



City of Santa Clarita

Local Hazard Mitigation Plan

2015



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SECTION 1. EXECUTIVE SUMMARY

The City of Santa Clarita Local Hazard Mitigation Plan (HMP) is a document containing resources and information to assist City residents, public and private sector organizations, and others who are interested in planning for the occurrence of natural and man-made hazards. The Plan provides a list of activities that may assist the City of Santa Clarita in reducing risk and preventing loss from future natural and man-made hazard events. The action items address multi-hazard issues, as well as activities for earthquakes, floods, hazardous materials, landslides and earth movement, severe weather, and wild fires.

HMP Planning and Updates

The original 2004 Plan was prepared by the Hazard Mitigation Plan Steering Committee (HMPSC) representing local community partners and a Planning Committee composed of representatives from a range of City Departments. The 2010 and this 2015 update were completed using a similar process that included the HMP Planning Committee and input from other stakeholder groups via the Steering Committee. Members of the public also participated in the development of the HMP and updates via online surveys and public meetings. In addition, copies of the HMP are provided via the City website and at specified locations in the City.

Updates to the HMP Strategies and Action Items take into account changes in project status (e.g., complete, revised, or removed), adjustments in priorities, new development and annexations, and modifications to the top identified risks to the community.

Mission Statement

The mission statement of the City of Santa Clarita Hazard Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural and man-made hazards. This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the City towards building a safer, more sustainable community.

Goals of the Plan

The Plan goals describe the overall direction that the City of Santa Clarita agencies, organizations, and citizens can take to work toward mitigating risk from natural and man-made hazards. The goals are stepping-stones between the broad direction of the mission statement and the specific recommendations outlined in the action items. The Plan Goals are:

- Protect Life and Property
- Increase Public Awareness
- Preserve Natural Systems
- Strengthen Partnerships and Encourage Implementation
- Maintain and Improve Emergency Services

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 and man-made hazards.
- Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards.
- Improve hazard assessment information to make recommendations for discouraging new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural and man-made hazards.

Increase Public Awareness

- Develop and implement education and outreach programs to increase public awareness of the risks associated with natural and man-made hazards. Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities.

Preserve Natural Systems

- Balance natural resource management and land use planning with natural hazard mitigation to protect life, property, and the environment.
- Preserve, rehabilitate, and enhance natural systems to serve natural hazard mitigation functions.

Strengthen Partnerships and Encourage Implementation

- Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, business, and industry to gain a vested interest in implementation.
- Encourage leadership within public and private sector organizations to prioritize and implement local and regional hazard mitigation activities.

Maintain and Improve Emergency Services

- Establish policies to ensure mitigation projects for critical facilities, services, and infrastructure.
- Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.
- Coordinate and integrate hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

Multi-Jurisdictional Support

Los Angeles County Operational Area and Disaster Management Areas

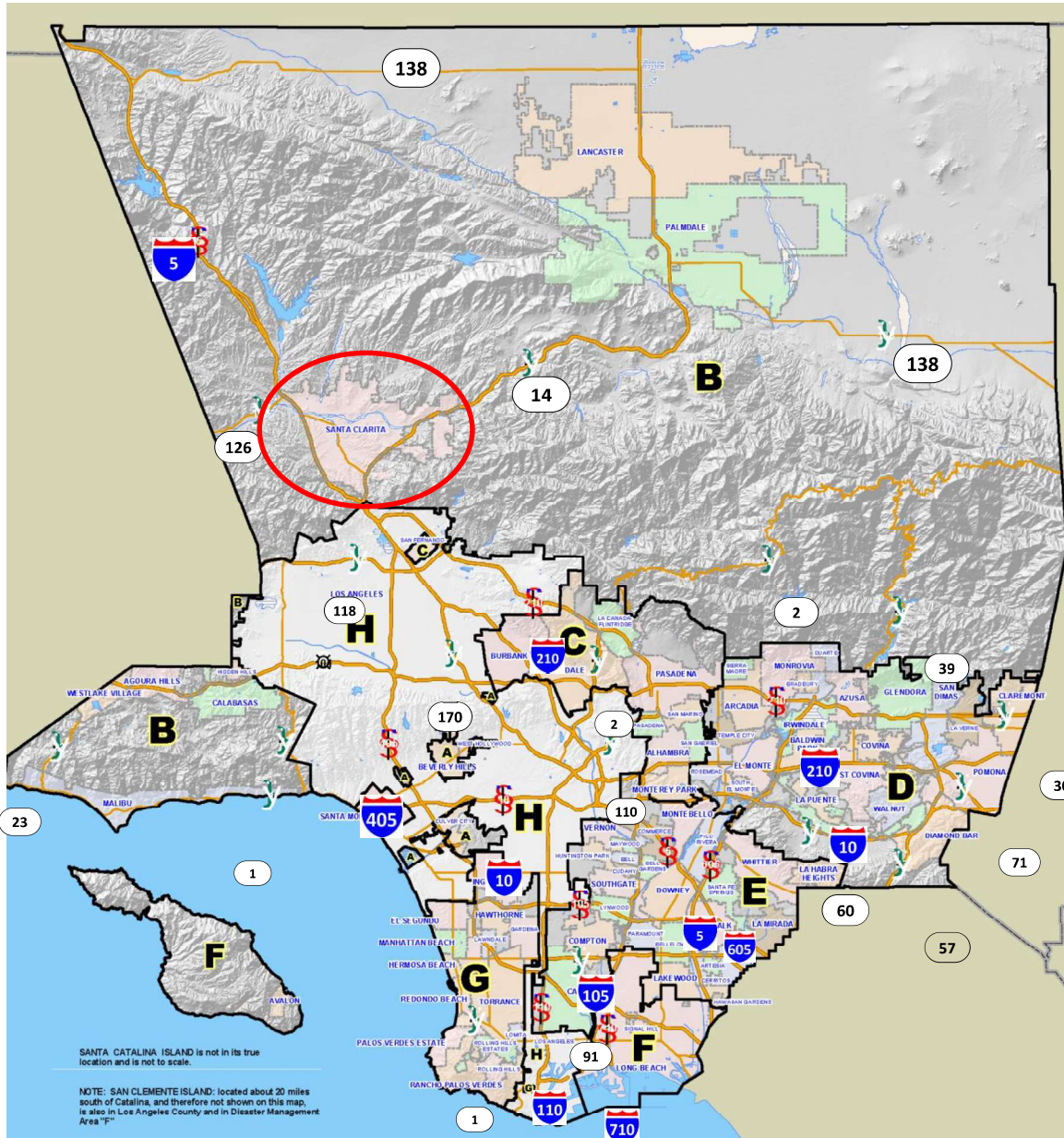
The City of Santa Clarita is part of the Los Angeles County Disaster Management Area B, which is comprised of the cities of: Santa Clarita, Lancaster, Palmdale, Agoura Hills, Calabasas, Hidden Hills, Malibu, and Westlake Village. As members of Area B, the City of Santa Clarita is able to incorporate County hazard mitigation and emergency response activities and programs into their local strategies. Examples include the Los Angeles County Fire Department’s wildfire prevention efforts and the **Specific Needs Awareness Planning (SNAP) program**.

The Los Angeles County Office of Emergency Management (OEM) was established by Chapter 2.68 of the County Code with responsibility for organizing and directing the preparedness efforts of the Emergency Management Organization of Los Angeles County. OEM responsibilities include: Planning and Coordination, Operations, Training, Technical Operations, and Public Education. The Los Angeles County Operational Area is divided into 8 groupings (A through H):

<p>Area A Beverly Hills Culver City Santa Monica West Hollywood City Of Industry Carson</p> <p>Area B Agoura Hills Calabasas Hidden Hills Lancaster Malibu Palmdale Santa Clarita Westlake Village</p> <p>Area C Alhambra Burbank Glendale La Canada Flintridge Monterey Park Pasadena San Fernando San Gabriel San Marino South Pasadena</p>	<p>Area D Arcadia Azusa Baldwin Park Bradbury Claremont Covina Diamond Bar Duarte El Monte Glendora Irwindale La Puente La Verne Monrovia Pomona Rosemead San Dimas Sierra Madre South El Monte Temple City Walnut West Covina</p>	<p>Area E Artesia Bell Bell Gardens Bellflower Cerritos City Of Commerce Compton Cudahy Downey Hawaiian Gardens Huntington Park La Habra Heights La Mirada Lakewood Lynwood Maywood Montebello Norwalk Paramount Pico Rivera Santa Fe Springs South Gate Vernon Whittier</p>	<p>Area F Avalon Long Beach Signal Hill</p> <p>Area G El Segundo Gardena Hawthorne Hermosa Beach Inglewood Lawndale Lomita Manhattan Beach Palos Verdes Estates Rancho Palos Verdes Redondo Beach Rolling Hills Rolling Hills Estates Torrance</p> <p>Area H Los Angeles</p>
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The Joint Powers Agreement provides for inter-agency cooperation in major natural or man-made disasters. The Area B group meets on a monthly basis and is responsible for:

- Creating and updating emergency, terrorism, recovery volunteer, debris management and hazard mitigation plans
- Training for emergency and disaster preparedness for cities, residents and businesses
- Technology for communications
- Homeland Security Grants Program (management)



Map 1: Los Angeles County Disaster Management Areas and City of Santa Clarita (circled)

Organization of the HMP

This HMP contains an updated five-year action plan matrix, background on the purpose and methodology used to develop the HMP, an updated profile of the City of Santa Clarita, sections on natural, man-made, and technological hazards that occur within the City, and a number of Appendices. These sections are described in detail in Section 2 Introduction.

Development of the HMP

The City of Santa Clarita's Hazard Mitigation Plan is the result of a collaborative effort between City of Santa Clarita staff and citizens, public agencies, non-profit organizations, the private sector, and regional and state organizations. Public participation played a key role in development of goals and action items. Interviews were conducted with stakeholders across the City, a public survey was used to gather hazard risk and mitigation data, and one public workshop was held that included City of Santa Clarita residents. Additional data was obtained from various City departments and through research on specific hazard details.

Planning Committee

A Hazard Mitigation Planning Committee comprised of City staff was tasked with leading the project to completion. The HMP Planning Committee is comprised of the following departments:

- Administrative Services
- Building & Safety
- Community Development
- Environmental Services
- Technology Services (including GIS)
- Landscape Maintenance District
- Parks, Recreation & Community Services
- Public Works
- Transit
- Urban Forestry

Steering Committee

A project Steering Committee provided guidance to the HMP update process. The Steering Committee (Community Partners) is comprised of representatives from the following organizations:

- Building Industry Association of Southern California
- California Department of Transportation (Caltrans)
- California Highway Patrol
- Castaic Lake Water Agency
- Castaic Union School District
- City of Santa Clarita Department of Community Development
- City of Santa Clarita Department of Parks, Recreation and Community Services
- City of Santa Clarita, Department of Administrative Services
- City of Santa Clarita, Department of Public Works
- City of Santa Clarita, Office of the City Manager
- Henry Mayo Newhall Hospital
- National Weather Service
- Newhall School District
- Santa Clarita Valley Senior Center
- Santa Clarita Valley Chamber of Commerce

- Santa Monica Mountains Conservancy
- Saugus Union School District
- Southern California Edison
- Southern California Gas Company
- Sulphur Springs School District
- The Los Angeles County Department of Public Works
- The Los Angeles County Fire Department
- The Los Angeles County Sheriff's Department
- The Sanitation Districts of Los Angeles County
- William S. Hart School District

In addition to directing the HMP's update on a broad level, a sub-committee of the Steering Committee was formed. The sub-committee, the Planning Committee, was comprised of a group of staff from the City of Santa Clarita representing each department within the City. This group participated in public meetings, and also provided assistance on specific areas of plan development.

Organization of the Action Items

The action items are a listing of activities in which City agencies and citizens can take to reduce risk. The action items are organized within the following matrix, which lists all of the multi-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 actions. The matrix includes the following information for each action item:

Priority of Action Items

The Planning Committee prioritized the potential mitigation activities for each hazard of concern and ranked each as either "high," "moderate," or "low" priority. The Plan goals including Protect Life and Property, Promote Public Awareness, Augment Emergency Services, Enhance Natural Systems, and Encourage Partnerships and Implementation were considered during each phase of the mitigation planning process. As the mitigation action items were developed, the Planning Committee identified which plan goals were addressed by each action item and then ranked the HMP goals to determine the priorities for the City of Santa Clarita. Each goal was given a score of one point to five points, with five points going to the highest priority.

The prioritized plan goals are as follows:

Points	Category
5	Protect Life and Property
4	Enhance Natural Systems
3	Augment Emergency Services
2	Partnerships and Implementation
1	Public Awareness

Points for the plan goals were then totaled for each action item. The following scoring system reflect the High, Moderate and Low rating:

Rating	Rating Description
0-5	Low/None
5-10	Moderate
10-15	High

Coordinating Organization

The coordinating organization is the public agency with regulatory responsibility to address natural and man-made 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.

Time Line

Action items include both short and long-term activities. Each action item includes an estimate of the time line for implementation. Short-term action items are activities which City agencies are capable of implementing with existing resources and authorities within one to two years. Long-term action items may require new or additional resources or authorities, and may take between one and five years (or more) to implement.

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 five areas detailed at length above. The five plan goals are:

- Protect Life and Property
- Increase Public Awareness
- Preserve Natural Systems
- Strengthen Partnerships and Encourage Implementation
- Maintain and Improve Emergency Services

Plan Implementation, Monitoring, and Evaluation

The Plan Maintenance Section of this document details the formal process which will ensure that the City of Santa Clarita's Hazard Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the HMP annually and producing a plan revision every five years. This section describes how the City has and will continue to integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how City of Santa Clarita government intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms such as the City's General Plan, Capital Improvement Projects, and Building and Safety Codes.

Plan Adoption

Adoption of the Hazard Mitigation Plan by the local jurisdiction's governing body is one of the prime requirements for approval of the plan. The City Council is responsible for adopting the City of Santa Clarita's Hazard Mitigation Plan. The local agency governing body has the responsibility and authority to promote sound public policy regarding natural and man-made hazards. The City Council will periodically need to re-adopt the plan as it is revised to meet changes in the natural and man-made hazard risks and exposures in the community, additional mitigation strategies are added, and at least every five years to comply with federal requirements (44 CFR 201 and 206). The approved Hazard Mitigation Plan will be significant in the future growth and development of the community.

Coordinating Body

The City of Santa Clarita Hazard Mitigation Plan Steering Committee is responsible for coordinating implementation of Plan action items and undertaking the formal review process. The City Council or their designee will assign representatives from City agencies, including, but not limited to, the current Hazard Mitigation Plan Steering Committee members.

Adoption and HMP Convener

The City Council has adopted the City of Santa Clarita’s Hazard Mitigation Plan and the Hazard Mitigation Plan Steering Committee and Planning Committee are responsible for plan implementation. The designee of the City Council will serve as a convener to facilitate the Hazard Mitigation Steering Committee meetings, and will assign tasks such as updating and presenting the HMP to the members of the committee. Plan implementation and evaluation will be a shared responsibility among all of the Hazard Mitigation Steering and Planning Committee Members.

Implementation through Existing Programs

The City of Santa Clarita addresses statewide planning goals and legislative requirements through its General Plan, Capital Improvement Projects, and City Building & Safety Codes. The Hazard Mitigation Plan provides recommendations that are closely related to the goals and objectives of these existing planning programs. The City will have the opportunity to implement recommended mitigation action items through existing programs and procedures.

Economic Analysis of Mitigation Projects

The Federal Emergency Management Agency's approach to identify costs and benefits associated with natural and man-made hazard mitigation strategies 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 natural, man-made, and technological hazards can provide decision makers with an understanding of the potential benefits and costs of an activity, and a means to compare alternative projects.

Formal Review Process

The Hazard Mitigation Plan is a living document that reflects ongoing hazard mitigation activities and requires monitoring, evaluating, and updating to ensure the mitigation actions are implemented. To facilitate the City of Santa Clarita’s Hazard Mitigation Planning process and adhere to regulatory requirements, the plan will be reviewed annually and any revisions will be incorporated into the five-year update. In addition, public involvement will be requested when applicable.

Continued Public Involvement

The City of Santa Clarita is dedicated to involving the public directly in the continual review and updates of the Hazard Mitigation Plan. Copies of the plan are catalogued and made available at City Hall and on line at www.santa-clarita.com. The existence and location of these copies is advertised to the public in a manner consistent with City policy. The plan also includes the address and the phone number of the department responsible for keeping track of public comments on the HMP. In addition, copies of the HMP and any proposed changes will be posted on the City website. This web site also contain an e-mail address and phone number to which people can direct their comments and concerns.

Acknowledgements

The City of Santa Clarita would like to acknowledge the following City staff members for their hard work on the Hazard Mitigation Planning Committee and the creation of Santa Clarita’s Hazard Mitigation Plan. Without their tireless efforts, the preparation of this document would not have been possible. The list also includes external agency partners active on the Planning Committee.

HMP Planning Committee

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Ruben Barrera	Building & Safety, Building Official
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Mike Marshall	Community Development, Assistant Planner II
Ben Jarvis	Community Development, Associate Planner
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Edgardo David	GIS, IT Analyst
Fernando Mendoza	Landscape Maintenance Specialist
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External Partners Active on the HMP Planning Committee

Name	Agency
Greg Hisel, Assistant Chief	Los Angeles County Fire Department
Stephanie English, Community Services Representative	Los Angeles County Fire Department
Mark Jackson, Meteorologist-in-Charge	National Weather Service
Eric Boldt, Warning Coordination Meteorologist	National Weather Service
Tony Tartaglia, Region Manager	Southern California Gas Company

HMP Steering Committee

Additionally, the HMP Planning Committee would like to thank the many individuals from the City staff, the public, and other agencies who shared their thoughtful insights and expertise, that assisted with the creation of this Plan. This recognition includes the members of the HMP Steering Committee:

Agency
Building Industry Association of Southern California
California Department of Transportation (Caltrans)
California Highway Patrol
Castaic Lake Water Agency
Castaic Union School District
City of Santa Clarita Department of Community Development
City of Santa Clarita Department of Parks, Recreation and Community Services
City of Santa Clarita, Department of Administrative Services
City of Santa Clarita, Department of Public Works
City of Santa Clarita, Office of the City Manager
Henry Mayo Newhall Hospital
Los Angeles County Department of Public Works
Los Angeles County Fire Department
Los Angeles County Sheriff's Department
National Weather Service
Newhall School District
Sanitation Districts of Los Angeles County
Santa Clarita Valley Senior Center

Agency
Santa Clarita Valley Chamber of Commerce
Santa Monica Mountains Conservancy
Saugus Union School District
Southern California Edison
Southern California Gas Company
Sulphur Springs School District
William S. Hart School District

SECTION 2. INTRODUCTION

Background

The City of Santa Clarita is the fourth most populous City in the County of Los Angeles, and offers the benefits of living in a Mediterranean type of climate. The City is characterized by the unique and attractive landscape that makes the area so popular (see Community Profile section for details).

Historical Hazard Impact to the City

The City of Santa Clarita has experienced the impacts of several natural, man-made, and technological hazards in its history. Events have included earthquakes, floods, hazardous materials releases, power outages, severe weather, earth movement, and wild fires. For example, the City of Santa Clarita was impacted by the 1994 Northridge Earthquake (6.7 M_w) and received approximately \$30 million in total reimbursements for disaster related expenses (since 1998) of which approximately \$27 million was related to damage caused by the Northridge Earthquake. Furthermore, the area has experienced multiple wildfires in its history including major wildfire events in 2013, 2009, 2007, and 2003 (see table below).

Table 1: Major Wildfires in the Santa Clarita Region

Year	Name	Size / Impact
2013	Powerhouse Fire	30,000+ acres, 10 injuries, 58 structures lost
2009	Station Fire	160,557 acres, 2 killed 209 structures lost
2007	2007 California Fire Siege including the Ranch Fire, Buckweed Fire, and Magic Fire (fires in the Santa Clarita area)	Ranch Fire: 58,401 acres 8 injuries 10 structures lost Buckweed Fire: 38,356 acres 1 injury 63 structures lost Magic Fire: 2,824 acres SOURCE: California Fire Siege 2007, Cal Fire, USFS, Cal OES
2003	2003 California Fire Siege including the Simi Fire and Verdale Fire (fires in the Santa Clarita area)	Simi Fire: 108,204 acres 315 structures lost Verdale Fire 8,650 acres 1 structure lost Source: California Fire Siege 2003, USFS and CA Dept. of Forestry and Fire Protection

(Southern California Public Radio, 2015), (CAL FIRE, U.S. Forest Services, Cal OES, 2009), and (USFS and the CA Dept. of Forestry and Fire Protection, 2004)

See **Risk Assessment** and **Hazard Sections** of this HMP for additional details by hazard.

These hazards adversely affected the lives of those who lived and worked in Santa Clarita and the surrounding communities. The City of Santa Clarita continues to grow. Furthermore, as the population of the City continues to increase, the exposure to natural, man-made, and technological hazards creates an even higher risk than previously experienced.

While it is extremely difficult to predict when these events will occur, or the extent to which they will affect the City, careful planning and collaboration among public agencies, private sector organizations, not for profits, and citizens within the community can help to protect the lives and safety of the community and minimize losses.

Why Develop a Hazard Mitigation Plan?

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

The Santa Clarita Hazard Mitigation Plan (HMP) provides a set of action items to reduce risk from natural, man-made, and technological hazards through education and outreach programs and to foster the development of partnerships, and implementation of preventative activities such as land use programs that restrict and control development in areas subject to damage. Key reasons for developing the HMP include:

- To establish a basis for coordination and collaboration among agencies and the public in City of Santa Clarita
- To identify and prioritize future mitigation projects
- To assist in meeting the requirements of federal assistance programs

This Plan works in conjunction with other City documents, including, but not limited to, the City General Plan, the Uniform Development Code, the Emergency Operations Plan, Fair Housing Element, and the Joint General Plan.

Whom Does the Plan Affect?

The City of Santa Clarita's Hazard Mitigation Plan affects the entire city. This plan provides a framework for planning for natural and man-made hazards. The resources and background information in the Plan is applicable City-wide, and the goals and recommendations can lay groundwork for local mitigation plans and partnerships.

How is the Plan Used?

Each section of the Hazard Mitigation Plan provides information and resources to assist in understanding the region and the hazard-related issues facing citizens, businesses, and the environment. The sections of the Hazard Mitigation Plan combine to create a document that guides the mission to reduce risk and prevent loss from future hazard events.

Hazard Mitigation Plan Process

The development of this plan was a collaborative effort. The process was facilitated across multiple departments along with a consulting agency, MLC & Associates, Inc. The HMP Planning Committee was composed of the representatives from various City of Santa Clarita departments involved in mitigation planning and disaster preparedness. The HMP Planning Committee was established in order to guide the process and provide final approval of the Hazard Mitigation Plan and mitigation strategies prior to City Council submission. In addition, the HMP Planning Committee facilitated the planning process, provided feedback, reviewed the plan, and was responsible for initial approvals. Further, various departments within the City of Santa Clarita assisted in developing the plan. Information resources included but were not limited to: General Plans, Master Plans, reports and studies, local maps, hazard maps, and public process documentation. Updates to the HMP also included a thorough review of changes in the community (new development, annexations, population increases, etc.) and modifications to the top identified risks to the community.

The workflow below depicts the basic process used to develop the plan.

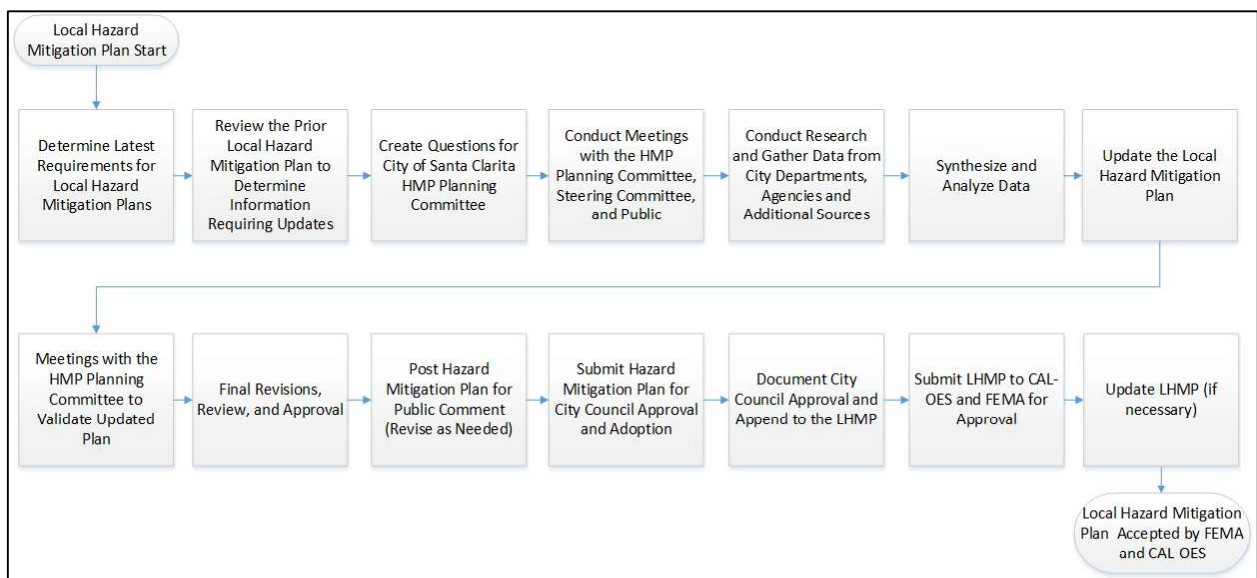


Figure 1: HMP Process Workflow

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 and the implementing ordinances that are required to comply with the statewide planning regulations.

The continuing challenge faced by local officials and state government is to keep the network of local mitigation 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. This is particularly true in the case of planning for natural hazards where communities must balance development pressures with detailed information on the nature and extent of hazards.

Planning for hazards includes the documentation of inventories, policies, and ordinances to guide development in hazard areas. These inventories should include the summary of hazards facing the community, the built environment at risk, the personal property that may be damaged by hazard events, and the people who live within the effective range of these hazards.

Support for Hazard Mitigation

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

- The Southern California Earthquake Center (SCEC) gathers information about earthquakes, integrates this information on earthquake phenomena, and communicates this to end-users and the general public to increase earthquake awareness, reduce economic losses, and save lives.
- The 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.
- The California Division of Forestry (CDF) is responsible for all aspects of wildland fire protection on private, state, and administers forest practices regulations, including landslide mitigation, on non-federal lands.
- The California Division of Mines and Geology (DMG) is responsible for geologic hazard characterization, public education, the development of partnerships aimed at reducing risk, and exceptions (based on science-based refinement of tsunami inundation zone delineation) to state mandated tsunami zone restrictions.
- The 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.

Plan Methodology

Information in the Hazard Mitigation Plan is based on research from a variety of sources. Staff from the City of Santa Clarita conducted data research and analysis, facilitated steering committee meetings and public workshops, and developed the final mitigation plan. The research methods and various contributions to the plan include:

Input from the Steering Committee

The Hazard Mitigation Plan Steering Committee formally convened to guide development of the Mitigation Plan. The Committee played an integral role in developing the mission, goals, and action items for the mitigation plan. The Committee consisted of representatives of public and private agencies and organizations in City of Santa Clarita, and is listed in the Executive Summary.

State and Federal Guidelines and Requirements for Mitigation Plans

The following are the Federal requirements for approval of a Hazard Mitigation Plan:

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

The following components must be part of the planning process:

- Complete documentation of the planning process
- A detailed risk assessment on hazard exposures in the community
- A comprehensive mitigation strategy, which describes the goals and objectives, including proposed strategies, programs and actions to avoid long-term vulnerabilities.
- A plan maintenance process, which describes the method and schedule of monitoring, evaluating and updating the plan and integration of the Hazard Mitigation Plan into other planning mechanisms.
- Formal adoption by the City Council.
- Plan Review by both Cal-OES and FEMA

Greater details of these requirements are provided in the HMP sections and supporting documentation that follow.

City of Santa Clarita staff examined existing mitigation plans from around the country, current FEMA hazard mitigation planning standards (386 series) and the State of California Natural Hazards Mitigation Plan Guidance. Other reference materials consisted of county and city mitigation plans from other jurisdictions throughout the country, including:

- Los Angeles County (California) Local All Hazards Mitigation Plan, Los Angeles County Office of Emergency Management, 2014
- State of California Multi-Hazard Mitigation Plan, Cal-OES, 2013
- Local Multi Hazard Mitigation Planning Handbook, FEMA, 2013
- Local Mitigation Plan Review Guide, FEMA, 2011

Hazard Specific Research

City of Santa Clarita staff along with the HMP consultant (MLC & Associates, Inc.) collected data and compiled research on 11 hazards: wildfires, earthquakes, floods, hazardous materials releases, severe weather (wind and heat), climate change (drought), landslide / mudslide / subsidence, cyberattack, energy disruptions, and terrorism. Research materials came from a wide variety of federal, state and local agencies as well as public information sources and research institutions. The City of Santa Clarita staff identified current mitigation activities, resources and programs, and potential mitigation strategies and action items from research materials and stakeholder input.

Public Workshops and Surveys

The City of Santa Clarita staff facilitated a public workshop to gather comments and ideas from City of Santa Clarita citizens about mitigation planning and priorities for mitigation plan goals. The workshop was held on September 10, 2015 (see Public Process Public Hazard Mitigation Planning Workshop). The workshop was held at the City of Santa Clarita Activities Center and involved a cross-section of the community. In addition, a public survey was issued to gather additional information from a wide cross section of the community (see 2015 Hazard Mitigation Survey). The resources and information cited in the mitigation plan provide a strong local perspective and help identify strategies and activities to make the City of Santa Clarita more disaster resilient.

How is the Plan Organized?

Each section of the mitigation plan provides information and resources to assist people in understanding the City and the hazard-related issues facing citizens, businesses, and the environment. Combined, the sections of the plan work together to create a document that guides the mission to reduce risk and prevent loss from future natural and man-made hazard events.

The structure of the plan enables people to use a section of interest to them. It also allows City government to review and update sections when new data becomes available. The ability to update individual sections of the mitigation plan places less of a financial burden on the City. Decision-makers can allocate funding and staff resources to selected pieces in need of review, thereby avoiding a full update, which can be costly and time-consuming. New data can be easily incorporated, resulting in a hazards mitigation plan that remains current and relevant to the City of Santa Clarita.

Table 2: HMP Sections

Section	Description
Section 1: Executive Summary	The Executive Summary provides a description of the Hazard Mitigation Plan Mission and Goals, a summary of how the HMP was developed, and lists the groups that participated in the process.
Section 2: Introduction	The Introduction describes the background and purpose of developing the mitigation plan for the City of Santa Clarita.
Section 3: Community Profile	This section presents the history, geography, demographics, and socioeconomics of the City of Santa Clarita. It serves as a tool to provide an historical perspective of natural, man-made, and technological hazards in the City.
Section 4: Risk Assessment	This section provides information on hazard identification, vulnerability and risk associated with natural, man-made, and technological hazards in the City of Santa Clarita.
Section 5: Hazard Mitigation Strategies and Action Items	This section describes how the mitigation strategies and action items were selected, prioritized, and reviewed. This section also includes a description of the Economic Analysis aspect of the HMP including the STAPLEE process and Benefit-Cost Analysis method.

Section	Description
Section 6: Multi-Hazard Goals and Action Items	<p>This section provides information on the process used to develop goals and action items that cut across the eleven (11) natural, human caused, and technological hazards addressed in the mitigation plan including a discussion of the financial analysis process used to determine the final list of strategies and action items included in the HMP.</p> <p>In addition, a Hazard Mitigation Strategies and Action Item Summary provides an overview of the mitigation plan strategies, corresponding goals, timelines, status, and action items implemented by the City to address the top hazard risks identified including multi-hazard strategies.</p>
<p>Hazard Specific Information:</p> <ul style="list-style-type: none"> • Section 7: Wildfire • Section 8: Climate Change (Drought) • Section 9: Earthquake • Section 10: Hazardous Materials Releases • Section 11: Landslide / Mudslide / Subsidence • Section 12: Severe Weather – Heat • Section 13: Cyber Attack • Section 14: Energy Disruption • Section 15: Flood • Section 16: Terrorism • Section 17: Severe Weather – Wind 	<p>Specific information and mitigation strategies for the top 11 hazards to the City of Santa Clarita are addressed in this Plan. The section order is based on the hazard rankings developed by the HMP Planning Committee with the highest rated hazards first.</p> <p>Chronic hazards occur with some regularity and may be predicted through historic evidence and scientific methods.</p> <p>Each of the hazard-specific sections includes information on the history, hazard causes and characteristics, hazard assessment, goals and action items, and local, state, and national resources.</p>
Section 18: Public Process	The section provides a chronological format on the public process development of the plan and the methodology use in the development.
Section 19: Plan Maintenance	In the plan maintenance section information on plan implementation, monitoring and evaluation are provided.

Section	Description
<p>Section 20: Annexes</p> <ul style="list-style-type: none"> • Annex A: HMP Planning and Steering Committee Meetings and Sign-in Sheets • Annex B: Public Planning Workshop 	<p>The Annexes support the City of Santa Clarita Hazard Mitigation Plan and can be viewed as standalone sources of information.</p> <p><u>HMP Planning Meetings and Sign-in Sheets:</u> Provides documentation of agendas, participation, and minutes of the planning meetings used to update the HMP.</p> <p><u>Public Planning Workshop:</u> Provides documentation of newspaper articles, press releases, public service announcements, agenda, and key details related to the public HMP workshop.</p>
<p>Section 21: Appendices</p> <ul style="list-style-type: none"> • Appendix A: References • Appendix B: Acronyms • Appendix C: Glossary • Appendix D: Maps • Appendix E: City Council HMP Adoption Documentation • Appendix F: Local Mitigation Plan Review Tool 	<p>The Appendices provide additional data that support and link to the City of Santa Clarita Hazard Mitigation Plan.</p> <p><u>References:</u> Provides a list of external and internal data sources used in the City of Santa Clarita Hazard Mitigation Plan.</p> <p><u>Acronyms:</u> Provides a list of acronyms for City, regional, state, and federal agencies and organizations that may be referred to within the City of Santa Clarita Hazard Mitigation Plan.</p> <p><u>Glossary:</u> Provides a glossary of terms used throughout the Plan.</p> <p><u>Maps:</u> Includes supplemental maps germane to this document.</p> <p><u>City Council Plan Adoption Documentation:</u> Provides a copy of the formal adoption of the City of Santa Clarita Hazard Mitigation Plan by the City Council. This is a requirement for final HMP approval by Cal-OES and FEMA.</p> <p><u>Local Mitigation Plan Review Tool:</u> This is a required form that functions as a HMP crosswalk and worksheet that Cal-OES and FEMA use to review and approve the HMP.</p>

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SECTION 3. COMMUNITY PROFILE

Why Plan for Natural Hazards in City of Santa Clarita?

Natural hazards impact citizens, property, the environment, and the economy of the City of Santa Clarita. The threat and occurrence of wildfires, earthquakes, floods, hazardous materials releases, severe weather (wind and heat), climate change (drought), landslide/mudslide/subsidence (earth movement), cyberattack, and energy disruptions expose Santa Clarita residents and businesses to the financial and emotional costs of response and recovery from natural disasters. The risk and exposure to these threats increase in proportion to the number of people living in Santa Clarita's city limits.

The inevitability of natural hazards and the continued growth and activity of Santa Clarita's population create an urgent need to develop strategies, coordinate resources, and increase public awareness to reduce risk and prevent loss from future natural hazard events. Identifying the risks posed by natural hazards and developing strategies to reduce them can assist in protecting the life and property of citizens and communities. Local residents and businesses can work together with the City to create a mitigation plan that addresses the potential impact of hazard events.

History of Santa Clarita

The area comprising the City of Santa Clarita was first settled in 1769 by the Spanish, naming the discovered river valley after Saint Clare; the river running through this valley was later named the "Little St. Clara" or "Santa Clara". By 1804, the Spanish had established an agricultural outpost, or *estancia* in the Santa Clarita Valley.

The first recorded discovery of gold in California occurred in Santa Clarita in 1842, six years prior to its discovery at Sutter's Mill in Sacramento. This discovery greatly impacted further development, specifically the Newhall pass, which was constructed to support transportation of mining supplies.

In 1875, crude oil was diverted into the first commercially producing oil well in nearby Pico Canyon. Operated by the forerunners of the Standard Oil Company, the well, named CSO 4, was the oldest operating oil well in the world until it was capped in 1990. The 1900's therefore brought new prosperity and businesses to the Valley after CSO 4 became operational. Many businesses opened shop during this era, including general stores, post offices, and churches.

By the early 1900's, Santa Clarita's growing community and its rich surroundings of mountains, trees, and deserts attracted Gene Autry and other notable Hollywood figures in both television and film, particularly for western-themed programming. Some of these figures settled in the area; for example, William S. Hart, a prominent Hollywood film star of the 1920's built his home in Santa Clarita and left it to the County upon his death, providing tourists and residents a chance to recapture the feelings of the old west and the beginnings of the western film business. Today, the film industry is one of the leading industries in the area and an important reason for its economic growth.

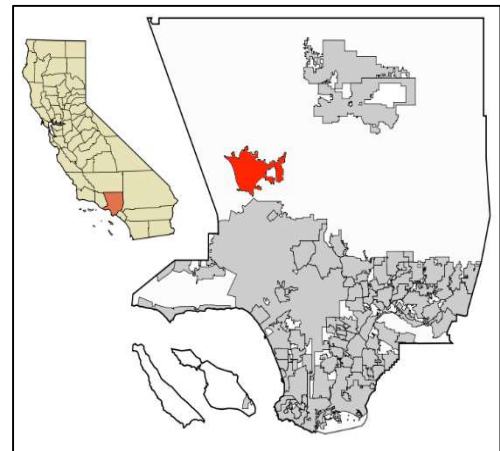


Figure 2: State of California (beige), Los Angeles County (orange) and the City of Santa Clarita (red)

On March 12, 1928 the Valley was flooded and nearly destroyed by the failure of the Saint Francis Dam, built by the renowned Henry Mulholland. The disaster sent a wall of water from the Santa Clarita Valley to Ventura, taking the lives of 470 people as it proceeded. The failure is the second worst disaster in California maritime history, second only to the 1906 earthquake in San Francisco.

By 1940, Santa Clarita’s population reached 4,000 people. With the development of schools came the construction of tract homes, such as Rancho Santa Clarita; in 1963, the area known as Canyon Country was founded. Santa Clarita’s continued growth led to the opening of the Santa Clarita National Bank in 1965, the dedication of the community of Valencia in 1967, and the addition of new schools, stores, and churches.

In the late 1960’s and early 1970’s, higher education opened its doors to the Santa Clarita Valley; of note, the College of the Canyons and California Institute of the Arts, incorporated by Walt Disney, were established to service the needs of this growing community. In 1971, the amusement park Magic Mountain opened, bringing thousands of tourists to the area and giving the Valley a significant landmark. Today, it remains one of the largest amusement parks in the country. In 1975, Henry Mayo Newhall Hospital was founded, as well as the Santa Clarita Valley Historical Foundation, which maintains and protects the rich history of the Valley.

In the 1980’s “Santa Clarita” became a commonly-used name for the region. The eighties also brought a staggering increase in population to almost 82,000. As a consequence, in 1985 the Chamber of Commerce commissioned a study on the economic feasibility of becoming an incorporated city; two years later voters approved the measure to formally incorporate as a municipality, and in December 1987, the City of Santa Clarita was established as the second largest and the sixth most populated city within Los Angeles County. Today, it boasts the third largest population of cities in Los Angeles County.

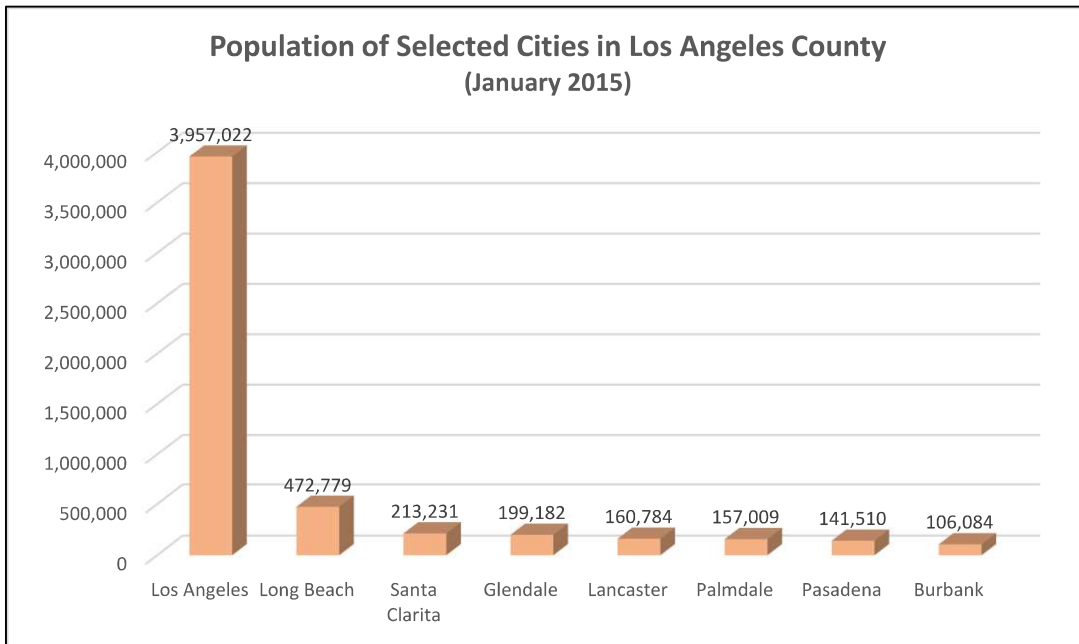


Figure 3: Population of Select Cities in Los Angeles County
(California Department of Finance, 2015)

In 2012, Fair Oaks Ranch, Jakes Way, Vista Canyon, North Copperhill, Norland Road, and South Sand Canyon were annexed into the City of Santa Clarita.

Santa Clarita Updates

Three New Communities Annexed into City of Santa Clarita

Posted Date:9/12/2012 3:30 PM

The Local Agency Formation Commission (LAFCO) approved the annexation of three new communities, which as of Tuesday, September 11, 2012, are part of the City of Santa Clarita. The areas include Fair Oaks Ranch, Jakes Way, and the future Vista Canyon.

This is the single largest annexation the City has undertaken to date at nearly four square miles, 2,437 acres and almost 15,000 new residents. In addition, this annexation brings the City-owned East Walker Ranch Open Space into the City.

“The City of Santa Clarita is excited to welcome new annexed areas and provide residents with a role in shaping their quality of life. With accessible and accountable local government services, a strong business community, safe neighborhoods, well cared for communities and great schools, the City is proud to provide high quality municipal services,” commented Mayor Frank Ferry.

In the last 25 years, the City of Santa Clarita has welcomed 32 different areas into the City, inclusive of over 61,200 residents and 17.1 square miles through a state-regulated process called annexation. The decision to annex is always one that is driven by residents or developers.

Annexation has many benefits including: replacing County zoning with City zoning; eliminating utility user tax; providing easily accessible local government services and increasing the availability of City sports and recreation programs. Additionally, it enables residents to vote in local elections, run for City public office and serve on City commissions.

By December 2012, the City of Santa Clarita will also include the following soon-to-be-annexed areas: North Copperhill in Saugus, which includes 2,470 acres (the City’s largest annexation to date) and 9,500 residents, including 810 acres of City-owned open space; Norland Road in Canyon Country, which includes 205 acres of which 57 acres are City-owned open space; and South Sand Canyon in Canyon Country, which includes 690 acres, of which 540 acres are filming ranches, and 40 residents.

These areas were reviewed by the Local Agency Formation Commission in April 2012 and it was determined the City of Santa Clarita is financially sound and capable of providing services to these areas. These annexations will bring the City of Santa Clarita’s population to just over 200,000 residents, making the City the third largest based on population in Los Angeles County.

For more information about annexations, contact the Planning Division at (661) 255-4330 or visit Santa-Clarita.com.

(City of Santa Clarita Planning Division, 2012)

Santa Clarita Geography and Environment

Located in a picturesque valley just north of Los Angeles, Santa Clarita is bold and confident in its role as a premier community for raising families and building businesses. The balance of quality living and quality growth is carefully maintained through long-term planning, fiscal responsibility, community involvement, respect for the environment and strong support for business development. Santa Clarita's successes are evident in its residential neighborhoods, recreational attractions, businesses, cultural activities, and commercial, educational and health care centers.



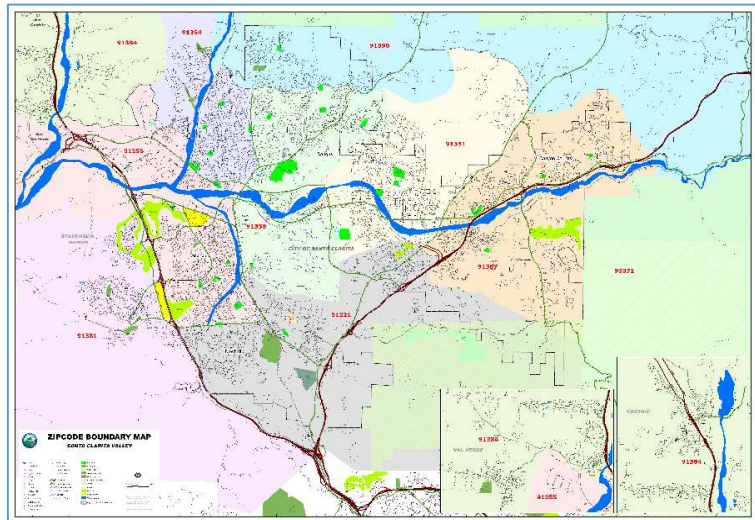
Figure 4: Santa Clarita Canyon Country

Nestled between the San Gabriel Mountain

Range to the east and the Santa Susana Mountain Range to the west, Santa Clarita is located just north of the San Fernando Valley, 30 miles from downtown Los Angeles, and 40 miles east of the Pacific Ocean. The total area of the city is 64.41 sq. miles (City of Santa Clarita, 2015)¹ and includes the communities of Canyon Country, Newhall, Saugus and Valencia. At 1,200 to 1,400 feet above sea level, Santa Clarita enjoys a mild Southern California Mediterranean climate, making it ideal for business, residential, and recreational opportunities.

The natural topography of the nearby Santa Clara River (see “Major Rivers” below) and its many tributary canyons has focused urban growth in the Santa Clarita Valley on the more central, level areas between the Valley's two major freeways. Most of the development has occurred adjacent to the Golden State (Interstate 5) and Antelope Valley (State Route 14) freeways, concentrating urbanization within a “V” shaped areas formed by these two major transportation routes (City of Santa Clarita, 2011).²

The Santa Clarita Valley is located at the convergence of several major transportation and utility facilities. The Union Pacific Railroad, the Golden State and Antelope Valley freeways, and two major aqueducts traverse the Valley. Oil, natural gas, and power lines enter from the north through the Tejon Pass, cross the Valencia-Newhall community, and then exit the Valley near the Newhall Pass.²



Map 2: Santa Clarita Zip Code Map

(City of Santa Clarita, GIS, 2012)

¹ City of Santa Clarita, City Hall, *City Profile*, <http://www.santa-clarita.com/index.aspx?page=572>

² City of Santa Clarita, *General Plan*, 2011.

Major Rivers

The Santa Clarita Valley contains many natural streams and creeks that function as storm drain channels. These tributaries empty into the Santa Clara River, which flows westerly into the Pacific Ocean near Ventura Harbor. The Valley's topography is characterized by rolling terrain, canyons, creeks, and the Santa Clara River, which is the major drainage feature within the City of Santa Clarita.

