hawes, City Clerk
City of El Monte

Attachment: Planning Team Sign-In Sheets*

City of El Monte
Hazard Mitigation Planning Team
December 10, 2014

Name	Department
CAROLYN HANSHAW	EMERGENCY PLANNING CONSULTANTS
VICTORIA BURL	Parks, Rec. & Community Services
PETER LIM	BUILDING DEPARTMENT
CESAR ROLDAN	PUBLIC WORKS ENGINEERING
Cathleen Serrano	Finance Department
Nicholas Duvally	Fire Dept
MINH THAI	EC. DEV.
PETE RASIC	POLICE DEPT.
Mike Rodriguez	Public Works
DAVID VAUTRIN	POLICE DEPT.
MICHELLE SOLORZANO	CMO x2278 msolorzano@elmontca.gov
Debbie Scott-Leistra	Human Resources/Risk Management Dept

Emergency Planning Consultants

*** ELEMENT A: PLANNING PROCESS | A2**

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))

City of El Monte
Hazard Mitigation Planning Team
February 4, 2015

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Dorna Farhadi	~~EDD~~ PW - Engineering
Mike Rodriguez	PW Maintenance
Debbie Scott-Leistra	HR/RM
Victoria Burk	PARKS & REC
PETE RASIC	P.D.
Cathleen Serrano	Purchasing/Finance.
Dave Vantrin	Police Dept.
Abby Shields	Building Department
STEVE WILLKOMM	ED/NS
Minh Thai	ED

Emergency Planning Consultants

City of El Monte
Hazard Mitigation Planning Team
March 18, 2015

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Dorna Farhadi	Public Works - Engineering
MAGGIE VALDIVIA	Los Angeles County F.D.
NICK DUVALLY	LA City Fire.
BETTY DONAVANIK	ECONOMIC DEVELOPMENT
Nathalie Adourian	Human Resources / Risk Management
David Vautrin	PD
VICTOR JIMENEZ	PW/MD
MICHELLE SOLORZANO	CMO
PETE RASIC	P.D.

Emergency Planning Consultants

City of El Monte
Hazard Mitigation Planning Team
April 28, 2015

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
BETTY DONAVANIK	ED
STEVE WILLKOMM	ED / NS
Mike Rodriguez	P.W.
Nathalie Adourian	Human Resources / Risk Management
David Vautrin	Police Dept.
Richard Luna	Police Department
PETE RASIC	Police Dept.

PART 2: HAZARD ANALYSIS

Risk Assessment

What is a Risk Assessment?

Conducting a risk assessment can provide information regarding: the location of hazards; the value of existing land and property in hazard locations; and an analysis of risk to life, property, and the environment that may result from natural, technological, and human-caused hazard events. Specifically, the five levels of a risk assessment are as follows:

1) Hazard Identification

This section is the description of the geographic extent, potential intensity, and the probability of occurrence of a given hazard. Maps are used in this plan to display hazard identification data. The City of El Monte identified a wide range of natural, human-caused, and technological hazards based on the State of California's Hazard Mitigation Plan, County of Los Angeles All-Hazard Mitigation Plan, the City's General Plan, and the City's Emergency Operations Plan to identify all possible hazard sources. These hazards included are earthquake, flooding, dam failure, drought, climate changes, wildfire, and windstorm.

Review of the documents identified above provided insights into determining which of the hazards is most likely to have a significant negative impact on the City. Significance was defined as a hazard event that would result in the declaration of a local disaster. Based on that definition, it was concluded that the hazards posing the greatest threat to the City are: earthquakes, floods, dam failure, and drought. Then, utilizing FEMA's Calculated Priority Risk Index (CPRI) hazard ranking technique, the Team was able to compare the identified hazards (Source: FEMA Emergency Management Institute Course G235 - Emergency Planning, 2010).

Prioritizing Hazards

- The CPRI value is obtained by assigning varying degrees of risk to four categories for each hazard, and then calculating an index value based on a weighting scheme.
- The four criteria in the CPRI are Probability (45%), Magnitude/Severity (30%), Warning Time (15%) and Duration (10%).
- For each of the criteria, there are four (4) options from which to choose: 1,2,3,4. Zero (0) is the value taken when an option is not assigned.

CPRI Example:

CPRI: Earthquake–San Andreas Fault M7.8

- **Probability** = Likely = 3
- **Magnitude/Severity** = Critical = 3
- **Warning Time** = Less than 6 hours = 4
- **Duration** = Less than 6 hours = 1

Here's how to calculate the CPRI for an earthquake occurring on the San Andreas Fault for the City of El Monte:

CPRI = [(3 x 0.45) + (3 x 0.30) + (4 x 0.15) + (1 x 0.10)] = 2.95

Table: Calculated Priority Risk Index Key
(Source: FEMA G235 Emergency Planning Course, 2010)

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability of less than 1 in 1,000 (<0.1%)	1	45%
	Possibly	Rare occurrences. Annual probability between 1 in 1,000 and 1 in 100 (0.1%-1%)	2	
	Likely	Periodic occurrences with at least 2 or more documented historic events. Annual probability of between 1 in 100 and 1 in 10 (1%-10%)	3	
	Highly Likely	Frequent events with a well-documented history of occurrence. Annual probability of greater than 1 in 10 (>10%)	4	
Magnitude/ Severity	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure owned by the Jurisdiction). Injuries or illnesses are treatable with first aid and there are no deaths. Negligible loss of quality of life. Shut down of critical public facilities for less than 24 hours.	1	30%
	Limited	Slight property damage (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure owned by the Jurisdiction). Injuries or illnesses do not result in permanent disability, and there are no deaths. Moderate loss of quality of life. Shut down of critical public facilities for more than 1 day and less than 1 week.	2	
	Critical	Moderate property damage (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure owned by the Jurisdiction). Injuries or illnesses result in permanent disability and at least 1 death. Shut down of critical public facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	Severe property damage (greater than 50% of critical and non-critical facilities and infrastructure owned by the Jurisdiction). Injuries and illnesses result in permanent disability and multiple deaths. Shut down of critical public facilities for more than 1 month.	4	
Warning Time	> 24 hours	Population will receive greater than 24 hours of warning.	1	15%
	12–24 hours	Population will receive between 12-24 hours of warning.	2	
	6-12 hours	Population will receive between 6-12 hours of warning.	3	
	< 6 hours	Population will receive less than 6 hours of warning.	4	
Duration	< 6 hours	Disaster event will last less than 6 hours	1	10%
	< 24 hours	Disaster event will last less than 6-24 hours	2	
	< 1 week	Disaster event will last between 24 hours and 1 week.	3	
	> 1 week	Disaster event will last more than 1 week	4	

Table: Calculated Priority Risk Index Ranking for City of El Monte

Hazard	Probability	Weighted 45% (x.45)	Magnitude Severity	Weighted 30% (x.3)	Warning Time	Weighted 15% (x.15)	Duration	Weighted 10% (x.1)	CPRI Ranking
Earthquake – San Andreas M7.8	3	1.35	4	1.2	4	0.6	1	0.1	**3.25**
Earthquake – Puente Hills M7.1	3	1.35	4	1.2	4	0.6	1	0.1	**3.25**
Dam Failure (Santa Fe Dam)	1	.45	4	1.2	2	0.3	4	0.1	**2.35**
Flood	2	.90	2	0.6	2	0.3	2	0.2	**2.00**
Windstorm	3	1.35	1	0.3	1	0.15	2	0.2	**2.00**
Drought	1	.45	1	0.3	1	0.15	2	0.2	**1.10**

2) Profiling Hazard Events

This process describes the causes and characteristics of each hazard and what part of the City's facilities, infrastructure, and environment may be vulnerable to each specific hazard. A profile of each hazard discussed in this plan is provided in the Hazard Detailed Evaluation section. Table: CPRI Ranking indicates a generalized perspective of the community's vulnerability of the various hazards according to extent (or degree), location, and probability.

Table: Vulnerability: Location, Extent, and Probability for City of El Monte*†‡

Hazard	Location (Where)	Extent (How Big an Event)	Annual Probability (How Often) [1]
Earthquake	Entire Project Area	The Southern California Earthquake Center (SCEC) in 2007 concluded that there is a 99.7 % probability that an earthquake of M6.7 or greater will hit California within 30 years. Earthquake would most likely originate from the San Andreas fault.	Likely
Flood	Isolated Portions of the Project Area	Urban Flooding resulting from Severe Weather so would vary greatly	Possible
Dam Failure (Santa Fe Dam)	Entire Project Area	If the Santa Fe Dam failed, water would reach the northeastern boundary of El Monte in fifteen minutes at a depth of six feet (Source: El Monte General Plan).	Possible
Windstorm	Entire Project Area	50 miles per hour or greater	Likely
Drought	Entire Project Area	Droughts in urban areas vary considerably in scope and intensity. Likely emergency water shortage regulations would restrict such activities as watering of landscape, washing of cars, and other non-safety related activities.	Possible

[1]Annual Probability is defined as: **Unlikely** = Annual probability of less than 1 in 1,000: (<.01%), **Possible** = Annual probability between 1 in 1,000 and 1 in 100: (.01%-1%), **Likely** = Annual probability of between 1 in 100 and 1 in 10: (1%-10%), **Highly Likely** = Annual probability of greater than 1 in 10: (>10%)

*** ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1**

B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))

† ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2

B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

‡ ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3

B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

3) Vulnerability Assessment/Inventory of Existing Assets

This is a combination of hazard identification with an inventory of the existing (or planned) property development(s) and population(s) exposed to a hazard. Critical facilities are of particular concern because these locations provide essential equipment or provide services to the general public that are necessary to preserve important public safety, emergency response, and/or disaster recovery functions. The critical facilities, essential facilities, and land use categories have been identified and are illustrated in Table: Impacts to Types of Structures in the City.

4) Risk Analysis

Estimating potential losses involves assessing the damage, injuries, and financial costs likely to be sustained in a geographic area over a given period of time. This level of analysis involves using mathematical models. The two measurable components of risk analysis are magnitude of the harm that may result and the likelihood of the harm occurring. Describing vulnerability in terms of dollar losses provides the community and the state with a common framework in which to measure the effects of hazards on assets. For each hazard where data was available, quantitative estimates for potential losses have been included in the hazard assessment.

Risk analysis involves estimating the damage and costs likely to be experienced in a geographic area over a period of time. Factors included in assessing risk, include population and property distribution in the hazard area, the frequency of events, buildings, infrastructure, and disaster preparedness of the region. This type of analysis can generate estimates of the damages to the region due to an earthquake event in a specific location.

FEMA's software program, HAZUS, uses mathematical formulas and information about building stock, local geology and the location and size of potential earthquakes, economic data, and other information, to estimate losses from a potential earthquake. The HAZUS software is available from FEMA at no cost however, appropriate computer equipment and capabilities are required to input data and run HAZUS.

HAZUS Data Sources

HAZUS is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. HAZUS uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. It graphically illustrates the limits of identified high-risk locations due to earthquake, hurricane, and floods. Users can then visualize the spatial relationships between populations and other more permanently fixed geographic assets or resources for the specific hazard being modeled, a crucial function in the pre-disaster planning process. For more information on HAZUS please see: http://www.fema.gov/plan/prevent/hazus/

5) Assessing Vulnerability/ Analyzing Development Trends

This step provides a general description of City facilities and contents in relation to the identified hazards so that mitigation options can be considered in land use planning and future land use decisions. This Mitigation Plan provides comprehensive description of the character of the City of El Monte in the Community Profile Section. This description includes the geographical context and climate, infrastructure, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns. Analyzing these components of the City of El Monte can help in identifying potential problem areas and can serve as a guide for incorporating the goals and ideas

contained in this mitigation plan into other community development plans. HAZUS maps and reports for Board of Supervisor District One included in the Mitigation Plan were developed by the County of Los Angeles during its 2014 update to the County's All-Hazard Mitigation Plan. Although the scope of the analysis encompassed a broader region than El Monte, the maps and reports are still beneficial to assess the overall risk faced by the El Monte community.

Critical Facilities*†

FEMA separates critical buildings and facilities into the five categories shown below based on their loss potential. All of the following elements are considered critical facilities:

Essential Facilities are essential to the health and welfare of the whole population and are especially important following hazard events. Essential facilities include hospitals and other medical facilities, police and fire stations, emergency operations centers and evacuation shelters, and schools.

Transportation Systems include airways – airports, heliports; highways – bridges, tunnels, roadbeds, overpasses, transfer centers; railways – trackage, tunnels, bridges, rail yards, depots; and waterways – canals, locks, seaports, ferries, harbors, drydocks, piers.

Lifeline Utility Systems such as potable water, wastewater, oil, natural gas, electric power and communication systems.

High Potential Loss Facilities are facilities that would have a high loss associated with them, such as nuclear power plants, dams, and military installations.

Hazardous Material Facilities include facilities housing industrial/hazardous materials, such as corrosives, explosives, flammable materials, radioactive materials, and toxins.

Since the Transportation, Lifeline Utility, High Potential Loss, and Hazardous Material Facilities information is already in the City's Emergency Operations Plan and to a certain extent protected information, the Planning Team chose to include only Essential Facilities in the table below.

*** ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1**

B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))

† ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3

B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

Table: Impacts to Critical Facilities

	Earthquake	Flood	Dam Failure	Windstorm	Drought
Essential Facilities:					
Civic Center, City Hall – 11333 Valley Boulevard	X	X	X	X	X
El Monte Police Department – 11333 Valley Boulevard	X	X	X	X	X
Public Works Yard – 3990 Arden Drive	X	X	X	X	X
Los Angeles County Fire Station #166	X	X	X	X	X
Los Angeles County Fire Station #167	X	X	X	X	X
Los Angeles County Fire Station #168	X	X	X	X	X
Los Angeles County Fire Station #169	X	X	X	X	X
Essential Facilities:					
El Monte Aquatic Center – 11001 Mildred Street	X	X	X	X	X
City Transportation Center – Cypress Street	X	X	X	X	X
Community Center and Senior Center – 3130 Tyler	X	X	X	X	X
Lambert Park – 11431 McGirk Avenue	X	X	X	X	X
Mountain View Park - 12127 Elliott Avenue	X	X	X	X	X

Earthquake Hazards

Hazard Identification and Risk Assessment

Definition

An earthquake is a sudden, rapid shaking of the ground caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates.

The major form of direct damage from most earthquakes is damage to construction. Bridges are particularly vulnerable to collapse, and dam and water tank failure may generate major downstream flooding. Buildings vary in susceptibility, dependent upon construction and the types of soils on which they are built. Earthquakes destroy power and telephone lines; gas, sewer, or water mains; which, in turn, may set off fires and/or hinder firefighting or rescue efforts.

The hazard of earthquakes varies from place to place, dependent upon the regional and local geology. Where earthquakes have struck before, they will strike again. Earthquakes strike suddenly, without warning. Earthquakes can occur at any time of the year and at any time of the day or night.

Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related injuries result from collapsing walls, flying glass, and falling objects as a result of the ground shaking, or people trying to move more than a few feet during the shaking. Much of the damage in earthquakes is predictable and preventable.

*Previous Occurrences of Earthquakes**

City of El Monte

The USGS database shows that there is a 96.05% chance of a major earthquake within 50km (31 miles) of El Monte within the next 50 years.

Recent earthquakes affecting El Monte include the Northridge Earthquake of 1994 (magnitude 6.7), Whittier Earthquake of 1987 (magnitude 5.9); and Landers Quake (magnitude 7.3). El Monte has never been severely impacted by an earthquake.

Los Angeles County

Since seismologists started recording and measuring earthquakes, there have been tens of thousands of recorded earthquakes in Los Angeles County, most with a magnitude below three. No community in Los Angeles County is beyond the reach of a damaging earthquake. The

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*** ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2**

B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

table as follows describes the historical earthquake events in Los Angeles County (Magnitude 5.0 or greater).

Table: Earthquake Events in Los Angeles County (Magnitude 5.0 or Greater) (Source: http://www.usgs.gov/)

1769	Los Angeles Basin	1910	Glen Ivy Hot Springs
1812	Wrightwood	1987	Whittier Narrows
1827	Los Angeles Region	1992	Landers
1855	Los Angeles Region	1994	Northridge
1893	Pico Canyon	2005	Southern California
		2014	La Habra California

To better understand the earthquake hazard, the scientific community has looked at historical records and accelerated research on those faults that are the sources of the earthquakes occurring in the Southern California region. Historical earthquake records can generally be divided into records of the pre-instrumental period and the instrumental period. In the absence of instrumentation, the detection of earthquakes are based on observations and felt reports, and are dependent upon population density and distribution. Since California was sparsely populated in the 1800s, the detection of pre-instrumental earthquakes is relatively difficult. However, two very large earthquakes, the Fort Tejon in 1857 (M7.9) and the Owens Valley in 1872 (M7.6) are evidence of the tremendously damaging potential of earthquakes in Southern California. In more recent times two M7.3 earthquakes struck Southern California, in Kern County (1952) and Landers (1992).

The damage from these four large earthquakes was limited because they occurred in areas which were sparsely populated at the time they happened. The seismic risk is much more severe today than in the past because the population at risk is in the millions, rather than a few hundred or a few thousand persons.

The most recent significant earthquake event affecting Southern California was the January 17, 1994 Northridge Earthquake. At 4:31 A.M. on Monday, January 17, a moderate but very damaging earthquake with a magnitude of 6.7 struck the San Fernando Valley. In the following days and weeks, thousands of aftershocks occurred, causing additional damage to affected structures.

Fifty-seven people were killed and more than 1,500 people seriously injured. For days afterward, thousands of homes and businesses were without electricity; tens of thousands had no gas; and nearly 50,000 had little or no water. Approximately 15,000 structures were moderately to severely damaged, which left thousands of people temporarily homeless; 66,500 buildings were inspected. Nearly 4,000 were severely damaged and over 11,000 were moderately damaged. Several collapsed bridges and overpasses created commuter havoc on the freeway system. Extensive damage was caused by ground shaking, but earthquake triggered liquefaction and dozens of fires also caused additional severe damage. This extremely strong ground motion in large portions of Los Angeles County resulted in record economic losses.

However, the earthquake occurred early in the morning on a holiday. This circumstance considerably reduced the potential effects. Many collapsed buildings were unoccupied, and most businesses were not yet open.

California has a long history of seismic events and is probably best known for the San Andreas Fault, a 400-mile long fault running from the Mexican border to a point offshore, west of San Francisco.

Another recent earthquake which had a magnitude of 5.1 was the La Habra earthquake which occurred on March 28, 2014 at 9:09 p.m., located 1 mile east of La Habra, 3 miles north of Fullerton and 21 miles east of Los Angeles. The event was felt widely throughout Orange, Los Angeles, Ventura, Riverside, and San Bernardino counties. It was preceded by two foreshocks, a magnitude 3.6 at 8:03 p.m. and a magnitude 2.1 at 8:16 p.m. This sequence could be associated with the Puente Hills Thrust (PHT). The PHT is a blind thrust fault that extends from this region to the north and west towards the City of Los Angeles.

Historical and geological records show that California has a long history of seismic events. Southern California is probably best known for the San Andreas Fault, a 400-mile long fault running from the Mexican border to a point offshore, west of San Francisco. "Geologic studies show that over the past 1,400 to 1,500 years large earthquakes have occurred at about 130 year intervals on the Southern San Andreas Fault. As the last large earthquake on the Southern San Andreas occurred in 1857, that section of the fault is considered a likely location for an earthquake within the next few decades."

Earthquake Threat

The City of El Monte, like most of the Los Angeles Basin, lies over the area of one or more known earthquake faults, and potentially many more unknown faults, particularly so-called lateral or blind thrust faults. According to the City's General Plan, the faults posing the greatest threat to El Monte are:

San Andreas
San Gabriel
Newport-Inglewood
Palos Verdes
Whittier
Santa Monica
Sierra Madre
Puente Hills Blind Thrust
Raymond Hill
Workman Hill
Clamshell-Sawpit

The Los Angeles Basin has a history of powerful and relatively frequent earthquakes, dating back to the powerful 8.0+ 1857 San Andreas Earthquake, which did substantial damage to the relatively few buildings that existed at the time. Paleoseismological research indicates that large (8.0+) earthquakes occur on the San Andreas fault at intervals between 45 and 332 years with an average interval of 140 years. Other lesser faults have also caused very damaging earthquakes since 1857. Notable earthquakes include the 1933 Long Beach Earthquake, the 1971 San Fernando Earthquake, the 1987 Whittier Narrows Earthquake, and the 1994 Northridge Earthquake.

