June 3, 2020 | # Hazard Mitigation Plan

emergency planning consultants

City of Duarte

Q&A | ELEMENT A: PLANNING PROCESS | A1c.

Q: Does the plan identify who represented each jurisdiction? (At a minimum, it must identify the jurisdiction represented and the person's position or title and agency within the jurisdiction.) (Requirement §201.6(c)(1))

A: See **Credits** below.

Credits

Special Thanks

Hazard Mitigation Planning Team:

Agency	*Name*	*Department*	*Position*
City of Duarte	Jason Golding	Community Development	Planning Division Manager
	Amanda Hamilton	Community Development	Public Works Manager
	Gerard Batista	Community Development	Field Services Manager
	Nick Baldwin	Community Development	Associate Planner
	Brian Villalobos	Public Safety	Public Safety Services Director
	Larry Breceda	Public Safety	Public Safety Manager
Emergency Planning Consultants	Carolyn J. Harshman	Consultant	President

Acknowledgements

City of Duarte

- ✓
- ✓ Samuel Kang, Mayor
- ✓ Bryan Urias, Mayor Pro Tem
- ✓ John Fasana, Councilmember
- ✓ Margaret Finlay, Councilmember
- ✓ Toney Lewis, Councilmember
- ✓ Tzeitel Paras-Caracci, Councilmember
- ✓ Liz Reilly, Councilmember

Point of Contact

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

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Consulting Services

Emergency Planning Consultants

- ✓ Project Manager: Carolyn J. Harshman, CEM, President
- ✓ Lead Research Assistant: Alex L. Fritzler
- ✓ HAZUS/GIS: Alex L. Fritzler

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Mapping

The maps in this plan were provided by the City of Duarte, 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 Duarte 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 Content

In an effort to assist the readers and reviewers of this document, the jurisdiction has inserted "markers" emphasizing mandated content as identified in the Disaster Mitigation Act of 2000 (Public Law – 390). Following is a sample marker:

EXAMPLE

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))

A:

Table of Contents

Part I: PLANNING PROCESS

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | A1b.

Q: Does the plan list the jurisdiction(s) participating in the plan that are seeking approval? (Requirement §201.6(c)(1))

A: See **Introduction** below.

Introduction

The Hazard Mitigation Plan (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 land use planning and emergency management planning programs. This document is a federally mandated update to the City of Duarte 2014 Hazard Mitigation Plan and ensures continuing eligibility for Hazard Mitigation Grant Program (HMGP) funding.

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.

The following FEMA definitions are used throughout this plan (Source: FEMA, 2002, *Getting Started, Building Support for Mitigation Planning*, FEMA 386-1):

Hazard Mitigation – "Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards".

Planning – "The act or process of making or carrying out plans; specifically, the establishment of goals, policies, and procedures for a social or economic unit."

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:

- ✓ **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.

Hazard Land Use Policy in California

Planning for hazards should be an integral element of any City's land use planning program. All California cities and counties have General Plans (also known as Comprehensive Plans) and the implementing ordinances that are required to comply with the statewide land use planning regulations.

The continuing challenge faced by local officials and state government is to keep the network of local plans effective in responding to the changing conditions and needs of California's 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's 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. Such an analysis is found in this hazard mitigation plan.

State and Federal Partners in Hazard Mitigation

All mitigation is local and the primary responsibility for development and implementation of risk reduction strategies and policies lies with each local jurisdiction. Local jurisdictions, however, are not alone. Partners and resources exist at the regional, state and federal levels. Numerous California state agencies have a role in hazards and hazard mitigation.

Some of the key agencies include:

- ✓ 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 general 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.

Q&A | ELEMENT A: PLANNING PROCESS | A3

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

A: See **Stakeholders** below.

Stakeholders

A Hazard Mitigation Planning Team (Planning Team) consisting of department representatives from City of Duarte staff worked with Emergency Planning Consultants to create the updated Plan. ***The Planning Team served as the primary stakeholders throughout the planning process. The general public and external agencies served as secondary stakeholders with an opportunity to contribute to the plan during the Plan Writing Phase of the planning process.***

As required by DMA 2000, the Planning Team invited the "general public" to participate in the planning process by making the Second Draft Plan available during the plan writing phase. The public was informed of the Plan's availability through several mediums (see Attachments) including the City's website "City News/Latest News" on the website landing page, bi-monthly "Community Development Update", and "City Hall Happenings" (July 11 and 17, 2019), and Facebook (July 7, 2019). In addition, external agencies (including utility providers, special districts and adjoining jurisdictions) were directed to the Second Draft Plan via an email invitation. The Second Draft Plan was announced and posted on the City's website from July 3-15, 2019 along with a request to forward any comments to the Chair of the Planning Team Jason Golding. A hard copy of the Second Draft Plan was available to the public at City Hall. See website screenshots below.

Hazard Mitigation Legislation

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

"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, Former FEMA Administrator

Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation Program (PDM) was authorized by §203 of the Stafford Act, 42 United States Code, 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 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)

Q&A | ELEMENT C. MITIGATION STRATEGY | C2

Q: 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))

A: See **NFIP Participation** below.

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. The City of Duarte adopted a floodplain management ordinance and has Flood Insurance Rate Maps (FIRM) that show floodways, 100-year flood zones, and 500-year flood zones. The Public Works Manager (Community Development) is designated as the floodplain administrator.

The City will maintain its participation with NFIP by continuing to enforce the Zoning Ordinance. Enforcement takes place when a prospective developer submits a permit request or building plans and the Community Department staff member looks up the zoning on the property. If the property is located in or near a designated floodplain, the applicant is provided with an NFIP brochure.

NFIP Participation

The City of Duarte participates in NFIP and the FEMA FIRM maps for the City of Duarte were last updated September 26, 2008. 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. According to FEMA, the City of Duarte is designated a No Special Flood Hazard Area (NSFHA). A Non-Special Flood Hazard Area (NSFHA) is an area that is in a moderate- to low-risk flood zone (Zones B, C, X Pre- and Post-FIRM). The City of Duarte is located within flood Zones X and D.

The NSFHA is not in any immediate danger from flooding caused by overflowing rivers or hard rains. However, it's important to note that structures within a NSFHA are still at risk. In fact, over 20% of all flood insurance claims come from areas outside of mapped high-risk flood zones.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B4

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

A: See **Repetitive Loss Properties** below.

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 Duarte.

State and Federal Guidance in Hazard Mitigation

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

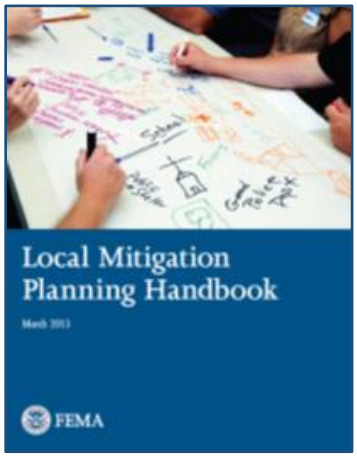
The Mitigation Plan was prepared in accordance with the following regulations and guidance documents:

- ✓ 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 (FEMA 2011)
- ✓ Local Mitigation Planning Handbook (FEMA 2013)

How is the Plan Organized?

The structure of the plan enables the reader 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.



Following is a description of each section of the plan:

Part I: Planning Process

Introduction

Describes the background and purpose of developing a mitigation plan.

Planning Process

Describes the mitigation planning process including stakeholders and integration of existing data and plans.

Part II: Risk Assessment

Community Profile

Summarizes the history, geography, demographics, and socioeconomics of the City.

Risk Assessment

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

City-Specific Hazard Analysis

Describes the hazards posing a significant threat to the City including:

Earthquake | Wildfire | Landslide | Flooding | Dam Failure | Windstorm | Hazardous Materials

Each City-Specific Hazard Analysis includes information on previous occurrences, local conditions, hazard assessment, and local impacts.

Part III: Mitigation Strategies

Mitigation Strategies

Documents the goals, community capabilities, and priority setting methods supporting the Plan. Also highlights the Mitigation Actions Matrix: 1) goals met; 2) identification, assignment, timing, and funding of mitigation activities; 3) benefit/cost/priorities; 4) plan implementation method; and 5) activity status.

Plan Maintenance

Establishes tools and guidelines for maintaining and implementing the Mitigation Plan.

Part IV: Appendix

The plan appendices are 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.

General Hazard Overviews

Generalized subject matter information discussing the science and background associated with the identified hazards.

Attachments

FEMA Letter of Approval
City Council Staff Report
City Council Resolution
Planning Team Sign-in Sheets
Web Postings and Notices

Plan Adoption and Approval

As per DMA 2000 and supporting Federal regulations, the Mitigation Plan is required to be adopted by the City Council and approved by FEMA. See the **Planning Process Section** for details.

Who Does the Mitigation Plan Affect?

This plan provides a framework for planning for natural hazards. The resources and background information in the plan are applicable City-wide and to City-owned facilities outside of the City boundaries, and the goals and recommendations provide groundwork for local mitigation plans and partnerships.

Planning Process

Throughout the project, the City followed its traditional approach to developing policy documents which included preparation of a First Draft Plan for internal review by the City's authors (Hazard Mitigation Planning Team) who served as the primary stakeholders. Next, following any necessary revisions, a Second Draft Plan was shared with the secondary stakeholders - general public and external agencies (utilities, special districts, adjoining jurisdictions) during the plan writing phase. The comments gathered from the secondary stakeholders were incorporated into a Third Draft Plan which was submitted to Cal OES and FEMA. Next, the Planning Team completed any mandated amendments to satisfy input from Cal OES and FEMA.

Following receipt of FEMA's "Approval Pending Adoption", the Final Draft Plan was posted as per jurisdictional practices in advance of the City Council meeting. Any questions or comments gathered in advance of the City Council meeting were incorporated into the City Council Staff Report. Following consideration and adoption by the City Council, proof of the Plan's adoption was forwarded to FEMA along with a request for final approval. The planning process described above is portrayed below in a timeline:

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)?

A: See **Planning Phases Timeline** and **Plan Methodology** below.

Q&A | ELEMENT A: PLANNING PROCESS | A3

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

A: See **Planning Phases Timeline** below.

Table: Planning Phases Timeline

PLANNING PHASES TIMELINE				
Plan Writing Phase (First & Second Draft Plan)	**Plan Review Phase (Third Draft Plan)**	**Plan Adoption Phase (Final Draft Plan)**	**Plan Approval Phase (Final Plan)**	**Plan Implementation Phase**
• Planning Team input – research, meetings, writing, review of First Draft Plan • Incorporate input from the Planning Team into Second Draft Plan • Invite general public and external agencies to comment and contribute to the Second Draft Plan • Incorporate and document gathered input into the Third Draft Plan	• Third Draft Plan sent to Cal OES and FEMA for "Approval Pending Adoption" • Address any mandated revisions identified by Cal OES and FEMA into Final Draft Plan	• Post Final Draft Plan along with public notice of City Council meeting • Present Final Draft Plan to the City Council • City Council Adopted Plan • Submit Proof of Adoption to FEMA with request for final approval	• Receive FEMA final approval • Incorporate FEMA approval into the Final Plan	• Conduct annual Planning Team meetings • Integrate mitigation action items into budget, CIP and other funding and strategic documents

Plan Methodology

The Planning Team discussed knowledge of natural hazards and past historical events, as well as planning and zoning codes, ordinances, and recent planning decisions.

The rest of this section describes the mitigation planning process including 1) Planning Team involvement, 2) public and external agency involvement; and 3) integration of existing data and plans.

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))

A: See **Table: Planning Team Involvement** and **Level of Participation** below.

Planning Team Involvement

The Planning Team consisted of representatives from City of Duarte departments related to hazard mitigation processes. The Chair of the Planning Team (Planning Division Manager) sent an email to the department heads requesting names of representatives to serve on the Planning Team. The Planning Team members served as primary stakeholders throughout the planning process. Next, the Chair of the Planning Team sent an email to the identified representatives describing the nature of the Mitigation Plan, the need for their participation and attendance at four Planning Team Meetings and contribute to the First Draft Plan.

Citizens and businesses ("general public") along with external agencies served as secondary stakeholders in the planning process. The Planning Team was responsible for the following tasks:

- ✓ Confirming planning goals
- ✓ Prepare timeline for plan update
- ✓ Ensure plan meets DMA 2000 requirements
- ✓ Organize and solicit involvement of public and external agencies
- ✓ Analyze existing data and reports
- ✓ Update hazard information
- ✓ Review HAZUS loss projection estimates
- ✓ Update status of Mitigation Action Items
- ✓ Develop new Mitigation Action Items
- ✓ Participate in Planning Team meetings and City Council public meeting
- ✓ Provide existing resources including maps and data

The Planning Team, with assistance from Emergency Planning Consultants, identified and profiled hazards; determined hazard rankings; estimated potential exposure or losses; evaluated development trends and specific risks; and developed mitigation goals and action items (see Mitigation Strategies section).

Table: Planning Team Meeting Dates and Content

Item	Meeting #1 12/19/18	Meeting #2 1/9/18	Meeting #3 2/26/19	Meeting #4 3/14/19
Hazard Identification and Ranking	X			
Update and Develop New Mitigation Action Items		X	X	
Review First Draft Plan				X

Table: Planning Team Level of Participation

Name	Research and Writing of Plan	Planning Team Meeting 12/19/18	Planning Team Meeting 1/9/19	Planning Team Meeting 2/26/19	Planning Team Meeting 3/14/19	Planning Team Comment on First Draft Plan	Input from general public and external agencies of the Second Draft Plan	Submit Third Draft Plan to Cal OES/FEMA for Approval Pending Adoption	Post Final Draft Plan in advance of City Council Public Meeting	Present Final Draft Plan to City Council at Public Meeting for Plan Adoption	Submit Proof of Adoption and Request for FEMA for Final Approval	Receive FEMA Final Approval. Issue Final Plan
City of Duarte												
Jason Golding		X	X	X	X	X	X	X	X	X	X	X
Amanda Hamilton		X	X	X	X	X						
Gerard Batista		X	X	X	X	X						
Nick Baldwin		X	X	X	X	X						
Brian Villalobos		X	X	X		X						
Larry Breceda		X		X	X	X						
Emergency Planning Consultants												
Carolyn Harshman	X	X	X	X	X		X	X		X	X	X
Alex Fritzler	X											
Zoe Schumacher	X											

Table: Planning Team Timeline

	December 2018	January 2019	February	March	April	May	June	July	August	September	October	November	December	January 2020	February	March	April	May	June
Research and Writing of First Draft Plan	X	X	X	X															
Planning Team Meetings	X	X	X	X															
Planning Team Review and Comment on First Draft Plan				X															
Input from general public and external agencies of Second Draft Plan								X											
Third Draft Plan to Cal OES/FEMA for Approval Pending Adoption										X									
Incorporate mandated amendments into Final Draft Plan																	X		
Post Final Draft Plan in advance of City Council meeting.																		X	
Present Final Draft Plan to City Council at Public Meeting																		X	
Submit Proof of Adoption to FEMA with Request for Final Approval																		X	
Receive FEMA Final Approval																			X
Incorporate FEMA Approval into Final Plan																			X

Q&A | ELEMENT A: PLANNING PROCESS | A2a.

Q: 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 interested parties to be involved in the planning process? (Requirement §201.6(b)(2))

A: See **Secondary Stakeholder Involvement** below.

Q&A | ELEMENT A: PLANNING PROCESS | A2b.

Q: 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 interested parties to be involved in the planning process? (Requirement §201.6(b)(2))

A: See **Secondary Stakeholder Involvement** below.

Q&A | ELEMENT A: PLANNING PROCESS | A3

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

A: See **General Public and External Agency Input and Table** below.

General Public and External Agency Input

In addition to the Planning Team, the secondary stakeholders also provided information, expertise, and other resources during plan writing phase. The secondary stakeholders included: general public and external agencies (e.g. utilities, special districts, adjoining jurisdictions, etc.).

Following review and input by the Planning Team of the First Draft Plan, a Second Draft Plan incorporating any revisions was made available to the secondary stakeholders as identified above. The gathered input from the secondary stakeholders was directed to the Chair of the Planning Team who reviewed the input and incorporated it as appropriate into the Third Draft Plan. Following is a specific accounting of comments received from the review of the Second Draft Plan by the secondary stakeholders:

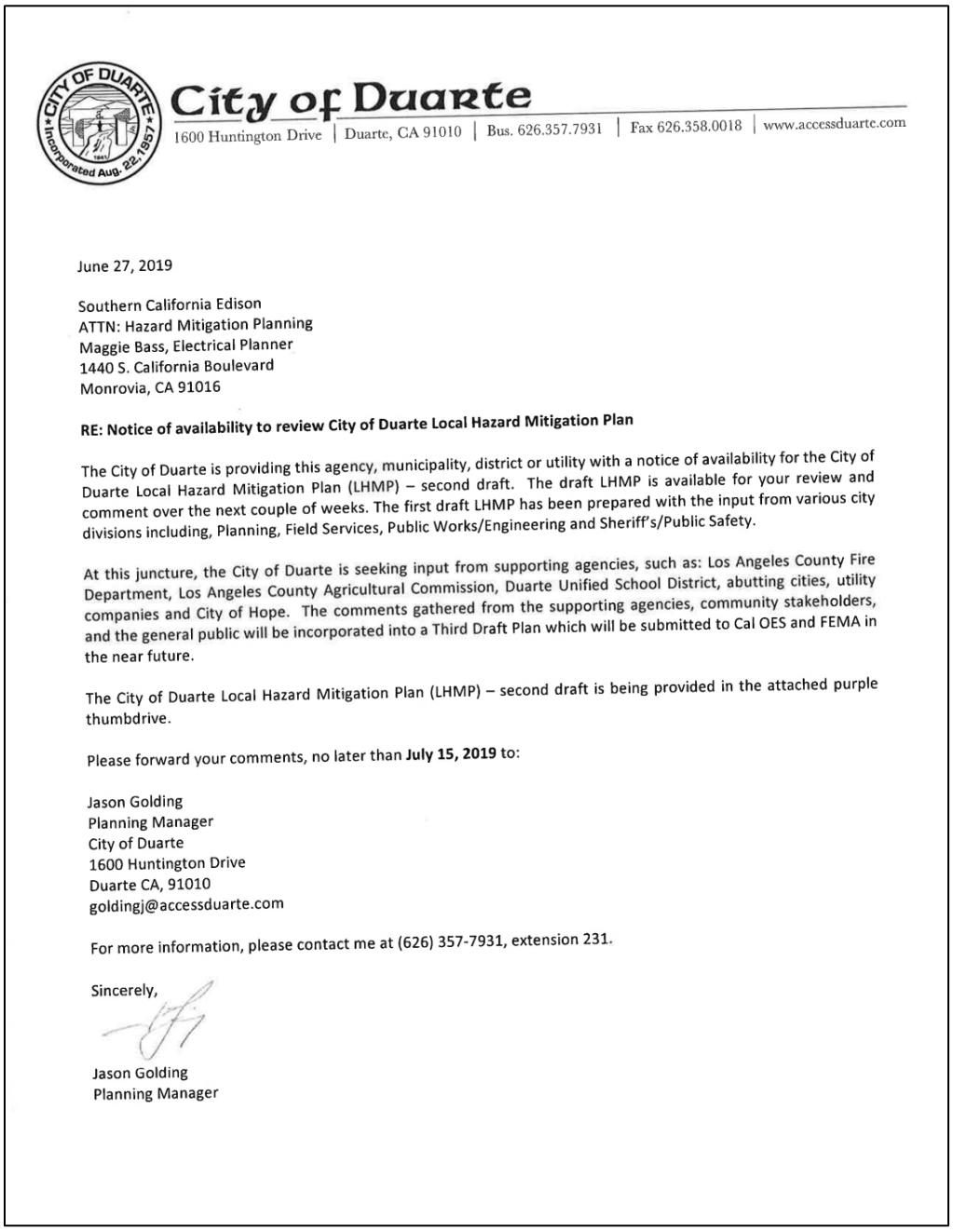
Table: General Public and External Agency Input

Date Informed	Agency, Name, Title	Date & Information Received	How Information was Addressed
GENERAL PUBLIC			
June 27, 2019	Extensive distribution of invitations to encourage public input (See Attachments)	N/A	No Comments Received
EXTERNAL AGENCIES			
June 27, 2019	California-American Water Company, Mark Reifer, PE, Operations Manager		No Comments Received
June 27, 2019	Southern California Edison, Maggie Bass, Electrical Planner		No Comments Received
June 27, 2019	Southern California Gas Company,		No Comments Received

Date Informed	Agency, Name, Title	Date & Information Received	How Information was Addressed
	William Vanettes, Field Planning Associate		
June 27, 2019	Area D Office of Disaster Management, Diana Manzano-Garcia, Area D Coordinator		No Comments Received
June 27, 2019	City of Hope National Medical Center, Jon Reuter, Vice President - Supply Chain, Facilities, & Construction Management		No Comments Received
June 27, 2019	City of Azusa, Matt Marquez Director of Economic and Community Development		No Comments Received
June 27, 2019	City of Bradbury, Kevin Kearney, City Manager		No Comments Received
June 27, 2019	City of Irwindale, Marilyn Simpson, Community Development Manager		No Comments Received
June 27, 2019	City of Monrovia, Craig Jimenez, Community Development Director		No Comments Received
June 27, 2019	Duarte Unified School District, Jim Bauler, Assistant Superintendent, Business Services		No Comments Received
June 27, 2019	LA County Agricultural Commissioner/Weights & Measures, Richard Lizuka, Chief Contact		No Comments Received
June 27, 2019	LA County Fire Department – Forestry Division, J. Lopez, Assistant Chief	July 15, 2019 Language pertaining to LA County Fire Department has been deemed accurate and acceptable.	No Revisions Required
June 27, 2019	LA County Department of Public Works, Rossana D'antonio, Deputy Director Development Services and Emergency Management		No Comments Received
June 27, 2019	LA County Sheriff's Department – Temple Station, David Flores, Captain		No Comments Received

External agencies listed above were invited via email and provided with an electronic link to the City's website. Following is the email distributed along with the invitation to comments:

Figure: Emailed Letter to Secondary Stakeholders



City of Duarte
1600 Huntington Drive | Duarte, CA 91010 | Bus. 626.357.7931 | Fax 626.358.0018 | www.accessduarte.com

June 27, 2019

Southern California Edison
ATTN: Hazard Mitigation Planning
Maggie Bass, Electrical Planner
1440 S. California Boulevard
Monrovia, CA 91016

RE: Notice of availability to review City of Duarte Local Hazard Mitigation Plan

The City of Duarte is providing this agency, municipality, district or utility with a notice of availability for the City of Duarte Local Hazard Mitigation Plan (LHMP) – second draft. The draft LHMP is available for your review and comment over the next couple of weeks. The first draft LHMP has been prepared with the input from various city divisions including, Planning, Field Services, Public Works/Engineering and Sheriff's/Public Safety.

At this juncture, the City of Duarte is seeking input from supporting agencies, such as: Los Angeles County Fire Department, Los Angeles County Agricultural Commission, Duarte Unified School District, abutting cities, utility companies and City of Hope. The comments gathered from the supporting agencies, community stakeholders, and the general public will be incorporated into a Third Draft Plan which will be submitted to Cal OES and FEMA in the near future.

The City of Duarte Local Hazard Mitigation Plan (LHMP) – second draft is being provided in the attached purple thumbdrive.

Please forward your comments, no later than **July 15, 2019** to:

Jason Golding
Planning Manager
City of Duarte
1600 Huntington Drive
Duarte CA, 91010
goldingj@accessduarte.com

For more information, please contact me at (626) 357-7931, extension 231.

Sincerely,

Jason Golding
Planning Manager

Following receipt of FEMA's "Approval Pending Adoption" and in advance of the City Council public meeting, the general public (via public noticing) and external agencies (via email) were informed of the web posting of the Final Draft Plan and encouraged to attend the public meeting. Gathered comments on the Plan during the posting period were noted in the City Council Staff Report and added to the Final Plan.

Q&A | ELEMENT C. MITIGATION STRATEGY | C1a.

Q: Does the plan document each jurisdiction's existing authorities, policies, programs and resources? (Requirement §201.6(c)(3))

A: See **Capability Assessment – Existing Processes and Programs** below.

Capability Assessment – Existing Processes and Programs

The City will incorporate mitigation planning as an integral component of daily operations. This will be accomplished by the Planning Team working with their respective departments to integrate mitigation strategies into the planning documents and operational guidelines within the City. In addition to the Capability Assessment below, the Planning Team will strive to identify additional policies, programs, practices, and procedures that could be created or modified to address mitigation activities.

Table: Capability Assessment - Existing Processes and Programs

Resource Type	Resource Name	Ability to Support Mitigation
Personnel	Administrative Services Department	*The Administrative Services Department covers a broad range of areas of service within the City including Finance, Human Resources, Risk Management, Transit Services and Information Technology.*
Personnel	City Attorney's Office	*The Office of the City Attorney represents the City as a municipal corporation. The City Attorney is responsible for representational advice to the City Council, the Successor Agency to the Duarte Redevelopment Agency, Boards, Commission and all City officer and staff in all matters of law pertaining to the City.*
Personnel	City Manager's Office	*The City Manager is appointed by the City Council to serve as the City's chief executive officer. The City Manager recommends policy actions and implements City Council policy direction and decisions through various City Departments. The City Manager is also responsible for providing overall project supervision, promoting economic stability through business development and retention, and promoting organizational stability through financial and human resources management.*
Personnel	City Clerk's Office	*City Clerk's Office is responsible for City Council Agendas, Meetings and Minutes, Bids and RFPs, Claims, Document Central Public Portal, Fair Political Practices Commission, Legislative Representatives, Municipal Code, Passport Services, Public Notices, and Public Records Requests.*
Personnel	Community Development Department	*Community Development includes the following functional areas: Planning, Building, Public Works, Economic Development, and Field Services*

Resource Type	Resource Name	Ability to Support Mitigation
		A wide range of mitigation actions can be managed by this department.
Personnel	Parks and Recreation Department	*The Parks and Recreation Department works with City staff in matters pertaining to parks, recreation areas, facilities, programs, and other associated activities, and cooperates with other governmental agencies and civic groups in the advancement of sound park and recreation planning and programming.*
Personnel	Public Safety Department	*Public Safety Department manages and provides an array of safety and security related services in the City of Duarte. The City's law enforcement services are contracted through the Los Angeles County Sheriff's Department. The City's fire protection services are provided by Los Angeles County Fire Department. Public Safety also partners with a number of community organizations to help residents address various issues. The Department also provides animal control and code enforcement services.*
Personnel	Hazard Mitigation Planning Team	*Hazard Mitigation Planning Team is made up of representatives from departments assigned responsibilities in the Hazard Mitigation Plan, including the 5-year plan updates as required by FEMA. The Planning Team is responsible for implementing, monitoring, and evaluating the plan during its annual meetings.*
Plans	Emergency Operations Plan	*Emergency Operations Plan is a reference and guidebook to operations during a major emergency impacting Duarte. The Plan includes a discussion on a wide range of hazards, organization and staffing of the Emergency Operations Center, and connectivity with field responders and external agencies. The Emergency Operations Plan is an excellent source of hazard information for the Hazard Mitigation Plan.*
Plans	Hazard Mitigation Plan	*The City's Hazard Mitigation Plan identifies the risks from hazards present in the community and includes strategies to reduce these risks. Updates to the Plan are coordinated with the hazard information and mitigation activities identified in the County of Los Angeles HMP as well as the HMP for the State of California in order to ensure a more consistent and unified approach to hazard mitigation.*
Plans	General Plan	*General Plan outlines long-term direction for development and policy in Duarte. There are opportunities to coordinate local hazard mitigation actions with policies governed by the General Plan. Also, the General Plan is an excellent resource to*

Resource Type	Resource Name	Ability to Support Mitigation
		assist with implementing many of the mitigation action items identified in the Hazard Mitigation Plan.
Plans	Capital Improvement Program	*The City is now in the process of preparing its first Capital Improvement Program which will direct construction activities for City-owned facilities and infrastructure for the next future years. Mitigation actions may involve construction of new or upgraded facilities and infrastructure.*
Plans	Storm Water Management Plan	*Storm Water Management Plan provides long-range planning of water supplies and water use to ensure a stable water supply and compliance with water conservation efforts. Mitigation actions that involve reducing water use may be incorporated into the next update to the Storm Water Management Plan.*
Policy	Zoning Ordinance	*Zoning Ordinance implements the City's General Plan by establishing specific regulations for development. It includes standards for where development can be located, how buildings must be sized, shaped, and positioned, and what types of activities can occur in an area. Hazard mitigation actions that pertain to new or substantially redeveloped buildings can be adopted into the Zoning Ordinance.*
Policy	Building Code	*Building Code specifies how new structures can be built. It includes the California Building Code, in addition to any amendments made by the City. Mitigation actions may involve amending the Building Code to improve a building's safety or structural stability.*

Q&A | ELEMENT A: PLANNING PROCESS | A4

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

A: See **Use of Existing Data** below.

Use of Existing Data

The Planning Team gathered and reviewed existing data and plans during plan writing and specifically noted as "sources". Numerous electronic and hard copy documents were used to support the planning process:

City of Duarte General Plan and Elements
www.accessduarte.com
Applicable Incorporation: Land Use map, Community Profile section – geography, environmental, population, housing, transportation and demographic data, Safety Element – hazard information and maps.

County of Los Angeles All-Hazards Mitigation Plan (2014)
www.lacoa.org
Applicable Incorporation: Information about hazards in the County contributed to the hazard-specific sections in the City's Mitigation Plan.

California State Hazard Mitigation Plan (2018)
www.caloes.ca.gov
Applicable Incorporation: Used to identify hazards posing greatest hazard to State.

HAZUS Maps and Reports
Created by Emergency Planning Consultants
Applicable Incorporation: Numerous HAZUS results have been included for earthquake scenarios to determine specific risk to City of Duarte.

California Department of Finance
www.dof.ca.gov/
Applicable Incorporation: Community Profile section – demographic and population data

FEMA "How To" Mitigation Series (386-1 to 386-9)
www.fema.gov/media
Applicable Incorporation: Mitigation Measures Categories and 4-Step Planning Process are quoted in the Executive Summary.

National Flood Insurance Program
www.fema.gov/national-flood-insurance-program
Applicable Incorporation: Used to confirm there are no repetitive loss properties within the City

Local Flood Insurance Rate Maps
www.msc.fema.gov
Applicable Incorporation: Provided by FEMA and included in Flood Hazard section.

California Department of Forestry and Fire Protection (CAL FIRE)
www.fire.ca.gov
Applicable Incorporation: Wildland fire hazard mapping

California Department of Conservation
www.conservation.ca.gov/cgs
Applicable Incorporation: Seismic hazards mapping

U.S. Geological Survey (USGS)
www.usgs.gov
Applicable Incorporation: Earthquake records and statistics

Q&A | ELEMENT E: PLAN ADOPTION | E1

Q: 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))

A: See **Plan Adoption Process** below.

Plan Adoption Process

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 must adopt the Mitigation Plan before the Plan can be approved by FEMA.

In preparation for the public meeting with the City Council, the Planning Team prepared a Staff Report including an overview of the Planning Process, Risk Assessment, Mitigation Goals, and Mitigation Actions. The staff presentation concluded with a summary of the input received during the public review of the document in advance of the City Council meeting. The meeting participants were encouraged to present their views and make suggestions on possible mitigation actions.

The City Council heard the item on May 12, 2020. The City Council voted unanimously to adopt the updated Mitigation Plan. The Resolution of adoption by the City Council is in the **Appendix**.

Plan Approval

FEMA issued an Approval Pending Adoption notice on March 18, 2020. Upon adoption by the City Council, the resolution was forwarded to FEMA. The FEMA Letter of Approval was issued on June 2, 2020. A copy of the FEMA Letter of Approval is in the **Appendix**.