The Santa Clara River drains approximately 1,634 square miles from its headwaters in the San Gabriel Mountains to its mouth at the Pacific Ocean. The watershed is approximately 84 miles in length and averages about 25 miles in width. The headwaters of the Santa Clara River are typical of mountain streams in that discharge increases rapidly with rainfall events. Ninety percent of the watershed consists of mountainous terrain; the remaining portion is a mix of valley floor/floodplain and coastal plains. The resulting conditions mean that high intensity rainfalls, in combination with alluvial soils, sparse vegetation, erosion, and steep gradients, can result in significant debris-laden flash floods.

The Santa Clara River and its tributary streams play a major role in moving the large volume of runoff that is generated from the valley and surrounding foothills and mountains. Major tributaries include Castaic Creek and San Francisquito Creek in Los Angeles County, and the Sespe, Piru, and Santa Paula Creeks in Ventura County. Approximately 40 percent of the Watershed is located in Los Angeles County and 60 percent is in Ventura County. The drainage system (both natural and County/City storm drain infrastructure) is normally adequate to handle the normal precipitation in the region. However, abnormal rainfall amounts, as in the case of the 100-year flood event, can strain the system.



Figure 5: Santa Clara River Watershed

Climate

Temperatures in Santa Clarita average between 40 and 60 degrees Fahrenheit in the winter months to between 70 and 100 degrees Fahrenheit in the summer months. However, the temperatures can vary over a wide range (particularly when the Santa Ana winds blow, bringing higher temperatures and very low humidity). Temperatures can, but rarely, exceed 110 degrees in the summer months (June to September), and rarely drop below 30 degrees in the winter months (November to March).

Average rainfall is about 17.6 inches per year in the flat areas and approximately 27 inches in the mountains.² However, annual rainfall fluctuates from year to year as well as from site to site, creating wide variations in annual precipitation and periodic occurrences of wildfires. In general, precipitation averages 15-18 inches between November and March.

Climate Change

Climate change has caused a significant impact to the Santa Clarita area and the entire western U.S. Since 2012, the ongoing drought in California increases the likelihood of wildfires and has resulted in drastic measures to curb water use. In January 2015, Governor Jerry Brown declared a State of Emergency and imposed strict conservation statewide. Conversely, the winter of 2015 is anticipated to bring El Niño conditions which can lead to major flooding as well as mudslides.

Minerals and Soils

The characteristics of Santa Clarita's minerals and soils indicate the potential types of hazards that may occur. Rock hardness and soil characteristics can determine whether or not an area will be prone to geologic hazards such as earthquakes, liquefaction and landslides.

The City of Santa Clarita consists mainly of two different soil series: Cienba and Pico.

- Cienba is characterized by very shallow to shallow soils that are somewhat excessively drained. Formed in material weathered from granitic rock, these soils are located at elevations between 500 and 4,000 feet. Generally this soil series exhibits low to medium runoff characteristics along with moderately rapid permeability.
- Pico soil consists of deep, well drained soils that formed in alluvium from primarily sedimentary rocks. Pico soils are found on floodplains and alluvial fans at an elevation of between 10 and 1,500 feet. Most of the soils directly surrounding the Santa Clara River are of the Pico series. These soils tend to exhibit slow to medium runoff, and moderately rapid permeability.

Geologic Features and Earthquake Faults

The City of Santa Clarita, like most of the Los Angeles Basin, lies over the area of one or more known and unknown earthquake faults, particularly so-called lateral or blind thrust faults. In addition to fault activity, Santa Clarita is subject to liquefaction and landslides.

The major faults that have the potential to affect the greater Los Angeles Basin (and therefore the City of Santa Clarita) are the San Andreas, San Fernando, San Gabriel, Holser, Santa Susana,

Oak Ridge, Clearwater, Soledad, Northridge Hills, San Francisquito, Pelona and the Sierra Madre³.

The Los Angeles Basin has a history of powerful and relatively frequent earthquakes, dating back to the powerful 8.0+ San Andreas Earthquake of 1857. Paleo-seismological research indicates that large (8.0+) earthquakes occur on the San Andreas fault at intervals between 45 and 332 years with an average interval of 140 years (Peacock, n.d.)⁴. Other lesser faults have also caused very damaging earthquakes since 1857. Notable earthquakes include the Long Beach earthquake of 1933, the San Fernando Earthquake of 1971, the 1987 Whittier Earthquake and the 1994 Northridge earthquake.

Since 1855, eighteen separate seismic events have affected the Santa Clarita Valley; the 1994 Northridge earthquake was the most impactful. This event was rated at a magnitude 6.7 with an epicenter located approximately thirteen miles south of the Santa Clarita Valley. An Alquist-Priolo Special Study Zone exists within the City of Santa Clarita covering the area of the San Gabriel Fault.

Risk of Liquefaction

Liquefaction refers to a phenomenon where the surface soils, generally alluvial in nature, become saturated with water. Ground-shaking packs the sand grains closer together so that there is less space available for water, and as a consequence these soils become very wet and mobile, causing foundations of structures to move and increasing the risk of potential structural damage.

The San Andreas and San Gabriel Faults are both causative sources for strong ground movement and liquefaction. The areas within the river channels and flood deposits, such as the Santa Clara River Channel, are the most susceptible to liquefaction.

Landslides/Mudslides/Subsidence (Earth Movement)

Landslides are often associated with earthquakes, although there are other factors that may influence landslides. The factors that can lead to landslides include the slope, soil moisture content, and the composition of soils and subsurface geology. Heavy rain and improper grading, as well as earthquakes, can all trigger landslides given the proper conditions. Because much of the City of Santa Clarita is placed on or near hills and mountainous terrain, there are a number of areas where landslides may occur within City limits. For example, the hills and mountains within the City consist of steep slopes and eroded hillsides of clays and shales. Shales are extremely susceptible to pervasive fracturing, which weakens slopes. Grading, ground movement, and rainfall can cause these slopes to fail. In addition, clays are considered to be expansive soils. When expansive soils are saturated, they can lose their cohesiveness and fail.

There is some potential for subsidence within the City. Subsidence can occur as a result of excessive ground water or petroleum withdrawal which results in a sinking of the ground surface. This can be particularly common in areas of high alluvial soils. However, no large-scale local subsidence has occurred within the City.

³ City of Santa Clarita, *Safety Element*, June 2011.

⁴ Peacock, Simon M., <http://aamc.geo.lsa.umich.edu/eduQuakes/EQpredLab/EQprediction.peacock.html>

Population and Demographics

According to the California Department of Finance, Santa Clarita’s population has increased by 4,000 (1.9%) from 2014, resulting in a total of 213,231 residents as recent as January 2015 (California Department of Finance, 2015).⁵ This increase in population can be attributed to the aforementioned annexations, birth rates and residents moving into Santa Clarita.

As stated, the City of Santa Clarita is the third-largest City in Los Angeles County, following the City of Los Angeles (3.9 million residents) and the City of Long Beach (472,779 residents). The City of Glendale ranks as the fourth-largest City in Los Angeles County, with a total estimated population of nearly 199,182 residents. Santa Clarita is the 18th largest city in the State of California following San Bernardino’s 213,933 residents. Consequently, Santa Clarita plays an important role in Los Angeles County based on its size.

Population Growth

According to the Southern California Association of Governments (SCAG), total population of Santa Clarita increased from 57,999 to 209,130 from 2000 to 2014. During this 14-year period, the city’s population growth rate of 38.4% was higher than the Los Angeles County rate of 5.5%. As a result, Santa Clarita hosts 2.1% of the total population of Los Angeles County (Southern California Association of Governments, 2015).⁶ In terms of different age groups, from 2010 to 2014, the age group 55-64 added the most to Santa Clarita’s population, with an increase of 12,013 people.

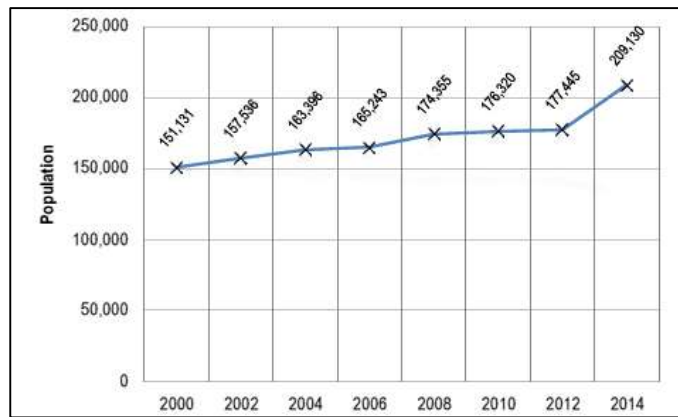


Figure 6: Santa Clarita Population Growth, 2000-2014

Estimates for 2014 indicate that roughly 25% percent of Santa Clarita’s population is between the ages of 35-54, 10-11% is between the ages of 55-64, and almost 10% is 65 years of age or older, while nearly 24% of the population is 19 years of age or less. Fifty-one percent of the population is women, while 49% are men.

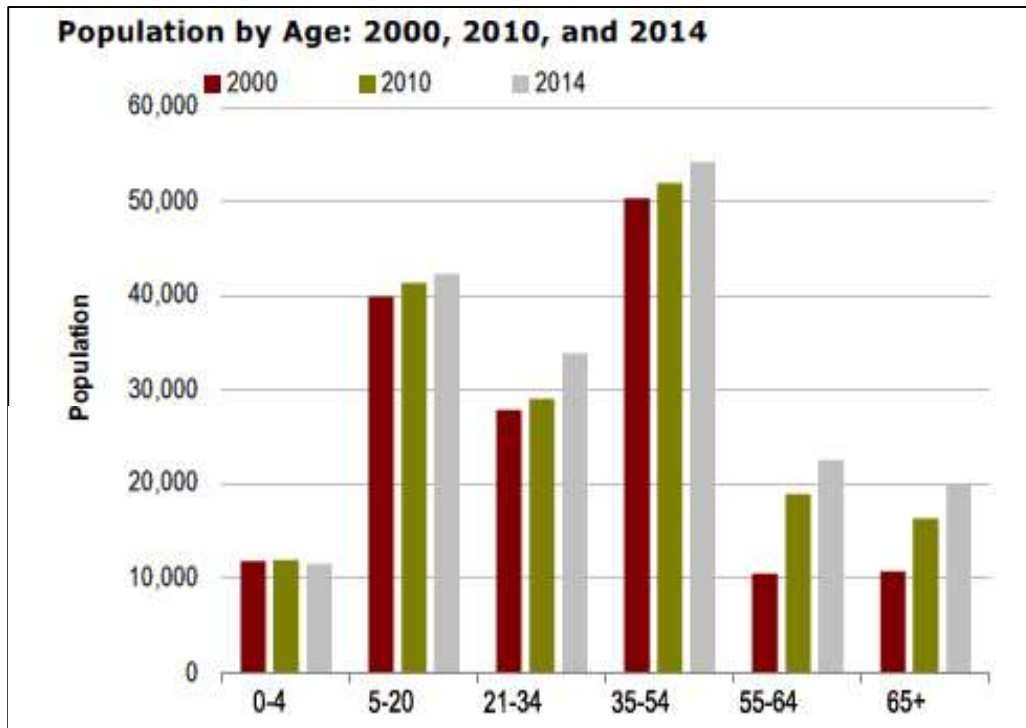
Education

Santa Clarita is home to four local public school districts; all rank in the top 10% in California, based on the California Assessment Program. Approximately 58% of the overall adult workforce in Santa Clarita has attained a four-year degree or higher. Residents of the City and the entire Santa Clarita Valley enjoy the opportunity of attending any of the three colleges located in the area: the California Institute of the Arts, The Master’s College, and College of the

⁵ California Department of Finance, “New State Population Report: California Grew by 358,000 Residents in 2014,” http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/documents/E-1_2015PressRelease.pdf.

⁶ Southern California Association of Governments, “Profile of the City of Santa Clarita,” May 2015.

Canyons. Collectively, their student population is approximately 24,000 (City of Santa Clarita).⁷



The following charts/tables further detail the population makeup of Santa Clarita (SCAG, 2014).⁸

Table 3: Population Percentage Comparison between Santa Clarita and Los Angeles County

Category	Santa Clarita	Los Angeles County
2014 Total Population	209,130	10,041,797
2014 Median Age (Years)	36.8	35.8
2014 Non-Hispanic White	51.3%	26.6%
2014 Hispanic	32.4%	49%
2014 Asian	9.5%	13.8%
2014 Black/African American	3.4%	7.9%
2014 American Indian	0.2%	0.2%
2014 All Other Non-Hispanic	3.2%	2.4%

Figure 7: Ethnic Population Comparison - Santa Clarita vs. Los Angeles County, 2014

⁷ City of Santa Clarita, “Community Profile” Section of 2014-2015 City Budget.

⁸ Data sources: SCAG Profile of Santa Clarita, U.S. Census Bureau American Community Survey 2014; Nielson Co.; California Department of Finance E-5, May 2014

Land and Development

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

It is the General Plan and the General Plan policies and objectives that ensure that any future development will follow city processes to mitigate any hazards by employing the following steps:

Avoid	Avoid development in areas that are identified as hazardous. This is primarily accomplished by designating areas as open space and thus prohibiting residential units and nearly preventing all habitable structures. Also, zoning with lesser or reduced densities can be assigned resulting in fewer development areas within a hazard area.
Engineer	Engineering a solution is often an option to reduce potential hazard impacts. This is common in flood zone areas as engineering measures are used for erosion control, bank stabilization and water retention. Further, buildings themselves can be engineered to the highest standard to withstand earthquakes.
Mitigate	Implement mitigation measures to lessen the threat from the hazard. Examples from "Avoid" and "Engineer" above represent possible mitigation measures. Any action that is taken to reduce the potential impact of a hazard would be a mitigation measure. This could be accomplished through land use controls, building development standards, building placement and flood control devices.

Previous Major Development History

Gate King Development

The 2004 Gate King Development, a 4.2 million square feet industrial development site, is located in a high fire hazard area. This development is 584 acres with only 170 of these acres being built upon. To mitigate the fire threat to this development 414 acres of this development will remain as Open Space. A trail system has been developed throughout the development and Open Space areas. In addition to providing a buffer between the development and the hazard area, other mitigation measures include: manufactured slopes, fuel modification landscape and two egress and ingress routes. An additional Fire Station has been planned for the area and a helipad site has been identified.

Riverpark, River Village Development

The 2007 Riverpark, River Village Development located north of the Santa Clara River along the Cross Valley Connector, includes 695.4 acres of land for 1,123 single- and multi-family units, a maximum of 16,000 square feet of commercial uses and recreational/park uses, along with associated infrastructure, and open space. This project is located in the geographic center of the City and is in a designated flood hazard zone. To mitigate the flood threat to his project the following mitigation activities were employed: buried bank stabilization, setbacks and a trail system.

Crossroads Shopping Area

The 2006 Crossroads Shopping Area includes 100,000 square feet of commercial development. The project is bisected by the Alquist-Priolo Special Study Zone – Earthquake Fault Zone. To mitigate the earthquake threat to this development, the following mitigation measures were completed: Setbacks of buildings to avoid the Alquist-Priolo Special Study Zone and higher risk areas were designated as low risk parking areas and trails.

Old Town Newhall Library

The Old Town Newhall Library is a 30,000 square foot facility that opened in September 2012. The library is located in central Santa Clarita and provides free access to a wide range of resources to the public including reference materials, computer access, and community programs.

Discovery Park

Discovery Park was designed to provide for the needs of the local community while restoring the ecological function of the land. Discovery Park is located along the banks of the Santa Clara River and opened in July 2010. The park occupies 25 acres, the majority of which remains in a natural state.

Future Development

In the future, the City plans to build a Canyon County Community Center and Sports Complex. Any hazards identified with these projects will be reduced by mitigation activities. Successful mitigation projects in the City have enabled private development projects to be built in fire, flood and earthquake hazard areas.

Annexations

Since incorporation in 1987, thirty-two communities positioned adjacent to the City have been annexed into Santa Clarita, adding a total of 18.1 square miles to the City. Since 2010, the following areas have been annexed into Santa Clarita’s City limits:

Table 4: Annexations

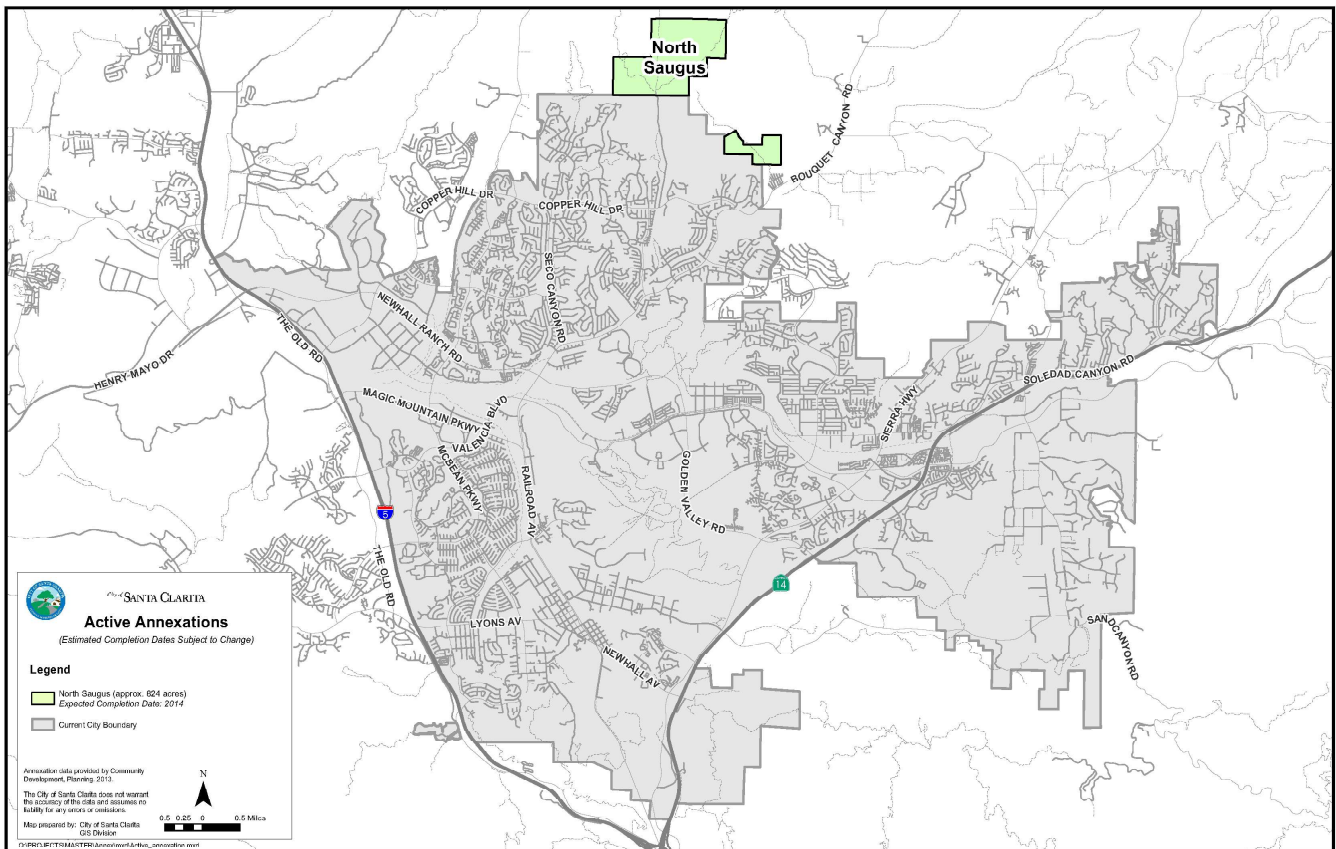
Name	Date Annexed	Size	Purpose
Soledad Commons	June 14, 2012	13.21 acres	Site of 60,000 square foot commercial development
Copperstone	June 14, 2012	68.66 acres	Site for 428 homes and approximately 1,284 residents
Elsmere Canyon	June 14, 2012	806.52 acres	Open space annexation
Fair Oaks/ West Sand Canyon	September 11, 2012	2436.63 acres	Site for 14,895 residents and existing 6,625 residential units. In addition, a City-approved project totaling 1,100 residents and up to 950,000 square feet for commercial uses

Name	Date Annexed	Size	Purpose
North Copperhill	November 28, 2012	2475.64 acres	Site for 9,543 residents and 3,305 residential units
South Sand Canyon	April 16, 2013	695.31 acres	Site for 40 residents and two filming ranches totaling approximately 540 acres
Norland Road	August 15, 2013	187.40 acres	Open space annexation, pending 40-unit residential development
North Saugus	October 14, 2014	823.98 acres	Open space annexation, site for three filming areas

Land Use Trends

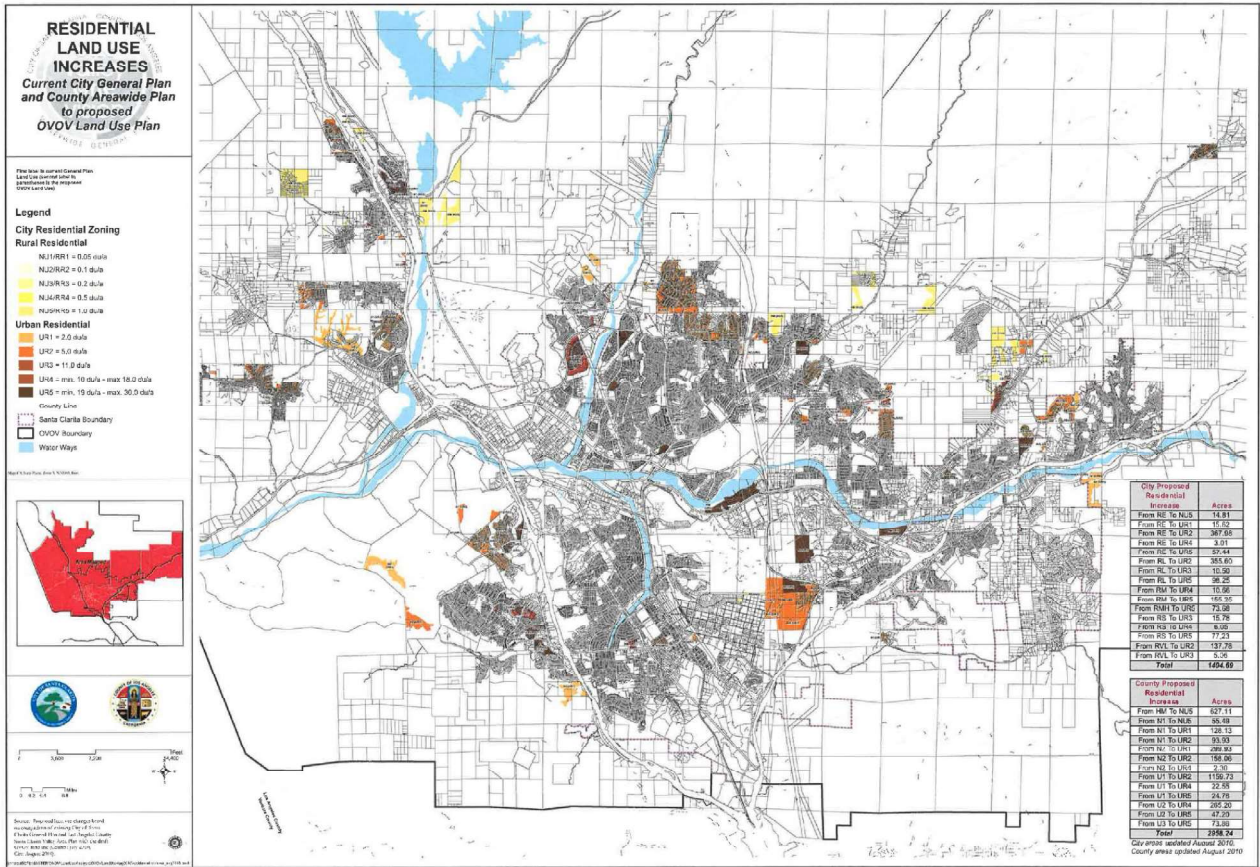
Land use in the City of Santa Clarita continues to change with some residential areas moving towards commercial use while other areas move from commercial to residential. The maps on the following pages depict recent land use trends including the added Annexation areas since 2010 (City of Santa Clarita, GIS, 2015). Additional information related to land use is provided in the [Housing and Community Development](#) and [Employment and Industry](#) sections of this Hazard Mitigation Plan.

Annexation Areas



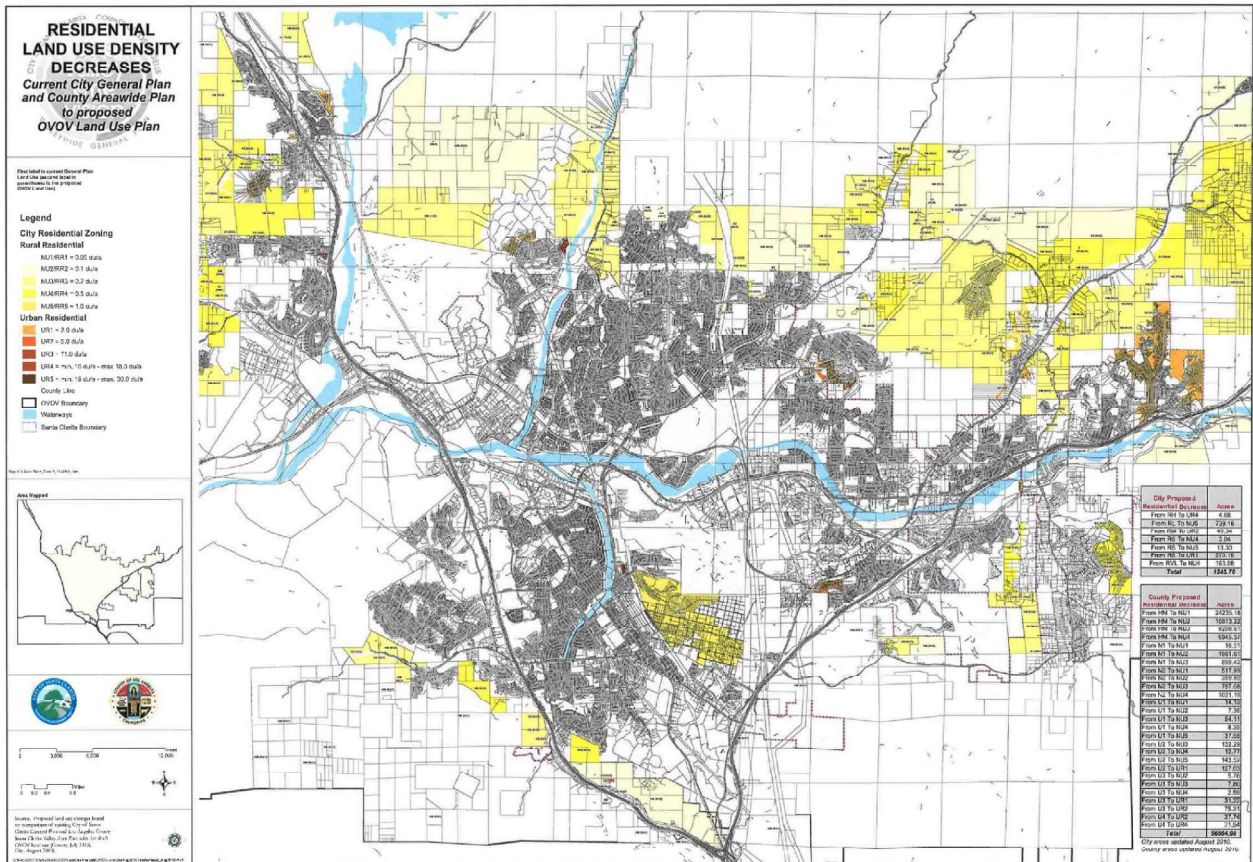
Map 3: City of Santa Clarita Active (completed) Annexations

Residential Land Use Increases



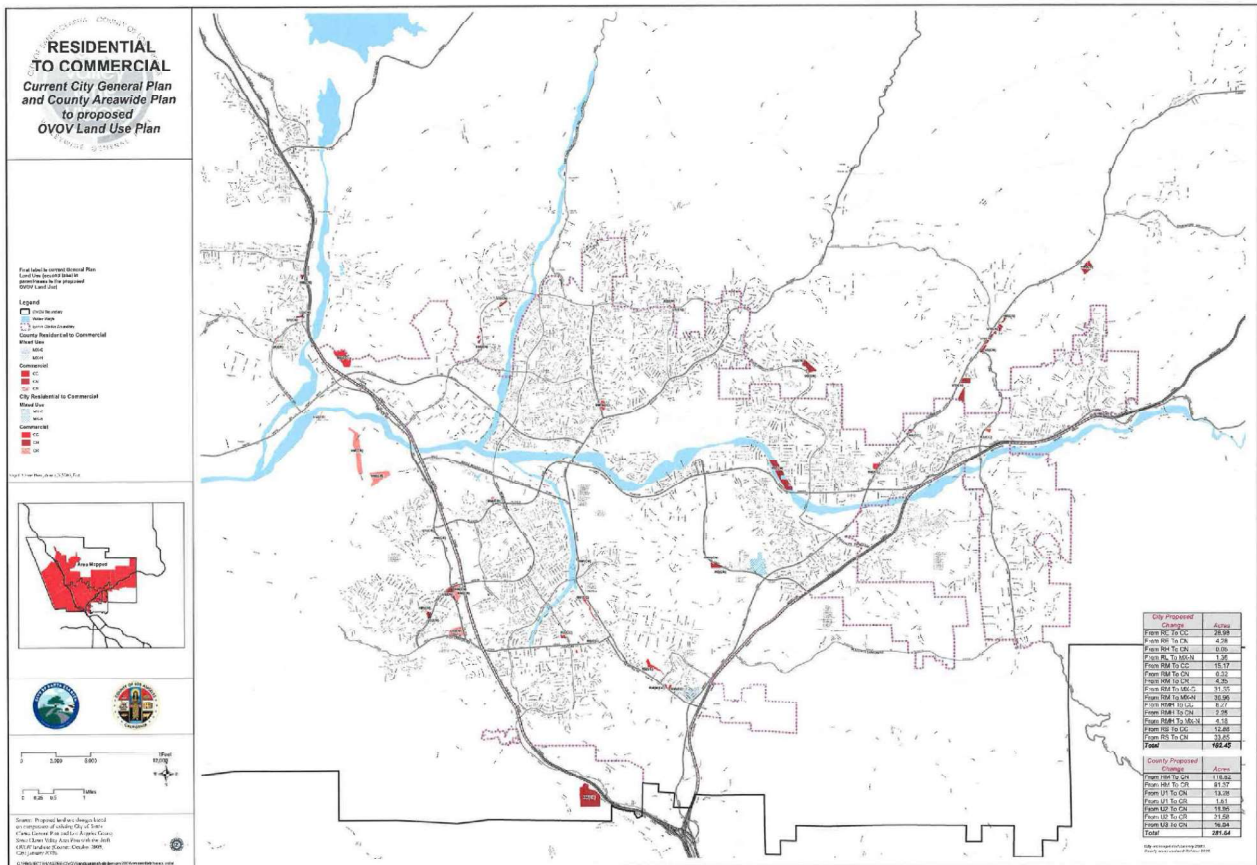
Map 4: Residential Land Use Increases

Residential Land Use Density Decreases



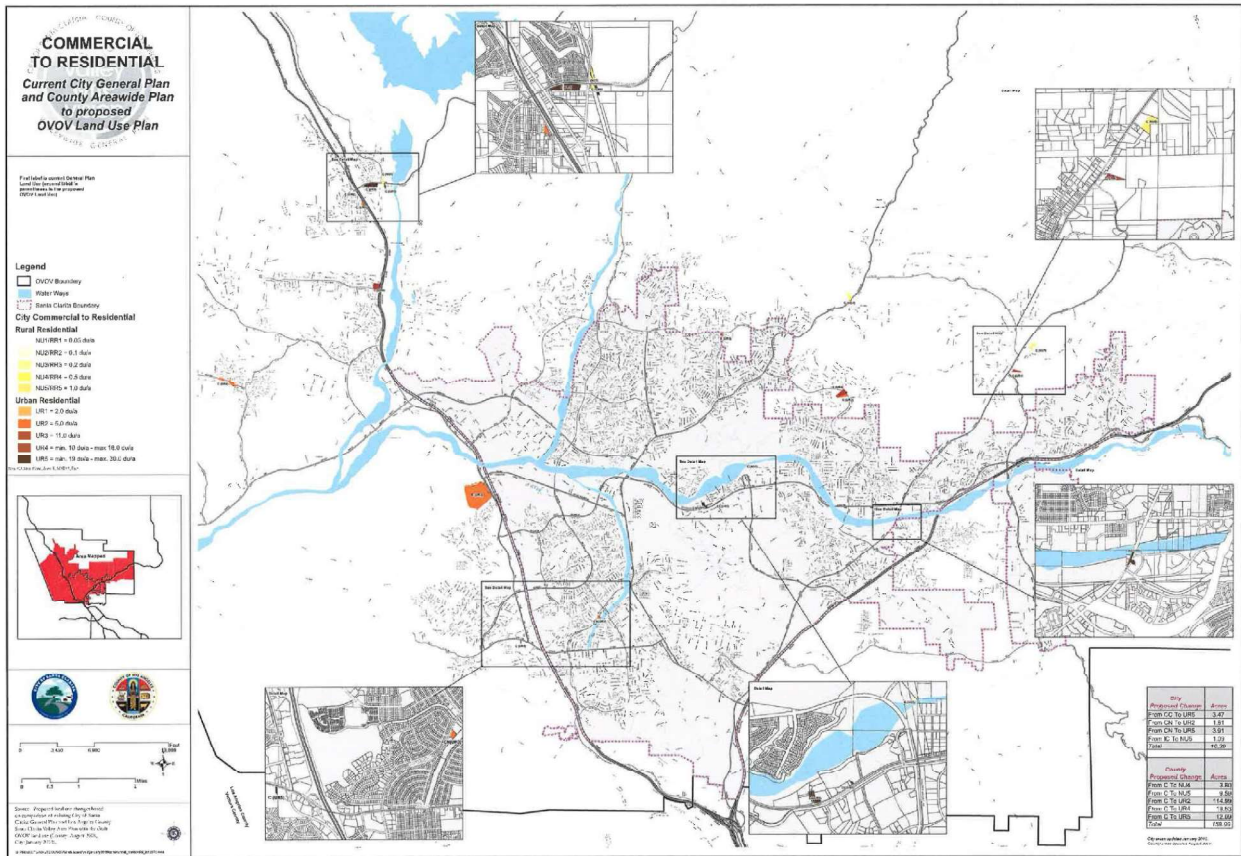
Map 5: Residential Land Use Density Decreases

Residential to Commercial



Map 6: Residential to Commercial

Commercial to Residential



Map 7: Commercial to Residential

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Housing and Community Development

Housing

Growth Trends

Between 2000 and 2014, the total number of households in Santa Clarita increased by 17,231 units, or 33.9%. During this 14-year period, the city’s household growth rate was higher than Los Angeles County’s growth rate of 4.4% (California Department of Finance, E-5, 2014).⁹

According to the California Department of Finance, there were 70,926 households in Santa Clarita in December 2012. Between 2008 and 2013, Santa Clarita’s housing stock increased by 12,212 units, a majority of which were the result of annexations (City of Santa Clarita, 2013).¹⁰

In 2014, there were 3,600 existing home sales in the Santa Clarita Valley – a decline of 10 percent from 2013. Sales were soft throughout the year, in tandem with most regional markets in California. From December 2013 to December 2014, the median price for existing homes increased by 11 percent, to \$457,300. This represents a slowdown from rates of appreciation that were observed from mid-2013 through mid-2014, but is generally in line with the rest of Southern California. According to official sources, the median home price in January 2015 was \$446,000 (Santa Clarita Valley Economic Development Corporation & College of the Canyons, 2015).¹¹

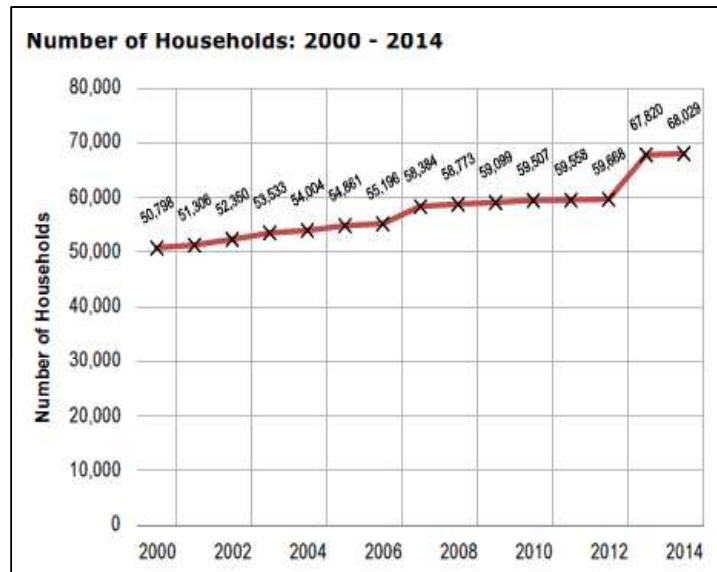


Figure 8: Number of Households in Santa Clarita (Occupied Housing Units), 2000-2014

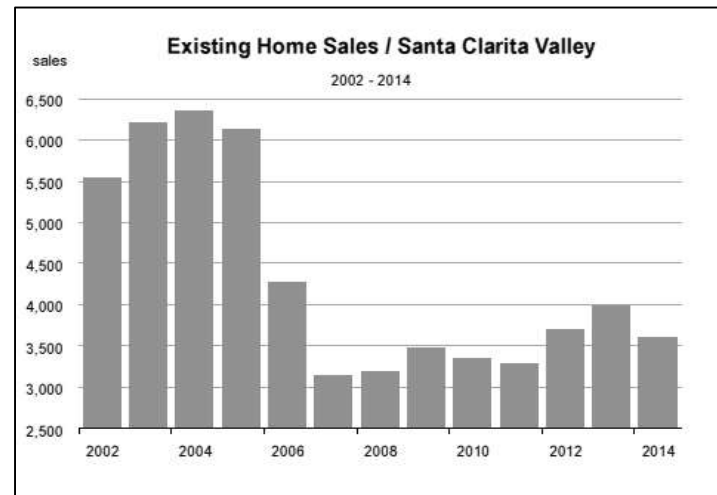


Figure 9: Existing Home Sales in Santa Clarita Valley, 2002-2014

⁹ 2000 and 2010 U.S. Decennial Census; California Department of Finance, E-5, 2014.

¹⁰ City of Santa Clarita, *General Plan – Housing Element*, October 2013.

¹¹ Santa Clarita Valley Economic Development Corporation & College of the Canyons, “2015 Economic Outlook,” March 2015.

New Housing Development

During 2014, just over 1,000 residential units were authorized through the permitting process in the Santa Clarita Valley, about the same number as in 2013. Because of the low levels of production during the housing bust, new units are expected to be developed at a more rapid pace to accommodate expected population growth (Santa Clarita Valley Economic Development Corporation & College of the Canyons, 2015).¹¹ The following table summarizes new developments underway in the Santa Clarita Valley:

Table 5: New Residential Developments, 2015

New Development Summary – Santa Clarita Valley	Principal Residential Projects in Santa Clarita Valley		February 2015
Project Name	Units to be Built	Type	Project Status
Valle Di Oro	83	Townhomes	Under construction
Whittaker Bermite	2,911	Mixed Development	Site under remediation
West Creek/West Hills	579	2,300 total single and multi- family homes	Under construction
Plum Ranch	316	Detached homes in 4 communities	Under construction
River Village	582	1,100 Multi-family and single family homes	Under construction
Villa Metro	94	Townhomes	Under construction
Golden Valley	499	Single and multi-family homes	Infrastructure started in 2014
Five Knolls	499	319 single, 180 multi-family homes	Grading to commence this year
Penlon / Trestles	137	Condos	Now grading
Newhall Ranch	20,885	Master planned community	Groundbreaking this year or next
Northlake (Castaic)	3,900	Single family homes	Pending approval
Vista Canyon	1,100	Large community	Groundbreaking Spring 2015
Los Valles (Castaic)	497	Single family homes	EIR in progress
Tapia Ranch (Castaic)	405	Single family estates	EIR in progress
TOTAL	32,082*		

*Smaller projects not in principal count

As of February 2015, a total of 36, 171 units are in various stages of the formal entitlement process. The majority of the units are in Newhall Ranch. The Newhall Ranch project, which has been in planning for ten years, is expected to commence grading this year or next, with the first wave of new homes scheduled to start in 2018. This will lead to a sharp rise in new home development that will continue beyond five year forecast horizons.

Currently, there are 9.4 million square feet of approved commercial and industrial projects in the Santa Clarita Valley. Approximately 689,000 square feet are under construction. There is no new office space currently underway, despite a rapidly tightening office market. Consequently, the office market is likely to tighten further in 2015 with upward pressure on rental rates.

Low/Moderate Income Housing

To support housing and neighborhood rehabilitation efforts for low and moderate income residents in the area, Santa Clarita works with the U.S. Housing and Urban Development (HUD) Department’s Residential Rehabilitation Grant Program. Additionally, the City participates in the Community Development Block Grant (CDBG) program, which is the primary resource available to address non-housing community development needs.

The City of Santa Clarita's anticipated CDBG Entitlement Allocation is \$1,124,810 for FY2015-2016 (averages over \$1 million in CDBG Program funding per year). As part of the program at least 65% must be spent on capital projects which benefit the low/moderate income community each year (HUD, 2015).

In the City of Santa Clarita the **Residential Rehabilitation Program** and **Handyworker Program** (Department of Land Conservation and Development, 2000) are two capital projects which address the safety and habitability of homes occupied by low and moderating income households. Typical activities include disabled accessibility modifications and repairs or replacement of plumbing, electrical systems, roofs, HVAC units, floors, windows, and exterior painting – some of which assist in mitigating the potential for fires, flood damage, and other losses to local structures and the community.

The budget and number of assisted houses through the City Residential Rehabilitation Program for the last 5 years are listed below:

Table 6: Residential Rehabilitation Program 5 Year Statistics

Years	Residential Rehabilitation Program Budget / Assisted Housing Units
2010-11	\$130,541 / 25 units
2011-12	\$114,876 / 27 units
2012-13	\$132,911 / 11 units
2013-14	\$132,911 / 16 units
2014-15	\$127,476 / 11 units

The budget and number of assisted houses through the City-funded Handyworker Program for the last five years are listed below:

Table 7: Handyworker Program 5 Year Statistics

Years	Handyworker Program Budget / Assisted Housing Units
2010-11	\$200,000 / 66 units
2011-12	\$172,000 / 72 units
2012-13	\$200,000 / 56 units
2013-14	\$200,000 / 52 units
2014-15	\$200,000 / 43 units

Income

In 2014 approximately 30% of households in Santa Clarita earned less than \$50,000 annually; approximately 38% of households earned \$100,000 or more.

From 2000 to 2014, median household income increased by \$14,534 (not adjusted for annual inflation) to \$81,088 (SCAG, 2014).

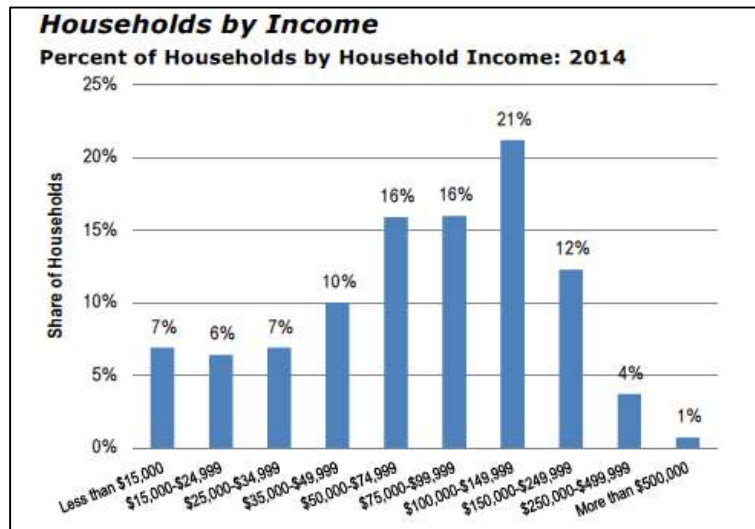


Figure 10: Santa Clarita Percent of Households by Household Income, 2014

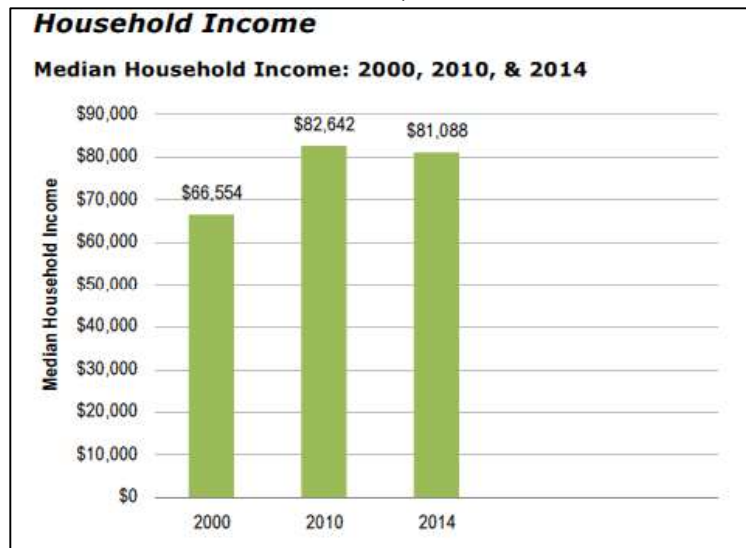


Figure 11: Santa Clarita Median Household Income: 2000, 2010, and 2014

Employment and Industry

The City of Santa Clarita’s strong and diverse economy makes Santa Clarita the ideal destination for business. Maintenance of highly supportive environment for business development is achieved through the cooperation of the Santa Clarita Economic Development Corporation, the Santa Clarita Valley Chamber of Commerce, the Valley Industrial Association, and the City government. In addition, companies benefit greatly from the area’s land and leasing opportunities, as well as from a highly-skilled labor pool, variety of transportation choices, housing, quality of life, climate, and scenery.

Employment Statistics

As of April 2015, Santa Clarita’s unemployment rate was 6.5 percent, compared to 7.3 percent for both Los Angeles County and 6.2 percent for the state of California (City of Santa Clarita, Economic Division, 2015).¹² Santa Clarita has the fourth-largest labor force in Los Angeles County with 88,800 individuals within City limits (City of Santa Clarita).⁷

Santa Clarita’s principal sectors of job creation are professional business services, leisure and hospitality, education, healthcare, retail trade, and manufacturing. Santa Clarita’s local economy is primarily a service based economy with 42% of the businesses in the service sector. An additional 22% of businesses are in retail trade and 11% are in the finance, insurance, and real estate sector.

The businesses located in Santa Clarita can be categorized as small businesses with 59% employing less than 5 employees. Businesses between 5 and 9 employees account for 19% of all businesses in the City and only 5% employ in excess of 50 employees.