El Monte could incur damage from seismic activity through ground shaking, liquefaction, or by an earthquake induced dam failure. Ground shaking poses the most threat to life and property in the City of El Monte. It is through ground shaking that most buildings and overpasses collapse, therefore, the more densely populated and urbanized areas of El Monte are at greater risk. Liquefaction zones are located within the northwest, southwest, and southeast areas of the City. The entire City of El Monte is in a dam inundation zone. If an earthquake or other event resulting in a catastrophic failure from Santa Fe Dam, the City of El Monte would be in the impact area.

The City of El Monte is located between the Whittier-Elsinore Fault Zone on the northeast and the Newport-Inglewood Fault to the southwest. The City is situated in an area of active crustal compression and will experience shaking due to a seismic event.

Following are descriptions of the various faults in the region (Source: El Monte General Plan – EIR):

Faults in and around the San Gabriel Valley
There are several faults near the rim of the San Gabriel Valley (see Figure 5.4-2, *Fault Map)*. The Sierra Madre Fault extends east–west along the boundary between the San Gabriel Valley and San Gabriel Mountains. The Raymond Fault runs northeast–southwest through the northwest Valley. The Whittier Fault extends east–west along the south side of the Puente Hills that form the Valley's southern boundary. There are three other faults mapped within the Valley: the San Jose Fault and Walnut Creek Fault in the southeastern part of the Valley and the Indian Hill Fault in the northeast Valley (USGS 2005; USGS 2003b).

Faults in and surrounding the San Gabriel Mountains
The San Andreas Fault extends northwest–southeast along the northern boundary of the San Gabriel Mountains, and forms the boundary between the San Gabriel Mountains and the San Bernardino Mountains to the east. The San Andreas Fault is the boundary between the Pacific and North American tectonic plates; the Pacific Plate is moving northwestward along the fault, and the North American Plate southeastward. The motion of the two plates past each other compresses, and consequently uplifts, the Transverse Ranges, which are one of the fastest-rising regions in the world (CGS 2002; Harden 2004). The San Gabriel Fault extends east–west almost all the way across the San Gabriel Mountains. The Clamshell-Sawpit Canyon Fault runs northeast–southwest within the San Gabriel Mountains.

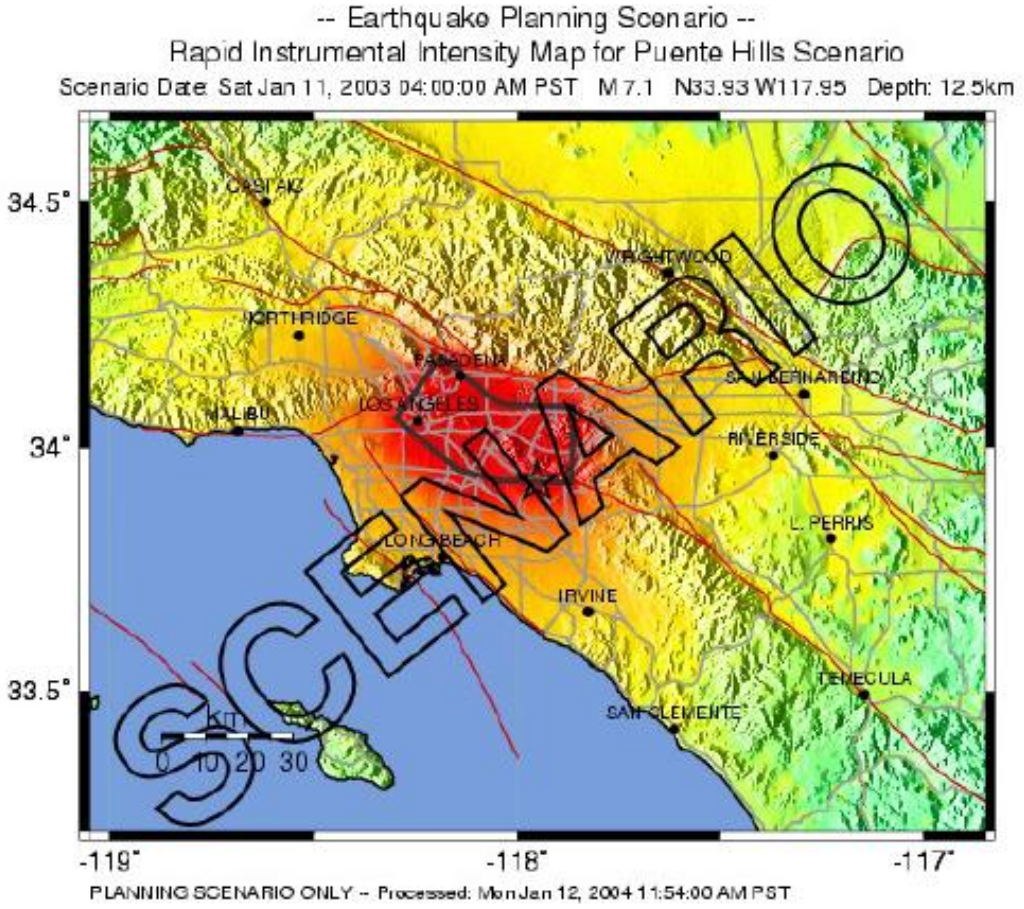
Table: Major Active Faults in the El Monte Region
(Source: El Monte General Plan – EIR, USGS and SCEC)

Fault Name	Distance from City	MCR[1]	Fault Type	Most Recent Activity
Newport-Inglewood	5 miles southwest	7.0	Strike Slip	1933
Whittier / Elsinore	9 miles northeast	7.0	Strike Slip	1987
Raymond	17 miles north	6.0-7.0	Left Lateral	Holocene
San Andreas	41 miles north	8.0	Strike Slip	1857
San Fernando	30 miles north	6.0-6.8	Left Reverse	1971
Malibu Coast	25 miles northwest	7.0	Left Lateral	Halocene
Verdugo	15 miles north	6.4	Reverse	Halocene
Elysian Park Anticline	10 miles northeast	6.9	Blind Thrust	1987 (Whittier)
Puente Hills	12 miles east	5.1	Blind Thrust	2014 (Brea)

[1] MCR refers to a potential earthquake's maximum credible magnitude as measured by Richter Scale.

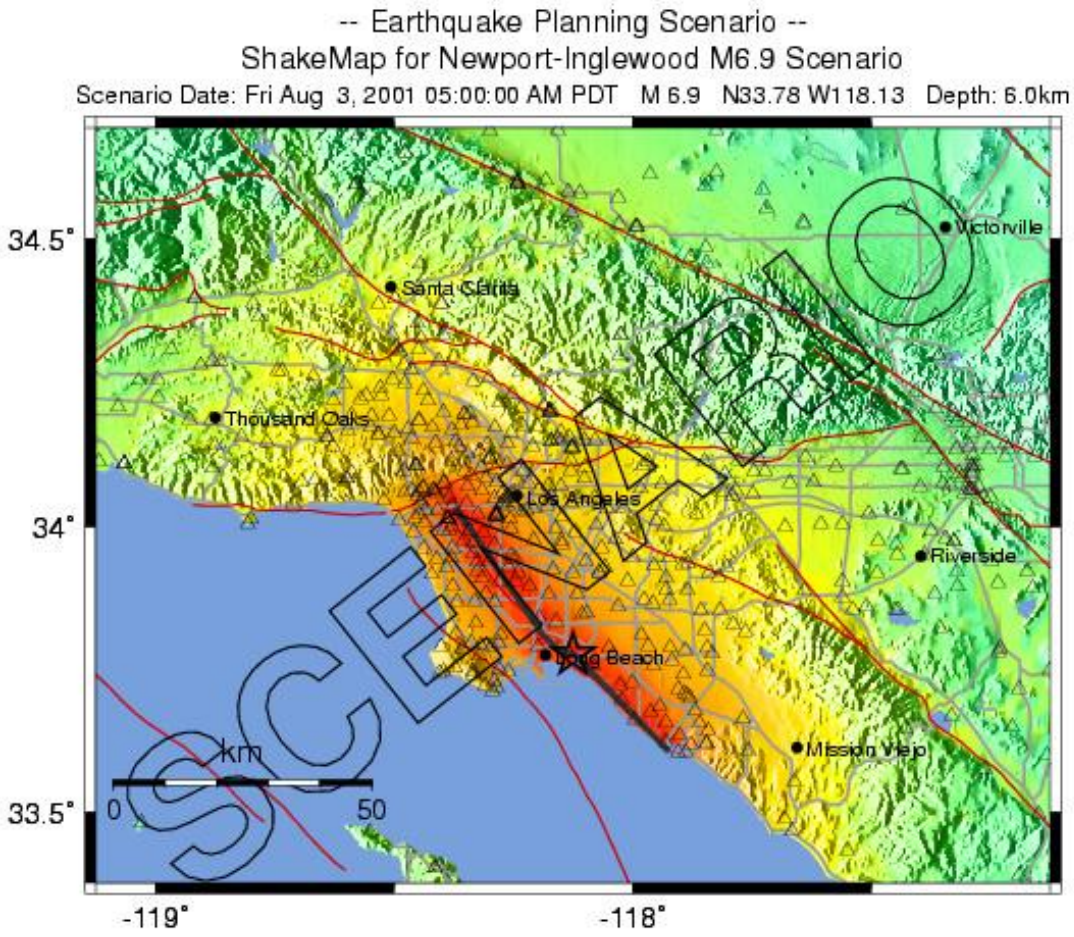
Map: Regional Fault Map
(Source: El Monte General Plan - EIR)

Map: Seismic Shaking Intensities for the Puente Hills Blind Fault (Source: State of California Department of Conservation)



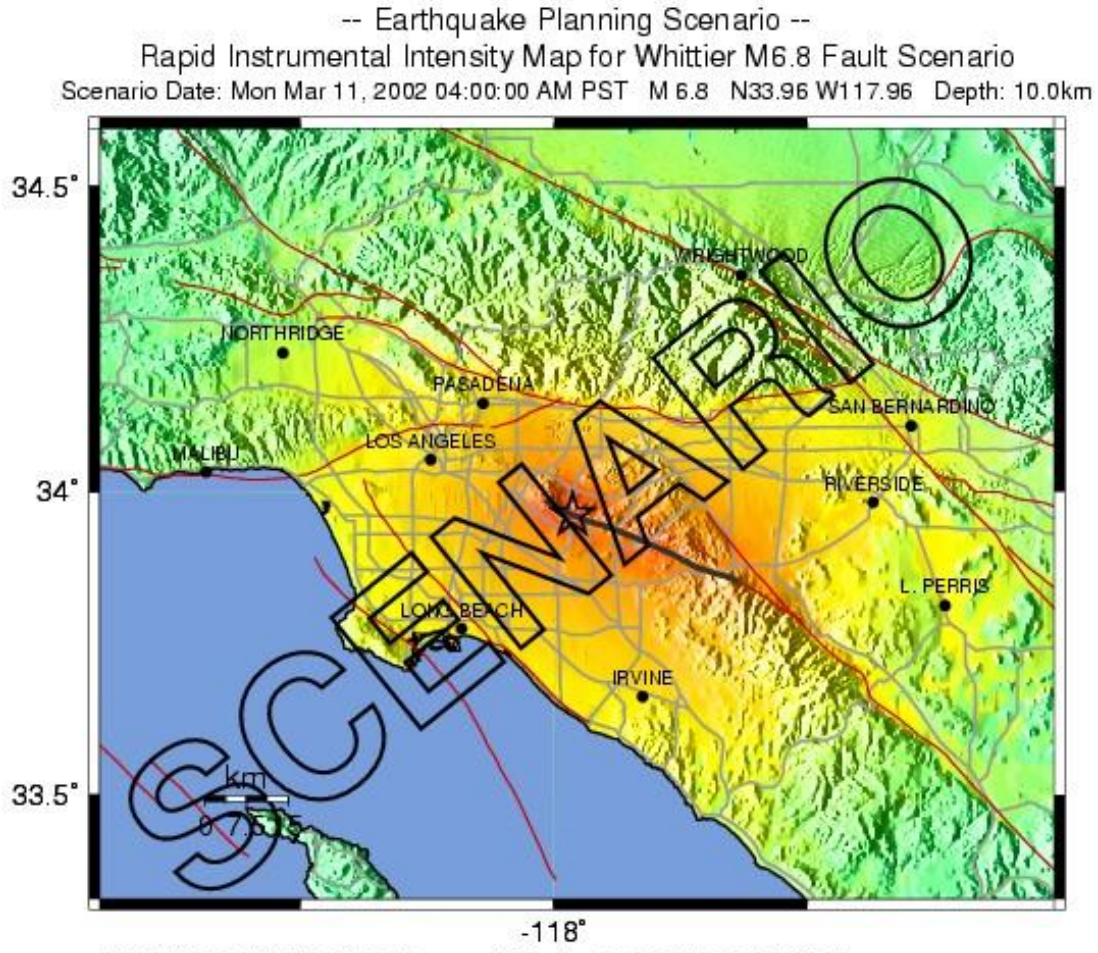
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Map: Seismic Shaking Intensities for the Newport-Inglewood Fault (Source: State of California Department of Conservation)



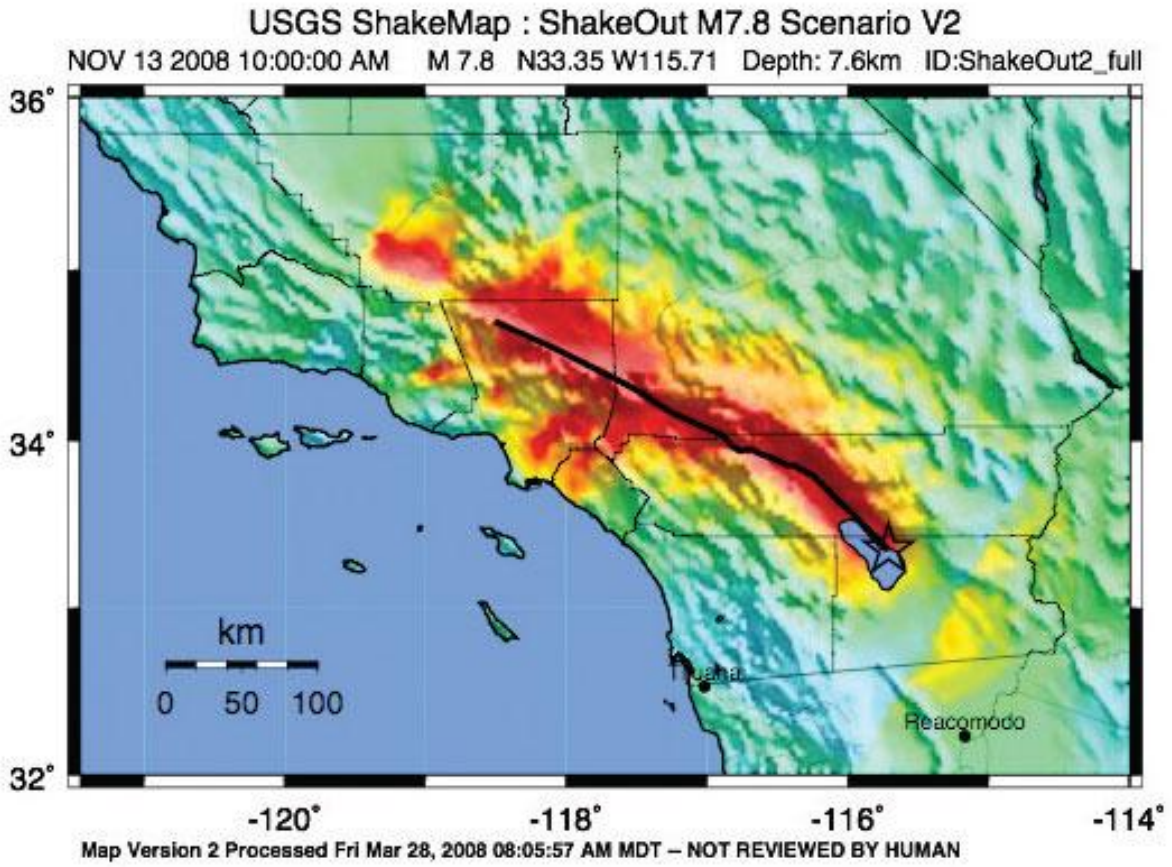
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	*<.17*	*.17-1.4*	*1.4-3.9*	*3.9-9.2*	*9.2-18*	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	*8.1-16*	*16-31*	*31-60*	*60-116*	*>116*
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Map: Seismic Shaking Intensities for the Whittier-Elsinore (Source: State of California Department of Conservation)



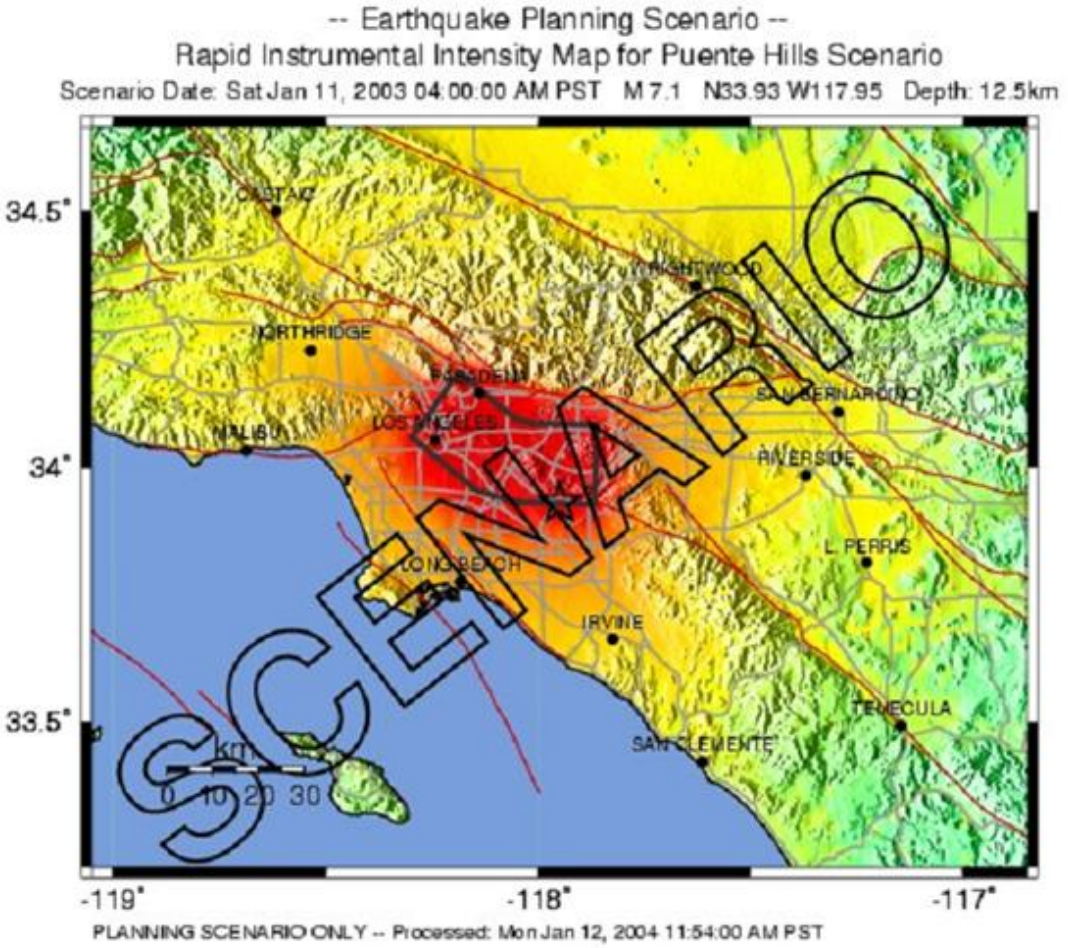
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	*<.17*	*.17-1.4*	*1.4-3.9*	*3.9-9.2*	*9.2-18*	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	*16-31*	*31-60*	*60-116*	*>116*
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Map: Shake Intensity Map – Southern San Andreas Scenario M7.8 (Source: USGS)



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	*<.17*	*.17-1.4*	*1.4-3.9*	*3.9-9.2*	*9.2-18*	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	*8.1-16*	*16-31*	*31-60*	*60-116*	*>116*
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Map: Shake Intensity Map – Puente Hills M7.1
(Source: USGS)