Part II: RISK ASSESSMENT

Community Profile

Geography and the Environment

The City of Duarte is a small community in eastern Los Angeles County encompassing 6.7 square miles with an estimated population of 21,855 residents as of 2019. The City is located at the foot of the San Gabriel Mountains approximately 20 miles northeast of the City of Los Angeles. It borders the cities of Monrovia to the west, Bradbury to the north, Azusa to the east, and Irwindale to the south. The San Gabriel River and Santa Fe Flood Control Basin abuts Duarte to the east and south. Major transportation corridors serve Duarte including Interstate 210 (I-210), Interstate 605 (I-605), and Huntington Drive (Route 66). The City is bisected by I-210, which runs east-west through the City and acts as a barrier that divides the City into a northern and southern area. **Map: Regional Location**, depicts Duarte's location to neighboring cities.

Climate

According to the National Weather Service, the City has a moderate climate, including dry summers with an average temperature of about 75°F and cool, wet winters with an average temperature of 56°F. The average annual rainfall for the region is between 9-14 inches.

Actual rainfall in the Southern California region 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.

Population and Demographics

According to the City's website, the City was incorporated in 1957 with a population of 13,962. As of 2019, the population has grown to 21,855. From 2010 to 2019, the City experienced a growth rate of 2.5 percent, with a projected growth rate of 2.3 percent from 2019-2024.

According to the U.S. Census Bureau, the demographic makeup of the City is as follows:

Table: City of Duarte Demographics
(Source: U.S. Census Bureau, Est. 2019)

Racial/Ethnic Group	Population	Percentage (%)
White	10,577	48.4%
Black	1,496	6.8%
American Indian or Alaska Native	180	0.8%
Asian or Pacific Islander	4,192	19.1%
Other	4,345	19.8%
Multiracial	1,065	4.9%
Non-Hispanic	11,243	51.4%
Hispanic	10,612	48.6%

Housing and Community Development

Table: City of Duarte Housing
(Source: U.S. Census Bureau, 2017)

2015	Number	Percent %
Housing Type:		
1-unit, detached	4,379	61.0%
1-unit, attached	984	13.7%
2-4 Units	287	4.0%
5+ Units	1,376	19.2%
Mobile homes/Other	148	2.1%
Housing Statistics:		
Total Occupied Housing Units	6,980	96.7%
Owner-Occupied Housing	4,703	67.1%
Renter-Occupied	2,310	32.9%
Average Household Size:	3.1 persons	
Median Home Price:	$422,000	

Employment and Industry

According to the Census data, the predominant employment industries for Duarte residents are Educational, Health and Social Services (25.7%); Retail Trade (12.4%); and Professional, scientific, and management services (11.6%).

The City's top employers include City of Hope, Duarte School District, GE Aviation, and Wal-Mart.

Table: City of Duarte Industry
(Source: American Community Survey - 2017)

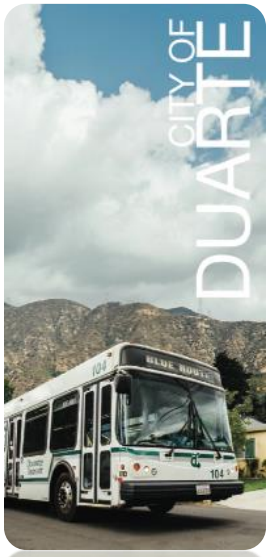
Industry	2017	
	Number	Percent %
Agriculture, forestry, fishing and hunting, and mining	56	0.5%
Construction	544	5.2%
Manufacturing	839	8.0%
Wholesale Trade	268	2.6%
Retail Trade	1,300	12.4%
Transportation and Warehousing, and Utilities	433	4.1%
Information	311	3.0%
Finance and insurance, and real estate and rental and leasing	748	7.1%
Professional, scientific, and management, and administrative and waste management services	1,215	11.6%
Educational services, and health care and social assistance	2,701	25.7%
Arts, entertainment, and recreation, and accommodation and food services	1,023	9.7%
Other services, except public administration	738	7.0%
Public administration	327	3.1%

Table: City of Duarte Occupation
(Source: American Community Survey - 2017)

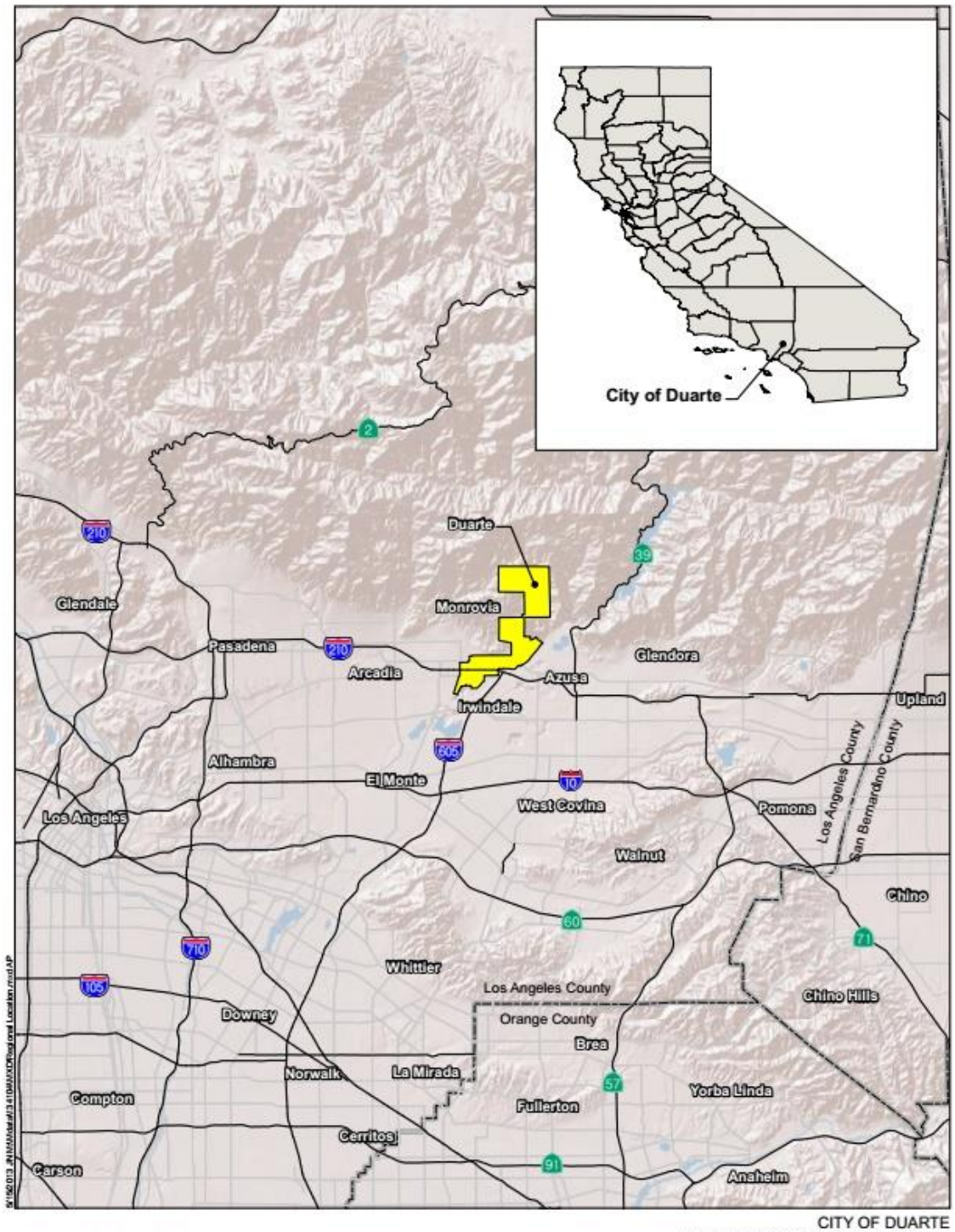
Occupation	2015	
	Number	Percent
Civilian employed population (16 years and over)	10,503	36.0%
Management, business, science, and arts occupations	3,781	19.9%
Service occupations	2,095	26.9%
Sales and office occupations	2,822	7.2%
Natural resources, construction, and maintenance occupations	761	9.9%
Production, transportation, and material moving	1,044	36.0%

Transportation and Commuting Patterns

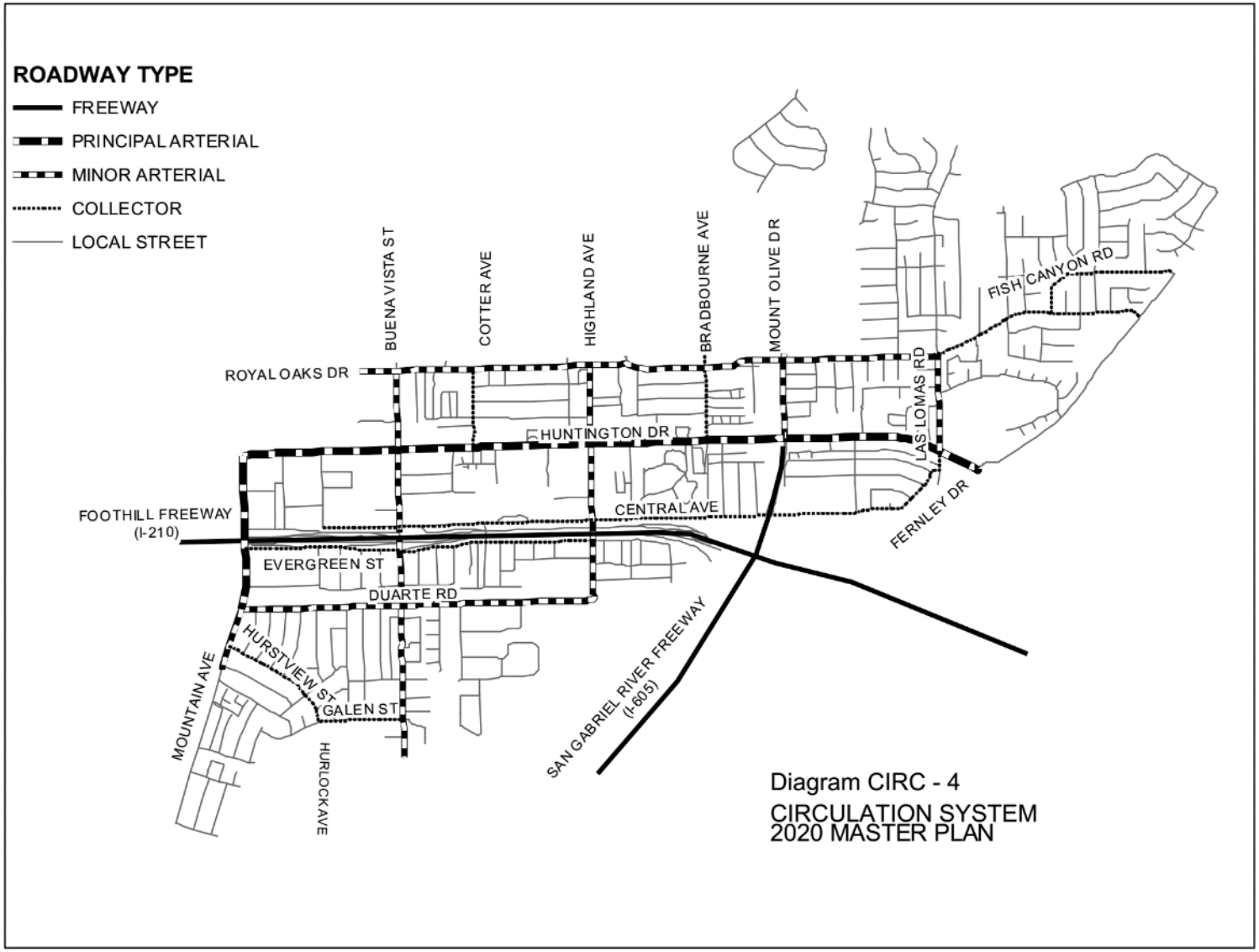
The City's Transportation Division is responsible for managing the Duarte Transit bus service and the City's fleet services. Duarte Transit has operated since 1984 and currently serves approximately 24,000 riders per month. The City in conjunction with Foothill Transit has introduced a fleet of new, 35- foot electric buses that operate on the existing Duarte Transit routes. The Green Route buses travel in a counterclockwise direction around the City and the Blue Route travels clockwise, each complete the route once every hour. Fleet Services maintains all of the City owned vehicles. The City currently owns approximately 40 vehicles, ranging from hybrid sedans to heavy duty aerial lift trucks. Fleet Services is also responsible for monitoring all employees driving qualifications and specialized license requirements.



Map: Regional Location
(Source: City of Duarte 2014 Hazard Mitigation Plan)



Map: Roadway Classifications
(Source: City of Duarte General Plan - 2007)



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 hazard events. Specifically, the five levels of a risk assessment are as follows:

1. *Hazard Identification*
2. *Profiling Hazard Events*
3. *Vulnerability Assessment/Inventory of Existing Assets*
4. *Risk Analysis*
5. *Assessing Vulnerability/Analyzing Development Trends*

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

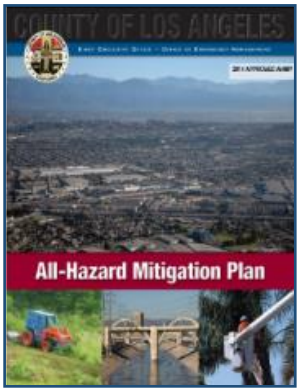
Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

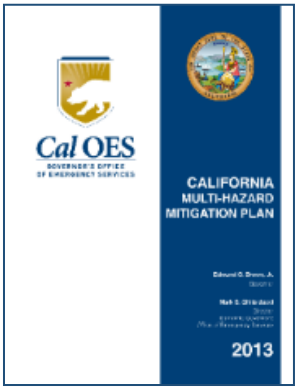
A: See **Hazard Identification** below.

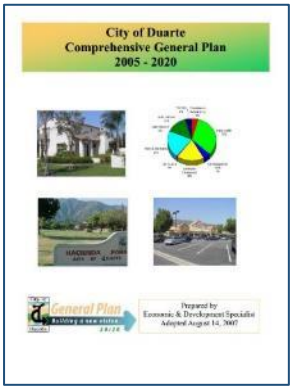
1) Hazard Identification

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 Duarte utilized the categorization of hazards as identified in California's State Hazard Mitigation Plan, including: Earthquakes, Floods, Levee Failures, Wildfires, Landslides and Earth Movements, Tsunami, Climate-related hazards, Volcanoes, and Other Hazards (including Drought)***.

Next, the Planning Team reviewed existing documents to determine which of these hazards posed the most significant threat to the City. In other words, which hazard would likely result in a local declaration of emergency.







The geographic extent of each of the identified hazards was identified by the Planning Team utilizing maps and data contained in the City's General. In addition, numerous internet resources and the County of Los Angeles All-Hazards Mitigation Plan served as valuable resources. Utilizing the Calculated Priority Risk Index (CPRI) ranking technique, the Planning Team concluded the following hazards posed a significant threat against the City:

Earthquake | Wildfire | Landslide | Flooding

Dam Failure | Windstorm | Hazardous Materials

The hazard ranking system is described in **Table: Calculated Priority Risk Index**, while the actual ranking is shown in **Table: Calculated Priority Risk Index Ranking for City of Duarte**.

Table: Calculated Priority Risk Index
(Source: Federal Emergency Management Agency)

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 years.	1	45%
	Possibly	Rare occurrences. Annual probability of between 1 in 100 years and 1 in 1,000 years.	2	
	Likely	Occasional occurrences with at least 2 or more documented historic events. Annual probability of between 1 in 10 years and 1 in 100 years.	3	
	Highly Likely	Frequent events with a well-documented history of occurrence. Annual probability of greater than 1 every year.	4	
Magnitude/ Severity	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure. 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). 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). 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). 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 Duarte

Hazard	Probability	Weighted 45% (x.45)	Magnitude Severity	Weighted 30% (x.3)	Warning Time	Weighted 15% (x.15)	Duration	Weighted 10% (x.1)	CPRI Total
Earthquake – San Andreas M7.8	3	1.35	3	0.90	4	0.60	1	0.10	**2.95**
Earthquake – Sierra Madre M7.2	2	0.90	4	1.20	4	0.60	1	0.10	**2.80**
Earthquake – Puente Hills M7.0	2	0.90	2	0.60	4	0.60	1	0.10	**2.20**
Wildfire	3	1.35	3	0.90	4	0.60	3	0.30	**3.15**
Landslide	3	1.35	2	0.60	4	0.60	1	0.10	**2.65**
Flood	2	0.90	2	0.60	2	0.30	1	0.10	**1.90**
Dam Failure	2	0.90	3	0.90	4	0.60	2	0.20	**2.60**
Windstorm	3	1.35	2	0.60	1	0.15	2	0.20	**2.30**
Hazardous Materials	2	0.90	2	0.60	4	0.60	1	0.10	**2.20**

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 City-Specific Hazard Analysis. **Table: Vulnerability: Location, Extent, and Probability for City of Duarte** indicates a generalized perspective of the community's vulnerability of the various hazards according to extent (or degree), location, and probability.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1b.

Q: Does the plan provide rationale for the omission of any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Duarte** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1c.

Q: Does the plan include a description of the **location** for all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Duarte** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1d.

Q: Does the plan include a description of the **extent** for all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Duarte** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Duarte** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2b.

Q: Does the plan include information on the **probability** of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Table: Vulnerability: Location, Extent, and Probability for City of Duarte** below.

Table: Vulnerability: Location, Extent, and Probability for City of Duarte

Hazard	Location (Where)	Extent (How Big an Event)	Probability (Frequency of an Event of Disaster Proportions) *	Most Recent Occurrence
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.[1]	Likely	Northridge Earthquake – January 1994
Wildfire	Northern foothills, Southern & Eastern City Boundaries	Severe fire hazard severity ratings indicate potential for major residential damages.	Likely	San Gabriel Complex Fire – June 2016
Landslide	North-eastern foothills	Major property damage and displacement of residents.	Likely	January 2017
Flood	Entire Project Area	Urban flooding to streets and underpasses from heavy rains.	Possibly	January 2017
Dam Failure	Southern, built-out areas of the City	Flood waters would reach the City within 20 minutes.	Unlikely	None
Windstorm	Entire Project Area	50 miles per hour or greater.	Likely	November 2011
Hazardous Materials	Entire Project Area – most vulnerable near critical facilities	Extent varies greatly depending on the scope, and magnitude of incident	Possibly	None

* Probability is defined as: Unlikely = 1:1,000 years, Possibly = 1:100-1:1,000 years, Likely = 1:10-1:100 years, Highly Likely = 1:1 year

[1] Uniform California Earthquake Rupture Forecast

3) Vulnerability Assessment/Inventory of Existing Assets

A Vulnerability Assessment in its simplest form is a simultaneous look at the geographical location of hazards and an inventory of the underlying land uses (populations, structures, etc.). Facilities that provide critical and essential services following a major emergency are of particular concern because these locations house staff and equipment necessary to provide important public safety, emergency response, and/or disaster recovery functions.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Critical Facilities** below.

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.

Table: Impacts to Critical Facilities illustrates the hazards with potential to impact critical facilities owned by or providing services to the City of Duarte.

Table: Impacts to Critical and Essential Facilities

Y – Yes facility is within hazard zone **N** – No facility is not within hazard zone

Name of Facility	Earthquake	Wildfire	Landslide	Flooding	Dam Failure	Windstorm	Hazardous Materials
Andres Duarte Arts Academy	Y	N	N	N	Y	Y	N
Beardslee Dual Language Academy	Y	N	N	N	Y	Y	N
California School of the Arts – San Gabriel Valley	Y	N	N	N	Y	Y	N
City of Hope (hospital)	Y	N	N	N	Y	Y	Y
Duarte City Hall	Y	N	N	N	Y	Y	Y
Duarte City Yard	Y	N	N	N	Y	Y	Y
Duarte Community Center	Y	N	N	N	Y	Y	N
Duarte Fitness Center	Y	N	N	N	Y	Y	Y
Duarte High School	Y	N	N	N	Y	Y	N
Duarte Teen Center	Y	N	N	N	Y	Y	N
Duarte Public Safety/ Sheriff's Substation	Y	N	N	N	Y	Y	Y
Duarte School District	Y	N	N	N	Y	Y	Y
Duarte Senior Center	Y	N	N	N	Y	Y	N
Encanto Park	Y	Y	N	N	Y	Y	N
Foothill Oaks Academy	Y	N	N	N	Y	Y	N
Highland Convalescent Hospital	Y	N	N	N	Y	Y	N
Huntington/Foothill Bridge	Y	N	N	N	Y	Y	N
Los Angeles County Fire Station #44	Y	N	N	N	Y	Y	Y
Maryvale Family Services (Preschool)	Y	N	N	N	Y	Y	N
Monrovia Convalescent Hospital	Y	N	N	N	Y	Y	Y
Mt. Olive Innovation & Technology High School	Y	N	N	N	Y	Y	N
North Facilities Maintenance Yard	Y	N	N	N	Y	Y	N
North View Intermediate School	Y	N	N	N	Y	Y	Y
Royal Oaks Park	Y	N	N	N	Y	Y	N
Royal Oaks STEAM Academy	Y	N	N	N	Y	Y	N

Name of Facility	Earthquake	Wildfire	Landslide	Flooding	Dam Failure	Windstorm	Hazardous Materials
Santa Teresita Campus & Hayden Child Care Center	Y	N	N	N	Y	Y	N
Smart & Final Extra	Y	N	N	N	Y	Y	Y
Target	Y	N	N	N	Y	Y	Y
Walmart	Y	N	N	N	Y	Y	Y
Valley View Academy of Technology & Creative Learning	Y	Y	N	N	Y	Y	N

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. Data was not available to make vulnerability determinations in terms of dollar losses for all of the identified hazards. The **Mitigation Actions Matrix** includes an action item to conduct such an assessment in the future.

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 Duarte 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 Duarte 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.

Hazard assessments are subject to the availability of hazard-specific data. Gathering data for a hazard assessment requires a commitment of resources on the part of participating organizations and agencies. Each hazard-specific section of the plan includes a section on hazard identification using data and information from City, County, state, or federal sources.

Regardless of the data available for hazard assessments, there are numerous strategies the City can take to reduce risk. These strategies are described in the action items detailed in the Mitigation Actions Matrix in the **Mitigation Strategies Section**. Mitigation strategies can further reduce disruption to critical services, reduce the risk to human life, and alleviate damage to personal and public property and infrastructure.

Land and Development

The City of Duarte General Plan provides the framework for the growth and development of the City. 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.

According to the City's General Plan (2007), the City is divided into three districts: the San Gabriel Mountain Range of the Angeles National Forest, the foothills and canyons of the San Gabriel Mountains, and the alluvial slopes of the mountains. The latter is the area where the City's urban development is concentrated. The largest land use within the City is wilderness area, totaling 2,331 acres (53 percent of the City's total land area), which includes 1,909 acres within the Angeles National Forest. As a national forest, this land is protected from urbanization and is designated Open Space.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impacts to Types of Land Uses** below.

Impacts to Types of Land Uses

City of Duarte's General Plan identifies primarily residential land uses with other land uses consisting of commercial, industrial, public facilities, research & development, and open space.

Table: Impacts to Existing and Future Land Uses in the City of Duarte (Source: EPC Analysis Based on City of Duarte General Plan - 2007)

Category of Land Use Designation	Acres (Area)	Earthquake	Wildfire	Landslide	Flooding	Dam Failure	Windstorm	Hazardous Materials
Residential	906	X	X	X	X	X	X	X
Commercial	99	X			X	X	X	X
Hospital	78	X	X		X	X	X	X
Industrial	68	X	X		X	X	X	X
Public Facilities	94	X	X	X	X	X	X	X
Open Space	2,943	X	X	X	X	X	X	X
Specific Plan	342	X	X		X	X	X	X

Q&A | ELEMENT D: MITIGATION STRATEGY | D1

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

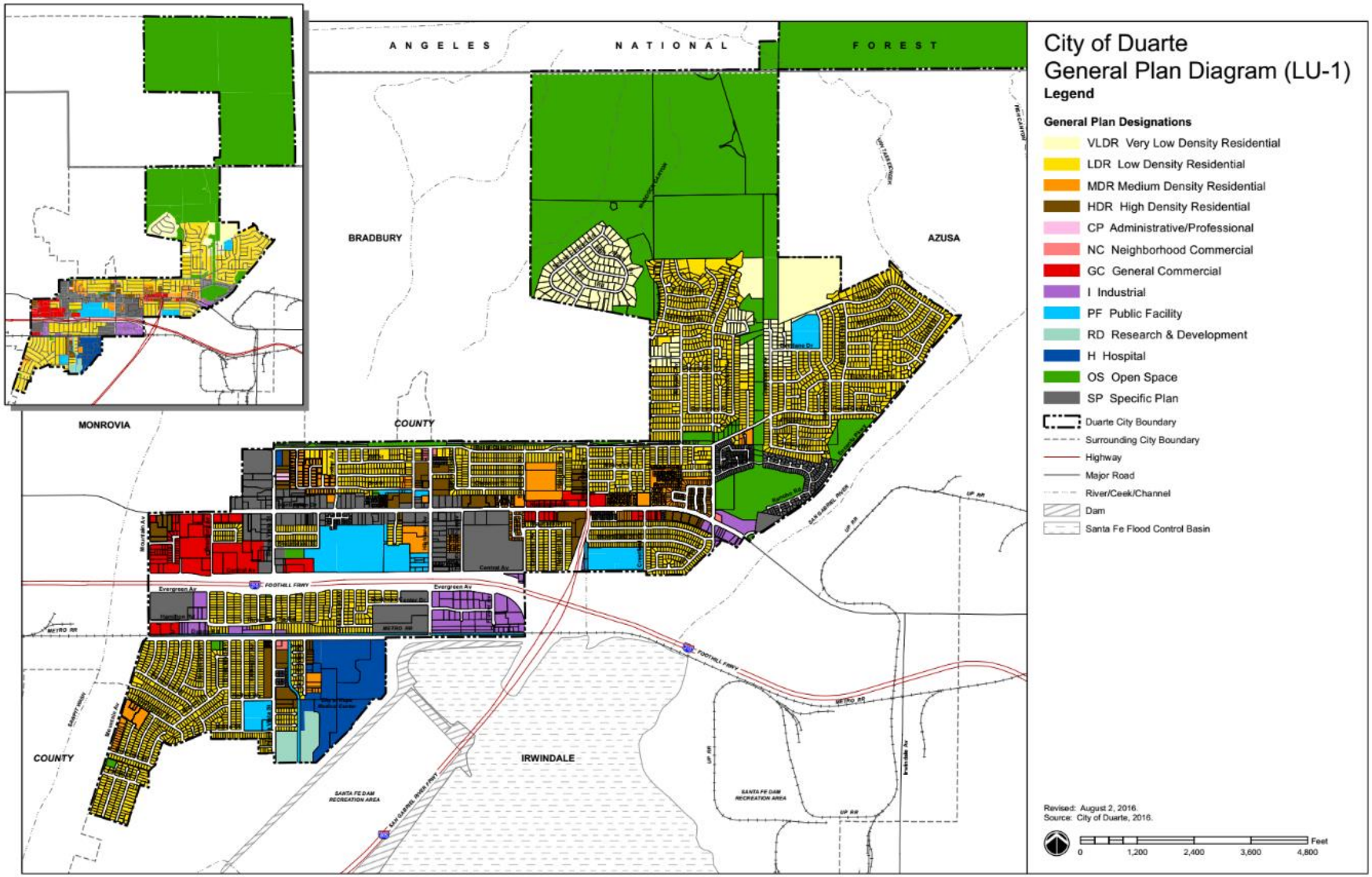
A: See **Changes in Development** below

Changes in Development

The City of Duarte was incorporated as a general law/charter city in 1957. Since its incorporation, Duarte has grown into a flourishing urban city. The City of Duarte has essentially been built out for many years, with very little vacant land remaining for new development. The majority of future development in the City is likely to consist of remodeling of existing structures or redevelopment of properties requiring demolition and replacement of existing buildings.

Since the adoption of the 2014 Plan, there have been no significant alterations to the development pattern of the City in the hazard prone areas. This conclusion was reached after a thorough review of the General Plan and discussion with the Planning Team. Furthermore, the Planning Team concluded the overall vulnerability to identified hazards remained approximately the same.

Map: Land Use Map
(Source: City of Duarte General Plan, 2007)



Earthquake Hazards

Previous Occurrences of Earthquakes in the City of Duarte

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Earthquakes in the City of Duarte** below.

The following earthquake events significantly impacted the region surrounding the City of Duarte.

In January 1994, the magnitude 6.7 Northridge Earthquake (thrust fault) which produced severe ground motion, caused 57 deaths, 9,253 injuries and left over 20,000 displaced. Scientists have stated that such devastating shaking should be considered the norm near any large thrust earthquake. Recent reports from scientists of the U.S. Geological Survey and the Southern California Earthquake Center say that the Los Angeles Area could expect one earthquake every year of magnitude 5.0 or more for the foreseeable future.

Since the writing of the 2014 Mitigation Plan, there have been no significant earthquake events in the City of Duarte.

Previous Occurrences of Earthquakes in Los Angeles County

Southern California has a history of powerful and relatively frequent earthquakes, dating back to the powerful magnitude 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 magnitude (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 Earthquake and the 1994 Northridge Earthquake.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

The City lies within a metropolitan area that has historically been seismically active. Faults are prevalent throughout California and are commonly classified as either "active" or "potentially active." An active fault is a break that has moved in recent geologic time (the last 11,000 years) and that is likely to move within the next approximately 100 years. Active faults are the primary focus of concern in attempting to prevent earthquake hazards. A potentially active fault is one that has shifted but not in the recent geologic period (or, between 11,000 and 3,000,000 years ago) and is therefore considered dormant or unlikely to move in the future.

Several active faults have been identified within close proximity or within the City boundaries which, most importantly, indicates that the community falls under the State Earthquake Fault Zoning Act and the State Hazards Mapping Act. These Acts require that local governments, in the general plan update process, adopt policies and criteria to ensure the structural adequacy of buildings erected across active faults for human occupancy. In some cases, the development of structures must be prohibited.

Earthquakes that could affect the City would most likely originate from the San Andreas (M7.8), Sierra Madre (M7.2), or Puente Hills (M7.0) Faults. These faults are close enough in proximity or expected to generate strong enough shaking that could significantly impact the City. **Map: Local Faults** plots the various major faults located closest to the City of Duarte.

Active Fault Zones

San Andreas Fault Zone

The San Andreas Fault Zone is located approximately 23 miles northeast of the City of Duarte. This fault zone extends from the Gulf of California northward to the Cape Mendocino area where it continues northward along the ocean floor. The total length of the San Andreas Fault Zone is approximately 750 miles. The activity of the fault has been recorded during historic events, including the 1906 (M8.0) event in San Francisco and the 1857 (M7.9) event between Cholame and San Bernardino, where at least 250 miles of surface rupture occurred. These seismic events are among the most significant earthquakes in California history. Geologic evidence suggests that the San Andreas Fault has a 50 percent chance of producing a magnitude 7.5 to 8.5 quake (comparable to the great San Francisco earthquake of 1906) within the next 30 years.

Sierra Madre Fault Zone

The Sierra Madre Fault zone passes through the northern portions of Pasadena, Arcadia, Monrovia, Duarte, Azusa, and portions of San Dimas. Movement along these frontal faults has resulted in the uplift of the San Gabriel Mountains. According to the Southern California Earthquake Data Center, rupture on the Sierra Madre fault zone (theoretically) could be limited to one segment at a time, it has recently been suggested that a large event on the San Andreas fault to the north (like that of 1857) could cause simultaneous rupture on reverse faults south of the San Gabriel Mountains – the Sierra Madre fault zone being a prime example of such. Whether this could rupture multiple Sierra Madre fault zone segments simultaneously is unknown. Seismic activity on the Sierra Madre Fault is expected to have a maximum credible magnitude of 7.2.