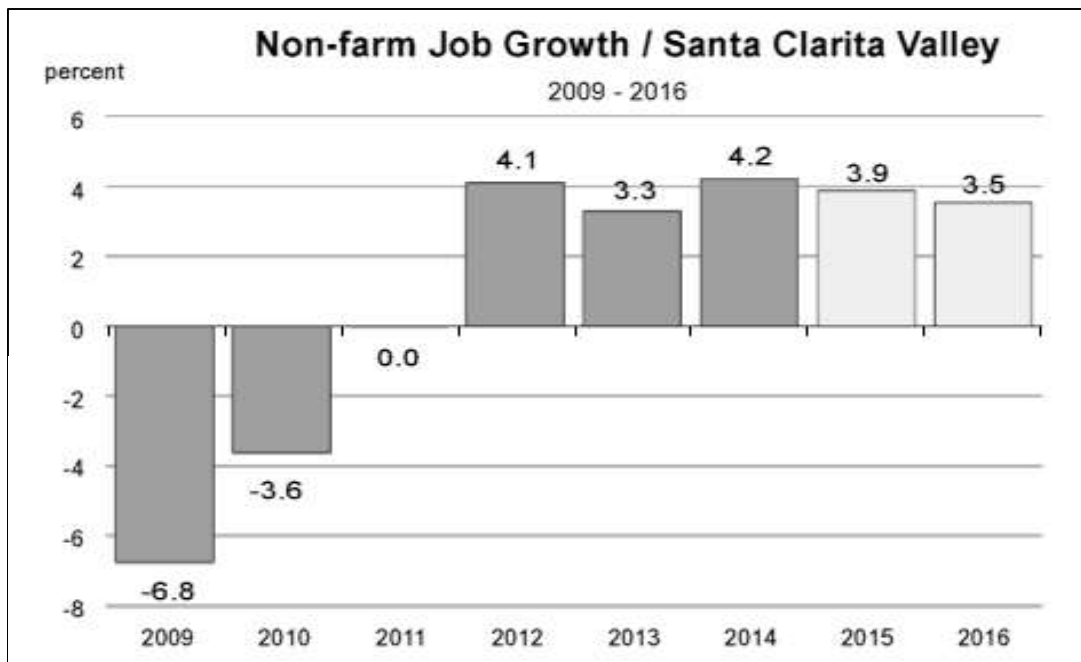


Figure 12: Non-Farm Job Growth, Santa Clarita Valley 2009-2016

¹² City of Santa Clarita, Economic Division Newsletter, June 2015.

Top Local Area Employers

The following table details the top ten largest employers in the Santa Clarita Valley, i.e., the City of Santa Clarita and adjacent communities (California Economic Forecast and the Santa Clarita Economic Development Corporation, 2015).¹³

Table 8: Top Ten Employers in Santa Clarita Valley, March 2015

Rank	Company	Type of Business	# of Employees
1	Six Flags Magic Mountain	Entertainment/Theme Park	3,200
2	William Hart Union School District	Public High & Junior High School District	2,007
3	College of the Canyons	Community College	1,911
4	Princess Cruises	Vacation Cruise Line Services	1,885
5	Saugus Union School District	Public Elementary School District	2,010
6	Henry Mayo Newhall Hospital	Healthcare: Services	1,640
7	U.S. Postal Service	Government	1,127
8	Quest Diagnostics	Healthcare: Medical Research & Development	850
9	Newhall School District	Public Elementary School District	834
10	Boston Scientific	Healthcare: Medical Research & Development	780

Mitigation activities are needed at the business level to ensure the safety and welfare of workers and limit damage to industrial infrastructure. Employees are highly mobile, commuting from surrounding areas to industrial and business centers. This creates a greater dependency on roads, communications, accessibility and emergency plans to reunite people with their families. Before a natural hazard event, large and small businesses can develop strategies to prepare for natural hazards, respond efficiently, and prevent loss of life and property.

Employment by Land Use Type

The amount of space Santa Clarita businesses occupy is relatively small. Close to one-half or 46% of businesses are in locations between 2,500 and 9,999 square feet with an additional 36% of businesses occupying less than 2,500 square feet (Santa Clarita Valley Chamber of Commerce, n.d.).¹⁴

¹³ California Economic Forecast and the Santa Clarita Economic Development Corporation, “2015 Economic Outlook.”

¹⁴ Santa Clarita Valley Chamber of Commerce, “Regional Facts and Figures,” <http://www.scvchamber.com/regional-facts--figures.html>

Job Growth Projections and Requirements

The following Growth Projection Worksheet (City of Santa Clarita, Planning Division, 2015) estimates various job growth requirements for the City of Santa Clarita based on population (housing) changes. The worksheet includes estimates for no annexations as well as post annexation figures. Growth ratio requirements range from 1.25 to 1.5 jobs to housing units resulting in a projected gap requiring ongoing future job growth in the City.

Growth Projection Worksheet						
Baseline Information (no annexations)			Baseline Information (with annexations)		GP Estimate of City Jobs in 2005	
Total Units	76,742		Total Units	86,043		74,889
Total Jobs	88,002		Total Jobs	88,195		GP New Jobs Estimate at Buildout
Ratio	1.15		Ratio	1.03		98,322 - 128,850
NEW JOBS TO ACHIEVE 1.25/1 (No Annexations)				NEW JOBS TO ACHIEVE 1.25/1 (With Annexations)		
No Growth		1.25/1	No Growth		1.25/1	
Housing Units	Total Jobs Required	Delta	Housing Units	Total Jobs Required	Delta	
76,742	95,928	7,926	86,043	107,554	19,359	
5% Growth		1.25/1	5% Growth		1.25/1	
Housing Units	Total Jobs Required	Delta	Housing Units	Total Jobs Required	Delta	
80,579.10	100,724	12,722	90,345	112,931	24,736	
10% Growth		1.25/1	10% Growth		1.25/1	
Housing Units	Total Jobs Required	Delta	Housing Units	Total Jobs Required	Delta	
84,416.2	105,520	17,518	94,647	118,309	30,114	
NEW JOBS TO ACHIEVE 1.5/1 (No Annexations)				NEW JOBS TO ACHIEVE 1.5/1 (With Annexations)		
No Growth		1.5/1	No Growth		1.5/1	
Housing Units	Total Jobs Required	Delta	Housing Units	Total Jobs Required	Delta	
76,742	115,113	27,111	86,043	129,065	40,870	
5% Growth		1.5/1	5% Growth		1.5/1	
Housing Units	Total Jobs Required	Delta	Housing Units	Total Jobs Required	Delta	
80,579.10	120,869	32,867	90,345	135,518	47,323	
10% Growth		1.5/1	10% Growth		1.5/1	
Housing Units	Total Jobs Required	Delta	Housing Units	Total Jobs Required	Delta	
84,416.2	126,624	38,622	94,647	141,971	53,776	

"Delta" refers to jobs difference between "Total Jobs Required" and baseline job figure.

Jobs / Housing Balance - Growth Projections by Sector

The Jobs/Housing Balance Spreadsheet provides a summary of development in Santa Clarita in terms of employers and housing units and indicates future growth trends. Employers are further delineated by job sector, job/housing ratio(s), status, and approval authority (City of Santa Clarita, Planning Division, 2015).

JOBS / HOUSING BALANCE SPREADSHEET (DRAFT 6/30/15)

Development Record Since Baseline (Approved and or in construction or no action)

Project Name	# Res Units	Commercial SF	Retail	Office	Industrial	Other	New Jobs	Source	Ratio(s)	Project J/H	Total Units	Total Jobs
Data Baseline 6/11											70,926	74,031
Approved and Completed												
Valle di Oror	102	-	-	-	-	-	-				71,028	74,031
Enterprise Rent-a-Car	-	1,600	800	800	-	-	5	SCAG	1/372		71,028	74,036
UCLA Film Vault (Phases 1&2)	-	218,609	-	68,444	-	150,165	57	Applicant Estimate	1/3835		71,028	74,093
Dapper Dan	-	10,000	-	-	-	-	3	Applicant Estimate	1/3333		71,028	74,096
TOTALS	102	230,209	800	69,244	-	150,165	65			0.64		
Approved by City Council (CC) In construction or grading												
Habitat for Heroes	81	-	-	-	-	-	-				71,109	74,096
Villa Metro	315	10,000	5,000	5,000	-	-	27	SCAG	1/372	0.09	71,424	74,123
Penlon	137	-	-	-	-	-	-				71,561	74,123
Hospital		360,000	-	200,000	-	160,000	571	EIR Employment Stats	1/630		71,561	74,694
River Village	1,089	-	-	-	-	-	-				72,650	74,694
River Village (Area C)	239	-	-	-	-	-	-				72,889	74,694
River Village (Area D)	277	-	-	-	-	-	-				73,166	74,694
Five Knolls	499	-	-	-	-	-	-				73,665	74,694
GV Ranch	404	-	-	-	-	-	-				74,069	74,694
La Cocina Center	-	10,000	10,000	-	-	-	27	SCAG	1/424		74,069	74,721
GVR Senior	95	-	-	-	-	-	-				74,164	74,721
TOTALS	3,136	380,000	15,000	205,000	-	160,000	625			0.20		

City of Santa Clarita
2015 Local Hazard Mitigation Plan

Final
LHMP VERSION 3.0
Revision Date: 9/15/2015

Project Name	# Res Units	Commercial SF	Retail	Office	Industrial	Other	New Jobs	Source	Ratio(s)	Project J/H	Total Units	Total Jobs
Approved by CC - No Action												
Quigly Parcel Map	2	-	-	-	-	-	-				74,166	74,721
Vista Canyon Ranch	1,117	950,000	164,000	646,000	-	140,000	2,535	SCAG	1/424, 1/319, 1/1152	2.27	75,283	77,256
Tourney Place	-	51,000	-	51,000	-		160	SCAG	1/319		75,283	77,416
TMC Master Plan	-	240,000	-	-	-	240,000	167	EIR Employment Stats	1/1437		75,283	77,583
Newhall Hotel	-	26,708	-	-	-	26,708	23	SCAG	1/1152		75,325	77,606
Whittaker Bermite	2,911	2,482,350	538,289	970,691	973,370		5,124	SCAG	1/424, 1/319, 1/1174	1.76		
Gate-King	-	4,200,000	-		4,200,000	-	4,730	SCAG	1/888		75,325	82,336
TOTALS	4,030	7,950,058	702,289	1,667,691	5,173,370	406,708	12,739			3.16		

Approved by Planning Commission In construction or grading												
Vale Di Oro	111	-	-	-	-	-	-				75,436	82,336
Oakmont Senior Living Facility	81	60,000	-	-	-	60,000	55	Applicant Estimate	1/1090	0.68	75,517	82,391
GV Senior Housing	95	-	-	-	-	-	-				75,612	82,391
Cell Site/La Cocina Center	-	10,000	5,000	5,000	-	-	27	SCAG	1/372		75,612	82,418
Chinquetera	-	91,000	45,500	45,500	-	-	245	SCAG	1/372		75,612	82,663
TOTALS	287	161,000	50,500	50,500		60,000	327			1.14		

JOBS / HOUSING BALANCE SPREADSHEET

Development Record Since Baseline (Approved and or in construction or no action)

Project Name	# Res Units	Commercial SF	Retail	Office	Industrial	Other	New Jobs	Source	Ratio(s)	Project J/H	Total Units	Total Jobs
Approved by Planning Commission No action												
Sheraton	-	137,000	-	-	-	137,000	119	SCAG	1/1152		75,612	82,782
Oak Ridget Indstrl.	-	300,000	-	-	300,000	-	338	SCAG	1/888		75,612	83,120
Sand Cyn. Estates	18	-	-	-	-	-	-				75,630	83,120
Sand Cyn. Estates	4	-	-	-	-	-	-				75,634	83,120
Canyon Brook	35	-	-	-	-	-	-				75,669	83,120
Oak Ridge Comrcl.	-	30,000	15,000	15,000	-	-	81	SCAG	1/372		75,669	83,201
Veluzat GVR Condos	9	-	-	-	-	-	-				75,678	83,201
Apple St. Condos	4	-	-	-	-	-	-				75,682	83,201
Iron Canyon	4	-	-	-	-	-	-				75,686	83,201
Core/Related	30	-	-	-	-	-	-				75,716	83,201
OTN Hotel	-										75,716	83,201
Valencia Chevron	-	6,000	5,000	1,000	-	-	15	SCAG	1/424, 1/319		75,716	83,216
TMC Residential	42										75,325	77,583
Walnut St. Condos	11	-	-	-	-	-	-				75,727	83,216
TOTALS	157	473,000	20,000	16,000	300,000	137,000	553			3.52		

Pending Planning Commission Approval												
Sand Canyon Plaza	580	114,400	54,400	-	-	60,000	180	SCAG	1/424, 1/1152	0.31	76,307	83,396
Ted Robinson	40	-	-	-	-	-	-				76,347	83,396
Mancara	109	-	-	-	-	-	-				76,456	83,396
TOTALS	729	114,400	54,400	-	-	60,000	180			0.25		

Project Name	# Res Units	Commercial SF	Retail	Office	Industrial	Other	New Jobs	Source	Ratio(s)	Project J/H	Total Units	Total Jobs
Approved Administratively												
Rent a Bin	-	60,000	-	-	60,000	-	72	SCAG	829		76,456	83,468
Kansas Infill	10	-	-	-	-	-	-				76,466	83,468
Audi Car Dealership	-	31,680	-	7,310	14,400	9,971	47	SCAG	1/319,1/829,1/1518		76,466	83,515
VTC Square	60	10,000	10,000	-	-	-	24	SCAG	1/424	0.40	76,526	83,539
Singing Hills Medical	-	11,740	-	11,740	-	-	37	SCAG	1/319		76,526	83,576
Soledad Medical	-	100,000	-	100,000	-	-	314	SCAG	1/319		76,526	83,890
Phantom Trail	29	-	-	-	-	-	-				76,555	83,890
Soledad Commons	-	60,000.00	30,000	30,000				SCAG	1/372			
Dentec	95	-	-	-	-	-	-				76,650	83,890
TOTALS	194	273,420	40,000	149,050	74,400	9,971	494			2.55		

Anticipated Submittals												
Mann Biomedical	-	535,000	-	-	535,000	-	602	SCAG	1/888		76,650	84,492
UCLA Phase 3	-	134,151					25	Applicant Estimate	1/5366		76,650	84,517
NTS	92	2,975,148	108,900		2,866,248		3,485	SCAG	1/424,1/888	37.88	76,742	88,002
Suncal/Saugus Speedway	704	33,000	3,000	30,000			101	SCAG	1/424,1/319			
Holiday Inn Hotel												
TOTALS	796	3,677,299	111,900	30,000	3,401,248	-	4,213			5.29		

	New Units	New Square Footage	Retail	Office	Industrial	Other	New Jobs	New Project Jobs Housing Balance	City Wide J/H Ratio	Total Units	Total Jobs
GRAND TOTALS	9,431	13,029,177	994,089	2,118,241	8,949,018	833,679	19,196		2.04	76,742	88,002

OVERALL JOBS/HOUSING RATIOS

Projects currently in process or approved since baseline.	2.04
All projects approved + baseline.	1.15
All projects approved + baseline + annexations	1.03

Annexation Data (4/15)	
Annexed Units	Annexed Jobs*
9,301	193

Total jobs since baseline 19,196

TOTALS WITH ANNEXATIONS

	1.03
86,043	88,195

Projects with Significant Employment Potential

	<u>Units</u>	<u>% of Total</u>
Vista Canyon Ranch Jobs	2,535	13%
Whittaker-Bermite Jobs	5,124	27%
Gate-King Jobs	4,730	25%
NTS Jobs	<u>3,485</u>	18%
TOTAL	15,874	83%

* Assumes 81,568 sf of retail space.
 VCR data is included in spreadsheet above.

UNITS NOT IN CONSTRUCTION OR COMPLETED

New Units	9,431
(Less "Approved and Completed")	102
(Less "Approved by CC - In Construction or Grading")	<u>3,136</u>
NET NEW UNITS	6,193



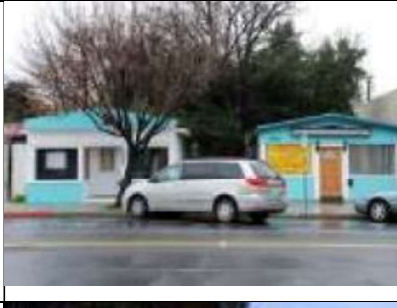

SQUARE FOOTAGE NOT IN CONSTRUCTION OR COMPLETED





New Square Footage	13,029,177
(Less "Approved and Completed")	230,209
(Less "Approved by CC - in Construction or Grading")	<u>380,000</u>
	12,418,968







Historic Structures

The City of Santa Clarita also maintains a number of designated historic structures (Historic Preservation Ordinance, January 2013). These sites are maintained by the Community Development Department (City of Santa Clarita Community Development Department, 2013).

Table 9: List of Structures Designated as Historic

ID	Address	Name	Photograph
1	22502-22510 5th Street	Newhall Ice Company	
2	24238 Main Street	Sheriff Substation #6	
3	24247-24251 Main Street	Tom Mix Cottages #1 & #2	
4	24757 Oakcreek Ave.	Melody Ranch (Front gate, Autry House, Barn)	

ID	Address	Name	Photograph
5	24148 Pine Street	California Oil Company and Standard Oil House	
6	24307 Railroad Avenue	Santa Clarita Courthouse	
7	24522 Spruce Street	Old Newhall Jail	
8	24527 Spruce Street	American Legion Hall / American Theater Company	

ID	Address	Name	
9	24151 Newhall Avenue	Heritage Junction	
			
9a Callahan's Schoolhouse		9b Edison House	9c Kingsburry House
			
9d Mitchel 1 Adobe School House		9e Newhall Ranch House	9f Pardee House
			
9g Ramona Chapel			

Capabilities Assessment

This section identifies current capabilities (administrative, technical, legal and fiscal) available for implementing hazard mitigation activities within the City. A summary is included to outline the City departments and their responsibilities associated with hazard mitigation planning as well as codes, ordinances, and plans already in place associated with hazard mitigation planning.

Existing Institutions, Plans, Policies and Ordinances

The following is a summary of existing departments in the City and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the City. The administrative and technical capabilities of Santa Clarita, as shown in Table 10: City of Santa Clarita Administrative and Technical Capability, provides an identification of the staff, personnel, and department resources available to implement the mitigation actions identified in the Multi-Hazard Mitigation Goals and Actions and each of the hazard sections. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the City.

Table 10: City of Santa Clarita Administrative and Technical Capability

Staff/Personnel Resources	Y/N	Dept./Agency and Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Y	Community Development- Housing, Redevelopment Manager Planning Division Manager
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Public Works Department – City Engineer, Public Works Director, Building Official and Public Works Building and Safety Inspectors
Planners or Engineer(s) with an understanding of natural and/or manmade hazards	Y	Public Works – Development Services Division, City Engineer, Building & Safety Division, Building Official
Floodplain manager	Y	Public Works- Director of Public Works
Surveyors	Y	Public Works – Development Services Division, Sr. Engineer
Staff with education or expertise to assess the community’s vulnerability to hazards	Y	Community Development- Housing, Redevelopment Manager Planning Division Manager, Public Works Department – City Engineer, Public Works Director, Building Official and Public Works Building and Safety Inspectors
Personnel skilled in GIS and/or Hazus	Y	Administrative Services Department, Information Technology Services Division, GIS Group, GIS Coordinator, and GIS Technician
Scientists familiar with the hazards of the community	Y	Private/Public Consultants
Emergency manager	Y	Emergency Services Manager, Emergency Services Supervisor
Grant writers	Y	All Departments – Management analyst, administrative analyst

The legal and regulatory capabilities of the City are shown in Table 11: Santa Clarita Regulatory Tools, which presents the existing ordinances and codes that affect the physical or built environment of the City. Examples of legal and/or regulatory capabilities can include: the City’s building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

Table 11: Santa Clarita Regulatory Tools

Regulatory Tools (Ordinances, Codes, Plans)	Local Authority (Y/N)	Does State Prohibit? (Y/N)
Building Code	Y	N
Zoning Ordinance	Y	N
Subdivision Ordinance or Regulations	Y	N
Special Purpose Ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	Y	N
Growth Management Ordinances (also called “smart growth” or anti-sprawl programs)	Y	N
Site Plan Review Requirements	Y	N
General Or Comprehensive Plan	Y	N
A Capital Improvements Plan	Y	N
An Economic Development Plan	Y	N
An Emergency Response Plan	Y	N
A Post-Disaster Recovery Plan	Y	N
Real Estate Disclosure Requirements	Y	N

Fiscal Resources

Table 12: Fiscal Resources shows specific financial and budgetary tools available to the City such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

Table 12: Fiscal Resources

Financial Resources	Accessible or Eligible to Use (Yes/No)
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes For Specific Purposes	Yes
Fees for Water	No
Fees for Sewer/Industrial Waste	Yes
Impact Fees for Homebuyers or Developers for New Developments/Homes	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax and Revenue Bonds	Yes
Incur Debt through Private Activity Bonds	Yes
Withhold Spending in Hazard-Prone Areas	Yes
Other – Other Grants	Yes

SECTION 4. RISK ASSESSMENT

The goal of mitigation is to reduce the future impacts of hazards. Hazards can result in injuries and the loss of life, cause property damage, disrupt the local economy, and force the expenditure of large amounts of public and private funds to assist with recovery. In order to focus efforts on the most likely and highest impact scenarios, mitigation must be based on a comprehensive Risk Assessment.

A Risk Assessment measures the potential loss from a hazard event by evaluating the vulnerability of buildings, infrastructure and people. It identifies the characteristics and potential consequences of hazards, how much of the community could be affected by a hazard, and the impact on community assets. Risk Assessments consist of:

- Hazard Identification and Risk Analysis
- Vulnerability Analysis / Loss Estimates

This Risk Assessment presents loss estimates and provides a foundation for evaluating mitigation measures should a real hazard event occur. The loss estimates are intended to support the decision making process for mitigation efforts.

It is important to note that the loss estimates calculated for this Risk Assessment used available data and methodologies and are approximate. These estimates should be used to understand the relative risk from hazards and potential losses and are not intended to be predictive of precise results.

Uncertainties are inherent in any loss estimation methodology arising in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from approximations and simplifications that are necessary in developing vulnerability estimates (e.g., risk of loss projections and relative likelihood of occurrence). These factors can result in a range of uncertainty in loss estimates produced by this analysis.

Federal Requirements for Risk Assessments

Federal regulations for hazard mitigation plans outlined in 44 CFR Part 201 include a requirement for conducting a Risk Assessment. This Risk Assessment requirement is intended to provide information that will help communities identify and prioritize mitigation activities that will reduce losses from the identified hazards.

The Federal criteria for conducting Risk Assessments under 44 CFR Part 201 (Section 322 of the Stafford Act, 42 U.S.C. 5165) and information on how the City of Santa Clarita Hazard Mitigation Plan meets those criteria are outlined below.

Section 322 Plan Requirement	How is this addressed?
Identifying Hazards	Each hazard section includes an inventory of selected available data sources that identify hazard areas. Maps identifying the locations of hazards in the City of Santa Clarita are provided in this Risk Assessment and in each individual hazard section.
Profiling Hazard Events	Each hazard section includes documentation of the history, and causes and characteristics of the hazard in the Region.
Assessing Vulnerability: Identifying Assets	The “hazard identification” and “risk assessment” provide a summary of the vulnerability assessment from each hazard and (where data is available) contain the types and numbers of existing buildings, infrastructure and critical facilities exposed to each hazard.
Assessing Vulnerability: Estimating Potential Losses	The calculations of the impact of the hazard (if data was available), the economic exposure, and physical losses, are discussed in this Risk Assessment and under each hazard of this Hazard Mitigation Plan. Vulnerability assessments were completed for the hazards addressed in the plan, and quantitative estimates were made (when data was available) for each hazard.
Assessing Vulnerability: Analyzing Development Trends	The Community Profile Section of this plan provides a description of the development trends in the Region, including the geography and environment, population and demographics, land use and development, housing and community development, employment, business-base, and transportation data.

Disaster History

Emergencies and disasters can cause damage to the City of Santa Clarita, its residents, businesses, infrastructure and the environment. These disasters can cause fatalities or injuries and expense in terms of response and recovery dollars.

The City of Santa Clarita have experienced natural disasters and other disruptive events in the past and continues to have the potential for future events. While the risk of disasters cannot be eliminated, the effects can be reduced through a well-organized public education and awareness effort, preparedness and mitigation. In addition, communities must be prepared to provide efficient and effective response and recovery. Furthermore careful planning and collaboration among public agencies, private sector organizations, and citizens within the community can minimize the losses that result from disasters.

In order to illustrate the potential hazards to the region, a review of historical events can provide indicators for future threats to the area. The table below provides a summary of major disasters occurring in Los Angeles County since 1995.

Table 13: Los Angeles County Federal Declared Disasters from 1995-2014

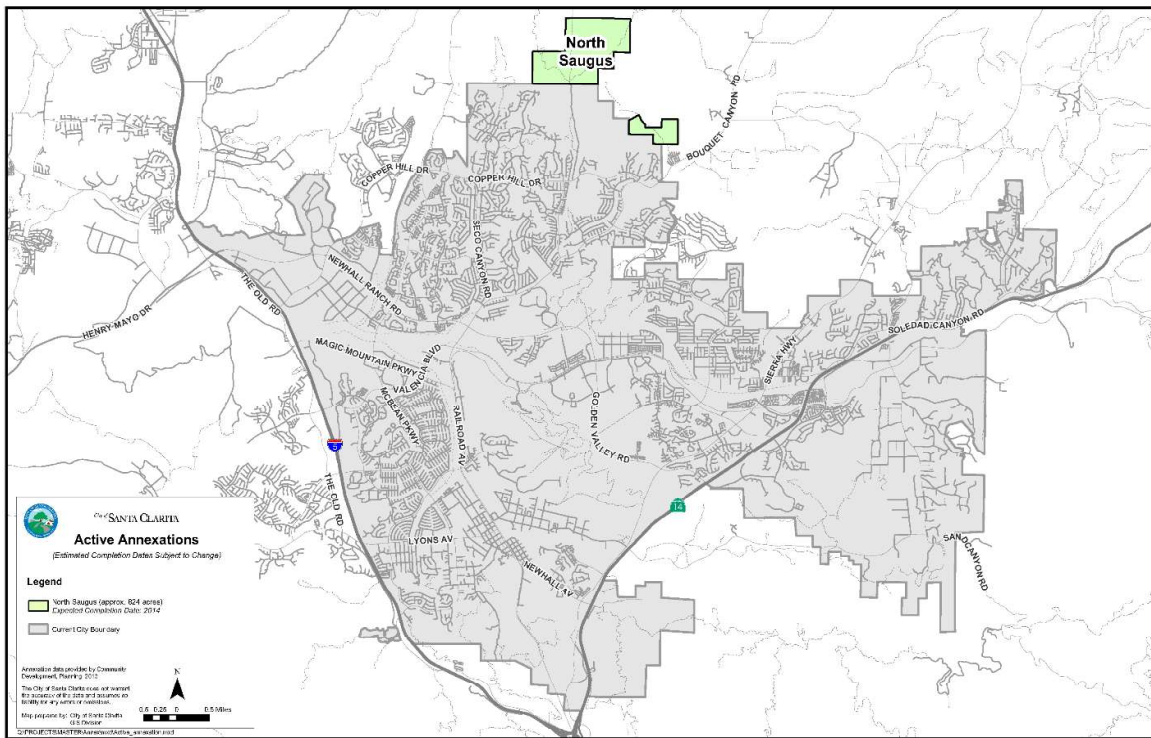
Incident Period	Hazard Type	Disaster #	Counties Declared	Federal Declaration	Total Public Assistance Grants
January 16 - February 6, 2010	Severe Winter Storms, Flooding, and Debris and Mud Flows	FEMA-1884-DR	Calaveras County, Imperial County, Los Angeles County, Riverside County, San Bernardino County, Siskiyou County.	3/8/2010	\$15,604,176
November 13 - 28, 2008	Wildfire	FEMA-1810-DR	Los Angeles County, Orange County, Santa Barbara	11/18/2008	\$35,044,374
October 21, 2007 - March 31, 2008	Wildfire, flooding, mud flows, and debris flows directly related to the wildfires	FEMA-1731-DR	Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, Ventura	10/24/2007	\$170,094,288
January 11-17, 2007	Severe Freeze	FEMA-1689-DR	Fresno, Imperial, Kern, Los Angeles, Monterey, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Tulare, Ventura	3/13/2007	approx. \$23,000,000
February 16 - 23, 2005	Severe Storms, Flooding, Landslides, and Mud and Debris Flows	FEMA-1585-DR	Los Angeles, Orange, Riverside, Ventura	4/14/2005	\$74,826,845
February 2, 1998 - April 30, 1998	California Severe Winter Storms and Flooding	FEMA-1203-DR	Los Angeles and 40 additional counties	2/9/1998	not listed
February 13 - April 19, 1995	Severe Winter Storms, Flooding, Landslides, Mud Flows	FEMA-1046-DR	Los Angeles and 57 additional counties	3/12/1995	not listed

Source: (FEMA, 2015)

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Hazard Identification and Risk Analysis

Hazard identification consists of (1) defining the study area in terms of scale and coverage; and (2) collecting and compiling a list of prevalent hazards in the study area to help narrow the focus of the analysis. The map below (City of Santa Clarita, 2013) depicts the study area including the recent Annexations for the City of Santa Clarita (see Community Profile section for additional details).



Map 8: City of Santa Clarita (including Annexation area)

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Hazard Identification Process

HMP Planning Committee

The City of Santa Clarita HMP Planning Committee participated in a working session to review and re-assess the ratings of hazards from the original and subsequent updates to the HMP. Part of the process was to assess the risks and consequences of various hazard scenarios. This method of tabulation considers the probability, magnitude/severity, the duration and warning time for each hazard and then produces a risk index.

Community Participation

The City of Santa Clarita posted a Hazard Risk and Disaster Preparedness Risk Survey (see 2015 Hazard Mitigation Survey) on the city website. Based on the results of the survey, community participants felt that wildfire and earthquake were the most likely hazard events to affect the area. These responses were based on magnitude, impact and probability. Furthermore, input from the survey was used to verify and further develop the list of major hazards to the City of Santa Clarita (see Risk Assessment).

Profiling Hazard Events - CPRI

Profiling Hazard Events describes the causes and characteristics of each hazard, how it has affected the City of Santa Clarita in the past, and what part of City's population, infrastructure, and environment has historically been vulnerable to each specific hazard. A profile of each hazard discussed in this plan is provided in each hazard section. For a full description of the history of hazard specific events, please see the appropriate hazard section.

The development of optimal mitigation strategies is critical in helping the City focus the mitigation plan on hazards most likely to affect, and result in loss to, the City and its resources. The HMP Planning Committee utilized a tool that was developed by the State of Arizona's Department of Emergency Management: the **Calculated Priority Risk Index (CPRI)**.

The CPRI was used to evaluate individual hazards and rank them according to an indexing system. The CPRI value is obtained by assigning varying degrees of risk to four (4) categories for each hazard, and then calculating an index value based on a weighting scheme.

It is duly noted that there is a high degree of subjectivity in the assigning of various levels of severity to each CPRI category for a given hazard. In addition to the CPRI tool, the HMP Planning Committee also took into account historical data from newspapers and other reports from FEMA and National Oceanic Atmospheric Administration (NOAA) databases.

The result of the CPRI analysis was a list of 11 specific hazards that represent the top risks to the City of Santa Clarita:

- Wildfire (including adjacent structures)
- Climate Change (drought)
- Earthquake
- Hazard Materials Releases
- Landslide (earth movement including mudslide/subsidence)
- Severe Weather - Heat
- Cyberattack
- Energy Disruptions (power failure)
- Flood
- Severe Weather – Wind
- Terrorism

It should be recognized that some risks are inter-related. For example, Drought, Extreme Heat, and Extreme Wind have a profound effect on the magnitude and severity of Wildfires as well as Energy Disruptions.

The four categories and associated levels of risk are summarized in Table 14: Summary of CPRI Categories and Risk Levels (next page) use the following formula:

$$\text{Risk} = 0.45 * \text{Probability} + 0.3 * \text{Magnitude/Severity} + 0.15 * \text{Warning Time} + 0.1 * \text{Duration}$$

Table 14: Summary of CPRI Categories and Risk Levels

Category	Degree of Risk			Weighting Factor
	Level ID	Description	Value	
Probability	Unlikely	<ul style="list-style-type: none"> Extremely rare with no documented history of occurrences or events. Annual probability of less than 0.001. 	1	45%
	Possibly	<ul style="list-style-type: none"> Rare occurrences with at least one documented or anecdotal historic event. Annual probability that is between 0.01 and 0.001. 	2	
	Likely	<ul style="list-style-type: none"> Occasional occurrences with at least two or more documented historic events. Annual probability that is between 0.1 and 0.01. 	3	
	Highly Likely	<ul style="list-style-type: none"> Frequent events with a well-documented history of occurrence. Annual probability that is greater than 0.1. 	4	
Magnitude/Severity	Negligible	<ul style="list-style-type: none"> 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 quality of life lost. Shut down of critical facilities for less than 24 hours. 	1	30%
	Limited	<ul style="list-style-type: none"> Slight property damages (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 quality of life lost. Shut down of critical facilities for more than 1 day and less than 1 week. 	2	
	Critical	<ul style="list-style-type: none"> Moderate property damages (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 one death. Shut down of critical facilities for more than 1 week and less than 1 month. 	3	
	Catastrophic	<ul style="list-style-type: none"> Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and multiple deaths. Shut down of critical facilities for more than 1 month. 	4	
Warning Time	Less than 6 hrs	Self-explanatory.	4	15%
	6 to 12 hrs	Self-explanatory.	3	
	12 to 24 hrs	Self-explanatory.	2	
	More than 24 hrs	Self-explanatory.	1	
Duration	Less than 6 hrs	Self-explanatory.	1	10%
	Less than 24 hrs	Self-explanatory.	2	
	Less than one wk	Self-explanatory.	3	
	More than one wk	Self-explanatory.	4	

CPRI Scoring Criteria

Probability

Table 15: Probability Rating Scale

Description	Value
Highly Likely: Frequent events with a well-documented history of occurrence OR an annual probability that is greater than 0.1.	4
Likely: Occasional occurrences with at least two or more documented historic events OR an annual probability that is between 0.1 and 0.01.	3
Possible: Rare occurrences with at least one documented or anecdotal historic event OR an annual probability between 0.01 and 0.001.	2
Unlikely: Extremely rare with no documented history of occurrence or events OR an annual probability less than 0.001.	1
Not Applicable	0

Magnitude/Severity

Table 16: Magnitude/Severity Rating Scale

Description	Value
Catastrophic: Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and multiple deaths. Shut down of critical facilities for more than 1 month.	4
Critical: Moderate property damages (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 one death. Shut down of critical facilities for more than 1 week and less than 1 month.	3
Limited: Slight property damages (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 quality of life lost. Shut down of critical facilities for more than 1 day and less than 1 week.	2
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 quality of life lost. Shut down of critical facilities for less than 24 hours.	1
Not Applicable	0

Warning Time

Table 17: Warning Time Rating Scale

Description	Value
Less than 6 hours or no warning	4
6 to 12 hours	3
12 to 24 hours	2
More than 24 hours	1
Not Applicable	0

Duration

Table 18: Duration Rating Scale

Description	Value
More than 1 week	4
Greater than 24 hours, up to 1 week	3
Greater than 6 hours, up to 24 hours	2
Less than 6 hours	1
Not Applicable	0

CPRI Hazard Ratings

The final CPRI hazard ratings determined by the HMP Planning Committee were as follows:

Table 19: CPRI Ratings

Hazard	Probability	Magnitude / Severity	Warning Time	Duration of the Event	Priority Risk Index Scale 1 min./4 max.	Rating*
Wildfire	Highly Likely 4	Limited 2	Less than 6 Hrs. 4	Less than 1 Wk. 3	3.30	High
Climate Change: Drought	Highly Likely 4	Critical 3	More than 24 Hrs. 1	More than 1 Wk. 4	3.25	High
Earthquake	Likely 3	Critical 3	Less than 6 Hrs. 4	Less than 6 Hrs. 1	2.95	Moderate
Hazardous Material Release	Likely 3	Limited 2	Less than 6 Hrs. 4	Less than 1 Wk. 3	2.85	Moderate
Landslide / Mudslide / Subsidence	Likely 3	Limited 2	Less than 6 Hrs. 4	Less than 1 Wk. 3	2.85	Moderate
Severe Weather: Heat	Highly Likely 4	Limited 2	More than 24 Hrs. 1	Less than 1 Wk. 3	2.85	Moderate
Cyber Attack**	Likely 3	Limited 2	Less than 6 Hrs. 4	Less than 24 Hrs. 2	2.75	Moderate
Energy Disruption Power Outage**	Possibly 2	Critical 3	12 to 24 Hrs. 2	Less than 1 Wk. 3	2.40	Moderate
Flood	Likely 3	Limited 2	More than 24 Hrs. 1	Less than 1 Wk. 3	2.40	Moderate
Terrorism**	Unlikely 1	Critical 3	No Warning 4	Less than 6 Hrs. 1	2.05	Moderate
Severe Weather: Wind	Possibly 2	Limited 2	More than 24 Hrs. 1	More than 24 Hrs. 2	1.85	Low

*4.00 = Severe 3.00 to 3.99 = High 2.00 to 2.99 = Moderate 1.00 to 1.99 = Low **New for 2015

Vulnerability Assessment/Inventorying Assets

Vulnerability Assessment/Inventorying Assets combines hazard identification with an inventory of the existing (or planned) property and population exposed to a hazard. Critical facilities are of particular concern because they provide essential products and services to the general public that are necessary to preserve the welfare and quality of life in the county and fulfill important public safety, emergency response, and/or disaster recovery functions. The critical facilities and infrastructures identified for the City of Santa Clarita are listed in the following tables:

- Table 21: Critical City-Owned Facilities
- Table 22: Critical Infrastructure: Bridges

The critical facilities identified include all owned and operated City facilities and critical infrastructure for the City. Additional earthquake and flood maps are provided in Appendix D: Maps.

Risk Analysis and Estimating Potential Losses

Risk Analysis and Estimating Potential Losses involves estimating the damage, injuries, and financial losses 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 City common format in which to measure the effects of hazards on assets. Using the best available data, from FEMA flood hazard data, County of Los Angeles Fire Department, City of Santa Clarita Building and Safety Division, and Santa Clarita Board of Realtors, the City was able to estimate potential losses. For each hazard where data was available, quantitative estimates for potential losses are included in the hazard assessment.

Assessing Vulnerability and Analyzing Development

Assessing Vulnerability and Analyzing Development Trends provides a general description of land uses and development trends within the community so that mitigation options can be considered in land use planning and future land use decisions. The Community Profile Section of this plan provides comprehensive depiction of the City of Santa Clarita. The description includes the geography and environment, population and demographics, land and development, housing and community development, and employment and industry. These components addressed in this plan for the City of Santa Clarita 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, agencies and special districts. Each hazard-specific section of the plan includes a section on hazard identification using data and information from various, City, County and state agencies sources.

The City of Santa Clarita conducted a vulnerability assessment for each hazard using Geographic Information Systems (GIS) to identify the geographic extent of the hazard and assess the land use and value at risk. Insufficient data exists to conduct vulnerability assessments and risk analyses for severe weather, and hazardous materials.

Although this data is not available for some of the hazard assessments, there are various strategies the city can take to reduce risk. These strategies are described in the action items detailed in each hazard section of this Plan. Mitigation strategies further reduce disruption to critical services, reduce the risk to human life, and lessen damage to personal and public property and infrastructure.

Critical Facilities and Infrastructure

Facilities critical to government response and sustainability (i.e., life safety and property and environmental protection) include: 911 centers, emergency operations centers, Sheriff's stations and fire stations, public works facilities, sewer and water facilities, hospitals, bridges and roads, and shelters. Facilities that, if damaged, could cause serious secondary impacts may also be considered "critical." Critical and essential facilities are those facilities that are vital to the continued delivery of key government services or that may significantly impact the public's ability to recover from the emergency.

Fire and Law Enforcement Facilities

Since the City of Santa Clarita is a contract city with County of Los Angeles Fire Department and the Los Angeles County Sheriff, those station facilities are under the County of Los Angeles' purview. Sanitation districts critical facilities also belong to the County of Los Angeles.

Water Facilities

The water provided in the City of Santa Clarita is owned by a separate public agency, the Castaic Lake Water Agency. This agency is a wholesaler of water, and its critical facilities are not under the City of Santa Clarita's jurisdiction. The water in the City of Santa Clarita and the Santa Clarita Valley is provided by three independent water retailers-Santa Clarita Water Company, Newhall County Water, and Valencia Water Company. All of the critical facilities attached to the three water retailers are not under the City of Santa Clarita's jurisdiction.

Energy Facilities

Southern California Edison (SCE) is the main electric provider for the City of Santa Clarita and is responsible for maintaining its substations and the electric power grid in the area. Similarly, the Southern California Gas (SCG) Company is responsible for supplying natural gas to the City and its residents.

School Facilities

The four schools districts within the City are not under the its jurisdiction-Newhall School District, Saugus Union School District, Sulphur Springs School District, and the William S. Hart School District.

Annexation Additional Facilities

Since 2010, the number of structures included in the Annexations has added to the City’s total inventory by over 6,000 facilities. The table below provides a breakdown of the number of locations added by General Occupancy Type.

Table 20: Annexation Building Counts and Valuation

Occupancy Type	Building Count	Property Valuation
Commercial	1	\$3,863,806
Industrial	0	\$0
Mixed Use	0	\$0
Residential	4,021	\$3,544,781,466
Special Plan	1,907	\$1,544,733,687
Open Space	160	\$24,478,538
Other (Public/Institutional)	101	\$1,869,025
TOTAL	6,190	\$5,119,766,522

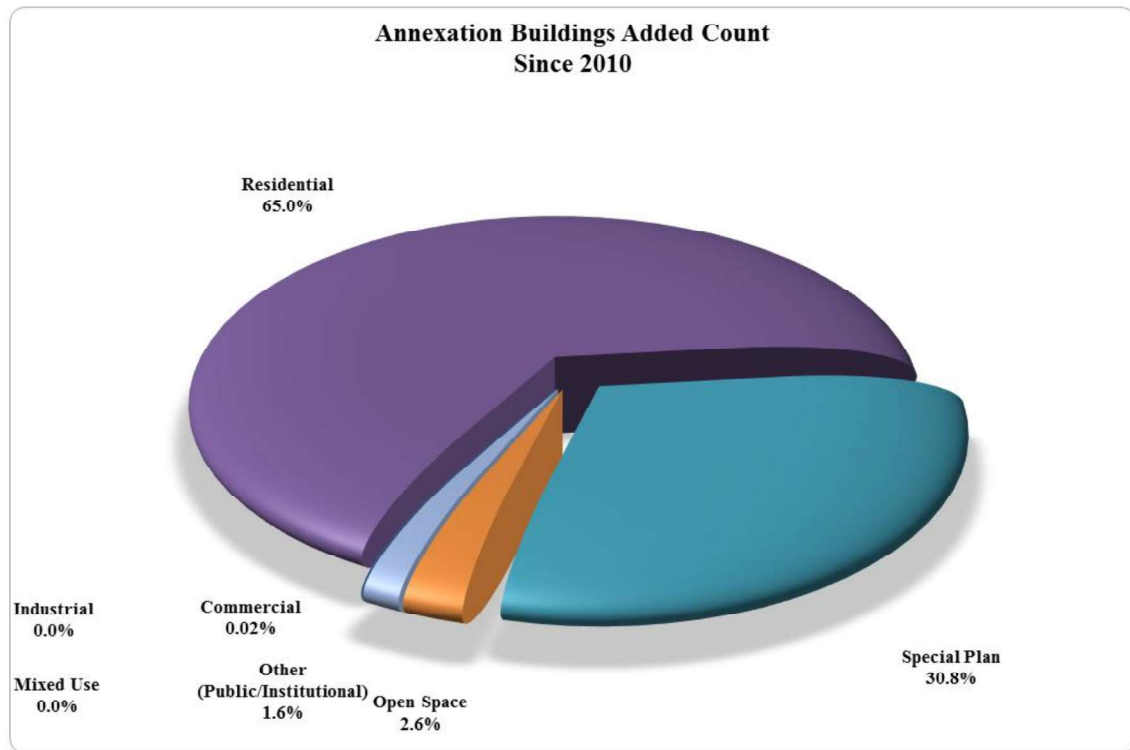


Figure 13: Annexation Buildings Added Count

Critical Infrastructure and Key Resources

Critical Infrastructure and Key Resources (CIKR) guidelines were established as part of the Homeland Security Act of 2002; Homeland Security Presidential Directive (HSPD) 7 and are a component of the National Infrastructure Protection Plan (NIPP) in association with the National Response Framework (NRF) (DHS, 2008). Understanding the CIKR within the City of Santa Clarita is an essential part of the Risk Assessment process. The following tables (Table 21: Critical City-Owned Facilities and Table 22: Critical Infrastructure: Bridges) list the key facilities and bridge infrastructure for the City of Santa Clarita.

City Operated Critical Facilities

The table below provides a comprehensive listing of all City-owned and operated critical facilities and infrastructure along with the hazards that may have an impact. These locations have been identified as “critical” by City staff and stakeholders. NOTE: In addition to the list of facilities provided, there are 176 traffic signals valued at \$44,000,000 throughout the City.

Table 21: Critical City-Owned Facilities

	Impacting Hazards	Earthquake Liquefaction	Wildfire	Landslide	Flood	Climate Change: Drought	Severe Weather: Heat	Severe Weather: Wind	Hazardous Materials Release	Cyber Attack	Energy Disruption	Total Exposure (\$)
Critical Facilities												Real Property & Personal Property
City Hall		X			X*		X	X	X	X	X	\$21,207,168
Fleet Services and Administration Office (Constellation)		X	X				X	X	X	X	X	\$16,441,298
Santa Clarita Sports Complex (Gym / Skate / Activities Ctr)		X	X	X			X	X	X	X	X	\$13,147,678
Public Works Yard (W. Ave. Stanford)		X					X	X	X	X	X	\$10,203,281
Aquatic Center		X	X	X		X**	X	X	X	X	X	\$5,601,678
Community Center (Market Street)		X	X		X		X	X	X	X	X	\$4,782,634
Central Park (Maint. Bldg. / Office / Fitness)		X	X	X			X	X	X	X	X	\$2,224,000
Metrolink Station/Soledad		X	X	X	X		X	X	X	X	X	\$1,969,900
Metrolink Station/Via Princessa		X			X		X	X	X	X	X	\$1,805,860
Metrolink Station/Newhall		X	X		X		X	X	X	X	X	\$342,811

Total Exposure \$ (Santa Clarita City Risk Administration, 2015)

*City Hall is not in a designated Flood Zone, but in the unlikely event of dam failure, City Hall is in the dam inundation pathway

**While Drought will have widespread implications for the entire City, continued operation of the Aquatics Center is especially at risk due to cost of maintaining operations as well as public perception concerns.

Bridge Inventory

The table below provides a comprehensive listing of local area bridges and includes the hazards that may impact each. Bridge information was obtained from the City of Santa Clarita (Engineering Department, 2015). The associated Impacting Hazards were developed and reviewed by the HMP Planning Committee.