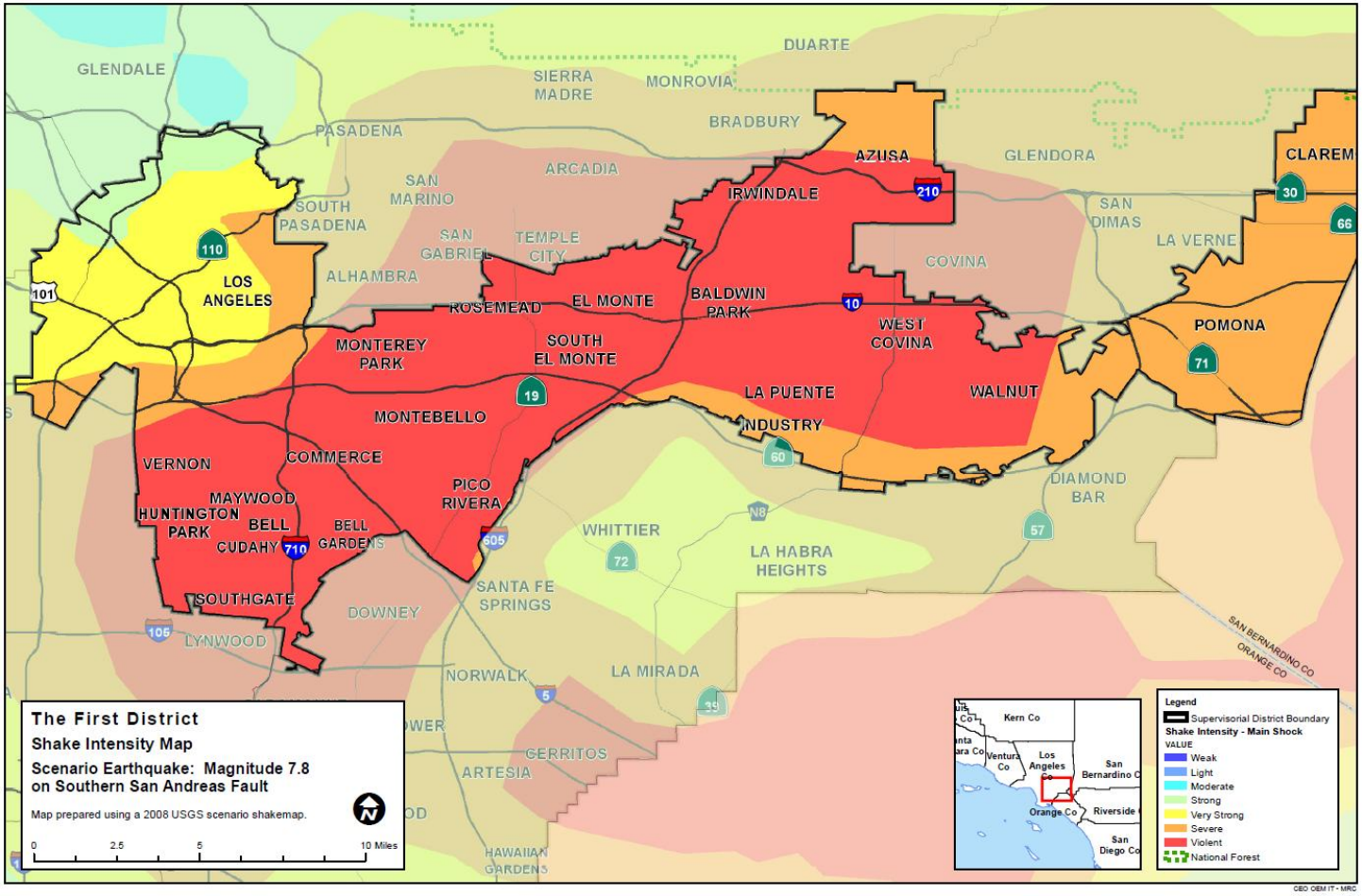
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC (%g)	*<.17*	*.17-1.4*	*1.4-3.9*	*3.9-9.2*	*9.2-18*	18-34	34-65	65-124	>124
PEAK VEL (cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	*16-31*	*31-60*	*60-116*	*>116*
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

S8 Puente Hills Fault Scenario M 7.1

Los Angeles County

The following seismic intensity maps were developed by County of Los Angeles Office of Emergency Management – GIS during the 2014 update to the All-Hazards Mitigation Plan. The maps provide valuable insights into the regional ramifications of a significant seismic event.

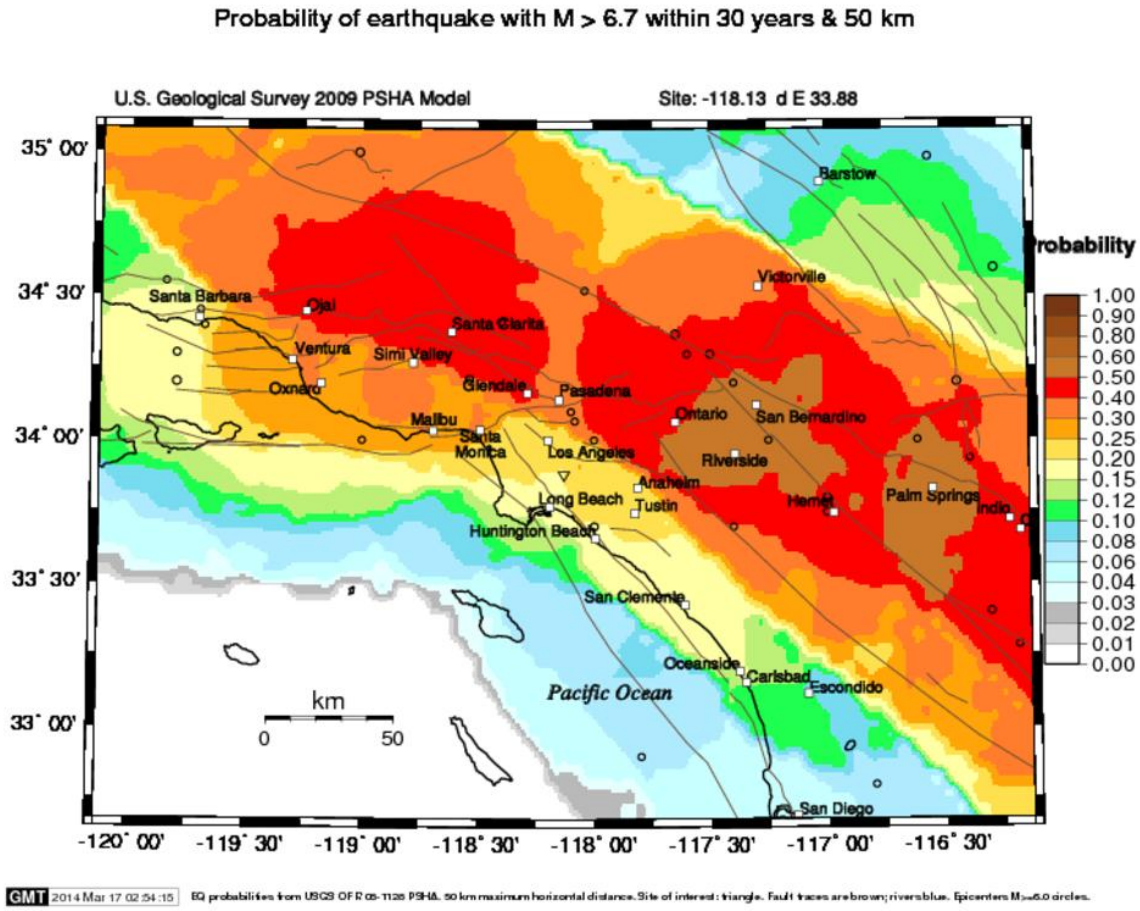
Map: Shake Intensity Map Southern San Andreas M7.8 – Board of Supervisor District One (Source: County of Los Angeles Office of Emergency Management – GIS)



Probability

The 2007 Working Group on California Earthquake Probabilities (WGCEP 2007), a multi-disciplinary collaboration of scientists and engineers, has released the Uniform California Earthquake Rupture Forecast (UCERF), the first comprehensive framework for comparing earthquake possibilities throughout all of California. In developing the UCERF, the 2007 Working Group revised earlier forecasts for Southern California (WGCEP 1995) and the San Francisco Bay Area (WGCEP 2003) by incorporating new data on active faults and an improved scientific understanding of how faults rupture to produce large earthquakes. It extended the forecast across the entire state using a uniform methodology, allowing for the first time, meaningful comparisons of earthquake probabilities in urbanized areas such as Los Angeles and San Francisco Bay Area, as well as comparisons among the large faults in different parts of the State. The study was organized by the Southern California Earthquake Center, the U.S. Geological Survey, and the California Geological Survey, and it received major support from the California Earthquake Authority, which is responsible for setting earthquake insurance rates statewide. According to the new forecast, California has a 99.7% chance of having a magnitude 6.7 or larger earthquake during the next 30 years. The likelihood of an even more powerful quake of magnitude 7.5 or greater in the next 30 years is 46%.

Map: Probability of Earthquake M>6.7 within 30 Years (Source: USGS)



Regulatory Background

The State regulates development within California to reduce or mitigate potential hazards from earthquakes or other geologic hazards. Development in potentially seismically active areas is also governed by the Alquist-Priolo Earthquake Fault Zoning Act and the Seismic Hazards Mapping Act.

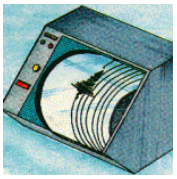
The 1933 Long Beach Earthquake resulted in the Field Act, affecting school construction. The 1971 Sylmar Earthquake brought another set of increased structural standards. Similar re-evaluations occurred after the 1989 Loma Prieta Earthquake and 1994 Northridge Earthquake. These code changes have resulted in stronger and more earthquake resistant structures.

Measuring and Describing Earthquakes

A tool used to describe earthquake intensity is the Magnitude Scale. The Magnitude Scale is sometimes referred to as the Richter Scale. The two are similar but not exactly the same. The Magnitude Scale was devised as a means of rating earthquake strength and is an indirect measure of seismic energy released. The Scale is logarithmic with each one-point increase corresponding to a 10-fold increase in the amplitude of the seismic shock waves generated by the earthquake. In terms of actual energy released, however, each one-point increase on the Richter scale corresponds to about a 32-fold increase in energy released. Therefore, a Magnitude 7 (M7) earthquake is 100 times (10 X 10) more powerful than a M5 earthquake and releases 1,024 times (32 X 32) the energy.

The Modified Mercalli Scale (MMI) is another means for rating earthquakes, but one that attempts to quantify intensity of ground shaking. Intensity under this scale is a function of distance from the epicenter (the closer to the epicenter the greater the intensity), ground acceleration, duration of ground shaking, and degree of structural damage. This rates the level of severity of an earthquake by the amount of damage and perceived shaking.

Table: Modified Mercalli Intensity Scale

	MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
	I			Not Felt
	II			Felt by persons at rest, on upper floors, or favorably placed.
	III			Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
	IV			Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motorcars rock. Windows, dishes, doors rattle. In the upper range of IV, wooden walls and frame creak.
	V	Light	Pictures Move	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clock stop, start, change rate.
	VI	Moderate	Objects Fall	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked.
	VII	Strong	Nonstructural Damage	Difficult to stand. Noticed by drivers of motorcars. Hanging objects quiver. Furniture broken. Damage to masonry, including cracks. Weak chimneys broken at roofline. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Small slides and caving in along sand or gravel banks. Concrete irrigation ditches damaged.

	MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
	VIII	Very Strong	Moderate Damage	Steering of motorcars affected. Damage to masonry C, partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, and elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Cracks in wet ground and on steep slopes.
	IX	Violent	Heavy damage	General panic. Damage to masonry buildings ranges from collapse to serious damage unless modern design. Wood-frame structures rack, and, if not bolted, shifted off foundations. Underground pipes broken.
	X	Very Violent	Extreme Damage	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land.
	XI			Rails bent greatly. Underground pipelines completely out of services.
	XII			Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.

Earthquake Related Hazards

Ground shaking, landslides, liquefaction, and amplification are the specific hazards associated with earthquakes. The severity of these hazards depends on several factors, including soil and slope conditions, proximity to the fault, earthquake magnitude, and the type of earthquake.

Ground Shaking

Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by the earthquake. It is the primary cause of earthquake damage. The strength of ground shaking depends on the magnitude of the earthquake, the type of fault, and distance from the epicenter (where the earthquake originates). Buildings on poorly consolidated and thick soils will typically see more damage than buildings on consolidated soils and bedrock. Seismic activity along nearby or more distant fault zones are likely to cause ground shaking within the City limits.

Regarding seismic safety for structures, ground shaking is measured as peak horizontal ground acceleration. According to the City's General Plan Environmental Impact Report (EIR), the peak horizontal ground acceleration forecast to occur in the City of El Monte during an earthquake with a 10 percent probability of exceedance in 50 years, that is, an average return period of 475 years, is roughly 0.6g, where g is the acceleration of gravity (CGS 2007). An acceleration of 0.6g corresponds roughly to an intensity of VIII on the MMI Scale (Wald 1999). In an Intensity VIII earthquake damage is slight in specially designed structures; ordinary substantial buildings are damaged considerably and partially collapse; and damage is great in poorly built structures. Objects such as chimneys, factory stacks, columns, monuments, and walls fall, and heavy furniture is overturned (USGS 2009).

Hazardous Buildings

The General Plan EIR goes on to explain the effects of seismic activity on hazardous buildings. A principal threat resulting from earthquakes, in addition to ground shaking, fault rupture, and liquefaction, is the damage that earthquakes cause to buildings that house people or essential functions. Continuing advances in engineering design and building code standards over the past decades have greatly reduced the potential for collapse in an earthquake of most of our newer buildings. However, many buildings were built before some of the earthquake design standards were incorporated into the building code. Several specific building types are a particular concern in this regard.

Unreinforced Masonry Buildings: In the late 1800s and early 1900s, unreinforced masonry was
the most common type of construction for larger downtown commercial structures and for multi-story apartment and hotel buildings. These were recognized as a collapse hazard following the San Francisco earthquake of 1906, the Santa Barbara earthquake of 1925, and again the aftermath of the Long Beach earthquake of 1933. These buildings are still recognized as the most hazardous buildings in an earthquake. Per Senate Bill 547, local jurisdictions are required to enact structural hazard reduction programs by: a) inventorying pre-1943 unreinforced masonry buildings, and b) developing mitigation programs to correct the structural hazards.

Precast Concrete Tilt-up Buildings: This building type was introduced following World War II and gained popularity in light industrial buildings during the late 1950s and 1960s. Extensive damage to concrete tilt-up buildings in the 1971 San Fernando earthquake revealed the need for better anchoring of walls to the roof, floor, and foundation

elements of the building and for stronger roof diaphragms.2 In the typical damage to these buildings, the concrete wall panels would fall outward and the roof would collapse.

Soft-Story Buildings: Soft-story buildings are those in which at least one story, commonly the ground floor, has significantly less rigidity and/or strength than the rest of the structure. This can form a weak link in the structure unless special design features are incorporated to give the building adequate structural integrity. Typical examples of soft-story construction are buildings with glass curtain walls on the first floor only, or buildings placed on stilts or columns, leaving the first story open for landscaping, street-friendly building entry, parking, or other purposes. In the early 1950s to early 1970s, soft-story buildings were a popular construction style for low- and mid-rise concrete frame structures.

Nonductile Concrete Frame Buildings: The brittle behavior of nonductile concrete frame buildings can create major damage and even collapse under strong ground shaking. This type of construction, which generally lacks masonry shear walls, was common in the very early days of reinforced concrete buildings, and they continued to be built until the codes were changed to require ductility in the moment-resisting frame in 1973. There were large numbers of these buildings built for commercial and light industrial use in California's older, densely populated cities. Although many of these buildings have four to eight stories, there are many in the lower height range. This category also includes one-story parking garages with heavy concrete roof systems supported by nonductile concrete columns.

Fault Rupture

Fault rupture refers to the actual "tearing apart" of the ground surface along a fault trace resulting from an earthquake. The effects of fault rupture are typically mitigated by placing structures at a specified distance from the known fault trace. The State of California has promulgated regulations prohibiting the placement of structures over, or in close proximity to, a known fault trace through the implementation of the Alquist-Priolo Special Studies Zones (APSSZ). There are no designated APSSZ in the City.

Earthquake-Induced Landslide Potential

Generally, these types of failures consist of rock falls, disrupted soil slides, rock slides, soil lateral spreads, soil slumps, soil block slides, and soil avalanches. Areas having the potential for earthquake-induced landslides generally occur in areas of previous landslide movement, or where local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacements.

Areas considered for earthquake-induced landslides are generally found in the hill and canyon area of the City and are shown on Map 2-8. Those areas at greatest risk in the City include the steep slopes typically found within the quarries. Some slumping and slope-failure could affect structures located at the top of the quarry pits. The landslide potential zones were compiled from USGS. Mapped earthquake-induced landslide potential zones are intended to prompt more detailed, site specific geotechnical studies as required by the Seismic Hazard Mapping Act.

Liquefaction

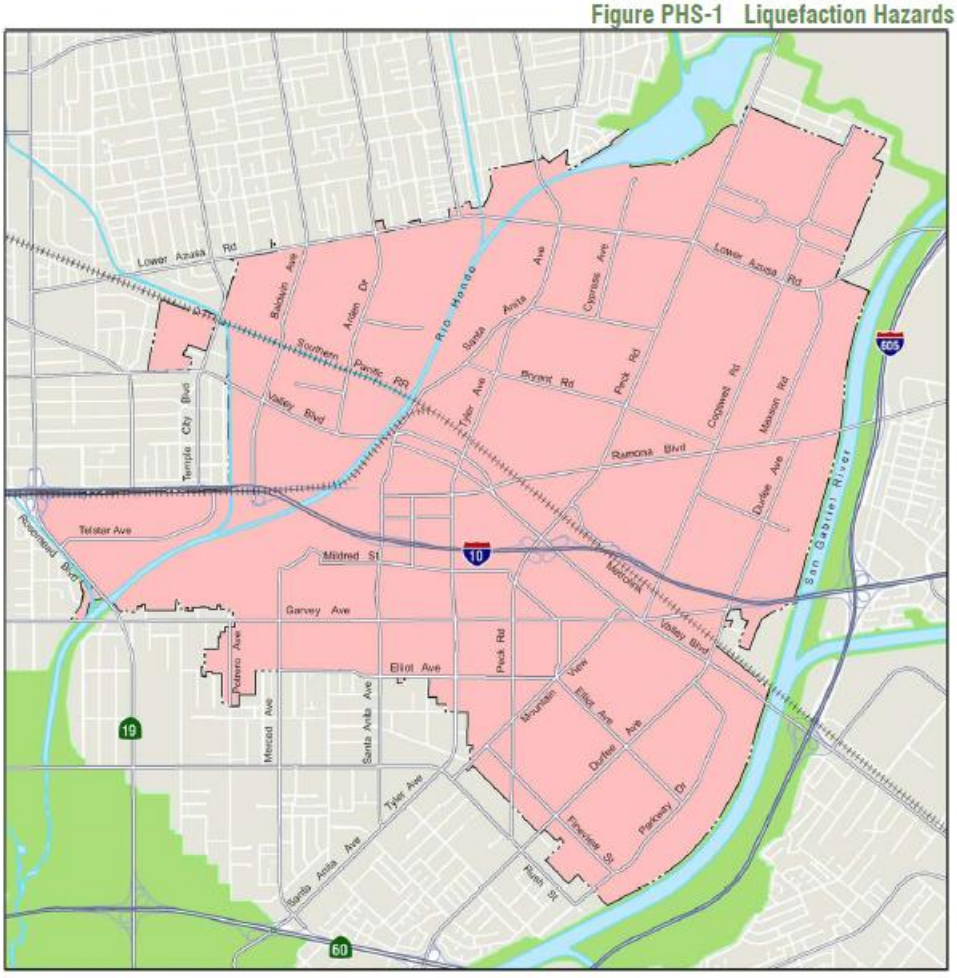
Liquefaction occurs when ground shaking causes wet granular soils to change from a solid state to a liquid state. This results in the loss of soil strength and the soil's ability to support weight.

Buildings and their occupants are at risk when the ground can no longer support these structures. Liquefaction generally occurs during significant earthquake activity, and structures located on soils such as silt or sand may experience significant damage during an earthquake due to the instability of structural foundations and the moving earth. Many communities in Southern California are built on ancient river bottoms and have sandy soil. In some cases this ground may be subject to liquefaction, depending on the depth of the water table.