Puente Hills Fault

The Puente Hills fault is located approximately 8 miles south of the City. According to USGS, the Puente Hills Fault was most recently responsible for the M5.1 La Habra earthquake on March 28, 2014 which caused an estimated $2.6 million in damage. Seismic activity on the Puente Hills Fault is expected to have a maximum credible magnitude of 7.0.

Potentially Active Fault Zones

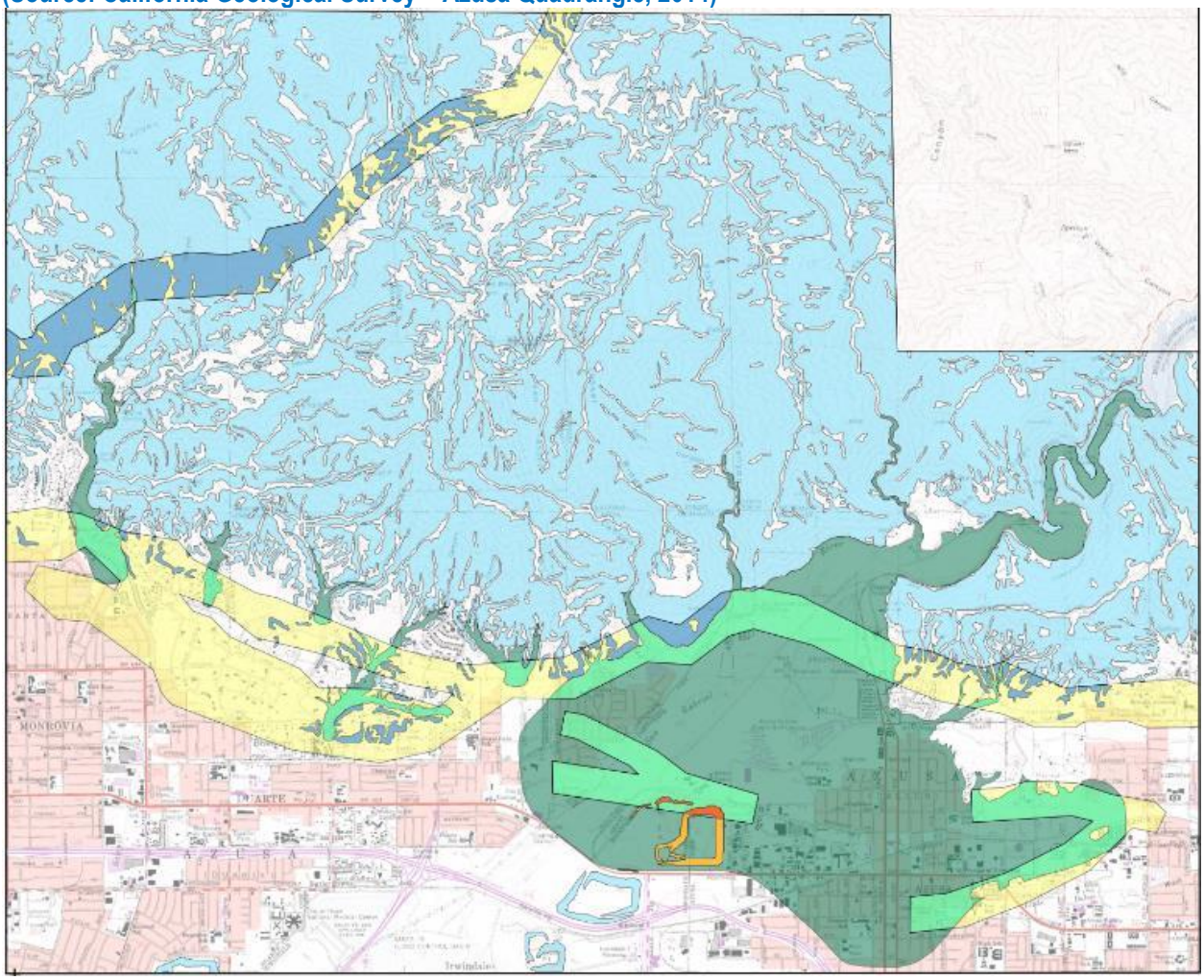
Duarte Fault

The Duarte Fault is a southern play of the Sierra Madre-Cucamonga Fault Zone that crosses the City of Duarte in the northeastern section of the City. The fault extends through the San Gabriel River and into the City of Azusa based on vegetation lineaments observed on aerial photographs and geophysical evidence. The Duarte Fault is designated as a potentially active fault, however, has not been zoned under the Alquist-Priolo Act because the timing of the latest movement has not been determined.

Raymond Fault

The Raymond Fault extends across the Los Angeles Basin from the Los Angeles River to the foot of the San Gabriel Mountains in Monrovia. This fault has been delineated as an Earthquake Fault Zone under the Alquist-Priolo Act. Seismic evidence and aftershock analyses indicate that the 1988 Pasadena earthquake (M4.9) occurred on the Raymond Fault. Future seismic activity on the Raymond Fault is expected to have a maximum magnitude of 6.5.

Map: Earthquake Fault Zones
(Source: California Geological Survey – Azusa Quadrangle, 2014)



MAP EXPLANATION

EARTHQUAKE FAULT ZONES

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

Active Fault Traces
Faults considered to have been active during Holocene time and to have potential for surface rupture: Solid Line in Black or Red where Accurately Located; Long Dash in Black or Solid Line in Purple where Approximately Located; Short Dash in Black or Solid Line in Orange where Inferred; Dotted Line in Black or Solid Line in Rose where Concealed; Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

SEISMIC HAZARD ZONES

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

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Overlapping Liquefaction and Earthquake-Induced Landslide Zones
Areas that lie within zones of required investigation for both liquefaction and earthquake-induced landslides.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Earthquakes in the City of Duarte** below.

Impact of Earthquakes in the City of Duarte

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 (e.g. 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

Earthquake-Induced Landslides

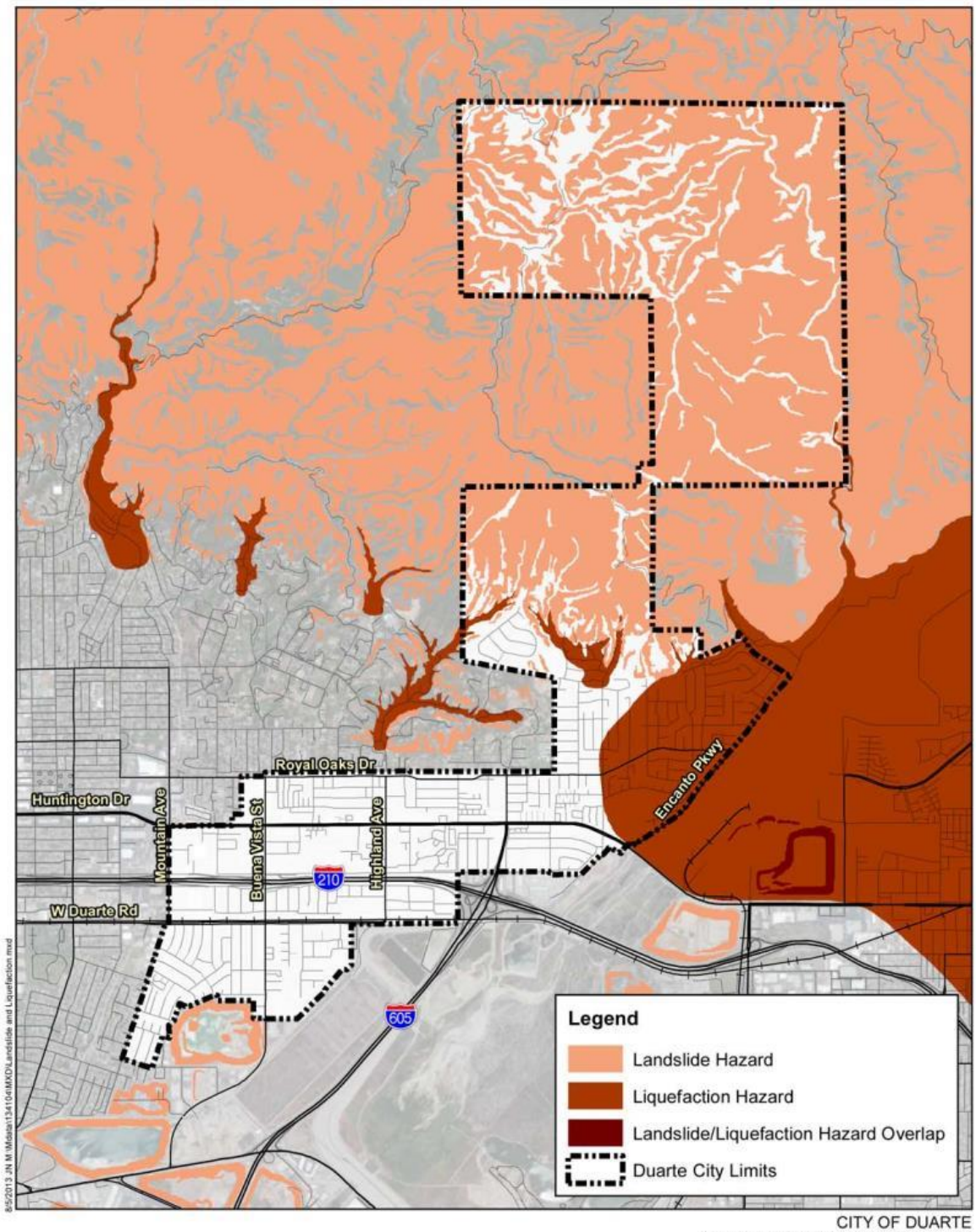
Earthquake-induced landslides are secondary earthquake hazards that occur from ground shaking. They can destroy the roads, buildings, utilities, and other critical facilities necessary to respond and recover from an earthquake. Many communities in Southern California have a high likelihood of encountering such risks, especially in areas with steep slopes. Seismically induced landslides have the potential to occur in limited areas, but proper geotechnical investigation and mitigation will minimize these secondary seismic hazards. The northeast mountainous areas of the City are generally too steep, and bedrock is too unstable for typical construction. Erosion, landslides and shaking from earthquakes can be severe hazards within these areas.

Liquefaction

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other events. Liquefaction occurs in saturated soils, which are soils in which the space between individual soil particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other. Because liquefaction only occurs in saturated soil, its effects are most commonly observed in low lying areas. Typically, liquefaction is associated with shallow groundwater, which is less than 50 feet beneath the earth's surface.

According to the City of Duarte's General Plan (2007), liquefaction presents the most prominent secondary earthquake ground failure issue in the City. The most notable areas of liquefaction potential are along the eastern portion of the City to the north of Encanto Park and Rancho Duarte Golf Course.

Map: Earthquake-Induced Liquefaction & Landslide Areas
(Source: City of Duarte 2014 Hazard Mitigation Plan)

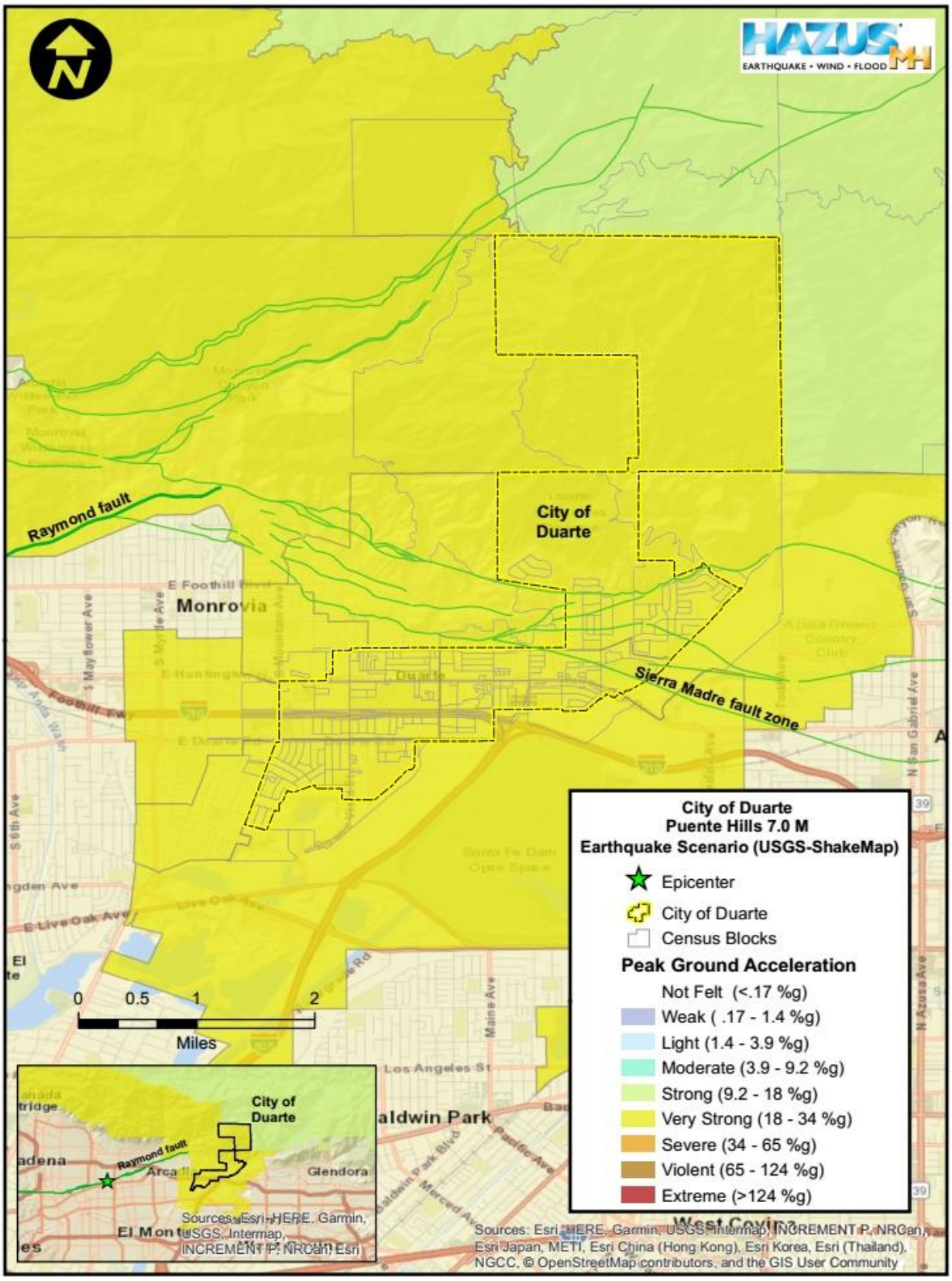


HAZUS Loss Projection Maps and Reports

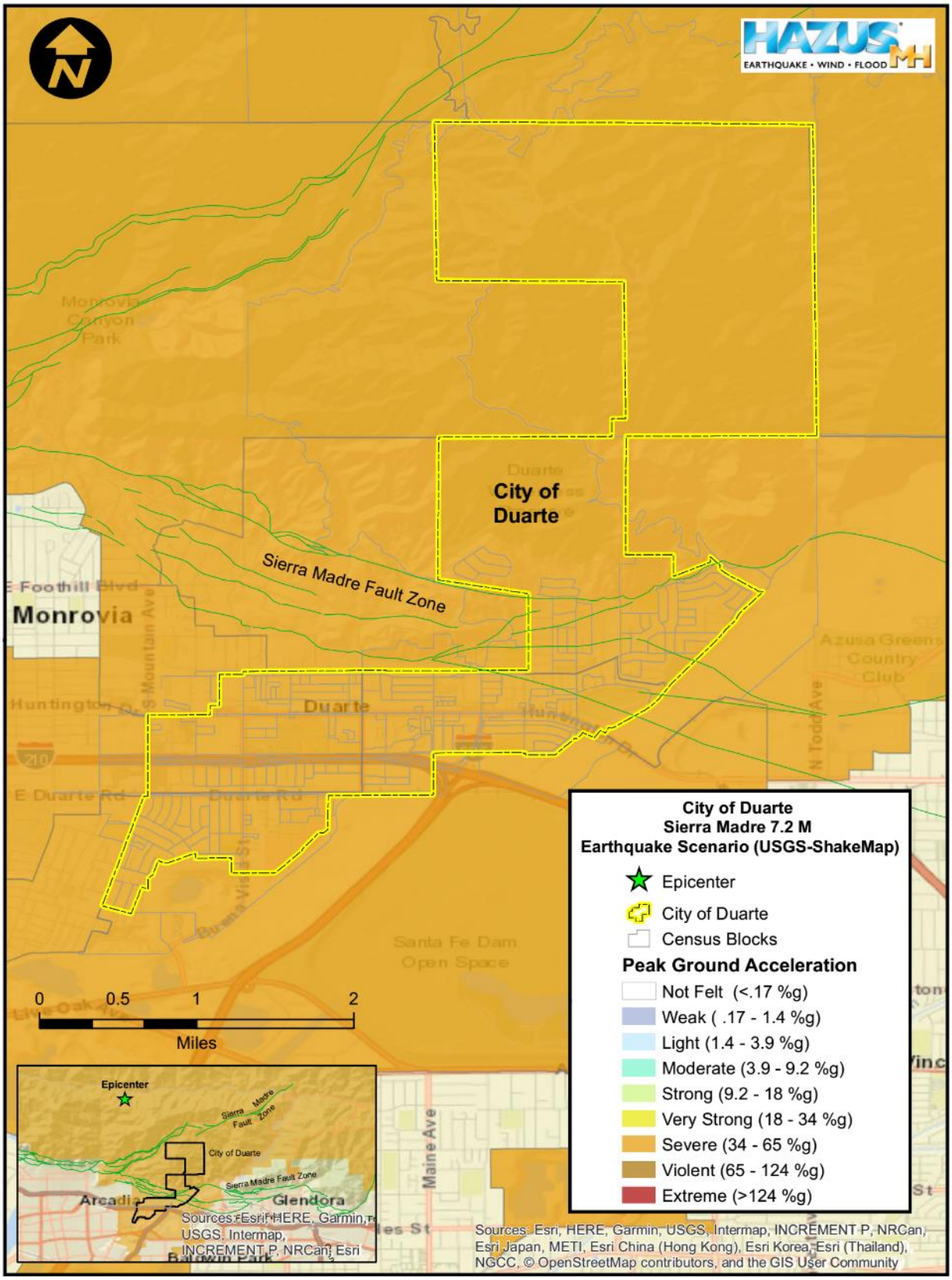
FEMA develop a loss projection software program that yields maps and data reports for hazards including earthquake, hurricane, flooding, and tsunami. The software is known as “HAZUS” which is an acronym for “Hazards United States”. Once the location and size of a hypothetical earthquake are identified, HAZUS-MH estimates the intensity of the ground shaking, the number of buildings damaged, the number of casualties, the amount of damage to transportation systems and utilities, the number of people displaced from their homes, and the estimated cost of repair and clean up.

Following are the maps created by Emergency Planning Consultants from HAZUS for the San Andreas Fault, Sierra Madre Fault, and Puente Hills Fault. The supporting HAZUS reports are located in the Attachments section at the end of the Mitigation Plan.

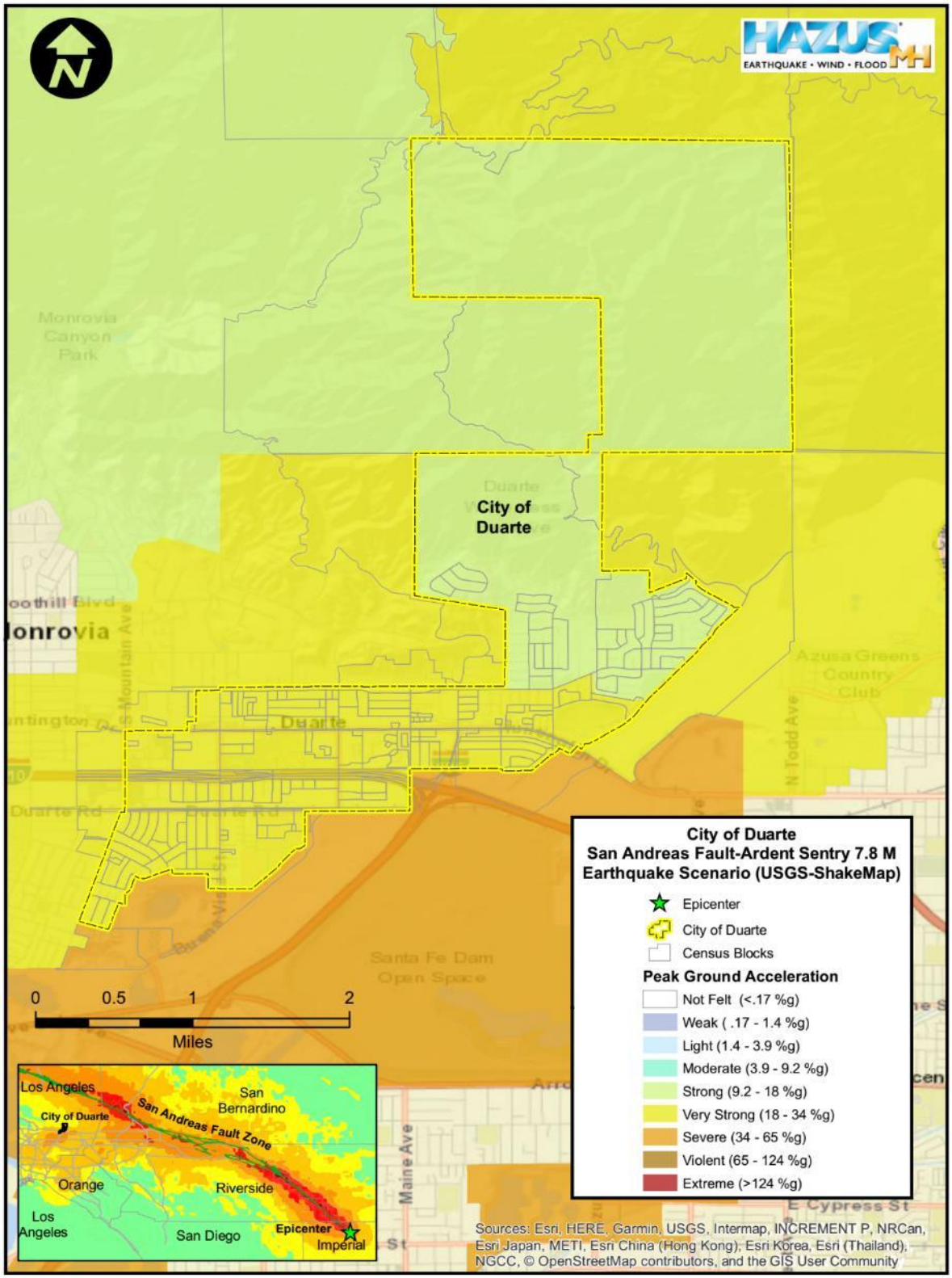
Map: Earthquake Scenario Map – Puente Hills M7.0
(Source: Emergency Planning Consultants)



Map: Earthquake Scenario Map – Sierra Madre M7.2
(Source: Emergency Planning Consultants)



Map: Earthquake Scenario – San Andreas M7.8
(Source: Emergency Planning Consultants)



Structures and Building Code

The built environment is susceptible to damage from earthquakes. Buildings that collapse can trap and bury people. Lives are at risk, and the cost to clean up the damages is great. In most California communities, including the City of Duarte, many buildings were built before 1993 when building codes were not as strict. In addition, retrofitting is not required except under certain conditions and can be expensive. Therefore, the number of buildings at risk remains high.

The greatest of those threats exists with unreinforced masonry buildings which are very vulnerable to catastrophic collapse during a significant earthquake. At present, the City of Duarte has identified 8-10 unreinforced masonry buildings and is working with the owners to comply with the California Building Code.

Implementation of earthquake mitigation policy most often takes place at the local government level. The City of Duarte Building Division enforces building codes pertaining to earthquake hazards.

Additionally, the City has implemented basic building requirements that are above and beyond what the State demands for hazard mitigation. Newly constructed buildings in Duarte that are built in an area subject to earthquake-induced landslide or liquefaction are typically built with extra foundation support. Such support is found in the post-tension reinforced concrete foundation; this same technique is used by coastal cities to prevent home destruction during cases of liquefaction.

Generally, these codes seek to discourage development in areas that could be prone to flooding, landslide, wildfire and/or seismic hazards; and where development is permitted, that the applicable construction standards are met. Developers in hazard-prone areas may be required to retain a qualified professional engineer to evaluate level of risk on the site and recommend appropriate mitigation measures.

Wildfire Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Wildfire in the City of Duarte** below.

Previous Occurrences of Wildfire in the City of Duarte

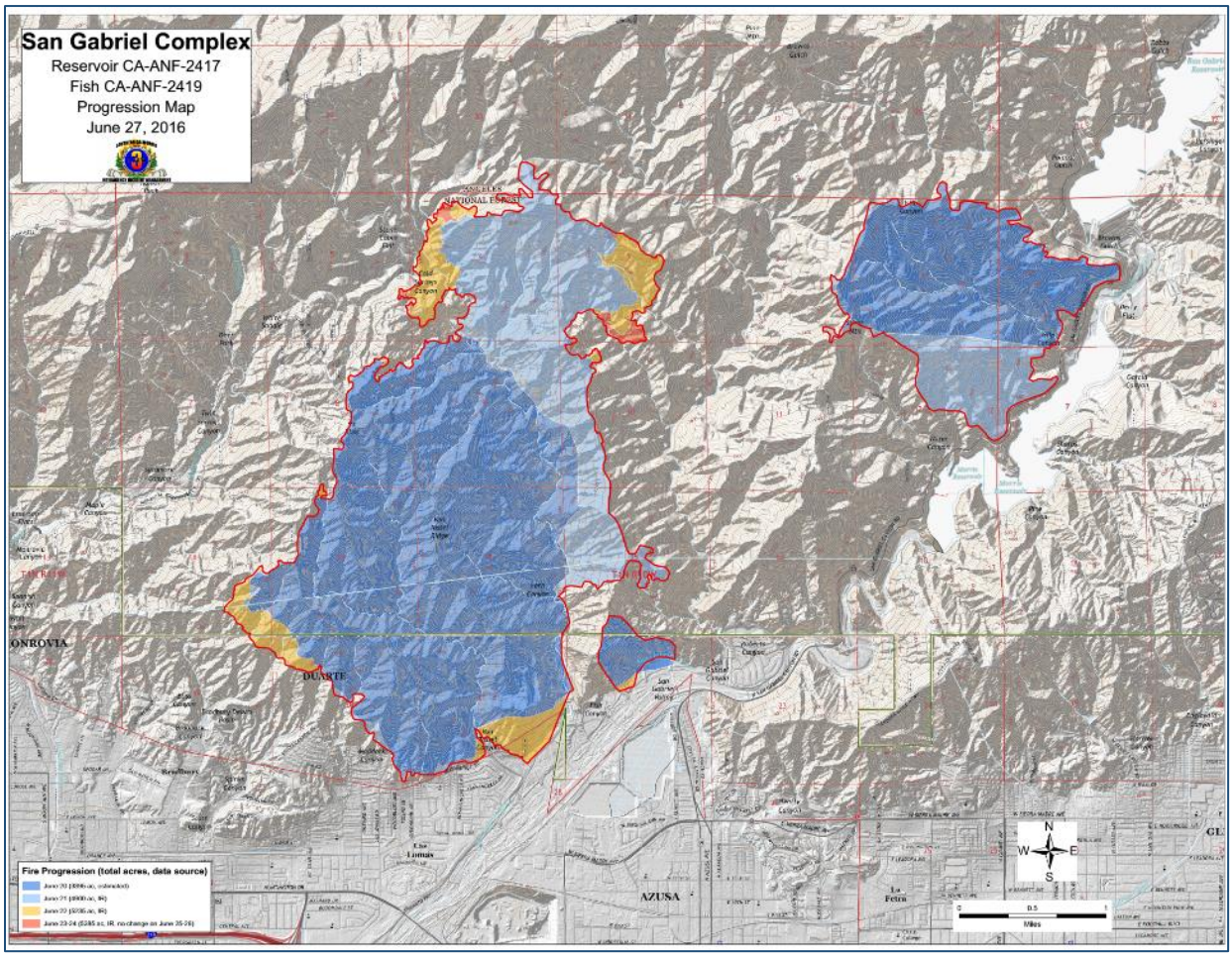
The most recent wildfire outbreak closest to Duarte was the San Gabriel Complex fire which ignited the morning of June 20, 2016. According to InciWeb (Source), the San Gabriel Complex fire consisted of 2 fires, the Reservoir Fire and the Fish Fire. Both fires originated northeast of the City limits as shown on **Map: San Gabriel Complex Fire Progression**. The cause of the Reservoir Fire was due to a vehicle crash while the cause of the Fish Fire is still under investigation. The fires were burning in fuel that was 30+ years old with 6 to 8-foot chaparral and large grass crop.

At the height of the fire, 1,376 homes were evacuated. The American Red Cross established an Evacuation Center and 1,460 staff from multiple local, state and federal agencies worked to protect property and suppress the fire. Road closures were in place and law enforcement patrolled for security while firefighters worked through the night to contain the fire.

Although the San Gabriel Complex Fire threatened homes in the City, no property damage was reported. Also see **Landslide Hazards** for discussion of post-fire impacts.

Photo: 2017 Fish Fire Impacted Duarte
Source: Duarte Public Safety

Map: San Gabriel Complex Fire Progression (Source: CAL FIRE)



Previous Occurrences of Wildfire in Los Angeles County

Due to its weather, topography, and native vegetation, the majority of Los Angeles County is at risk from wildland fires. The extended droughts characteristic of California's Mediterranean climate result in large areas of dry vegetation that provide fuel for wildland fires. Furthermore, the native vegetation typically has a high oil content that makes it highly flammable. The area is also intermittently impacted by Santa Ana winds, the hot, dry winds that blow across southern California in the spring and late fall.