Table 22: Critical Infrastructure: Bridges

Agencies

SC PW = City of Santa Clarita Public Works

Cal Trans = California Department of Transportation

Bridge No.	Agency	Location	Impacting Hazards	Earthquake	Wildfire	Landslide	Flood	Climate Change:	Severe Weather:	Severe Weather:	Hazardous	Cyber Attack	Energy	Size
				Liquefaction				Drought	Heat	Wind	Materials	Disruption		
791	SC PW	Southern Pacific RR over Sand Cyn. Rd		X	X		X				X			689
897	SC PW	Soledad Canyon Rd. Tick Cyn Wash		X			X							
1134	SC PW	Placerita Cyn. Rd. over Sand Cyn. Wash		X	X		X							1,948
1318	SC PW	Lost Cyn. Rd. over Sand Cyn. Wash		X	X		X				X			1,432
1577	SC PW	Lyons Ave. over Santa Clara River		X			X							5,425
1578	SC PW	Valencia Blvd N. over So. Fork Santa Clara		X			X			X	X			8,224
1594	SC PW	Urbandale Ave. over Bouquet Channel		X	X									4,973
1597	SC PW	Clearlake Dr. over Unnamed Wash		X	X									1,281
1653	SC PW	Bouquet Cyn. Rd. over Plum Cyn. Channel		X	X									2,540
1672	SC PW	Soledad Cyn. Rd. over Santa Clara River		X			X				X			48,631
1784	SC PW	Sierra Hwy. N. over Santa Clara River		X			X				X			17,416
1814	SC PW	Avenida Rondel Pedestrian Tunnel PUC		X										167
1815	SC PW	Avenida Rotella Pedestrian Tunnel PUC		X										195
1844	Cal Trans	Valencia Blvd. over Golden State Freeway		X										11,600
1845	Cal Trans	Lyons Ave. over Golden State Freeway		X										41,328
1851	SC PW	Wiley Cyn. Rd. over Pico Cyn. Channel		X	X									8,913

Bridge No.	Agency	Location	Impacting Hazards										Deck Area (m ²)		
			Earthquake Liquefaction	Wildfire	Landslide	Flood	Climate Change: Drought	Severe Weather: Heat	Severe Weather: Wind	Hazardous Materials	Cyber Attack	Energy Disruption			
1905	SC PW	Sierra Hwy. over Whitney Wash	X	X		X									5,700
1928	SC PW	Sierra Hwy. S. over Santa Clara River	X			X					X				18,191
1929	SC PW	Sierra Hwy. over Solemint SPTCO	X	X		X									9,849
1932	SC PW	Orchard Village Rd. over Santa Clara River	X			X									26,221
1938	SC PW	Bouquet Cyn. Rd. over Santa Clara River	X			X					X				44,024
1963	SC PW	Bouquet Cyn. Rd. over Bouquet Cyn. Channel	X			X									14,833
1976	SC PW	Bouquet Cyn. Rd. over Bouquet Cyn. Creek	X			X									1,582
2034	SC PW	Garzota Dr. over Dry Cyn. Channel	X												2,390
2035	SC PW	Decoro Dr. over Dry Cyn. Channel	X			X									3,326
2062	SC PW	Whites Cyn. & Nadel St. over PD 704	X	X											40,500
2063	SC PW	Foxlane Dr. over PD 704	X	X											1,827
2064	SC PW	Grandifloras Rd. over PD 771	X	X											1,227
2065	SC PW	Begonias Ln. over PD 771	X	X											1,345
2084	SC PW	Festividad Dr. over Dry Cyn. Channel	X												2,390
2119	SC PW	Bouquet Cyn. Rd. over Bouquet Cyn. Channel	X			X				X	X				19,623
2126	SC PW	Wiley Cyn. Rd. over Santa Clara River	X			X					X				9,042
2151	SC PW	15 th St. over Newhall Creek	X			X					X				1,991
2186	Cal Trans	McBean Pkwy. Over Golden State Freeway	X							X					33,756
2210	SC PW	Powell/Everett Dr. over So. Fork Santa Clara River	X												10,904
2216	SC PW	Ridgegrove Dr. over Haskell Cyn. Channel	X												3,035

Bridge No.	Agency	Location	Impacting Hazards	Earthquake Liquefaction	Wildfire	Landslide	Flood	Climate Change: Drought	Severe Weather: Heat	Severe Weather: Wind	Hazardous Materials	Cyber Attack	Energy Disruption	Deck Area (m ²)
														Description
2219	SC PW	Sand Cyn. Rd. over Iron Cyn Creek		X	X		X							1,249
2244	SC PW	Centurion Wy. Over Bouquet Cyn. Channel		X										7,395
2284	Cal Trans	Golden Valley Rd. & 14 Freeway		X	X									12,900
2319	SC PW	Soledad Cyn. Rd. over Mint Cyn. Wash		X			X							6,792
2345	SC PW	Pamplico Dr. over Dry Cyn. Channel		X										2,390
2375	SC PW	Sierra Hwy. over Solemint SPTCO		X	X		X							10,161
2376	SC PW	Tournament Rd. over Pico Cyn. Channel		X										4,058
2611	SC PW	Atwood Boulevard over Santa Clara River		X										1,173
2878	SC PW	Tupelo Ridge Dr. over Dry Cyn. Channel		X										2,293
3105	SC PW	Esterbrook Ave. over PD 266		X										1,908
3107	SC PW	De Wolfe Road over Santa Clara River South		X										1,088
3250	SC PW	Benz Rd. over Bouquet Cyn. Channel		X	X									6,706
3263	SC PW	Haskell Cyn. Rd. over Bouquet Cyn. Channel		X										6,168
3277	SC PW	14 th St. over Newhall Creek		X							X			1,991
3441	SC PW	Rodgers Dr. over Plum Cyn. Channel		X	X									1,615
3452	SC PW	Adon Ave. over Mint Cyn. Wash		X	X		X							1,604
3515	SC PW	McBean Pkwy. Over Santa Clara River		X			X							60,784
3516	SC PW	Newhall Ranch Rd. over Bouquet Cyn. Channel		X			X				X			12,325
3524	SC PW	Scherzinger Ln. over Mint Cyn. Wash		X	X		X							1,981
3537	SC PW	Sand Cyn. Rd. over Santa Clara River		X			X				X			24,789

Bridge No.	Agency	Location	Impacting Hazards											Deck Area (m ²)	
			Earthquake Liquefaction	Wildfire	Landslide	Flood	Climate Change: Drought	Severe Weather: Heat	Severe Weather: Wind	Hazardous Materials	Cyber Attack	Energy Disruption	Size		
3538	SC PW	Sierra Hwy. over Mint Cyn. Wash	X			X									5,974
3548		Tourney Rd. over Valencia Golf Course PUC	X												4,895
3589	SC PW	Valle Del Oro over Newhall Creek	X	X		X									4,865
3617	SC PW	White's Cyn. Rd. over Santa Clara River	X			X					X				18,180
3653	SC PW	White's Cyn. Rd. over SPRR	X			X					X				40,332
3679	SC PW	Valencia Blvd S. over So. Fork Santa Clara	X			X					X				8,224
3695	SC PW	Newhall Ranch Road over San Francisquito	X			X									43,099
3875	SC PW	Camp Plenty Rd over PD 453	X			X					X				3,850
3877	SC PW	Ave. Scott over San Francisquito Ctn. Chann	X			X									38,416
3881		Ave. Crocker over Private Drain #1066	X												1,960
3883	SC PW	Ave. Stanford over Unnamed Wash	X												1,281
3961	SC PW	Banyan Place over Private Drain 1954	X	X											3,000
3962	SC PW	Boxwood Lane over PD 1954	X	X											2,940
3963	SC PW	Avenue Crocker over Unnamed Wash	X												3,360
3964	SC PW	Tamarack Lane over PD 1954	X	X											3,136
4002	SC PW	Golden Valley Rd over Soledad Cyn Rd	X								X				38,772
532890	SC PW (was Cal Trans)	Wiley Cyn/Via Princessa over SC River Fork	X			X					X				62,560
530014	Cal Trans	Railroad Ave over Placerita Creek	X	X		X					X				13,325
530015	SC PW (was Cal Trans)	Magic Mtn over SC River South Fork	X	X							X				44,290
4009		Golden Valley over SC River - NB	X			X					X				62,111

Bridge No.	Agency	Location	Impacting Hazards										Deck Area (m ²)
			Earthquake Liquefaction	Wildfire	Landslide	Flood	Climate Change: Drought	Severe Weather: Heat	Severe Weather: Wind	Hazardous Materials	Cyber Attack	Energy Disruption	
4022		Golden Valley over SC River - SB	X			X					X		55,431

Bridge Inventory (City of Santa Clarita Public Works, 2015)

Other Bridges Maintained by Caltrans

The following other bridges maintained by Caltrans are located in the area.

Federal Bridge Number	Facility Carried	Feature Intersected
530014	SR-126	Placerita Creek
530687L	I-5	Santa Clara River
530687R	I-5	Santa Clara River
530688	I-5	Santa Clara OH
531621	SR-14	Lost Canyon Rd. UC
531626G	I-5	Route 126/5 Separation OC
531626G	I-5	Route 126/5 Separation UC
531688	I-5	Rye Canyon Rd. UC
532029	SR-14	Humphreys OH
532096	SR-14	Los Penetos Rd. UC
532146	SR-14	LA Aqueduct UC
532167	SR-14	Canyon Park Blvd.
532361	SR-126	Elsmere Creek
532779	SR-126	Magic Mtn. Pkwy.
532788	SR-126	Newhall Creek
532816	SR-14	Sand Canyon Rd. OC
532927	I-5	Valencia Blvd. OC
532928	I-5	Route 5/126 Separation
531792L	I-5	Calgrove Blvd. UC
531792R	I-5	Calgrove Blvd. UC

Bridge Inventory (City of Santa Clarita Public Works, 2015)

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SECTION 5. HAZARD MITIGATION STRATEGIES AND ACTION ITEMS

Prioritization of Mitigation Projects

The Planning Committee identified which plan goals were addressed by each action item and then ranked the strategies to determine the priorities for the City of Santa Clarita. The HMP Plan goals are:

- Protect Life and Property
- Enhance Natural Systems
- Augment Emergency Services
- Encourage Partnerships and Implementation
- Promote Public Awareness

Each goal was given a score of one point to five points, with five points going to the highest priority. The prioritized plan goals are as follows:

Points	Category
5	Protect Life and Property
4	Enhance Natural Systems
3	Augment Emergency Services
2	Encourage Partnerships and Implementation
1	Promote Public Awareness

Mitigation strategies were further rated in terms of “high,” “moderate,” or “low” priority. Points for the plan goals were then totaled for each action item. The following scoring system reflect the High, Moderate and Low rating:

Rating	Rating Description
10-15	High
5-10	Moderate
0-5	Low/None

STAPLEE Evaluation

In addition to the internal scoring system implemented to prioritize each mitigation activity, the qualitative STAPLEE method was used to further refine the prioritization of the mitigation activities. The STAPLEE method takes into account the Social, Technical, Aministrative, Political, Legal, Economic, and Environmental (STAPLEE) opportunities and constraints of implementation. The evaluation criteria is summarized below in terms of situations that present opportunities for implementation success:

- **Social criteria:** The public must support the overall implementation strategy and specific mitigation activities; therefore, community acceptance of the proposed mitigation activities must be considered.
- **Technical criteria:** Such factors as technical feasibility of the proposed mitigation activity to reduce losses in the long term, with minimal secondary impact, must be considered.
- **Administrative criteria:** Anticipated staffing, funding, and maintenance for each mitigation activity must be considered.
- **Political criteria:** The political leadership of the communities must support the overall implementation strategy and specific mitigation activities; therefore, decision-maker acceptance of the proposed mitigation activities must be considered.
- **Legal criteria:** Whether the communities have legal authority to implement the proposed mitigation activities must be considered.
- **Economic criteria:** Budget constraints must be considered.
- **Environmental criteria:** Environmental impacts caused by implementing specific mitigation activities must be considered.

The following table provides an example of the STAPLEE Qualitative scoring and prioritization method.

Table 23: STAPLEE Qualitative Scoring Method Example

Actions Criteria	Flood proof 10 properties in the downtown area		Build safe rooms in a neighborhood of 50 homes without basements		Broadcast educational video about hazard mitigation on local channel	
	Cost	Benefit	Cost	Benefit	Cost	Benefit
Social	-	-	L	-	-	-
Technical	M	H	M	M	L	L
Administrative	M	-	M	-	L	-
Political	-	L	-	H	-	-
Legal	-	-	-	-	-	-
Economic	M	H	H	-	-	-
Environmental	-	-	-	-	-	-
Priority	High (priority 1)		Medium (priority 2)		Low (priority 3)	

Definition of rating scale: H=High, M=Medium, L=Low

Economic Analysis of Mitigation Strategies and Action Items

FEMA's approaches to identify the benefits and costs associated with hazard mitigation strategies, measures, or projects include a Benefit/Cost Review and more detailed Benefit-Cost Analyses (BCA). Conducting an economic analysis for a mitigation activity can assist in determining whether a project is worth undertaking now in order to avoid disaster-related damages later.

Benefit-Cost Review

The Benefit-Cost Review process includes monetary as well as non-monetary costs and benefits associated with each action. Some projects can be extremely cost-effective but not as beneficial for the community at large. The Planning Committee considered a wide variety of questions, such as:

- How many people will benefit from the action?
- How large an area is impacted?
- How critical are the facilities that benefit from the action (e.g., is it more beneficial to protect the swim center than an administrative building, even though it costs more)?
- Environmentally, does it make sense to do this project for the overall community?

Benefit-Cost Analysis (BCA)

The Benefit-Cost Analysis is used to determine if the cost of investing in a specific mitigation project, i.e., the “cost” will result in reduced damages in the future, i.e., the “benefits” and if the loss prevented justifies the expenditure of funds for the project. If the benefit is greater than the cost, then the project is cost effective; if the benefit is less than the cost, then the project is not cost effective.

The Benefit-Cost Analysis is essentially the same for each type of hazard and associated mitigation project. The only differences are the types of data that are used (e.g., if the project is for earthquake, flood, wind, fire, or other hazard mitigation). To determine the Benefit-Cost, the project cost is compared to the anticipated dollar loss that will be prevented by the mitigation project. For example, if the project cost is \$100,000 and the expected loss averted is \$1,000,000, then the benefit exceeds the cost and is therefore cost effective. The ratio of the benefit versus the cost is 10:1 (\$1,000,000 divided by \$100,000). Priority is given to those projects with the highest Benefit-Cost Ratio or those projects with the greatest benefit to the community.

Benefit-Cost Analysis Exemptions

The following categories of mitigation measures are exempt from the FEMA policy on Benefit-Cost analysis:

- 5% Initiative Projects: States, which receive a Presidential declaration, are eligible to use up to 5% of available HMGP funding at their discretion.
- Tornado Initiative: States, which receive a Presidential declaration, are eligible to use up to an additional 5% of available HMGP funding at their discretion.
- Substantial Damage Waivers for acquisition of substantially damaged structures in 100-year floodplain.
- Mitigation planning related grants.

Benefit-Cost Methodology Utilized

DMA 2000 does not require Hazard Mitigation Plans to include BCA’s for specific projects.¹⁵ Consequently a Benefit-Cost Review approach is used for the Hazard Mitigation Plan. Future projects will be evaluated using a similar process.

Specific projects and future actions involving federal grants requiring a more detailed Benefit-Cost Analysis are managed on a case-by-case basis at the City of Santa Clarita’s discretion. In such cases, the City has submitted detailed BCA documentation (e.g., the McBean Bridge Project).

For the 2015 HMP, mitigation strategies and action items were reviewed and prioritized by the HMP Planning Committee which considered:

- The expected benefit to the community according to the following categories:
 - Protect Life and Property
 - Increase Public Awareness
 - Preserve Natural Systems
 - Strengthen Partnerships and Encourage Implementation
 - Maintain and Improve Emergency Services
 - Scope of Impact (i.e., the degree to which the project benefits the community)
- Costs: total estimated expense including ongoing maintenance requirements
- Constraints: the availability of resources, if funds were already budgeted or if additional budget funding was required, and the timeline for completion (if known)
- Other considerations included whether projects were already in progress or part of another effort (e.g., part of a County-wide program or existing city initiative)

The following tables provide examples of the Benefit-Cost Review factors considered:

Benefit Factors	Evaluation Score
Protect Life and Property	High / Moderate / Low / None
Increase Public Awareness	High / Moderate / Low / None
Preserve Natural Systems	High / Moderate / Low / None
Strengthen Partnerships and Encourage Implementation	High / Moderate / Low / None
Maintain and Improve Emergency Services	High / Moderate / Low / None
Scope of Impact	High (benefits the entire city) Moderate (benefits a large part of the city) Low (benefits a targeted or limited area) None

¹⁵ FEMA Publication 386-5, State and Local Mitigation Planning, Using Benefit-Cost Review in Mitigation Planning, May 2007

Cost Factor	Evaluation Score
More than \$50K	High
\$25K to \$49.9K	Moderately High
\$10K to \$24.9K	Moderate
\$5K to \$9.9K	Moderately Low
Less than \$5K	Low
In-house Time	None

Constraint Factor	Evaluation Score
Resources	No Resources Available Limited Resources Available Resources Allocated and Assigned
Funding	No Funds Available (Need to Obtain New Funding) Limited Funds Available Funds Allocated
Time	Rapid or Condensed Timeframe Moderate Timeframe No Time Constraints

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Hazard Mitigation Strategies and Action Item Summary

From the 2010 HMP with Status Updates and New Additions for 2015 (Named hazards listed in order of Risk Rating)

Multi-Hazard

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
MULTI HAZARD										
MH001	Construct/enhance major transportation infrastructure to provide the necessary additional roads and mobility.	High	See Status Below	Pub. Wks., Capital Improvement Projects, Dev. Svcs. Div., Metro, LA County, Federal Highway Administration, The Gas Co., So. Ca. Edison, Developer-Bridge & Thoroughfare, and Caltrans	2-4 years	X			X	X
	1. Complete the restriping of the Cross Valley Connector – Golden Valley segment between Centre Pointe Parkway and Sierra Highway to provide additional travel lanes	High	Partially Complete	MH001-01: Design is complete. City is seeking grant funding to construct this project. MH001-02: Project is in design; City received \$4,264,000 of Los Angeles County Metropolitan Transportation Authority (Metro) grant funding. City was successful in moving original grant year funding from 2012 to 2015; anticipated beginning of construction to start in FY13-14. MH001-03: The City received \$3,775,000 of Los Angeles County Metropolitan Transportation Authority (Metro) grant funding. Project complete. MH001-04: Project is being considered as part of the City's Capital Improvement Program Five-Year Plan. MH001-05: Project is in planning phase; City received \$17,706 of Caltrans grant funding for planning study for Highway Bridge Program. Additional design and construction grant funding was requested for 2012-2013; project anticipates going into full design in FY 13-14.						
	2. Bridge Widening - Hwy 14 – Golden Valley Off/On ramp.	High	In Progress							
	3. Bridge Widening – McBean Bridge	High	Complete							
	4. Consider retrofitting Cross Valley Connector.	High	Under Review							
	5. Bridge Widening – Newhall Ranch Road, San Francisquito Bridge.	High	In Progress							

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
MH002	Implement technologies to enhance public notification and support in the event of an emergency.	High	See Status Below	Tech. Svcs. Div., Communications Svcs. Div., Traffic Div., Metro, and LA County	Ongoing	X	X		X	X
	6. Continue replacing backup batteries for traffic lights on a rotational basis.	High	Partially Complete	<p><u>MH002-06:</u> The City currently has battery backup at 79 signalized intersections. Staff established a five-year maintenance program to replace the batteries. In 2012-2013 the maintenance program upgraded all batteries with backup systems. Cost: \$70,000</p> <p><u>MH002-07:</u> Completed. All of the City's 183 signalized intersections have been upgraded with LED technology. Staff established a seven-year maintenance program to replace old LED modules. In 2012-2013 the City upgraded 44 intersections. Cost: \$120,000</p> <p><u>MH002-08:</u> In 2011-2012, the City began using the Nixle text alert system. Community members are encouraged to register to receive texts; the City conducted a campaign to promote registration at its annual Emergency Expo. Ongoing promotion continues on the City's website, CERT program, and during community outreach events.</p> <p>Santa Clarita Transit has recently installed LED signs and plasma screens at bus stops and transit centers and content-controlled television in our buses. This equipment is intended to distribute city messages, including emergency notifications.</p> <p><u>MH002-09:</u> Completed. City received \$286,000 in grant funding from the LAMTA. City staff now have the ability to control and manage all field signal controllers at the City's 183 signalized intersections. The Traffic Operations Center (TOC) receives data from traffic controllers along with video signals from 46 CCTV cameras, 192 video detection cameras, 48 wireless count stations, and 79 battery backup systems through 55 miles of fiber optic cable, 58 miles of copper wire, and 10 wireless access points.</p>						
	7. Continue replacing old traffic/light signals with LED signals.	High	Complete							
	8. Consider new technology for emergency messages.	High	Complete							
	9. Install Intelligence Transportation System Infrastructure.	High	Complete							

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
MH003	Enhance School Emergency Communications Plan	High	See Status Below	Community Svcs. Div., Communications Team (Volunteers), LA County Fire Department, LA County Sheriff Department, Private and Public Schools	On-going		X		X	X
	10. Enhance Communications Plan by incorporating private schools and child-care facilities.	High	Ongoing	MH003-10: City staff continues to conduct ongoing outreach events and workshops with private schools and daycare providers. For example, in 2011-2012, ten educators from private schools participated in the CERT program. MH003-11: Outreach to stakeholders with the First Start Program to promote the importance of parental education on the role of schools during emergencies is ongoing. MH003-12: The City, in coordination with the Community and Law Enforcement Awareness Response Committee (CLEAR), the LACSD, and the Santa Clarita Valley Committee on Aging, contributed to the development of a special needs registry. Continuously maintained by the City and the Santa Clarita Valley Sheriff's Station, the registry assists law enforcement to identify individuals who cannot identify themselves due to a disability or special need, such as Alzheimer's, autism, or a speech disorder. Law enforcement personnel can view updates to the Registry in real-time. This registry has improved the effectiveness of search and rescue operations involving persons with disabilities or special needs. Santa Clarita Transit meets on a monthly basis with its Accessibility Advisory Group. Information is routinely distributed at these meetings. The AAC was established by the City of Santa Clarita Transit for the purpose of providing guidance on the quality of its programs and services for seniors and persons with disabilities. Staff also works closely with the Special Education program at the William S. Hart Union High School District. MH003-13: Ongoing coordination occurs during the annual October Great Shakeout drill. Amateur radio capabilities, cell phone, and landline coordination is/are tested. MH003-14: City staff are regularly invited to Parent-Teacher Association meetings to conduct outreach and provide materials on emergency preparedness as well as detailing how the City coordinates with community partners (i.e. schools) during emergencies.						
	11. Work with First Start program to incorporate them into the Communications Plan.	High	Ongoing							
	12. Work with special needs community and groups to identify alternate modes of communications.	High	Ongoing							
	13. Participate annually in communications exercise with school districts.	High	Ongoing							
	14. Encourage schools to send annual letters to parents regarding emergency procedures.	High	Ongoing							

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
MH004	Prepare the City to be self-sufficient in the event of a major emergency.	High	See Status Below	Community Svcs. Div., LA County Sheriff's Office, LA County Fire	Ongoing	X	X	X	X	X
	15. Promote City's C.E.R.T.-Community Emergency Response Training Program and increase number of CERT trained residents and business by 20%.	High	Ongoing	<p>MH004-15: Training for the CERT program continues in cooperation with the LACFD and L.A. Sheriff's CERT Volunteer program. All students are taught by LACFD firefighters. The following numbers illustrate the number of participants who completed CERT training: 2010-2011 - 125 participants, 2011-2012 - 134 participants, 2012-2013 - 147 participants, and 2014-2015 - 172 participants.</p> <p>MH004-16: The City continues to be a sponsor at the SCV Emergency Expo. The event can include companion events with other partners; for example, in 2011-2012 the Expo was produced by the local radio station KHTS AM 1220 as a companion event to the station's Home and Garden show; attendance was in excess of 2,000 people. In 2012-2013, 160 people directly engaged at the City's expo booth. They participated in a quiz, with the opportunity to win prizes. Nine City CERT members volunteer at the booth operations. In FY 2014-2015, 11 CERT volunteers were involved in an Emergency Expo Booth that engaged 541 attendees with a Preparedness "Wheel Game".</p> <p>MH004-17: In August 2011, the City was selected to pilot a catastrophic mass care and sheltering plan by the Operational Area Alliance Group. The current draft plan addresses shelter, bulk distribution, mass feeding, pet sheltering, non-traditional sheltering, mental health and welfare, recovery transition needs, transportation, medical health support, disaster welfare information, and public information. The City, Henry Mayo Newhall Memorial, and the SCV Disaster Coalition have developed a web-based portal for Faith-Based Organizations and nonprofits to document availability of resources and capabilities that could be potentially utilized in a disaster. The portal began operating in March 2015.</p> <p>MH004-18: A critical facilities assessment was conducted by the U.S. Army Corps of Engineers in May 2015. No further action taken to purchase generators due to budgetary constraints. The City is in the process of updating a resource list of local and regional vendors with generator equipment capabilities.</p> <p>MH004-19: No action taken on this specific item due to budgetary constraints; timeline and priority remain the same. During this reporting period the City purchased handheld emergency radios to enhance communication redundancies.</p>						
	16. Promote City's Emergency Expo, encouraging residents to attend and learn how to prepare for all types of emergencies.	High	Ongoing							
	17. Implement the emergency operations plan that includes, but is not limited to, the establishment of a volunteer pool and community partners to assist in responding to, and the provision of food and shelter to those in the valley (residents and non-residents) during the emergency.	High	Complete							
	18. Consider acquiring additional generators to back-up critical operations.	High	On-hold							
	19. Consider acquiring mobile communications trailer to augment communication capabilities.	High	On-hold							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
MH005 Establish a permanent Department Operations Center at the Transportation Maintenance Facility for Public Works. The facility serves as an alternate Emergency Operations Center.	High	See Status Below	Pub. Wks., Tech. Svcs. Div., Community Svcs. Div., Traffic Div.	2-4 years	X			X	X	
20. Assess the facility's basic physical capabilities and identify the physical requirements for a DOC., i.e. space, layout, technology, etc.	High	Complete, Assmt Ongoing	MH005-20: Original configuration of a DOC was completed during the initial design of the Transit Maintenance Facility. However, capabilities continue to be assessed and upgraded.							
21. Consider new design and construction to accommodate emergency functions and people.	High	Under Review	MH005-21: No action taken at this time for this item. Priority level needs to be reviewed in the five-year plan update. Wi-Fi enhancements added to renovated gym at Sports Complex. New system has ability to broadcast multiple Wi-Fi networks, improving emergency sheltering operations capabilities.							
MH006 Identify safe evacuation routes in high-risk natural disaster areas.	High		LA County Sheriff (contract city), Tech Svcs. Div., Traffic Div., California Highway Patrol, and Caltrans	Ongoing	X	X		X	X	
22. Identify potential debris removal resources.	High	Complete	MH006-22: Streets Division purchased a front loader to deal with mass bulk items. In addition, a road blade scraper was also purchased to deal with mud and debris that block public right-of-ways. Streets' fleet includes: 7-yard dump truck, 10 -							
23. Increase participation in regional committee planning for emergency transportation routes.	High	Ongoing								

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
	24. Identify and publicize information regarding emergency transportation routes.	High	Ongoing	yard dump truck, and backhoe with loader bucket, bobcat skid steer with bucket and sweeper attachment, and a 3-yard front loader. MH006-23: City staff participates in L.A. Metro countywide meetings that involve discussions of expanding transportation routes. For example, City staff attend Metro’s Streets and Freeways Meeting on a monthly basis. Various transportation issues are discussed at these meetings, including on ways to improve traffic on regional routes. City staff participates in the production of a countywide Mutual Aid Assistance Plan led by Metro. MH006-24: The Streets Division works closely with local law enforcement (LACSD and California Highway Patrol) to set up emergency traffic lane closures and emergency routes when needed. Resources include arrows and message boards, arrow board trucks, and an abundant supply of delineation devices (cones, delineators, and barricades).							
MH007	Create a Recovery and Reconstruction Ordinance.	Moderate	See Status Below	City Manager’s Office, City Council, Public Works Dept., Building and Safety, Community Dev. Dept.	4 years	X				X	
	25. Consider developing and adopting a pre-disaster ordinance for post-disaster recovery and reconstruction that includes provisions for debris clearance, damage assessment, demolitions, re-occupancy and building moratorium criteria, fee waivers and deferrals, and expedited permitting procedures for repair and reconstruction.	Moderate	Ongoing	MH007-25: In 2011-2012, Planning staff participated in a regional disaster housing planning workshop sponsored by the Los Angeles Housing Department. The goal of the project was to focus on reconstruction and recovery efforts throughout Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties.							

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
MH008	Use HAZUS to develop loss estimates from earthquakes and floods. Loss estimates include: physical damage, economic loss and social impacts	Moderate	See Status Below	Tech Svcs. Division	2 years	X	X			X
	26. Provide HAZUS training for GIS group.	Moderate	Partially Complete	MH008-26: Two GIS staff members completed basic training in the use of HAZUS software at the National Emergency Training Facility in Emmetsburg, Maryland in 2010. Future trainings will deal with understanding and learning how to prepare and manage pertinent data needed to run the HAZUS software application efficiently and successfully.						

Wildfire

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
WILDFIRES										
WF001	Work with Los Angeles County Fire Department Division III, North Regional Operations Bureau (LACoFD Division III) to enhance emergency services to increase the efficiency of wildfire response and recovery activities.	Low	Ongoing	LACoFD Division III (contract city), Tech Svcs. Div., Communications Div., City Manager's Office, and LA County Sheriff's Department	Ongoing					X
	1. Support LACoFD Division III's efforts to install more fire stations for better access and coverage.	Low	Ongoing	WF001-01: The City supported the LACFD in the opening of the following fire stations: - Fire Station 156 - opened August 2011 - Fire Station 128 - opened March 2012 - Fire Station 132 - opened March 2012 - Fire Station 140 - opened September 2012 - Fire Station 104 - opened October 2012 - Fire Station 143 - opened November 2012 - Fire Station 150 - opened March 2013						
	2. Coordinate with LACoFD Division III and Sheriff's Department to coordinate the Public Alert and Warning Notification System to quickly contact all at-risk urban/wildland interface residents in the Santa Clarita Valley regarding evacuations. Incorporate the use of texting, mass notification and social media, i.e. Twitter, Facebook, MySpace, etc.	Low	Ongoing	WF001-02: Urban Forestry provides handouts published by the LACFD to residents in high risk areas. They include "Homeowner's Guide to Fire and Watershed Safety at the Chaparral/Urban Interface" and "Fire Hazard Reduction and Safety Guidelines." Pruning permits are issued to residents who have protected trees so that the tree(s) can be trimmed for proper clearance for safety and response time. Urban Forestry staff will meet with local fire stations to review any locations that may be a potential risk due to trees and brush. In most cases an emergency exemption permit is issued to a resident to bring their property to compliance. In the event of an emergency, the Streets Division will place portable, changeable message boards (CMS) to alert local residents of an emergency. The division possesses four CMS boards and additional CMS boards can be secured through local vendors. Additionally, the City and its Fire Department coordinates with the Los Angeles County Sheriff's Department to utilize ALERT LA for mass notifications for residents and businesses.						

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
WF002 Collaborate with LACoFD Division III in educating City staff and fire personnel on federal cost-share and grant programs, Fire Protection Agreements and other related federal programs so the full array of assistance available to local agencies is understood.	Moderate	Ongoing / Removed	LACoFD Division III (contract city), Parks and Recreation and Community Svcs. Dept.	Ongoing	X	X				
3. Collaborate with LACoFD to secure potential funding opportunities for individual mitigation projects.	Moderate	Ongoing	WF002-03: LACFD pursues grants by the Fire District and Department of Homeland Security grants. These grants are passed through the City. WF002-04: This activity is to be removed for the five year update - there is no need to promote fire protection agreements, as they are well-entrenched within the fire agency's system.							
4. Work with LACoFD Division III's to develop, approve, and promote Fire Protection Agreements and partnerships to clarify roles and responsibilities and to provide for fire mitigation activities and suppression preparedness.	Moderate	Removed								
WF003 Continue collaborating with LACoFD Division III's to develop and disseminate maps relating to fire hazards to help educate and assist builders and homeowners in being engaged in wildfire mitigation activities and to help guide emergency services during response.	Moderate	Complete / Ongoing	LACoFD Division III (contract city), Tech Svcs. Div., Bldg. & Safety Div.	On-going	X					
5. Work with LACoFD Division III to update wildland/urban interface maps.	Moderate	Revision Complete / Updates Ongoing	WF003-05: State-generated fire zone maps were adopted by the City Council in April 2012 for the Very High Fire Hazard Severity Zone. WF003-06: The City's GIS Department updates fire zone maps per each annexation development in the City with input from the LACFD and approval through the CAL FIRE [California Department of Forestry and Fire Protection] Fire and Resource Assessment Program (FRAP). City Building and Safety staff worked with the LA County Fire Department to adopt the current Very High Fire Hazard Severity Zone maps.							
6. Encourage LACoFD Division III and USDA Forest Service to continue to conduct risk analysis incorporating data and creating hazard maps using GIS technology to identify risk sites and further assist in prioritizing mitigation activities.	Moderate	Revision Complete / Updates Ongoing								

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
WF004 Collaborate with LACoFD Division III's to enhance outreach and education programs aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners, and businesses to natural and man-made hazards.	Moderate	Ongoing	LACoFD Division III (contract city), Community Svcs. Div., Communications Div.	On-going	X	X				
7. Support LACoFD Division III's efforts to hire and educate fire prevention staff to oversee education programs.	Moderate	Ongoing	<p>WF004-07: LACFD and the U.S. Forestry & Fire Protection Bureau both participate in the City of Santa Clarita Arbor Day Celebration. Information is provided to all residents on how to prevent wildfires.</p> <p>WF004-08: City staff and LACFD personnel conducted two outreach meetings on April 18th and 25th, 2013 to inform the public of the new VHFHSZ MAPS. LACFD provides the Santa Clarita Urban Forestry Division with handouts which include "Homeowner's Guide to Fire and Watershed Safety at the Chaparral/Urban Interface" and "Fire Hazard Reduction and Safety Guidelines." Pruning permits are issued to residents who have protected trees so that the tree(s) can be trimmed for proper clearance for safety and response time purposes.</p> <p>WF004-09: The City's firefighters conducted 14 separate outreach efforts to mobile home park communities and distributed hundreds of smoke detectors/batteries to homeowners. The LACFD Forestry Unit supports development of "Fire Safe Councils;" The Sand Canyon Fire Safe Council within Santa Clarita is active and received support from LACFD for its formation and growth.</p> <p>WF004-10: Urban Forestry Oak Tree Specialists continue to meet with the LACFD to review and inspect any high-risk areas where clearance trimming is needed. This includes structure clearance and emergency vehicle clearance. Emergency exemption permits are issued to residents at no cost in order to bring their property to compliance.</p> <p>WF004-11: The City supports LACFD's fire awareness outreach efforts in addition to their annual Swim Safety Expo held in the summertime.</p>							
8. Work with LACoFD Division III and USDA Forest Service to visit urban interface neighborhoods and rural areas and conduct education and outreach activities.	Moderate	Ongoing								
9. Work with LACoFD Division III to conduct specific community-based demonstration projects of fire prevention and mitigation in the urban interface.	Moderate	Ongoing								
10. Continue to work with LACoFD Division III to establish neighborhood "drive-through" activities that pinpoint site-specific mitigation activities. Fire crews can give property owners personal suggestions and assistance.	Moderate	Ongoing								
11. Continue to work with LACoFD Division III to organize public outreach and information activities at fire stations, such as "Wildfire Awareness Week" activities. This allows the public to visit fire stations, see the equipment, and discuss wildfire mitigation with the station crews.	Moderate	Ongoing								

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
WF005 Work with LACoFD Division III to encourage and increase communication, coordination, and collaboration between wildland/urban interface property owners, County and officials to address risks, existing mitigation measures and federal assistance programs.	High	Ongoing	LACoFD Division III (contract city), Community Svcs. Div., Communications Div.	On-going	X	X		X	X	
12. Continue to encourage single-family residences to have fire plans and practice evacuation routes.	High	Ongoing	WF005-12: This ongoing activity is promoted through the CERT program, various Fire and City outreaches, Fire-sponsored open houses, and the Emergency Expo.							
13. Work with LACoFD Division III to continue performing fire inspections in residential homes to increase awareness among homeowners and potential fire responders.	High	Ongoing	WF005-13: During routine inspections, residents are advised of the clearance required by the LACFD for both their roof and around their structures. Pruning permits are issued to allow the resident to bring their property to compliance.							
14. Work with LACoFD Division III to encourage a standard for the State Fire Marshall to evaluate fire plans and emergency plans for businesses.	High	Ongoing	WF005-14: This item to be deleted. There are standards for evaluation. WF005-15: This ongoing practice is a coordinated effort through the Building and Safety Division, City Plan Check process, and LACFD prevention. Projects located in the VHFHSZ are required to incorporate certain construction-related requirements designed to reduce the building's risk of catching fire. These requirements are identified during building plan check and confirmed during the building inspections.							
15. City and LACoFD Division III work closely with landowners and/or developers who choose to build in the wildland/urban interface to identify and mitigate conditions that aggravate wildland/urban interface wildfire hazards.	High	Ongoing	WF005-16: Per the California Residential Code, all new homes and additions to existing homes are required to install a "class A" fire-retardant roof. All new homes are required to install a sprinkler system. This requirement is consistent throughout California and is required in all states that have adopted the International Residential Code.							
16. City to encourage all new homes and major remodels involving roof additions that are located in the interface to have fire resistant roofs and residential sprinkler systems.	High	Ongoing	WF005-17: LACFD promotes these preparedness concepts through its "Ready, Set, Go" program, which is significantly important for the rural and canyon communities in Santa Clarita. This information is posted to the City and Fire Department websites.							
17. Work with LACoFD Division III to encourage the public to evaluate access routes to rural homes for fire-fighting vehicles and to develop passable routes if they do not exist.	High	Ongoing								

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
WF006 Collaborate with LACoFD Division III to encourage implementation of wildfire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.	Low	Ongoing	LACoFD Division III (contract city), Community Svcs. Div., Communications Div.	Ongoing			X			
18. Support LACoFD Division III's effort to employ mechanical thinning and prescribed burning to abate the risk of catastrophic fire and restore the more natural regime of high frequency, low-intensity burns.	Low	Ongoing	WF006-18: Prescribed burns for brush abatement and training are performed by the LACFD; burns are based on climate conditions.							
19. Support LACoFD Division III's efforts to clear trimmings, trees, brush and other debris completely from sites when performing routine maintenance and landscaping to reduce fire risk.	Low	Ongoing	WF006-19: During routine inspections, residents are advised of the clearance required by the LACFD for both their roof and around their structures. Pruning permits are issued to allow the resident to bring their property to compliance.							
WF007 Enhance City's Urban Forestry ability to mitigate, respond to, prepare for and recover from events that impact the more than 80,000 trees in the City.	High	Ongoing / Complete	LACoFD Division III (contract city), Urban Forestry, Natural Resources Conservation Service, Cal Fire,	Ongoing	X	X	X	X	X	
20. Maintain tree program in the City which includes routine inspections and review of the tree maintenance cycle	High	Ongoing	WF007-20: All parkway trees located within the public right of way are part of the Tree Inventory System (Arbor Pro). Urban Forestry maintains a three to six-year pruning cycle, where all city-maintained trees are pruned every three to six years depending on need. The Arbor Pro system is used to track and maintain all records of work performed on each individual tree; this system includes all trees on city-owned property and parks.							
21. Mitigate tree hazards by addressing trees that pose a public safety hazard.	High	Ongoing								
22. Purchase a full-size bucket truck for tree maintenance operations to enable city staff to safely perform emergency limb removal.	High	Complete	WF007-21: Hazard trees that are located within the public right of way are removed and replaced with new trees. Trees that may be causing a visual hazard are raised and trimmed							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED						
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services		
23. Design and develop informational and educational brochures that relate to the hazards of dead material on palm trees and problematic trees in fire areas. Brochures would educate the public on how to keep your homes fire safe and inform them of what trees are beneficial and troublesome in high fire areas.	High	Complete									

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Climate Change: Drought

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
Climate Change: Drought										
CCD-001	Work with Local Water Agencies to Develop New Drought Mitigation Strategies	Moderate	New Project	Public Works, Santa Clarita Water Division, Castaic Lake Water Agency, etc.	Ongoing		X	X	X	
	Conduct regular meetings with local water agencies to devise additional drought mitigation strategies.	Moderate	Ongoing	CCD-001-01: (New Project – Not included in the 2010 HMP): July 2014 - City officials, in coordination with Castaic Lake Water Agency, presented an update on the recent drought conditions, weather probabilities, public information and outreach, and legislation on water conservation. Information included stats of local reservoirs and the water supply portfolio where Santa Clarita receives water.						
CCD-002	Research Additional Internal City Actions to Mitigate the Impact of Climate Change and Drought	Moderate	New Project	Environmental Services	Ongoing			X		
	Continue to research additional projects to further improve the City’s standing as a “Green City”.	Moderate	Ongoing	CCD-002-02: (New Project – Not included in the 2010 HMP):						
	Work to improve the City’s current “Silver” Green City status to “Gold” status.	Moderate	Not Started	CCD-002-03: (New Project – Not included in the 2010 HMP): Silver Status achieved, Gold Status Not started.						

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Earthquake

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
EARTHQUAKE										
E001	Identify funding sources for structural and nonstructural retrofitting of structures that are identified as seismically vulnerable.	Low	Complete/Ongoing	Public Works, City Manager's Office	Ongoing		X		X	
	1. Provide information for property owners, small businesses, and organizations on sources of funds (loans, grants, etc.)	Low	Complete	E001-01: 2013: The "Red Guide to Recovery" was secured by the City through a grant. These books will be given to people who experience a disaster to their property. E001-02: Certain building renovation and repair projects require retrofitting to components of entire lateral force-resisting systems. The extent of the retro fitting depends upon the scope of the renovation. Timeline and priority remain the same for this action item.						
	2. Explore options for including seismic retrofitting in existing programs such as low-income housing, insurance reimbursements, and pre and post disaster repairs.	Low	Ongoing							
E002	Seismically retrofit city-owned facilities to meet essential and critical building codes and standards, as needed.	High	Complete/Ongoing	Building and Safety Division	5 years	X	X		X	X
	3. Seismically retrofit City Hall (primary EOC.)	High	Complete	E002-03: City Hall seismic retrofit completed in summer of 2014. Project was completed when City staff were able to secure both environmental and grant application funding for the FEMA Pre-Disaster Mitigation Grant for \$825,000 with an additional City match of \$275,000, for a total budget of \$1,000,000. This was one of three City Hall Seismic Retrofit grant applications submitted by the City during the previous reporting period of						
	4. Seismically retrofit Transportation Maintenance Facility to perform as an essential facility (alternate EOC).	High	Ongoing							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
5. Seismically retrofit Sports Complex Facility to perform as a critical facility (community shelter).	High	Ongoing	July 2010 to June 2011. The installed system includes fluid viscous dampers which move on piston rods; there are 553 structures around the world that currently use this type of seismic construction system, most commonly in Japan. <u>E002-04</u> : There has not been an opportunity to apply for FEMA grant funding for this project in FY2012-2013. City continues to research funding requirements for alternate EOCs. <u>E002-05</u> : There has not been an opportunity to apply for FEMA grant funding for this project in FY2012-2013. City continues to research funding requirements for Community Shelters.						
E003 Educate citizens about seismic risks, the potential impacts of earthquakes and opportunities for mitigation actions.	Moderate	Complete / Ongoing	Parks and Recreation and Community Services, Community Services Division, Building and Safety Division	Ongoing	X	X			
6. Print and distribute emergency preparedness booklet.	Moderate	Complete	<u>E003-06</u> : Completed in fall of 2013.						
7. Organize and hold an annual Earthquake Forum.	Moderate	Ongoing	<u>E003-07</u> : Two faith-based/non-profit continuity of operations training were conducted in September 2010 and February 2011. Incorporated into 2013 Santa Clarita Emergency Expo, which was produced by KHTS AM 1220 radio and supported in sponsorship with the City, Henry Mayo Newhall Hospital, utilities, and the private sector. 3,000 people						
8. Distribute emergency preparedness information through other social media outlets.	Moderate	Ongoing							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
9. Encourage residents to prepare an earthquake kit, an evacuation plan and mitigate non-structural hazards.	Moderate	Ongoing	attended the Expo. Also conducted one public workshop in December 2010 to educate local designers and contractors about new structural provisions for earthquake safety required for new buildings constructed with updated permits. In addition to earthquake forums, Building and Safety conducts public outreach meetings to inform the building industry of changes to the building code prior to each three-year adoption cycle. The information includes changes to seismic design requirements. <u>E003-08</u> : The City uses Twitter, Facebook, City of Santa Clarita website, City Daily Briefs, and the City e-Notify system to provide preparedness outreach, training opportunities, and workshop information to community partners and residents. Examples include the Great Shakeout, National and Earthquake Preparedness Months. The Communication staff continues to increase use of social media for preparedness and emergency response. Preparedness video downloadable for social media. City E-Notification requests for emergency preparedness information has increased by 12%. <u>E003-09</u> : Outreach efforts are ongoing; for example, in 2012-2013, 25 separate outreach efforts were made to homeowner associations, service organizations, senior apartments, parent-teacher associations, and church groups. In 2011-2012, 23 preparedness outreaches to similar groups were conducted. Additionally, a component in the CERT program addresses this preparation.						
E004 Encourage seismic strength evaluations of critical facilities in the City of Santa Clarita to identify vulnerabilities for mitigation of schools and universities, public infrastructure, and critical facilities to meet current seismic standards.	Moderate	Revised / Ongoing	Building and Safety Division, local water agencies, school districts, and LA County Public Works	2 - 5 years	X				X
10. Develop an inventory of schools, universities, and critical facilities that do not meet current seismic standards.	Moderate	Revised ETA 2 Years	<u>E004-010</u> : Schools and universities were removed. These facilities are regulated by the California Division of the State Architect. The City of Santa Clarita has no jurisdiction over them. The phrase "meets current seismic standards" must be defined. Each update of the seismic provisions of the California Building Code may cause an existing building to "not meet current standards." Item should be revised to "Develop an inventory of city-						
11. Encourage owners of non-retrofitted structures to upgrade them to meet seismic standards.	Moderate	Revised / Ongoing							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
12. Encourage water providers to replace old cast iron pipes with more ductile iron, and identify partnership opportunities with other agencies for pipe replacement.	Moderate	Ongoing							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
E005 Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.	Moderate	Revised / Ongoing Complete	Building and Safety Division, Parks and Recreation and Community Services, Community Services Division, school districts, Chamber of Commerce, Valley Industrial Association (VIA), Building and Industry Association (BIA), and residents.	On-going	X	X			
13. Provide information to government building and school facility managers and teachers on securing bookcases, filing cabinets, light fixtures, and other objects that can cause injuries and block exits.	Moderate	Revised / Ongoing	E005-13: This activity is ongoing. Social media outlets are used to push non-structural hazard mitigation messages, especially in October in preparation for the Statewide Great Shakeout-Drop, Cover, Hold On Drill. This item was revised to: <i>Provide information to City Facilities staff on securing bookcases, filing cabinets, light fixtures, and other objects that can cause injuries and obstruct exits.</i> The school districts have their own criteria and are under the direction of the State of California and several schools and colleges in the area participate in the CERT program. E005-14: Information was disseminated to the Santa Clarita Chamber of Commerce and the Valley Industrial Association to post on their respective websites. E005-15: This item is revised to reflect the updated title of the website: "Earthquake Risk Around the U.S. - How to Protect Your Property." This link is on the Building and Safety webpage (http://www.santa-clarita.com/index.aspx?page=548) under "Homeowner Information."						
14. Encourage facility managers, business owners, and teachers to refer to FEMA's practical guidebook: "Reducing the Risks Nonstructural Earthquake Damage."	Moderate	Complete							
15. Encourage homeowners and renters to use "Is Your Home Protected from Earthquake Disaster? A Homeowner's Guide to Earthquake Retrofit" (IBHS) for economic and efficient mitigation techniques.	Moderate	Revised / Ongoing							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
E006 Identify and require analysis and modification of structures that are vulnerable to earthquake damage: pre-cast concrete, soft-story structures, and non-ductile frame buildings.	High	Complete / Ongoing	Building and Safety Division of Public Works Dept., FEMA, Cal-OES	5 years	X	X		X	X
17. Perform a seismic retrofit analysis of Santa Clarita City Hall - the primary emergency operations center (EOC) for the Santa Clarita Valley.	High	Complete	E006-17: City Hall seismic retrofit completed in summer of 2014. System includes fluid viscous dampers which move on piston rods; there are 553 structures around the world that currently use this type of seismic construction system, most commonly in Japan. E006-18: This program will require significant resources for both public and private buildings to identify damaged structures, perform invasive testing, prepare calculations and plans, and perform the upgrades. This task is unfeasible as a city-wide program. However, on large alterations and/or additions, building owners are required to upgrade affected structural systems to meet current seismic provisions. As funding is identified, City Hall will be repaired/strengthened.						
18. Implement a program to investigate critical connections within existing buildings for unrepaired damage caused by the 1994 Northridge Earthquake. Where damage is uncovered, mandate further investigation and repairs in accordance with City Council direction.	High	Ongoing							

Hazardous Material Release

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
HAZARDOUS MATERIALS RELEASE										
HM001	Conduct a public awareness and educational campaign to raise awareness about hazardous and toxic materials.	Low	Ongoing	LACoFD (contract city), and Community Services Division,	Ongoing		X		X	
	1. Support LACoFD's efforts to disseminate and keep current emergency information on hazardous materials. Include phone numbers for contacting the proper agencies.	Low	Ongoing	HM001-01: The City promotes the dissemination of emergency contract numbers to the public on the City's websites, publications, and at preparedness outreach events. The City maintains and updates community and partner agency contact information in the Emergency Operations Center and for the Emergency Operations Plan.						
	2. Continue to promote and update information on hazardous materials that may be found in the home and the proper antidotes for them.	Low	Ongoing	HM001-02: In 2011-2012, the City of Santa Clarita and the Santa Clarita Valley's Sheriff's Department partnered to offer a Safe and Secure Community Collection Event for proper personal document destruction, electronic waste, and prescription medications disposal. The Safe and Secure Disposal event was held at the College of the Canyons. Also, City of Santa Clarita staff continues to provide various outreaches on hazardous waste materials (HHW) and proper disposal mechanisms through print and electronic media. Print media include the Green Guide in the Seasons brochure and waste haulers newsletters. Electronic media include a social media app, E-notify, and greensantaclarita.com. The City also provides free door-to-door collection of HHW and partners with Los Angeles County to provide a HHW drop-off event each year.						
	3. Conduct information meetings on how to "shelter-in-place for residences as well as businesses.	Low	Ongoing	HM001-03: .The ongoing Community Emergency Response Training (CERT) curriculum with the Los Angeles County Fire Department includes "shelter in place" training. At community preparedness outreach events, the City presents how to "shelter in place" as part of its CERT public outreach program.						