In accordance with the Seismic Hazard Mapping Act, the California Division of Mines and Geology has evaluated liquefaction susceptibility for most of the El Monte area. Map: Landslide and Liquefaction Zones shows the results of these studies. The entire city has been identified as having a potential for liquefaction.

Map: Areas Susceptible to Liquefaction
(Source: City of El Monte 2013 General Plan)

Figure PHS-1 Liquefaction Hazards



Areas Susceptible to Liquefaction

Areas where historic occurances of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Vulnerability

Following major earthquakes, extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food and temporary shelter would be required for injured or displaced persons. In the event of a truly catastrophic earthquake, identification and burial of the dead would pose difficult problems. Mass evacuation may be essential to save lives, particularly in areas below dams. Many families could be separated, particularly if the earthquake should occur during working hours, and a personal inquiry or locator system would be essential to maintain morale.

Emergency operations could be seriously hampered by the loss of communications and damage to transportation routes within, and to and from, the disaster area and by the disruption of public utilities and services.

Extensive federal assistance could be required and could continue for an extended period. Efforts would be required to remove debris and clear roadways, demolish unsafe structures, assist in reestablishing public services and utilities, and provide continuing care and welfare for the affected population, including temporary housing for displaced persons.

In general, the population is less at risk during non-work hours (if at home) as wood-frame structures are relatively less vulnerable to major structural damage than are typical commercial and industrial buildings. Transportation problems are intensified if an earthquake occurs during work hours, as significant numbers of employees would be stranded in the City. An earthquake occurring during work hours would clearly create major transportation problems for those displaced workers.

In addition to the loss of production capabilities, the economic impact on the City from a major earthquake would be considerable in terms of loss of employment and loss of tax base. Also, a major earthquake could cause serious damage and/or outage to computer facilities. The loss of such facilities could curtail or seriously disrupt the operations of banks, insurance companies, and other elements of the financial community. In turn, this could affect the ability of local government, business and the population to make payments and purchases.

Vulnerability Assessment

The effects of earthquakes span a large area, and large earthquakes occurring in many parts of the Southern California region would probably be felt throughout the region. However, the degree to which the earthquakes are felt, and the damages associated with them may vary. At risk from earthquake damage are large stocks of old buildings and bridges: many high-tech and hazardous materials facilities: extensive sewer, water, and natural gas pipelines; earth dams; petroleum pipelines; and other critical facilities and private property located in the county. The relative or secondary earthquake hazards, which are liquefaction, ground shaking, amplification, and earthquake-induced landslides, are just as devastating as the earthquake.

Impact of Earthquakes in the City of El Monte*

Based on the risk assessment, it is evident that earthquakes will continue to have potentially devastating economic impacts to certain areas of the city. Impacts that are not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life;
- ✓ Commercial and residential structural damage;
- ✓ Disruption of and damage to public infrastructure;
- ✓ Secondary health hazards e.g. 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.

* **ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3**

B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

Flood Hazards

Hazard Identification and Risk Assessment

Definition

Floods are defined as the overflowing of water onto an area of land that is normally dry. Floods generally occur from natural causes, usually weather-related, such as a sudden snow melt, often in conjunction with a wet or rainy spring or with sudden and very heavy rainfalls. Floods can, however, result from human causes as a dam impoundment bursting. Dam break floods are usually associated with intense rainfall or prolonged flood conditions. In the Los Angeles County area, an earthquake can cause dam failure. The greatest threat to people and property is normally in areas immediately below the dam since flood discharges decrease as the flood wave moves downstream.

Flood Terminology

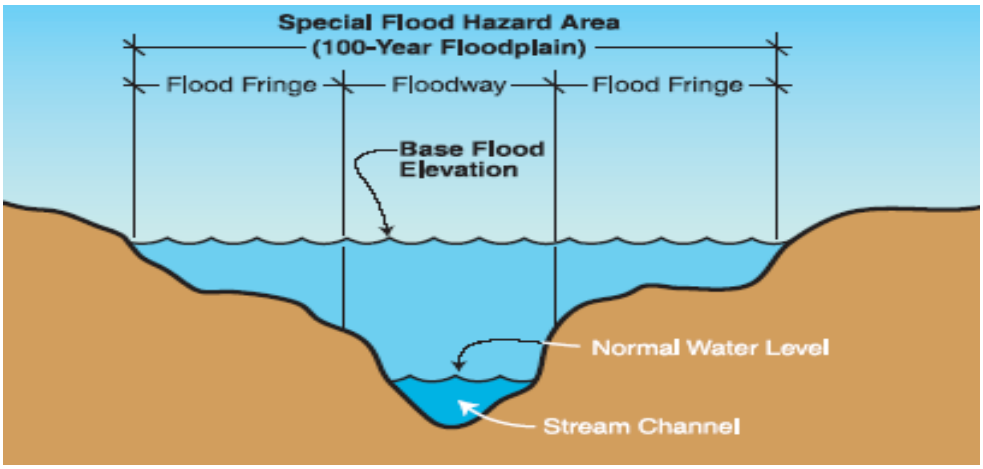
Floodplain

A floodplain is a land area adjacent to a river, stream, lake, estuary, or other water body that is subject to flooding. This area, if left undisturbed, acts to store excess floodwater. The floodplain is made up of two sections: the floodway and the flood fringe.

100-Year Flood

The 100-year flooding event is the flood having a one percent chance of being equaled or exceeded in magnitude in any given year. Contrary to popular belief, it is not a flood occurring once every 100 years. The 100-year floodplain is the area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood. Thus, a 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. A structure located within a special flood hazard area shown on a map has a 26 percent chance of suffering flood damage during a 30-year period.

The schematic below shows the relationship of the floodplain and the floodway.



*Previous Occurrences of Flooding**

City of El Monte

In spite of the region's semi-arid climate, it has experienced flood episodes throughout its history. In recent history, the City has not experienced significant flooding events. Nonetheless, major floods have impacted the surrounding region and throughout Los Angeles County. Major floods that have impacted the County are summarized in Table: Historical Record of Large Floods in Los Angeles County below.

Table: Historical Record of Large Floods in Los Angeles County (Source: NOAA)

Date	Loss Estimation	Source of Estimate	Comments
1995	$50 million	National Oceanic and Atmospheric Association	Flash Flood
1995	$50 thousand	National Oceanic and Atmospheric Association	Flood/Flash Flood
2005	$1 million	National Oceanic and Atmospheric Association	Flash Flood
2007	$300 thousand	National Oceanic and Atmospheric Association	Flash Flood
2010	$3.2 million	National Oceanic and Atmospheric Association	Flash Flood

Flood Threat

The size and frequency of a flood in a particular area depends on a complex combination of conditions, including the amount, intensity, and distribution of rainfall previous moisture condition and drainage patterns.

The magnitude of a flood is measured in terms of its peak discharge, which is the maximum volume of water passing a point along a channel in a given amount of time, usually expressed in cubic feet per second (cfs). Floods are usually referred to in terms of their chance of occurrence. For example, a 100-year flood has a 1% chance of occurring in any given year.

The Federal Emergency Management Agency (FEMA) establishes base flood heights and inundation areas for 100-year and 500-year flood zones. The 100-year flood zone is defined as the area that could be inundated by the flood that has a one percent probability of occurring in any given year. The 500-year flood is defined as the flood that has a 0.2 percent probability of occurring in any given year.

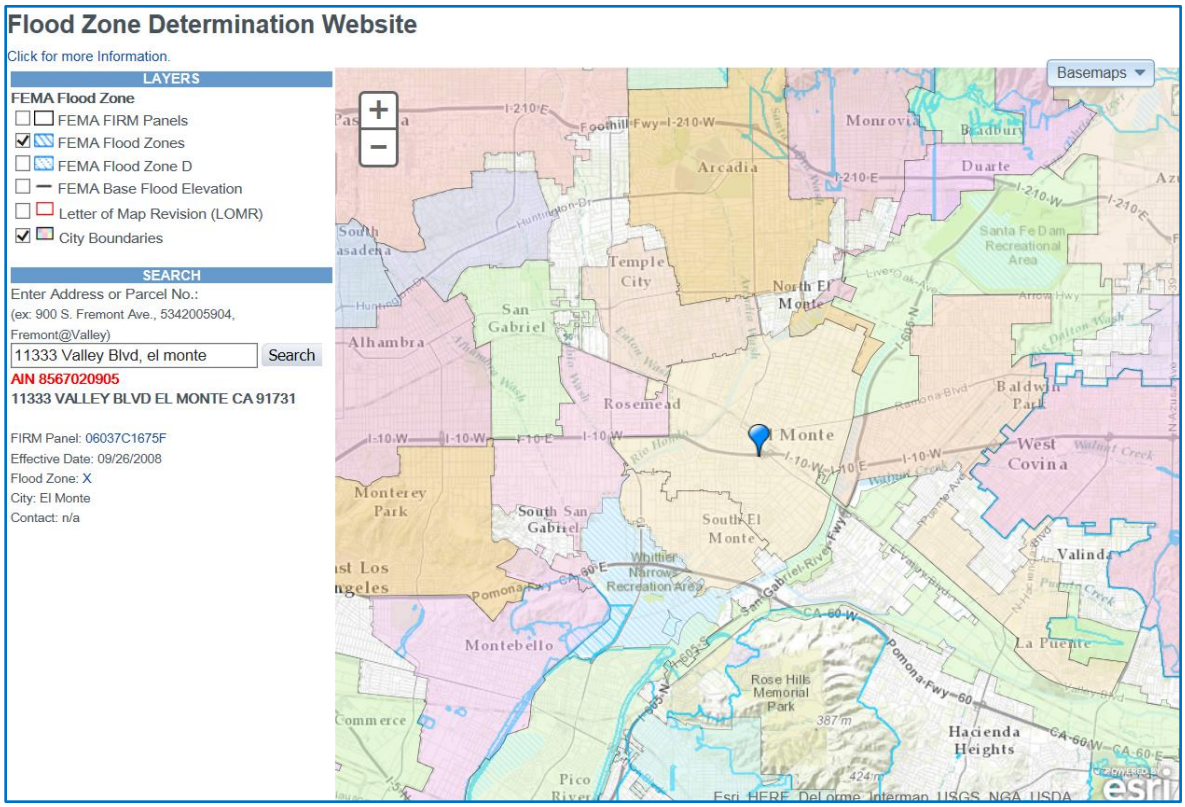
According to FEMA, the City participates in the National Flood Insurance Program (NFIP). Created by Congress in 1968, the NFIP makes flood insurance available in communities that enact minimum floodplain management rules consistent with the Code of Federal Regulations §60.3.

* **ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2**

B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

Map: Flood Zone Determination Website
(Source: Los Angeles County Department of Public Works)

The map below identifies the properties within the City as “Flood Zone X”.



El Monte lies between two channelized rivers: San Gabriel to the east and Rio Hondo to the west. In addition, the City is in the dam inundation area of the Santa Fe Dam (see additional information in Dam Failure Hazards).

Rainfall

As mentioned earlier in the Community Profile, the average rainfall in the City of El Monte is approximately 14" per year. However, large storms can cause quick bursts of rapid rainfall in a very short period of time. The soil in the City is generally not able to effectively absorb water quickly, nor is it able to absorb a large volume of water. Therefore, when the region does experience heavy rain, or rain over a period of days or weeks, flash flooding is a common problem.

According to the El Monte General Plan, the City maintains 233 storm drains and 6 underpass pumps on a regular basis. These drains and catch basins are essential in alleviating flooding during periods of heavy rains.

El Niño

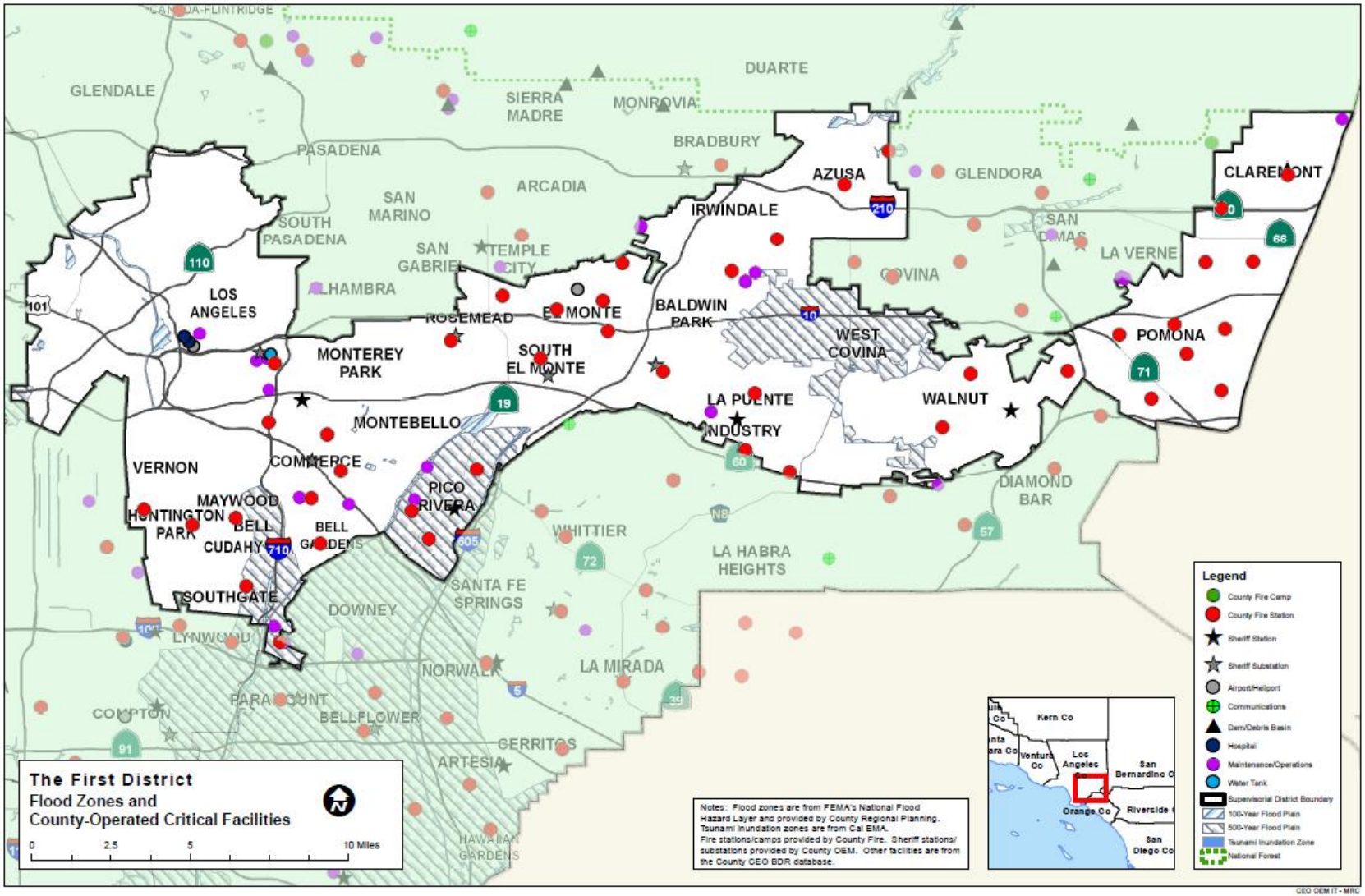
El Niño is a disruption of the ocean-atmosphere system in the tropical Pacific having important consequences. Among these consequences is increased rainfall across the southern tier of the United States, which has caused destructive flooding, and drought in the West Pacific. Observations of conditions in the tropical Pacific are considered essential for the prediction of short-term (a few months to 1 year) climate variations.

El Niño (Spanish name for the male child), initially referred to a weak, warm current appearing annually around Christmas time along the coast of Ecuador and Peru, and lasting only a few weeks, to a month or more. Every three to seven years, an El Niño event can last for many months, having significant economic and atmospheric consequences worldwide. During the past forty years, ten of these major El Niño events have been recorded, the worst of which occurred in 1997-1998. Previous to this, the El Niño event in 1982-1983 was the strongest. Some of the El Niño events have persisted more than one year.

Severity

Floods threaten life and property. People and animals can drown; structures and their contents destroyed; roads, bridges, and railroad tracks can be washed out; and crops ruined. Floods can create health hazards due to the discharge of raw sewage from damaged septic tank leach fields, sewer lines, and sewage treatment plants; or due to hazardous materials carried off by raging waters.

Map: Flood Zones and County-Operated Critical Facilities
(Source: County of Los Angeles All-Hazards Mitigation Plan)



Types of Flooding

Urban Flooding

As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization of a watershed changes the hydrologic systems of the basin. Heavy rainfall collects and flows faster on impervious concrete and asphalt surfaces. The water moves from the clouds, to the ground, and into streams at a much faster rate in urban areas. Adding these elements to the hydrological systems can result in flood waters that rise very rapidly and peak with violent force.

The City of El Monte has a high concentration of impermeable surfaces that either collect water, or concentrate the flow of water in unnatural channels. During periods of urban flooding, streets can become swift moving rivers and basements can fill with water. Storm drains often back up with vegetative debris causing additional, localized flooding.

Riverine Flooding

Riverine flooding is the overbank flooding of rivers and streams. The natural processes of riverine flooding add sediment and nutrients to fertile floodplain areas. Flooding in large river systems typically results from large-scale weather systems that generate prolonged rainfall over a wide geographic area, causing flooding in hundreds of smaller streams, which then drain into the major rivers. Shallow area flooding is a special type of riverine flooding. FEMA defines shallow flood hazards as areas that are inundated by the 100-year flood with flood depths of only one to three feet. These areas are generally flooded by low velocity sheet flows of water.

Vulnerability

Vulnerability Assessment

A vulnerability assessment combines the floodplain boundary, generated through hazard identification, with an inventory of the property within the floodplain. Understanding the population and property exposed to hazards will assist in reducing risk and preventing loss from future events. Because site-specific inventory data and inundation levels given for a particular flood event (10-year, 25-year, 50-year, 100-year, and 500-year) are not readily available, calculating a community's vulnerability to flood events is not straightforward. The amount of property in the floodplain, as well as the type and value of structures on those properties, should be calculated to provide a working estimate for potential flood losses.

Impact of Flooding in the City of El Monte*

Floods and their impacts vary by location and severity of any given flood event, and likely only affect certain areas of the county during specific times. Based on the risk assessment, it is evident that floods will continue to have devastating economic impact to certain areas of the city.

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* **ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3**

B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

Impact that is not quantified, but could be anticipated in future events includes:

- ✓ Injury and loss of life;
- ✓ Commercial and residential structural damage;
- ✓ Disruption of and damage to public infrastructure;
- ✓ Secondary health hazards e.g. 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.

Property Loss Resulting from Flooding Events

The type of property damage caused by flood events depends on the depth and velocity of the flood waters. Faster moving flood waters can wash buildings off their foundations and sweep cars downstream. Pipelines, bridges, and other infrastructure can be damaged when high waters combine with flood debris. Extensive damage can be caused by basement flooding and landslide damage related to soil saturation from flood events. Most flood damage is caused by water saturating materials susceptible to loss (i.e., wood, insulation, wallboard, fabric, furnishings, floor coverings, and appliances). In many cases, flood damage to homes renders them unlivable.

*Repetitive Loss Properties**

Repetitive Loss Properties (RLPs) are most susceptible to flood damages; therefore, they have been the focus of flood hazard mitigation programs. Unlike a countywide program, the Floodplain Management Plan (FMP) for repetitive loss properties involves highly diversified property profiles, drainage issues, and property owner's interest. It also requires public involvement processes unique to each RLP area. The objective of an FMP is to provide specific potential mitigation measures and activities to best address the problems and needs of communities with repetitive loss properties. A repetitive loss property is one for which two or more claims of $1,000 or more have been paid by the National Flood Insurance Program (NFIP) within any given ten-year period. According to FEMA resources, there are no Repetitive Loss Properties (RLPs) within the City of El Monte.

Business/Industry

Flood events impact businesses by damaging property and by interrupting business. Flood events can cut off customer access to a business as well as close a business for repairs. A quick response to the needs of businesses affected by flood events can help a community maintain economic vitality in the face of flood damage. Responses to business damages can include funding to assist owners in elevating or relocating flood-prone business structures.

Public Infrastructure

Publicly owned facilities are a key component of daily life for all citizens of the county. Damage to public water and sewer systems, transportation networks, flood control facilities, emergency facilities, and offices can hinder the ability of the government to deliver services. Government

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*** ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B4**

B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))

can take action to reduce risk to public infrastructure from flood events, as well as craft public policy that reduces risk to private property from flood events.