The most recent significant wildfire event to impact the County of Los Angeles was the Station Fire in 2009. The Station Fire destroyed 209 structures and burned a total of 160,577 acres within Los Angeles County. According to the United States Forest Service (Source), the Station Fire was the 10th largest in modern California history, and the largest wildfire in Los Angeles County to date.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

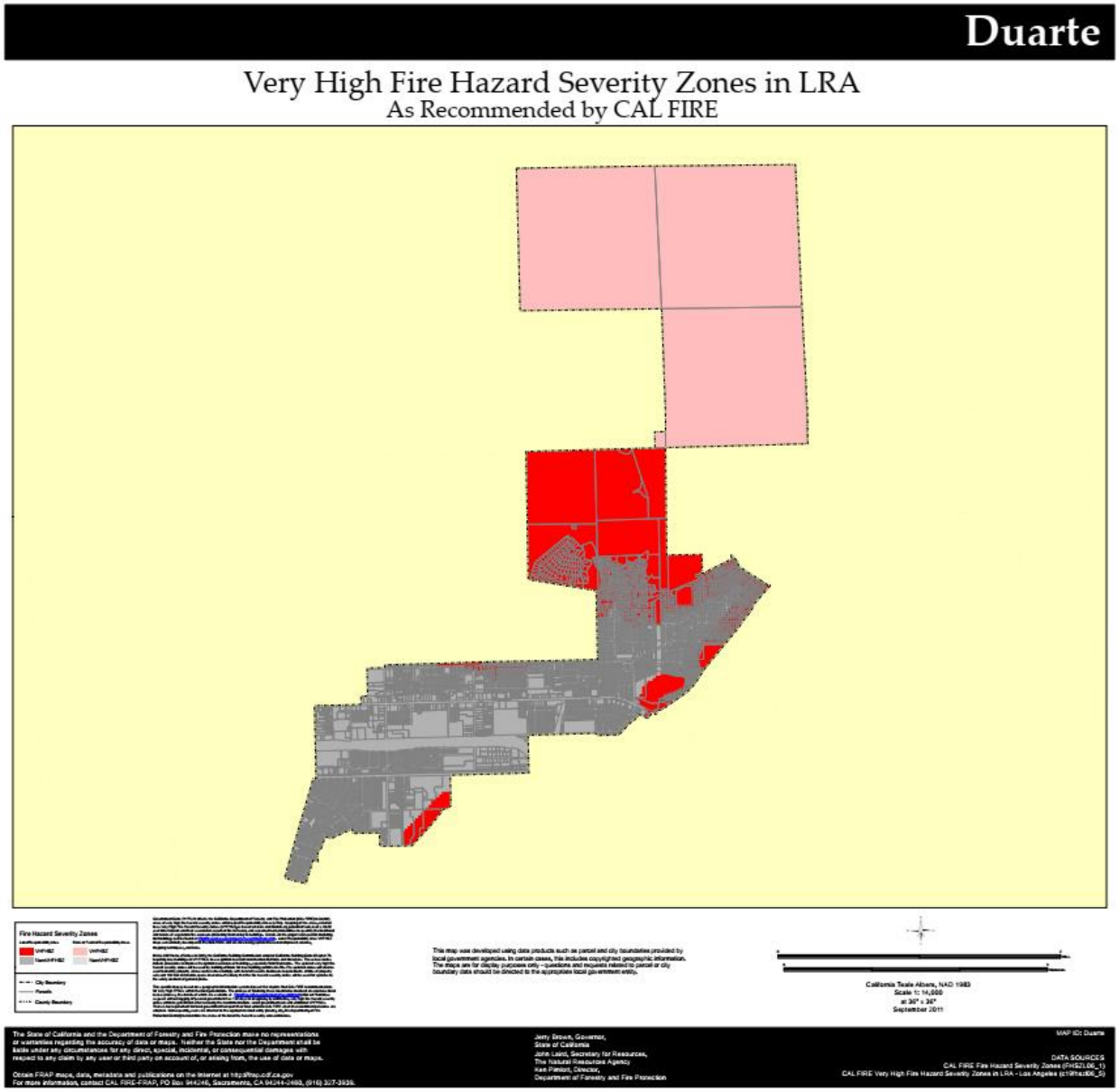
Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

Duarte's location at the base of the San Gabriel Mountains creates an urban/wildland interface that makes Duarte more susceptible to wildfires than cities that do not border the foothills. According to **Map: Very High Fire Hazard Severity Zones** shows properties closest to the foothills to be at greatest risk to wildfires. These areas are at significant risk during the summer months, extended periods of heat, and long periods of no rain. Strong periodic Santa Ana winds add to the fire danger in the City.

Map: Very High Fire Hazard Severity Zones (Source: CAL FIRE, September 2011)



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Wildfire in the City of Duarte** below.

Impact of Wildfire in the City of Duarte

Wildfires and their impact vary by location and severity of any given wildfire event and will likely only affect certain areas of the county during specific times. Based on the risk assessment, it is evident that wildfires will have a potentially devastating economic impact to certain areas of the City.

Impacts that are not quantified, but which may 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

Landslide Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Landslides in the City of Duarte** below.

Previous Occurrences of Landslides in the City of Duarte

In Duarte, wildfires have been the contributing factor for debris and mudflows that have impacted residential neighborhoods in the north foothills of the City. The first hazard event occurred in 1952 when large quantities of debris were carried down Vineyard Avenue. The second hazard event occurred in 1980 following the Stable Fire. The third hazard event occurred in January 2017 downslope of the Fish and Reservoir fire. Duarte was impacted by fire-related mudflows that filled the following Debris Basins: Duarte/Bliss Canyon, Spinks Canyon, Maddock, Las Lomas, Crestview, Upper Dominic, Cedarwood, and Green Bank.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

The City's location at the base of the San Gabriel Mountains makes it susceptible to landslide hazards. These mountains are traversed by deep, steep- sided canyons cut into highly fractured crystalline basement rocks that form the bedrock underpinnings of the mountains. The sides of most canyons are blanketed by unstable hill-slope rock debris that constantly is being stripped away by slope failures from earthquakes and stormwater runoff then washed out to the range fronts.

Heavy rainfall can produce another kind of earth movement: mudflow. A mudflow (or debris flow) is a rapidly moving slurry of water, mud, rock, vegetation, and debris. Larger debris flows are capable of moving trees, large boulders, and even cars. This type of failure is especially dangerous, as it can move at speeds more than 10 miles per hour, is capable of crushing

buildings, and can strike with very little warning. As with soil slips, the development of debris flows is strongly tied to storm periods of prolonged rainfall.

Ground failure occurs during an intense rainfall event following saturation of the soil by previous rains. Even relatively small amounts of debris can cause damage from inundation and/or impact. Due to Duarte's hillsides and steep slopes, mud and debris flow can be a factor, particularly after prolonged rainfall.

1952 Landslide

According to the U.S. Army Corp of Engineers, in September 1952, a fire burned 500 acres of watershed in the foothills north and northeast of the City of Duarte. Of the 500 acres, approximately, 150 acres of vegetation cover was destroyed in the Maddock Canyon Area just north of Duarte Mesa and Vineyard Avenue in the City of Duarte. Maddock Canyon is one of two small canyons located between Fish Canyon and Spinks Canyon and it extends from the mountains toward Vineyard Avenue. In December 1952, four months after the fire, a light rainstorm caused post fire canyon flows in Maddock Canyon. The debris flow caused considerable damage to a new residential subdivision and other residential properties along Vineyard Avenue, Conata Street, and Royal Oaks Drive. Due to the potential for more debris flow and mudslides, the residents of the area sent a petition to the Los Angeles County Board of Supervisors requesting aid.

In July 1953, the County of Los Angeles committed to the building of a debris basin in Maddock Canyon. This was followed by the adoption of a U.S. Congress Bill that provided a million dollars in funding for the construction of five debris basins along the San Gabriel foothills as well as improvements for Sawpit Wash.

1980 Landslide

On November 16, 1980 the Stable Fire fanned by Santa Ana Wind conditions swept down from the foothills and destroyed 35 homes in the City of Duarte. Reports indicated that the fire had moved from the City of Azusa, east of the San Gabriel River to the Duarte and Duarte homes in 8 to 10 minutes, due to strong shift in winds. The fire was responsible for defoliating several steep slopes and exposed a residential subdivision to mudslides.

Immediately after the “Stable Fire”, City and County personnel began taking measures to deal with possible floods and mudslides. Mud diversion structures were constructed, 50,000 sandbags were distributed, and parking was restricted on streets with potential slides. Since the Stable Fire occurred during California’s rainy season, “Storm Watch” flyers were also issued to residents in Duarte’s hillside areas. A Disaster Center was also established at City Hall to monitor weather reports and storm situations and to inform residents. The City prepared to mobilize personnel and equipment if needed to clear mud flows from the public streets and parkways.

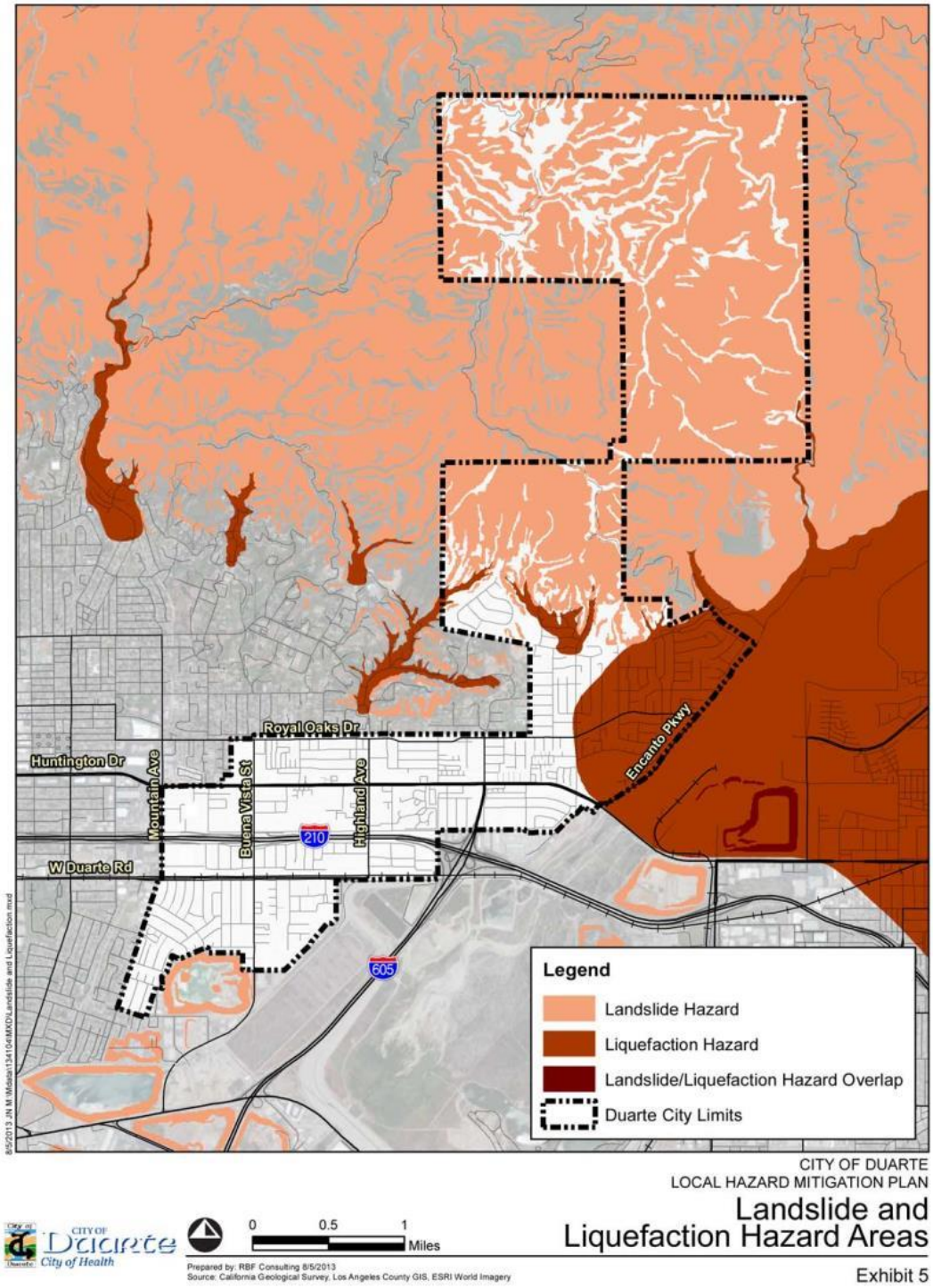
As quickly as possible, several temporary debris basins were constructed, and existing debris basins were cleared and reinforced with sandbags. The City also provided erosion control consultation to residents. In the months that followed the City encouraged the re-seeding of hillside areas.

2017 Debris Flow

On January 22, 2017, authorities issued mandatory evacuation orders for homes below the Fish fire burn area in the City of Duarte as powerful storms threatened to drop up to 6 inches of rain, prompting fears of mudslides and flooding. The storms caused mud and debris flows that swept past K-rails and clogged up several roadways in the hillside communities.

The **Map: Landslide Zones** identifies areas in the City of Duarte that are considered at highest risk for landslides.

Map: Landslide Zones
(Source: City of Duarte 2014 Hazard Mitigation Plan)



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impacts of Landslides in the City of Duarte** below.

Impacts of Landslides in the City of Duarte

Based on the risk assessment, it is evident that landslides continue to have potentially devastating economic impact 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
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed

Flood Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

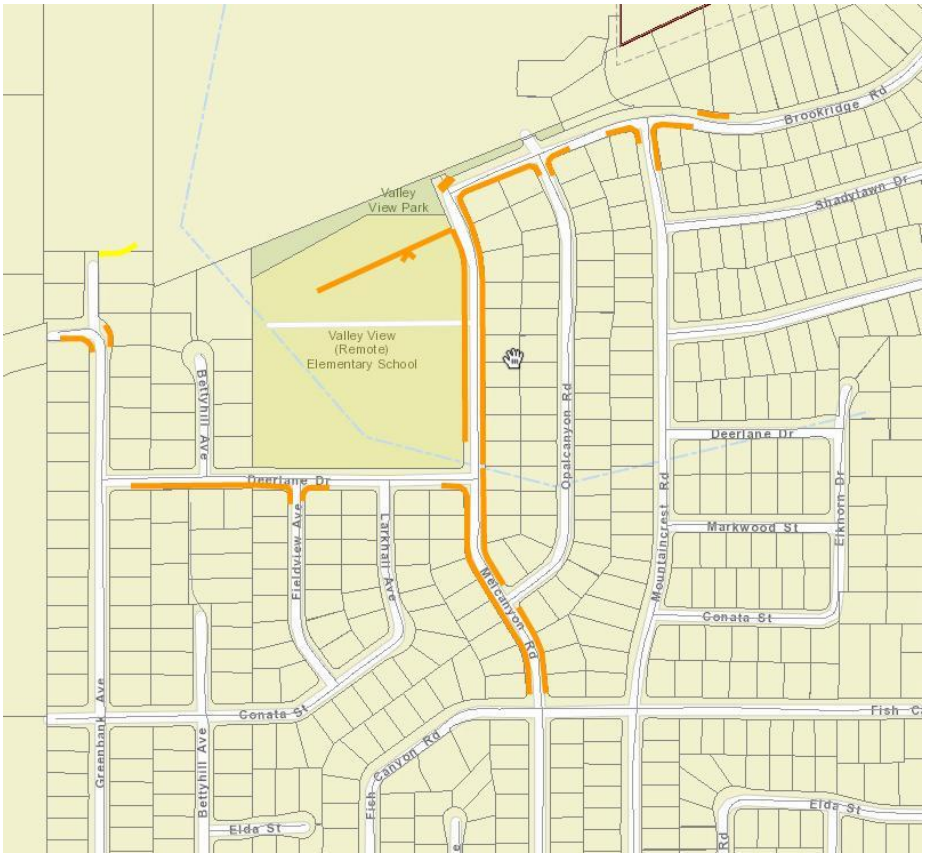
A: See **Previous Occurrences of Flood in the City of Duarte** below.

Previous Occurrences of Flooding in the City of Duarte

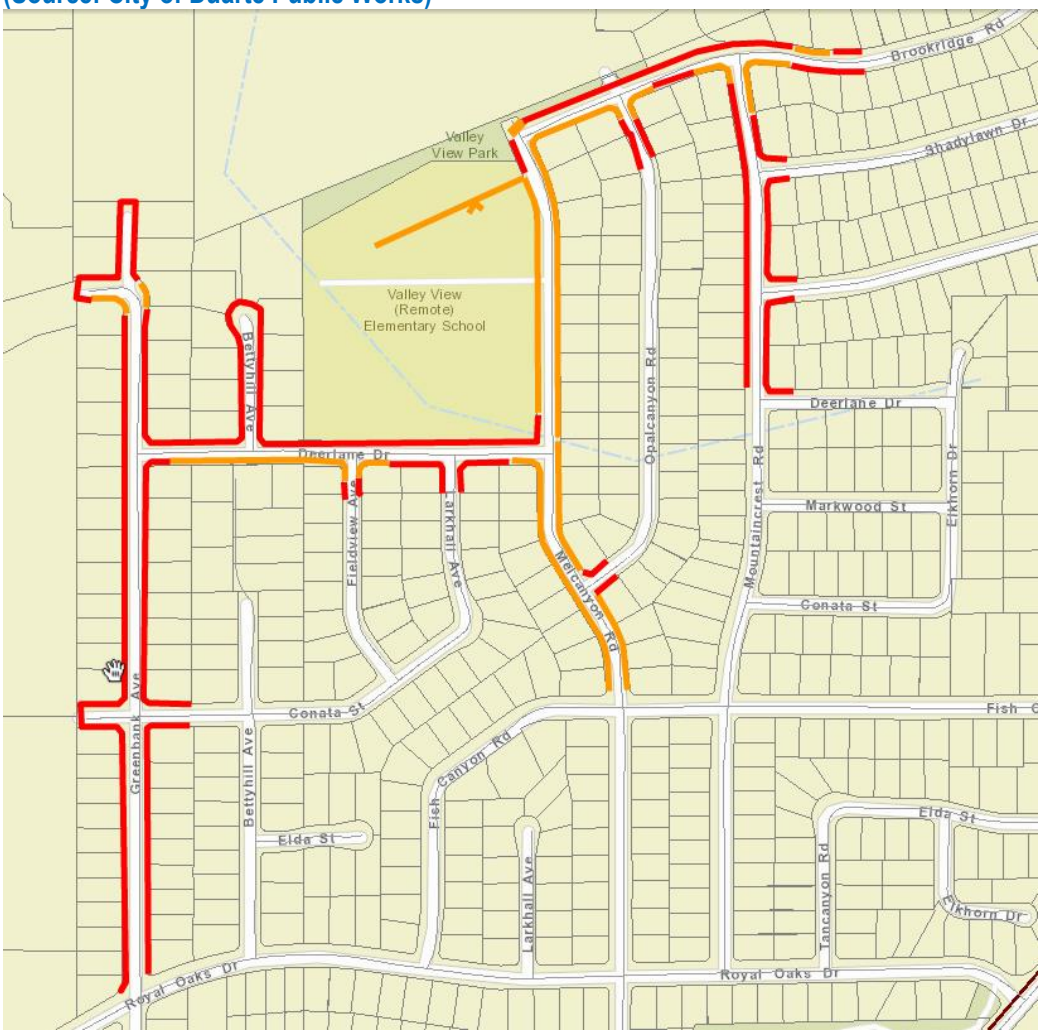
Flooding has not been a serious hazard to Duarte in several decades, and the risk of serious flooding in the City is considered minimal. Duarte does not lie within a 100- or 500- year floodplain, as delineated by the Federal Emergency Management Agency (FEMA). However, the potential for a localized flood event still exists within Duarte, and it is an important hazard to be addressed in the City's Hazard Mitigation Plan.

Since the writing of the 2014 Mitigation Plan, heavy rains in January and February of 2017 resulted in flooding and debris accumulation to several streets in the foothills of Duarte as shown in the following maps and photos provided by Duarte Public Works.

Map: Location of K-Rails Following 2017 Fish Fire
(Source: City of Duarte Public Works)



Map: Location of Parking Restrictions Following 2017 Fish Fire (Source: City of Duarte Public Works)



Previous Occurrences of Flooding in Los Angeles County

Los Angeles County records reveal since 1861, the Los Angeles River has flooded 30 times, on average once every 6.1 years. But averages are deceiving, for the Los Angeles basin goes through periods of drought and then periods of above average rainfall. Between 1889 and 1891 the river flooded every year, from 1941 to 1945, the river flooded 5 times. Conversely, from 1896 to 1914, and again from 1944 to 1969, a period of 25 years, the river did not have serious floods.

Average annual precipitation in Los Angeles County ranges from 13 inches on the coast to approximately 40 inches on the highest point of the Peninsular Mountain Range that transects the County. Several factors determine the severity of floods, including rainfall intensity and duration. A large amount of rainfall over a short time span can result in flash flood conditions. A sudden thunderstorm or heavy rain, dam failure, or sudden spills can cause flash flooding. The National Weather Service's definition of a flash flood is a flood occurring in a watershed where the time of travel of the peak of flow from one end of the watershed to the other is less than six hours.

The towering mountains that give the Los Angeles region its spectacular views also wring a great deal of rain out of the storm clouds that pass through. Because the mountains are so steep, the rainwater moves rapidly down the slopes and across the coastal plains on its way to the ocean.

Naturally, this rainfall moves rapidly downstream, often with severe consequences for anything in its path. In extreme cases, flood-generated debris flows will roar down a canyon at speeds near 40 miles per hour with a wall of mud, debris and water, tens of feet high. Flooding occurs when climate, geology, and hydrology combine to create conditions where water flows outside of its usual course.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

Although the San Gabriel River is adjacent to the City, the majority of the City's flooding concerns are on urban flooding. While urban flooding is not a major problem in the City, it is one that requires on-going maintenance of existing storm drains and flood control channels. Debris accumulation in storm drains and flood control channels is one of the largest maintenance problems for the City. Low-lying areas of the City are particularly susceptible to urban flooding. As identified in the 2014 Hazard Mitigation Plan, the following areas are considered at risk due to urban flooding:

- Huntington Drive, north side, west of Buena Vista Street
- Encanto Parkway, north of Huntington Drive
- Encanto Parkway near Fish Canyon Road
- Central Avenue, north side, east of Santo Domingo Avenue
- Buena Vista Street, east side, south of Galen Street
- Vineyard Avenue north of Royal Oaks

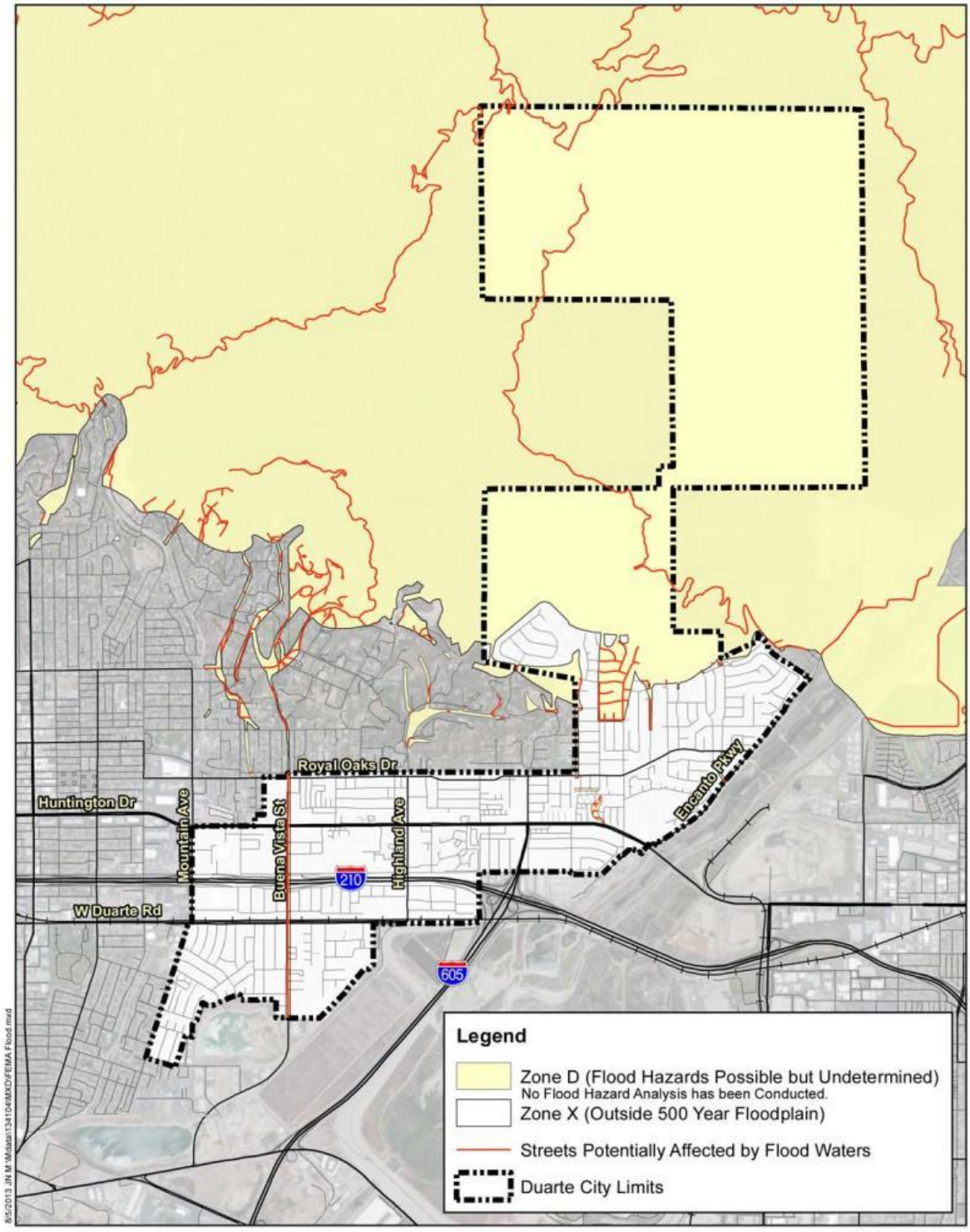
According to FEMA, the City of Duarte is designated a No Special Flood Hazard Area (NSFHA). A No Special Flood Hazard Area (NSFHA) is an area that is in a moderate- to low-risk flood zone (Zones B, C, X Pre- and Post-FIRM). According to **Map: Flood Insurance Rate Map**, the built areas of the City are in "Flood Zone X" and "Flood Zone D". Zone X is defined as the area outside the 500-year flood and protected by levee from 100-year flood. Zone D is defined as areas in which flood hazards are undetermined (no analysis of flood hazards has been conducted), but possible.

An NSFHA is not in any immediate danger from flooding caused by overflowing rivers or hard rains. However, it's important to note that structures within a NSFHA are still at risk. In fact, over 20-percent of all flood insurance claims come from areas outside of mapped high-risk flood zones.

National Flood Insurance Program

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.

Map: FEMA Flood Zones
(Source: City of Duarte 2014 Hazard Mitigation Plan)

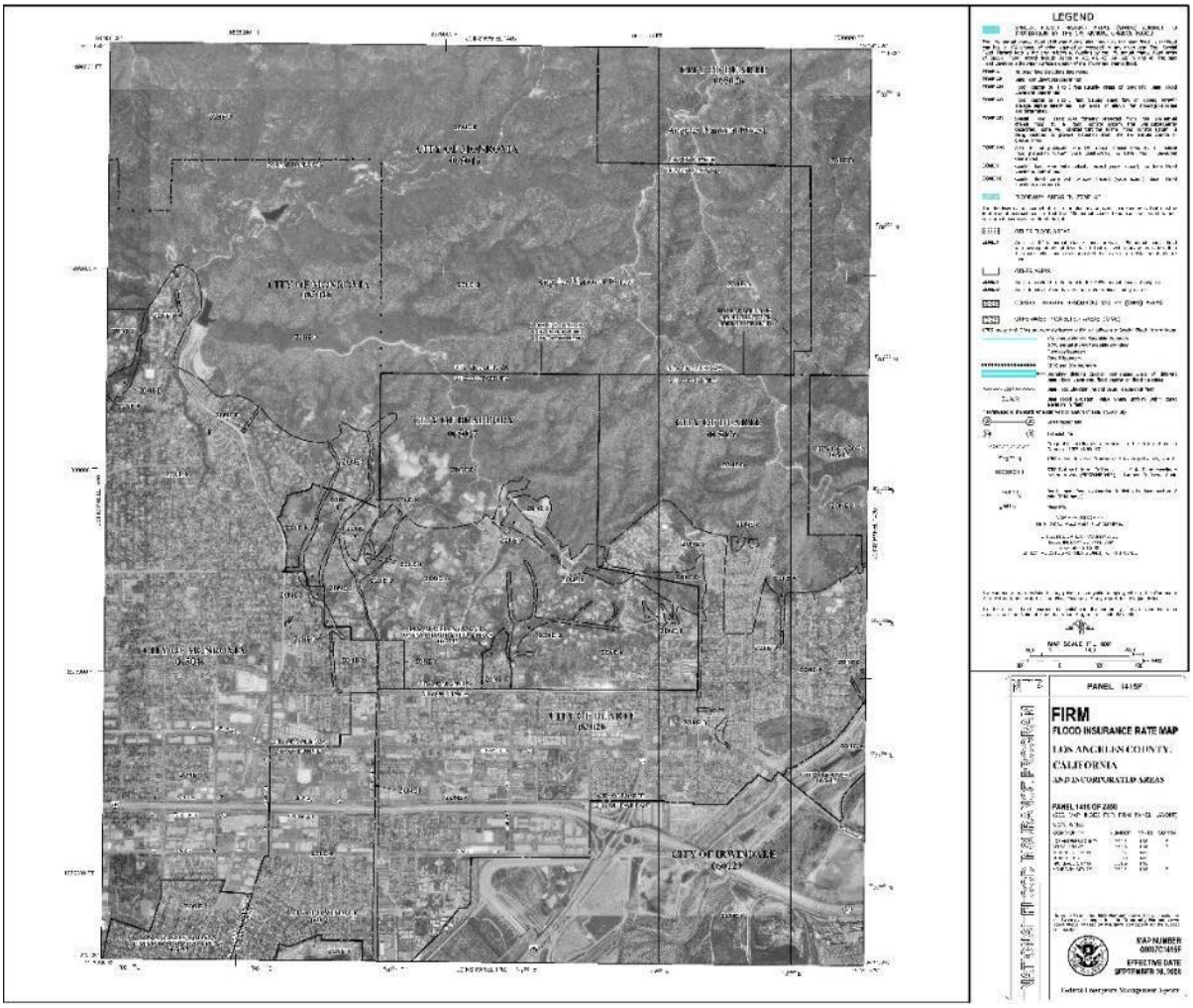


CITY OF DUARTE
LOCAL HAZARD MITIGATION PLAN

FEMA Flood Zones

Exhibit 10

Map: Flood Insurance Rate Map
(Source: FEMA Flood Map Service Center)



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Flooding in the City of Duarte** below.

Impact of Flooding in the City of Duarte

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.

Impact that is not quantified, but 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
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed

Dam Failure Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Dam Failure in the City of Duarte** below.

Previous Occurrences of Dam Failure in the City of Duarte

The City of Duarte has not been recently affected by a release/failure of any of the dam facilities identified in **Table: Dams Near City of Duarte**.

Since the writing of the 2014 Mitigation Plan, there have been no dam failure incidents that have impacted the City of Duarte.

Previous Occurrences of Dam Failure in Los Angeles County

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. In the latter half of the twentieth century, enormous public work projects were completed, which served to mitigate flood damage in the Los Angeles area.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

If not for the successful flood control system, the City of Duarte could experience major flood events based on its location at the base of the San Gabriel Mountains. The range's major watershed is the San Gabriel River with three main forks and countless tributaries that fully drain

20 percent of the mountain's precipitation. The San Gabriel River runs in a north/south direction near the east boundary of the City of Duarte.

The San Gabriel River is controlled by a network of dams and flood control measures. This network of carefully planned dams has protected the City of Duarte from any serious flooding events. The natural water cycle and flow are significantly altered to protect the adjacent communities from flood damage and to better use local water resources for urban and agricultural water supplies. The network of dams and flood control measures have been very effective in controlling flood waters in Los Angeles County; however, a major earthquake could cause sudden failure of one of these dams resulting in major damage.

There are four dams in the Los Angeles network that could have a direct impact on the City:

Table: Dams Near City of Duarte

Name of Facility	Owner	Primary Purpose
Sawpit Reservoir	Los Angeles County Department of Public Works	Flood Control
Cogswell Dam	Los Angeles County Department of Public Works	Flood Control/Water Conservation
San Gabriel Dam	Los Angeles County Department of Public Works	Flood Control
Morris Dam	Los Angeles County Department of Public Works	Flood Control/Water Conservation

Sawpit Reservoir

The Sawpit Reservoir was constructed by the Los Angeles County Department of Public Works in 1927 in Sawpit Canyon. Sawpit Canyon drains the southern slopes of Monrovia Peak. The reservoir has a 157' crest height and it holds 10 acres of water. The Sawpit Reservoir is located 2.5 miles northeast of the City of Duarte.

Cogswell Dam

The Cogswell Dam and Reservoir is owned by the Los Angeles County Department of Public Works and is operated by the Department of Power and Water. It was completed in April of 1934 at a cost of $3.1 million. It is a rock-filled structure with a concrete cutoff wall and rises 255 feet above the original stream bottom. Used both for flood control and water conservation, Cogswell Dam is located 22 miles north of the cities of Azusa and Duarte in San Gabriel Canyon.