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
HM002 Create an inventory of the sites that are contaminated with chemicals and other hazardous materials, and promote clean-up efforts.	High	Complete / Ongoing	Tech. Svcs. Div., LACoFD, and LA Co Industrial Waste Div.	2 years	X			X	X
4. Create a hazardous materials users GIS layer for the city's hazard map.	High	Complete / Updates Ongoing	HM-002-04: Completed. The City's GIS staff was granted approval to download natural gas and oil pipeline map layers from the Pipeline and Hazardous Material Safety Administration's National Pipeline Mapping System. These added GIS layers will help to support emergency response in the event of a pipeline incident. In coordination with LACFD Hazmat, the City now has all of the addresses of sites with hazardous material handlers within the City. This information was added to the City's GIS mapping program.						

Landslide / Mudslide / Subsidence

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
Landslide / Mudslide / Subsidence										
L001	Increase knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	High	Ongoing	Pub. Wks. Dept., Development Svcs. Div., Developers, and Homeowners, and local water and utility agencies.	Ongoing	X	X		X	X
	1. Develop public information to emphasize risks when building on potential or historical landslide areas.	High	Ongoing	L001-01: This is addressed on a case-by-case basis; all queries in these cases are given landslide hazard information. A development prerequisite requires the mitigation of landslides as recommended by geological studies. L001-02: Maps are available from the CA Department of Conservation's Division of Mine and Geology for earthquake-induced landslide and liquefaction hazard zones. Hazard zone information mapped-out and available for public dissemination. L001-03: This is addressed on a case-by-case basis.						
	2. Continue to map new earth movement hazards and make information available to staff, developers, and residents so that soil types, slope percentage, drainage, or other critical factors are used to identify landslide prone areas.	High	Ongoing							
	3. Encourage design and placement of utilities outside of landslide areas to decrease the risk of service disruption.	High	Ongoing							
L002	Continue public education information program that includes material for residents with information on how to protect their property from landslides and debris flows.	High		Bldg. & Safety. Div., Community Svcs. Div., Development Svcs. Div., Communications Div., and LA County Public Works	Ongoing	X	X	X		

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
4. Provide information on plant ground cover for slopes and building of retaining walls.	High	Ongoing	L002-04: Community Development's Planning Division addresses this issue in Santa Clarita's Unified Development Code for required landscaping on hillsides, including both cut and fill slopes. In addition, the Urban Forestry division provides information pertaining to proper planting selections to residents as requested, to include how to select proper ground cover, shrubs, and trees suitable for slope stabilization. L002-05: An information booklet available through the County of Los Angeles Public Works Department and through their Coordinated Agency Recovery Effort (CARE) website. This is a multi-agency public outreach program to disseminate information about recovery efforts and potential storm impacts. www.dpw.lacounty.gov/care . The LADPW also utilizes an e-notification alert system for mud and debris flow; residents can register to receive updates from this system. L002-06: This information is available on the Southern California Gas website. Collateral materials have been requested from SCG.							
5. Provide information for mudflow areas, including information on building channels or deflection walls to direct the flow around buildings (be conscientious of diverting debris flow and the flow lands on a neighbor's property).	High	Ongoing								
6. Provide information on installation of flexible pipe fittings to avoid gas or water leaks.	High	Ongoing								
L003 Review, monitor and update codes, regulations, and local ordinances.	Moderate	Complete / Ongoing	Bldg. & Safety, Div., Dev. Svcs. Div., Community Preservation, LA County, State of Ca., and Building and Industry Association (BIA)	Ongoing	X	X				
7. Study ordinances including Zoning, Grading, Hillside, Subdivision, etc. and make recommendations to mitigate landslide prone areas.	Moderate	Complete	L003-07: In response to the adoption of the General Plan in 2011, the City's entire Unified Development Code is being rewritten and updated to reflect these goals and subject areas. Specifically, the update includes a review and modification of the City's hillside development ordinances in an effort to reduce development-related impacts upon hillsides throughout the City (UDC adopted June 11, 2013). L003-08: Addressed on a case-by-case basis. Foundation recommendations are derived from geological reports and distributed to Building and Safety for inclusion on plans. L003-09: Addressed on a case-by-case basis. Grading and drainage plans are required and include recommendations from geological reports, e.g. planting of native vegetation, minimizing landscape watering, and inclusion of back drains.							
8. Review and enforce building codes for construction standards, including minimum foundation requirements, in landslide prone areas.	Moderate	Ongoing								
9. Review drainage control regulations to control drainage, and reduce the risk of landslides resulting from saturated soils.	Moderate	Ongoing								

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
L004 Limit activities in identified potential and historical landslide areas through regulation and public outreach.	High	Ongoing	Bldg. & Safety. Div., Development Svcs. Div., Planning Svcs. Div., Developers & residents	Ongoing	X	X		X	X
10. Analyze existing regulations regarding development in landslide prone areas. 11. Continue the open space designation efforts. Open space designations keep landslide prone areas undeveloped.	High	Ongoing	L004-10: The City's General Plan (June 2011) includes policies to preserve open space to meet the community's multiple objectives for resource protection for long-term community benefit. The general plan also included a land use map that contained land uses/residential densities in known areas prone to landslides. The plan proposed 27,000 acres of permanently-secured open space and an additional 147,000 acres of open space for National Forest areas. L004-11: The City's General Plan that was adopted in 2011 and 2013 proposed zoning maps designate appropriate open space parcels in addition to policies for the pursuit of additional open space. The City's Open Space District will allow for the continued acquisition and designation of open space areas and will increase the City's ability to keep landslide-prone areas undeveloped.						
L005 Identify and potentially improve if feasible landslide prone areas.	High	Ongoing	Planning Div., Dev. Svcs. Div., City Manager's Office, Landscape Maintenance District	5 years	X	X	X	X	X
12. Consider acquiring landslide prone property as city open-space. 13. Consider vegetation management on landslide prone property. 14. Encourage public/private partnerships that encourage homeowners to mitigate landslide potential.	High	Ongoing	L005-12: In addition to acting on its own (based on General Plan policies), the City will partner with conservation agencies and other entities to acquire and maintain open space - some of which could be located in landslide-prone areas. L005-13: Referenced in L2-4 above. In coordination with LACFD fuel modification guidelines, the City will consider best management practices for vegetation management on landslide-prone property. L005-14: Homeowners work with the City to mitigate landslide potential by either building slopes in landscaped maintenance districts or by requiring Homeowner Associations submit landscape plans for common areas to the City for review and approval.						

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Severe Weather: Extreme Heat

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
SEVERE WEATHER – EXTREME HEAT										
SW-EH001 (previously SW1) Continue to enhance participation in Southern California Edison’s Independent System Operator Notification Procedure Process for Rolling Blackouts.	Moderate	Ongoing	Pub. Wks. Dept., and Southern California Edison	Ongoing		X		X	X	
1. Continue to participate with Southern California Edison’s notification system to inform the community of impending rolling blackouts.	Moderate	Ongoing	SW-EH001-01: The City participates in Quarterly FLASH Communication drills and annual notification tests conducted by Southern California Edison in preparation for power outages and rolling blackouts.							
SW-EH002 (previously SW2) Create a Public Education program regarding proper precautions against exposure to heat and potential hazards of exposure to extreme heat.	Moderate	Ongoing	Community Services Div., Environmental Services and Los Angeles County Pub. Health,	Ongoing		X		X	X	
2. Partner with the Los Angeles County Department of Health Services to create and or/adopt their existing information regarding heat, how to monitor and/or adjust behavior depending on the specific heat index, and information to seek should specific ailments from exposure to heat occur.	Moderate	Ongoing	SW-EH002-02: In preparation for extreme heat weather issues, the City and the LA County Dept. of Public Health coordinate the distribution of heat advisories and alerts to the Santa Clarita community. Information is distributed to schools, senior centers, and SC Chamber of Commerce and other community partners. This is completed via social media, press releases, media interviews, and handouts (electronic and physical).							
3. Maintain and update cooling center inventory on a bi-annual schedule.	Moderate	Ongoing	SW-EH002-03: The Santa Clarita Valley Senior Center and the Valencia Library are the designated cooling centers.							

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
SW-EH003	Create a Public Education program regarding proper precautions against exposure to poor air quality.	Moderate	Ongoing	Environmental Services, South Coast Air Quality Management District (AQMD), LA County Pub. Health, and National Weather Service	Ongoing		X		X	X
(previously SW3)	4. Partner with the Los Angeles County Department of Health Services to create and/or adopt their existing information regarding poor air quality.	Moderate	Ongoing	<p><u>SW-EH003-04</u>: The City distributes the Los Angeles County Department of Health Services public warning information on poor air quality at a number of City events, including Earth Day and River Rally. This type of information typically occurs during extreme heat-related events.</p> <p>2011-2012 - The City celebrated the 25th annual Rideshare Week by hosting a Ride Share open house. Employees were encouraged to rideshare, learn about air quality, and the benefits of carpooling. Additionally, air quality information was updated on GreenSantaClarita.com and emailed to over 400 residents through the eNotify email system.</p> <p>The City's Environmental Services and Economic Development divisions are currently investigating opportunities to hold an Alternative Fuel event for residents and businesses to learn the benefits of purchasing cleaner burning vehicles.</p>						
	5. Partner with the South Coast Air Quality Management District to develop a mechanism to notify sensitive populations within the City on days when air quality standards exceed state and federal standards.	Moderate	Ongoing	<p><u>SW-EH003-05</u>: The South Coast Air Quality Management District (SCAQMD) has developed and made available a notification system via text/email about air quality. The City has partnered with the Los Angeles County Department of Health Services to disseminate poor air quality warning systems in coordination with the SCAQMD. Alerts, press releases, and notifications are distributed to community partners and the public. A free app is available via SCAQMD, called AIRNow, to give air quality information on-demand.</p>						

Cyber Attack

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
CYBER ATTACK										
CY001	Ensure that every physical and virtual computing infrastructure currently utilized by the City are secure. Revise current standard IT operating procedures to meet industry best practices.	High	See Status Below	Technical Services	Ongoing	X			X	
CY001-01	1. Ensure that all hardware and software currently utilized by city staff are updated including: anti-virus, spyware, and malware mitigation measures.	High	Complete / Monitoring Ongoing	CY001-01: Hardware / Software security controls in place. Monitoring ongoing.						
	2. Conduct updates of cyber threat management tools.	High	Updates Ongoing	CY001-02: Tools in place. Monitoring and updates ongoing.						
	3. Review ways to increase bandwidth on Local Area Networks and Wi-Fi networks used by the city to ensure capability to handle sudden, increased data usage.	High	Ongoing	CY001-03: Evaluations ongoing.						
	4. Implement controls of access ports used for City services and take action to reduce the threat of cyber threats.	High	Updates Ongoing	CY001-04: Controls in place. Monitoring and updates ongoing.						

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
CY002	Adopt and comply with all relevant United States Computer Emergency Readiness Team (US-CERT) and other national requirements for local governments and utilize existing resources and programs made available by US-CERT and other federal agencies for system resilience and security testing.	High	See Status Below	Technical Services	Ongoing	X			X	
	5. Integrate incident notification requirements into existing IT department policies.	High	Complete	<p>CY002-05: Incident notification included in IT department policies. CY002-06: Reviews conducted on a scheduled basis. CY002-07: Additional policies and standards such as the NIST Framework under review for incorporation into IT department policies and procedures. CY002-08: Inclusion of NCCIC under review for incorporation into IT department policies and procedures. CY002-09: Participation in DHS C3 under review. CY002-10: Conducting security evaluations by DHS under review.</p> <p>More information on national resources for State and Local officials: https://www.us-cert.gov/ccubedvp/getting-started-slitt</p>						
	6. Conduct a Cyber Resilience Reviews.	High	Complete / Ongoing							
	7. Adopt National Institute of Standards and Technology's (NIST) Framework for Improving Critical Infrastructure Cybersecurity.	High	Under Review							
	8. Include National Cybersecurity and Communications Integration Center (NCCIC) into IT Department policies and procedures.	High	Under Review							
	9. Consider participation in DHS C3 Voluntary Program, which provides resources to help State, local, tribal, and territorial governments address their cybersecurity needs.	High	Under Review							
	10. Consider having DHS Cyber Security Advisors/Protective Security Advisors conduct assessments of Santa Clarita cyber and critical infrastructure resources.	High	Under Review							

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
CY003	Review IT Department staff credentials, policies, and procedures and update them to meet industry best practices for software security, access management, and cybersecurity mitigation.	High	See Status Below	Technical Services	Ongoing	X				X
	11. Conduct regular updates to IT department policies to incorporate the latest cyber security best practices.	High	Ongoing	CY003-11: Conduct regular updates to IT department policies to incorporate the latest cyber security best practices.						
	12. Review and strengthen internal IT administrator password and credential controls.	High	Ongoing	CY003-12: Review and strengthen internal IT administrator password and credential controls.						
	13. Review current password management practices and controls.	High	Ongoing	CY003-13: Review current password management practices and controls.						
	14. Perform regular testing to confirm that critical systems are not subject to compromise.	High	Ongoing	CY003-14: Perform regular testing to confirm that critical systems are not subject to compromise.						
	15. Maintain procedures for performing “remote wipes” of lost or stolen smartphones or tablet computers.	High	Ongoing	CY003-15: Maintain procedures for performing “remote wipes” of lost or stolen smartphones or tablet computers.						
	16. Assess the need for cyber-insurance coverage.	High	Ongoing	CY003-16: Assess the need for cyber-insurance coverage.						
	17. Periodically test IT cyber incident response plans.	High	Ongoing	CY003-17: Periodically test IT cyber incident response plans.						
	18. Conduct regular risk assessments to identify potential cybersecurity threats.	High	Ongoing	CY003-18: Conduct regular risk assessments to identify potential cybersecurity threats.						
	19. Proactively and systematically archive or delete obsolete data and users.	High	Ongoing	CY003-19: Proactively and systematically archive or delete obsolete data and users.						
	20. Evaluate third-party/vendor risk and indemnification provisions to ensure they cover the full costs of a data breach, including notification costs and credit monitoring.	High	Ongoing	CY003-20: Evaluate third-party/vendor risk and indemnification provisions to ensure they cover the full costs of a data breach, including notification costs and credit monitoring.						

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
CY004 Ensure that existing Santa Clarita training protocols reflect current and industry best practices in the fields of cyber, information, and critical infrastructure security. Where necessary or applicable, include cyber-security training requirements towards staff professional training/development goals and/or performance reviews.	High	See Status Below	Technical Services	Ongoing	X	X		X	
21. Conduct cybersecurity training to help IT staff maintain expertise and foster operational readiness.	High	Ongoing	CY004-21: Cyber security training ongoing. CY004-22: Cyber security briefing protocols under review. CY004-23: Employee privacy, security, and response training ongoing. Note: NSLTT Cybersecurity Engagement Program managed by DHS Office of Cybersecurity and Communications, Stakeholder Engagement and Cyber Infrastructure Resilience Division.						
22. Utilize the DHS State, Local, Tribal, and Territorial Cyber security Engagement Program to provide cybersecurity risk briefings to City officials.	High	Under Review							
23. Conduct periodic employee training on privacy and security policies and incident response procedures.	High	Ongoing							
CY005 Partner with other cities in Los Angeles County as well as other counties (where possible) with more robust IT resources/staff to pool and share resources during an incident.	High	See Status Below	Technical Services	Ongoing				X	
24. Conduct outreach to Los Angeles County and Area B cities to determine their existing IT capabilities and review opportunities for strategic partnerships to share IT resources in times of need.	High	Ongoing	CY005-24: Outreach efforts to Los Angeles County and Area B cities ongoing. CY005-25: Outreach efforts to local cyber security groups ongoing.						
25. Conduct outreach to the Los Angeles Chapter of the Information Systems Security Association to review partnership and networking opportunities with local IT professionals.	High	Ongoing							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
CY006 Partner with the California Office of Emergency Services and the California Cybersecurity Integration Center	High	See Status Below	Technical Services	Ongoing				X	
26. Partner with the California Office of Emergency Services and the California Cybersecurity Integration Center to assess the risks to Santa Clarita's critical infrastructure and information technology networks, enable cross-sector coordination and sharing of recommended best practices and security measures, and support	High	Ongoing	CY006-26: Outreach to Cal-OES and the California Cybersecurity Integration Center ongoing.						

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Energy Disruption

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
ENERGY DISRUPTION										
EA001	Power Pole Inspection and Remediation	Moderate	New Project	Public Works, SCE		X			X	
	1. Partner with Southern California Edison to inspect and remediate older wood power poles.	Moderate	Inspection Complete Remediation Partially Complete Ongoing	EA001-01: New Mitigation Project (not in previous 2010 HMP) The City has partnered with Southern California Edison's Pole Loading/Intrusive Pole Inspection and Pole Remediation programs. These programs are 12-year plans designed to perform pole assessments and replacements of wood, light duty steel, and fiberglass/composite poles into compliance with new, regulated safety standards. Poles are inspected and replaced relative to specified compliance due dates. The number of poles scheduled to be replaced in the system vary from year to year. Within Santa Clarita, SCE identified 816 poles to be replaced in 2015 and 15 poles for 2016. SCE's plan will be to continue to communicate the scope of work and progress to the City each year as well as to joint pole owners and renters.						
EA002	Natural Gas Pipeline and Infrastructure Mitigation and Improvement	Moderate	New Project	Public Works, SCG		X			X	
	2. Partner with Southern California Gas Company to identify and improve the delivery of gas to the community including the identification of vulnerable infrastructure.	Moderate	Ongoing	EA-002-02: New Mitigation Project (not in previous 2010 HMP)						

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
EA003	Mitigate the Impact of Electrical Outages on Special Needs Residents	Moderate	Proposed New Project	Public Works, Public Safety, Emergency Management, SCE		X			X	
	3. Assess the key vulnerabilities of Special Needs residents and develop a program to mitigate the impact of energy disruptions. <ul style="list-style-type: none"> • Create a program with Southern California Edison to share its database of special needs customers with the City. • Work with CERT members to identify special needs residents in their communities. • Assess the feasibility of a battery back-up program for special needs residents (i.e., people with life safety, medical, and other critical power needs). 	Moderate	Proposed New Project	EA003-03: New Mitigation Project (not in previous 2010 HMP) <ul style="list-style-type: none"> • Addressing the requirements of special needs residents and programs to ensure ongoing power will mitigate the impact of power outages. • Identification of requirements for special needs populations will enable the City to develop specific programs and projects to protect at-risk populations. 						
EA004	Energy Needs and Hazards Public Outreach	Moderate	Proposed New Project	Public Works, Public Safety, Emergency Management, SCE, SCG			X			
	4. Promote SNAP participation among residents as part of an annual Public Safety Fair to promote hazard mitigation and preparedness.	Moderate	Proposed New Project	EA004-04: New Mitigation Project (not in previous 2010 HMP) <ul style="list-style-type: none"> • Addressing the requirements of special needs residents and programs to ensure ongoing power will mitigate the impact of power outages. • Identification of requirements for special needs populations will enable the City to develop specific programs and projects to protect at-risk populations. 						

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
EA005 Develop an Energy Assurance Plan in Accordance to the State of California Energy Assurance Planning Framework (per CaLEAP)	Moderate	New Project	Public Works, Public Safety, Emergency Management, SCE, SCG		X	X		X	
5. Identify energy risks and vulnerabilities.	Moderate	Complete, included in this HMP	EA005-05: Complete, included in this HMP EA005-06: Complete, included in this HMP EA005-07: Ongoing: For example, USACE has worked with the City to identify generator hook-up capabilities at key City locations.						
6. Document existing mitigation efforts and responsibilities.	Moderate	Complete, included in this HMP							
7. Develop and implement new energy assurance strategies. This may include identification of critical City locations and evaluating the potential for installing backup generators.	Moderate	Ongoing							

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Flood

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
FLOODS										
F001	Continue participation in programs.	High	Ongoing	Public Works Dept., Developers, Homeowners, and FEMA	Ongoing	X		X		X
	1. Continue the participation in the National Flood Insurance Program (NFIP).	High	Ongoing	F001-01 and F001-02: Santa Clarita is good member in-standing in NFIP and received updated April 2015 information on NFIP program changes. FEMA conducted a five-year audit in December 2011 and the City remains in good standing.						
	2. Continue in the participation of the Community Rating System (CRS). This program consists of additional "activities" which are all defined by FEMA and have points associated with each activity.	High	Ongoing							
F002	Lower CRS rating.	High	Complete / Ongoing	Public Works Dept., FEMA, Cal EMA, Insurance Services Office		X	X	X	X	
	3. Research CRS activities to apply for credit to lower CRS rating from 9 to 8 to further educate public on flood hazards, reduce flooding potential and reduce property owners flood insurance premiums an additional 5% lower than the class 9 discount.	High	Complete	F002-03: Goal has been completed and approved as of October 1, 2009. F002-04: FEMA completely overhauled the CRS program, issued a new CRS Coordinator Manual in March 2012, and changed the activity point structure. A five year audit was performed in 2014. At the conclusion of the audit, the City earned enough activity points to lower the CRS rating to a Class 7.						
	4. Research CRS activities to apply for credit to lower CRS rating from 8 to 7 to further educate public on flood hazards, reduce flooding potential and reduce property owners flood insurance premiums an additional 5% lower than the class 8 discount.	High	Complete							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
F003 Minimize damage and hazards to development in areas subject to risk resulting from flooding conditions.	High	Ongoing	Public Works Dept., FEMA, Cal EMA		X	X	X		
5. Promote open space and recreational uses in designated flood zones.	High	Ongoing	F003-05: The City's Open Space Preservation District has acquired seven areas totaling approximately 2,000 acres. A portion of these locations are within designated flood zones. The City regularly promotes hiking, equestrian, and biking uses in these areas. The City continues to promote recreational uses in designated flood zones. Parks division is obtaining parcels in the river. F003-06: The City spends between \$100,000 and \$200,000 each year to remove non-native plant species from the Santa Clara river. City staff's efforts to find grant funds resulted in securing over \$400,000 for 2012. Staff expects approximately 100 acres of non-native species Arundo and Tamarisk to be removed in the demonstration area. Related: Bouquet Canyon Creek Restoration Project (2011-2012): Multi-year weed abatement and restoration project along a 3.5 mile section of Bouquet Canyon Creek from the Santa Clarita city limit to the Angeles National Forest boundary. Target species to eradicate were the tree tobacco (Nicotiana glauca) and Arundo Donax, with the goals of improving the ecology, increasing ground water recharge, reducing fire threats and infrastructure damage, and increasing the capacity of the natural floodplain. Annexation began in 2011 and as of May 23, 2012, 8.25 tons of tree tobacco and approximately 4.0 acres of Arundo were removed. Native seedlings were introduced with support from the LACFD. From 2012-2013, re-treatment of the removal area is scheduled, followed by more native plantings in 2013-2014. Maintenance of the removal areas are ongoing; the Antelope Valley Resource Conservation District serves as the financial administrator of the grants. F003-07: The City has added a new development review process to address construction that does not require a building permit and continues to regulate all development in floodplains. All new developments must go through a multi-division review and must meet all regulations of the NFIP and CRS programs prior to issuance of any permits.						
6. Continued clearance of the Santa Clara River of non-native plant species that may impede flood flow.	High	Ongoing							
7. Continue to review all permits for development in designated flood hazard areas to meet the requirements of the NFIP and reduce damages and loss of life during flooding events.	High	Ongoing							

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
F004 Update existing 30-yr old Flood Insurance Rate Maps (FIRMs) to provide most current flood data to regulate development standards.	High	Ongoing	City of Santa Clarita, HDR Inc., FEMA	2 Years	X	X	X		
8. Coordinate review and implementation of new Flood Insurance Study	High	Ongoing Est. 2 years	F004-08: In 2012, City contracted with FEMA's engineering consultant to conduct a more detailed FIS in downtown Newhall than previously performed by FEMA. This FIS was intended to address the decertified levee which created a new flood zone in downtown Newhall. The City also continues to work with FEMA to move forward on draft FISs already completed. F004-09: Letter of Map Revision (LOMR) to officially change FIRM for Newhall Creek Left Overbank flow was submitted and became effective on August 9, 2013. Upon approval, the floodplain residents in areas affected by this flooding source had problems with the flood designations across their properties. In portions of Newhall, the A zones or Special Flood Hazard Areas (SFHA), were supposed to be shown as contained within the streets while the city blocks adjacent were mapped into the Shaded-X zone. Because of archaic mapping methods still in use by FEMA (e.g., did not utilize full hydraulic modeling due to budget/time constraints), the A zones were extending beyond the limits of the streets onto the structures; many residents and business owners still had their structures designated in the A zone. City staff worked with FEMA to correct the issue and a subsequent LOMR became effective on February 7, 2014 to correct the problem.						
9. Submit Letter Of Map Revision for storm drain improvements in downtown Newhall to reduce floodplain in affected area.	High	Ongoing Est. 1 year							

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Terrorism

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED					
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services	
TERRORISM										
TAS001	Conduct Active Shooter training with City staff	Moderate	Ongoing	Los Angeles County Sheriff's Department – Tactics and Survival Unit	Ongoing	X			X	
	1. Conduct Active Shooter training with City staff	Moderate	Ongoing	TAS001-01: First round of training completed for staff. Second round of training to be conducted September 2015.						
TAS002	Improve Community Active Shooter Response Capabilities	Moderate	Scheduled	Los Angeles County Fire Department, Emergency Management	Ongoing	X	X		X	
	2. Conduct CERT training to mitigate the number of casualties during an Active Shooter incident and improve response capabilities	Moderate	Ongoing	TAS002-02: Active Shooter to be included in CERT training commencing Winter 2015-2016.						
TAS003	Identify City-owned Potential Terrorist Targets and Take Action to Harden Vulnerable Sites	Moderate	Ongoing	City Manager's Office, Public Works, Emergency Management, Department of Homeland Security	Ongoing	X			X	
	3. Work with the Department of Homeland Security to conduct a review of City-owned and operated facilities. The review to include access controls and security for each site as well as the identification of site vulnerabilities and capabilities.	Moderate	Ongoing	TAS003-03: Proposed new project (not included in the 2010 HMP). DHS conducts site reviews of Critical Infrastructure and Key Resources so the City would benefit from partnering with DHS to conduct the assessments.						
	4. Based on the results of the site review, take actions to harden critical City-owned sites.	Moderate	Ongoing	TAS003-04: Specific sites and hardening requirements to be determined based on the site analysis.						

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
TAS004 Work with Critical Infrastructure Partners to Identify Potential Terrorist Targets and Take Action to Harden Vulnerable Sites	Moderate	Ongoing	City Manager's Office, Emergency Management, Department of Homeland Security, CIKR Owners	Ongoing	X			X	
5. Continue to work with Critical Infrastructure and Key Resource (CIKR) partners including: healthcare facilities, utility providers, event centers, and other major public venues. This includes working with DHS on developing the site list.	Moderate	Ongoing	TAS004-05: New project (not included in the 2010 HMP). Work with sites and partners ongoing. TAS004-06: New project (not included in the 2010 HMP). Work ongoing. TAS004-07: New project (not included in the 2010 HMP). Work ongoing. Note: For security purposes partner names and sites not published.						
6. Work with or encourage each partner to conduct a review of their critical infrastructure sites to assess the vulnerability to terrorist or active shooter attack.	Moderate	Ongoing							
7. Work with critical infrastructure partners to harden key sites against terrorist attack or active shooter incidents.	Moderate	Ongoing							

Severe Weather: Extreme Wind

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
SEVERE WEATHER – EXTREME WIND										
SW-EW001 (previously SW4)	Enhance programs to keep trees from threatening lives, property, and public infrastructure during windstorm events.	Moderate	Ongoing	Urban Forestry , Landscape Maintenance District, LA County Fire, Utilities,	Ongoing	X		X		
	1. Partner with responsible agencies and organizations to design and disseminate education information to property owners to reduce risk from tree failure to life, property, and utility systems.	Moderate	Ongoing	<p>SW-EW001-01: Urban Forestry distributes informational brochures published by the International Society of Arboriculture (ISA) to residents during special events and routine field work. This information includes "How to Recognize Hazardous Trees." The Urban Forestry Division is also active in professional tree organizations, which are comprised of both municipal and private tree professionals. Specifically, the City is involved with Street Tree Seminar (STS), where 85% of members/attendees are from other municipal agencies. Through seminars and meetings at STS, City staff are able to network with other agencies on different methods used for emergency response.</p> <p>SW-EW001-02: Urban Forestry has a positive working relationship with Southern California Edison (SCE). In a cooperative effort, Urban Forestry and SCE provide residents with informational brochures to guide them in selecting an appropriate tree for situations where power lines exist. Both agencies provide ISA's "Right Tree, Right Place" brochure as a guideline for homeowners. The City has partnered with SCE to remove inappropriate trees located under power lines and replace those trees with trees that will not interfere with those lines; the program removes potentially hazardous trees (when grid pruning is performed) at no cost to residents.</p> <p>SW-EW001-03: Urban Forestry uses a tree inventory program (Arbor Pro) that allows it to track, monitor, and address potentially hazardous trees in its inventory. In addition, Urban Forestry participates in the City's eService system (CRM) that residents can use to report hazardous trees to officials. All concerns that are submitted are then inspected by Urban Forestry staff and any corrective actions needed are identified. Additionally, Urban Forestry staff respond to reports of fallen tree limbs on a daily basis, performs routine inspections on major thoroughfares, and continues to identify dead trees in neighborhoods across the City.</p>						
	2. Develop partnerships between utility providers and City/County local public works agencies to document known hazard areas.	Moderate	Ongoing							
	3. Identify and track potentially hazardous trees.	Moderate	Ongoing							

Mitigation Goals and Action Items		Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED				
						Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services
SW-EW002 (previously SW5)	Enhance strategies for debris management for windstorm events.	Moderate	Complete	Public Works Dept.	2 years	X				X
	4. Develop coordinated management strategies for clearing debris from roads of fallen trees, and clearing debris from public and private property.	Moderate	Complete	<p><u>SW-EW002-04</u>: Santa Clarita's Debris Management Plan includes:</p> <ul style="list-style-type: none"> Phase 1 - Debris is moved to allow for movement of emergency vehicles for emergency response purposes. Phase 2 - A coordinated debris removal from the public right of way initiated. Determination of whether additional contractors/agencies are needed is based on the severity of the event. <p>Debris monitoring also takes place to measure truck capacities, identification of hazardous waste, and identify recyclable materials within debris.</p> <p>Urban Forestry receives emergency calls and responds to each location to resolve issues by securing the public right of ways. Outside contractors may be called in for severe conditions. The Streets Division will respond and will also contract out to private contractors in severe situations.</p> <p>Both Urban Forestry and Street Maintenance have a standard out-call procedure for emergencies. Designated employees are on-call at all times and on weekends in the event an emergency occurs, and a 30-minute response time is standard.</p> <p>Entering the fall of 2015, Urban Forestry is working with other departments to actively monitor the overall health of forests, focusing efforts on removing dead trees, and proactively pruning/deep watering trees along major thoroughfares in an effort to minimize limb and complete tree failures as a result of drought.</p>						

Mitigation Goals and Action Items	Priority	Status	Coordinating Organization	Timeline	PLAN GOALS ADDRESSED						
					Protect Life and Property	Public Awareness	Natural Systems	Partnerships & Implementation	Emergency Services		
SW-EW003 (previously SW***This p6)	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Moderate	Ongoing	Pub. Wks. Dept., Planning Div., and Southern California Edison	2 years	X					X
	5. Open a dialogue with local utility companies to increase the use of underground utilities where possible.	Moderate	Ongoing	SW-EW003-05: Zoning codes require undergrounding with power lines that handle voltage amounts in excess of 34KV. The City cooperates with local utilities upon redevelopment of property on a project-by-project basis. SW-EW003-06: No action taken concerning this item during this period. This action would be based on available opportunity in development/redevelopment.							
	6. Participate in the Underground Utilities Program	Moderate	Ongoing								
SW-EW004 (previously SW7)	Create a localized map that charts seasonal dominant wind speeds and directions.	High	Ongoing	Tech Svcs. Div., National Weather Service, US Forest Service, and LACoFD	5 years	X			X	X	
	7. Expand Weather Spotters program for high winds and extreme weather to pinpoint areas that are hardest hit in the City	High	Ongoing	SW-EW004-07: The City continues to host a national weather service spotter training on a yearly basis. There are currently 110 identified weather spotters in the Santa Clarita Valley. SW-EW004-08: The City re-evaluated the need for this activity and removed it from the list since it continually works with other agency partners to coordinate weather related mapping, response, and mitigation activities. For example the City's GIS Department utilizes weather data models and mapping tools provided by the National Weather Service and its website.							
	8. Coordinate with public/private weather entities to obtain weather data and create various weather maps.	High	Removed								

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SECTION 6. MULTI-HAZARD GOALS AND ACTION ITEMS

This section provides information on goals and action items that pertain to the 11 hazards addressed in the mitigation plan: wildfire, earthquakes, flood, hazardous materials releases, landslide/mudslide/subsidence, severe weather (wind and heat), climate change (drought), cyberattack, energy disruption, and terrorism. It also describes the framework that focuses the plan on developing successful mitigation strategies.

NOTE: The previous 2010 City of Santa Clarita Hazard Mitigation Plan included 6 specific hazards: wildfire, earthquakes, flood, hazardous materials, landslide/mudslide/subsidence, and severe weather. This list was expanded in 2015 as part of the plan update.

Strategy Number	Priority	Timeline	Status
MH001	High	Ongoing	MH001-01: Partially Complete MH001-02: In progress MH001-03: Complete MH001-04: Under review MH001-05: In progress
Strategy Description	Construct/enhance major transportation infrastructure to provide the necessary additional roads and mobility.		
Activities	MH001-01: Complete the restriping of the Cross Valley Connector-Golden Valley segment between Centre Pointe Parkway and Sierra Highway to provide additional travel lanes. MH001-02: Bridge Widening - Hwy 14 – Golden Valley Off/On ramp. MH001-03: Bridge Widening – McBean Bridge MH001-04: Consider retrofitting Cross Valley Connector. MH001-05: Bridge Widening – Newhall Ranch Road, San Francisquito Bridge		
Coordinating Organization	Public Works Department, Capital Improvement Projects, Development Services Division, Metropolitan Transportation Authority (Metro), Los Angeles County, Federal Highway Administration, Southern California Gas Company, Southern California Edison, Developer-Bridge & Thoroughfare, and Caltrans.		
Plan Goals Addressed	Partnerships and Implementation Protect Life and Property Emergency Services		
Funding Source	Capital Improvement Projects / Grant Funding		
Comments	<p><u>MH001-01</u>: Design is complete. City is seeking grant funding to construct this project.</p> <p><u>MH001-02</u>: Project is in design; City received \$4,264,000 of Los Angeles County Metropolitan Transportation Authority (Metro) grant funding. City was successful in moving original grant year funding from 2012 to 2015; anticipated beginning of construction to start in FY13-14.</p> <p><u>MH001-03</u>: The City received \$3,775,000 of Los Angeles County Metropolitan Transportation Authority (Metro) grant funding. Project complete.</p> <p><u>MH001-04</u>: Project is being considered as part of the City's Capital Improvement Program Five-Year Plan.</p> <p><u>MH001-05</u>: Project is in planning phase; City received \$17,706 of Caltrans grant funding for planning study for Highway Bridge Program. Additional design and construction grant funding was requested for 2012-2013; project anticipates going into full design in FY13-14.</p>		

Strategy Number	Priority	Timeline	Status
MH-002	High	Ongoing	MH002-06: Partially Complete MH002-07: Complete MH002-08: Complete MH002-09: Complete
Strategy Description	Implement technologies to enhance public notification and support in the event of an emergency.		
Activities	<p>MH002-06: Continue replacing backup batteries for traffic lights on a rotational basis.</p> <p>MH002-07: Continue replacing old traffic/light signals with LED signals.</p> <p>MH002-08: Consider new technology for emergency messages.</p> <p>MH002-09: Install Intelligence Transportation System Infrastructure.</p>		
Coordinating Organization	Technology Services Division, Communications Services Division, Metropolitan Authority (Metro), Los Angeles County.		
Plan Goals Addressed	<p>Partnerships and Implementation</p> <p>Protect life and Property</p> <p>Public Awareness</p> <p>Emergency Services</p>		
Funding Source	General Fund		
Comments	<p><u>MH002-06</u>: The City currently has battery backup at 79 signalized intersections. Staff established a five-year maintenance program to replace the batteries. In 2012-2013 the maintenance program upgraded all batteries with backup systems. Cost: \$70,000</p> <p><u>MH002-07</u>: Complete. All of the City's 183 signalized intersections have been upgraded with LED technology. Staff established a seven-year maintenance program to replace old LED modules. In 2012-2013 the City upgraded 44 intersections. Cost: \$120,000</p> <p><u>MH002-08</u>: In 2011-2012, the City began using the Nixle text alert system. Community members are encouraged to register to receive texts; the City conducted a campaign to promote registration at its annual Emergency Expo. Ongoing promotion continues on the City's website, CERT program, and during community outreach events.</p> <p>Santa Clarita Transit has recently installed LED signs and plasma screens at bus stops and transit centers and content-controlled television in our buses. This equipment is intended to distribute city messages, including emergency notifications.</p> <p><u>MH002-09</u>: Complete. City received \$286,000 in grant funding from the LAMTA. City staff now have the ability to control and manage all field signal controllers at the City's 183 signalized intersections. The Traffic Operations Center (TOC) receives data from traffic controllers along with video signals from 46 CCTV cameras, 192 video detection cameras, 48 wireless count stations, and 79 battery backup systems through 55 miles of fiber optic cable, 58 miles of copper wire, and 10 wireless access points.</p>		

Strategy Number	Priority	Timeline	Status
MH003	High	Ongoing	MH003-10: Ongoing MH003-11: Ongoing MH003-12: Ongoing MH003-13: Ongoing MH003-14: Ongoing
Strategy Description	Enhance School Emergency Communications Plan		
Activities	<p>MH003-10: Enhance Communications Plan by incorporating private schools and child-care facilities.</p> <p>MH003-11: Work with First Start program to incorporate them into the Communications Plan.</p> <p>MH003-12: Work with special needs community and groups to identify alternate modes of communications.</p> <p>MH003-13: Participate annually in communications exercise with school districts.</p> <p>MH003-14: Encourage schools to send annual letter to parents regarding emergency procedures.</p>		
Coordinating Organization	Community Services Division, Santa Emergency Communications Team (Volunteers) County of Los Angeles Fire Department, Los Angeles County Sheriff's Department, public and private schools		
Plan Goals Addressed	Partnerships and Implementation Public Awareness Emergency Services		
Funding Source	General Fund		
Comments	<p><u>MH003-10</u>: City staff continues to conduct ongoing outreach events and workshops with private schools and daycare providers. For example, in 2011-2012, ten educators from private schools participated in the CERT program.</p> <p><u>MH003-11</u>: Outreach to stakeholders with the First Start Program to promote the importance of parental education on the role of schools during emergencies is ongoing.</p> <p><u>MH003-12</u>: The City, in coordination with the Community and Law Enforcement Awareness Response Committee (CLEAR), the LACSD, and the Santa Clarita Valley Committee on Aging, contributed to the development of a special needs registry. Continuously maintained by the City and the Santa Clarita Valley Sheriff's Station, the registry assists law enforcement to identify individuals who cannot identify themselves due to a disability or special need, such as Alzheimer's, autism, or a speech disorder. Law enforcement personnel can view updates to the Registry in real-time. This registry has improved the effectiveness of search and rescue operations involving persons with disabilities or special needs.</p> <p>Santa Clarita Transit meets on a monthly basis with its Accessibility Advisory Group. Information is routinely distributed at these meetings. The AAC was established by the City of Santa Clarita Transit for the purpose of providing guidance on the quality of its programs and services for seniors and persons with disabilities. Staff also works closely with the Special Education program at the William S. Hart Union High School District.</p> <p><u>MH003-13</u>: Ongoing coordination occurs during the annual October Great Shakeout drill. Amateur radio capabilities, cell phone, and landline coordination is/are tested.</p> <p><u>MH003-14</u>: City staff are regularly invited to Parent-Teacher Association meetings to conduct outreach and provide materials on emergency preparedness as well as detailing how the City coordinates with community partners (i.e. schools) during emergencies.</p>		

Strategy Number	Priority	Timeline	Status
MH004	High	Ongoing	MH004-15: Ongoing MH004-16: Ongoing MH004-17: Complete MH004-18: On-hold MH004-19: On-hold
Strategy Description	Prepare the City of Santa Clarita to be self-sufficient in the event of a major emergency.		
Activities	<p>MH004-15: Promote the City’s CERT-Community Emergency Response Training Program, and increase number of CERT trained residents and businesses by 20%.</p> <p>MH004-16: Promote the City’s Emergency Expo; encouraging residents to attend and learn how to prepare, mitigate, and respond for all types of emergencies.</p> <p>MH004-17: Implement the Emergency Operations Plan that includes, but is not limited to the establishment of a volunteer pool, and community partners to assist in responding to the provision of care and shelter to those in the valley (residents and non-residents) during an emergency.</p> <p>MH004-18: Consider acquiring additional generators to back-up critical operations.</p> <p>MH004-19: Consider acquiring mobile communications trailer to augment communication capabilities.</p>		
Coordinating Organization	Community Services Division, County of Los Angeles Fire Department, Los Angeles County Sheriff’s Department,		
Plan Goals Addressed	Protect Life and Property Public Awareness Natural Systems	Partnerships and Implementation Emergency Services	
Funding Source	General Fund		
Comments	<p><u>MH004-15</u>: Training for the CERT program continues in cooperation with the LACFD and L.A. Sheriff’s CERT Volunteer program. All students are taught by LACFD firefighters. The following numbers illustrate the number of participants who completed CERT training: 2010-2011 - 125 participants, 2011-2012 - 134 participants, 2012-2013 - 147 participants, and 2014-2015 – 172 participants.</p> <p><u>MH004-16</u>: The City continues to be a sponsor at the SCV Emergency Expo. The event can include companion events with other partners; for example, in 2011-2012 the Expo was produced by the local radio station KHTS AM 1220 as a companion event to the station’s Home and Garden show; attendance was in excess of 2,000 people. In 2012-2013, 160 people directly engaged at the City’s expo booth. They participated in a quiz, with the opportunity to win prizes. Nine City CERT members volunteer at the booth operations. In FY 2014-2015, 11 CERT volunteers were involved in an Emergency Expo Booth that engaged 541 attendees with a Preparedness “Wheel Game”.</p> <p><u>MH004-17</u>: In August 2011, the City was selected to pilot a catastrophic mass care and sheltering plan by the Operational Area Alliance Group. The current draft plan addresses shelter, bulk distribution, mass feeding, pet sheltering, non-traditional sheltering, mental health and welfare, recovery transition needs, transportation, medical health support, disaster welfare information, and public information. The City, Henry Mayo Newhall Memorial, and the SCV Disaster Coalition have developed a web-based portal for Faith-Based Organizations and nonprofits to document availability of resources and capabilities that could be potentially utilized in a disaster. The portal began operating in March 2015.</p> <p><u>MH004-18</u>: A critical facilities assessment was conducted by the U.S. Army Corps of Engineers in May 2015. No further action taken to purchase generators due to budgetary constraints. The City is in the process of updating a resource list of local and regional vendors with generator equipment capabilities.</p> <p><u>MH004-19</u>: No action taken on this specific item due to budgetary constraints; timeline and priority remain the same. During this reporting period the City purchased handheld emergency radios to enhance communication redundancies.</p>		

Strategy Number	Priority	Timeline	Status
MH005	High	2-4 years	MH005-20: Complete / Assessment Ongoing MH005-21: Under Review
Strategy Description	Establish a permanent Department Operations Center at the Transportation Maintenance Facility for Public Works. The facility serves as an alternate Emergency Operations Center.		
Activities	<p>MH005-20: Assess the facility’s basic physical capabilities and identify the physical requirements for a DOC, i.e. space layout, technology, etc.</p> <p>MH005-21: Consider new design and construction to accommodate emergency functions and people.</p>		
Coordinating Organization	City Public Works, Technology Services Division, Community Services Division, Traffic Division.		
Plan Goals Addressed	<p>Partnerships and Implementation</p> <p>Emergency Services</p> <p>Protect life and Property</p>		
Funding Source	General Fund		
Comments	<p><u>MH005-20</u>: Original configuration of a DOC was completed during the initial design of the Transit Maintenance Facility. However, capabilities continue to be assessed and upgraded.</p> <p><u>MH005-21</u>: No action taken at this time for this item. Priority level needs to be reviewed in the five-year plan update. Wi-Fi enhancements added to renovated gym at Sports Complex. New system has ability to broadcast multiple Wi-Fi networks, improving emergency sheltering operations capabilities.</p>		

Strategy Number	Priority	Timeline	Status
MH006	High	Ongoing	MH006-22: Complete MH006-23: Ongoing MH006-24: Ongoing
Strategy Description	Identify safe evacuation routes in high-risk natural disaster areas.		
Activities	<p>MH006-22: Identify potential debris removal resources.</p> <p>MH006-23: Increase participation in regional committee planning for emergency transportation routes.</p> <p>MH006-24: Identify and publicize information regarding emergency transportation routes.</p>		
Coordinating Organization	Los Angeles County Sheriff (contract city), Technology Services Division, Traffic Division, California Highway Patrol, and Caltrans		
Plan Goals Addressed	<p>Partnerships and Implementation</p> <p>Public Awareness</p> <p>Emergency Services</p> <p>Protect life and Property</p>		
Funding Source	General Fund		
Comments	<p><u>MH006-22</u>: Streets Division purchased a front loader to deal with mass bulk items. In addition, a road blade scraper was also purchased to deal with mud and debris that block public right-of-ways. Streets' fleet includes: 7-yard dump truck, 10 -yard dump truck, and backhoe with loader bucket, bobcat skid steer with bucket and sweeper attachment, and a 3-yard front loader.</p> <p><u>MH006-23</u>: City staff participates in L.A. Metro countywide meetings that involve discussions of expanding transportation routes. For example, City staff attend Metro's Streets and Freeways Meeting on a monthly basis. Various transportation issues are discussed at these meetings, including on ways to improve traffic on regional routes. City staff participates in the production of a countywide Mutual Aid Assistance Plan led by Metro.</p> <p><u>MH006-24</u>: The Streets Division works closely with local law enforcement (LACSD and California Highway Patrol) to set up emergency traffic lane closures and emergency routes when needed. Resources include arrows and message boards, arrow board trucks, and an abundant supply of delineation devices (cones, delineators, and barricades).</p>		

Strategy Number	Priority	Timeline	Status
MH007	Moderate	4 Years	MH007-25: Ongoing
Strategy Description	Create a Recovery and Reconstruction Ordinance.		
Activities	MH007-25: Consider developing and adopting a pre-disaster ordinance for post-disaster recovery and reconstruction that includes provisions for debris clearance, damage assessment, demolitions, re-occupancy and building moratorium criteria, fee waivers and deferrals, and expedited permitting procedures for repair and reconstruction.		
Coordinating Organization	City Manager's Office, City Council, Public Works Department, Building and Safety, Community Development Department.		
Plan Goals Addressed	Protect life and Property Emergency Services		
Funding Source	General Fund		
Comments	<u>MH007-25</u> : In 2011-2012, Planning staff participated in a regional disaster housing planning workshop sponsored by the Los Angeles Housing Department. The goal of the project was to focus on reconstruction and recovery efforts throughout Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties.		