Roads

During hazard events, or any type of emergency or disaster, dependable road connections are critical for providing emergency services. Roads systems in the City of El Monte are maintained by multiple jurisdictions. Federal, state, county, and city governments all have a stake in protecting roads from flood damage. Road networks often traverse floodplain and floodway areas. Transportation agencies responsible for road maintenance are typically aware of roads at risk from flooding.

Storm Water Systems

Local drainage problems are common throughout the City of El Monte. The City of El Monte Public Works staff is aware of local drainage threats. The problems are often present where storm water runoff enters culverts or goes underground into storm sewers. Inadequate maintenance can also contribute to the flood hazard in urban areas.

Debris in the Storm Drains

Storm water pollution is urban runoff water that picks up pollutants as it flows through the storm drain system – a network of channels, gutters and pipes that collect runoff from city streets, neighborhoods, farms, construction sites and parking lots – and empties directly into local waterways.

Unlike sewage, which goes to treatment plants, urban runoff flows untreated through the storm drain system. Anything thrown, swept or poured into the street, gutter or a catch basin – the curbside openings that lead into the storm drain system – can flow directly into our channels, creeks, bays and ocean. This includes pollutants like trash, pet waste, cigarette butts, motor oil, anti-freeze, runoff from pesticides and fertilizers, paint from brushes and containers rinsed in the gutter, and toxic household chemicals.

Contaminated urban runoff is an uncontrolled nonpoint source of pollution into local waters, and contributes to beach closures. Litter, leaves and other debris clog catch basins causing flooding when it rains. It is illegal for businesses without a permit to discharge wastewater or other materials into the storm drain system.

Water Quality

Environmental water quality problems include bacteria, toxins, and pollution.

Dam Failure Hazards

Hazard Identification and Risk Assessment

Definition

Dams are man-made structures built for a variety of uses including flood protection, power, 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 a larger flood occurs, then that structure will be overtopped. Overtopping is the primary cause of earthen dam failure in the United States.

Failed dams can create floods that are catastrophic to life and property as a result of the tremendous energy of the released water. A catastrophic dam failure could easily overwhelm local response capabilities and require mass evacuations to save lives. Dams typically are constructed of earth, rock, concrete, or mine tailings. Two factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream.

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

- ✓ Prolonged periods of rainfall and flooding, resulting in excess overtopping flows
- ✓ Earthquake
- ✓ Inadequate spillway capacity, resulting in excess overtopping flows
- ✓ Internal erosion caused by embankment or foundation leakage or piping
- ✓ Improper design
- ✓ Improper maintenance
- ✓ Negligent operation
- ✓ Failure of upstream dams on the same waterway

*Previous Occurrences of Dam Failures**

The City of El Monte has not been recently affected by a release/failure of any of the dam facilities identified in the table below.

Dams Posing Threat to City of El Monte

Name of Facility	Owner	Primary Purpose
Santa Fe Dam	U.S. Army Corps of Engineers	*Flood Control Dam*

* **ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2**

B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

Hazard Identification

Hazard identification is the first phase of a hazard assessment. Identification is the process of estimating: 1) the geographic extent of the dam (i.e., the area at risk from dam failure); 2) the intensity of the flooding that can be expected in specific areas of the dam failure path; and 3) the probability of occurrence of dam failure. This process usually results in the creation of a dam failure inundation map. Inundation maps provide detailed information that can assist jurisdictions in making policies and land-use decisions.

Dam failure results from a number of natural or human causes, including earthquakes, erosion of the face or foundation, rapidly rising flood waters, improper sitting, and structural/design flaws. The Planning Team categorized dam failure as a natural hazard for purposes of this plan. Should a catastrophic dam failure occur, it would most likely be the result of a natural event.

Since 1929, the State of California is responsible for overseeing dams to safeguard life and property (California Department of Resources, 1995). This legislation was prompted by the 1928 failure of St. Francis Dam. In 1965, the law was amended to include off stream storage reservoirs due to the 1963 failure of Baldwin Hill Reservoir. In 1973, Senate Bill 896 was enacted to require dam owners, under the direction of Cal OES, to show the possible inundation path in the event of a dam failure.

Governmental assistance could be required and continued for an extended period. These efforts are required to remove debris and clear roadways, demolish unsafe structures, assist in reestablishing public services and utilities, and provide continuing care and welfare for the affected population including, as required, temporary housing for displaced persons.

There are a total of 103 dams in Los Angeles County, owned by 23 agencies or organizations, ranging from the Federal government to Home Owner Associations. These dams hold billions of gallons of water in reservoirs. Releases of water from the major reservoirs are designed to protect Southern California from flood waters and to store domestic water. Seismic activity can compromise the dam structures, and the resultant flooding could cause catastrophic flooding. Following the 1971 Sylmar earthquake the Lower Van Norman Dam showed signs of structural compromise, and tens of thousands of persons had to be evacuated until the dam could be drained. The dam has never been refilled.

Historic Dam Failure Events in Southern California

There have been a total of 45 dam failures in California, since the 19th century. The significant dam failures in Southern California are listed below.

Historical Dam Failures in Southern California
(Source: UC Davis)

Sheffield	Santa Barbara	1925	Earthquake-induced slide
Puddingstone	Pomona	1926	Overtopping during construction
Lake Hemet	Palm Springs	1927	Overtopping
Saint Francis	San Francisquito Canyon	1928	Sudden failure at full capacity through foundation, 426 deaths
Cogswell	Monrovia	1934	Breaching of concrete cover
Baldwin Hills	Los Angeles	1963	Leak through embankment turned into washout, 3 deaths

Vulnerability

Vulnerability Assessment

Vulnerability assessment is the second phase of a dam failure-hazard assessment. It combines the inundation path boundary, generated through hazard identification, with an inventory of the property within the path. Understanding the population and property exposed to hazards will assist in reducing risk and preventing loss from future events. The amount of property in the inundation path, as well as the type and value of structures on those properties, should be calculated to provide a working estimate for potential dam failure losses.

Risk Analysis

Risk analysis is the third and most advanced phase of a dam failure hazard assessment. It builds upon the hazard identification and vulnerability assessment. A dam failure risk analysis for the City of El Monte should include two components: 1) the life and value of property that may incur losses from a dam failure event (defined through the vulnerability assessment); and 2) the number of dam failure events expected to occur over time. Within the broad components of a risk analysis, it is possible to predict the severity of damage from a range of events. Flow velocity models assist in predicting the amount of damage expected from different magnitudes of dam failure events.

Community Dam Failure Issues

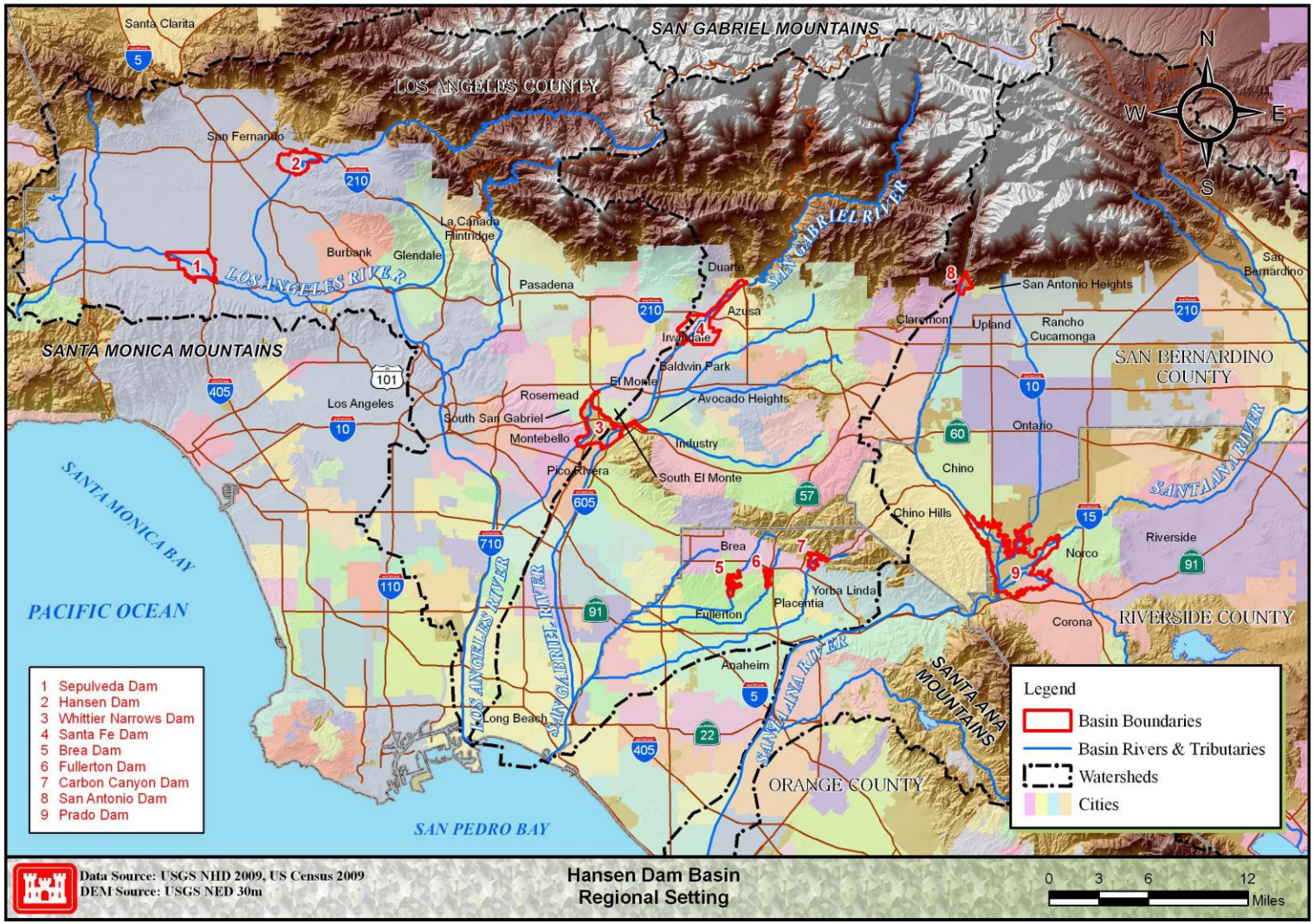
Dam Failure Flooding

Loss of life and damage to structures, roads, and utilities may result from a dam failure. Economic losses can also result from a lowered tax base and lack of utility profits. These effects would certainly accompany the failure of one of the major dams near the City of El Monte. Because dam failure can have severe consequences, FEMA requires that all dam owners develop Emergency Action Plans (EAP) for warning, evacuation, and post-flood actions. Although there may be coordination with county officials in the development of the EAP, the responsibility for developing potential flood inundation maps and facilitation of emergency response is the responsibility of the dam owner.

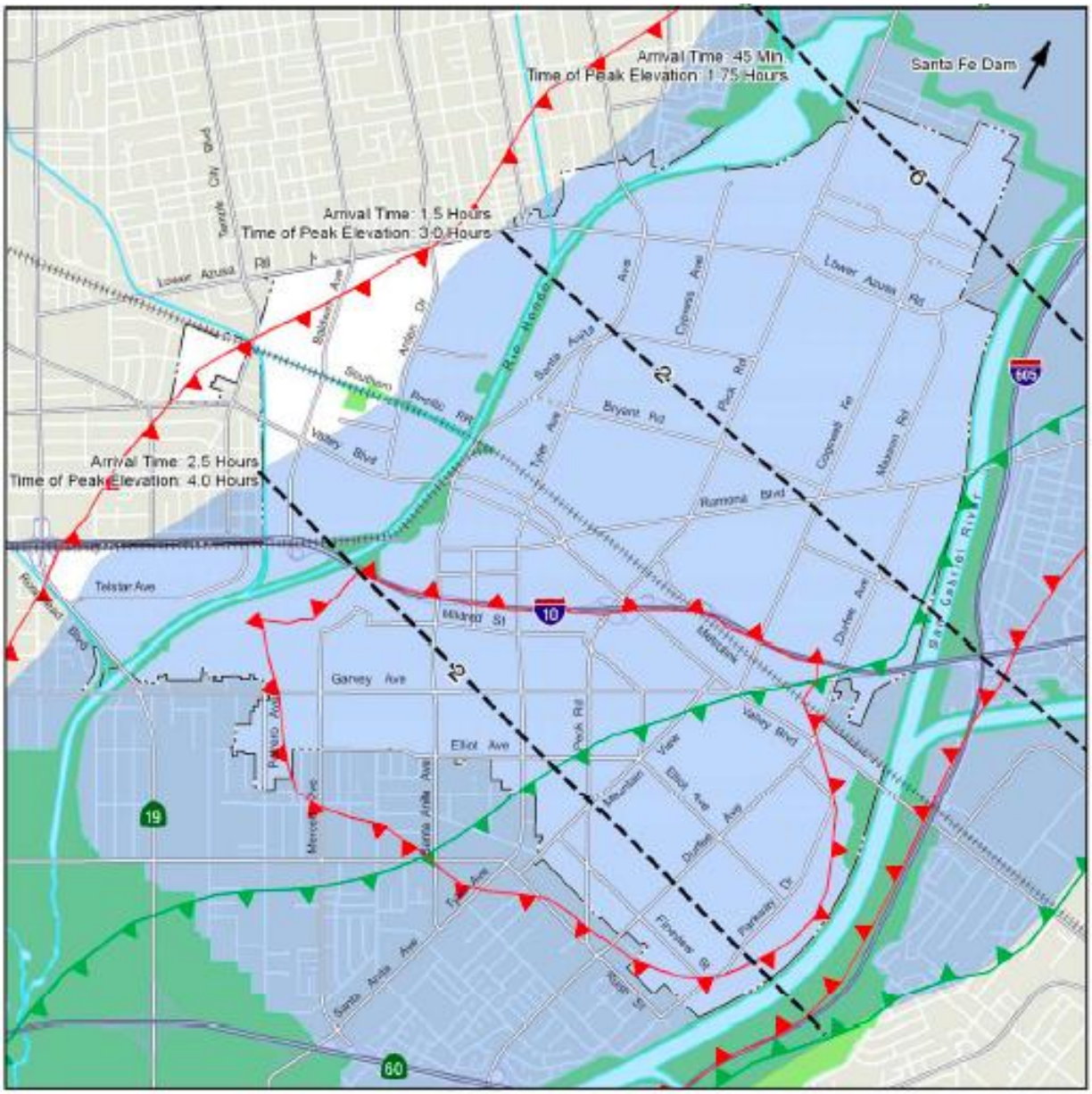
The Santa Fe Dam could potentially impact the City of El Monte. The Santa Fe Dam is a flood control facility located on the San Gabriel River two miles northeast of the City of El Monte. The entire City of El Monte is within the dam inundation zone.

El Monte is framed by two major dams and reservoirs that protect the community from floodwaters from the San Gabriel Mountains. The Santa Fe Dam and Reservoir is on the San Gabriel River two miles northeast of the City; the Whittier Narrows Dam is three miles south of the City of El Monte. The major threat from dams or reservoirs is flood inundation in the rare case of structural failure or breach. If a breach occurred at the Santa Fe Dam, water would reach six feet in depth at the City's northeastern boundary in fifteen minutes from dam failure and decrease to two feet in center El Monte before rising to seven feet near Whittier Narrows in three hours from a dam breach at Santa Fe Dam (Source: City of El Monte's General Plan).

Map: Dam Inundation – Regional Setting
(Source: U.S. Army Corps of Engineers



Map: Santa Fe Dam Inundation Area - City of El Monte
(Source: City of El Monte General Plan 2013)



OES Dam Breach Scenario 1

OES Dam Breach Scenario 2

Army Corps of Engineers Dam Inundation Areas

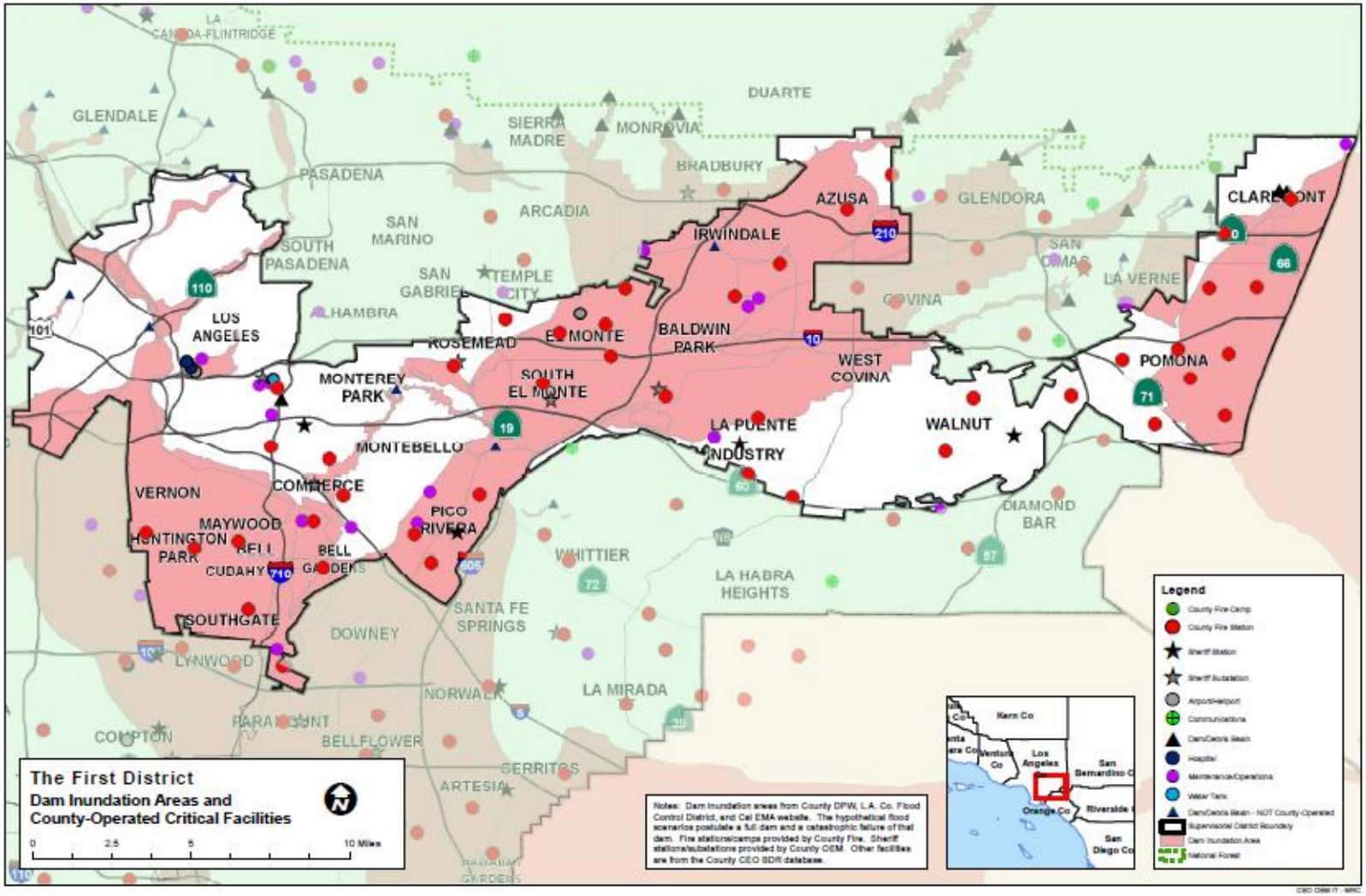
--2-- Cross Section with Average Overbank Depth in Feet at Cross Section

Source: Santa Fe Dam Emergency Plan Inundation Map (ACE, June 1985), California Office of Emergency Services (OES, 2000)

Note: The inundation areas shown on this map reflect events of extremely remote nature.

0 1,000' 2,000' 3,000'

Map: Dam Inundation Areas and County-Operated Critical Facilities – Board of Supervisors District One (Source: Los Angeles County GIS)



Impact of Dam Failure in the City of El Monte*

Dam Failures and the impact varies by location and severity of any given Dam Failure event, and only affects certain areas of the City during specific times. Based on the risk assessment, it is evident that Dam Failure continues to have a potentially devastating economic impact on certain areas of the City. Impact that is not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life
- ✓ Commercial and residential structural damage
- ✓ Disruption of and damage to public infrastructure
- ✓ Secondary health hazards e.g. 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
- ✓ Significant disruption to students and teachers as temporary facilities and relocations are needed

* **ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3**

B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

Windstorm Hazards

Hazard Identification and Risk Assessment

Definition

High Wind is caused by air moving from an area of high pressure to an area of low pressure. Winds vary in strength and destructive power.