San Gabriel Dam

The San Gabriel Dam and Reservoir is owned by the Los Angeles County Department of Public Works. Construction of this dam began in 1932 and finished in 1939 at a cost of $17 million. It is a compacted, earth-filled and rock-filled dam with a concrete crest. San Gabriel Dam is located seven miles north of the Cities of Azusa and Duarte.

Morris Dam

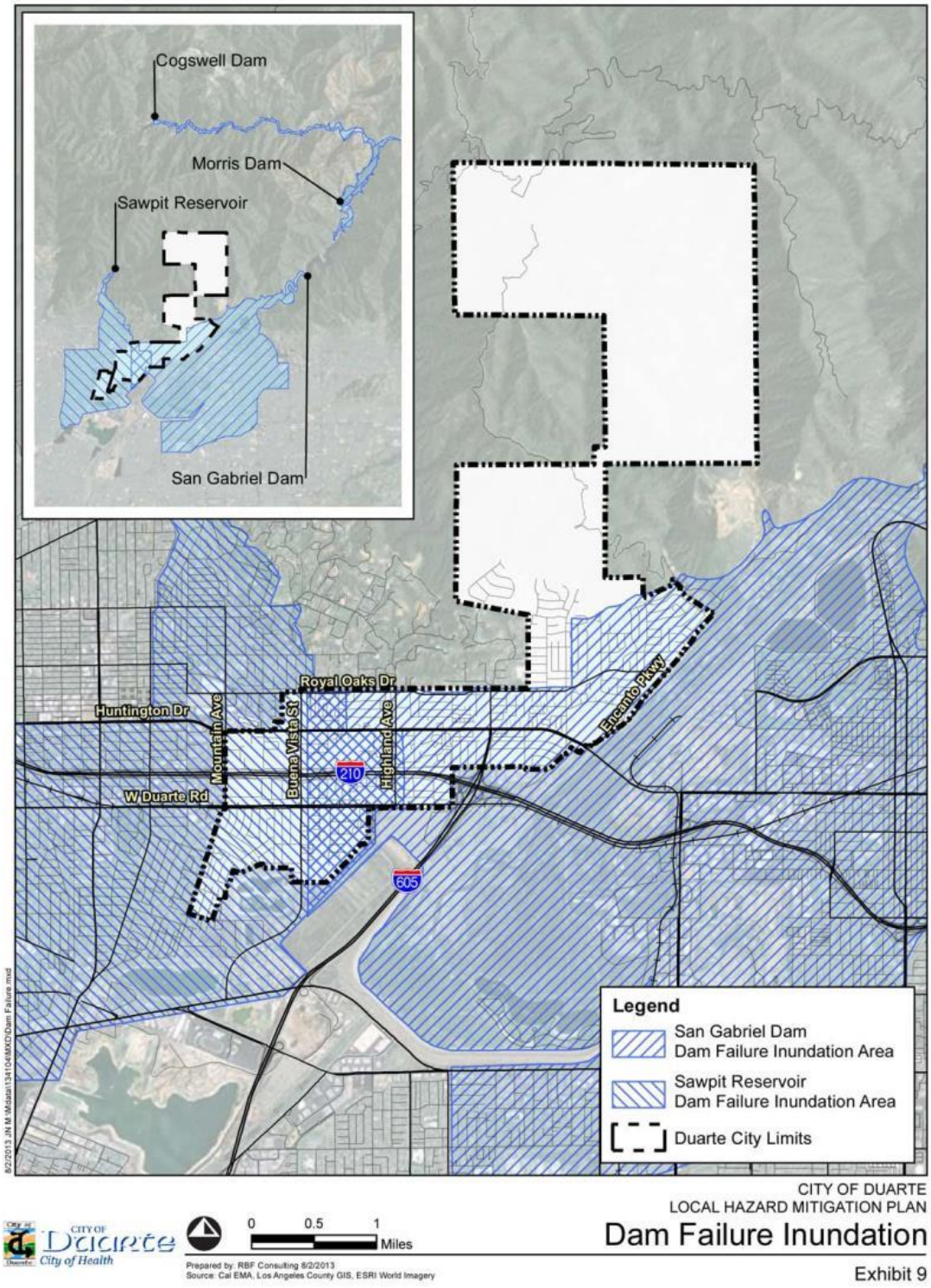
The Morris Dam and Reservoir was built by the City of Pasadena in 1934 at a cost of $7.6 million. It was later relinquished to the Metropolitan Water District (MWD) of Southern California. In 1955,

it was transferred to the Los Angeles County Department of Public Works. Morris Dam is a concrete, partially-arched gravity structure. It is 800 feet long and rises 245 feet above the original streambed. Morris Dam is located just a few miles below the San Gabriel Dam and its primary use is water conservation.

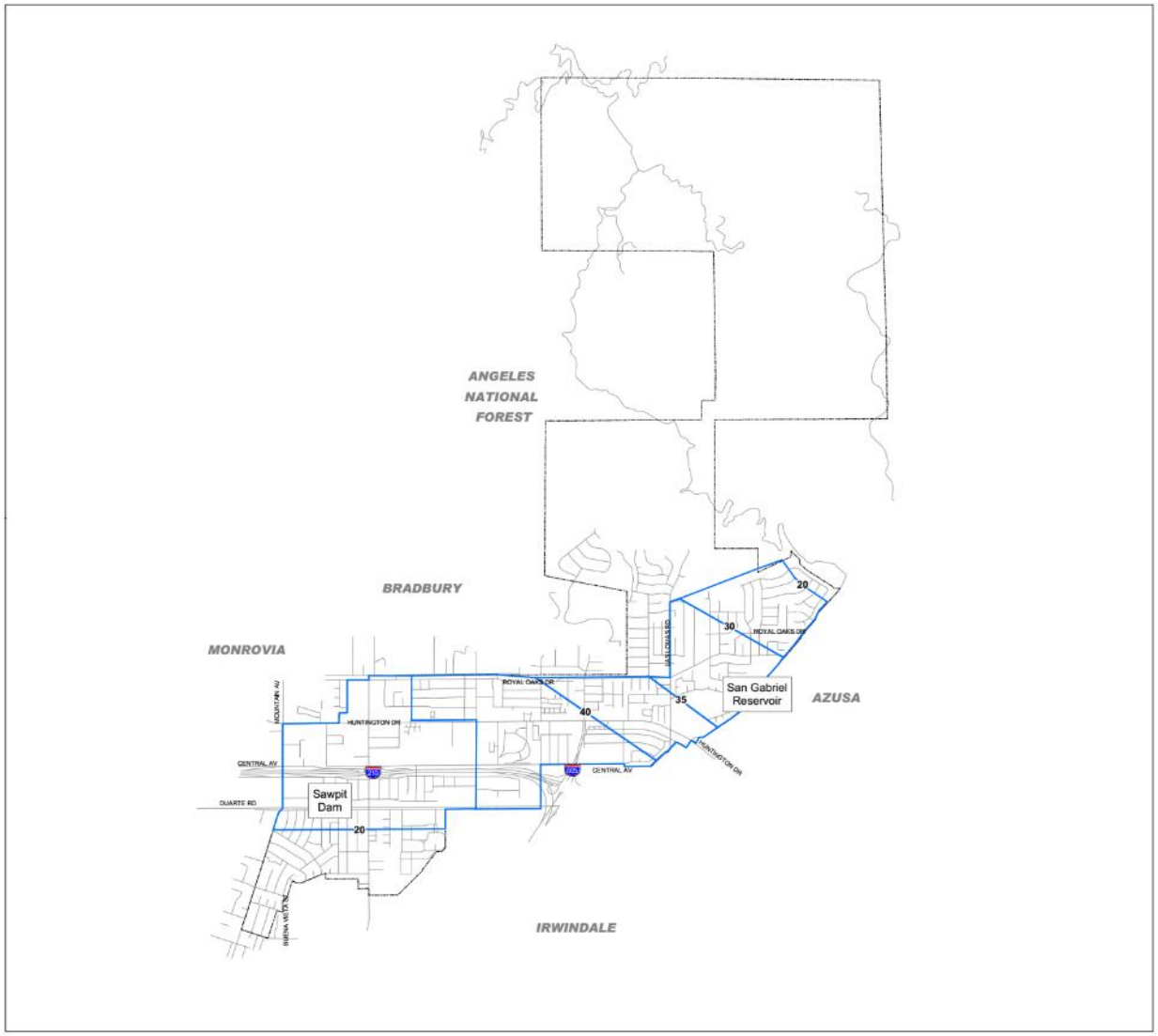
According to the City's 2014 Hazard Mitigation Plan, the entire City and all critical facilities are susceptible to dam failure, making dam failure inundation one of the City's most significant hazards and placing the greatest number of residents and structures at risk. The Dam Failure Inundation Map below shows that all of the City's critical facilities are located within dam failure inundation areas. Analysis of the dam failure inundation overlay shows that the populated area affected by dam failure is a total of 1,643 acres. A total of 18,773 residents (88.05 percent of the City's total population) would be affected in the event of a dam failure.

Map: Dam Failure Inundation Areas below shows the potential flood inundation areas in the event of a catastrophic dam failure at any of the aforementioned facilities.

Map: Dam Failure Inundation Areas
(Source: City of Duarte 2014 Hazard Mitigation Plan)



Map: Dam Failure Timing Scenario
(Source: City of Duarte General Plan, 2007)



General Plan
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2020

Diagram Safe - 4

LEGEND

City Limits

Elapsed time in minutes from dam failure to arrival of first water

Source: City of Duarte - June 2006

NORTH

0 700 1,400 2,800 4,200 Feet

July 10, 2006

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Dam Failure in the City of Duarte** below.

Impacts of Dam Failure in the City of Duarte

Based on the risk assessment, it is evident that dam failures 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
- ✓ Significant disruption to students and teachers as temporary facilities and relocations are needed

Windstorm Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Windstorms in the City of Duarte** below.

Previous Occurrences of Windstorms in the City of Duarte

According to City of Duarte, the most recent windstorm on record occurred in the winter of 2011. High winds caused about $50.3 million in damages within Los Angeles County. This amount did not meet the federal threshold for public damages and therefore, a federal disaster declaration was not warranted. However, the Duarte City Council declared a local emergency due to the effects of this windstorm. The City incurred damages of approximately $82,000.

At the windstorms peak, 440,000 customers throughout Los Angeles County lost power. Very strong gusts reached 67 mph in Saugus, 69 mph in Warm Springs, 36 mph in Santa Monica, 47 mph at Los Angeles International Airport, and 97 mph was reported at Whitaker Peak in the Angeles National Forest.

Since the writing of the 2014 Mitigation Plan, there have been no significant windstorms in the City of Duarte.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

Based on the 2011 windstorm, it is not difficult to assume that a future windstorm event could generate similar damage. Severe windstorms pose a significant risk to life and property in the City of Duarte 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 in and near the community. High winds have destructive impact, especially to trees, power lines, and utility services.

The most common wind condition is a Santa Ana Wind. This condition has generated winds that have exceeded 100 mph. Wind velocities of up to 111 mph have been generated from the same Santa Ana wind, resulting in the loss of life due to flying debris.

The entire City and all critical facilities are susceptible to windstorm damage. A majority of windstorm damage that occurs is associated with fallen trees/tree limbs. Facilities located in close proximity to large trees may be more susceptible to windstorm damage as a result. However, it is highly unlikely that a windstorm would completely destroy any of the identified critical facilities.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Windstorms in the City of Duarte** below.

Impacts of Windstorms in the City of Duarte

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

Impacts 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

Hazardous Materials Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Previous Occurrences of Hazardous Materials in the City of Duarte** below.

Previous Occurrences of Hazardous Materials in the City of Duarte

The City of Duarte has not been recently affected by a significant hazardous materials release. In 2018, the California State Warning Center received approximately 1,200 hazardous material spill reports on hazardous material incidents within Los Angeles County. Of these incidents, most are minor, but some do cause significant impacts such as injuries, evacuation, and the need for cleanup. (Source: https://www.caloes.ca.gov/for-individuals-families/hazardous-materials/spill-release-reporting)

The table below contains a list of spills documented within the City on the California Office of Emergency Services (Cal OES) Hazardous Materials Spill Report website between 2011 and the beginning of 2019. Since 1993, there have been 32 incidents documented within the City of Duarte. (Source: https://w3.calema.ca.gov/operational/malhaz.nsf/)

Date	Agency	Substance	Location
9/2/2018	Southern California Edison	Oil	1442 3rd Street
2/5/2018	California American Water	Sodium Hypochlorite	2654 Royal Oaks Dr
8/15/2015	Southern California Edison	Hydraulic Fluid	1088 Hamilton Road
8/3/2015	Edison	Sodium Hypochlorite	Not Provided
2/16/2013	Los Angeles County Public Works	Sewage	245 Vineyard Ave
6/27/2012	Los Angeles County Public Works	Sewage	Vineyard Ave & Markwood Ave
11/1/2011	Los Angeles County Public Works	Sewage	1300 Pengra Street

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))

A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))

A: See **Local Conditions** below.

Local Conditions

Hazardous materials sites in the City include medical and medical research and development facilities; pharmacies; automotive-related businesses; industrial businesses; and aviation-related businesses.

Medical facilities and medical research and development facilities, such as City of Hope and Santa Teresita Campus, often must use hazardous materials, equipment and processes, including radiation, to conduct biomedical research and employ life-saving techniques. Specifically, Santa Teresita Campus is noted to have a 3,500-gallon liquid petroleum gas (LPG) above-ground tank, and City of Hope powers its emergency generators with both on-site diesel and propane fuel supplies. In addition, pharmacies must also store items considered to be hazardous in the normal course of business. A number of drug entities and pharmaceutical formulations meet the definition of hazardous waste, including such common drugs as epinephrine, nitroglycerin, warfarin, nicotine, and seven common chemotherapy agents. Pharmacies within the City include those at both the City of Hope and Santa Teresita Campus, as well as Target Pharmacy, Rite-Aid and CVS Pharmacy.

Industrial businesses generally store hazardous materials on their premises. Such facilities in the City include several automotive body shops, a pool/spa supply company, Delafield welding and pipe-fitting company, and Justice Brothers automotive chemical company. Of these industrial businesses, Justice Brothers has the greatest potential for storage and use of on-site hazardous materials. A portion of Justice Brothers campus is located in the City of Irwindale, abutting Duarte. Delafield uses acetylene and other chemicals used in the welding process.

Automotive-related businesses, such as car wash and repair facilities, generate hazardous waste in the form of used motor oil, automotive chemicals, fluorescent lamps and tubes, electronics, appliances, automotive tires and batteries. In addition, gas stations store and sell petroleum products. Automotive-related businesses located in the City include the 76 Gas Station and Car Wash, Mobil Gas Station, and Arco Gas Station.

In addition, the Rancho Duarte Golf Course located in the eastern portion of the City was formerly a landfill, redeveloped as a golf course, and is the site of a methane gas recovery system.

One concern in particular regarding hazardous materials spills is the potential for chemicals and substances to migrate into the groundwater table. The City is served by California American Water, who relies mainly on groundwater pumped from local wells for its supplies. These wells are located in the Main San Gabriel, Central and Raymond basins. The basins are large underground reservoirs that cover hundreds of square miles. Any potential contaminants entering the groundwater aquifer could impact California American Water's ability to serve its customers.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))

A: See **Impact of Hazardous Materials in the City of Duarte** below.

Impact of Hazardous Materials in the City of Duarte

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

Impact that is not quantified, but 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
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed

PART III: MITIGATION STRATEGIES

Mitigation Strategies

Overview of Mitigation Strategy

As the cost of damage from natural disasters continues to increase nationwide, the City of Duarte 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 Duarte
2. Identify and prioritize future mitigation projects
3. Assist in meeting the requirements of federal assistance programs

The Mitigation Plan is integrated with other City plans including the City of Duarte Emergency Operations Plan, General 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 Planning 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.

Q&A | ELEMENT C. MITIGATION STRATEGY | C3

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

A: See **Goals** below.

Goals

In the 2014 Hazard Mitigation Plan, the Planning Team identified the overall goal of avoiding or reducing long-term vulnerabilities to hazards. The 2019 Planning Team agreed to maintain the overall goal as well as the five mitigation goals as identified below.

The goals are based on the risk assessment and Planning 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 Planning 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.

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.

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.

The Planning Team tied the mitigation action items to the goals. See below for the **Mitigation Actions Matrix**.

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 **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

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 Program, and other funding opportunities.

Coordinating Organization

The Mitigation Actions Matrix assigns primary responsibility for each of the action items. The hierarchies of the assignments vary – from positions to departments to committees. 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

Planning Mechanism

It's important that each action item be implemented. Perhaps the best way to ensure implementation is through integration with one or many of the City's existing "planning mechanisms" including the General Plan, Capital Improvement Program, General Fund and Grants. Opportunities for integration will be simple and easy in cases where the action item is already compatible with the content of the planning mechanism. As an example, if the action item calls for the creation of a floodplain ordinance and the same action is already identified in the General Plan's policies, then the General Plan will assist in implementation. On the contrary, if preparation of a floodplain ordinance is not already included in the General Plan policies then the item will need to be added during the next update to the General Plan. The General Plan was last updated in 2007 and was used as a resource throughout the Mitigation Plan. The next General Plan update will likely not take place for another 10 years.

The Capital Improvement Program (CIP), depending on the budgetary environment, is updated every 5 years. The CIP includes infrastructure projects built and owned by the City. As such, the CIP is an excellent medium for funding and implementing action items from the Mitigation Plan. The Mitigation Actions Matrix includes several items from the existing CIP. The authors of the CIP served on the Planning Team and are already looking to funding addition Mitigation Plan action items in future CIPs.

The General Fund is the budget document that guides all of the City's expenditures and is updated on an annual basis. Although primarily a funding mechanism, it also includes descriptions and details associated with tasks and projects.

Grants come from a wide variety of sources – some annually and other triggered by events like disasters. Whatever the source, the City uses the General Fund to identify successful grants as funding sources.

Building and Infrastructure

This addresses the issue of whether or not a particular action item results in the reduction of the effects of hazards on new and existing buildings and infrastructure.

Comments

The purpose of the "Comments" is to capture the notes and status of the various action items. Since Planning Team members frequently change between plan updates and annual reviews, the Comments provide a sort of history to help in tracking the progress and status of each action. Comments are expressed in terms of Completed, Revised, Deleted, New, Deferred, and Notes.

Q&A | ELEMENT C. MITIGATION STRATEGY | C5a.

Q: Does the plan explain how the mitigation actions and projects will be prioritized (including cost benefit review)? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

A: See **Benefit/Cost Ratings** and **Priority Rating** below.

Benefit/Cost Ratings

The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) grant program. A less formal approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects.

Cost ratings were defined as follows:

High: Existing jurisdictional funding will not cover the cost of the action item so other sources of revenue would be required.

Medium: The action item could be funded through existing jurisdictional funding but would require budget modifications.

Low: The action item could be funded under existing jurisdictional funding.

Benefit ratings were defined as follows:

High: The action item will provide short-term and long-term impacts on the reduction of risk exposure to life and property.

Medium: The action item will have long-term impacts on the reduction of risk exposure to life and property.

Low: The action item will have only short-term impacts on the reduction of risk exposure to life and property.

Priority Rating

The 2014 Hazard Mitigation Plan did not identify "priorities" for mitigation action items. However, the 2019 Planning Team chose to adopt the following process for rating the "priority" of each mitigation action item. 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?

As mitigation action items were updated or written the Planning Team, 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

Q&A | ELEMENT C. MITIGATION STRATEGY | C1b.

Q: Does the plan document each jurisdiction's ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3)) c

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C4a.

Q: Does the plan identify and analyze a comprehensive range (different alternatives) of specific mitigation actions and projects to reduce the impacts from hazards? (Requirement §201.6(c)(3)(ii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C4b.

Q: Does the plan identify mitigation actions for every hazard posing a threat to each participating jurisdiction? (Requirement §201.6(c)(3)(ii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C4c.

Q: Do the identified mitigation actions and projects have an emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C5a.

Q: Does the plan explain how the mitigation actions and projects will be prioritized (including cost benefit review)? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C5b.

Q: Does the plan identify the position, office, department, or agency responsible for implementing and administering the action/project, potential funding sources and expected timeframes for completion? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D1

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

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D2

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

A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D3

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

A: See **Mitigation Actions Matrix** below.

Mitigation Actions Matrix

Following is **Table: Mitigation Actions Matrix** which identifies the existing and future mitigation activities developed by the Planning Team.

Table: Mitigation Actions Matrix

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
Earthquake and Liquefaction													
EQLQ-1A Continue to adopt and enforce the most up-to-date California Building Code and California Fire Code with local amendments and continue to support the training of City staff in the provisions of the latest codes, to provide for seismic safety and fire safety design.	Community Development Department: Planning and Building Divisions, LACoFD	Ongoing	X	X		X	GF	MC	Y	H	H	L	Revised
EQLQ-1B Regulate the location of new essential or critical facilities in areas that would be directly affected by seismic and geologic hazards (including surface fault rupture, liquefaction, and slope instability) to ensure the facility will not be located in	Community Development Department: Planning and Building Divisions	Ongoing	X	X		X	GF	MC	Y	H	H	L	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
an area identified as susceptible to damage from a natural hazard.													
EQLQ-1C Continue to require fault rupture hazard assessment studies for qualifying projects proposed in the Alquist-Priolo Earthquake Fault Zones and Fault Hazard Management Zones mapped through the City.	Community Development Department: Planning and Building Divisions	Ongoing	X	X		X	GF	MC	Y	H	H	L	Revised
EQLQ-1D Continue to require liquefaction assessment studies for qualifying projects proposed in areas of the City mapped as susceptible to liquefaction, and in areas where geotechnical testing shows the sediments are susceptible to liquefaction, require the implementation of mitigation measures as a condition of approval.	Community Development Department: Planning and Building Divisions	Ongoing	X	X		X	GF	MC	Y	H	H	L	Revised
EQLQ-1E Develop and make available to all residents and businesses literature on hazard prevention and disaster response, including information on how to earthquake-proof residences and places of business, and information on what to	Public Safety Department	Ongoing	X	X		X	GF	GF	Y	H	H	L	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
do before, during and after an earthquake. Reminders will be issued periodically to encourage the review and renewal of earthquake-preparedness kits and other emergency preparedness materials and procedures.													
EQLQ-2 Create inventory of potentially hazardous buildings, including pre-1952 wood-frame structures, concrete tilt-ups, pre-1971 reinforced masonry, soft-story, and multi-family residential buildings, to assess the seismic vulnerability of their structures and conduct seismic retrofitting as necessary to improve the building's resistance to seismic shaking.	Community Development Department	1-5 years	X	X		X	GF	GF	Y	H	H	M	Revised
EQLQ-3 Encourage the evaluation of the above-ground water storage tanks in the City to assess their potential inundation hazard in the event of catastrophic failure and ensure that all tanks are fitted with the appropriate seismic safeguards, including shut-off valves, in accordance	Community Development Department: Public Works Division; Cal-American Water	1-5 years	X			X	U	GF	Y	H	H	L	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
with the most recent water tank design guidelines.													
EQLQ-4 Conduct a seismic evaluation of City-owned essential and critical facilities that are located in or near mapped faults or in areas mapped as susceptible to liquefaction or earthquake-induced slope instability.	Community Development Department	1-5 years	X	X		X	GR	GR	Y	H	H	M	Revised
EQLQ-5 Where appropriate, relocate, strengthen, or retrofit those City-owned essential and critical facilities found to be at risk from seismic hazards.	Community Development Department	1-5 years	X	X		X	GR	GR	Y	M	H	H	Revised
Wildfire													
WLD-1 Ensure City equipment is up to date and maintained to supplement the Los Angeles County Fire Department efforts (including City water trucks, City trucks, and tools), especially during red flag warning days.	Community Development Department: Public Works and Field Services Divisions, LACoFD	Ongoing	X	X		X	GR	GR	N	L	H	M	Revised
WLD-2 Ensure that there are an appropriate number of generators for emergency power, and compatibility with LACoFD supply.	Community Development Department - Public	Ongoing	X	X		X	GR	GR	N	L	H	M	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
Specifically, these generators will be used to provide back-up power systems in the event of an electrical power failure in order to pump water supply into water tanks for fire suppression.	Works and Field Services Divisions; LACoFD												
WLD-3 Continue fire inspections and brush clearance programs sponsored by the Los Angeles County Fire Department and LA County Agricultural Commission.	Community Development Department, LACoFD	Ongoing	X	X		X	GF	GF	Y	H	H	L	Revised
WLD-4 Continue to enforce development standards and distribute zoning handouts to property owners and contractors that describe the fire prevention measures contained within the Hillside Overlay Zone including unobstructed fire protection equipment access easements, Class A roof materials, fire hydrant locations, and water main minimum requirements.	Community Development Department: Planning, Public Works Divisions; LACoFD	Ongoing	X	X	X	X	GF	GF	Y	M	H	L	Revised
WLD-5 Update the development standards of the Hillside Development Standards with new fire prevention measures as needed to	Community Development Department: Planning, Public	Ongoing	X		X	X	GR	GF	Y	M	M	L	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
address the construction of new buildings and infrastructure.	Works Divisions; LACoFD												
WLD-6 Update the public on vegetative and fire management activities via communication mechanisms in Duarte such as temporary signs at affected properties; the City web sites; newspapers; and direct mailings.	Community Development Department: Public Works Division; City Manager's Office; LACoFD	Ongoing	X	X	X	X	GF	GF	Y	L	M	L	Revised
WLD-7 Distribute public information brochures that encourage residents to plant fire resistant landscaping, to clear dry brush, and to consider fire-resistant building materials.	Community Development Department: Planning, Building, Safety Divisions; LASD; LACoFD	Ongoing	X	X	X	X	GF	GF	Y	L	M	L	Revised
WLD-8 Publish fire prevention articles in City newsletter related to fire evacuation, fire escape plans, and fire safety.	Community Development: Planning, Public Works, and Building and Safety Divisions	Ongoing	X	X		X	GF	GF	Y	M	H	L	Revised
WLD-9 Build a community message board to be placed in a strategic location in the City to alert the public to wildfire hazards	Community Development Department	Completed	X	X		X	GR	GR	Y	L	L	M	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
and provide the community information related to hazards.													
WLD-10 Explore funding sources and advocate with Cal-American Water Company to install fire-resistant electrical pump systems or to install back-up power generators at each water tank to ensure adequate fire suppression.	Community Development Department: Public Works Division; LASD; LACoFD	1-5 years	X			X	GR, U	GP	Y	L	M	M	Revised
WLD-11 Seek funding for replacement and/or retrofit of rain cannons for Wildland urban Interface areas throughout the City.	Public Safety Department; Community Development Department; City Manager's Office	1-5 years	X		X	X	GR, U	GP	Y	L	M	M	Revised
WLD-12 Use information from different sources such as field evaluations, aerial maps and photography, and public feedback to continually evaluate vegetative health and develop recommendations for the Fish Fire Impact Area.	Public Safety Department; Community Development Department; LACoFD	7/2021	X	X	X	X	GF	GF	Y	M	L	M	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
WLD-13 Monitor and evaluate outbreaks on a continual basis due to the dynamic nature of insects and disease.	Public Safety Department; LACoFD	Ongoing	X	X		X	GF	GF	Y	L	L	L	Revised
WLD-14 Develop a brush clearance plan that addresses fuel modification/reduction on annual schedule for public-owned parcels. The schedule will remain flexible to meet staff workload and funding options, management objectives, neighborhood groups and other strategic inputs. Work with neighborhood groups who have demonstrated a commitment to hazardous fuels reduction and those neighborhoods who would benefit from a demonstration site where one has been proposed.	Community Development Department: Public Works Division; LACoFD	Ongoing	X	X	X	X	GR, GF	GF		M	M	L	Revised
WLD-15 A brush clearance and fuel modification/reduction plan will identify a schedule for completion for maintenance of City-owned properties identified as needing a management plan. Work collaboratively with state and federal agencies to plan, prepare, and implement fuel treatment	Community Development Department	10/2020	X		X	X	GF	GF		H	M	M	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
options for the landscape, particularly as funding and cooperative opportunities become available for these items.													
WLD-16 Annually reevaluate evacuation resources and update the evacuation plan.	Public Safety Department; Community Development Department; LACoFD	Annually	X	X		X	GF	GF, GR	Y	L	M	L	Revised
WLD-17 Use social media and a cell phone registration service to help notify residents of emergency events requiring evacuation.	City Manager's Office	Ongoing	X	X		X	GF	GF	Y	L	M	L	Revised
WLD-18 Require all existing roofs in Very High Fire Hazard areas to only be replaced by roofing as required by Fire and Building Codes.	Community Development Department: Building and Safety Division	Ongoing	X	X		X	GF	GF	Y	M	H	L	Revised
WLD-19 Require vacant parcel inspections for weeds and other vegetation, insect, and disease issues.	Community Development Department: Field Services Division; LACoFD; Public	Annually			X	X	GF	GF		M	M	L	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
	Safety; Los Angeles County Department of Agriculture												
WLD-20 Require property owners to remove wood piles, fast burning vegetation, and other fuel sources from the perimeter of residences.	Public Safety Department; LACoFD	Annually	X	X		X	GF	GF		M	H	L	Revised
Windstorm													
WND-1 Continue to send requests for tree trimming in the City to Southern California Edison (SCE) for trees located in close proximity to overhead power lines.	Community Development Department: Public Works	Ongoing	X		X	X	GF	GF	Y	H	M	L	Revised
WND-2 Seek funding for tree-trimming contractor to provide proactive pruning and trimming services prior to wind events.	Field Services	1-5 years	X		X	X	GR, GF	GR, GF		M	H	M	New
WND-3 Concrete repair to hardscape caused by wind event.	Field Services; Public Works	As needed	X			X	GR, GF	GR, GF	Y	M	M	M	New
Hazardous Materials													
HZMT-1 Coordinate with the Los Angeles County Department of Environmental Health Services, on enforcement of State and local	Public Safety Department; Community	Ongoing	X			X	GF	GF	Y	L	L	L	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
statutes and regulations pertaining to hazardous materials/waste storage, use, and disposal.	Development Department: Public Works Division; LACoFD; LASD												
HZMT-2 Support staff training and education requirements regarding emergency response procedures associated with transportation-based hazardous materials releases.	Public Safety Department; Community Development Department: Public Works Division; LACoFD; LASD	Ongoing	X		X	X	GF	GF	Y	L	H	L	Revised
Land Subsidence													
LS-1 Evaluate the stability of the roadways surrounding the Rancho Duarte Golf Course to ensure that they meet current engineering standards and are constructed with an adequate factor of safety to provide emergency access/evacuation during a disaster event.	Community Development Department: Public Works Division; LACoFD; LASD	Ongoing	X			X	GR, GF	GR	Y	L	M	M	Revised
LS-2 Fund and conduct repairs based on evaluation results from LS-1.	Community Development Department: Public	1-5 years	X			X	GR, GF	GR	Y	L	M	M	New

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
	Works Division; LACoFD; LASD												
LS-3 Seek funding to construct a methane collection system at the former landfill site.	Community Development Department: Public Works Division; LACoFD; LASD	1-5 years	X			X	GR, GF	GR	Y	L	M	M	New
Landslide													
LM-1 Continue to require that geologic/engineering reports be prepared for any proposed construction near landslide subsidence area and require mitigation of landslide hazards before issuing any building or grading permits, in accordance with the seismic guidelines provided in the City's *Seismic Hazards Report* (July 2013).	Community Development Department: Building and Safety, Public Works Divisions	Ongoing	X	X	X	X	GF	GF	Y	M	M	L	Revised
LM-2 Improve mapping capabilities in order to allow City, developers, and residents to make better decisions. Soil types, slope percentage, drainage, or other critical factors are used to identify landslide prone areas.	Community Development Department: Public Works and Planning Divisions	Ongoing	X	X		X	GR	GR	Y	L	M	M	New