Strategy Number	Priority	Timeline	Status
MH008	Moderate	2 Years	MH008-26: Partially Complete
Strategy Description	Use Hazus to develop loss estimates from earthquakes and floods. Loss estimates include: physical damage, economic loss and social impacts.		
Activities	MH008-26: Use Hazus to develop loss estimates from earthquakes and floods. Loss estimates include: physical damage, economic loss and social impacts		
Coordinating Organization	Administrative Services, Tech Services, GIS Group		
Plan Goals Addressed	Protect life and Property Public Awareness Emergency Services		
Funding Source	General Fund		
Comments	<u>MH008-26</u> : Two GIS staff members completed basic training in the use of HAZUS software at the National Emergency Training Facility in Emmetsburg, Maryland in 2010. Future trainings will deal with understanding and learning how to prepare and manage pertinent data needed to run the HAZUS software application efficiently and successfully.		

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SECTION 7. WILDFIRE

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	4	Highly Likely		Severe
Magnitude / Severity	2	Limited	●	High
Warning Time	4	6 to 12 Hours		Moderate
Duration	3	Less than 1 Week		Low
CPRI Rating	3.30	High		

Wildfire Hazard Information and Background

The City of Santa Clarita and the unincorporated parts of Los Angeles County are susceptible to wildland fires because of hilly terrain, dry weather conditions, and the type of plant cover. Steep slopes in the Santa Clarita Valley allow for the quick spread of flames during fires and pose difficulty for fire suppression due to access problems for firefighting equipment. The late summer and fall months are the critical times of the year when wildland fires could occur, as the Santa Ana winds deliver hot, dry desert air in the region. In addition, highly flammable plant communities present in the Santa Clarita Valley, allows fire to spread easily in the hillside areas, which are the primary wildfire hazard areas in the Santa Clarita Valley. These plant communities consist of variable mixtures of woody shrubs and herbaceous species, such as chaparral and sage vegetation.

Wildfires are particularly a threat to the Santa Clarita Valley because of its natural topography. The Santa Clarita Valley is surrounded by mountains and is in between two major freeways (14 Freeway and Interstate 5 Freeway). This layout can create obstacles to access emergency resources from outside of the Santa Clarita Valley and facilitate evacuation during a severe fire storm. The City ensures that these obstacles are addressed through collaboration with Los Angeles County Fire and Sheriff’s Departments, the City General Plan, the Unified Development Code, the Unified Building Code, and environmental analysis of development projects.

Topography

The Santa Clarita Valley is surrounded by mountains. This 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.

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' 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.

“Fire has been important in the life cycle of chaparral communities for over 2 million years; however, the true nature of the "fire cycle" has been subject to interpretation. In a period of 750 years, it generally thought that fire occurs once every 65 years in coastal drainages and once every 30 to 35 years inland.” (Ainsworth, J. and Doss, T., 1995).

“The vegetation of chaparral communities has evolved to a point it requires fire to spawn regeneration. Many species invite fire through the production of plant materials with large surface-to-volume ratios, volatile oils and through periodic die-back of vegetation. These species have further adapted to possess special reproductive mechanisms following fire. Several species produce vast quantities of seeds which lie dormant until fire triggers germination. The parent plant which produces these seeds defends itself from fire by a thick layer of bark which allows enough of the plant to survive so that the plant can crown sprout following the blaze. In general, chaparral community plants have adapted to fire through the following methods: a) fire induced flowering; b) bud production and sprouting subsequent to fire; c) in-soil seed storage and fire stimulated germination; and d) on plant seed storage and fire stimulated dispersal” (Ainsworth, J. and Doss, T., 1995).

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.

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 (Department of Land Conservation and Development, 2000). 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.

Climate Change - 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 may contribute to additional fires, or additional difficulties in fighting fires.

Wildfire Exposures

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.

Lower Elevation Scrub Brush and Chaparral Fires

The lower elevations covered with chaparral create one type of exposure. “Past fire suppression is not to blame for causing large shrub land wildfires, nor has it proven effective in halting them.” said Dr. Jon Keeley, a USGS fire researcher who studies both southern California shrub lands and Sierra Nevada forests. “Under Santa Ana conditions, fires carry through all chaparral regardless of age class. Therefore, prescribed burning programs over large areas to remove old stands and maintain young growth as bands of firebreaks resistant to ignition are futile at stopping these wildfires (USGS, 2003).”

Upper Elevation Forest Fires

The higher elevations of Southern California’s mountains are typically heavily forested. The magnitude of the 2003 fires is the result of three primary factors:

- (1) Severe drought, accompanied by a series of 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.

“When Lewis and Clark explored the Northwest, the forests were relatively open, with 20 to 25 mature trees per acre. Periodically, lightning would start fires that would clear out underbrush and small trees, renewing the forests. Today's forests are completely different, with as many as 400 trees crowded onto each acre, along with thick undergrowth. This density of growth makes forests susceptible to

disease, drought, and severe wildfires. Instead of restoring forests, these wildfires destroy them and it can take decades to recover. This radical change in our forests is the result of nearly a century of well-intentioned but misguided management (Gale A. Norton, Secretary of the Interior, 2002). ”

Urban Interfaces

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.

Growth and Development in the Interface

The hills and mountainous areas of Southern California are considered to be interface areas. The development of homes and other structures is encroaching onto the wildlands and is expanding the wildland/urban interface. The interface neighborhoods are characterized by a diverse mixture of varying housing structures, development patterns, ornamental and natural vegetation, and natural fuels.

Furthermore, owners often prefer homes that are private, have scenic views, are nestled in vegetation and use natural materials. A private setting may be 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. Property owners in the interface may not be aware of the problems and threats they face. Therefore, many owners have done very little to manage or offset fire hazards or risks on their own property. Furthermore, human activities increase the incidence of fire ignition and potential damage.

Every year the growing population has expanded further and further into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas and the open spaces created by this expansion has produced a significant increase in threats to life and property from fires and has pushed existing fire protection systems beyond original or current design and capability.

Road Access

Road access is a major issue for all emergency service providers. As development encroaches into the rural areas of the county, the number of houses without adequate turn-around space is increasing. In many areas, there is not adequate space for emergency vehicle turnarounds in single-family residential neighborhoods, causing emergency workers to have difficulty doing their jobs because they cannot access houses. As fire trucks are large, fire fighters are challenged by narrow roads and limited access. When there is inadequate turn around space, the fire fighters can only work to remove the occupants, but cannot safely remain to save the threatened structures.

Water Supply

Fire fighters in remote and rural areas are faced by limited water supply and lack of hydrant taps. Rural areas are characteristically outfitted with small diameter pipe water systems, inadequate for providing sustained firefighting flows.

Urban Interface Fires

There are three categories of urban interface fire (Department of Land Conservation and Development, 2000):

- 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; a
- The occluded wildland/urban interface exists where islands of wildland vegetation occur inside a largely urbanized area.

Designated Hazard Areas

Wildfire hazard areas are commonly identified in regions of the wildland/urban interface. Ranges of the wildfire hazard are further determined by the ease of fire ignition due to natural or human conditions and the difficulty of fire suppression. The wildfire hazard is also magnified by several factors related to fire suppression/control such as the surrounding fuel load, weather, topography and property characteristics. Generally, hazard identification rating systems are based on weighted factors of fuels, weather, and topography.

The following table illustrates the rating system to identify wildfire hazard risk (with a score of 3 equaling the most danger and a score of 1 equaling the least danger).

Table 24: Hazard Identification Rating System

Sample Hazard Identification Rating System		
Category	Indicator	Rating
Roads and Signage	Steep; narrow; poorly signed	3
	One or two of the above	2
	Meets all requirements	1
Water Supply	None, except domestic	3
	Hydrant, tank, or pool over 500 feet away	2
	Hydrant, tank, or pool within 500 feet	1
Location of the Structure	Top of steep slope with brush/grass below	3
	Mid-slope with clearance	2
	Level with lawn, or watered groundcover	1
Exterior Construction	Combustible roofing, open eaves, Combustible siding	3
	One or two of the above	2
	Non-combustible roof, boxed eaves, non-combustible siding	1

In order to determine the "base hazard factor" of specific wildfire hazard sites and interface regions, several factors must be taken into account. Categories used to assess the base hazard factor include:

- Topographic location, characteristics, and fuels
- Site/building construction and design
- Site/region fuel profile (landscaping)
- Defensible space
- Accessibility
- Fire protection response
- Water availability

The Threat of Urban Conflagration

Although communities without an urban/wildland interface are much less likely to experience a catastrophic fire, in Southern California there is a scenario where any community might be exposed to an urban conflagration similar to the fires that occurred following the 1906 San Francisco earthquake.

“Large fires following an earthquake in an urban region are relatively rare phenomena, but have occasionally been of catastrophic proportions. The two largest peace-time urban fires in history, 1906 San Francisco and 1923 Tokyo, were both caused by earthquakes. The fact that fire following earthquake has been little researched or considered in the United States is particularly surprising when one realizes that the conflagration in San Francisco after the 1906 earthquake was the single largest urban fire, and the single largest earthquake loss, in U.S. history. The loss over three days of more than 28,000 buildings within an area of 12 km² was staggering: \$250 million in 1906 dollars, or about \$5 billion at today’s prices.

The 1989 Loma Prieta Earthquake, the 1991 Oakland hills fire, and Japan’s recent Hokkaido Nansei-oki Earthquake all demonstrate the current, real possibility of a large fire, such as a fire following an earthquake, developing into a conflagration. In the United States, all the elements that would hamper fire-fighting capabilities are present: density of wooden structures, limited personnel and equipment to address multiple fires, debris blocking the access of fire-fighting equipment, and a limited water supply” (EQE, 1993).

Southern California Wildfire History

Large fires have been part of the Southern California landscape for millennia. “Written documents reveal that during the 19th century human settlement of southern California altered the fire regime of coastal California by increasing the fire frequency. This was an era of very limited fire suppression, and yet like today, large crown fires covering tens of thousands of acres were not uncommon. One of the largest fires in Los Angeles County (60,000 acres) occurred in 1878, and the largest fire in Orange County’s history, in 1889, was over half a million acres” (USGS, 2003).

Records from the U.S. Department of Forestry reveal that wildland fires occur on a regular basis almost every year, while large fires occur fairly regularly every ten years. The occurrence of major wildfires in a particular region corresponds to the age of its vegetation. Often, renewed growth of vegetation after a major fire tends to pose a lesser risk during the first ten years of growth. However, as dead vegetation accumulates, the potential for a major wildfire increases as these materials are more susceptible to ignition and facilitate the spreading of flames.

Calgrove Fire

The 2015 Calgrove Fire provides an example of the wildfire threat to the City of Santa Clarita. The fire began on June 24th near Interstate 5 in Santa Clarita and burned over 400 acres. At the peak of the fire 1,000 people were evacuated and more than 500 homes and numerous livestock were affected by the threat. Due to a rapid response and the allocation of significant resources fire was rapidly contained. The Los Angeles County Fire Department estimates that the value of homes saved was over \$15 million (Los Angeles County Fire Department, Gregory Hisel, Assistant Fire Chief, 2015).



Figure 14: Calgrove Fire

(Los Angeles County Fire Department, Air Operations, 2015)

Top 20 Largest California Wildland Fires (By Size)

The table below summarizes the Top 20 Wildfires in California. Summaries of the significant wildfires that have impacted the Santa Clarita area are provided in the following sub-sections.


Table 25: Top 20 Largest California Wildfires

	FIRE NAME (CAUSE)	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1	CEDAR (Human Related)	October 2003	San Diego	273,246	2,820	15
2	RUSH (Lightning)	August 2012	Lassen	271,911 CA / 43,666 NV	0	0
3	RIM (Human Related)	August 2013	Tuolumne	257,314	112	0
4	ZACA (Human Related)	July 2007	Santa Barbara	240,207	1	0
5	MATILJA (Undetermined)	September 1932	Ventura	220,000	0	0
6	WITCH (Powerlines)	October 2007	San Diego	197,990	1,650	2
7	KLAMATH THEATER COMPLEX (Lightning)	June 2008	Siskiyou	192,038	0	2
8	MARBLE CONE (Lightning)	July 1977	Monterey	177,866	0	0
9	LAGUNA (POWERLINES)	September 1970	San Diego	175,425	382	5
10	BASIN COMPLEX (Lightning)	June 2008	Monterey	162,818	58	0
11	DAY FIRE (Human Related)	September 2006	Ventura	162,702	11	0
12	STATION FIRE (Human Related)	August 2009	Los Angeles	160,557	209	2
13	McNALLY (Human Related)	July 2002	Tulare	150,696	17	0
14	STANISLAUS COMPLEX (Lightning)	August 1987	Tuolumne	145,980	28	1
15	BIG BAR COMPLEX (Lightning)	August 1999	Trinity	140,948	0	0
16	HAPPY CAMP COMPLEX (Lightning)	August 2014	Siskiyou	132,833	6	0
17	CAMPBELL COMPLEX (Powerlines)	August 1990	Tehama	125,892	27	0
18	WHEELER (Arson)	July 1985	Ventura	118,000	26	0
19	SIMI (Under Investigation)	October 2003	Ventura	108,204	300	0
20	HWY. 58 (Vehicle)	August 1996	San Luis Obispo	106,668	13	0

***Happy Camp Complex Fire information may change until the fire is contained.**

*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.



10/6/2014

(California Department of Forestry & Fire Protection, 2014)

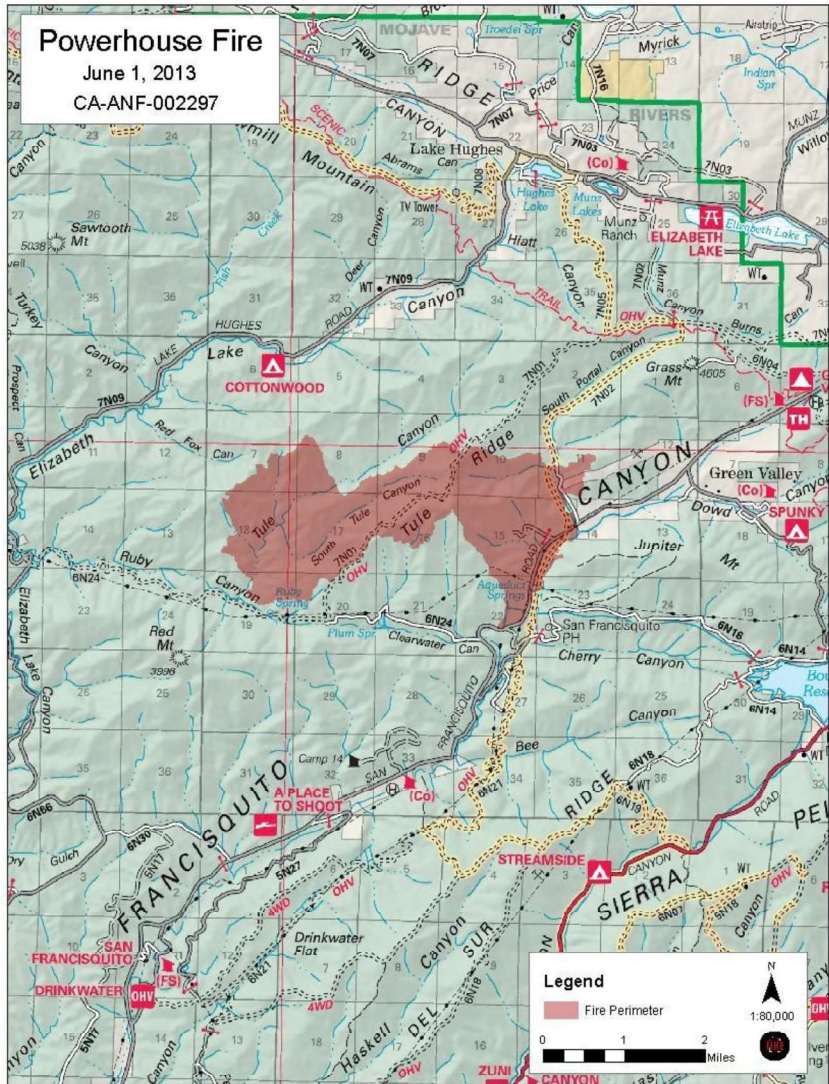
2013 Powerhouse Fire

Date(s)	5/30/2013 – 6/10/2013
Size	30,274 acres
Injuries/Deaths	10 injuries
Structures Destroyed	58 structures lost
Cost	Estimated suppression cost: \$11,500,000

(CAL FIRE, 2013)

On May 30, 2013 the Powerhouse fire began. Ultimately the fire lasted 10 days before it was contained. The resulting losses included over 30,000 acres burned, 10 injuries, and 58 structures lost. (InciWeb, 2013)

Several lawsuits were subsequently filed alleging that the Department of Water & Power (DWP) was responsible for the fire due to poor equipment maintenance of their equipment and power lines near the DWP Powerhouse No. 1 power plant off San Francisquito Canyon Road.

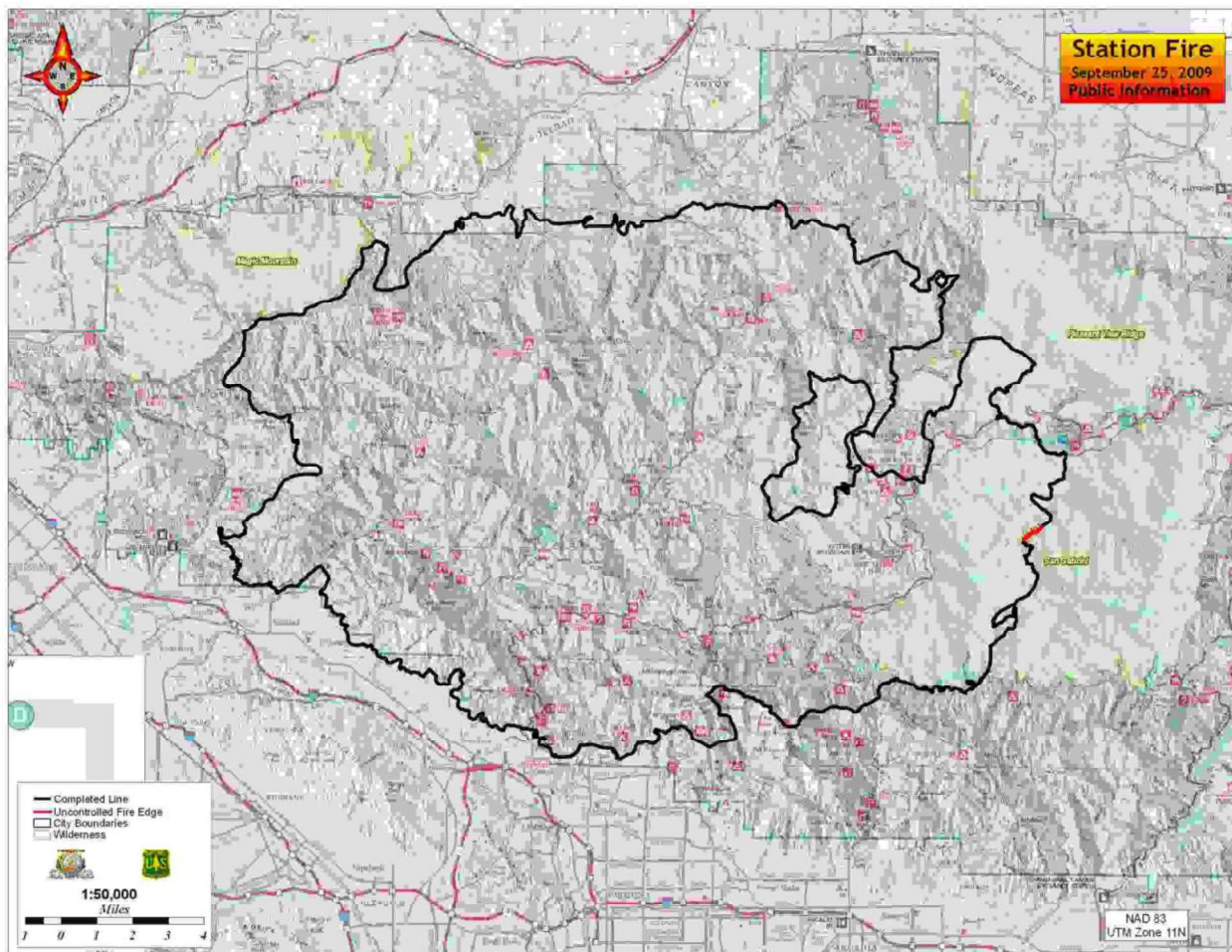


Map 9: Powerhouse Fire

2009 Station Fire

Date(s)	8/26/2009 – 10/16/2009
Size	160,557 acres
Injuries/Deaths	134 injures / 2 killed
Structures Destroyed	209 structures lost
Cost	Estimated suppression cost: \$95,300,000

(CAL FIRE, 2009), (USFS, 2009)



Map 10: Station Fire

(InciWeb, 2009)

The Station Fire was started by an arsonist in the Angeles National Forest, north of Los Angeles. It was the largest fire in Los Angeles County’s recorded history, resulting in 2 firefighter deaths and burning a total of 161,189 acres (nearly 252 square miles).

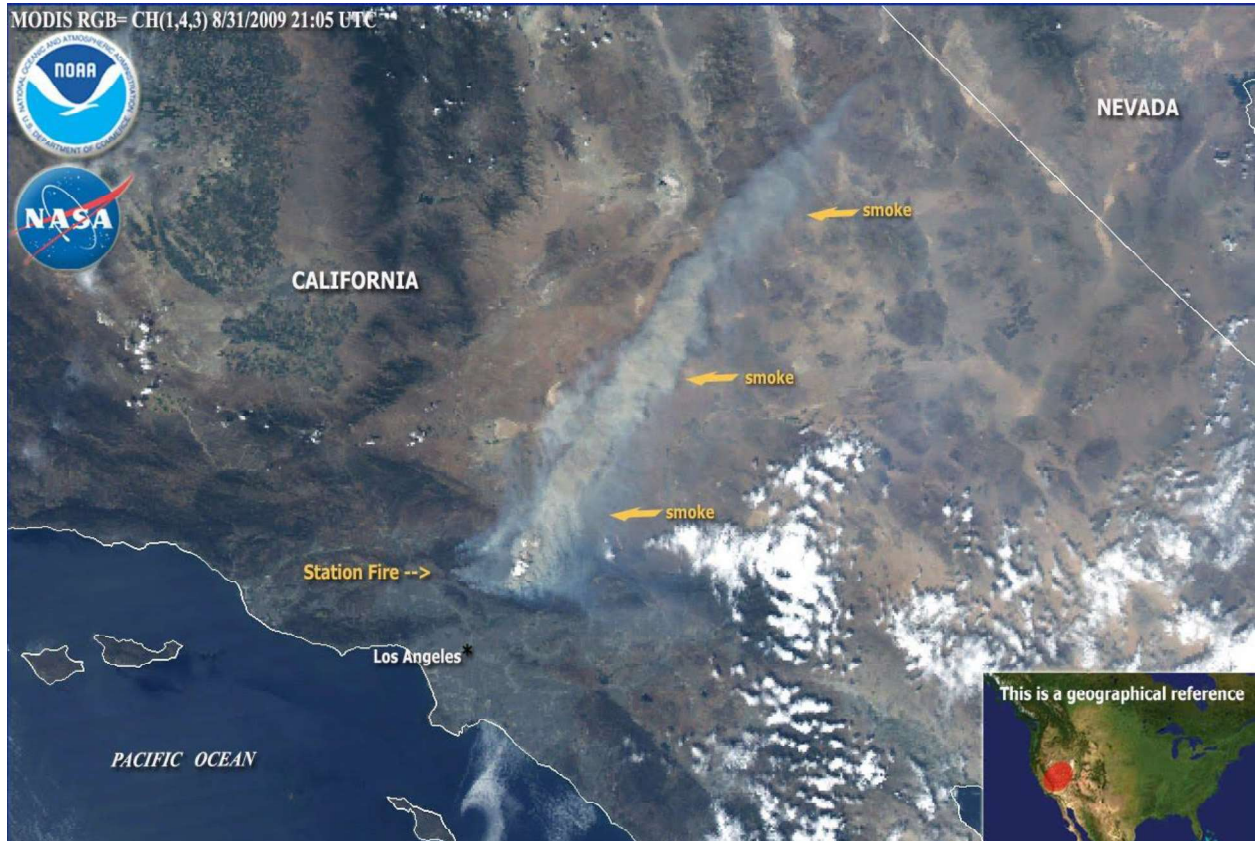


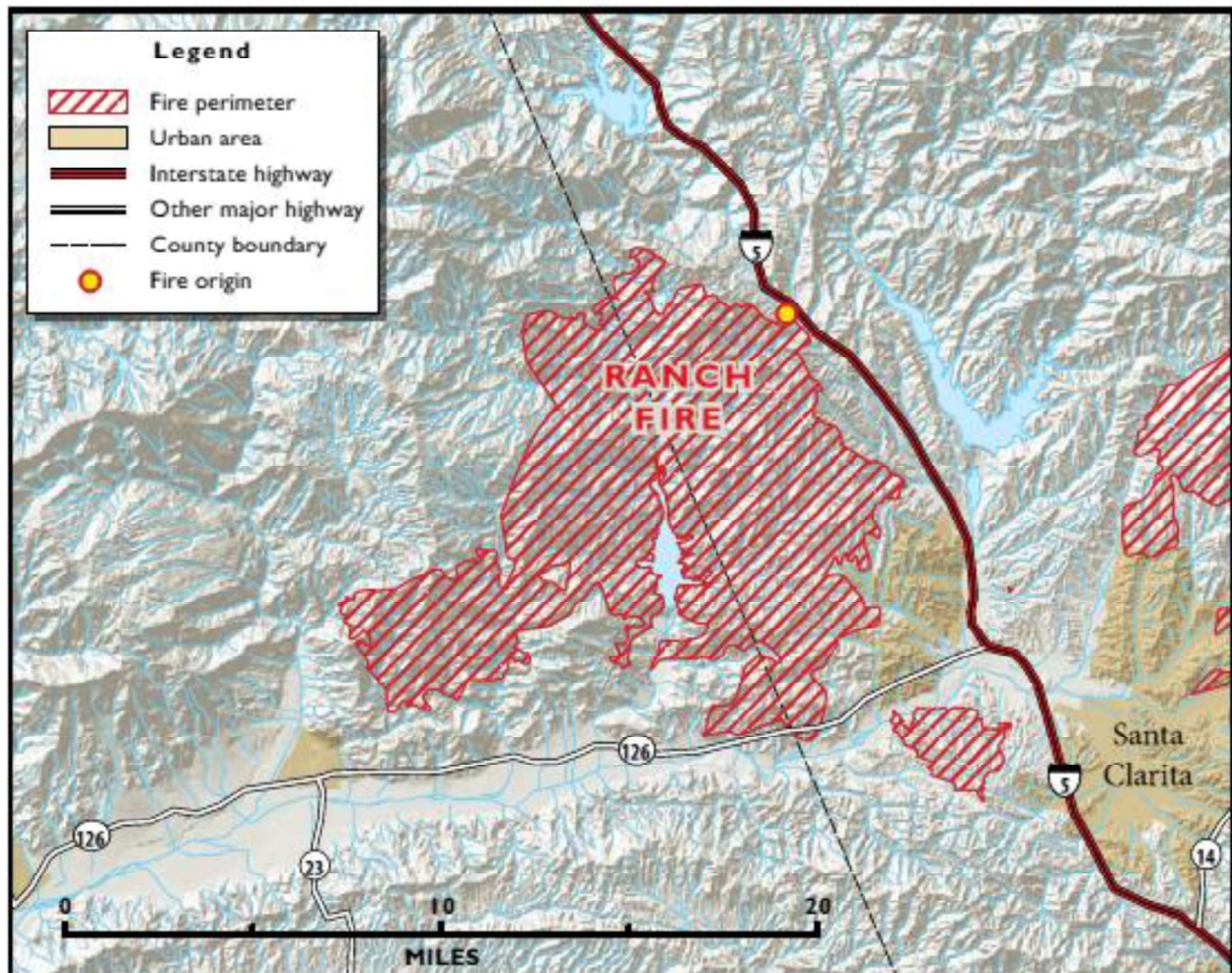
Figure 15: Station Fire Satellite Image
(NOAA, NASA, 2009)

2007 Southern California Fires

In late October 2007 a series of wildfires devastated the Southern California area. The fires in the Santa Clarita area were the Ranch, Buckweed, and Magic Fire. The following summaries provide an overview of these fires, maps, and key statistics and were taken from the comprehensive report: California Fire Siege 2007, An Overview (CAL FIRE, U.S. Forest Services, Cal OES, 2009).

Ranch Fire

Date(s)	10/20/2007 – 10/30/2007
Size	58,401 acres
Injuries/Deaths	8 injuries
Structures Destroyed	10 structures lost
Cost	USFS estimated suppression cost: \$9,945,000 CAL FIRE estimated suppression cost: \$3,031,397



Map 11: Ranch Fire

The Ranch Fire started at 9:42 p.m., October 20, 2007, on the west side of Interstate-5, approximately seven miles northwest of the community of Castaic, in Los Angeles County, and was burning to the southwest toward Ventura County. Santa Ana winds were blowing 25-to-30 miles per hour, and gusting to 40 miles per hour. The fire was spotting up to 1/2 mile, and by 6:00 a.m. October 21, it had burned 500 acres but was slowing down. The winds had calmed to 10 miles per hour, with gusts to 20 miles per hour, and the relative humidity rose to 45%. Additional resources arrived and there was no eminent threat to structures unless the winds picked up again. Three hours later at 9:00 a.m., the fire was still holding at 500 acres. However, the winds picked up again and spread the fire from a rural area without threat to structures, to 6,000 acres. By the end of the day, it threatened the communities of Fillmore, Piru, Ventura, Ojai, and the Condor Reserve and Sespe Wilderness areas.

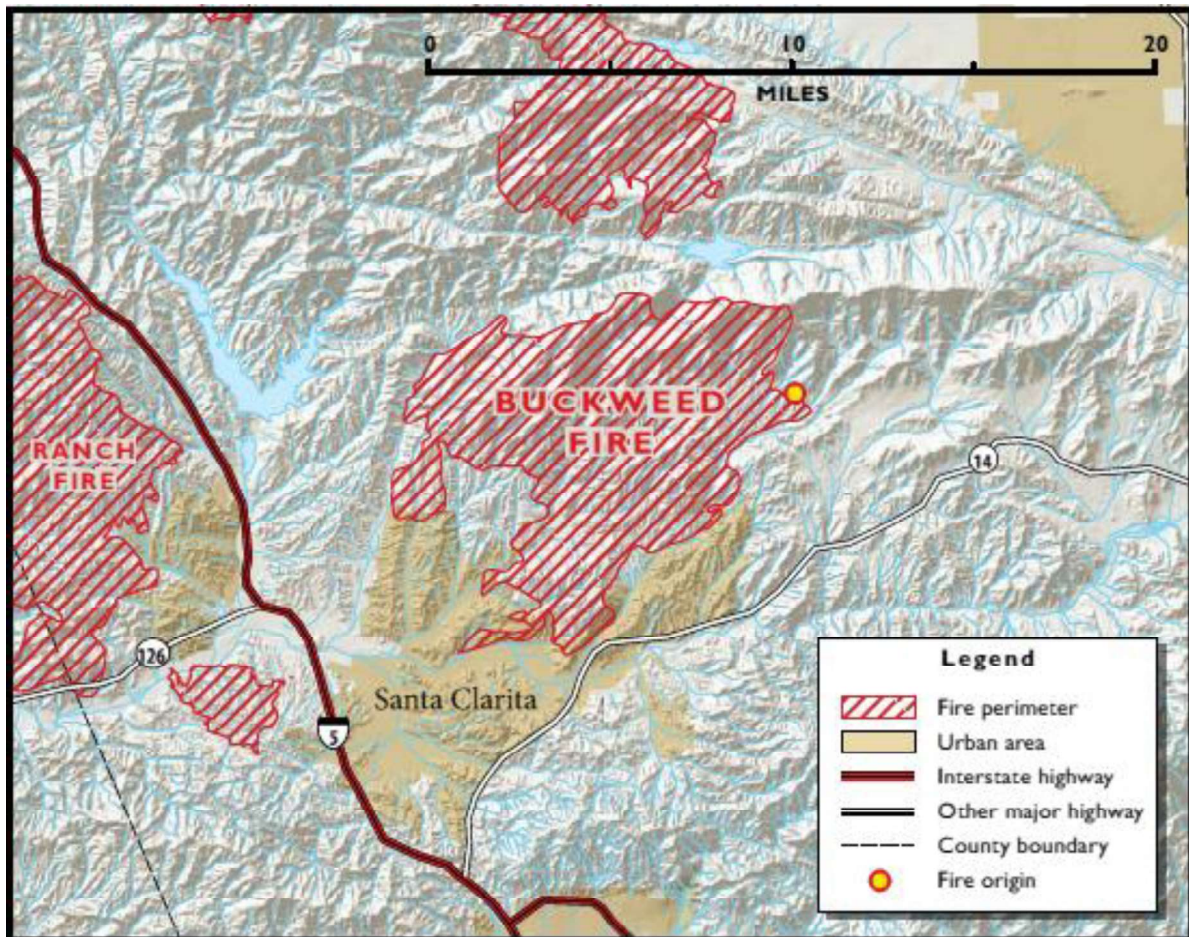
Winds continued to drive the fire, and by the morning of October 23, the area burned exceeded 50,000 acres, and the fire became well established in Ventura County. If the winds continued, the Buckweed, Magic, and Ranch fires were expected to burn together in 24-to-48 hours. By October 23, seven structures were reported destroyed, and Highway 126 was closed.

An evacuation center was established at the Fillmore Veterans Memorial Building. Large animals were evacuated to the Ventura County Fairgrounds and small animals were moved to the Camarillo Animal Shelter. Evacuations occurred in Chiquito Canyon, Halsey Canyon, Val Verde, Hopper Canyon and toward Fillmore. Structure protection was provided for Hasley, Piru, Sespe, Fillmore, and structures along Highway 126.

By the morning of October 24, the winds had calmed and fire activity was minimal with some topography driven short distance runs; flames were visible from Interstate-5. Evacuations were lifted and efforts refocused on securing the perimeter and mopping up. Line construction was completed on the west perimeter of the fire on October 26; the fire was 97% contained by October 27. The Ranch Fire was 100% contained on October 30, 2007.

Buckweed Fire

Date(s)	10/21/07 – 10/24/07
Size	38,356 acres
Injuries/Deaths	1 injury
Structures Destroyed	63 structures lost
Cost	USFS estimated suppression cost: \$5,810,000 CAL FIRE estimated suppression cost: \$2,135,148



Map 12: Buckweed Fire

The Buckweed Fire was reported near Mint Canyon Road and Sierra Highway at 12:55 p.m. on October 21, 2007. It was rapidly spread by strong, gusty Santa Ana winds. By 4:30 p.m., about 2,000 acres had burned, Sierra Highway and many other roads were closed, and the fire was moving toward the city of Santa Clarita. At 5:43 p.m. the fire was reported to be about 10,000 acres, numerous structures had been destroyed, and another 200 were threatened. Evacuations were in progress for upper Bouquet Canyon, San Francisquito Canyon, and Green Valley areas. Evacuation centers were established at Hart High School, Saugus High School, Crown Valley Middle School, and Meadowlark School.

As of 8:25 a.m., on October 22, the Santa Ana winds continued. The area had burned nearly 30,000 acres, and at least 25 structures had destroyed. As the fire burned toward the Magic Mountain area of Santa Clarita, evacuations continued and now included Vasquez Canyon, Copperhill, and areas up to Spunky Canyon. A total of 3,800 residences as well as major electrical transmission lines were threatened. The L.A. County Sheriff, and Animal Control coordinated animal evacuations. Only residents were allowed into the evacuation areas. Both the Saugus Union School District and the Castaic School District cancelled classes. The incident exceeded capabilities of available firefighting resources.

By 2:00 p.m. the burn area exceeded 35,000 acres. It was estimated that 15,000 people were evacuated from 5,500 homes. The south flank slowed significantly when it ran into a sub-division surrounded by a greenbelt. The west flank held in San Francisquito Canyon. As winds eased later that afternoon, the fire spread slowed, containment lines held, containment increased and the threat to the communities diminished. It was noted that there were impacts to archeological sites along the service road to Drinkwater Reservoir and along Del Sur Ridge, and also that fires threatened the endangered the Red Legged frog, Arroyo toad and Stickleback fish. At 5:45 pm, conditions had improved, evacuations were lifted and residents were allowed return.

By 6:00 p.m. on October 23, containment was at 80%, and mop-up, patrol, and containment line improvement were the main focuses. Both the Buckweed and nearby Magic Fires were 100% contained on October 24, 2007.

Impact on Santa Clarita

The strong Santa Ana winds, the dry weather, and drought conditions caused the “perfect storm” for the fires that spread quickly, jumped canyons, and destroyed everything in its path. At one point, nearly every major roadway out of the area was closed due to the fires, leaving only the freeways to exit the community.

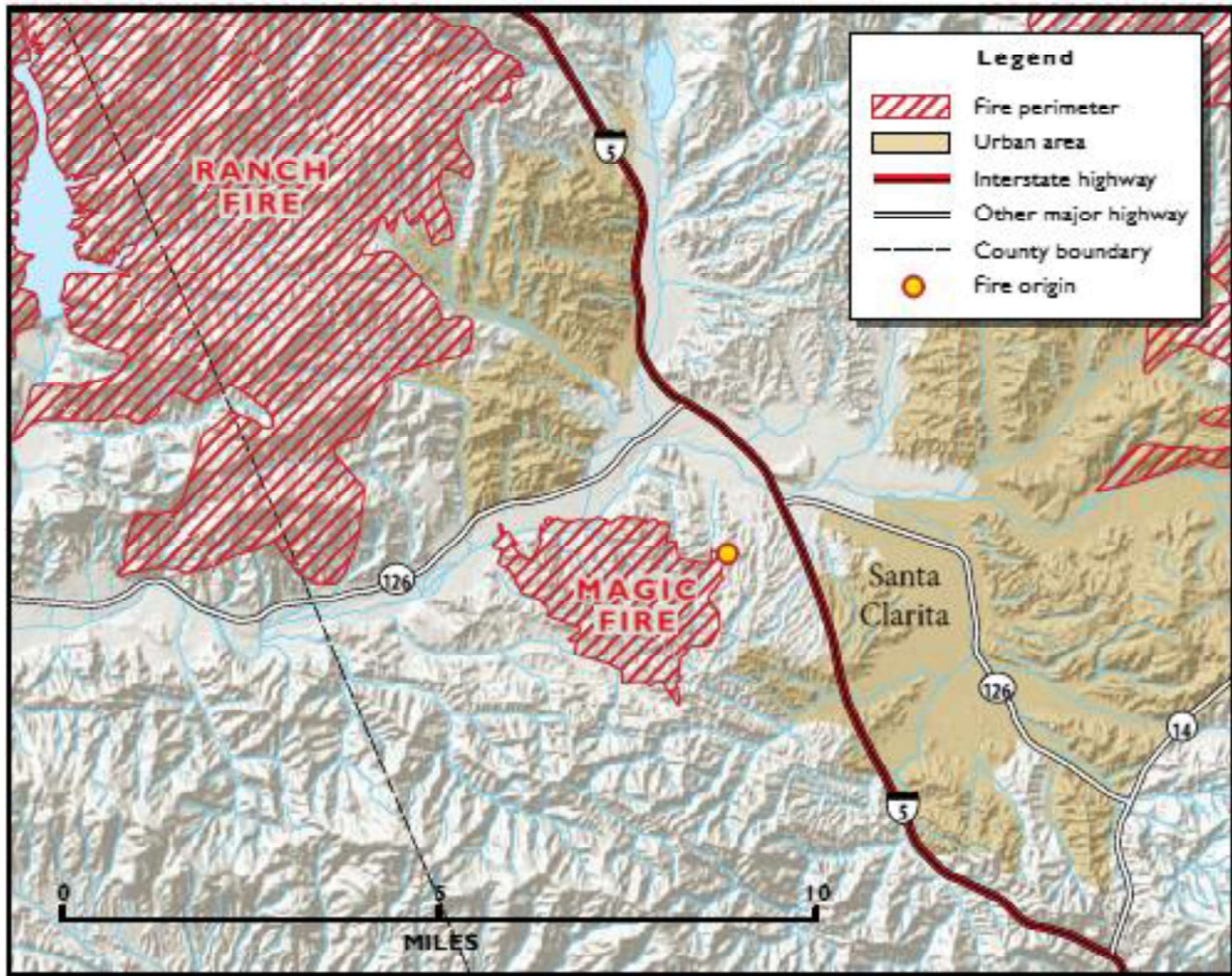
For the first time, the City of Santa Clarita utilized its Emergency Mass Notification System to send telephone evacuation notifications to 1,200 homes in under one hour. The City’s home page (www.santa-clarita.com) was transformed into an emergency information site, and was updated almost every minute with all manner of information of importance to Santa Clarita residents. This City’s emergency information web site received 151,195 unique visitors during the three-day fire disaster.

The City partnered with the American Red Cross and the William S. Hart School District to set up shelters at local high schools, including Golden Valley and Saugus High Schools. Over 490 residents were served at both Red Cross shelters in two days. On the final day, 103 people were using the shelters.

The City submitted claims totaling \$92,746 through the Public Assistance program with FEMA and Cal-OES for debris removal, traffic control, road closures, evacuation and city buses. An additional \$20,792 was claimed with the Federal Highway Administration for a destroyed guard rail. Private property losses are estimated at approximately \$2.8 million.

Magic Fire

Date(s)	10/22/07 – 10/24/07
Size	2,284 acres
Injuries/Deaths	0
Structures Destroyed	0
Cost	USFS estimated suppression cost: \$125,000 CAL FIRE estimated suppression cost: \$900,196



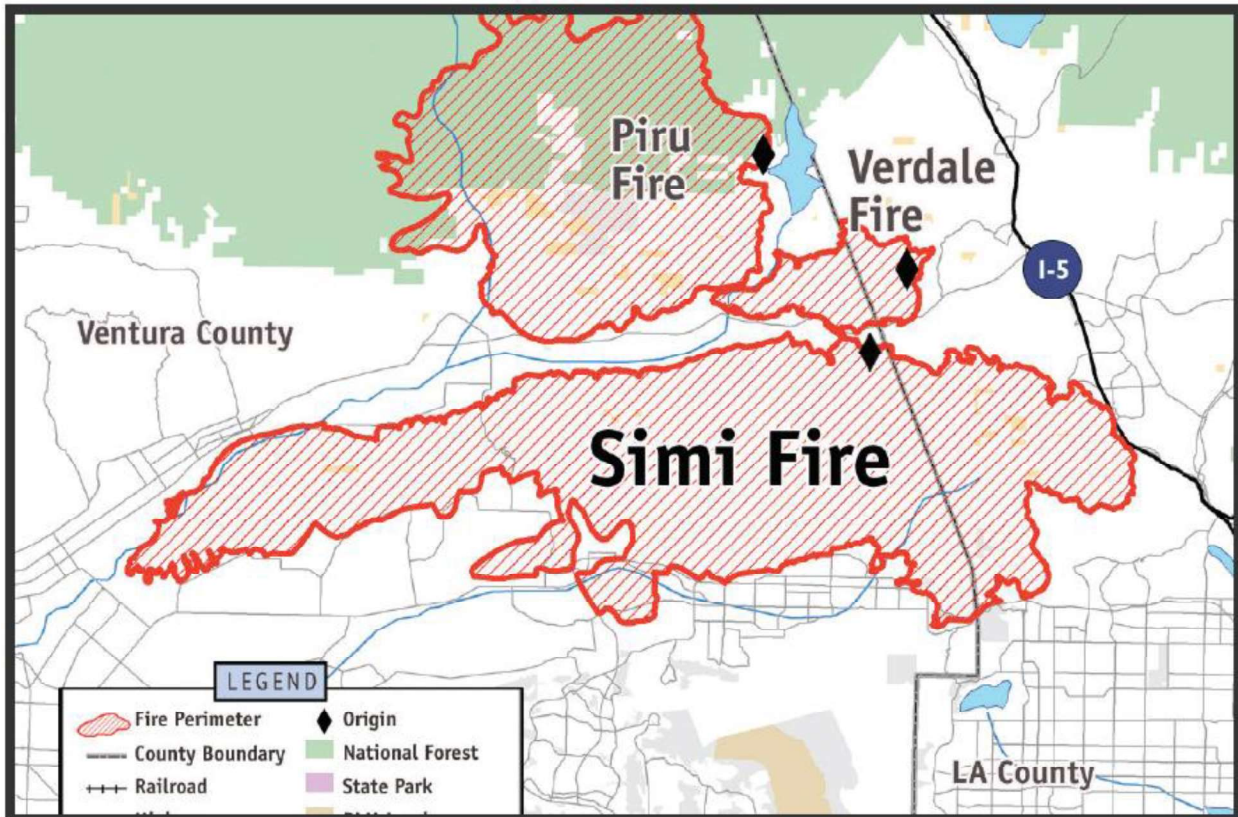
Map 13: Magic Fire

The Magic Fire started shortly after 2:00 p.m., October 22, near the Six Flags Magic Mountain amusement park on the western side of Santa Clarita. By October 23 the fire had grown to 1,200 acres. Only 20% contained, it was considered a threat to Simi Valley if the winds continued. However, weather conditions improved, and by evening there was little fire spread, and control lines were holding. Efforts shifted to mop-up and patrol. The Magic Fire was 100% contained on October 24, 2007.

2003 Southern California Fires

The fall of 2003 was the most destructive wildfire season in California history. In a 10-day period, 12 separate fires raged across Los Angeles, Riverside, San Bernardino, San Diego, and Ventura Counties, burning almost 750,000 acres and resulting in the loss of 22 lives and 4,812 homes. The magnitude of the 2003 fires resulted from a combination of factors, including extended drought followed by thunderstorms, lightning strikes and windy conditions; an infestation of bark beetles that killed thousands of mature trees; and the practice of suppressing wildfires over the last century that has led to buildup of brush and highly flammable fuel loads (Los Angeles County, 2009).¹⁶

The 2003 fires in the Santa Clarita area were the Simi Fire and Verdale Fire. The following summaries provide an overview of these fires, maps, and key statistics and were taken from the comprehensive report: California Fire Siege 2003, The Story (USFS and the CA Dept. of Forestry and Fire Protection, 2004).



Map 14: 2003 Simi, Verdale, and Piru Fires

¹⁶ Los Angeles County Preliminary Draft Santa Clarita Valley Area Plan, 2009

Verdale Fire

Date(s)	10/24/2003 – 10/28/2003
Size	8,650 acres
Injuries/Deaths	0
Structures Destroyed	1
Cost	Estimated suppression cost: \$2,407,000

The Verdale Fire started in Los Angeles County near the community of Santa Clarita and quickly burned into Ventura County. When the fire spotted across Highway 126, three-quarters of a mile away, the Chief Officers of LA County and Ventura County Fire Departments agreed to create a second incident command, the Simi Fire. This decision allowed for a simplified command structure, reducing the span of control and potential communication problems as the fire spread into Ventura County. By October 25, Incident Commanders effectively operated as an area command to share resources as needed between the Verdale, Piru, and Simi fires. The strategy allowed for an efficient use of available resources on the incidents but caused some confusion at South Ops.