*Previous Occurrences of Windstorms**

Based on local history, most incidents of high wind in the City are the result of Santa Ana wind conditions. While high impact wind incidents are not frequent in the area, significant Santa Ana Wind events and sporadic tornado activity have been known to negatively impact the local community.

Severe windstorms pose a significant risk to life and property within the City by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High winds can and do occasionally cause tornado-like damage to local homes and businesses. High winds have destructive impact, especially to trees, power lines, and utility services. The City was most recently and severely impacted in November 2011. Beginning on November 30, 2011, powerful windstorms blew through Los Angeles County including much of the San Gabriel Valley, toppling trees, downing power lines, slowing traffic, damaging homes and vehicles, and knocking out electricity for over 350,000 customers. The cleanup in Los Angeles County alone topped $17 million.

Hazard Characteristics

Santa Ana wind conditions results in two general disaster conditions. The most common is fire fanned by the high winds. This was the situation in 1993 in Laguna Beach when a massive fire destroyed a number of homes in the surrounding hills. Wind driven flames again caused the destruction of more than 3,000 homes in Southern California in October, 2003. Other forms of disaster would be direct building damage, damage to utilities and infrastructure as a result of the high winds. This has occurred in the past few years in many southland communities including Los Angeles County.

Santa Ana winds commonly occur between October and February, with December having the highest frequency of events. Summer events are rare. Wind speeds are typically north to east at 35 knots through and below passes, and canyons with gusts to 50 knots. Stronger Santa Ana winds have gusts greater than 60 knots over widespread areas, and gusts greater than 100 knots in favored areas. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of a sea breeze. The sea breeze which typically blows onshore daily, can moderate the Santa Ana winds during the late morning and afternoon hours. Santa Ana winds are an important forecast challenge because of the high fire danger associated with them. Also, unusually high surf conditions on the northeast side of the Channel

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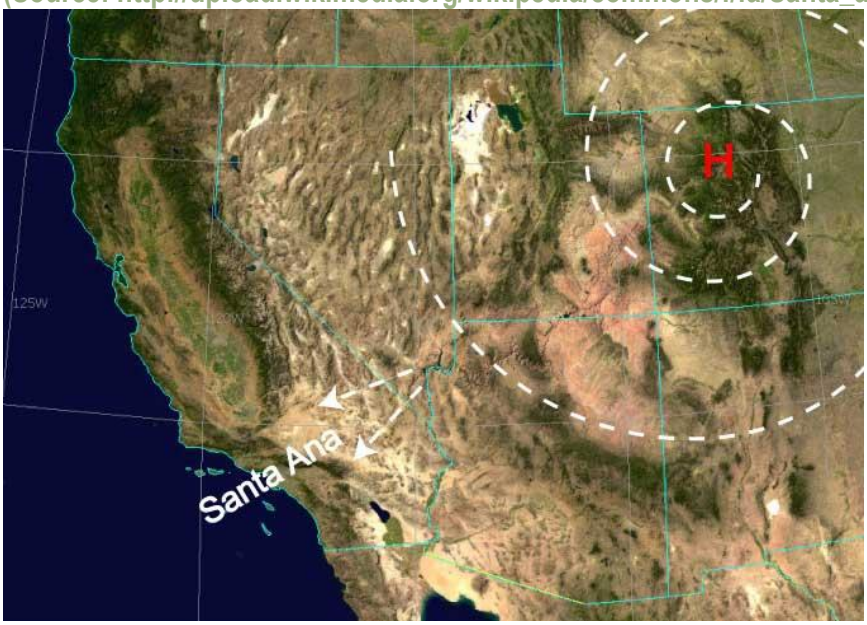
* **ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2**

B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

Islands normally accompany a Santa Ana event. See Figure: Santa Ana Wind Formation below.

Figure: Santa Ana Wind Formation
(Source: http://upload.wikimedia.org/wikipedia/commons/f/fa/Santa_ana_wind1.jpg)



Measuring Wind

The Beaufort Scale below, coined and developed by Sir Francis Beaufort in 1805, illustrates the effect that varying wind speed can have on structures:

Table: Beaufort Wind Scale
(Source: http://www.compuweather.com/decoder-charts.html)

Beaufort Force	Speed (mph)	Wind Description - Effects on Land
0	Less 1	Calm - Smoke rises vertically
1	1-3	Light - Smoke drift shows direction of wind, but wind vanes do not
2	4-7	Light Breeze - Wind vanes move; Leaves rustle; You can feel wind on the face
3	8-12	Gentle Breeze - Leaves and small twigs move constantly; Small, light flags are extended
4	13-18	Moderate Breeze - Wind lifts dust and loose paper; Small branches move
5	19-24	Fresh Breeze - Small trees with leaves begin to move
6	25-31	Strong Breeze - Large branches move; Telegraph wires whistle; Hard to hold umbrellas
7	32-38	Near Gale - Whole trees move; Resistance felt walking into wind
8	39-46	Gale - Twigs and small branches break off trees; Difficult to walk
9	47-54	Strong Gale - Slight structural damage
10	55-63	Storm - Trees broken or uprooted; Considerable structural damage
11	64-73	Violent Storm - Seldom experienced inland; Considerable structural damage
12	>74	Hurricane - Widespread damage. Very rarely experienced on land

Vulnerability

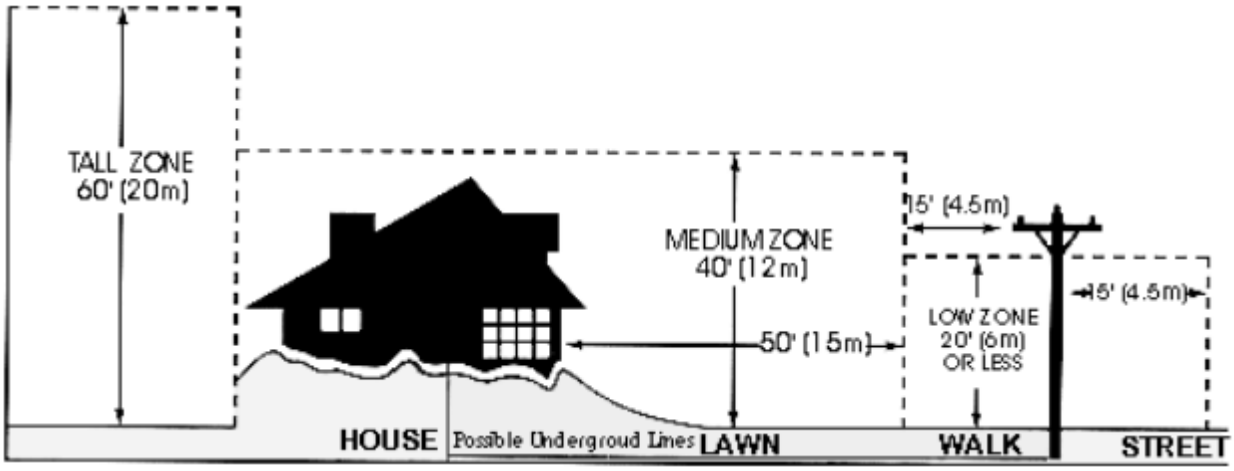
Life and Property

Based on the history of the region, windstorm events can be expected, perhaps annually, across widespread areas of the region. This can result in the involvement of City emergency response personnel during a wide-ranging windstorm or microburst tornadic activity. Both residential and commercial structures with weak reinforcement are susceptible to damage. Wind pressure creates a direct and frontal assault on a structure, pushing walls, doors, and windows inward. Conversely, passing currents creates lift suction forces that pull building components and surfaces outward. With extreme wind forces, the roof or entire building can fail causing considerable damage.

Debris carried along by extreme winds can directly contribute to loss of life and indirectly to the failure of protective building envelopes, siding, or walls. When severe windstorms strike, downed trees, power lines, and damaged property can be major hindrances to emergency response and disaster recovery.

Utilities

Historically, falling trees are the major cause of power outages in the region. Windstorms such as strong microbursts and Santa Ana Wind conditions cause flying debris and downed utility lines. For example, tree limbs breaking in winds of only 45 mph can be thrown over 75 feet. Overhead power lines can be damaged, even in relatively minor windstorm events. Falling trees bring electric power lines down to the pavement, creating the possibility of lethal electric shock.



Infrastructure

Windstorms damage buildings, power lines, and other property, and infrastructure, due to falling trees and branches. During wet winters, saturated soils cause trees to become less stable and more vulnerable to uprooting from high winds.

Increased Fire Threat

Perhaps the greatest danger from windstorm activity in Southern California comes from the combination of the Santa Ana winds with the major fires that occur every few years in the urban/wildland interface. With the Santa Ana winds driving the flames, the speed and reach of the flames is even greater than in times of calm wind conditions.

Transportation

Windstorm activity impacts local transportation in addition to the problems caused by downed trees and electrical wires blocking streets and highways. During periods of extremely strong Santa Ana winds, major highways can be temporarily closed to truck and recreational vehicle traffic. However, typically these disruptions are not long lasting, nor do they carry a severe long term economic impact on the region.

Impact of Windstorms in City of El Monte*

Based on the risk assessment, it is evident that Windstorms continue to have potentially devastating economic impact to certain areas of the City.

Impact that is not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life
- ✓ Commercial and residential structural damage
- ✓ Disruption of and damage to public infrastructure
- ✓ Secondary Health hazards e.g. 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
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.

*** ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3**

B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

Drought Hazards

Hazard Identification and Risk Assessment

Definition

Drought is defined as a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal". It is also related to the timing (e.g., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness of the rains (e.g., rainfall intensity, number of rainfall events). Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity. Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. Human beings often exacerbate the impact of drought. Recent droughts in both developing and developed countries and the resulting economic and environmental impacts and personal hardships have underscored the vulnerability of all societies to this "natural" hazard.

One dry year does not normally constitute a drought in California, but serves as a reminder of the need to plan for droughts. 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.

Many governmental utilities, the National Oceanic and Atmospheric Administration (NOAA), and the California Department of Water Resources, as well as academic institutions such as the University of Nebraska-Lincoln's National Drought Mitigation Center and the National Drought Mitigation Center, generally agree that there is no clear definition of drought. Drought is highly variable depending on location.

*Previous Occurrences of Drought**

Fortunately, there is no severe history of drought within the City of El Monte. Although there is no evidence of a drought having a significant impact on the City at the current time, California as a whole has experienced a serious drought since 2012.

*** ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2**

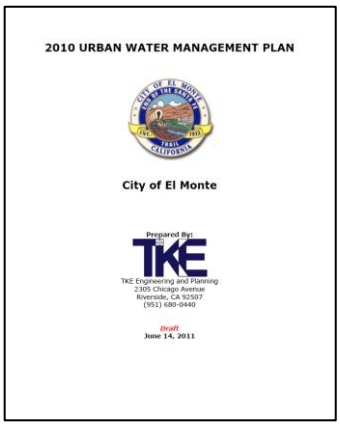
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

Drought Threat

The region's Mediterranean climate makes it especially susceptible to variations in rainfall. Though the potential risk to El Monte is in no way unique, severe water shortages could have a bearing on the economic well-being of the community. Comparison of climate (rainfall) records from Los Angeles with water well records beginning in 1930 from the San Gabriel Valley indicates the existence of wet and dry cycles on a 10-year scale as well as for much longer periods. The climate record for the Los Angeles region beginning in 1890 suggests drying conditions over the last century. With respect to the present day, climate data also suggests that the last significant wet period was the 1940s. Well level data and other sources seem to indicate the historic high groundwater levels (reflecting recharge from rainfall) occurred in the same decade. Since that time, rainfall (and groundwater level trends) appears to be in decline. This slight declining trend, however, is not believed to be significant. Climatologists compiled rainfall data from 96 stations in the State that spanned a 100-year period between 1890 and 1990. An interesting note is that during the first 50 years of the reporting period, there was only one year (1890) that had more than 35 inches of rainfall, whereas the second 50 year period recording of 5 year intervals (1941, 1958, 1978, 1982, and 1983) that exceeded 35 inches of rainfall in a single year. The year of maximum rainfall was 1890 when the average annual rainfall was 43.11 inches. The second wettest year on record occurred in 1983 when the State's average was 42.75 inches.

The driest year of the 100-year reported in the study was 1924 when the State's average rainfall was only 10.50 inches. The region with the most stations reporting the driest year in 1924 was the San Francisco Bay area. The second driest year was 1977 when the average was 11.57 inches. The most recent major drought (1987 to 1990) occurred at the end of a sequence of very wet years (1978 to 1983). The debate continues whether "global warming" is occurring, and the degree to which global climate change will have an effect on local micro-climates. The semi-arid southwest is particularly susceptible to variations in rainfall. A study that documented annual precipitation for California since 1600 from reconstructed tree ring data indicates that there was a prolonged dry spell from about 1755 to 1820 in California. Fluctuations in precipitation could contribute indirectly to a number of hazards including wildfire and the availability of water supplies.

Local Conditions


2010 URBAN WATER MANAGEMENT PLAN

City of El Monte

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Draft
June 14, 2011

In 2010, the City of El Monte prepared an update to its 2005 Urban Water Management Plan (UWMP). The UWMP includes an extensive analysis of the water consumption needs and capacities within the service area of the City. The Plan was prepared in accordance with the California Urban Water Management Planning Act which became effective on January 1, 1985. The Act requires each urban water supplier, proving water to more than 3,000 customers or supplying more than 3,000 acre-feet of water per year, to prepare and adopt an Urban Water Management Plan and to review and update its Plan every five years. The primary objective of the Plan is to demonstrate conservation and efficient use of urban water supplies to ensure sufficient water supplies will be available for future beneficial use. The Plan reviews the activities of the City of El Monte as a retail water supplier and describes the operations of the City's management in achieving the maximum practicable conversation and efficient use of local water resources.

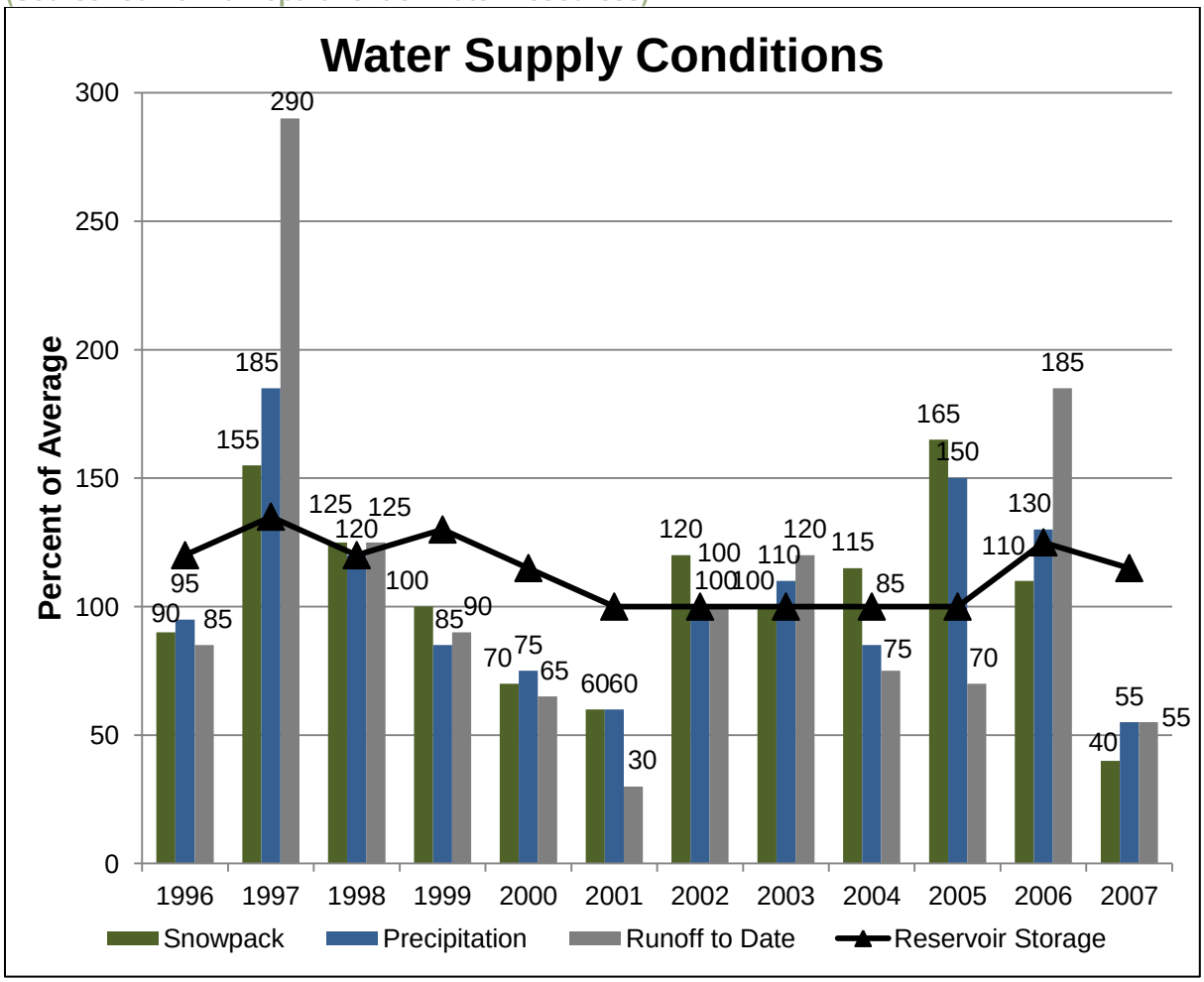
According to the Plan, the City produces groundwater from its four active wells (Wells 2A, No. 10, No. 12, and No. 13) in the Main Basin. Two inactive wells, Well 3 and Well 4, are permitted by the County's Department of Public Health for "Standby" operation due to high levels of nitrates, and would only be used in an emergency. The City's wells have pumping capabilities ranging from about 900 gallons per minute (gpm) to about 3,000 gpm. The total capacity of the City's wells is about 9,500 gpm (or about 14,000 acre-feet per year).

The Plan includes an extensive list of Water Reduction Use Measures. Those are adopted into the Mitigation Plan and referenced in the Mitigation Actions Matrix.

General Situation

Figure: Water Supply Conditions below illustrates several indicators commonly used to evaluate California water conditions. The percent of average values are determined for measurement sites and reservoirs in each of the State's ten major hydrologic regions. Snow pack is an important indicator of runoff from Sierra Nevada watersheds, the source of much of California's developed water supply.

Figure: Water Supply Conditions
(Source: California Department of Water Resources)



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 multiyear period. There is no universal definition of when a drought begins or ends. Impacts of drought are typically felt first by those most reliant on annual rainfall: ranchers engaged in dry land grazing, rural residents relying on wells in low-yield rock formations, or small water systems lacking a reliable source. Criteria used to identify statewide drought conditions do not address these localized impacts. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

Types of Drought

There are four different ways that drought can be defined:
(1) Meteorological - a measure of departure of precipitation from normal. Due to climatic differences what is considered a drought in one location may not be a drought in another location.
(2) Agricultural - refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
(3) Hydrological - occurs when surface and subsurface water supplies are below normal.
(4) Socioeconomic - refers to the situation that occurs when physical water shortage begins to affect people.

Historical California Droughts

A significant drought, reported by many of the ranchers in southern California, occurred in 1860. The great drought of the 1930s, coined the "Dust Bowl," was geographically centered in the Great Plains yet ultimately affected water shortages in California. The drought conditions in the plains resulted in a large influx of people to the west coast. Approximately 350,000 people from Arkansas and Oklahoma immigrated mainly to the Great Valley of California. As more people moved into California, including Los Angeles County increases in intensive agriculture led to overuse of the Santa Ana River watershed and groundwater resulting in regional water shortages. Several bills have been introduced into Congress in an effort to mitigate the effects of drought. In 1998, President Clinton signed into law the National Drought Policy Act, which called for the development of a national drought policy or framework that integrates actions and responsibilities among all levels of government. In addition, it established the National Drought Policy Commission to provide advice and recommendations on the creation of an integrated federal policy. The most recent bill introduced into Congress was the National Drought Preparedness Act of 2003, which established a comprehensive national drought policy and statutorily authorized a lead federal utility for drought assistance. Currently there exists only an ad-hoc response approach to drought unlike other disasters (e.g., hurricanes, floods, and tornadoes) which are under the purview of FEMA.

Droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. The 1929-34 droughts 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. California's most recent multi-year droughts occurred between 1987-92 and 2006-2010.

The Long-term Climatic Viewpoint

The historical record of California hydrology is brief in comparison to geologically modern climatic conditions. The following sampling of changes in climatic conditions over time helps put California's twentieth century droughts into perspective. Most of the dates shown below are necessarily approximations.

Not only must the climatic conditions be inferred from indirect evidence, but the onset or extent of changed conditions may vary with geographic location. Readers interested in the subject of paleo-climatology are encouraged to seek out the extensive body of popular and scientific literature on this subject.

Past California Droughts

The historical record of California hydrology is brief in comparison to the time period of geologically modern climatic conditions. The following samplings of changes in climatic and hydrologic conditions help put California's twentieth century droughts into perspective, by illustrating the variability of possible conditions. Most of the dates shown below are approximations, since the dates must be inferred from indirect sources.

11,000 years before present

Beginning of Holocene Epoch- Recent time, the time since the end of the last major glacial epoch.

6,000 years before present

Approximate time when trees were growing in areas now submerged by Lake Tahoe. Lake levels were lower then, suggesting a drier climate.

900-1300 A.D. (Approximate)

The Medieval Warm Period, a time of warmer global average temperatures. The Arctic ice pack receded, allowing Norse settlement of Greenland and Iceland. The Anasazi civilization in the Southwest flourished, its irrigation systems supported by monsoonal rains.

1300-1800 A.D. (approximate)

The Little Ice Age, a time of colder average temperatures. Norse colonies in Greenland failed near the start of the time period, as conditions became too cold to support agriculture and livestock grazing. The Anasazi culture began to decline about 1300 and had vanished by 1600, attributed in part to drought conditions that made agriculture infeasible.

Mid - 1500s A.D.

Severe, sustained drought throughout much of the continental U.S., according to dendrochronology. Drought suggested as a contributing factor in the failure of European colonies at Parris Island, South Carolina and Roanoke Island, North Carolina.

1850s A.D.

Sporadic measurements of California precipitation began.

1890s A.D.

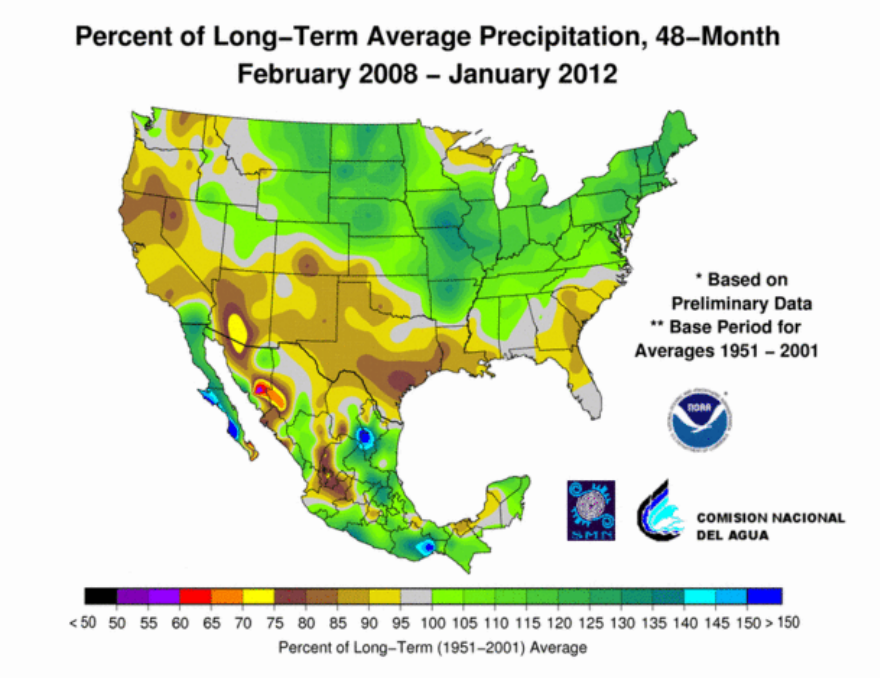
Long-term stream flow measurements began at a few California locations. Of the many varied indexes used to measure drought, the "Palmer Drought Severity Index" (PDSI) is the most

commonly used drought index in the United States. Developed by meteorologist Wayne Palmer, the PDSI is used to measure dryness based on recent temperature compared to the amount of precipitation. It utilizes a number range, 0 as normal, drought shown in terms of minus numbers, and wetness shown in positive numbers. The PDSI is most effective at analyzing long-range drought forecasts or predications. Thus, the PDSI is very effective at evaluation trends in the severity and frequency of prolonged periods of drought, and conversely wet weather. The National Oceanic and Atmospheric Administration (NOAA) publish weekly Palmer maps, which are also used by other scientists to analyze the long-term trends associated with global warming and how this has affected drought conditions.

The University of Nebraska-Lincoln has published many of these Palmer Drought Index maps analyzing trends over the past one hundred years (National Drought Mitigation Center 2005; Figure I). In coastal southern California, from 1895 to 1995, severe droughts occurred ten to 15 percent of the time. From 1990 to 1995, severe droughts occurred ten to 20 percent of the time and as recently as 1989, a severe drought was documented that lasted for six years. More recently, between 1999 and 2004, a six-year drought on the Colorado River basin has resulted in a drawdown of Colorado River water storage by more than 50 percent. Based on these trends, severe droughts can readily occur in southern California. According to the California Natural Resources Conservation Service (NRCS), the current drought in southern California has caused extensive devastation to forests in the mountains of San Bernardino, San Jacinto and Palomar Mountains. Drought weakens trees, making them susceptible to infestation by bark beetles. In turn, dry vegetation and beetle-infested trees are more susceptible to fire than healthy forests.

Map: Percent of Long Term Average Precipitation is the most current snapshot of drought conditions across the U.S. It is provided by NOAA's Climate Prediction Center.

Map: Percent of Long Term Average Precipitation
(Source: NOAA Climate Prediction Center)



Vulnerability

What is Susceptible to Drought?

Disastrous drought damage could be sustained to parks, landscaping and grounds around commercial and residential facilities, as well as to various plant and animal species, which depend on a delicate meteorological balance to survive. Detrimental drought damage could also impact various plant and animal species, which depend on a delicate meteorological balance to survive. The threat to the human population could also be significant depending on the severity of the drought. Historically, Southern California populations have been respectful of the need to conserve water during periods of drought. However, these efforts have required only minor sacrifices of discretionary activities such as washing of cars, etc.

Simply put, nearly every functioning process within the confines of the City is dependent on water. That includes infrastructure, private homes and businesses, places of employment, industry, and so forth.

Life and Property

Based on changes in weather cycles and recent legal decisions concerning water rights ownership, the likelihood of future drought conditions is increasing.

Utilities

As mentioned above, every functioning process within the City is dependent on water. The creation and distribution of vital utilities could be significantly impacted by a long-term drought.

Impact of Drought in City of El Monte*

Based on the risk assessment, it is evident that drought events continue to have potentially devastating economic impacts to certain areas of the City.

Impacts that are not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life
- ✓ Disruption of and damage to public infrastructure
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Fire Damage
- ✓ Economic cost of Forest Management

*** ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3**

B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

PART 3: MITIGATION STRATEGIES

Mitigation Strategies

Overview of Mitigation Strategy

As the cost of damage from natural disasters continues to increase nationwide, the City of El Monte recognizes the importance of identifying effective ways to reduce vulnerability to disasters. Mitigation Plans assist communities in reducing risk from natural hazards by identifying resources, information and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the City.

The plan provides a set of action items to reduce risk from natural hazards through education and outreach programs, and to foster the development of partnerships. Further, the plan provides for the implementation of preventative activities, including programs that restrict and control development in areas subject to damage from natural hazards.

The resources and information within the Mitigation Plan:

1. Establish a basis for coordination and collaboration among agencies and the public in the City of El Monte;
2. Identify and prioritize future mitigation projects; and
3. Assist in meeting the requirements of federal assistance programs

The Mitigation Plan is integrated with other City plans including the City of El Monte Emergency Operations Plan, the General Plan and its associated Environmental Impact Report, the Capital Improvement Plan, as well as department specific standard operating procedures.

Mitigation Measure Categories

Following is FEMA's list of mitigation categories. The activities identified by the Team are consistent with the six broad categories of mitigation actions outlined in FEMA publication 386-3 *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies*.

- ✓ **Prevention:** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
- ✓ **Property Protection:** Actions that involve modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- ✓ **Public Education and Awareness:** Actions to inform and educate citizens, property owners, and elected officials about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
- ✓ **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses preserve or restore the functions of natural systems. Examples include sediment and

erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- ✓ **Emergency Services:** Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
- ✓ **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, retaining walls, and safe rooms.

Planning Approach

The four-step planning approach outlined in the FEMA publication, *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies* (FEMA 386-3) was used to develop this plan:

FEMA defines **Goals** as general guidelines that explain what you want to achieve. They are usually broad policy-type statements, long-term, and represent global visions.

FEMA defines **Mitigation Activities** as specific actions that help you achieve your goals and objectives.

✓ **Develop mitigation goals and objectives -** The risk assessment (hazard characteristics, inventory, and findings), along with municipal policy documents, were utilized to develop mitigation goals and objectives.

✓ **Identify and prioritize mitigation actions -** Based on the risk assessment, goals and objectives, existing literature/resources, and input from participating entities, mitigation activities were identified for each hazard. Activities were 1) qualitatively evaluated against the goals and objectives, and other criteria; 2) identified as high, medium, or low priority; and 3) presented in a series of hazard-specific tables.

✓ **Prepare implementation strategy -** Generally, high priority activities are recommended for implementation first. However, based on community needs and goals, project costs, and available funding, some medium or low priority activities may be implemented before some high priority items.

✓ **Document mitigation planning process -** The mitigation planning process is documented throughout this plan.

Goals*

The Team developed mitigation goals to avoid or reduce long-term vulnerabilities to hazards. These general guidelines clarify desired outcomes.

The goals are based on the risk assessment and Team input, and represents a long-term vision for hazard reduction or enhanced mitigation capabilities. They are compatible with community needs and goals expressed in other planning documents prepared by the City.

Each goal is supported by mitigation action items. The Team developed these action items through its knowledge of the local area, risk assessment, review of past efforts, identification of mitigation activities, and qualitative analysis. The five mitigation goals and descriptions are listed below.

*** ELEMENT C. MITIGATION STRATEGY | C3**

C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))

Protect Life and Property

Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from natural, human-caused, and technological hazards.

Improve hazard assessment information to make recommendations for avoiding new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural, human-caused, and technological hazards.

Enhance Public Awareness

Develop and implement education and outreach programs to increase public awareness of the risks associated with natural, human-caused, and technological hazards.

Provide information on tools; partnership opportunities, and funding resources to assist in implementing mitigation activities.

Preserve Natural Systems

Support management and land use planning practices with hazard mitigation to protect life.

Preserve, rehabilitate, and enhance natural systems to serve hazard mitigation functions.

Encourage Partnerships and Implementation

Strengthen communication and coordinate participation with public agencies, citizens, non-profit organizations, business, and industry to support implementation.

Encourage leadership within the City and public organizations to prioritize and implement local and regional hazard mitigation activities.

Strengthen Emergency Services

Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.

Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.

Coordinate and integrate hazard mitigation activities where appropriate, with emergency operations plans and procedures.

The Team also developed hazard-specific mitigation goals, which appear later in this Section.

How are the Mitigation Action Items Organized?

The action items are a listing of activities in which City agencies and citizens can be engaged to reduce risk. Each action item includes an estimate of the timeline for implementation.

The action items are organized within the following Table: Mitigation Actions Matrix which lists all of the multi-hazard (actions that reduce risks for more than one specific hazard) and hazard-specific action items included in the mitigation plan. Data collection and research and the public participation process resulted in the development of these action items. The Matrix includes the following information for each action item:

Funding Source/Planning Mechanism

Funding Source

The action items can be funded through a variety of sources, possibly including: operating budget/general fund, development fees, Community Development Block Grant (CDBG), Hazard Mitigation Grant Program (HMGP), other Grants, private funding, Capital Improvement Plan, and other funding opportunities.

Planning Mechanism

Many of the action items will be implemented through the powers of existing regulatory ordinances and policies. Among those are the City's General Plan, Zoning Ordinance, Building Code, and other Administrative Documents.

Coordinating Organization

The Mitigation Actions Matrix assigns primary responsibility for each of the action items. The hierarchies of the assignments vary – some are positions, others departments, and other Teams. The primary responsibility for implementing the action items falls to the entity shown as the "Coordinating Organization". The coordinating organization is the agency with regulatory responsibility to address hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of or responsible for implementing activities and programs.

Plan Goals Addressed

The plan goals addressed by each action item are included as a way to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins.

The plan goals are organized into the following five areas:

- ✓ Protect Life and Property
- ✓ Enhance Public Awareness
- ✓ Preserve Natural Systems
- ✓ Encourage Partnerships and Implementation
- ✓ Strengthen Emergency Services

Comments

Department representatives provided status updates on each of the mitigation action items identified in the 2007 Plan. Gathered information is posted in the "Comments" column using the following categories: New, Revised, Completed, Deleted, and Deferred.

*Ranking Priorities**

To assist with implementing the Hazard Mitigation Plan, the Planning Team adopted the following process for ranking mitigation action items. Designations of "High", "Medium", and "Low" priority have been assigned to each action item using the following criteria:

Does the Action:

- solve the problem?
- address Vulnerability Assessment?
- reduce the exposure or vulnerability to the highest priority hazard?
- address multiple hazards?
- benefits equal or exceed costs?
- implement a goal, policy, or project identified in the General Plan or Capital Improvement Plan?

Can the Action:

- be implemented with existing funds?
- be implemented by existing state or federal grant programs?
- be completed within the 5-year life cycle of the LHMP?
- be implemented with currently available technologies?

Will the Action:

- be accepted by the community?
- be supported by community leaders?
- adversely impact segments of the population or neighborhoods?
- require a change in local ordinances or zoning laws?
- positive or neutral impact on the environment?
- comply with all local, state and federal environmental laws and regulations?

Is there:

- sufficient staffing to undertake the project?
- existing authority to undertake the project?

During the prioritization meeting of the Planning Team, department representatives were provided worksheets for each of their assigned action items. Answers to the criteria above determined the priority according to the following scale.

- 1-6 = Low priority
- 7-12 = Medium priority
- 13-18 = High priority

*** ELEMENT C. MITIGATION STRATEGY | C5**

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

Mitigation Actions Matrix*†‡§**

Following is Table: Mitigation Actions Matrix, which identifies the existing and future mitigation activities developed by the Team.
** Note: all of the original action items indicate "revised" in the column labeled 2016 Comments and Status because categories (columns) were added: Funding Source, Ranking, Planning Mechanism or the Action Item itself was revised, the Coordinating Organization was renamed or reassigned, or the Timeline as changed.*

*** ELEMENT C. MITIGATION STRATEGY | C1**

C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))

† ELEMENT C. MITIGATION STRATEGY | C4

C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))

‡ ELEMENT C. MITIGATION STRATEGY | C5

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

§ ELEMENT D. MITIGATION STRATEGY | D2

D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))

**** ELEMENT D. MITIGATION STRATEGY | D3**

D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))

Item	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source - (* = not yet identified, CIP=Capital Improvement Program, GF = General Fund, GR = Grants)	Ranking - (L=Low, M=Med, H=High, n/a=not applicable)	Planning Mechanism - (GP=General Plan, GF=General Fund, ZO=Zoning Ordinance, BC=Building Code)	2017 Comments and Status – Completed, Revised*, Deleted, New, Deferred, and Notes
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
Multi-Hazard Action Items												
MH-1	Integrate the goals and action items from the El Monte Natural Hazards Mitigation Plan into existing regulatory documents and programs, where appropriate.	Economic Development Department	Ongoing				X		GF	H	GP	Revised
MH-2	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Police Department, Parks, Recreation, and Community Services	Ongoing				X		GF	H	GF	Revised, 1033 funding (US military surplus)
MH-3	Identify, improve, and sustain collaborative programs focusing on the real estate and insurance industries, public and private sector organizations, and individuals to avoid activity that increases risk to natural hazards.	Community Services Department, Community Development Department, City Manager's Office	Ongoing	X	X		X		GF	M	GF	Revised
MH-4	Develop inventories of City-owned critical and essential at-risk buildings and infrastructure and prioritize appropriate mitigation activities during the	Economic Development Department - Community Development	2 Years	X			X		GF	H	GF	Revised

Item	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source - (* = not yet identified, CIP=Capital Improvement Program, GF = General Fund, GR = Grants)	Ranking - (L=Low, M=Med, H=High, n/a=not applicable)	Planning Mechanism - (GP=General Plan, GF=General Fund, ZO=Zoning Ordinance, BC=Building Code)	2017 Comments and Status – Completed, Revised*, Deleted, New, Deferred, and Notes
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	next update to the Mitigation Plan.											
MH-5	Use technical knowledge of natural ecosystems and events to link natural resource management and land use organizations to mitigation activities and technical assistance.	Economic Development Department	Complete			X						Note: General Plan was updated in 2011.
MH-6	Develop a debris management plan for multi-hazard events.	Public Works Department – Environmental Services	2 years				X	X	GR	M	n/a	Deferred – lack of staff and funding
MH-7	Monitor and publicize the effectiveness of mitigation initiatives implemented in the community.	Police Department	Ongoing	X	X		X		GF	M	GF	Revised
MH-8	With the assistance of the American Red Cross, establish emergency sheltering and evacuation procedures.	Parks, Recreation, and Community Services, Police Department	Complete	X	X		X					Completed
MH-9	Educate community residents and city staff about the natural hazards prevalent to the region.	Public Information, Police Department	1 year	X	X		X		GF	H	GF	Revised. Note: Cal OES myhazards.com, EBlast

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
												to staff
MH-10	Utilize a street fair to distribute preparedness kits to community residents.	Community Services	Ongoing	X	X		X		GF	H	GF	Revised, Note: Began in 2013
MH-11	Provide the County Emergency Preparedness Guidebook to hotels to be available in each room for visitor's information.	Government Access TV	Ongoing	X	X		X		GF	H	GF	Revised, Note: Began in 2012
MH-12	Identify opportunities for partnering with citizens, private contractors, and other jurisdictions to increase availability of equipment, supplies, and manpower in order to increase the efficiency of response efforts. *Note: focus on developing a resource list.*	Economic Development Department – Community Development	Ongoing	X	X		X		GF	H	GF	Revised, Note: Began in 2010
MH-13	Maintain documentation of emergency evacuation routes. Also, integrate with other regulatory documents.	Economic Development Department – Community Development	Ongoing					X	GF	H	GF	Revised, Note: General Plan Update 2011, EOP Update

Item	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source - (* = not yet identified, CIP=Capital Improvement Program, GF = General Fund, GR = Grants)	Ranking - (L=Low, M=Med, H=High, n/a=not applicable)	Planning Mechanism - (GP=General Plan, GF=General Fund, ZO=Zoning Ordinance, BC=Building Code)	2017 Comments and Status – Completed, Revised*, Deleted, New, Deferred, and Notes
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
												2014
MH-14	Routine and proactive maintenance of community's infrastructure will be done to minimize the potential for system failure. Example: Clearing of storm drains in advance of major storm.	Public Works Department	Ongoing	X		X		X	GF	H	GF	Revised
MH-15	Determine temporary protection measures to City-owned buildings; install plastic sheeting on roofs, cover exterior openings such as windows or doors, draining trapped water in ceilings or draining accumulated flood waters, temporary shoring to avoid imminent building collapse or damage.	Public Works Department	Ongoing	X			X		GF	H	GF	Revised
MH-16	Allocate City resources and assistance to mitigation projects when possible.	All Departments	Ongoing				X		GF, GR	H	GP, GF	Revised
MH-17	Conduct site visit review to determine reconstruction, repair	Economic Development Department – Community	Ongoing	X			X		GF	H	GF	Revised