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
Dam Failure													
DAM-1 Prepare a Dam Failure evacuation plan that can be incorporated into the City's Emergency Operations Plan.	Public Safety Department; LACoFD	1 year	X			X	GR, GF	GF, GR		L	M	L	Revised
DAM-2 Acquire Dam Inundation Maps from Cal OES.	Public Safety Department	1 year	X	X	X	X	GF	GF		H	H	L	New
Flood													
FLD-1 Continually monitor and review FEMA's National Flood Insurance Program (NFIP) requirements to ensure that Title 16.40, Floodplain Management Regulations, of the City's Municipal Code is in compliance. Participate in the FEMA NFIP Community Rating System (CRS).	Community Development Department: Public Works Division	Ongoing	X	X		X	GF	GF		L	M	L	Revised
FLD-2 Work in coordination with the Los Angeles County Flood Control District to develop and disseminate public education materials on flood protection and mitigation by working collaboratively with community groups, non-governmental organizations and the local media.	Community Development Department	Ongoing	X	X		X	GF	GF	Y	M	L	L	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
FLD-3 Review and update Title 16.40, Floodplain Management Regulations, of the City's Municipal Code as it relates to storm/flooding hazards, consistent with the risks identified in this LHMP.	Community Development Department	1-5 years	X		X	X	GR, GF	GP	Y	L	M	L	Revised
FLD-4 Utilize land acquisition in situations where land with structures could be purchased by and titled in the name of the City. The City would then remove structures and enforce permanent restrictions on development.	Community Development Department: Public Works Division	1-3 years	X			X	GR	GR	Y	H	L	H	New
FLD-5 Review and update Zoning Ordinance to ensure utilization of methods that mitigate against flooding including: 1) adopting ordinances that limit development in the floodplain; 2) limiting the density of developments in the floodplain; and 3) requiring that floodplains be kept as open space.	Community Development Department	5 years	X			X	GR	GR	Y	M	M	M	New
FLD-6 Conduct review of existing storm drain system. Flood mitigation can involve installing, re-routing, or increasing the	Community Development Department	5 years	X			X	GR	GR	Y	M	L	M	New

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
capacity of a storm drainage system that may involve detention and retention ponds, drainage easements, or creeks and streams. It can include separation of storm and sanitary sewerage systems as well as higher engineering standards for drain and sewer capacity.													
FLD-7 Consider drainage easements for planned and regulated public use of privately-owned land for temporary water retention and drainage.	Community Development Department	5 years	X			X	GR	GR	Y	M	L	M	New
FLD-8 Properly designed and maintained roads are needed to get people and goods from place to place. In addition to planning for traffic control during floods, there are various construction and placement factors to consider when building roads. To maintain dry access, roads should be elevated above the base flood elevation. However, if a road creates a barrier it can cause water to pond. Where ponding is problematic, drainage and flow may be	Community Development Department	5 years	X			X	GR	GR	Y	M	M	M	New

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
addressed by making changes to culvert size and placement. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage but also stabilization or armoring of vulnerable shoulders or embankments.													
FLD-9 Structural flood control measures (e.g., levees, dams, or floodwalls) should be examined as means to channel water away from people and property. Structural measures may also increase drainage or absorption capacities (e.g., detention and retention basins, relief drains, spillways, drain widening/dredging or rerouting, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, or channel redirection). However, structural measures may cause an increase in the base flood elevation. History has shown that structures that channel water may create a false sense of security and	Community Development Department	10 years	X			X	GR	GR	Y	M	L	L	New

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
result in greater damage to nearby properties if the structures fail.													
FLD-10 Consider back-up generators for pumping and lift stations in sanitary sewer systems, along with other measures (e.g., alarms, meters, remote controls, and switchgear upgrades).	Community Development Department	5 years	X			X	GR	GR	Y	H	L	M	New
FLD-11 Dry well installation plan or storm water drain extension of areas considered at risk due to urban flooding: 1) Huntington Drive – north side, with Buena Vista; 2) Encanto Parkway- north of Huntington; 3) Encanto Parkway near Fish Canyon; 4) Central Avenue – northside, east of Santo Domingo; 5) Buena Vista Street – east side, south of Galen Street; 6) Vineyard Avenue south of Royal Oaks.	Community Development Department / Public Works	5 years	X		X	X	GR, GF	GR, GF	Y	M	M	M	New
Multi-Hazard													
MH-1 Coordinate hazard mitigation progress/efforts with the Los Angeles County Office of Emergency Management	Public Safety Department; Community Development	Ongoing	X		X	X	GF	GF	Y	M	L	L	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
and other agencies and cities within Los Angeles County.	Department; LACoFD; LASD; City Manager's Office												
MH-2 Continue to work with Los Angeles 911 and other relevant agencies to maintain a coordinated and effective emergency communication system.	Public Safety Department; Community Development Department; LACoFD; LASD	Ongoing	X		X	X	GF	GF	Y	M	M	L	Revised
MH-3 Continue to update and enhance mapping data and the City's GIS for all hazards.	Community Development Department	Ongoing	X		X	X	GF	GF	Y	M	L	L	Revised
MH-4 Work with the appropriate cellular phone service providers to ensure there is always adequate cellular services to critical facilities within the City and that a contingency plan is available to provide cellular services to City and Public Safety personnel during emergencies.	Public Safety Department; Community Development Department	Ongoing	X		X	X	GF	GF	Y	M	M	L	Revised

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes
MH-5 Review and update the city's existing ordinances as they relate to hazards and risks identified in this LHMP.	Community Development Department	Ongoing	X	X		X	GF	GF		L	H	M	Revised
MH-6 Replace generator for EOC and Civic Center Complex.	Parks & Recreation Department	2022	X			X	GR	GR	Y	M	H	L	New
MH-7 Update Emergency Operations Plan.	Public Safety Department	2021	X	X	X	X	GF, GR	GF, GR		L	M	M	New
MH-8 Continue to encourage CERT participation through LACoFD, including funding for training and equipment.	Public Safety Department	Ongoing	X	X		X	GR	GR		M	M	M	New
MH-9 Emergency response personnel need to be trained for various contingencies and response activities, such as evacuation, traffic control, search and rescue.	Public Safety Department	Ongoing	X	X		X	GR	GR		H	M	H	New

Plan Maintenance

The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan update every five years. This section describes how the City will integrate public participation throughout the plan maintenance process.

Q&A | ELEMENT A: PLANNING PROCESS | A6a.

Q: Does the plan identify how, when, and by whom the plan will be **monitored** (how will implementation be tracked) over time? (Requirement §201.6(c)(4)(i))

A: See **Method and Scheduling of Plan Implementation** below.

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 (Jason Golding – Community Development Department – Planning Manager) who 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

The City Council will be responsible for adopting the Mitigation Plan. This governing body has the authority to promote sound public policy regarding hazards. Once the plan has been adopted, the Local Mitigation Officer 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, City of Duarte will gain eligibility for Hazard Mitigation Grant Program funds.

Local Mitigation Officer

Under the direction of the Local Mitigation Officer, the Planning Team will take responsibility for plan maintenance and implementation. The Local Mitigation Officer will 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 Planning Team members. The Local Mitigation Officer will coordinate with City leadership to ensure funding and support for 5-year updates to Plan as required by FEMA.

The Planning Team will be responsible for coordinating implementation of plan action items and undertaking the formal review process. The Local Mitigation Officer will be authorized to make changes in assignments to the current Planning Team.

The Planning Team will meet no less than annually to review the status of the mitigation action items. Meeting dates will be scheduled once the final Planning 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.

Q&A | ELEMENT C. MITIGATION STRATEGY | C6a.

Q: Does the plan identify the local planning mechanisms where hazard mitigation information and/or actions may be incorporated? (Requirement §201.6(c)(4)(ii))

A: See **Implementation through Existing Program** below.

Implementation through Existing Programs

The City of Duarte addresses statewide planning goals and legislative requirements through its General Plan, its Capital Improvement Program, and the State's 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 Duarte will incorporate hazard information and implement recommended mitigation action items through existing programs and procedures.

The City of Duarte Community Development Department is responsible for adhering to the State of California's Building and Safety Codes. In addition, the Planning Team will work with other agencies at the state level to review, develop and ensure the adopted Building and Safety Codes are adequate to mitigate or present 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 will 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 Planning Team will work with the City departments to identify areas that the Mitigation Plan action items are consistent with CIP goals and integrate them where appropriate.

Upon FEMA approval, the Planning Team will begin the process of incorporating existing planning mechanisms at the City level. The meetings of the Planning Team will provide an opportunity for Planning Team members to report back on the progress made on the integration of mitigation planning elements into City planning documents and procedures.

Upon FEMA approval, the Planning Team will begin the process of incorporating risk information and mitigation action items into existing planning mechanisms including the General Plan, Capital Improvement Program, and other planning mechanisms (see Mitigation Action Matrix for links between individual action items and associated planning mechanism). The meetings of the Planning Team will provide an opportunity for Planning Team members to report back on the progress made on the integration of mitigation planning elements into City planning documents and procedures.

Specifically, the Planning Team will utilize the updates of the following documents to implement the Mitigation Plan:

- ✓ Risk Assessment, Community Profile, Planning Process (stakeholders) – General Plan Land Use Element, City's Emergency Operations Plan
- ✓ Community Profile – General Plan Housing Element
- ✓ Risk Assessment, Hazard-Specific Sections, General Hazard Overviews – General Plan Safety Element
- ✓ Mitigation Actions Matrix – Annual Budget, Capital Improvement Program

It's important to note that since the approval and adoption of the 2014 Hazard Mitigation Plan, the only document that was updated was the Annual Budget. Although the Annual Budget did provide funding for a few of the mitigation action items, those items were not specifically identified as coming from the 2014 Hazard Mitigation Plan.

Economic Analysis of Mitigation Projects

FEMA's approach 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.

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.

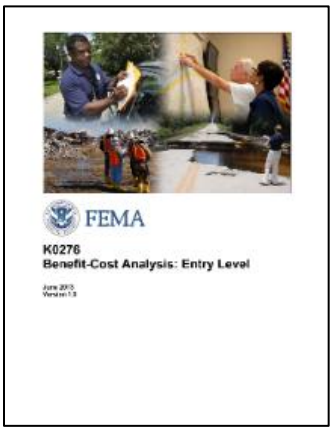
Given federal funding, the Planning Team will use a FEMA-approved benefit/cost analysis approach to identify and prioritize mitigation action items. For other projects and funding sources, the Planning Team will use other approaches to understand the costs and benefits of each action item and develop a prioritized list.

The "benefit", "cost", and overall "priority" of each mitigation action item was included in the Mitigation Actions Matrix located in Part III: Mitigation Strategies. A more technical assessment will be required in the event grant funding is pursued through the Hazard Mitigation Grant Program. FEMA Benefit-Cost Analysis Guidelines are discussed below.

FEMA Benefit-Cost Analysis Guidelines

The Stafford Act authorizes the President to establish a program to provide technical and financial assistance to state and local governments to assist in the implementation of hazard mitigation measures that are cost effective and designed to substantially reduce injuries, loss of life, hardship, or the risk of future damage and destruction of property. To evaluate proposed hazard mitigation projects prior to funding FEMA requires a Benefit-Cost Analysis (BCA) to validate cost effectiveness. BCA is the method by which the future benefits of a mitigation project are estimated and compared to its cost. The end result is a benefit-cost ratio (BCR), which is derived from a project's total net benefits divided by its total project cost. The BCR is a numerical expression of the cost effectiveness of a project. A project is considered to be cost effective when the BCR is

1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs.



Although the preparation of a BCA is a technical process, FEMA has developed software, written materials, and training to support the effort and assist with estimating the expected future benefits over the useful life of a retrofit project. It is imperative to conduct a BCA early in the project development process to ensure the likelihood of meeting the cost-effective eligibility requirement in the Stafford Act.

The BCA program consists of guidelines, methodologies and software modules for a range of major natural hazards including:

- ✓ Flood (Riverine, Coastal Zone A, Coastal Zone V)
- ✓ Hurricane Wind
- ✓ Hurricane Safe Room
- ✓ Damage-Frequency Assessment
- ✓ Tornado Safe Room
- ✓ Earthquake
- ✓ Wildfire

The BCA program provides up to date program data, up to date default and standard values, user manuals and training. Overall, the program makes it easier for users and evaluators to conduct and review BCAs and to address multiple buildings and hazards in a single BCA module run.

Q&A | ELEMENT A: PLANNING PROCESS | A6a.

Q: Does the plan identify how, when, and by whom the plan will be **monitored** (how will implementation be tracked) over time? (Requirement §201.6(c)(4)(i))

A: See **Evaluating and Updating the Plan** below.

Q&A | ELEMENT A: PLANNING PROCESS | A6c.

Q: Does the plan identify how, when, and by whom the plan will be **updated** during the 5-year cycle? (Requirement §201.6(c)(4)(i))

A: See **Evaluating and Updating the Plan** below.

Evaluating and Updating the Plan

The Planning Team will be responsible for coordinating implementation of plan by monitoring the progress of the mitigation action items and documenting progress notes for each item. It will be up to the Local Mitigation Officer to announce the meeting with the coordinating agencies. The purpose of the meeting will be to track the status on each of the mitigation action items. The monitoring meetings will take place no less than annually. 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. See the **Annual Implementation Report** discussed below which will be a valuable tool for the Planning Team to measure the success of the Hazard Mitigation Plan.

Quarterly Implementation Report

The Quarterly Implementation Report is the same as the Mitigation Action Matrix but with a column added to the far right to track the quarterly status of each Action Item. Upon approval and adoption of the Plan, the Quarterly Implementation Report was added to the Appendix of the Plan.

An equally part of the monitoring process is the need to maintain a strategic planning process which needs to include funding and organizational support. In that light, at least one year in advance of the FEMA-mandated 5-year submission of an update, the Local Mitigation Officer will convene the Planning Team to discuss funding and timing of the update planning process. On the fifth year of the planning cycles, the Planning Team will broaden its scope to include discussions and research on all of the sections within the Plan with particular attention given go goal achievement and public participation.

Q&A | ELEMENT A: PLANNING PROCESS | A6b.

Q: Does the plan identify how, when, and by whom the plan will be **evaluated** (assessing the effectiveness of the plan at achieving stated purpose and goals) over time? (Requirement §201.6(c)(4)(i))

A: See **Evaluation** below.

Evaluation

At the conclusion of the meeting each year, the Local Mitigation Officer will lead a discussion with the Planning Team on the success (or failure) of the Mitigation Plan to meet the Plan Goals. The results of that discussion will be added to the 4th Quarterly Report and inclusion in the 5-year update to the Plan. Efforts will be made immediately by the Local Mitigation Officer to address any failed Plan Goals.

Formal Update Process

The Mitigation Plan will be monitored on an annual basis to determine the effectiveness of mitigation action items and to reflect changes in land development or programs that may affect mitigation actions or their priorities. The evaluation process includes a firm schedule and timeline, and identifies the agencies and organizations participating in plan evaluation. The Local Mitigation Officer or designee will be responsible for contacting the Planning Team members and organizing the annual meeting. Planning Team members will also be responsible for participating in the formal update to the Plan every fifth year of the planning cycle.

The Planning Team will review the goals and mitigation 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 Planning Team will also review the Plan's **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, including the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised. Amending will be made to the Mitigation Actions Matrix and other sections in the Plan as deemed necessary by the Planning Team.

Q&A | ELEMENT A: PLANNING PROCESS | A5

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

A: See **Continued Public Involvement** below.

Continued Public Involvement

The City of Duarte 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 Public Safety and Community Development. 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 Planning Team. The meetings will provide the public a forum in which they can express their concerns, opinions, or ideas about the Plan.

The Local Mitigation Officer will be responsible for using City resources to publicize the annual public meetings and maintain public involvement through the public access channel, web page, and newspapers.

PART IV: APPENDIX

General Hazard Overviews

Earthquake Hazards

Measuring and Describing Earthquakes

An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can further amplify ground motions. The severity of these effects is dependent on the amount of energy released from the fault or epicenter. One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. The acceleration due to gravity is often called "g". A ground motion with a peak ground acceleration of 100%g is very severe. Peak Ground Acceleration (PGA) is a measure of the strength of ground motion. PGA is used to project the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (10%, 5%, or 2%) of being exceeded in 50 years. These ground motion values are used for reference in construction design for earthquake resistance. The ground motion values can also be used to assess relative hazard between sites, when making economic and safety decisions.

When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter.

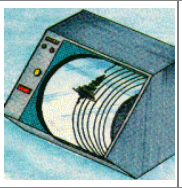
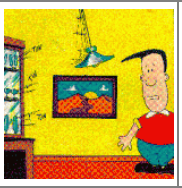
Another tool used to describe earthquake intensity is the Magnitude Scale. The Magnitude Scale is sometimes referred to as the Richter Scale. The two are similar but not exactly the same. The Magnitude Scale was devised as a means of rating earthquake strength and is an indirect measure of seismic energy 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.

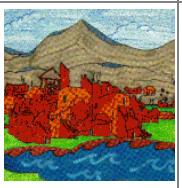
An earthquake generates different types of seismic shock waves that travel outward from the focus or point of rupture on a fault. Seismic waves that travel through the earth's crust are called body waves and are divided into primary (P) and secondary (S) waves. Because P waves move faster (1.7 times) than S waves, they arrive at the seismograph first. By measuring the time delay between arrival of the P and S waves and knowing the distance to the epicenter, seismologists can compute the magnitude for the earthquake.

The duration of an earthquake is related to its magnitude but not in a perfectly strict sense. There are two ways to think about the duration of an earthquake. The first is the length of time it takes for the fault to rupture and the second is the length of time shaking is felt at any given point (e.g. when someone says, "I felt it shake for 10 seconds" they are making a statement about the duration of shaking). (Source: www.usgs.gov)

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. The Modified Mercalli Intensity Scale below 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	N/A	N/A	Not Felt
	II	N/A	N/A	Felt by persons at rest, on upper floors, or favorably placed.
	III	N/A	N/A	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
	IV	N/A	N/A	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.

	MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
	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.
	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	N/A	N/A	Rails bent greatly. Underground pipelines completely out of services.
	XII	N/A	N/A	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.

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.

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, the soil may be subject to liquefaction, depending on the depth of the water table.

Wildfire Hazards

Description

A wildfire is an uncontrolled fire spreading through vegetative fuels and exposing or possibly consuming structures. They often begin unnoticed and spread quickly. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities. A wildland/urban interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

People start more than 80 percent of wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. Wildfire behavior is based on three primary factors: fuel, topography, and weather. The type, and amount of fuel, as well as its burning qualities and level of moisture affect wildfire potential and behavior. The continuity of fuels, expressed in both horizontal and vertical components is also a determinant of wildfire potential and behavior. Topography is important because it affects the movement of air (and thus the fire) over the ground surface. The slope and shape of terrain can change the speed at which the fire travels, and the ability of firefighters to reach and extinguish the fire. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind (both short and long term) affect the severity and duration of wildfires. Much of Los Angeles County's topography, consisting of semi-arid plains and rolling highlands, when fueled by shrub overgrowth, occasional Santa Ana winds and high temperatures, creates an ever-present threat of wildland fire. Extreme weather conditions such as high temperature, low humidity, and/or winds of extraordinary force may cause an ordinary fire to expand into one of massive proportions.

For thousands of years, fires have been a natural part of the ecosystem in Southern California. However, wildfires present a substantial hazard to life and property in communities built within or adjacent to hillsides and mountainous areas. There is a huge potential for losses due to wildland/urban interface fires in Southern California.

Wildfire Threat

In urban areas, the effectiveness of fire protection efforts is based upon several factors, including the age of structures, efficiency of circulation routes that ultimately affect response times and availability of water resources to combat fires. In wildland areas, taking the proper precautions, such as the use of fire resistant building materials, a pro-active fire Prevention inspection program, and the development of defensible space around structures where combustible vegetation is controlled, can protect developed lands from fires and, therefore, reduce the potential loss of life and property.

Other factors contribute to the severity of fires including weather and winds. Specifically, winds commonly referred to as Santa Ana winds, which occur during fire season (typically from June to the first significant rain in November) are particularly significant. Such "fire weather" is

characterized by several days of hot dry weather and high winds, resulting in low fuel moisture in vegetation.

California experiences large, destructive wildland fires almost every year, and Los Angeles County is no exception as highlighted in **Table: Top 20 Largest California Wildfires**. Wildland fires have occurred within the County, particularly in the fall of the year, ranging from small, localized fires to disastrous fires covering thousands of acres. The most severe fire protection problem in the area is wildland fire during Santa Ana wind conditions.

Table: Top 20 Largest California Wildfires
(Source: CAL FIRE, 2019)

	FIRE NAME *(CAUSE)*	DATE	COUNTY	*ACRES*	STRUCTURES	DEATHS
1	**MENDOCINO COMPLEX** *(Under Investigation)*	July 2018	Colusa County, Lake County, Mendocino County & Glenn County	**459,123**	280	1
2	**THOMAS** *(Under Investigation)*	December 2017	Ventura & Santa Barbara	**281,893**	1,063	2
3	**CEDAR** *(Human Related)*	October 2003	San Diego	**273,246**	2,820	15
4	**RUSH** *(Lightning)*	August 2012	Lassen	**271,911 CA / 43,666 NV**	0	0
5	**RIM** *(Human Related)*	August 2013	Tuolumne	**257,314**	112	0
6	**ZACA** *(Human Related)*	July 2007	Santa Barbara	**240,207**	1	0
7	**CARR** *(Human Related)*	July 2018	Shasta County, Trinity County	**229,651**	1,614	8
8	**MATILIJA** *(Undetermined)*	September 1932	Ventura	**220,000**	0	0
9	**WITCH** *(Powerlines)*	October 2007	San Diego	**197,990**	1,650	2
10	**KLAMATH THEATER COMPLEX** *(Lightning)*	June 2008	Siskiyou	**192,038**	0	2
11	**MARBLE CONE** *(Lightning)*	July 1977	Monterey	**177,866**	0	0
12	**LAGUNA (POWERLINES)**	September 1970	San Diego	**175,425**	382	5
13	**BASIN COMPLEX** *(Lightning)*	June 2008	Monterey	**162,818**	58	0
14	**DAY FIRE** *(Human Related)*	September 2006	Ventura	**162,702**	11	0
15	**STATION** *(Human Related)*	August 2009	Los Angeles	**160,557**	209	2
16	**CAMP FIRE (Under Investigation)**	November 2018	Butte	**153,336**	18,804	85
17	**ROUGH** *(Lightning)*	July 2015	Fresno	**151,623**	4	0
18	**McNALLY** *(Human Related)*	July 2002	Tulare	**150,696**	17	0
19	**STANISLAUS COMPLEX** *(Lightning)*	August 1987	Tuolumne	**145,980**	28	1
20	**BIG BAR COMPLEX** *(Lightning)*	August 1999	Trinity	**140,948**	0	0

*There is no doubt that there were fires with significant acreage burned in years prior to 1932, but those records are less reliable, and this list is meant to give an overview of the large fires in more recent times.
**This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.

2/19/2019

The 2003 Southern California Fires

The fall of 2003 marked the most destructive wildfire season in California history. In a ten-day period, 12 separate fires raged across Southern California in Los Angeles, Riverside, and San Bernardino, San Diego and Ventura counties. The massive "Cedar Fire" in San Diego County alone consumed 2,800 homes and burned over a quarter of a million acres.

In October 2003, Southern California experienced the most devastating wildland fire disaster in state history. According to the Governor's Blue Ribbon Panel Fire Commission Report (2004), over 739,597 acres burned; 3,631 homes, 36 commercial properties, and 1,169 outbuildings were destroyed; 246 people were injured; and 24 people died, including one firefighter. At the height of the siege, 15,631 personnel were assigned to fight the fires.

The 2007 Southern California Fires

In late October 2007, Southern California experienced an unusually severe fire weather event characterized by intense, dry, gusty Santa Ana winds. This weather event drove a series of destructive wildfires that took a devastating toll on people, property, natural resources, and infrastructure. Although some fires burned into early November, the heaviest damage occurred during the first three days of the siege when the winds were the strongest.

According to CAL FIRE, during this siege, 17 people lost their lives, ten were killed by the fires outright, three were killed while evacuating, four died from other fire siege related causes, and 140 firefighters, and an unknown number of civilians were injured. A total of 3,069 homes and other buildings were destroyed, and hundreds more were damaged. Hundreds of thousands of people were evacuated at the height of the siege. The fires burned over half a million acres, including populated areas, wildlife habitat and watershed. Portions of the electrical power distribution network, telecommunications systems, and even some community water sources were destroyed. Transportation was disrupted over a large area for several days, including numerous road closures. Both the Governor of California and the President of the United States personally toured the ongoing fires. Governor Schwarzenegger proclaimed a state of emergency in seven counties before the end of the first day. President Bush quickly declared a major disaster. While the total impact of the 2007 fire siege was less than the disastrous fires of 2003, it was unquestionably one of the most devastating wildfire events in the history of California.

Wildfire Characteristics

There are three categories of wildland/urban interface fire: The classic wildland/urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas; the mixed wildland/urban interface is characterized by isolated homes, subdivisions, and small communities situated predominantly in wildland settings. The occluded wildland/urban interface exists where islands of wildland vegetation occur inside a largely urbanized area. Certain conditions must be present for significant interface fires to occur. The most common conditions include: hot, dry and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed

resources; and a large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel topography, weather, drought, and development.

Southern California has two distinct areas of risk for wildland fire. The foothills and lower mountain areas are most often covered with scrub brush or chaparral. The higher elevations of mountains also have heavily forested terrain. The lower elevations covered with chaparral create one type of exposure.

The higher elevations of Southern California's mountains are typically heavily forested. The magnitude of fires is the result of three primary factors: (1) severe drought, accompanied by storms that produce thousands of lightning strikes and windy conditions; (2) an infestation of bark beetles that has killed thousands of mature trees; and (3) the effects of wildfire suppression over the past century that has led to buildup of brush and small diameter trees in the forests.

The Interface

One challenge Southern California faces regarding the wildfire hazard is from the increasing number of houses being built on the urban/wildland interface. Every year the growing population expands further into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas, and the open spaces created by this expansion, produces a significant increase in threats to life and property from fires, and pushes existing fire protection systems beyond original or current design and capability. Property owners in the interface are not aware of the problems and fire hazards or risks on their own property. Furthermore, human activities increase the incidence of fire ignition and potential damage.

Fuel

Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is classified by volume and by type. Volume is described in terms of "fuel loading," or the amount of available vegetative fuel.

The type of fuel also influences wildfire. Chaparral is a primary fuel of Southern California wildfires. Chaparral habitat ranges in elevation from near sea level to over 5,000 feet in Southern California. Chaparral communities experience long dry summers and receive most of their annual precipitation from winter rains. Although chaparral is often considered as a single species, there are two distinct types; hard chaparral and soft chaparral. Within these two types are dozens of different plants, each with its own particular characteristics.

An important element in understanding the danger of wildfire is the availability of diverse fuels in the landscape, such as natural vegetation, manmade structures and combustible materials. A house surrounded by brushy growth rather than cleared space allows for greater continuity of fuel and increases the fire's ability to spread. After decades of fire suppression "dog-hair" thickets have accumulated, which enable high intensity fires to flare and spread rapidly.

Topography

Topography influences the movement of air, thereby directing a fire course. For example, if the percentage of uphill slope doubles, the rate of spread in wildfire will likely double. Gulches and canyons can funnel air and act as chimneys, which intensify fire behavior and cause the fire to spread faster. Solar heating of dry, south-facing slopes produces up slope drafts that can complicate fire behavior. Unfortunately, hillsides with hazardous topographic characteristics are

also desirable residential areas in many communities. This underscores the need for wildfire hazard mitigation and increased education and outreach to homeowners living in interface areas.

Weather

Weather patterns combined with certain geographic locations can create a favorable climate for wildfire activity. Areas where annual precipitation is less than 30 inches per year are extremely fire susceptible. High-risk areas in Southern California share a hot, dry season in late summer and early fall when high temperatures and low humidity favor fire activity. The so-called "Santa Ana" winds, which are heated by compression as they flow down to Southern California from Utah, create a particularly high risk, as they can rapidly spread what might otherwise be a small fire.

Drought

Recent concerns about the effects of climate change, particularly drought, are contributing to concerns about wildfire vulnerability. The term 'drought' is applied to a period in which an unusual scarcity of rain causes a serious hydrological imbalance. Unusually dry winters, or significantly less rainfall than normal, can lead to relatively drier conditions and leave reservoirs and water tables lower. Drought leads to problems with irrigation and contributes to additional fires, or increased difficulty in fighting fires.

Development

Growth and development in scrubland and forested areas is increasing the number of human-caused structures in Southern California interface areas. Wildfire affects development, yet development can also influence wildfire. Owners often prefer homes that are private with scenic views, nestled in vegetation, and use natural materials. A private setting is usually far from public roads, or hidden behind a narrow, curving driveway. These conditions, however, make evacuation and firefighting difficult. The scenic views found along mountain ridges can also mean areas of dangerous topography. Natural vegetation contributes to scenic beauty, but it may also provide a ready trail of fuel leading a fire directly to the combustible fuels of the home itself.

Landslide Hazards

Hazard Characteristics

Landslides are a serious geologic hazard in almost every state in America. Nationally, landslides cause 25 to 50 deaths each year. The best estimate of direct and indirect costs of landslide damage in the United States range between $1 and $2 billion annually. As a seismically active region, California has a significant number of locations impacted by landslides. Some landslides result in private property damage; other landslides impact transportation corridors, fuel and energy conduits, and communication facilities. They can also pose a serious threat to human life.

Landslides can be broken down into two categories: 1) rapidly moving (generally known as debris flows), and; 2) slow moving. Rapidly moving landslides or debris flows present the greatest risk to human life, and people living in or traveling through areas prone to rapidly moving landslides, are at increased risk of serious injury. Slow moving landslides can cause significant property damage but are less likely to result in serious human injuries.

The primary effects of mudslides/landslides include: abrupt depression and lateral displacement of hillside surfaces over distances of up to several hundreds of feet, disruption of surface drainage, blockage of flood control channels and roadways, displacement or destruction of improvements such as roadways, buildings, and water wells.

Historic Southern California Landslides

1956 Portuguese Bend

Cost, $14.6 million (2000 Dollars) California Highway 14, Palos Verdes Hills. Land use on the Palos Verdes Peninsula consists mostly of single-family homes built on large lots, many of which have panoramic ocean views. All of the houses were constructed with individual septic systems, generally consisting of septic tanks and seepage pits. Landslides have been active here for thousands of years, but recent landslide activity has been attributed in part to human activity. The Portuguese Bend Landslide began its modern movement in August 1956, when displacement was noticed at its northeast margin. Movement gradually extended downslope so that the entire eastern edge of the slide mass was moving within 6 weeks. By the summer of 1957, the entire slide mass was sliding towards the sea.

1958-1971 Pacific Palisades

Cost, $29.1 million (2000 Dollars) California Highway 1 and house damaged.

1961 Mulholland Cut

Cost, $41.5 million (2000 Dollars) On Interstate 405, 11 miles north of Santa Monica, Los Angeles County.

1969 Glendora

Cost, $26.9 million (2000 Dollars) Los Angeles County, 175 houses damaged, mainly by debris flows.

1969 Seventh Ave., Los Angeles County

Cost, $14.6 million (2000 Dollars) California Highway 60.

1970 Princess Park

Cost, $29.1 million (2000 Dollars) California Highway 14, ten miles north of Newhall, near Saugus, northern Los Angeles County.