Simi Fire

Date(s)	10/25/2003 – 11/04/2003
Size	108,204 acres
Injuries/Deaths	0
Structures Destroyed	315
Cost	Estimated suppression cost: \$10,000,000

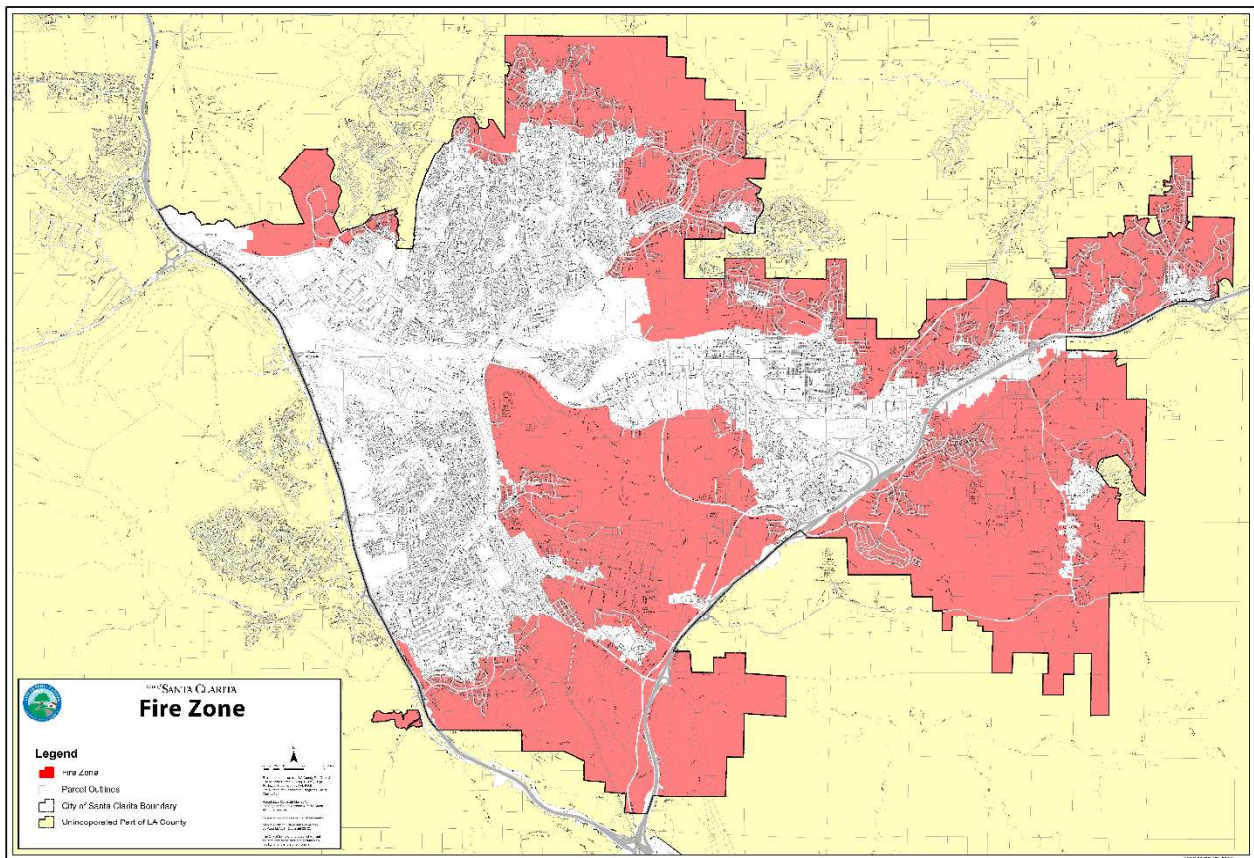
The fires burning on the Los Angeles and Ventura County line moved at extraordinary rates of spread. The Simi Fire, fanned by Santa Ana winds burned at the incredible rate of 80,000 acres in 16 hours. Contingency plans were developed early on in the firefight to prevent the predictable spread of the fire to the west.

By Oct. 25, Incident Commanders for the Verdale, Piru, and Simi fires coordinated and shared resources among the fires, effectively operating as an area command. As Santa Ana winds pushed the fire through Ventura County, the State Incident Command Team focused on a defensive strategy to protect lives and property. With resources critically short, the Ventura County Fire Chief requested ambulance companies to cover empty fire stations to provide basic EMS services to the public. Fire history for the last eight major fires in this area shows that a fire will run through Rocky Peak Park to Malibu once it crosses Highway 118. The fire was successfully stopped at the 118 Freeway. On the night of October 25 and into the morning hours of the October 26, the rampaging fire burned 300 structures including 22 homes. On October 26, LA City and County Chiefs took independent action to launch all air resources within the county’s control to stop the eastern progression of the Simi Fire. On Oct. 27, the Incident Command Team requested the closure of Interstate 5 in Santa Clarita for public and firefighter safety knowing that interstate commerce would be severely impacted. During the wind event, firefighters were able to take advantage of the vegetation clearance and construction standards required by county ordinance to save subdivisions and were able to allow citizens to shelter in place rather than evacuate. The defensible space ordinances proved very successful.

Wildfire Probability, Frequency and Magnitude

According to the Los Angeles County Fire Department (LACoFD) and CAL FIRE (CAL FIRE, 2012), approximately 80 to 90 percent of the Santa Clarita Valley is in a Very High Fire Hazard Severity Zone (VHFHSZ) which is the department's highest classification for areas prone to wildfires.

The City's Technology Services Division, GIS Group used data from LA County Fire Department and City of Santa Clarita Building and Safety Department, and the City's GIS data to create the Fire Zones Map (below). The Fire Zones Map depicts the Very High Fire Hazard Severity Zones within and surrounding the City (see Appendix D: Maps - Fire Zone Map for an expanded view).



Map 15: Santa Clarita Fire Zones

(City of Santa Clarita, GIS, 2012)

Note: Effective January 1, 2014 the City of Santa Clarita Building Code was amended with specific construction requirements for VHFHSZ structures (City of Santa Clarita, 2014).

Wildfire Vulnerability

Southern California residents are served by a variety of local fire departments as well as county, state, and federal fire resources. Data that includes the location of interface areas in the county can be used to assess the population and total value of property at risk from wildfire and direct these fire agencies in fire prevention and response.

Key factors included in assessing wildfire risk include ignition sources, building materials and design, community design, structural density, slope, vegetative fuel, fire occurrence and weather, as well as occurrences of drought. In the event of a wildfire, vegetation, structures, and other flammables can merge into unwieldy and unpredictable events. Factors important to the fighting of such fires include access, firebreaks, proximity of water sources, distance from a fire station, and available firefighting personnel and equipment. Reviewing past wildland/urban interface fires shows that many structures are destroyed or damaged for one or more of the following reasons:

- Combustible roofing material;
- Wood construction;
- Structures with no defensible space;
- Fire department with poor access to structures;
- Subdivisions located in heavy natural fuel types;
- Structures located on steep slopes covered with flammable vegetation;
- Limited water supply; and
- Winds over 30 miles per hour.
- The National Wildland/Urban Fire Protection Program has developed the Wildland/Urban Fire Hazard Assessment Methodology tool (1997) for communities to assess their risk to wildfire.

For more information on wildfire hazard assessment refer to <http://www.Firewise.org> (Firewise Communities).

Wildfire Magnitude and Potential Damage

Potential Magnitude of Wildfires

The City’s Technology Services Division, GIS Group used the LACoFD’s Fire Zone data and the city’s own GIS data to identify the structures that lie within the fire hazard zones. It is understood that if a structure is identified in a fire hazard area that it has a higher probability of being impacted by a fire than a structure that is not in the fire hazard area. The following table identifies the number of structures by type in the city’s VHFHSZ.

Table 26: VHFHSZ Potential Building Count and Valuation by General Occupancy Type

Occupancy Type	Number of Buildings in Very High Fire Hazard Severity Zones	Valuation of Buildings in Very High Fire Hazard Severity Zones
Commercial	255	\$95,505,294
Industrial	353	\$273,257,193
Mixed Use	368	\$115,819,133
Residential	16,101	\$7,323,292,076
Special Plan	2,058	\$916,520,641
Open Space	211	\$34,310,308
Other (Public/Institutional)	417	\$121,963,999
TOTAL	19,763	\$8,880,668,644

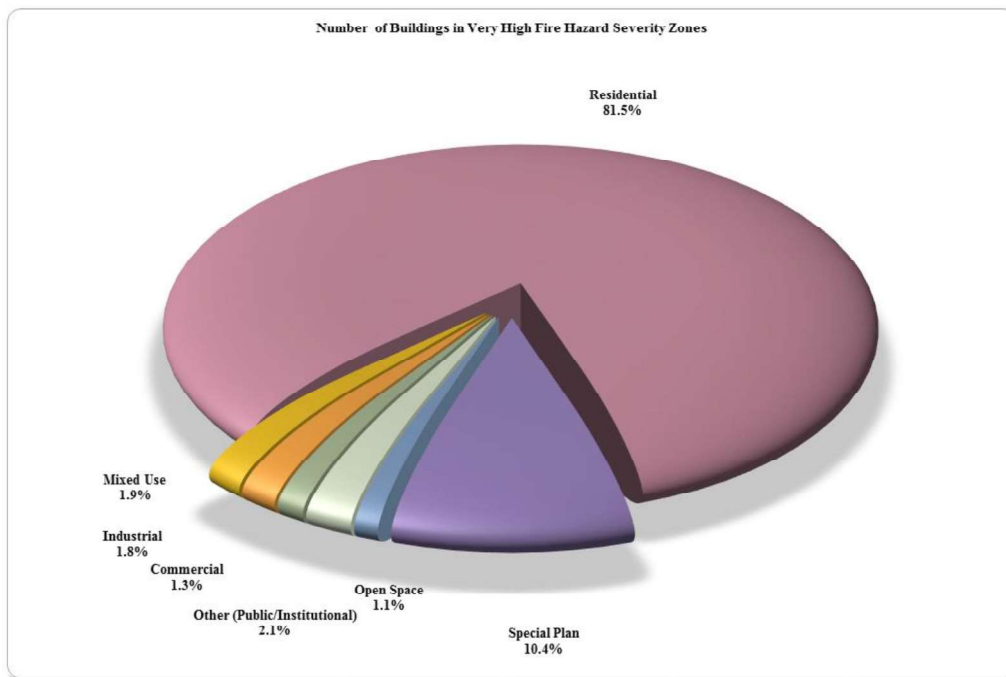


Figure 16: Number of Buildings in VHFHSZ

Estimated Wildfire Damage

In the event of wildfires, the following estimate has been developed based on the number of properties by type in VHFHSZ in Santa Clarita. The purpose of the estimate is to provide an example for planning purposes. The estimate is based on damage to 1% of properties in VHFHSZ areas.

Table 27: Estimate of Wildfire Damage by Occupancy Type

Occupancy Type	# of Buildings in Very High Fire Hazard Severity Zone	# of Properties Damaged if a 1% Loss Occurs	Valuation of Properties Damaged if a 1% Loss Occurs
Commercial	255	3	\$955,053
Industrial	353	4	\$2,732,572
Mixed Use	368	4	\$1,158,191
Residential	16,101	161	\$73,232,921
Special Plan	2,058	21	\$9,165,206
Open Space	211	2	\$343,103
Other (Public/Institutional)	417	4	\$1,219,640
TOTAL	19,763	198	\$88,806,686

Existing Mitigation Activities and Wildfire Services

Los Angeles County Fire Department

The City of Santa Clarita and the unincorporated parts of the Santa Clarita Valley receive urban and wildland fire suppression service from the LACoFD. Mutual aid or assistance pacts are maintained with several local, state, and federal agencies. As of 2015, there are eleven fire stations in Santa Clarita with another 5 fire stations in the nearby area. These stations include engine companies, ladder trucks, paramedic squads, and hazardous materials squads, serving the Santa Clarita Valley. A list and location of the facilities are shown in Table 28: Los Angeles County Fire Department Stations in the City of Santa Clarita and Surrounding Area.

Station 150 was dedicated in 2013 and includes Hazardous Materials Task Force 150. Station 150 is also the Battalion 22 and Division III Headquarters for the Santa Clarita Valley (Los Angeles County Fire Department Station 150, 2013).

Aside from the personnel and equipment listed above, the LACoFD has additional resources available to provide back-up services to the Santa Clarita Valley as needed, including additional engine companies, truck companies, paramedic squads, hazardous material squads, firefighting helicopters, other fire camps, and a variety of specialty equipment.

- The Los Angeles County Fire Department, Air Operations, operates a fleet of three Bell 412HP, two Bell 412 EP and three Sikorsky S-70 Firehawks. All of these aircraft are multi-mission configured. Each has a rescue hoist for removing sick, injured or trapped victims from precarious locations.

- Additionally, each aircraft has an interior that can be utilized for paramedic patient transport to specialty centers for trauma or critical illness.
- All of the aircraft carry fixed water tanks for water dropping on wildfires. The Bell aircraft drop up to 360 gallons of water or water with firefighting foam. The S-70 Firehawk is capable of dropping up to 1000 gallons of water or water firefighting foam in a single drop.
- The Firehawk cabin is also quickly converted for firefighting crew transport during fire season.



Figure 17: LACoFD Firehawk Helicopter



Figure 18: LACoFD Bell 412 Helicopter (PHPA.org)

The citizens of Los Angeles County are provided unmatched protection by these capable aircraft and the talented pilots and firefighter paramedics that staff them. The Los Angeles County Fire Department also contracts a Sikorsky S-64 Sky Crane as well as two CL-415 SuperScoopers to cost-effectively augment the already robust air force. These resources are added during the critically dry fall months when the fierce Santa Ana winds occur.



Figure 19: LACoFD SuperScoopers



Figure 20: LACoFD Rescue Operations

Another major activity area of the LACoFD, Emergency Medical Service (EMS) was established in 1969. This service allows paramedics to go straight to a medical call and, if necessary, implement advance life support while being able to contact a nurses at a hospital over a specially designed radio system. Aside from EMS provided by the LACoFD, there is also a private ambulance service in the Santa Clarita Valley.

The mission of the Health Hazardous Materials Division is “to protect the public health and the environment throughout Los Angeles County from accidental releases and improper handling, storage, transportation and disposal of hazardous materials and waters through coordinated efforts of inspections, emergency response, enforcement, and site mitigation oversight.”

LACoFD also provides the Urban Search and Rescue (USAR) services, an activity that requires special training and equipment, allows the LACoFD to offer advanced technical rescue capabilities during disasters. Members of the USAR Committee, which consists of LACoFD personnel certified as California State instructors for Rescue Systems 1 and Emergency Trench Rescue, are trained in:

- Confined space rescue
- High angle rescue
- The use of Biopack self-contained breathing apparatuses (SCBAs)
- Helicopter rescue
- Rescue diving
- Other specialties

LACoFD Fire Stations in Santa Clarita
(Los Angeles County Fire Department, 2015)

Table 28: Los Angeles County Fire Department Stations in the City of Santa Clarita and Surrounding Area

Station	Location
Fire Station 73*	24875 N. San Fernando Road Santa Clarita, CA 91321
Fire Station 104	26201 Golden Valley Road Santa Clarita, CA 91350
Fire Station 107*	18239 W. Soledad Canyon Santa Clarita, CA 91351
Fire Station 108	28799 Rock Canyon Drive Santa Clarita, CA 91390
Fire Station 111*	26829 Seco Canyon Road Santa Clarita, CA 91350
Fire Station 123	26321 N. Sand Canyon Road Santa Clarita, CA 91387
Fire Station 126 Los Angeles County Fire Dept. Battalion 6 Headquarters	26320 Citrus Street Santa Clarita, CA 91355
Fire Station 128	28450 Whites Canyon Road Santa Clarita, CA 91351
Fire Station 132	29310 Sand Canyon Road Santa Clarita, CA 91387
Fire Station 150 Battalion 22 Division III Headquarters Hazardous Materials Task Force	19190 Golden Valley Road Santa Clarita, CA 91387
Fire Station 156	24525 Copper Hill Drive Santa Clarita, CA 91354
Stations Outside of the City – Serving the City of Santa Clarita	
Fire Station 76	27223 Henry Mayo Drive Valencia, CA 91355
Fire Station 77	46833 Peace Valley Road Gorman, CA 93243
Fire Station 80	1533 W. Sierra Highway Acton, CA 93510
Fire Station 81*	8710 W. Sierra Highway Agua Dulce, CA 91350
Fire Station 124*	25870 Hemingway Ave. Stevenson Ranch, CA 91381
Fire Station 149*	31770 Ridge Route Castaic, CA 91384
Fire Station 157	15921 Spunky Canyon Road Green Valley, CA 91390
* Paramedic Units	

Fire Prevention Activities

In addition to fire suppression, another major focus of LACoFD is fire prevention, which is headed up by the Fire Marshal. As of January 1, 2003, fire prevention services offered by LACoFD's Fire Prevention Bureau include the following:

- Codes and Ordinances Unit that participates in updating codes to the latest standards
- Fire Prevention Engineering that assists in plan checking, particularly for fire sprinkler installation and fire alarm plans
- Inspections of occupancies (except one and two-family dwellings)
- Forestry services that includes a Brush Clearance Compliance Program and a Fuel modification program
- Special Unites Section that includes a Petroleum/Chemical Unit, Schools and Institutions Unit, and Fire Investigation Unit
- Water, Subdivision and Access Unit that reviews development impact issues
- Area Sections Unit to inspect and plan check specific buildings/structures
- Environmental Review

Emergency Preparedness Capabilities

One of the focal points of LACoFD programs is emergency preparedness. Each year, LACoFD sponsors Fire Safety Day events throughout the County to provide residents with the knowledge base for safe fire protection strategies and tips on emergency preparedness. In addition, the LACoFD also provides programs to educate youth about fire safety as well as helping to promote healthy communities. Some of the current youth programs offered by the LACoFD to the community include the following:

- Junior Fire Chiefs – Promoting fire safety to elementary school youths.
- Rescue Youth – LACoFD joining with the District Attorney to assist “at risk” youths.
- Explorers – LACoFD's explorer program in association with the Boy Scouts of America for young adults interested in a career in Fire Service.
- WATCH (Water Awareness Training for Children in the Home) – A 5-Step program for poolside safety.
- Spark of Love – Firefighter interacting with the community to bring the spirit of togetherness.
- Yogi Bear Schoolhouse – Using a mobile earthquake simulator to stimulate heightened public awareness about earthquake preparedness.

Santa Clarita CERT Program

The City of Santa Clarita currently offers two training programs on emergency preparedness for its community. The Community Emergency Response Training (CERT) Program, which is under the leadership of the City and LACoFD, is designed to help families, neighborhoods, schools, and businesses prepare for effective disaster/emergency response through training and pre-planning. Emergency responders, emergency management personnel, and emergency trained volunteers provide training on preparation and response to fires and other life-threatening situations.

The Santa Clarita Educated Communities United in Response to Emergencies (SECURE) Program provides free emergency preparedness training for residents and businesses so they can be prepared through the critical first 72 hours from when a disaster/emergency, such as a fire, occurs. Over the past years, this program has been effective in training families, businesses, seniors, and schools about basic emergency preparedness skills. Recently, training has been expanded to also reach residents who speak Spanish as their primary language. Additionally, the program now includes specific emergency preparedness information for senior citizens and individuals with disabilities.

The City also performs outreach to its community through the Internet and libraries. Materials provided to community members include tips on emergency preparedness, such as information on how to prepare 72-Hour Emergency Financial Kits and Emergency Car Kits, how to get disaster assistance, and how to locate emergency shelters. Other non-fire-related services provided by the City depend on issues that are currently important at hand, such as information on bioterrorism preparedness and response, sand-bagging classes for El Nino season, updates on epidemics, etc. An outreach event hosted by the City of Santa Clarita is the annual Emergency Expo. This event has been in place for ten years and helps educate approximately 1,500-2,000 people per year on emergency preparedness and safety, and on the emergency services available to them in the Valley.

Interface Fire Education Programs and Enforcement

Fire protection in urban/wildland interface areas may rely heavily more on the landowner's personal initiative to take measures to protect his or her own property. Therefore, public education and awareness may play a greater role in interface areas. In those areas with strict fire codes, property owners who resist maintaining the minimum brush clearances may be cited for failure to clear brush.

Fire Codes

City and County programs directed toward wildland fire prevention include the adoption of the State Fire Code for regulations and standards to be applied toward new development in "hazardous fire areas." Fire prevention items addressed in the Fire Code include provision of access roads, adequate road widths, and clearance of brush around structures located in hillside areas that are considered primary wildland fire risk areas. Compliance with County and City Building Codes also requires that new development within high fire hazard areas show proof through certification with the LACoFD that new development is located within a designated distance of a water source such as water supply tanks or retention basins for emergency firefighting purposes. Furthermore, the Water Code specifies that water storage facilities be placed to ensure gravity emergency fire flow in the event power lines are damaged.

General Wildfire Mitigation Programs

Continued development into the interface areas will have growing impacts on the wildland/urban interface. Periodically, the historical losses from wildfires in Southern California have been catastrophic, with deadly and expensive fires going back decades. The continued growth and development increases the public need for natural hazards mitigation planning in Southern California.

Federal Programs

The role of the federal land managing agencies in the wildland /urban interface is reducing fuel hazards on the lands they administer; cooperating in prevention and education programs; providing technical and financial assistance; and developing agreements, partnerships and relationships with property owners, local protection agencies, states and other stakeholders in wildland/urban interface areas. These relationships focus on activities before a fire occurs, which render structures and communities safer and better able to survive a fire occurrence.

Fire Suppression Assistance Grants, Disaster Assistance, and Mitigation Funding

Federal Emergency Management Agency (FEMA) Programs is directly responsible for providing fire suppression assistance grants and, in certain cases, major disaster assistance and hazard mitigation grants in response to fires. The role of FEMA in the wildland /urban interface is to encourage comprehensive disaster preparedness plans and programs, increase the capability of state and local governments and provide for a greater understanding of FEMA programs at the federal, state, and local levels.

Fire Suppression Assistance Grants

Fire Suppression Assistance Grants may be provided to a state with an approved hazard mitigation plan for the suppression of a forest or grassland fire that threatens to become a major disaster on public or private lands. These grants are provided to protect life and improved property and encourage the development and implementation of viable multi-hazard mitigation measures and provide training to clarify FEMA's programs. The grant may include funds for equipment, supplies, and personnel. A Fire Suppression Assistance Grant is the form of assistance most often provided by FEMA to a state for a fire. The grants are cost-shared with states. FEMA's US Fire Administration (USFA) provides public education materials addressing wildland/urban interface issues and the USFA's National Fire Academy provides training programs.

Hazard Mitigation Grant Program

Following a major disaster declaration, the FEMA Hazard Mitigation Grant Program provides funding for long-term hazard mitigation projects and activities to reduce the possibility of damages from all future fire hazards and to reduce the costs to the nation for responding to and recovering from the disaster.

National Wildland/Urban Interface Fire Protection Program

Federal agencies can use the National Wildland/Urban Interface Fire Protection Program to focus on wildland/urban interface fire protection issues and actions. The Western Governors' Association (WGA) can act as a catalyst to involve state agencies, as well as local and private stakeholders, with the objective of developing an implementation plan to achieve a uniform, integrated national approach to hazard and risk assessment and fire prevention and protection in

the wildland/urban interface. The program helps states develop viable and comprehensive wildland fire mitigation plans and performance-based partnerships.

U.S. Forest Service

The U.S. Forest Service (USFS) is involved in a fuel-loading program implemented to assess fuels and reduce hazardous buildup on forest lands. The USFS is a cooperating agency and, while it has little to no jurisdiction in the lower valleys, it has an interest in preventing fires in the interface, as fires often burn up the hills and into the higher elevation of U.S. forest lands.

Firewise

Firewise is a program developed within the National Wildland/ Urban Interface Fire Protection Program and it is the primary federal program addressing interface fire. It is administered through the National Wildfire Coordinating Group whose extensive list of participants includes a wide range of federal agencies. The program is intended to empower planners and decision makers at the local level. Through conferences and information dissemination, Firewise increases support for interface wildfire mitigation by educating professionals and the general public about hazard evaluation and policy implementation techniques. Firewise offers online wildfire protection information and checklists, as well as listings of other publications, videos and conferences. The interactive home page allows users to ask fire protection experts questions and to register for new information as it becomes available.

Other Mitigation Programs and Activities

Some areas of the country are facing wildland/urban issues collaboratively. These are model programs that include local solutions. Summit County, Colorado, has developed a hazard and risk assessment process that mitigates hazards through zoning requirements. In California, the LACoFD has retrofitted more than 100 fire engines with fire retardant foam capability and Orange County is evaluating a pilot insurance grading and rating schedule specific to the wildland/urban interface. All are examples of successful programs that demonstrate the value of pre-suppression and prevention efforts when combined with property owner support to mitigate hazards within the wildland/urban interface.

Prescribed Burning

The health and condition of a forest will determine the magnitude of wildfire. If fuels - slash, dry or dead vegetation, fallen limbs and branches - are allowed to accumulate over long periods of time without being methodically cleared, fire can move more quickly and destroy everything in its path. The results are more catastrophic than if the fuels are periodically eliminated. Prescribed burning is the most efficient method to get rid of these fuels. In California during 2003, various fire agencies conducted over 200 prescribed fires and burned over 33,000 acres to reduce the wildland fire hazard.

FireFree Program

FireFree is a unique private/public program for interface wildfire mitigation involving partnerships between an insurance company and local government agencies. It is an example of an effective non-regulatory approach to hazard mitigation. Originating in Bend, Oregon, the program was developed in response to the city's "Skeleton Fire" of 1996, which burned over 17,000 acres and damaged or destroyed 30 homes and structures. Bend sought to create a new kind of public education initiative that emphasized local involvement. SAFECO Insurance Corporation was a willing collaborator in this effort. Bend's pilot program included:

- A short video production featuring local citizens as actors, made available at local video stores, libraries, and fire stations;
- Two city-wide yard debris removal events;
- A 3D-minute program on a model FireFree home, aired on a local cable television station; and
- Distribution of brochures, featuring a property owner evaluation checklist and a listing of fire-resistant indigenous plants.

Ready!Set!Go!

The READY! SET! GO! Personal Wildfire Action Plan provides the tools and tips to successfully prepare residents for wildfires or other disasters. The program provides guidance on retrofitting homes with fire-resistive construction, helps the homeowner create the necessary defensible space around their home, which will give firefighters a chance to fight the fire and protect homes and surrounding neighborhoods. Most, importantly, it help protects lives by explaining why families need to evacuate early, well ahead of a fast-approaching wildfire.

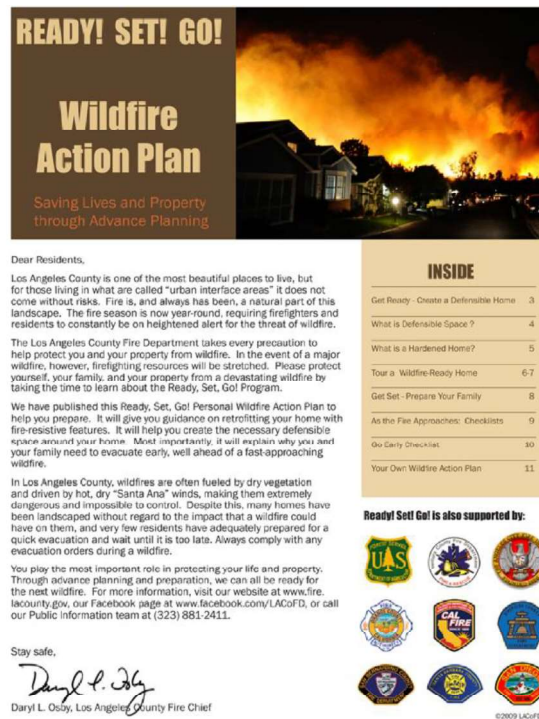
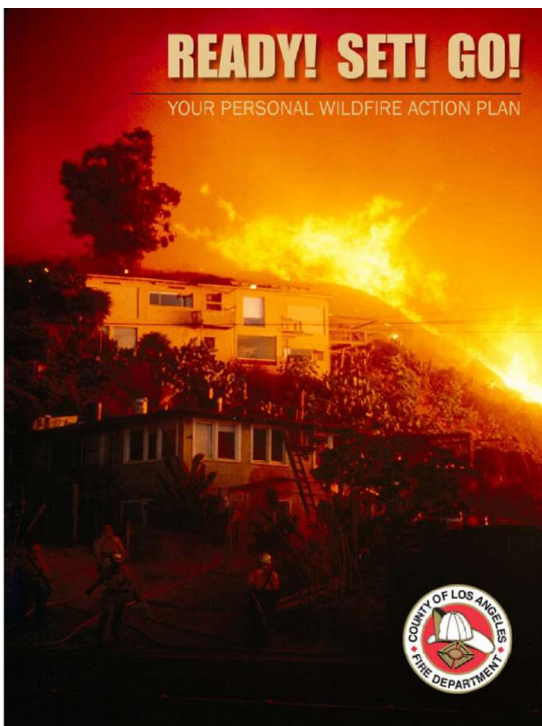


Figure 21: Ready! Set! Go! Wildfire Action Plan

Wildfire Mitigation Strategies and Action Items

The wildfire mitigation strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from wildfire events. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP.

Strategy Number	Priority	Timeline	Status
WF001	Low	Ongoing	Ongoing Effort
Strategy Description	Work with Los Angeles County Fire Department Division III, North Regional Operations Bureau (LACoFD Division III) to enhance emergency services to increase the efficiency of wildfire response and recovery activities.		
Activities	<p>WF001-01: Support LACoFD Division III’s efforts to install more fire stations for better access and coverage.</p> <p>WF001-02: Coordinate with LACoFD Division III and Sheriff’s Department to coordinate the Public Alert and Warning Notification System to quickly contact all at-risk urban/wildland interface residents in the Santa Clarita Valley regarding evacuations. Incorporate the use of e-texting, mass notification and social media, i.e. Twitter, Facebook, My Space.</p>		
Coordinating Organization	LACoFD Division III (contract city), Technology Services Division Communications Division, City Manager’s Office, and LA County Sheriff’s Department		
Plan Goals Addressed	Emergency Services		
Funding Source	General Fund		
Comments	<p><u>WF001-01</u>: The City supported the LACFD in the opening of the following fire stations:</p> <ul style="list-style-type: none"> - Fire Station 156 - opened August 2011 - Fire Station 128 - opened March 2012 - Fire Station 132 - opened March 2012 - Fire Station 104 - opened October 2012 - Fire Station 143 – Fall 2016 - Fire Station 150 - opened March 2013 <p><u>WF001-02</u>: Urban Forestry provides handouts published by the LACFD to residents in high risk areas. They include "Homeowner's Guide to Fire and Watershed Safety at the Chaparral/Urban Interface" and "Fire Hazard Reduction and Safety Guidelines." Pruning permits are issued to residents who have protected trees so that the tree(s) can be trimmed for proper clearance for safety and response time. Urban Forestry staff will meet with local fire stations to review any locations that may be a potential risk due to trees and brush. In most cases an emergency exemption permit is issued to a resident to bring their property to compliance. In the event of an emergency, the Streets Division will place portable, changeable message boards (CMS) to alert local residents of an emergency. The division possesses four CMS boards and additional CMS boards can be secured through local vendors. Additionally, the City and its Fire Department coordinates with the Los Angeles County Sheriff’s Department to utilize ALERT LA for mass notifications for residents and businesses.</p>		

Strategy Number	Priority	Timeline	Status
WF002	Moderate	Ongoing	Activity WF002-03: Ongoing Activity WF002-04: Removed
Strategy Description	Collaborate with LACoFD Division III in educating City staff and fire personnel on federal cost-share and grant programs, Fire Protection Agreements and other related federal programs so the full array of assistance available to local agencies is understood.		
Activities	<p>WF002-03: Collaborate with LACoFD to secure potential funding opportunities for individual mitigation projects.</p> <p>WF002-04: Work with LACoFD Division III's to develop, approve, and promote Fire Protection Agreements and partnerships to clarify roles and responsibilities and to provide for fire mitigation activities and suppression preparedness.</p>		
Coordinating Organization	LACoFD Division III (contract city), Parks and Recreation and Community Services Department		
Plan Goals Addressed	Protect Life and Property Public Awareness		
Funding Source	General Fund		
Comments	<p><u>WF002-03</u>: LACFD pursues grants by the Fire District and Department of Homeland Security grants. These grants are passed through the City.</p> <p><u>WF002-04</u>: This activity is to be removed for the five year update - there is no need to promote fire protection agreements, as they are well-entrenched within the fire agency's system.</p>		

Strategy Number	Priority	Timeline	Status
WF003	Moderate	Ongoing	Activity WF003-05: Revision Complete, Updates Ongoing Activity WF003-06: Revision Complete, Updates Ongoing
Strategy Description	Continue collaborating with LACoFD Division III's to develop and disseminate maps relating to fire hazards to help educate and assist builders and homeowners in being engaged in wildfire mitigation activities and to help guide emergency services during response.		
Activities	WF003-05: Work with LACoFD Division III to update wildland/urban interface maps. WF003-06: Encourage LACoFD Division III and USDA Forest Service to continue to conduct risk analysis incorporating data and creating hazard maps using GIS technology to identify risk sites and further assist in prioritizing mitigation activities.		
Coordinating Organization	LACoFD Division III (contract city), Technology Services Division and Building and Safety Division		
Plan Goals Addressed	Protect Life and Property		
Funding Source	General Fund		
Comments	<p><u>WF003-05</u>: State-generated fire zone maps were adopted by the City Council in April 2012 for the Very High Fire Hazard Severity Zone.</p> <p><u>WF003-06</u>: The City's GIS Department updates fire zone maps per each annexation development in the City with input from the LACFD and approval through the CAL FIRE [California Department of Forestry and Fire Protection] Fire and Resource Assessment Program (FRAP). City Building and Safety staff worked with the LA County Fire Department to adopt the current Very High Fire Hazard Severity Zone maps.</p>		

Strategy Number	Priority	Timeline	Status
WF004	Moderate	Ongoing	WF004-07: Ongoing WF004-08: Ongoing WF004-09: Ongoing WF004-10: Ongoing WF004-11: Ongoing
Strategy Description	Collaborate with LACoFD Division III's to enhance outreach and education programs aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners, and businesses to natural and man-made hazards.		
Activities	<p>WF004-07: Support LACoFD Division III's efforts to hire and educate fire prevention staff to oversee education programs.</p> <p>WF004-08: Work with LACoFD Division III and USDA Forest Service to visit urban interface neighborhoods and rural areas and conduct education and outreach activities.</p> <p>WF004-09: Work with LACoFD Division III to conduct specific community-based demonstration projects of fire prevention and mitigation in the urban interface.</p> <p>WF004-10: Continue to work with LACoFD Division III to establish neighborhood "drive-through" activities that pinpoint site-specific mitigation activities. Fire crews can give property owners personal suggestions and assistance.</p> <p>WF004-11: Continue to work with LACoFD Division III to organize public outreach and information activities at fire stations, such as "Wildfire Awareness Week" activities. This allows the public to visit fire stations, see the equipment, and discuss wildfire mitigation with the station crews.</p>		
Coordinating Organization	LACoFD Division III (contract city), Community Services Division and Communications Division		
Plan Goals Addressed	Protect Life and Property Public Awareness		
Funding Source	General Fund		
Comments	<p><u>WF004-07</u>: LACFD and the U.S. Forestry & Fire Protection Bureau both participate in the City of Santa Clarita Arbor Day Celebration. Information is provided to all residents on how to prevent wildfires.</p> <p><u>WF004-08</u>: City staff and LACFD personnel conducted two outreach meetings on April 18th and 25th, 2013 to inform the public of the new VHFHSZ MAPS. LACFD provides the Santa Clarita Urban Forestry Division with handouts which include "Homeowner's Guide to Fire and Watershed Safety at the Chaparral/Urban Interface" and "Fire Hazard Reduction and Safety Guidelines." Pruning permits are issued to residents who have protected trees so that the tree(s) can be trimmed for proper clearance for safety and response time purposes.</p> <p><u>WF004-09</u>: The City's firefighters conducted 14 separate outreach efforts to mobile home park communities and distributed hundreds of smoke detectors/batteries to homeowners. The LACFD Forestry Unit supports development of "Fire Safe Councils;" The Sand Canyon Fire Safe Council within Santa Clarita is active and received support from LACFD for its formation and growth.</p> <p><u>WF004-10</u>: Urban Forestry Oak Tree Specialists continue to meet with the LACFD to review and inspect any high-risk areas where clearance trimming is needed. This includes structure clearance and emergency vehicle clearance. Emergency exemption permits are issued to residents at no cost in order to bring their property to compliance.</p> <p><u>WF004-11</u>: The City supports LACFD's fire awareness outreach efforts in addition to their annual Swim Safety Expo held in the summertime.</p>		

Strategy Number	Priority	Timeline	Status
WF005	High	Ongoing	WF005-012: Ongoing WF005-013: Ongoing WF005-014: Removed WF005-015: Ongoing WF005-016: Ongoing WF005-017: Ongoing
Strategy Description	Work with LACoFD Division III to encourage and increase communication, coordination, and collaboration between wildland/urban interface property owners, County and officials to address risks, existing mitigation measures and federal assistance programs.		
Activities	<p>WF005-012: Continue to encourage single-family residences to have fire plans and practice evacuation routes.</p> <p>WF005-013: Work with LACoFD Division III to continue performing fire inspections in residential homes to increase awareness among homeowners and potential fire responders.</p> <p>WF005-014: Work with LACoFD Division III to encourage a standard for the State Fire Marshall to evaluate fire plans and emergency plans for businesses.</p> <p>WF005-015: City and LACoFD Division III work closely with landowners and/or developers who choose to build in the wildland/urban interface to identify and mitigate conditions that aggravate wildland/urban interface wildfire hazards.</p> <p>WF005-016: City to encourage all new homes and major remodels involving roof additions that are located in the interface to have fire resistant roofs and residential sprinkler systems.</p> <p>WF005-017: Work with LACoFD Division III to encourage the public to evaluate access routes to rural homes for fire-fighting vehicles and to develop passable routes if they do not exist.</p>		
Coordinating Organization	LACoFD Division III (contract city), Community Services Division and Communications Division		
Plan Goals Addressed	Protect Life and Property Public Awareness Partnerships and Implementation Emergency Services		
Funding Source	General Fund		
Comments	<p><u>WF005-12</u>: This ongoing activity is promoted through the CERT program, various Fire and City outreaches, Fire-sponsored open houses, and the Emergency Expo.</p> <p><u>WF005-13</u>: During routine inspections, residents are advised of the clearance required by the LACFD for both their roof and around their structures. Pruning permits are issued to allow the resident to bring their property to compliance.</p> <p><u>WF005-14</u>: This item to be deleted. There are standards for evaluation.</p> <p><u>WF005-15</u>: This ongoing practice is a coordinated effort through the Building and Safety Division, City Plan Check process, and LACFD prevention. Projects located in the VHFHSZ are required to incorporate certain construction-related requirements designed to reduce the building's risk of catching fire. These requirements are identified during building plan check and confirmed during the building inspections.</p> <p><u>WF005-16</u>: Per the California Residential Code, all new homes and additions to existing homes are required to install a "class A" fire-retardant roof. All new homes are required to install a sprinkler system. This requirement is consistent throughout California and is required in all states that have adopted the International Residential Code.</p> <p><u>WF005-17</u>: LACFD promotes these preparedness concepts through its "Ready, Set, Go" program, which is significantly important for the rural and canyon communities in Santa Clarita. This information is posted to the City and Fire Department websites.</p>		

Strategy Number	Priority	Timeline	Status
WF006	Low	Ongoing	WF006-18: Ongoing WF006-19: Ongoing
Strategy Description	Collaborate with LACoFD Division III to encourage implementation of wildfire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.		
Activities	<ul style="list-style-type: none"> • Support LACoFD Division III’s effort to employ mechanical thinning and prescribed burning to abate the risk of catastrophic fire and restore the more natural regime of high frequency, low-intensity burns. • Support LACoFD Division III’s efforts to clear trimmings, trees, brush and other debris completely from sites when performing routine maintenance and landscaping to reduce fire risk. 		
Coordinating Organization	LACoFD Division III (contract city), Community Services Division and Communications Division		
Plan Goals Addressed	Natural Systems		
Funding Source	General Fund		
Comments	<p><u>WF006-18</u>: Prescribed burns for brush abatement and training are performed by the LACFD; burns are based on climate conditions.</p> <p><u>WF006-19</u>: During routine inspections, residents are advised of the clearance required by the LACFD for both their roof and around their structures. Pruning permits are issued to allow the resident to bring their property to compliance.</p>		

Strategy Number	Priority	Timeline	Status
WF007	High	Ongoing	WF007-20: Ongoing WF007-21: Ongoing WF007-22: Complete WF007-23: Ongoing
Strategy Description	Enhance City’s Urban Forestry ability to mitigate, respond to prepare for and recovery from events that impact the more than 80,000 trees in the City.		
Activities	<p>WF007-20: Maintain tree program in the City which includes routine inspections and review of the tree maintenance cycle. Urban Forestry Division will target dead or hazardous trees within the public right of way. Dead or hazardous trees are removed and replaced with new trees.</p> <p>WF007-21: Mitigate tree hazards by addressing trees that pose a public safety hazard.</p> <p>WF007-22: Purchase a full-size bucket truck for tree maintenance operations to enable city staff to safely perform emergency limb removal.</p> <p>WF007-23: Design and develop informational and educational brochures that relate to the hazards of dead material on palm trees and problematic trees in fire areas. Brochures would educate the public on how to keep your homes fire safe and inform them of what trees are beneficial and troublesome in high fire areas.</p>		
Coordinating Organization	LACoFD Division III (contract city), Urban Forestry, Natural Resources Conservation Service, Cal Fire		
Plan Goals Addressed	Protect Life and Property Public Awareness Natural Systems Partnerships and Implementation Emergency Services		
Funding Source	General Fund		
Comments	<p><u>WF007-20</u>: All parkway trees located within the public right of way are part of the Tree Inventory System (Arbor Pro). Urban Forestry maintains a three to six-year pruning cycle, where all city-maintained trees are pruned every three to six years depending on need. The Arbor Pro system is used to track and maintain all records of work performed on each individual tree; this system includes all trees on city-owned property and parks.</p> <p><u>WF007-21</u>: Hazard trees that are located within the public right of way are removed and replaced with new trees. Trees that may be causing a visual hazard are raised and trimmed for appropriate clearance and trees with hazardous branches or limbs are addressed through selective pruning.</p> <p><u>WF007-22</u>: Urban Forestry currently has a chipper truck, chipper and bucket truck that allows for full-time staff to respond quickly and effectively to an emergency situation.</p> <p><u>WF007-23</u>: Tree information handouts are provided to residents at Arbor Day and River Rally, as well as distributed to residents during Oak Tree Awareness Month. These handouts are published by the International Society of Arboriculture (ISA).</p>		

Wildfire Resource Directory

Local and Regional Resources

Los Angeles County Fire Department Division III, North Regional Operations Bureau
19190 Golden Valley Road
Santa Clarita, CA 91387
Telephone: (661) 298-5280

Los Angeles County Fire Department
1320 N. Eastern Ave.
Los Angeles, CA 90063
Telephone: (323) 881-2411
<http://www.lacofd.org/default.htm>

State Resources

California Division of Forestry & Fire Protection

1416 9th Street
PO Box 944246
Sacramento, CA 94244-2460
(916) 653-5123
<http://www.fire.ca.gov/php/index.php>

CAL FIRE

1416 9th Street
PO Box 944246
Sacramento, CA 94244-2460
(916)653-5123

Office of the State Fire Marshal (OSFM)

1131 "S" Street
Sacramento, CA 95814
PO Box 944246
Sacramento, CA 94244-2460
Tel. (916) 445-8200

Federal Resources and Programs

National Interagency Fire Center (NIFC)

National Weather Service and Office of Aircraft National Interagency Fire Center.
3833 S. Development Ave.
Boise, Idaho 83705
(208) 387-5512
<http://www.nifc.gov/>

United States Fire Administration (USFA) of the Federal Emergency Management Agency

USFA, Planning Branch, Mitigation Directorate

16825 S. Seton Ave.

Emmitsburg, MD 21727

(301) 447-1000

<http://www.fema.gov/hazards/fires/wildfires.shtm> - Wildfire Mitigation

<http://www.usfa.fema.gov/index.htm> - U.S. Fire Administration

InciWeb

<http://inciweb.nwcg.gov>

Additional Resources

Firewise - The National Wildland/Urban Interface Fire program

Firewise

1 Battery March Park.

P.O. Box 9101

Quincy, MA 02269-9101

Phone: (617) 770-3000

<http://www.firewise.org/>

Fire Tracker

Southern California Public Radio

474 S. Raymond Ave.

Pasadena, CA 91105

National Fire Protection Association (NFPA)

NFPA, Public Fire Protection Division

1 Battery March Park.

P.O. Box 9101

Quincy, MA 02269-9101

Phone: (617) 770-3000

Publications

National Fire Protection Association Standard 299: Protection of Life and Property from Wildfire, National Wildland/Urban Interface Fire Protection Program, (1991), National Fire Protection Association, Washington, D.

This document, developed by the NFPA Forest and Rural Fire Protection Committee, provides criteria for fire agencies, land use planners, architects, developers and local governments to use in the development of areas that may be threatened by wildfire. To obtain this resource:

National Fire Protection Association Publications
(800) 344-3555
<http://www.nfpa.org> or <http://www.firewise.org>

An International Collection of Wildland- Urban Interface Resource Materials, (Information Report NOR- 344). Hirsch, K., Pinedo, M., & Greenlee, J. (1996). Edmonton, Alberta: Canadian Forest Service.

This is a comprehensive bibliography of interface wildfire materials. Over 2,000 resources are included, grouped under the categories of general and technical reports, newspaper articles and public education materials. The citation format allows the reader to obtain most items through a library or directly from the publisher. The bibliography is available in hard copy or diskette at no cost. It is also available in downloadable PDF form.

Canadian Forest Service, Northern Forestry Centre, I-Zone Series
Phone: (780) 435-7210
<http://www.prefire.ucfpl.ucop.edu/uwibib.htm>

Wildland/Urban Interface Fire Hazard Assessment Methodology.
National Wildland/Urban Interface Fire Protection Program, (1998).
NFPA, Washington, D.C.

Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
<http://www.firewise.org>

Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility.
National Wildland/Urban Interface Fire Protection Program, (1998). Washington, DC.

Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
<http://www.firewise.org>

Federal Wildland Fire Policy, Wildland/Urban Interface Protection
U.S. Forest Service

1400 Independence Ave., SW
Washington, D.C. 20250-1111
(800) 832-1355
<http://www.fs.usda.gov>

SECTION 8. CLIMATE CHANGE: DROUGHT

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	4	Highly Likely		Severe
Magnitude / Severity	3	Critical	●	High
Warning Time	1	More than 24 Hours		Moderate
Duration	4	More than 1 Week		Low
CPRI Rating	3.25	High		

Climate Change and Drought Information and Background

According to the U.S. Global Change Research Program (U.S. Global Change Research Program, 2014), increased heat, drought, wildfires, and insect outbreaks are all linked to climate change. Declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and flooding and erosion in coastal areas are additional concerns.

The Southwest is the hottest and driest region in the United States, where the availability of water has defined its landscapes, history of human settlement, and modern economy. Climate changes pose challenges for an already parched region that is expected to get hotter and, in its southern half, significantly drier. Increased heat and changes to rain and snowpack will send ripple effects throughout the region’s critical agriculture sector, affecting the lives and economies of 56 million people – a population that is expected to increase 68% by 2050, to 94 million (Theobald, D. M., W. R. Travis, M. A. Drummond, and E. S. Gordon, 2012). Severe and sustained drought will stress water sources, already over-utilized in many areas, forcing increasing competition among farmers, energy producers, urban dwellers, and plant and animal life for the region’s most precious resource.