Item	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source - (* = not yet identified, CIP=Capital Improvement Program, GF = General Fund, GR = Grants)	Ranking - (L=Low, M=Med, H=High, n/a=not applicable)	Planning Mechanism - (GP=General Plan, GF=General Fund, ZO=Zoning Ordinance, BC=Building Code)	2017 Comments and Status – Completed, Revised*, Deleted, New, Deferred, and Notes
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	and reconstruction of damaged structures.	Development										
MH-18	Inventory alternative firefighting water sources and encourage the development of additional sources.	Economic Development Department - Community Development, Los Angeles County Fire Department	Ongoing	X			X		GF	H	GF, GP	Revised
MH-19	Conduct annual functional exercise in the City's Emergency Operations Center. Exercise should be coordinated with state-wide ShakeOut exercise.	Police Department - Emergency Coordinator	Annual	X			X	X	GF, GR	H	GF	Revised
MH-20	Maintain resource centers in City buildings. Display racks will include the Emergency Preparedness Guidebook, FEMA's Are You Ready, the Special Needs Survey, brochures on disaster supplies kits and plans, etc.	Police Department - Emergency Coordinator, Parks, Recreation, and Community Services	2 years	X	X				GF	M	GF	Revised
MH-21	Every three years review and update City's Emergency Operations Plan. Include	Police Department - Emergency Coordinator						X	GF, GR	H	GF	Revised, Note: Last EOP

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	participation of all Departments/Divisions.											Update completed in 2014
MH-22	Hold workshops about hazards, mitigation, and preparedness family disaster planning with the boys and girls clubs, scouting organizations, County churches, PTA, Red Cross Youth Corps, VOAD, Chamber of Commerce, Rotary, Kiwanis, and Lions Clubs.	Police Department - Emergency Coordinator	Ongoing	X	X		X	X	GF	M	GF	Revised
MH-23	Utilize the media for the distribution and publication of hazard information.	Police Department	Ongoing	X	X		X		GF	M	GF	Revised
MH-24	Encourage school districts to provide seasonal disaster preparedness literature for students to take home to their families.	Police Department - Emergency Services Coordinator	Ongoing	X	X			X	GF	H	GF	Revised
MH-25	Distribute FEMA's Emergency Management Guide for Businesses and Industry and Preparing Your Business for the Unthinkable brochure to the local	Police Department - Emergency Services Coordinator	Ongoing	X	X		X	X	GF, GR	M	GF	Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	Chamber of Commerce.											
MH-26	Create displays for children's programs that teach safety. Examples of information to be used would be similar to that on the FEMA for Kids CD, the Sparky Fire Safety Program, and/or the American Red Cross's Masters of Disasters program. These displays can be used in conjunction with "Safetyville", the library's children's section, etc.	Parks, Recreation and Community Services	1-5 years	X	X			X	GF, GR	M	GF	Revised
MH-27	Partner with other agencies such as the Hospital, County Social Services, the Health Department etc., to include the Website address as a link on their websites.	Information Technology		X	X		X		GF	H	GF	Completed
MH-28	Encourage the American Red Cross will hold a variety of courses, including: CPR, Basic First Aid, Introduction to Disaster Services, Mass Care, Shelter	Parks, Recreation and Community Services	Ongoing	X	X				GF	H	GF	Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	Operations, babysitting, Healthcare Provider, pet first-aid and others at the Red Cross Office and at other locations throughout the City.											
MH-29	Maintain compliance with the International Building Code.	Economic Development Department - Building	Ongoing	X				X	GF	H	GP	Revised
MH-30	Ensure compliance of regulations that require that any building that has been substantially damaged, for any reason, must be brought into compliance with the current International Building Code.	Community Development (Building Department)	Ongoing	X				X	GF	H	GF	Revised
MH-31	Ensure repairs or construction funded by Federal disaster assistance conform to applicable codes and standards.	Economic Development Department - Building	Ongoing	X				X	GF	H	GF	Revised
MH-32	Monitor trees and branches in public areas at risk of breaking or falling in wind. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines or other significant structures or critical	Public Works Department	Ongoing	X				X	CIP, GF	G	CIP, GF	Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	facilities in the community. Priority should be given to diseased trees.											
MH-33	Provide adequate and consistent enforcement of ordinances and codes.	Economic Development Department - Building	Ongoing	X			X	X	GF	H	GF	Revised
MH-34	Integrate the goals and action items from the county Natural Hazard Mitigation Plan into existing regulatory documents and programs, where appropriate.	City Manager	Ongoing	X	X				GF	H	GF	Revised
MH-35	Work with government entities to identify bridges at risk from flood or earthquake hazards, identify enhancements, and implement projects needed to reduce the risks.	Economic Development Department - Community Development	Ongoing	X		X	X	X	GF	H	GF	Revised
MH-36	Improve communication between city, county, and Caltrans road departments to proactively work together to prioritize and identify strategies to deal with road problems.	Economic Development Department - Community Development	Ongoing	X	X	X	X	X	GF	H	GF	Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
MH-37	Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.	Economic Development Department - Community Development, Red Cross, Schools, Police Department, Fire Department, Public Works Department	Ongoing	X	X	X	X	X	GF	H	GF	Revised
MH-38	Develop Pre-Disaster Recovery Plan. Review priorities for restoration of the community's infrastructure and vital public facilities following a disaster.	Economic Development Department - Community Development and Building, Fire Department, Police Department, Engineering Department	Ongoing	X			X	X	GF	H	GF	Revised
MH-39	Send staff to ATC 20 course in order to be qualified for conducting safety assessments following a disaster. The training teaches attendees how to determine if structures are safe to enter and/or reoccupy.	Community Development (Building Department)	Ongoing	X					GF	H	GF	Revised
Earthquake Action Items												
EQ-1	Integrate new earthquake hazard mapping data from the State of	Community Development Department	Ongoing	X			X		GF	H	GF	Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	California applicable to the City of El Monte into future Hazard Mitigation Plan and General Plan updates.											
EQ-2	Incorporate the Regional Earthquake Transportation Evacuation Routes developed by the Disaster Management Area Coordinators into appropriate planning documents.	Economic Development Department – Community Development	Ongoing					X	GF	H	GF	Revised
EQ-3	Identify funding sources for City-owned structural and nonstructural retrofitting of structures that are identified as seismically vulnerable.	Economic Development Department - Community Development	Ongoing	X	X				GF	H	GF	Revised
EQ-4	Encourage purchase of earthquake hazard insurance.	Community Development Department	1-5 years	X	X				GF	H	GF	Revised
EQ-5	Encourage seismic strength evaluations of critical facilities in the City to identify vulnerabilities of public infrastructure and critical facilities. Goal is to meet current seismic standards for all City-owned infrastructure and critical	Hazard Mitigation Advisory Committee	5 years	X	X				GF	H	GF	Revised

Item	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source - (* = not yet identified, CIP=Capital Improvement Program, GF = General Fund, GR = Grants)	Ranking - (L=Low, M=Med, H=High, n/a=not applicable)	Planning Mechanism - (GP=General Plan, GF=General Fund, ZO=Zoning Ordinance, BC=Building Code)	2017 Comments and Status – Completed, Revised*, Deleted, New, Deferred, and Notes
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	facilities.											
EQ-6	Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.	Police Department – Emergency Services Coordinator, Parks, Recreation and Community Services	Ongoing	X	X		X	X				Revised - Moved from Multi-Hazard Mitigation Action Items
Flood Action Items												
FLD-1	Recommend revisions to requirements for development within the floodplain, where appropriate.	Community Development Department	1-2 years	X								Completed – see item below
FLD-2	Enhance data and mapping information within the City and identify and map flood-prone areas outside of designated floodplains.	Economic Development Department - Community Development	3 years (as funding allows)	X								Completed
FLD-3	Acquire funding and conduct Storm Drain Analysis for the entire City including identification of all surface water drainage	Economic Development Department - Community Development	5 years	X					GF	H	GF	Revised

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				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	obstructions.											
Windstorm Action Items												
WS-1	Increase public awareness of windstorm threats.	Police Department	Ongoing	X	X				GF	H	GF	Revised
WS-2	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Community Development (Planning Department)	Ongoing	X			X	X	GF	H	GF	Revised – Moved from Multi-Hazard Mitigation Action Items
Dam Inundation Action Items												
DAM-1	Continue to maintain communications with Army Corps of Engineers concerning the condition and status of repairs to both the Santa Fe Dam and Reservoir and the Whittier Narrows Reservoir.	Police Department	Ongoing	X	X	X	X	X	GF	H	GF	New
Drought Action Items												
DR-1	Encourage drought tolerant landscaping for new development	Community Development Department	Ongoing	X	X	X	X	X	GF	H	ZO, GP	New

Item	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source - (* = not yet identified, CIP=Capital Improvement Program, GF = General Fund, GR = Grants)	Ranking - (L=Low, M=Med, H=High, n/a=not applicable)	Planning Mechanism - (GP=General Plan, GF=General Fund, ZO=Zoning Ordinance, BC=Building Code)	2017 Comments and Status – Completed, Revised*, Deleted, New, Deferred, and Notes
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	in the City.											
DR-2	Implement the City's 2010 Water Management Plan water reduction measures: (A) Water survey programs for single-family residential and multi-family customers. (B) Residential plumbing retrofit. (C) System water audits, leak detection, and repair. (D) Metering with commodity rebates for all new connections and retrofit of existing connections. (E) Large landscape conservation programs and incentives. (F) High-efficiency washing machine rebate programs. (G) Public information programs. (H) School education programs. (I) Conservation programs for commercial, industrial, and institutional accounts. (J) Wholesale agency programs.	Community Development Department	Ongoing	X	X	X	X	X	GF	H	ZO, GP	New

Item	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source - (* = not yet identified, CIP=Capital Improvement Program, GF = General Fund, GR = Grants)	Ranking - (L=Low, M=Med, H=High, n/a=not applicable)	Planning Mechanism - (GP=General Plan, GF=General Fund, ZO=Zoning Ordinance, BC=Building Code)	2017 Comments and Status – Completed, Revised*, Deleted, New, Deferred, and Notes
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services				
	(K) Conservation pricing. (L) Water conservation coordinator. (M) Waster waste prohibition. (N) Residential ultra-low flush toilet replacement programs. Note: additional information about these measures can be found in the City's 2010 Urban Water Management Plan.											

Plan Maintenance

The Plan Maintenance section of this document details the formal process that will ensure that the Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually while producing a plan update every five years. This section describes how the City will integrate public participation throughout the plan maintenance process.

Method and Scheduling of Plan Implementation*

The Planning Team that was involved in research and writing of the Plan will also be responsible for implementation. The Planning Team will be led by the Chair of the Planning Team and will be referred to as the Local Mitigation Officer.

	Year 1	Year 2	Year 3	Year 4	Year 5
Monitoring	X	X	X	X	X
Evaluating					X
Internal Planning Team Evaluation	X	X	X	X	X
Cal OES and FEMA Evaluation					X
Updating					X

Monitoring and Implementing the Plan†

Plan Adoption

Adoption of the Mitigation Plan by the City's governing body is one of the prime requirements for approval of the plan. Once the plan is completed, the City Council will be responsible for adopting the Mitigation Plan. The governing body has the responsibility and authority to promote sound public policy regarding hazards. The local agency governing body will have the authority to periodically update the plan as it is revised to meet changes in the hazard risks and exposures in the City. The approved Mitigation Plan will be significant in the future growth and development of the City.

Once the plan has been adopted, the City Manager will be responsible for submitting it to the State Hazard Mitigation Officer at California Office of Emergency Services (Cal OES). Cal OES will then submit the plan to the Federal Emergency Management Agency (FEMA) for review and approval. This review will address the requirements set forth in 44 C.F.R. Section 201.6 (Local Mitigation Plans). Upon acceptance by FEMA, the City of El Monte will gain eligibility for Hazard Mitigation Grant Program funds.

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* **ELEMENT A: PLANNING PROCESS | A6**

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))

† **ELEMENT A: PLANNING PROCESS | A6**

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))

Convener

The City Council will adopt the Mitigation Plan and the Planning Team will take responsibility for plan maintenance and implementation. The City Manager, will serve as a Convener to facilitate the Planning Team meetings, and will assign tasks such as updating and presenting the Plan to the members of the Planning Team. Plan implementation and evaluation will be a shared responsibility among all of the Team members. The City Manager will have authority to prepare and approve future amendments to the Mitigation Plan.

Planning Team

The Team will be responsible for coordinating implementation of plan action items and undertaking the formal review process. The convener will assign representatives from City departments, divisions, and agencies, including, but not limited to, the current Planning Team.

In order to make the Team as broad and useful as possible, the City Manager may choose to involve other relevant organizations and agencies in hazard mitigation. These additional appointments could include:

- ✓ A representative from the American Red Cross
- ✓ A representative from a county government emergency response agency

The Team will meet no less than semi-annually. Meeting dates will be scheduled once the final Team has been established. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the mitigation plan.

*Implementation through Existing Programs**

The City of El Monte addresses statewide planning goals and legislative requirements through its General Plan, Capital Improvement Program (CIP), and City Building and Safety Codes the Mitigation Plan provides a series of recommendations - many of which are closely related to the goals and objectives of existing planning programs. The City of El Monte will implement the recommended mitigation action items through existing programs and procedures.

The City of El Monte Building and Safety Department is responsible for adhering to the State of California's Building and Safety Codes. In addition, the Team will work with other agencies at the state level to review, develop and ensure Building and Safety Codes are adequate to mitigate or prevent damage by hazards. This is to ensure that life-safety criteria are met for new construction.

Some of the goals and action items in the Mitigation Plan may be achieved through activities recommended in the CIP. Various city departments develop the CIP and review it on an annual basis. Upon annual review of the CIP, the Team will work with the city departments

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*** ELEMENT C. MITIGATION STRATEGY | C6**

C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))

to identify areas where the Mitigation Plan action items are consistent with CIP goals and integrate them where appropriate.

Within six months of formal adoption of the Mitigation Plan, the recommendations listed above will be incorporated into the process of existing planning mechanisms at the City level. The Team meetings will provide an opportunity for members to report back on the progress made on the integration of mitigation planning elements into City planning documents and procedures.

Economic Analysis of Mitigation Projects

FEMA's approach to identifying the costs and benefits associated with hazard mitigation strategies, measures, or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis.

Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later.

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating hazards can provide decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Given federal funding, the Team will use a FEMA-approved benefit/cost analysis approach to identify and prioritize mitigation action items. For other projects and funding sources, the Team will use other approaches to understand the costs and benefits of each action item and develop a prioritized list. For more information regarding economic analysis of mitigation action items, please see Part 4: Appendix - Benefit/Cost Analysis.

Evaluating and Updating the Plan*

Formal Review Process

The Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The evaluation process includes a firm schedule and timeline, and identifies the agencies and organizations participating in plan evaluation. The Convener or designee will be responsible for contacting the Team members and organizing the annual meeting. Members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan.

The Team will review the goals and action items to determine their relevance to changing situations in the City, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The Team will also review the Risk Assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The coordinating organizations responsible for the various action items will report on the status of their projects, the success of various

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*** ELEMENT A: PLANNING PROCESS | A6**

A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))

implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised.

The Convener will assign the duty of updating the Plan to one or more of the members. The designated members will have three months to make appropriate changes to the Plan before submitting it to the Team members. The Team will also notify all holders of the City plan when changes have been made. Every five years the updated plan will be submitted to the State Hazard Mitigation Officer at the California Office of Emergency Services and the Federal Emergency Management Agency for review. The City Manager is authorized to approve future updates and amendments to the Mitigation Plan.

*Continued Public Involvement**

The City of El Monte is dedicated to involving the public directly in the continual review and updates to the Mitigation Plan. Copies of the plan will be catalogued and made available at City Hall and at the Library. The existence and location of these copies will be publicized in City newsletters and on the City website. This site will also contain an email address and phone number where people can direct their comments and concerns. A public meeting will also be held after each evaluation or when deemed necessary by the Team. The meetings will provide the public a forum in which they can express their concerns, opinions, or ideas about the Plan.

The Police Department will be responsible for using City resources to publicize the annual public meetings and maintain public involvement through the City web page, and the City Council agenda.

*** ELEMENT A: PLANNING PROCESS | A5**

A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))

PART 4: APPENDIX

Benefit/Cost Analysis

Benefit/cost analysis is a key mechanism used by the California Emergency Management Agency, the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects, and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

This appendix outlines several approaches for conducting economic analysis of hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: The Interagency Hazards Mitigation Team, State Mitigation Plan, and Federal Emergency Management Agency Publication 331, Report on Costs and Benefits of Hazard Mitigation.

This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to provide the details of economic analysis methods that can be used to evaluate local projects. It is intended to: 1) raise benefit/cost analysis as an important issue, and 2) provide some background on how economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred.

Evaluating hazard mitigation provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables.

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First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, police, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce “ripple-effects” throughout the community, greatly increasing the disaster’s social and economic consequences.

While not easily accomplished, there is value, from a public policy perspective, in assessing the positive and negative impacts from mitigation activities, and obtaining an instructive benefit/cost comparison.
Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

What are Some Economic Analysis Approaches for Mitigation Strategies?

The approaches used to identify the costs and benefits associated with hazard mitigation strategies, measures, or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis. The distinction between the two methods is the way in which the relative costs and benefits are measured. Additionally, there are varying approaches to assessing the value of mitigation for public sector and private sector activities.

Benefit/Cost Analysis

Benefit/cost analysis is used in hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoided future damages, and risk.

In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented (i.e., if net benefits exceed net costs, the project is worth pursuing). A project must have a benefit/cost ratio greater than 1 in order to be funded.

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in public sector mitigation activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still affect the public in profound ways.
Economists have developed methods to evaluate the economic feasibility of public decisions that involve a diverse set of beneficiaries and non-market benefits.

Investing in private sector mitigation activities

Private sector mitigation projects may occur on the basis of one of two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits. A building or landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

1. Request cost sharing from public agencies
2. Dispose of the building or land either by sale or demolition
3. Change the designated use of the building or land and change the hazard mitigation compliance requirement; or

4. Evaluate the most feasible alternatives and initiate the most cost effective hazard mitigation alternative

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws can be developed which require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchasers. Correcting deficiencies is expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

How Can an Economic Analysis be Conducted?

Benefit/cost analysis and cost-effectiveness analysis are important tools in evaluating whether or not to implement a mitigation activity. A framework for evaluating alternative mitigation activities is outlined below:

1. Identify the Alternatives: Alternatives for reducing risk from hazards includes structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation project assists in minimizing risk to hazards, but do so at varying economic costs.

2. Calculate the Costs and Benefits: Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate alternative. Potential economic criteria to evaluate alternatives include:

- ✓ **Determine the project cost.** This may include initial project development costs, and repair and operating costs of maintaining projects over time.
- ✓ **Estimate the benefits.** Projecting the benefits or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult to project. These considerations will also provide guidance in selecting an appropriate salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.
- ✓ **Consider costs and benefits to society and the environment.** These are not easily measured, but are assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impact of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- ✓ **Determine the correct discount rate.** Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Alternatives: Once costs and benefits have been quantified, economic analysis tools can rank the alternatives. Two methods for determining the best alternative given varying costs and benefits include net present value and internal rate of return.

- ✓ **Net present value.** Net present value is the value of the expected future returns of an investment minus the value of expected future cost expressed in today's dollars. If the net present value is greater than the project costs, the project is determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.
- ✓ **Internal Rate of Return.** Using the internal rate of return method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it is compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project.

Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk; project effectiveness; and economic, environmental, and social returns in choosing the appropriate project for implementation.

How are Benefits of Mitigation Calculated?

Economic Returns of Hazard Mitigation

The estimation of economic returns, which accrue to building or land owner as a result of hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- ✓ Building damages avoided
- ✓ Content damages avoided
- ✓ Inventory damages avoided
- ✓ Rental income losses avoided
- ✓ Relocation and disruption expenses avoided
- ✓ Proprietor's income losses avoided

These parameters are estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment are important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over a period of time.

Additional Costs from Hazards

Property owners should also assess changes in a broader set of factors that change as a result of a large natural disaster. These are usually termed "indirect" effects, but they have a very direct effect on the economic value of the owner's building or land. They are positive or negative, and include changes in the following:

- ✓ Commodity and resource prices
- ✓ Availability of resource supplies
- ✓ Commodity and resource demand changes
- ✓ Building and land values

- ✓ Capital availability and interest rates
- ✓ Availability of labor
- ✓ Economic structure
- ✓ Infrastructure
- ✓ Regional exports and imports
- ✓ Local, state, and national regulations and policies
- ✓ Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models. Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters in order to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community to reduce risk and prevent loss from hazards. Economic analysis saves time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that assist in conducting an economic analysis for hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. Many communities are looking towards developing multi-objective projects. With this in mind, opportunity rises to develop strategies that integrate hazard mitigation with projects related to watersheds, environmental planning, community economic development, and small business development, among others. Incorporating hazard mitigation with other community projects can increase the viability of project implementation.

Resources

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