1971 Upper and Lower Van Norman Dams, San Fernando

Cost, $302.4 million (2000 Dollars) Earthquake-induced landslides. Damage due to the February 9, 1971, Magnitude 7.5 San Fernando, Earthquake.
The earthquake of February 9 severely damaged the Upper and Lower Van Norman Dams.

1971 Juvenile Hall, San Fernando

Cost, $266.6 million (2000 Dollars) Landslides caused by the February 9, 1971, San Fernando earthquake. In addition to damaging the San Fernando Juvenile Hall, this 1.2 km-long slide damaged trunk lines of the Southern Pacific Railroad, San Fernando Boulevard, Interstate Highway 5, the Sylmar electrical converter station, and several pipelines and canals.

1977-1980 Monterey Park, Repetto Hills, Los Angeles County

Cost, $14.6 million (2000 Dollars) 100 houses damaged in 1980 due to debris flows.

1978 Bluebird Canyon Orange County

Cost, $52.7 million (2000 Dollars) October 2, 60 houses destroyed or damaged. Unusually heavy rains in March of 1978 may have contributed to initiation of the landslide. Although the 1978 slide area was approximately 3.5 acres, it is suspected to be a portion of a larger, ancient landslide.

1979 Big Rock, California, Los Angeles County

Cost, $1.08 billion (2000 Dollars) California Highway 1 rockslide.

1980 Southern California Slides

Cost, $1.1 billion in damage (2000 Dollars) Heavy winter rainfall in 1979-90 caused damage in six Southern California counties. In 1980, the rainstorm started on February 8. A sequence of 5 days of continuous rain and 7 inches of precipitation had occurred by February 14. Slope failures were beginning to develop by February 15 and then very high-intensity rainfall occurred on February 16. As much as eight inches of rain fell in a six-hour period in many locations. Records and personal observations in the field on February 16 and 17 showed that the mountains and slopes literally fell apart on those two days.

1983 San Clemente, Orange County

Cost, $65 million (2000 Dollars), California Highway 1. Litigation at that time involved approximately $43.7 million (2000).

1983 Big Rock Mesa

Cost, $706 million (2000 Dollars) in legal claims condemnation of 13 houses, and 300 more threatened rockslide caused by rainfall.

1978-1980 San Diego County

Experienced major damage from storms in 1978, 1979, and 1979-80, as did neighboring areas of Los Angeles and Orange County. One hundred and twenty landslides were reported to have occurred in San Diego County during these 2 years. Rainfall for the rainy seasons of 78-79 and 79-80 was 14.82 and 15.61 inches (37.6 and 39.6 cm) respectively, compared to a 125-year average (1850-1975) of 9.71 inches (24.7 cm). Significant landslides occurred in the Friars Formation, a unit that was noted as slide-prone in the Seismic Safety Study for the City of San Diego. Of the nine landslides that caused damage in excess of $1 million, seven occurred in the Friars Formation, and two in the Santiago Formation in the northern part of San Diego County.

1994 Northridge Earthquake Landslides

As a result of the Magnitude 6.7 Northridge Earthquake, more than 11,000 landslides occurred over an area of 10,000 km^2. Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. Destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. Caused deaths from Coccidioidomycosis (valley fever) the spore of which was released from the soil and blown toward the coastal populated areas. The spore was released from the soil by the landslide activity.

March 1995 Los Angeles and Ventura Counties

Above normal rainfall triggered damaging debris flows, deep-seated landslides, and flooding. Several deep-seated landslides were triggered by the storms, the most notable was the La Conchita landslide, which in combination with a local debris flow, destroyed or badly damaged 11 to 12 homes in the small town of La Conchita, about 20 km west of Ventura. There also was widespread debris-flow and flood damage to homes, commercial buildings, and roads and highways in areas along the Malibu coast that had been devastated by wildfire two years before.

January 2005 Ventura County

On January 10, 2005, a landslide once again struck the community of La Conchita, killing ten people and destroying or seriously damaging 36 houses.

Landslide Characteristics

What is a landslide?

"A landslide is defined as, the movement of a mass of rock, debris, or earth movement down a slope. Landslides are a type of "mass wasting" which denotes any down slope movement of soil and rock under the direct influence of gravity. The term "landslide" encompasses events such as rock falls, topples, slides, spreads, and flows.

Landslides are initiated by rainfall, earthquakes, volcanic activity, changes in groundwater, disturbance and change of a slope by human-caused construction activities, or any combination of these factors. Landslides also occur underwater, causing tidal waves and damage to coastal areas. These landslides are called submarine landslides."

The size of a landslide usually depends on the geology and the initial cause of the landslide. Landslides vary greatly in their volume of rock and soil, the length, width, and depth of the area affected, frequency of occurrence, and speed of movement. Some characteristics that determine the type of landslide are slope of the hillside, moisture content, and the nature of the underlying materials. Landslides are given different names, depending on the type of failure, and their composition and characteristics.

Slides move in contact with the underlying surface. These movements include rotational slides where sliding material moves along a curved surface and translational slides where movement occurs along a flat surface. These slides are generally slow moving and can be deep. Slumps are small rotational slides that are generally shallow. Slow-moving landslides occur on relatively gentle slopes and cause significant property damage but are far less likely to result in serious injuries than rapidly moving landslides.

What is a Debris Flow?

A debris or mud flow is a river of rock, earth and other materials, including vegetation that is saturated with water. This high percentage of water gives the debris flow a very rapid rate of movement down a slope. Debris flows move with speeds greater than 20 miles per hour, and often move much faster. This high rate of speed makes debris flows extremely dangerous to people and property in its path.

Areas Particularly Susceptible to Landslides

Locations at risk from landslides or debris flows include areas with one or more of the following conditions:

- ✓ On or close to steep hills
- ✓ Steep road-cuts or excavations
- ✓ Existing landslides or places of known historic landslides (such sites often have tilted power lines, trees tilted in various directions, cracks in the ground, and irregular-surfaced ground)
- ✓ Steep areas where surface runoff is channeled, such as below culverts, V-shaped valleys, canyon bottoms, and steep stream channels
- ✓ Fan-shaped areas of sediment and boulder accumulation at the outlets of canyons
- ✓ Canyon areas below hillside and mountains that recently (within 1-6 years) were subjected to a wildland fire

Excavation and Grading

Slope excavation is common in the development of home sites or roads on sloping terrain. Grading these slopes results in slopes that are steeper than the pre-existing natural slopes. Since slope steepness is a major factor in landslides, these steeper slopes are at an increased risk for landslides.

The added weight of fill placed on slopes also results in an increased landslide hazard. Small landslides are fairly common along roads, in either the road cut or the road fill. Landslides occurring below new construction sites are indicators of the potential impacts stemming from excavation.

Drainage and Groundwater Alterations

Water flowing through or above ground, is often the trigger for landslides. Any activity that increases the amount of water flowing into landslide-prone slopes increases landslide hazards. Broken or leaking water or sewer lines can be especially problematic, as does water retention facilities that direct water onto slopes. However, even lawn irrigation in landslide prone locations results in damaging landslides. Ineffective storm water management and excess runoff also cause erosion and increase the risk of landslide hazards. Drainage is affected, naturally by the geology and topography of an area. Development that results in an increase in impervious surface impairs the ability of the land to absorb water and redirects water to other areas. Channels, streams, ponding, and erosion on slopes indicate potential slope problems.

Road and driveway drains, gutters, downspouts, and other constructed drainage facilities concentrates and accelerates flow. Ground saturation and concentrated velocity flow are major causes of slope problems and triggers landslides.

Changes in Vegetation

Removing vegetation from very steep slopes increases landslide hazards. Areas that experience wildfire and land clearing for development may have long periods of increased landslide hazard. Also, certain types of ground cover require constant watering to remain green. Changing away from native ground cover plants increases the risk of landslide.

Flood Hazards

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 flood water. The floodplain is made up of two sections: the floodway and the flood fringe.

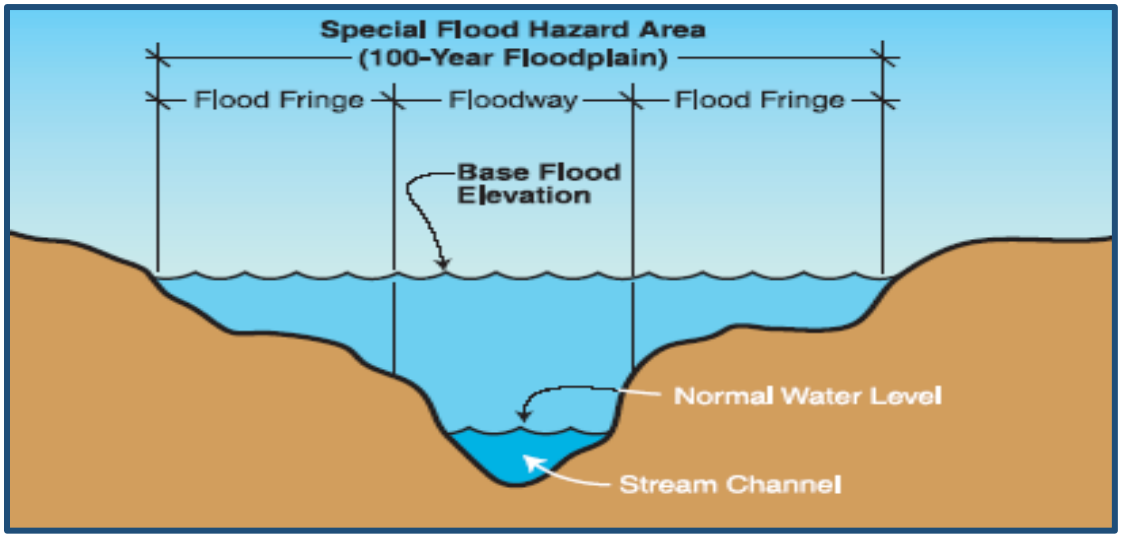
100-Year Flood

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. Schematic: Floodplain and Floodway shows the relationship of the floodplain and the floodway.

The 100-year flooding event is the flood having a 1% 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.

Figure: Floodplain and Floodway
(Source: FEMA How-To-Guide Assessing Hazards)



Floodway

The floodway is one of two main sections that make up the floodplain. Floodways are defined for regulatory purposes. Unlike floodplains, floodways do not reflect a recognizable geologic feature. For NFIP purposes, floodways are defined as the channel of a river or stream, and the overbank areas adjacent to the channel. The floodway carries the bulk of the flood water downstream and is usually the area where water velocities and forces are the greatest. NFIP regulations require that the floodway be kept open and free from development or other structures that would obstruct or divert flood flows onto other properties.

Base Flood Elevation (BFE)

The term "Base Flood Elevation" refers to the elevation (normally measured in feet above sea level) that the base flood is expected to reach. Base flood elevations can be set at levels other than the 100-year flood. Some communities use higher frequency flood events as their base flood elevation for certain activities, while using lower frequency events for others. For example, for the purpose of storm water management, a 25-year flood event might serve as the base flood elevation; while the 500-year flood event serves as base flood elevation for the tie down of mobile homes. The regulations of the NFIP focus on development in the 100-year floodplain.

Types of Flooding

Two types of flooding can affect the City of Duarte: slow-rise or flash flooding. Slow-rise floods in Duarte may be preceded by a warning period of hours or days. Evacuation and sandbagging for slow-rise floods have often effectively lessened flood related damage. Conversely, flash floods are most difficult to prepare for, due to extremely limited, if any, advance warning and preparation time. Unlike most of California, the areas of Los Angeles County that are subject to slow-rise flooding are not associated with overflowing rivers, aqueducts, canals or lakes. Slow-rise flooding in Duarte is usually the result of one or a combination of the following factors: extremely heavy rainfall, saturated soil, area recently burned in wild fires with inadequate new ground cover growth, or heavy rainfall with runoff from melting mountain snow.

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 Duarte 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. Drainage systems within the City of Duarte have been updated and it is anticipated that they would be fully functional in an emergency.

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.

Definitions of FEMA Flood Zone Designations

Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

Moderate to Low Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

ZONE	DESCRIPTION
B and X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
C and X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.

High Risk Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.

ZONE	DESCRIPTION
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.

Undetermined Risk Areas

ZONE	DESCRIPTION
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

Dam Failure Hazards

Hazard Characteristics

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

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.

Windstorm Hazards

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 of 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 has 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 Islands normally accompany a Santa Ana event.

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

Table: Beaufort Scale
(Source : NOAA Storm Center)

Beaufort Force	Speed (mph)	Wind Description - State of Sea - Effects on Land
0	Less 1	Calm - Mirror-like - Smoke rises vertically
1	1-3	Light - Air Ripples look like scales; No crests of foam - Smoke drift shows direction of wind, but wind vanes do not
2	4-7	Light Breeze - Small but pronounced wavelets; Crests do not break - Wind vanes move; Leaves rustle; You can feel wind on the face
3	8-12	Gentle Breeze - Large Wavelets; Crests break; Glassy foam; A few whitecaps - Leaves and small twigs move constantly; Small, light flags are extended
4	13-18	Moderate Breeze - Longer waves; Whitecaps - Wind lifts dust and loose paper; Small branches move
5	19-24	Fresh Breeze - Moderate, long waves; Many whitecaps; Some spray - Small trees with leaves begin to move

Beaufort Force	Speed (mph)	Wind Description - State of Sea - Effects on Land
6	25-31	Strong Breeze - Some large waves; Crests of white foam; Spray - Large branches move; Telegraph wires whistle; Hard to hold umbrellas
7	32-38	Near Gale - White foam from breaking waves blows in streaks with the wind - Whole trees move; Resistance felt walking into wind
8	39-46	Gale - Waves high and moderately long; Crests break into spin drift, blowing foam in well-marked streaks - Twigs and small branches break off trees; Difficult to walk
9	47-54	Strong Gale - High waves with wave crests that tumble; Dense streaks of foam in wind; Poor visibility from spray - Slight structural damage
10	55-63	Storm - Very high waves with long, curling crests; Sea surface appears white from blowing foam; Heavy tumbling of sea; Poor visibility - Trees broken or uprooted; Considerable structural damage
11	64-73	Violent Storm - Waves high enough to hide small and medium sized ships; Sea covered with patches of white foam; Edges of wave crests blown into froth; Poor visibility - Seldom experienced inland; Considerable structural damage
12	>74	Hurricane - Sea white with spray. Foam and spray render visibility almost non-existent - Widespread damage. Very rarely experienced on land.

Santa Ana Winds and Tornado-Like Wind Activity

Based on local history, most incidents of high wind in the City of Duarte are the result of the Santa Ana and El Niño related wind conditions. While high impact wind incidents are not frequent in the area, significant wind events and sporadic tornado activity have been known to negatively impact the City. In addition, the City is increasingly concerned with “global warming” ramifications and potential increases in wind related events.

What are Santa Ana Winds?

“Santa Ana winds are generally defined as warm, dry winds that blow from the east or northeast (offshore). These winds occur below the passes and canyons of the coastal ranges of Southern California and in the Los Angeles and Orange County basins. Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon (the canyon from which it derives its name). Forecasters at the National Weather Service offices in Oxnard and San Diego usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots.” These winds accelerate to speeds of 35 knots as they move through canyons and passes, with gusts to 50 or even 60 knots.

“The complex topography of Southern California combined with various atmospheric conditions create numerous scenarios that may cause widespread or isolated Santa Ana events. Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah). Clockwise circulation around the center of this high-pressure area forces air downslope from the high plateau. The air warms as it descends toward the California coast at the rate of five degrees F per 1,000 feet due to compressional heating. Thus, compressional heating provides the primary source of warming. The air is dry since it originated in the desert, and it dries out even more as it is heated.”

These regional winds typically occur from October to March, and, according to most accounts are named either for the Santa Ana River Valley where they originate, or for the Santa Ana Canyon, southeast of Los Angeles, where they pick up speed.

What are Tornados?

Tornadoes are spawned when there is warm, moist air near the ground, cool air aloft, and winds that speed up and change direction. An obstruction, such as a house, in the path of the wind causes it to change direction. This change increases pressure on parts of the house, and the combination of increased pressures and fluctuating wind speeds creates stresses that frequently cause structural failures.

In order to measure the intensity and wind strength of a tornado, Dr. T. Theodore Fujita developed the Fujita Tornado Damage Scale. This scale compares the estimated wind velocity with the corresponding amount of suspected damage. The scale measures six classifications of tornadoes with increasing magnitude from an "F0" tornado to a "F6+" tornado.

Table: Fujita Tornado Damage Scale
(Source: NOAA Storm Prediction Center)

Scale	Wind Estimated (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys and TV antennas; breaks twigs off trees; pushes over shallow-rooted trees.
F1	73-112	Moderate damage. Peels surface off roofs; windows broken; light trailer houses pushed or overturned; some trees uprooted or snapped; moving automobiles pushed off the road. 74 mph is the beginning of hurricane wind speed.
F2	113-157	Considerable damage. Roofs torn off frame houses leaving strong upright walls; weak buildings in rural areas demolished; trailer houses destroyed; large trees snapped or uprooted; railroad boxcars pushed over; light object missiles generated; cars blown off highway.
F3	158-206	Severe damage. Roofs and some walls torn off frame houses; some rural buildings completely demolished; trains overturned; steel-framed hangar-warehouse-type structures torn; cars lifted off the ground; most trees in a forest uprooted snapped, or leveled.
F4	207-260	Devastating damage. Whole frame houses leveled, leaving piles of debris; steel structures badly damaged; trees debarked by small flying debris; cars and trains thrown some distances or rolled considerable distances; large missiles generated.
F5	261-318	Incredible damage. Whole frame houses tossed off foundations; steel-reinforced concrete structures badly damaged; automobile-sized missiles generated; trees debarked; incredible phenomena can occur.
F6-F12	319 to sonic	Inconceivable damage. Should a tornado with the maximum wind speed in excess of F5 occur, the extent and types of damage may not be conceived. A number of missiles such as iceboxes, water heaters, storage tanks, automobiles, etc. will create serious secondary damage on structures.

Microbursts

Unlike tornados, microbursts are strong, damaging winds which strike the ground and often give the impression a tornado has struck. They frequently occur during intense thunderstorms. The origin of a microburst is downward moving air from a thunderstorm's core. But unlike a tornado, they affect only a rather small area. University of Chicago storm researcher Dr. Ted Fujita first coined the term "downburst" to describe strong, downdraft winds flowing out of a thunderstorm cell that he believed were responsible for the crash of Eastern Airlines Flight 66 in June of 1975.

A downburst is a straight-direction surface wind in excess of 39 mph caused by a small-scale, strong downdraft from the base of convective thundershowers and thunderstorms. In later investigations into the phenomena he defined two sub-categories of downbursts: the larger macrobursts and small microbursts.

Macrobursts are downbursts with winds up to 117 mph which spread across a path greater than 2.5 miles wide at the surface and which last from five to 30 minutes. The microburst, on the other hand is confined to an even smaller area, less than 2.5 miles in diameter from the initial point of downdraft impact. An intense microburst can result in damaging winds near 270 km/hr (170 mph) and often last for less than five minutes.

Downbursts of all sizes descend from the upper regions of severe thunderstorms when the air accelerates downward through either exceptionally strong evaporative cooling or by very heavy rain which drags dry air down with it. When the rapidly descending air strikes the ground, it spreads outward in all directions, like a fast-running faucet stream hitting the sink bottom.

When the microburst wind hits an object on the ground such as a house, garage or tree, it can flatten the buildings, and strip limbs and branches from the tree. After striking the ground, the powerful outward running gust can wreak further havoc along its path. Damage associated with a microburst is often mistaken for the work of a tornado, particularly directly under the microburst. However, damage patterns away from the impact area are characteristic of straight-line winds rather than the twisted pattern of tornado damage."

Tornados, like those that occur every year in the Midwest and Southeast parts of the United States, are a rare phenomenon in most of California, with most tornado-like activity coming from micro-bursts.

What is Susceptible to Windstorms?

Life and Property

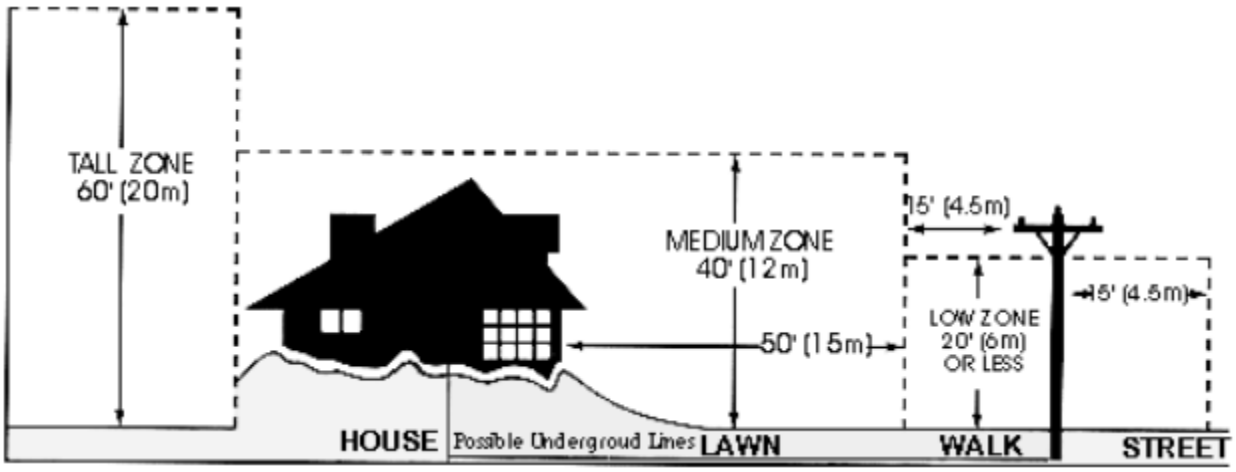
Based on the history of the region, windstorm events can be expected, perhaps annually, across widespread areas of the region which can be adversely impacted during a windstorm event. This can result in the involvement of City emergency response personnel during a wide-ranging windstorm or microburst 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 a City, 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 are 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.

Hazardous Materials Hazards

Hazard Characteristics

Definition

Hazardous materials are substances that are flammable, combustible, explosive, toxic, noxious, and corrosive, an oxidizer, an irritant, or radioactive. A hazardous material spill or release can pose a risk to life, health, or property. An incident can result in the evacuation of a few people, a section of a facility, or an entire neighborhood.

Hazardous Materials Transportation

Federal emergency planning requirements include the formation of local emergency planning committees (LEPCs). The LEPC is required to evaluate facilities using threshold quantities of extremely hazardous substances (EHS), and determine which facilities are at risk of a release or subject to additional risk due to their proximity to another facility using EHS. The LEPC is also required to identify hazardous materials transportation routes. This requirement has led Region I LEPC to develop a specific transportation element to its plan. The following represents the Region I transportation element:

Transportation of hazardous materials by air, land, or water poses a significant need to plan and coordinate emergency resources necessary to respond to hazardous materials spills and releases. These types of incidents could affect several million Californians and are potentially hazardous to both the local community, and those traveling near the incident site. First, we will discuss the different modes of transportation and the unique challenges presented for planners and emergency responders.

Air

The southern California region has several major air transportation facilities. In some instances, there may be hazardous materials incidents involving air cargo either on the aircraft or on the ground. Initial response to these incidents would be provided by airport emergency response personnel. The need may arise for additional resources to respond. Response efforts must be coordinated to ensure all personnel are made aware of the material involved and of the potential hazards. In the event of a crash of an aircraft, the major hazardous materials concerns will be fuel from the aircraft, hydraulic fluid, and oxygen systems. The threat posed by onboard hazardous cargo will be minimal. Regulations on hazardous materials shipments by air are found in 49 CFR section 175.

Water
Two major ports serve the southern California region. These are the Port of Los Angeles and the Port of Long Beach. The prime concern for these two major ports would be releases of petroleum products from both oil tankers and other large ocean-going vessels. Not only is there a significant potential from fire and explosion, the environmental effects could be catastrophic. Additionally, many other types of hazardous materials may be shipped by bulk or containerized cargo. Planners must recognize potential risks associated with vessels and port facilities in their hazard assessment. Response to water related incidents is coordinated through the Coast Guard and the California Department of Fish and Game.

Ground
Ground transportation provides the largest movement of hazardous materials and will generate the majority of incidents which will be confronted by local emergency response personnel. The three modes of ground transportation are rail, highway, and pipeline.

Rail is unique in both the quantity and types of hazardous materials which can be involved in one incident. Collisions, derailments, and mechanical failure, as well as loading and unloading, can all result in very serious hazardous materials incidents. A critical consideration for planners is a careful evaluation of the rail traffic in their jurisdiction. Rail companies as well as product manufacturers have emergency response teams available to assist local emergency responders. The United States Department of Transportation governs the transportation of hazardous materials by rail.

Highway-related hazardous materials incidents account for the vast majority of situations faced by local responders. Highway incidents range from minor releases of diesel fuel, to multiple vehicle accidents involving large quantities of multiple types of hazardous materials. A concern for planners is the fact that these incidents can occur anyplace throughout the region. Multiple agency coordination is essential for successful control and mitigation of these incidents. Section 2454 of the California Vehicle Code mandates authority for incident command at the scene of an on-highway hazardous substance incident in the appropriate law enforcement agency having primary traffic investigative authority on the highway where the incident occurs. The local governing body of the City may assign the authority to the local fire protection agency.

Pipeline incidents will typically involve compressed natural gas, or petroleum products. An important aspect for planners to consider is that pipelines are frequently out of sight and out of mind. Southern California region is honeycombed with underground pipelines ranging from a few inches to several feet in diameter. Pipelines transport products from as far away as Texas for use by local consumers. An important source of information on underground pipelines is Dig Alert. Regulation of pipeline activity is governed by the U.S. Department of Transportation and the California Public Utilities Commission.

Potential Effects of a Hazardous Materials Incident

As previously mentioned, highway accidents and incidents will constitute the majority of emergency response situations. There are two distinct facets which must be addressed in a local emergency action plan. Planners must consider the local community with fixed facilities and those individuals in transit. The following is illustrative of typical concerns which planners will encounter in addressing hazardous material occurrences.

Residential and Business Community

Chemical spills on streets and highways can impact the public in one or more of the following ways:

- ✓ Shelter-in-place
- ✓ Evacuations
- ✓ Restriction or detour of local traffic
- ✓ Damage to homes and businesses
- ✓ Injury, illness or death

Because of these potentially dangerous situations, it is necessary for emergency responders to be familiar with requirements for hazmat spill notification and to obtain and direct the resources necessary to protect public health and the environment.

Commuter/Delivery Traffic

In addition to the surrounding locale, travelers going through or near transportation incidents may be impacted in several ways:

- ✓ Exposure to harmful or flammable chemicals resulting in injury or illness
- ✓ Delayed travel
- ✓ Accidents
- ✓ Vehicle damage due to chemical contact

Agencies with on highway responsibility in LEPC Region I should become familiar with shipping corridors and traffic patterns.

Region I Transportation Needs

Research has indicated that the majority of hazardous materials incidents occur in the transportation arena. This fact strongly suggests that the region make the following recommendations for further transportation planning assessment:

- ✓ Identify various surface transporters within the region
- ✓ Determine level of training as it relates to transportation routes and notification requirements
- ✓ Evaluate emergency response resources for both public and private hazardous materials response teams
- ✓ Prioritize response resources in areas unable to respond to proportionally higher number of incidents.
- ✓ Develop standard guidelines for evacuation of populations impacted by transportation related incidents.
- ✓ Evaluate the need to perform Transportation Risk Assessment for selected high priority areas.

Region I Map

Attachments

FEMA Letter of Approval

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

FEMA

June 2, 2020

Jason Golding
Planning Division Manager
Community Development Department
1600 Huntington Drive
Duarte, CA 91010

Dear Mr. Golding:

We have completed our final review of the *City of Duarte Hazard Mitigation Plan*, officially adopted by the City of Duarte on May 12, 2020, 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 Duarte'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 Duarte Hazard Mitigation Plan* is for a period of five years, effective starting the date of this letter. Prior to June 2, 2025, the City of Duarte 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. The enclosed plan review tool provides additional recommendations to incorporate into the plan when the City of Duarte undertakes its identified plan maintenance process.

If you have any questions regarding the planning or review processes, please contact the FEMA Region IX Hazard Mitigation Planning Team at fema-r9-mitigation-planning@fema.dhs.gov.

Sincerely,

Digitally signed by ALISON KEARNS
Date: 2020.06.02 22:36:47 -07'00'

for Juliette Hayes
Director
Mitigation Division
FEMA Region IX

Enclosure

cc: Jennifer Hogan, State Hazard Mitigation Officer, California Governor's Office of Emergency Services
Victoria LaMar-Haas, Hazard Mitigation Planning Chief, California Governor's Office of Emergency Services

CITY COUNCIL STAFF REPORT

Date: May 12, 2020

To: Mayor and City Council

From: Carolyn J. Harshman, Emergency Planning Consultants; and
Jason Golding, Planning Manager

Subject: Adoption of Local Hazard Mitigation Plan; Resolution 20-R-15

Purpose

The Disaster Mitigation Act of 2000 requires communities to develop, implement, and update hazard mitigation plans recognizing potential natural hazards and to identify and consider mitigation measures to reduce the risks associated with those hazards. The plan is a tool to aid in facility and infrastructure planning and improvements and is a requirement to qualify for federal hazard mitigation grants. The federal regulations require hazard mitigation plans to be updated every five years. The City's existing Hazard Mitigation Plan was approved by FEMA in 2014. The updated plan must first be adopted by the local jurisdiction's governing body and then approved by FEMA before being provided a Final Letter of Approval. Staff is seeking the adoption of Resolution No. 20-R-15 finalizing the hazard mitigation planning process.

Background/Analysis

The Hazard Mitigation Plan (HMP) process began in December 2018 with assistance from Emergency Planning Consultants (EPC) and the City's Hazard Mitigation Planning Team, made up of representatives from the City's Public Safety Department and Engineering, Field Services, and Planning Divisions (Planning Team). Four Planning Team meetings were held before the first draft of the HMP. The Planning Team invited the general public to participate in the planning process by making the Second Draft Plan available during the plan writing phase. The public was informed of the Plan's availability through several mediums including the City's website "City News/Latest News" on the website landing page, bi-monthly "Community Development Update", "City Hall Happenings" (July 11 and 17, 2019), and Facebook (July 7, 2019). In addition, external agencies (including: utility providers, DUSD, special districts and adjoining jurisdictions) were provided an invitation to comment on the Second Draft Plan. The Second Draft Plan was announced and posted on the City's website from July 3-15, 2019 along with a hard copy of the HMP available to the public at City Hall.

Carolyn Harshman, President of EPC, was selected by the City Council in November 2018 to prepare the update to our local HMP. Ms. Harshman facilitated a total of four meetings, development of the 2020 HMP, and will finalize the approval process with California Office of Emergency Services (Cal OES) and the Federal Emergency Management Agency (FEMA).

Through the planning process, the Planning Team developed a Mitigation Actions Matrix that identifies desired and planned projects including those from the existing City plans, including the General Plan and Capital Improvement Program and reflects the following goals: (1) protect life and property, (2) enhance public awareness, (3) preserve natural systems, (4) encourage partnerships and implementation, and (5) strengthen emergency services. The adoption of the HMP will allow the City to seek mitigation grant funding when the opportunity becomes available. The HMP will be a living document and will be reviewed by the Planning Team members on a quarterly basis to ensure the Mitigation Actions Matrix is implemented.

A final draft of the 2020 HMP will be provided electronically to the City Council, with a digital copy provided through a link on the City Council agenda available through the City's website.

Alignment with Strategic Goals

The adoption of the Hazard Mitigation Plan is the key to qualifying for Hazard Mitigation Grant Program funding that follows Presidential Disaster Declarations. Seeking out such opportunities meets the City's goal to be fiscally responsible. This HMP 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. Finally, the HMP helps meet the goals and objectives of the General Plan Land Use and Safety elements and provides implementation strategies for future mitigation planning activities.

Recommendation

It is recommended that the City Council adopt Resolution 20-R-15, approving the updated 2020 Hazard Mitigation Plan, and authorize Staff to forward the resolution of approval to FEMA for issuance of a Final Letter of Approval.

ATTACHMENTS:

A. Final Draft, 2020 Hazard Mitigation Plan (electronic)
B. Resolution 20-R-15

City Council Resolution

RESOLUTION NO. 20-15

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF DUARTE, CALIFORNIA, ADOPTING THE 2020 LOCAL HAZARD MITIGATION PLAN

WHEREAS, the City of Duarte is vulnerable to natural and human-caused hazards which may result in loss of life and property, economic hardship, and threats to public health and safety; and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities; and

WHEREAS, the City of Duarte acknowledges the requirements of Section 322 of DMA 2000 to update the 2014 Hazard Mitigation Plan in order to be eligible for pre- and post-disaster federal hazard mitigation grant funds; and

WHEREAS, the City of Duarte developed by a Planning Team with representatives from the City, pertinent municipalities and other stakeholders; and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Hazard Mitigation Plan; and

WHEREAS, the 2020 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the City; and

WHEREAS, pursuant to the California Environmental Quality Act ("CEQA"), City Staff determined that the adoption of the 2020 Hazard Mitigation Plan ("Project") is covered by the general rule, pursuant to Section 15061(b)(3) of the State CEQA Guidelines (14 CCR§ 15061(b)(3)), that CEQA applies only to projects which have the potential for causing a significant effect on the environment, and City Staff found that there is no possible significant effect directly related to the Project. Furthermore, CEQA Guidelines Sections 15262 and 15269 provide additional guidance, in the context, that the Project is a planning study that does not tacitly approve projects that would otherwise require independent environmental review under CEQA.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DUARTE, CALIFORNIA, RESOLVES AS FOLLOWS:

SECTION 1. The City Council finds that all of the facts set forth in the Recitals of this Resolution are true and correct.

SECTION 2. The City Council has reviewed the Project and based upon the whole record before it, in the exercise of its independent judgment and analysis, concurs that the adoption of the City of Duarte 2020 Local Hazard Mitigation Plan is exempt from consideration under the California Environmental Quality Act ("CEQA") pursuant to CEQA Guidelines Section 15061 (b)(3) because it can be seen with certainty that there is no possibility that the adoption of this Plan, in and of itself, may have a significant effect on the environment; and future projects described within the Plan may be subject to independent environmental review pursuant to CEQA, and therefore no further action is required under CEQA at this time.

SECTION 3. The City Council hereby approves and adopts the City of Duarte 2020 Local Hazard Mitigation Plan.

PASSED, APPROVED, AND ADOPTED at a regular meeting of the City Council of the City of Duarte this 12th day of May, 2020.

/s/ Samuel Kang
Mayor Samuel Kang

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES) ss.
CITY OF DUARTE)

I, Marla Akana, City Clerk of the City of Duarte, County of Los Angeles, State of California, hereby attest to the above signature and certify that Resolution No. 20-15 was adopted by the City Council of said City of Duarte at a regular meeting of said Council held on the 12th day of May, 2020, by the following Roll Call vote:

AYES: Councilmembers: Reilly, Paras-Caracci, Lewis, Finlay, Fasana, Urias, Kang

NOES: Councilmembers: None

ABSENT: Councilmembers: None

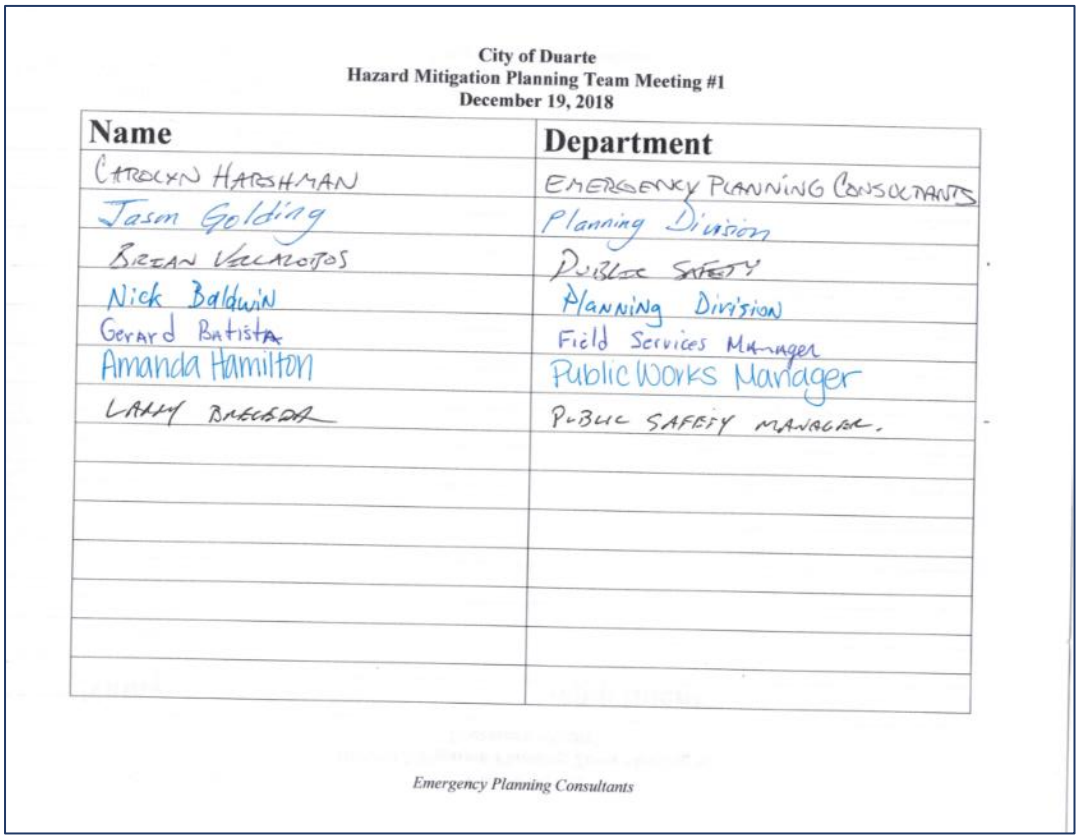
/s/ Marla Akana
City Clerk Marla Akana
City of Duarte, California

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))

A: See **Sign-In Sheets** below.

Planning Team Sign-In Sheets



City of Duarte
Hazard Mitigation Planning Team Meeting #1
December 19, 2018

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Jason Golding	Planning Division
BRIAN VELARDITOS	PUBLIC SAFETY
Nick Baldwin	Planning Division
Gerard Batista	Field Services Manager
Amanda Hamilton	Public Works Manager
LARRY BAGGERLY	PUBLIC SAFETY MANAGER.

Emergency Planning Consultants

City of Duarte
Hazard Mitigation Planning Team Meeting #2
January 9, 2019

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Jason Golding	Community Development
Nick Baldwin	" "
Gerard C Batista	" "
BRIAN VILLALOBOS	PUBLIC SAFETY
LARRY DUECEDA	PUBLIC SAFETY
Amanda Hamilton	Public Works

Emergency Planning Consultants

City of Duarte
Hazard Mitigation Planning Team Meeting #3
February 26, 2019

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Jason Golding	Community Deypt - Planning
Nick Baldwin	" "
Gerard Batista	Community Development (Field Services)
Amanda Hamilton	Public Works
BRIAN VILLALOBOS	PUBLIC SAFETY

Emergency Planning Consultants

City of Duarte
Hazard Mitigation Planning Team Meeting #4
March 14, 2019

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Jason Golding	Planning Division
Nick Baldwin	" "
Amanda Hamilton	Public Works
Gerard Batista	Field Services
LARRY BALDERAS	PUBLIC SAFETY MANAGER.

Emergency Planning Consultants

Planning Team Agendas

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))

A: See **Planning Team Agendas** below.

Agenda

City of Duarte

Planning Team Meeting #1

1. **Examine the purpose hazard mitigation.**
2. **Discuss the concepts and terms related to hazard mitigation planning.**
3. **Review the project schedule and public involvement during the plan writing phase.**
4. **Discuss initial results of Hazard Analysis and Rank Hazards.**
5. **Gather Updated Community Profile Data**
    a. **History, Geography, Land Use, Demographics, CIP**

Agenda

City of Duarte

Planning Team Meeting #2

1. **Review examples of hazard mitigation activities.**

2. **Update Existing and Develop New Hazard Mitigation Action Items.**
   a. **Action Item**
   b. **Goals Achieved**
   c. **Coordinating Agency**
   d. **Timeline**
   e. **Funding Source**
   f. **Planning Mechanisms**
   g. **Benefit, Cost, and Priority Ranking**
   h. **Does action item apply to existing or future buildings or infrastructure?**

Agenda

City of Duarte

Planning Team Meeting #3

1. **Continue to Develop Additional Mitigation Action Items - Review County of Los Angeles All-Hazard Mitigation Plan (Attachment: Mitigation Action Ideas).**

Agenda

City of Duarte

Planning Team Meeting #4

1. **Review First Draft Plan (distributed ahead of meeting to all members).**

2. **Discuss Strategy for Distributing Second Draft Plan to External Agencies and General Public. Also, discuss sending to City Council as a consent agenda (information item) in advance of submission to Cal OES/FEMA for formal review. Upon return of Approval Pending Adoption, updated Plan will be set for a public meeting with the City Council for Plan adoption.**

Q&A | ELEMENT A: PLANNING PROCESS | A3

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

A: See **Stakeholders** below.

Web Postings and Notices

Website Screenshots – Landing Page and Access to Plan (posted 7.3.2019)

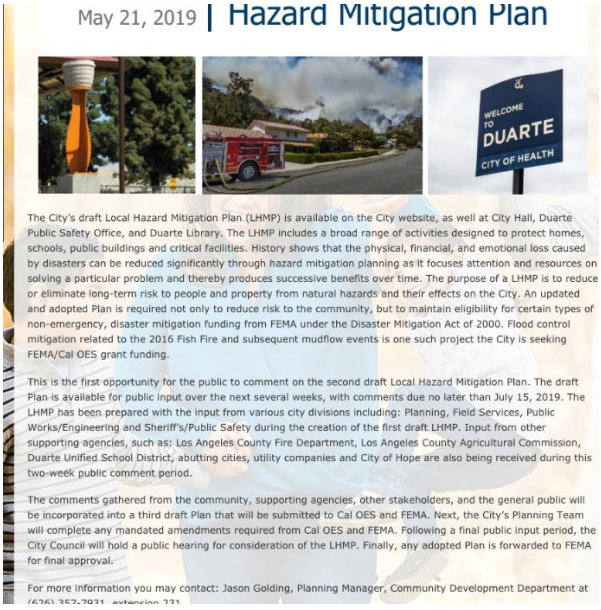
Landing Page (Duarte ENews)

LOCAL HAZARD MITIGATION PLAN AVAILABLE FOR PUBLIC REVIEW

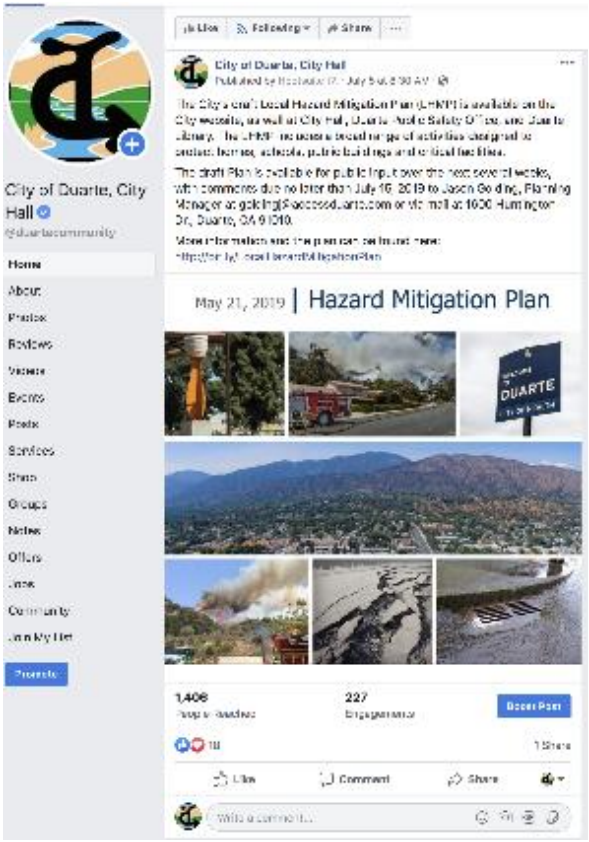
The City's draft Local Hazard Mitigation Plan (LHMP) is available for review on the City website, as well at City Hall, Duarte Public Safety Office, and Duarte Library. The LHMP includes a broad range of activities designed to protect homes, schools, public buildings and critical facilities. Plan is available for public review over the next several weeks, with **comments due no later than July 15, 2019.**

READ MORE

Website



Facebook (posted June 27, 2019)



City Hall Happenings (posted June 27, 2019)

LOCAL HAZARD MITIGATION PLAN AVAILABLE FOR COMMENT

- First opportunity for the public to comment on the draft Local Hazard Mitigation Plan (LHMP) - **comments due no later than July 15, 2019.**
- The draft Plan is available on the **City website**. Physical copies are available at City Hall, Duarte Public Safety Office and the Duarte Library.
- The purpose of the LHMP is to reduce or eliminate long-term risk to people and property from natural hazards and their effects on the City and is required to maintain eligibility for certain types of non-emergency, disaster mitigation funding from FEMA.
- One such project the City is seeking funding is for flood mitigation related to the 2016 Fish Fire and subsequent mudflow events.

Quarterly Implementation Report

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
Earthquake and Liquefaction														
EQLQ-1A Continue to adopt and enforce the most up-to-date California Building Code and California Fire Code with local amendments and continue to support the training of City staff in the provisions of the latest codes, to provide for seismic safety and fire safety design.	Community Development Department: Planning and Building Divisions, LACoFD	Ongoing	X	X		X	G F	MC	Y	H	H	L	Revised	
EQLQ-1B Regulate the location of new essential or critical facilities in areas that would be directly affected by seismic and geologic hazards (including surface fault rupture, liquefaction, and slope instability) to ensure the facility will not be located in an area identified as susceptible to damage from a natural hazard.	Community Development Department: Planning and Building Divisions	Ongoing	X	X		X	G F	MC	Y	H	H	L	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
EQLQ-1C Continue to require fault rupture hazard assessment studies for qualifying projects proposed in the Alquist-Priolo Earthquake Fault Zones and Fault Hazard Management Zones mapped through the City.	Community Development Department: Planning and Building Divisions	Ongoing	X	X		X	G F	MC	Y	H	H	L	Revised	
EQLQ-1D Continue to require liquefaction assessment studies for qualifying projects proposed in areas of the City mapped as susceptible to liquefaction, and in areas where geotechnical testing shows the sediments are susceptible to liquefaction, require the implementation of mitigation measures as a condition of approval.	Community Development Department: Planning and Building Divisions	Ongoing	X	X		X	G F	MC	Y	H	H	L	Revised	
EQLQ-1E Develop and make available to all residents and businesses literature on hazard prevention and disaster response, including information on how to earthquake-proof residences and places of	Public Safety Department	Ongoing	X	X		X	G F	GF	Y	H	H	L	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
business, and information on what to do before, during and after an earthquake. Reminders will be issued periodically to encourage the review and renewal of earthquake-preparedness kits and other emergency preparedness materials and procedures.														
EQLQ-2 Create inventory of potentially hazardous buildings, including pre-1952 wood-frame structures, concrete tilt-ups, pre-1971 reinforced masonry, soft-story, and multi-family residential buildings, to assess the seismic vulnerability of their structures and conduct seismic retrofitting as necessary to improve the building's resistance to seismic shaking.	Community Development Department	1-5 years	X	X		X	GF	GF	Y	H	H	M	Revised	
EQLQ-3 Encourage the evaluation of the above-ground water storage tanks in the City to assess their potential inundation	Community Development	1-5 years	X			X	U	GF	Y	H	H	L	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
hazard in the event of catastrophic failure and ensure that all tanks are fitted with the appropriate seismic safeguards, including shut-off valves, in accordance with the most recent water tank design guidelines.	Department: Public Works Division; Cal-American Water													
EQLQ-4 Conduct a seismic evaluation of City-owned essential and critical facilities that are located in or near mapped faults or in areas mapped as susceptible to liquefaction or earthquake-induced slope instability.	Community Development Department	1-5 years	X	X		X	G R	GR	Y	H	H	M	Revised	
EQLQ-5 Where appropriate, relocate, strengthen, or retrofit those City-owned essential and critical facilities found to be at risk from seismic hazards.	Community Development Department	1-5 years	X	X		X	G R	GR	Y	M	H	H	Revised	
Wildfire														
WLD-1 Ensure City equipment is up to date and maintained to supplement the Los	Community Development	Ongoing	X	X		X	G R	GR	N	L	H	M	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
Angeles County Fire Department efforts (including City water trucks, City trucks, and tools), especially during red flag warning days.	Department: Public Works and Field Services Divisions, LACoFD													
WLD-2 Ensure that there are an appropriate number of generators for emergency power, and compatibility with LACoFD supply. Specifically, these generators will be used to provide back-up power systems in the event of an electrical power failure in order to pump water supply into water tanks for fire suppression.	Community Development Department - Public Works and Field Services Divisions; LACoFD	Ongoing	X	X		X	G R	GR	N	L	H	M	Revised	
WLD-3 Continue fire inspections and brush clearance programs sponsored by the Los Angeles County Fire Department and LA County Agricultural Commission.	Community Development Department, LACoFD	Ongoing	X	X		X	G F	GF	Y	H	H	L	Revised	
WLD-4 Continue to enforce development standards and distribute zoning handouts to property owners and contractors that	Community Development Department: Planning,	Ongoing	X	X	X	X	G F	GF	Y	M	H	L	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
describe the fire prevention measures contained within the Hillside Overlay Zone including unobstructed fire protection equipment access easements, Class A roof materials, fire hydrant locations, and water main minimum requirements.	Public Works Divisions; LACoFD													
WLD-5 Update the development standards of the Hillside Development Standards with new fire prevention measures as needed to address the construction of new buildings and infrastructure.	Community Development Department: Planning, Public Works Divisions; LACoFD	Ongoing	X		X	X	G R	GF	Y	M	M	L	Revised	
WLD-6 Update the public on vegetative and fire management activities via communication mechanisms in Duarte such as temporary signs at affected properties; the City web sites; newspapers; and direct mailings.	Community Development Department: Public Works Division; City Manager's Office; LACoFD	Ongoing	X	X	X	X	G F	GF	Y	L	M	L	Revised	
WLD-7 Distribute public information brochures that encourage residents to plant	Community Development	Ongoing	X	X	X	X	G F	GF	Y	L	M	L	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
fire resistant landscaping, to clear dry brush, and to consider fire-resistant building materials.	Department: Planning, Building, Safety Divisions; LASD; LACoFD													
WLD-8 Publish fire prevention articles in City newsletter related to fire evacuation, fire escape plans, and fire safety.	Community Development: Planning, Public Works, and Building and Safety Divisions	Ongoing	X	X		X	GF	GF	Y	M	H	L	Revised	
WLD-9 Build a community message board to be placed in a strategic location in the City to alert the public to wildfire hazards and provide the community information related to hazards.	Community Development Department	Completed	X	X		X	GR	GR	Y	L	L	M	Revised	
WLD-10 Explore funding sources and advocate with Cal-American Water Company to install fire-resistant electrical pump systems or to install back-up power	Community Development Department: Public Works Division; LASD; LACoFD	1-5 years	X			X	GR, U	GP	Y	L	M	M	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
generators at each water tank to ensure adequate fire suppression.														
WLD-11 Seek funding for replacement and/or retrofit of rain cannons for Wildland urban Interface areas throughout the City.	Public Safety Department; Community Development Department; City Manager's Office	1-5 years	X		X	X	G R, U	GP	Y	L	M	M	Revised	
WLD-12 Use information from different sources such as field evaluations, aerial maps and photography, and public feedback to continually evaluate vegetative health and develop recommendations for the Fish Fire Impact Area.	Public Safety Department; Community Development Department; LACoFD	7/2021	X	X	X	X	G F	GF	Y	M	L	M	Revised	
WLD-13 Monitor and evaluate outbreaks on a continual basis due to the dynamic nature of insects and disease.	Public Safety Department; LACoFD	Ongoing	X	X		X	G F	GF	Y	L	L	L	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
WLD-14 Develop a brush clearance plan that addresses fuel modification/reduction on annual schedule for public-owned parcels. The schedule will remain flexible to meet staff workload and funding options, management objectives, neighborhood groups and other strategic inputs. Work with neighborhood groups who have demonstrated a commitment to hazardous fuels reduction and those neighborhoods who would benefit from a demonstration site where one has been proposed.	Community Development Department: Public Works Division; LACoFD	Ongoing	X	X	X	X	GR, GF	GF		M	M	L	Revised	
WLD-15 A brush clearance and fuel modification/reduction plan will identify a schedule for completion for maintenance of City-owned properties identified as needing a management plan. Work collaboratively with state and federal agencies to plan, prepare, and implement fuel treatment	Community Development Department	10/2020	X		X	X	GF	GF		H	M	M	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
options for the landscape, particularly as funding and cooperative opportunities become available for these items.														
WLD-16 Annually reevaluate evacuation resources and update the evacuation plan.	Public Safety Department; Community Development Department; LACoFD	Annually	X	X		X	G F	GF, GR	Y	L	M	L	Revised	
WLD-17 Use social media and a cell phone registration service to help notify residents of emergency events requiring evacuation.	City Manager's Office	Ongoing	X	X		X	G F	GF	Y	L	M	L	Revised	
WLD-18 Require all existing roofs in Very High Fire Hazard areas to only be replaced by roofing as required by Fire and Building Codes.	Community Development Department: Building and Safety Division	Ongoing	X	X		X	G F	GF	Y	M	H	L	Revised	
WLD-19 Require vacant parcel inspections for weeds and other vegetation, insect, and disease issues.	Community Development Department: Field Services Division;	Annually			X	X	G F	GF		M	M	L	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
	LACoFD; Public Safety; Los Angeles County Department of Agriculture													
WLD-20 Require property owners to remove wood piles, fast burning vegetation, and other fuel sources from the perimeter of residences.	Public Safety Department; LACoFD	Annually	X	X		X	GF	GF		M	H	L	Revised	
Windstorm														
WND-1 Continue to send requests for tree trimming in the City to Southern California Edison (SCE) for trees located in close proximity to overhead power lines.	Community Development Department: Public Works	Ongoing	X		X	X	GF	GF	Y	H	M	L	Revised	
WND-2 Seek funding for tree-trimming contractor to provide proactive pruning and trimming services prior to wind events.	Field Services	1-5 years	X		X	X	GR, GF	GR, GF		M	H	M	New	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
WND-3 Concrete repair to hardscape caused by wind event.	Field Services; Public Works	As needed	X			X	GR, GF	GR, GF	Y	M	M	M	New	
Hazardous Materials														
HZMT-1 Coordinate with the Los Angeles County Department of Environmental Health Services, on enforcement of State and local statutes and regulations pertaining to hazardous materials/waste storage, use, and disposal.	Public Safety Department; Community Development Department: Public Works Division; LACoFD; LASD	Ongoing	X			X	GF	GF	Y	L	L	L	Revised	
HZMT-2 Support staff training and education requirements regarding emergency response procedures associated with transportation-based hazardous materials releases.	Public Safety Department; Community Development Department: Public	Ongoing	X		X	X	GF	GF	Y	L	H	L	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
	Works Division; LACoFD; LASD													
Land Subsidence														
LS-1 Evaluate the stability of the roadways surrounding the Rancho Duarte Golf Course to ensure that they meet current engineering standards and are constructed with an adequate factor of safety to provide emergency access/evacuation during a disaster event.	Community Development Department: Public Works Division; LACoFD; LASD	Ongoing	X			X	GR, GF	GR	Y	L	M	M	Revised	
LS-2 Fund and conduct repairs based on evaluation results from LS-1.	Community Development Department: Public Works Division; LACoFD; LASD	1-5 years	X			X	GR, GF	GR	Y	L	M	M	New	
LS-3 Seek funding to construct a methane collection system at the former landfill site.	Community Development Department: Public	1-5 years	X			X	GR,	GR	Y	L	M	M	New	

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	Works Division; LACoFD; LASD						G F							
Landslide														
LM-1 Continue to require that geologic/engineering reports be prepared for any proposed construction near landslide subsidence area and require mitigation of landslide hazards before issuing any building or grading permits, in accordance with the seismic guidelines provided in the City's *Seismic Hazards Report* (July 2013).	Community Development Department: Building and Safety, Public Works Divisions	Ongoing	X	X	X	X	G F	GF	Y	M	M	L	Revised	
LM-2 Improve mapping capabilities in order to allow City, developers, and residents to make better decisions. Soil types, slope percentage, drainage, or other critical factors are used to identify landslide prone areas.	Community Development Department: Public Works and Planning Divisions	Ongoing	X	X		X	G R	GR	Y	L	M	M	New	
Dam Failure														

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DAM-1 Prepare a Dam Failure evacuation plan that can be incorporated into the City's Emergency Operations Plan.	Public Safety Department; LACoFD	1 year	X			X	GR, GF	GF, GR		L	M	L	Revised	
DAM-2 Acquire Dam Inundation Maps from Cal OES.	Public Safety Department	1 year	X	X	X	X	GF	GF		H	H	L	New	
Flood														
FLD-1 Continually monitor and review FEMA's National Flood Insurance Program (NFIP) requirements to ensure that Title 16.40, Floodplain Management Regulations, of the City's Municipal Code is in compliance. Participate in the FEMA NFIP Community Rating System (CRS).	Community Development Department: Public Works Division	Ongoing	X	X		X	GF	GF		L	M	L	Revised	
FLD-2 Work in coordination with the Los Angeles County Flood Control District to develop and disseminate public education materials on flood protection and mitigation	Community Development Department	Ongoing	X	X		X	GF	GF	Y	M	L	L	Revised	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
by working collaboratively with community groups, non-governmental organizations and the local media.														
FLD-3 Review and update Title 16.40, Floodplain Management Regulations, of the City's Municipal Code as it relates to storm/flooding hazards, consistent with the risks identified in this LHMP.	Community Development Department	1-5 years	X		X	X	GR, GF	GP	Y	L	M	L	Revised	
FLD-4 Utilize land acquisition in situations where land with structures could be purchased by and titled in the name of the City. The City would then remove structures and enforce permanent restrictions on development.	Community Development Department: Public Works Division	1-3 years	X			X	GR	GR	Y	H	L	H	New	
FLD-5 Review and update Zoning Ordinance to ensure utilization of methods that mitigate against flooding including: 1) adopting ordinances that limit development in the floodplain; 2) limiting the density of	Community Development Department	5 years	X			X	GR	GR	Y	M	M	M	New	

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developments in the floodplain; and 3) requiring that floodplains be kept as open space.														
FLD-6 Conduct review of existing storm drain system. Flood mitigation can involve installing, re-routing, or increasing the capacity of a storm drainage system that may involve detention and retention ponds, drainage easements, or creeks and streams. It can include separation of storm and sanitary sewerage systems as well as higher engineering standards for drain and sewer capacity.	Community Development Department	5 years	X			X	G R	GR	Y	M	L	M	New	
FLD-7 Consider drainage easements for planned and regulated public use of privately-owned land for temporary water retention and drainage.	Community Development Department	5 years	X			X	G R	GR	Y	M	L	M	New	

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FLD-8 Properly designed and maintained roads are needed to get people and goods from place to place. In addition to planning for traffic control during floods, there are various construction and placement factors to consider when building roads. To maintain dry access, roads should be elevated above the base flood elevation. However, if a road creates a barrier it can cause water to pond. Where ponding is problematic, drainage and flow may be addressed by making changes to culvert size and placement. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage but also stabilization or armoring of vulnerable shoulders or embankments.	Community Development Department	5 years	X			X	G R	GR	Y	M	M	M	New	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
FLD-9 Structural flood control measures (e.g., levees, dams, or floodwalls) should be examined as means to channel water away from people and property. Structural measures may also increase drainage or absorption capacities (e.g., detention and retention basins, relief drains, spillways, drain widening/dredging or rerouting, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, or channel redirection). However, structural measures may cause an increase in the base flood elevation. History has shown that structures that channel water may create a false sense of security and result in greater damage to nearby properties if the structures fail.	Community Development Department	10 years	X			X	G R	GR	Y	M	L	L	New	

Mitigation Action Item	Coordinating Department	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Minimize Risk	Funding Source: GF-General Fund, GR-Grant, U-Utilities	Planning Mechanism: GP-General Plan, CIP, GF-General Fund, GR – Grant, MC – Municipal Code, GF – General Fund	Buildings & Infrastructure: Does the Action Item impact New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Priority L-Low, M-Medium, H-High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	2020 Comments and Status – C-Completed, R-Revised, D-Deleted, N-New, P- Postponed, and Notes	First Quarter Comments
FLD-10 Consider back-up generators for pumping and lift stations in sanitary sewer systems, along with other measures (e.g., alarms, meters, remote controls, and switchgear upgrades).	Community Development Department	5 years	X			X	G R	GR	Y	H	L	M	New	
FLD-11 Dry well installation plan or storm water drain extension of areas considered at risk due to urban flooding: 1) Huntington Drive – north side, with Buena Vista; 2) Encanto Parkway- north of Huntington; 3) Encanto Parkway near Fish Canyon; 4) Central Avenue – northside, east of Santo Domingo; 5) Buena Vista Street – east side, south of Galen Street; 6) Vineyard Avenue south of Royal Oaks.	Community Development Department / Public Works	5 years	X		X	X	G R, G F	GR, GF	Y	M	M	M	New	
Multi-Hazard														
MH-1 Coordinate hazard mitigation progress/efforts with the Los Angeles County Office of Emergency Management and other	Public Safety Department; Community	Ongoing	X		X	X	G F	GF	Y	M	L	L	Revised	

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agencies and cities within Los Angeles County.	Development Department; LACoFD; LASD; City Manager's Office													
MH-2 Continue to work with Los Angeles 911 and other relevant agencies to maintain a coordinated and effective emergency communication system.	Public Safety Department; Community Development Department; LACoFD; LASD	Ongoing	X		X	X	GF	GF	Y	M	M	L	Revised	
MH-3 Continue to update and enhance mapping data and the City's GIS for all hazards.	Community Development Department	Ongoing	X		X	X	GF	GF	Y	M	L	L	Revised	
MH-4 Work with the appropriate cellular phone service providers to ensure there is always adequate cellular services to critical facilities within the City and that a contingency plan is available to provide	Public Safety Department; Community Development Department	Ongoing	X		X	X	GF	GF	Y	M	M	L	Revised	

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cellular services to City and Public Safety personnel during emergencies.														
MH-5 Review and update the city's existing ordinances as they relate to hazards and risks identified in this LHMP.	Community Development Department	Ongoing	X	X		X	GF	GF		L	H	M	Revised	
MH-6 Replace generator for EOC and Civic Center Complex.	Parks & Recreation Department	2022	X			X	GR	GR	Y	M	H	L	New	
MH-7 Update Emergency Operations Plan.	Public Safety Department	2021	X	X	X	X	GF, GR	GF, GR		L	M	M	New	
MH-8 Continue to encourage CERT participation through LACoFD, including funding for training and equipment.	Public Safety Department	Ongoing	X	X		X	GR	GR		M	M	M	New	
MH-9 Emergency response personnel need to be trained for various	Public Safety Department	Ongoing	X	X		X	GR	GR		H	M	H	New	

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contingencies and response activities, such as evacuation, traffic control, search and rescue.														