Threat Descriptions

Increased heat and drought are two of the main concerns related to climate change in the Southwest. Climate change can also lead to extensive weather swings, from extreme wind to flooding. These conditions lead to secondary concerns such as higher incidence of catastrophic wildfires, agriculture losses, increased disease from insect outbreaks, and power outages (from increased demands combined with limited supplies). This section of the HMP focuses on drought. Additional sections of the HMP provide information on other Climate Change related topics. These sections are:

- Wildfire
- Severe Weather: Extreme Heat
- Energy Disruption
- Flood

Climate Change and Drought History

California is currently in its fourth consecutive year of drought. As an example of the current drought conditions in the Santa Clarita area, from 2011 to 2015 measurements for the Los Angeles region) have been significantly below normal with 2013 being the driest year (National Centers for Environmental Information, 2015).

Table 29: Los Angeles Precipitation Totals from 2011 to 2014

DATES	VALUE	ANOMALY (12.02") 1944 2000 BASE PERIOD
01/2011 – 12/2011	9.87"	-2.15"
01/2012 – 12/2012	8.89"	-3.13"
01/2013 – 12/2013	3.65"	-8.37"
01/2014 – 12/2014	8.30"	-3.72"

The plot below depicts the annual rainfall totals for Los Angeles from 2010 to 2014 as compared to a baseline average of 12.02 inches (from 1994 to 2000). The plot demonstrates the impact of the current drought conditions in California and the annual rainfall deficit for the Los Angeles area (National Centers for Environmental Information, 2015).

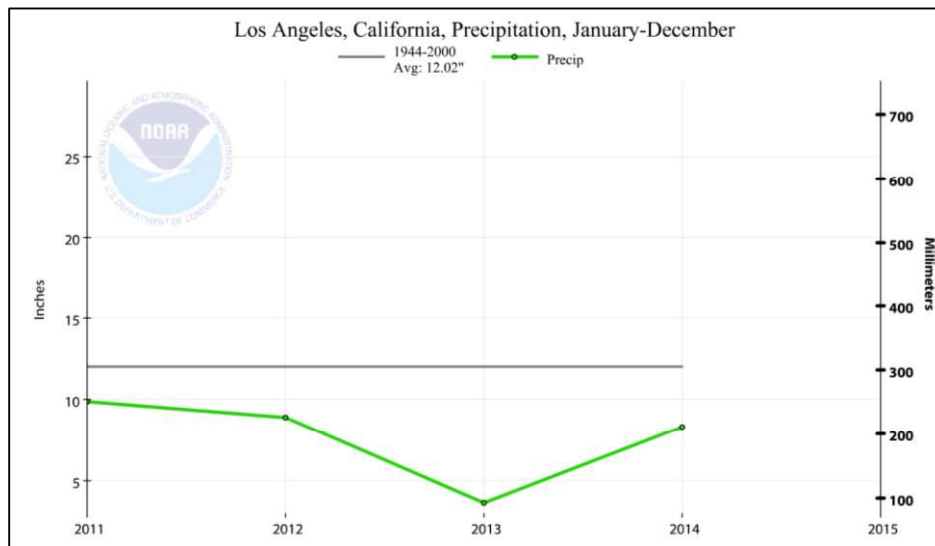


Figure 22: Los Angeles Precipitation, 2011 to 2014

On April 1, 2015, the California Department of Water Resources measured the statewide water content of Sierra snowpack at five percent of average for April 1st. These levels are lower than any year in records going back to 1950. The April 1 snowpack measurement is crucial because this is when the snowpack is normally at its peak and begins to melt into streams and reservoirs. Snowpack, through runoff, provides about one-third of the water used by California's cities and farms. California's 2014 Water Year, which ended September 30, 2014, was the third driest in 119 years of record. It also was the warmest year on record (USGS California Water Science Center, 2015).

Drought Probability, Frequency and Magnitude

Climate Change and Drought Vulnerabilities

In terms of the City of Santa Clarita, in addition to wildfire (see Wildfire Section), the main vulnerabilities involve the impact of drought and limited water supplies causing:

- Reduced water availability to the local community and residents
- Reduced agriculture output
- Livestock losses
- Damage to local natural habitats



Figure 23: Castaic Reservoir Drought Conditions

Photo by: Santa Clarita Valley Signal

Furthermore, excessive heat conditions can lead to power outages (see Severe Weather: Extreme Heat Section) and heat-related health problems (see Severe Weather: Extreme Heat Section).

It should also be noted that excessive pumping of ground water supplies can result in subsidence. Though this has not occurred in the City of Santa Clarita, in the California Central Valley, high water pumping activities has led to significant subsidence with some ground levels sinking 10 inches or more (Tom G. Farr, Cathleen Jones, Zhen Liu, 2015) causing concerns regarding damage to the local infrastructure including the California Aqueduct.

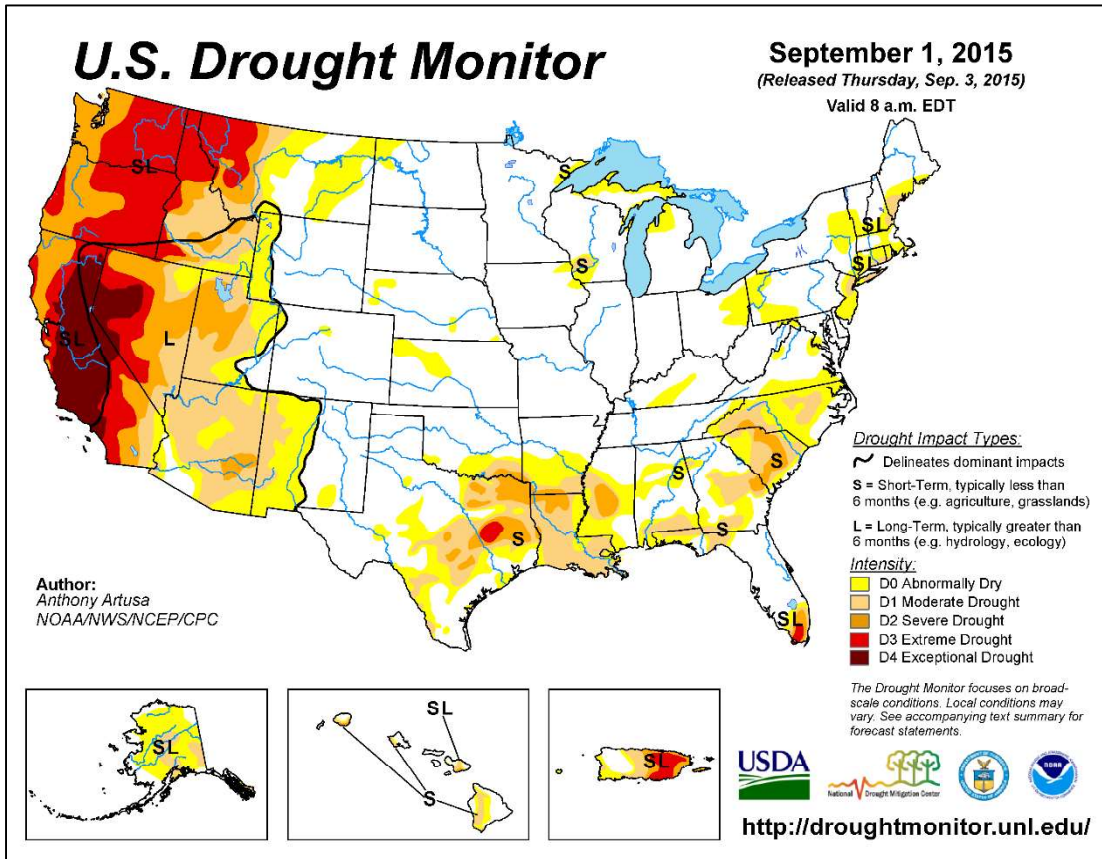
Climate Change and Drought Probabilities

Climate Change

According to the Environmental Protection Agency (EPA), continued emissions of greenhouse gases will lead to further climate changes. Future changes are expected to include a warmer atmosphere, a warmer and more acidic ocean, higher sea levels, and larger changes in precipitation patterns. The extent of future climate change depends on what we do now to reduce greenhouse gas emissions. The more we emit, the larger future changes will be (Environmental Protection Center, 2015).

Drought

Over the long-term, drought conditions in the Western U.S. are likely to continue for the foreseeable future. The map below depicts area of drought by state (National Integrated Drought Information System - NIDIS, 2015).



Map 16: U.S. Drought Monitor

Short-term, forecasters are predicting an El Niño year for the Winter 2015/2016, with higher than normal rainfall levels. However, even if heavy rainfall occurs during this weather season, it will not make up the drought deficit and it will be unlikely to be sufficient enough to re-build the Sierra snowpack.

The National Weather Service, Climate Prediction Center “Discussion for the Seasonal Drought Outlook” provides a summary of the current drought outlook (National Weather Service, Climate Prediction Center, 2015). A subset of the full report is provided below.

Discussion for the Seasonal Drought Outlook

Tools used in the U.S. Seasonal Drought Outlook (SDO) included the official Climate Prediction Center (CPC) temperature and precipitation outlooks for September 2015 and September-October-November (SON) 2015, various short- and medium-range forecasts and models such as the 5-day and 7-day precipitation totals forecast (QPFs) from the Weather Prediction Center (WPC), the 6-10 day and 8-14 day CPC extended-range forecasts (ERFs), the NAEFS precipitation outlooks, the soil moisture tools based on the Constructed Analog on Soil Moisture (CAS), dynamical models (CFSv2, NMME, IRI, IMME, and ECMWF), the 384-hour total precipitation forecasts from several runs of the GFS, the four-month Palmer drought termination and amelioration probabilities, September and SON climatology, and initial conditions. An El Niño (ENSO) Advisory continues in effect, with the August 13, 2015 ENSO Diagnostic Discussion indicating a 90 percent chance of El Niño conditions continuing through Northern Hemisphere winter 2015-16, and 85 percent chance it will last into early spring 2016. This El Niño is one of the strongest on record for this time of the year (mid-August).

Improvement or removal of drought across the Arizona, New Mexico, Utah, and eastern Nevada is based on short-term and extended-range precipitation forecasts, increased chances for above-median precipitation in CPC's September and SON outlooks, and late August and September wet climatology. Similar to what remnant moisture from former Hurricane Delores dropped on normally arid southern California during mid-July, the active East Pacific hurricane season is expected to continue due to the ongoing El Niño and above-normal sea surface temperatures during the outlook period. With the relatively strong wet signal among the precipitation tools, a less severe and shorter drought as compared to California, forecast confidence is a bit higher here than to the west. A significant increase in reservoir levels across the Southwest is not expected until an adequate winter snowfall season occurs. With the CPC September and SON outlooks favoring above-median precipitation across the eastern Great Basin (which is not in as severe of drought as western sections), improvement or removal is the probable outcome in this region. **Forecast confidence for the Southwest and Great Basin is moderate.**

September and October are a dry time of year across California (known for hot Santa Ana winds and wild fire season), while November normally marks the commencement of cold season precipitation, especially in northern sections. With the monthly and seasonal precipitation outlooks keeping above-median odds in extreme southern sections (and EC elsewhere), drought persistence is strongly favored for the rest of the State. Any drought removal, associated with monsoon rainfall and tropical cyclone activity across the East Pacific, is expected to be limited to the southeast California desert (some of which is currently drought free). **Forecast confidence for California is high.**

Existing Mitigation Activities

State and Federal Water Management Operations

On January 17, 2014, Governor Jerry Brown Jr. declared a state-wide drought State of Emergency. Under the requirements issued by the Governor, specific water use restrictions were put into place and goals were established for communities to decrease water use (State of California, California Department of Water Resources, 2015). Key measures in the proclamation include:

- Asking all Californians to reduce water consumption by 20 percent and referring residents and water agencies to the Save Our Water campaign - www.saveourh2o.org - for practical advice on how to do so
- Directing local water suppliers to immediately implement local water shortage contingency plans
- Ordering the State Water Resources Control Board (state water board) to consider petitions for consolidation of places of use for the State Water Project and Central Valley Project, which could streamline water transfers and exchanges between water users
- Directing the California Department of Water Resources and the state board to accelerate funding for projects that could break ground this year and enhance water supplies
- Ordering the state water board to put water rights holders across the state on notice that they may be directed to cease or reduce water diversions based on water shortages
- Asking the state water board to consider modifying requirements for releases of water from reservoirs or diversion limitations so that water may be conserved in reservoirs to protect cold water supplies for salmon, maintain water supplies and improve water quality

As part of the State's drought response, a public website has been established to provide guidance and information on ways to save water <http://saveourwater.com/>.

According to the State of California Drought Management Website (May 1, 2014) (<http://ca.gov/drought/managementactions.html>):

“the Department of Water Resources (DWR) and the U.S. Bureau of Reclamation (Reclamation) joined with the State Water Resources Control Board (State Water Board) to form a Real-Time Drought Operations Management Team. This multi-agency team has exercised flexibility to conserve and store water since late January and continues exercising flexibility in a manner consistent with State Water Project and federal Central Valley Project operations protocols and provisions for water contract shortages. The California Department of Fish and Wildlife (CDFW), the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have coordinated closely with the Team and they have collectively worked to ensure that water management decisions do not unreasonably affect threatened and endangered species” (State of California, 2014).

Santa Clarita Drought Programs

The Santa Clarita Water Division (SCWD) provides water services to the Santa Clarita Valley. The SCWD provides conservation and drought information via its website which also includes rebate program links and other water savings initiatives (<http://santaclaritawater.com/>).

On June 10, 2015, the Castaic Lake Water Agency Board of Directors approved the Santa Clarita Water Division **Ordinance No. 43** establishing Water Conservation and Water Supply Shortage Restrictions and Regulations in compliance with the State Water Resources Control Board 32% conservation mandate (Santa Clarita Water Division, 2015).

Ordinance No. 43 prohibits the following actions at all times:

- Irrigating outdoor lawns, turfs and landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, and or/structures.
- The application of potable water to driveways, sidewalks, and other hardscape.
- Failure to repair a leak within 24 hours of detection or notification.
- Irrigating outdoor lawns, turf, or vegetated area of landscape during and within 48 hours following measurable precipitation.
- The use of a hose to wash a motor vehicle without an automatic shut-off nozzle.
- Non-recirculating fountains and decorative features.
- Irrigating outdoor lawns, turf, landscape or other vegetated area during the hours of 9:00 to 5:00 p.m.
- Irrigating outdoor lawns, turf, landscape, or other vegetated area using a landscape irrigation system for more than ten (10) minutes per station per day.
- Customers must adjust to the following water schedule based on the last digit of their address.

These prohibited actions would constitute a violation, punishable by a fine of up to five hundred dollars (\$500) for each day in which the violation occurs.

The SCWD website also provides a means for residents to report water waste in order to ensure enforcement of current water use restrictions (<http://santaclaritawater.com/your-water/report-water-waste-form>).

Drought programs include a residential rebate program for installing water savings devices such as high efficiency toilets (through the California Department of Water Resources) and clothes washers (SCWD). The SCWD also offers bathroom faucet and kitchen faucet aerators that lower average water use. Other programs include a “lawn replacement” initiative that reimburses homeowners (up to \$2 per square foot) for replacing lawn grass with drought tolerant plants and/or hard landscaping. There is also a “drip conversion kit” program to install low volume drip-type watering systems as well as a “high efficiency sprinkler nozzle” program for replacing standard nozzles with water efficient devices.



Figure 24: SCWD Water Waste Link

The City of Santa Clarita also provides the public with a status of water and drought programs that the City has implemented via its “Water Wise” site (<http://waterwisescv.com/>).



Figure 25: WaterWiseSCV Site

Internal City drought and climate change efforts include the turning off of public fountains, replacing toilets and urinals to comply with California “Green” code water conservation requirements, replacing water fixtures, and limiting outdoor watering at City-owned facilities. Furthermore, the City installed Smart controllers at City facilities that save 330 million gallons of water annually.

For example, an irrigation controller modernization program replaced more than 500 obsolete irrigation controllers with Smart, weather-based irrigation controllers in water parks, medians, and streetscaping. The result was a significant water savings per year (see Santa Clarita Green Initiatives below).

Santa Clarita “Green” Initiatives

The City of Santa Clarita is also actively pursuing efforts to combat the impact of climate change. In 2012, the City was recognized as a “Silver” California Green Community.

Santa Clarita Updates

City of Santa Clarita Achieves "Silver" Status as a California Green Community

Posted Date: 2/24/2012 11:00 AM

The City of Santa Clarita will be recognized by representatives of the California Green Communities, an environmental recognition program, at the **Tuesday, February 28, 2012** City Council meeting for achieving 'silver' status as a result of the city's commitment to environmental sustainability. Santa Clarita is one of only four cities to be honored by California Green Communities for its efforts.

"The City of Santa Clarita places a high priority on reducing its environmental footprint and preserving our community and its resources for generations to come," said Santa Clarita Mayor Laurie Ender. "We are committed to being one of the state's leading green communities and are working towards achieving Platinum status in this program."

California Green Communities was created in 2009 and is spearheaded by Environmental Media Association (EMA), Southern California Edison, and Green Seal. The recognition program is a community-based effort that encourages cities to adopt environmentally sound practices involving energy efficiency, waste reduction, water conservation, renewable and alternative fuels, efficient transportation and other activities. To participate in the program, cities must develop their own action plan to identify projects and activities they will implement to reach Silver, Gold and ultimately Platinum status once all identified project areas are complete.

"We created California Green Communities to showcase what cities are doing to improve the quality of life for their residents," said EMA President Debbie Levin. "Santa Clarita is a leader among Southern California cities who are modeling sustainable practices for others."

One example of the City of Santa Clarita's success includes its efforts in the area of **Water and Wastewater Systems**. As part of the California Green Communities Action Plan, the city replaced more than 500 obsolete irrigation controllers with smart, weather-based irrigation controllers to water parks, medians and streetscaping to save millions of gallons of water and increase savings.

The new controllers access real-time weather information via the Internet to determine the right time and amount of water needed to irrigate various landscaped areas based on solar radiation, wind, humidity and temperature. The system is similar to a home thermostat, measuring temperature and adjusting accordingly.

Since installation, the City's irrigation-water management system has grown to become the world's largest smart-controller water system and in the last year alone, this system has reduced the City's annual water consumption by more than 150 million gallons.

The City of Santa Clarita's action plan, as well as those prepared by other participating cities like Los Angeles, Culver City, Redlands, Santa Monica, Simi Valley, and Ventura among others, is currently not available online. For more information about the City of Santa Clarita's efforts as a California Green Community, please contact Heather Merenda, sustainability planner with the City of Santa Clarita's environmental services division, at (661) 284-1413

Climate Change/Drought Mitigation Strategies and Action Items

The drought strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from long-term climate change and drought. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Other strategies related to Climate Change are located in the Severe Weather sections of this HMP.

Strategy Number	Priority	Timeline	Status
CCD-001	Moderate	Ongoing	CCD-001-01: New Project / Ongoing
Strategy Description	Work with Local Water Agencies to Develop New Drought Mitigation Strategies		
Activities	CCD-001-01: Conduct regular meetings with local water agencies to devise additional drought mitigation strategies.		
Coordinating Organization	Public Works, Santa Clarita Water Division, Castaic Lake Water Agency, etc.		
Plan Goals Addressed	Increase Public Awareness Preserve Natural Systems Partnerships and Implementation		
Funding Source	General Fund		
Comments	<u>CCD-001-01</u> : (New Project – Not included in the 2010 HMP): July 2014 - City officials, in coordination with Castaic Lake Water Agency, presented an update on the recent drought conditions, weather probabilities, public information and outreach, and legislation on water conservation. Information included stats of local reservoirs and the water supply portfolio where Santa Clarita receives water.		

Strategy Number	Priority	Timeline	Status
CCD-002	Moderate	Ongoing	CCD-002-02: New Project / Ongoing CCD-002-03: New Project / Not Started
Strategy Description	Research Additional Internal City Actions to Mitigate the Impact of Climate Change and Drought		
Activities	CCD-002-02: Continue to research additional projects to further improve the City’s standing as a “Green City”. CCD-002-03: Work to improve the City’s current “Silver” Green City status to “Gold” status.		
Coordinating Organization	Environmental Services		
Plan Goals Addressed	Preserve Natural Systems		
Funding Source	General Fund and/or Grant Funding		
Comments	<u>CCD-002-02</u> : (New Project – Not included in the 2010 HMP): <u>CCD-002-03</u> : (New Project – Not included in the 2010 HMP): Silver Status achieved, Gold Status Not started.		

Climate Change / Drought Resource Directory

California-Nevada Climate Applications Program (CNAP)
Climate Research Division, Scripps Institution of Oceanography
University of California - San Diego
9500 Gilman Drive
La Jolla, CA 92093-0224
(858) 534-4507
<http://meteora.ucsd.edu/cnap/>

Environmental Protection Agency (EPA)
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
<http://www.epa.gov/climatechange/science/future.html>

National Centers for Environmental Information
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
(828) 271-4800
<http://www.ncdc.noaa.gov>

National Centers for Environmental Prediction
Climate Prediction Center
5830 University Research Court
College Park, Maryland 20740
<http://www.cpc.ncep.noaa.gov>

National Integrated Drought Information System (NIDIS)
The National Drought Mitigation Center
3310 Holdrege Street
P.O. Box 830988
Lincoln, NE 68583-0988
(402) 472-6707

Santa Clarita Water Division
26521 Summit Circle
Santa Clarita, CA 91350-3049
(661) 259-2737
<http://santaclaritawater.com/conservation-2>

State of California, California Department of Water Resources
Department of Water Resources
1416 9th Street
Sacramento, CA 95814
(916) 653-5791
<http://www.water.ca.gov>

Santa Clarita Valley Signal

24000 Creekside Road
Valencia CA 91355
(661) 259-1234

USGS California Water Science Center

6000 J Street, Placer Hall
Sacramento, CA 95819
(916) 278-3000
<http://ca.water.usgs.gov/data/drought/>

Publications

“2014 National Climate Assessment Report” (2014), U.S. Global Change Research Program

Farr,T., Jones,C., Liu,Z., "Progress Report: Subsidence in the Central Valley, California" (2015)
Jet Propulsion Laboratory / California Institute of Technology

Los Angeles County Department of Public Health, “Your Health and Climate Change in Los Angeles County” (2014), Division of Environmental Health

Theobald, D. M., W. R. Travis, M. A. Drummond, and E. S. Gordon, "Ch. 3: The Changing Southwest. Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment", pp. 37-55 (2013), Island Press

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SECTION 9. EARTHQUAKE

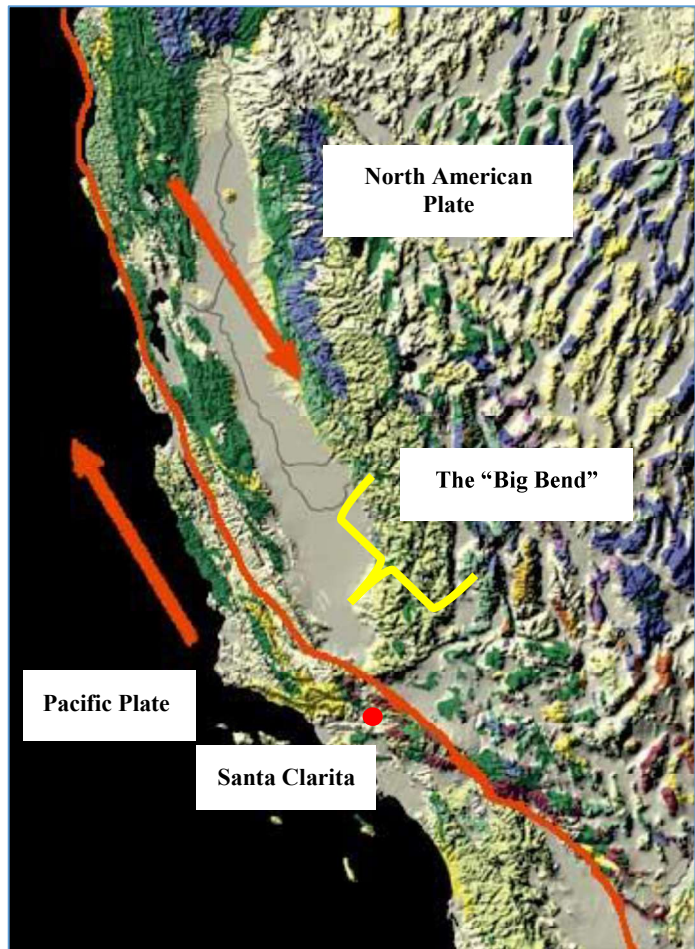
Category of Risk	Score	Description		Level of Risk
Probability / Frequency	3	Likely		Severe
Magnitude / Severity	3	Critical		High
Warning Time	4	Less than 6 Hours	○	Moderate
Duration	1	Less than 6 Hours		Low
CPRI Rating	2.95	Moderate		

Earthquake Hazard Information and Background

Earthquakes occur at the boundaries of the Earth’s tectonic plates as they move relative to one another. The tectonic boundary between the Pacific Plate and the North American Plate in California is along the San Andreas Fault. The fault is a transform boundary where the plates are sliding horizontally past one another.

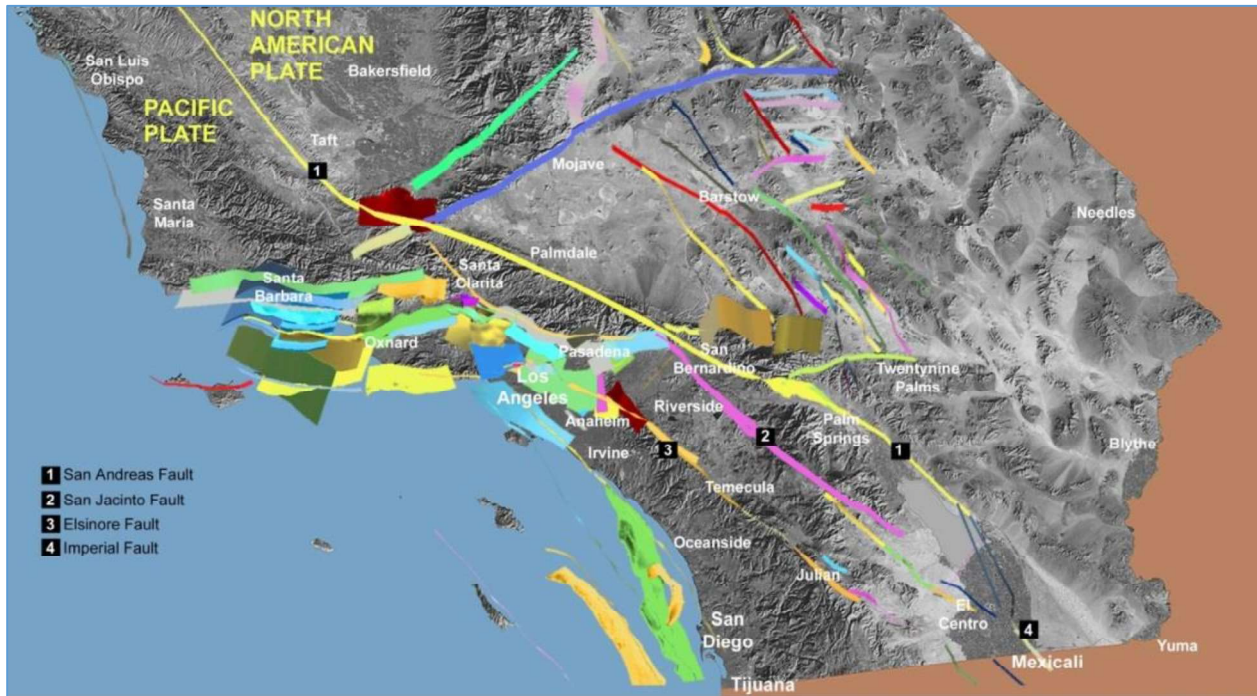
The risk of earthquakes in Southern California is exacerbated by the fact that the two plates are inhibited in their motion by what is known as the “Big Bend” (USGS, n.d.). In this section of the San Andreas, the fault curves to the west then curves back to the north. This creates a barrier to simple lateral motion. This bend is a convergent (restraining) bend, creating a localized collision of tectonic plates, generating a tremendous amount of compression stress.

To release this stress, additional faults have formed over time. The “Big Bend” of the San Andreas Fault is thought to be responsible for much of the complexity of faulting in Southern California.



Map 17: San Andreas Fault "Big Bend"

The map below depicts several parallel faults to the San Andreas Fault (SCEC, 2011). These four faults are considered to be responsible for approximately half of the significant earthquakes in the region.



Map 18: San Andreas and Other Major Faults - SCEC

Shaking

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake’s magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The most commonly used scale today is the **Moment Magnitude (Mw) Scale**. Moment magnitude is related to the total area of the fault that ruptured and the amount of offset (displacement) across the fault. It is a more uniform and more precise measure of the energy released during an earthquake.

The other commonly used measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. In general, it decreases with distance from the source of an earthquake, but it may be increased or decreased by a number of factors. The Modified Mercalli Intensity Scale is widely used to describe the impact of shaking.

Intensity	I	II-III	IV	V	VI	VII	VIII	IX	X XII
Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
Damage	None	None	None	Very Light	Light	Moderate	Moderate / Heavy	Heavy	Very Heavy

The Modified Mercalli Intensity Scale and Corresponding Richter Scale Magnitudes

Shaking intensity is often described using the Modified Mercalli Intensity Scale, which rates an earthquake’s effects based on human observation. While an earthquake has only one magnitude it may have many intensity values, which will generally decrease with distance from the epicenter. The table below lists various intensity levels using the Mercalli Scale’s and the corresponding Richter and Moment Magnitude Scales. The table also includes a description of the relative energy released in terms of TNT Energy (South Carolina Earthquake Education and Preparedness).

Table 30: Earthquake Size (Magnitude)

Modified Mercalli Scale		Richter Scale	TNT Energy	Moment Magnitude
I	Only felt by instruments	1.5	2 pounds	
		2	13 pounds	
II	Felt by few persons at rest, especially on upper floors, delicate suspended objects may swing	2.5	63 pounds	
III	Felt indoors, but may not be recognized as an earthquake, vibrations like a large passing truck		123 pounds	2
IV	Felt indoors by many, some outdoors, may awaken some sleeping persons; dishes, windows, doors may move, cars rock	3	347 pounds	
		3.5	1,000 pounds	
V	Felt by most; some windows, dishes break; tall objects may fall		2 tons	3
VI	Felt by all, falling plaster and chimneys, light damage but some fear.	4	6 tons	
VII	Very noticeable, damage to weaker buildings on fill; driving automobiles notice	4.5	32 tons	
			62 tons	4
		5	199 tons	
		5.5	500 tons	
VIII	Walls, monuments, chimneys, bookcases fall; liquefaction; driving is difficult		2000 tons	5
		6	6,270 tons	
IX	Buildings shifted off foundations. cracked and twisted; ground is cracked, and underground pipes are broken	6.5	31,550 tons	
			61,730 tons	5
X	Most structures severely damaged to destroyed: ground is cracked, rails are bent, landslides on steep slopes	7	199,000 tons	
XI	Few structures standing; bridges and roads severely damaged or destroyed, large fissures in ground	7.5	1,000,000 tons	
		8	6,270,000 tons	
XII	Total damage; can see the earthquake wave move through the ground; gravity overcome and objects thrown into the air		19,842,000 tons	7
		8.5	31,550,000 tons	
			61,729,400 tons	8
		9	199,999,000 tons	
			1,984,160,360 tons	9
			61,729,433,410 tons	10

Amplification of Seismic Shaking

Although seismic waves radiate from their source like ripples on a pond, the radiation is not uniform due to the complex nature of an earthquake rupture, the different paths the waves follow through the earth, and the different rock and soil layers near the earth's surface. Large earthquakes begin to rupture at their hypocenter deep in the earth and the fault ruptures outward from that point. Because the speed of an earthquake rupture on a fault is similar to the speed of seismic waves, waves closer to the epicenter can be compounded by waves from farther along the rupture, creating a pulse of very strong seismic waves that moves along the fault in the direction of the fault rupture. Seismic waves may also be modified as they travel through the earth's crust. As seismic waves approach the ground surface, they commonly enter areas of loose soils where the waves travel more slowly. As the waves slow down, their amplitude increases, resulting in larger waves with frequencies that are more likely to damage structures. Waves can also be trapped within soft sediments between the ground surface and deep, hard basement rocks, their destructive energy multiplying as they bounce back and forth, producing much greater shaking at the ground surface.

Ground Failure

Fissuring, settlement, and permanent horizontal and vertical shifting of the ground often accompany large earthquakes. Although not as pervasive or as costly as the shaking itself, these ground failures can significantly increase damage and under certain circumstances can be the dominant cause of damage. Because of the geographic extent, the City of Santa Clarita water distribution and wastewater pipelines are particularly vulnerable to ground failures.

Fault Rupture

The sudden sliding of one part of the earth's crust past another releases the vast store of elastic energy in the rocks as an earthquake. The resulting fracture is known as a fault, while the sliding movement of earth on either side of a fault is called fault rupture. Fault rupture begins below the ground surface at the earthquake hypocenter, typically between three and ten miles below the ground surface in California. If an earthquake is large enough, the fault rupture will actually travel all the way to the ground surface, wreaking havoc on structures built across its path. Recent large earthquakes in Turkey and Taiwan have shown that few structures built across the surface traces of faults can withstand the large displacement that occurs during an earthquake.

Liquefaction

In addition to the primary fault rupture that occurs right along a fault during an earthquake, the ground many miles away can also fail during the intense shaking. One common type of failure occurs when soft, water-saturated soil settles, causing the water to eject sediment particles as it works its way to the ground surface. This phenomenon, known as liquefaction, turns the soil into a fluid, causing it to lose the ability to support buildings and other structures. Areas susceptible to liquefaction include places where sandy sediments have been deposited by rivers along their course or by wave action along beaches.

Landslides

Landslides are the result of the down-slope movement of unstable hillside materials under the influence of weathering and gravity over time. Strength of rock and soil, steepness of slope, and weight of the hillside material all play an important role in the stability of hillside areas.

Weathering and absorption of water can weaken slopes, while the added weight of saturated materials or overlying construction can increase the chances of slope failure. Sudden failure can be triggered by heavy rainfall, excavation of weak slopes, and earthquake shaking, among other factors (see SECTION 10 Landslide/Mudslide/Subsidence for additional details on landslide and subsidence risks).

Dam Failure

In 1971, the near-failure of the Los Angeles dam during a magnitude 6.7 earthquake forced 80,000 people to evacuate their residences. Embankments and outlet towers respond to earthquake vibrations. Shaking an unstable slope that has been weakened after saturation by rises in ground water levels may produce a landslide into the reservoir. A dam failure is defined as the collapse, breach, or other failure resulting in downstream flooding. Dam failures are considered secondary events to natural hazards. Both earthquakes and landslides have the potential to cause dam failures in the Cascadian region. Earthquakes can undermine the structure of dams and cause breaches or complete failures (see SECTION 15 Flood for additional details on Flood and Dam risks).

Fires

Fire following an earthquake can have devastating consequences, as tragically seen worldwide, notably after the 1906 San Francisco, 1923 Tokyo, and 1995 Kobe earthquakes. It is a significant problem in urban areas of southern California. In fact, the 2008 U.S. Geological Survey, California Department of Conservation and California Geological Survey's ShakeOut Scenario doubles the fatalities and economic losses. In the magnitude 7.8 ShakeOut scenario (Jones, 2008) approximately 1,600 ignitions occur that require the response of a fire engine (see SECTION 7 Wildfire for additional details on fire risks).

Utility Failure / Energy Disruption

Power outages and other utility disruptions caused by earthquakes are secondary effects that can exacerbate primary hazards and prolong response activities. The hydroelectric-power plants located on the California and Los Angeles Aqueducts in the area will be out of service for an extended period of time due to major damage to both of these aqueduct systems. Numerous damaged or collapsed towers are expected along transmission routes. Moreover and specific to the City of Santa Clarita, the Saugus, Pardee, and Sylmar substations would shut down due to damage caused by liquefaction and intense ground shaking (see SECTION 14SECTION 10 Energy Disruption for additional data (Jones, 2008) on utility risks).

Pipeline Failure

Fault rupture will sever the imported natural gas supplies from the San Joaquin Valley that cross the fault near Tejon Pass. These lines will be shut off automatically. Underground storage facilities within the area will provide gas for users in many parts during the post-earthquake period. More damage would occur to those pipes crossing Castaic Creek and Santa Clara River.

Imports of crude oil from the San Joaquin Valley will be disrupted in lines route through Tejon Pass. Oil spills and fires may occur along the rupture portions of the line. The petroleum producing area parallel to the Santa Clara River between Newhall and Saugus may incur some damage, which could have minor effects on the industry shaking (see SECTION 10 Hazardous Materials Release and SECTION 14 Energy Disruption for additional details on pipeline risks).

Earthquake History

Historical earthquake records can generally be divided into records of the pre-instrumental period and the instrumental period. In the absence of instrumentation, the detection of earthquakes is based on observations and felt reports, and is dependent upon population density and distribution. Since California was sparsely populated in the 1800s, the detection of pre-instrumental earthquakes is relatively difficult. However, two very large earthquakes, the Fort Tejon in 1857 (7.9) and the Owens Valley in 1872 (7.6) are evidence of the tremendously damaging potential of earthquakes in Southern California. In more recent times two 7.3 earthquakes struck Southern California, in Kern County (1952) and Landers (1992). The damage from these four large earthquakes was limited because they occurred in areas which were sparsely populated at the time they happened. The seismic risk is much more severe today than in the past because the population at risk is in the millions, rather than a few hundred or a few thousand persons.

The table below provides examples of 24 significant earthquakes in Southern California since 1857 (Southern California Earthquake Data Center) and (USGS, n.d.).

Table 31: Significant Earthquake in California (since 1857)

Date	Time	Location	Magnitude
01.09.1857	8:24 A.M.	Fort Tejon	7.9
02.24.1892	11:20 P.M.	Laguna Salada	7.3
12.25.1899	4:25 A.M.	San Jacinto / Hemet	6.7
04.21.1918	2:31 P.M.	San Jacinto	6.8
06.29.1925	7:42 A.M.	Santa Barbara	6.8
11.04.1927	5:51 P.M.	Offshore Lompoc	7.1
03.10.1933	5:54 P.M.	Long Beach	6.4
05.18.1940	8:37 P.M.	Imperial Valley	6.9
04.10.1947	7:58 A.M.	Manix	6.5
07.21.1952	3:52 A.M.	Kern County	7.5
04.09.1968	6:29 A.M.	Borrego Mountain	6.6
02.09.1971	6:01 A.M.	San Fernando	6.6
10.15.1979	4:16 P.M.	Imperial Valley	6.4
07.08.1986	2:21 A.M.	North Palm Springs	5.7
10.01.1987	7:42 A.M.	Whittier Narrows	5.9

Date	Time	Location	Magnitude
11.24.1987	5:15 A.M.	Superstition Hills	6.6
06.28.1991	7:43 A.M.	Sierra Madre	5.8
04.22.1992	9:50 P.M.	Joshua Tree	6.1
06.28.1992	4:57 A.M.	Landers	7.3
06.28.1992	8:05 A.M.	Big Bear	6.3
01.17.1994	4:30 A.M.	Northridge	6.7
10.16.1999	2:46 A.M.	Hector Mine	7.1
12.22.2003	11:15 A.M.	San Simeon	6.5
07.09.2008	11:42 A.M.	Chino Hills	5.4
03.21.2009	Various	Bombay Beach Swarm	4.8
05.17.2009	8:39 P.M.	Inglewood	4.7
12.30.2009	10:48 A.M.	Northern Baja California	5.8
02.01.2010	6:16 A.M.	Rosarito	4.4
03.16.2010	4:04 A.M.	Pico Rivera	4.4
04.04.2010	3:40 P.M.	Sierra El Mayor	7.2
04.20.2010	3:40 P.M.	Baja California	7.2
03.11.2013	9:55 A.M.	Indian Wells	4.7
07.05.2014	9:59 A.M.	Running Springs	4.6
06.02.2014	7:36 P.M.	Westwood	4.2
03.29.2014	2:32 P.M.	Rowland Heights	4.1
03.29.2014	9:09 P.M.	La Habra	5.1
03.17.2014	6:25 A.M.	Beverly Hills	4.4
01.15.2014	1:35 A.M.	Fontana	4.4
07.25.2015	5:54 A.M.	Fontana	4.2
01.03.2015	7:18 PM	Castaic Dam	4.2

Table 32: Significant Southern California Earthquakes Since 1857

SCEDC Caltech Dataset. doi:10.7909/C3WD3xH1

Northridge Earthquake Impact on Santa Clarita

Northridge Earthquake Impact on the Southern California Area

On January 17, 1994 a magnitude 6.7 earthquake occurred at 4:31 A.M. on an unknown fault near Northridge, California, located approximately 13 miles southwest of Santa Clarita. The Northridge Earthquake was the most recent and damaging earthquake to greatly affect the City of Santa Clarita and its residents. It was the largest earthquake to hit a Southern California city since 1971, and the 11th largest earthquake to be recorded in California since 1769. The main shock was followed by thousands of aftershocks causing additional damage to affected structures.

In terms of human impact, 60 people were killed, more than 7,000 injured, and 20,000 were left homeless in the greater Los Angeles Basin (no deaths were recorded in Santa Clarita). For days

afterward, thousands of homes and businesses were without electricity; tens of thousands had no gas; and nearly 50,000 had little or no water.

It has been estimated that the cost of the earthquake exceeded \$20 billion in losses (USGS). More than 1,600 buildings were “red-tagged” as unsafe to enter and another 7,300 buildings were “yellow tagged” and restricted to limited entry.

Several collapsed bridges and overpasses created commuter havoc on the freeway system. Extensive damage was caused by ground shaking including pipeline ruptures and earthquake-triggered fires.

Northridge Earthquake Impact on Santa Clarita

The City of Santa Clarita was greatly affected by the Northridge Earthquake. In one case, the Santa Clarita City Hall was “red tagged” and emergency operations were conducted from a temporary shelter in the parking lot.



Figure 26: Santa Clarita City Hall Temporary Shelter
(SOURCE: SCVhistory.com)

The City was not only impacted because of its proximity to the epicenter, but also as a result of the significant damage done to the surrounding transportation infrastructure. Specifically, the Antelope Valley Freeway (State Route 14) - Golden State Freeway (I-5) interchange collapsed. These failures created severe hardship for the residents of Santa Clarita. The earthquake also damaged the water distribution and filtration systems, natural gas service, electrical services, and roads and bridges. Other damage resulting from the earthquake included a crude oil release from a pipeline rupture and other hazardous materials spills. The total disaster reimbursement to the City of Santa Clarita for the Northridge Earthquake was approximately \$27 million dollars.

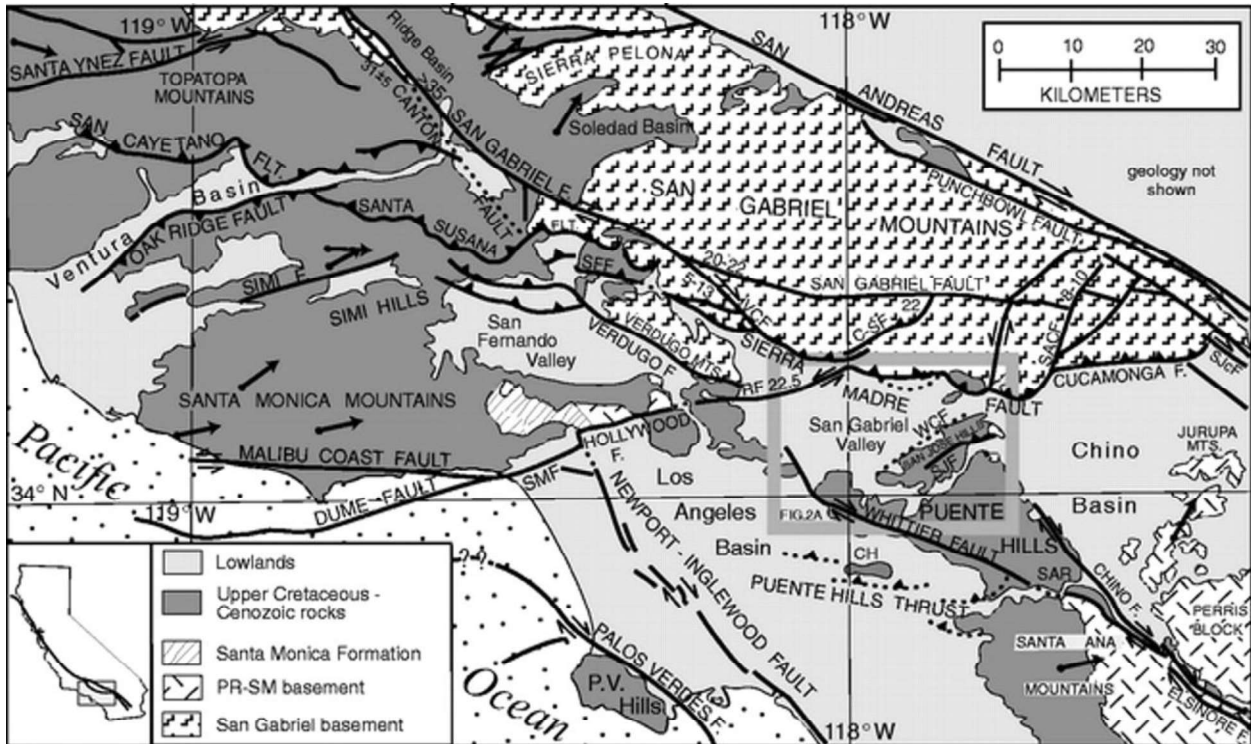


Figure 27: Freeway Collapsed Interchange

Earthquake Probability, Frequency and Magnitude

Earthquake Faults

The City of Santa Clarita is located within the Santa Clarita Valley. This valley is bordered to the southeast by the San Gabriel Mountains, to the southwest by the Santa Susana Mountains, and to the north by the Sierra Pelona. Due its relative proximity and magnitude potential (the longer the fault, the larger earthquake magnitude it can generate), the San Andrea Fault zone is the greatest threat to the City of Santa Clarita. In addition to the San Andreas Fault, the most significant geological hazard identified is the presence of the active San Gabriel Fault, which crosses the City. The map below provides an overview of the major faults in the Santa Clarita area (The Geological Society of America).



Map 19: Southern California Fault Map

The City of Santa Clarita also lies within the Transverse Ranges Geomorphic Province. This province is extensively faulted with known active faults. Large faults in or near the province include the San Andreas, Oak Ridge, Holser, San Fernando, Santa Susana, Red Mountain, Garlock, Newport-Inglewood and Malibu Coast faults. The table below provides a summary of major faults in the area (data from the Southern California Earthquake Data Center and the Department of Conservation Division of Mines and Geology).

Table 33: Major Faults in the Santa Clarita Area

Fault Name	Location and Seismicity
Holser Fault	The Holser fault is similar in orientation to the San Cayetano fault and might be considered as an extension of the same geological feature. The Holser fault trends along the northern border of the Santa Clara River Valley. Based on a conversation with the Department of Conservation Division of Mines and Geology, the exact location in the City of Santa Clarita is concealed beneath alluvium. Therefore, it has not been determined if this fault runs through the City. The fault is an east-west trending fault that dips to the north. The fault has a reverse sense of offset. It is modeled as being capable of generating a maximum moment magnitude of 6.5. The interval between major ruptures is uncertain.
Oak Ridge Fault	The Oak Ridge Fault is located seven miles west of the City. The fault is a steep south-dipping fault that forms the boundary between Oak Ridge to the south and the Santa Clara River to the north. Activity along the Oak Ridge fault is known to have occurred during the Pliocene times (5.3 to 7.6 million years ago) and into the Pleistocene. The magnitude 6.7 Northridge earthquake (in 1994) is thought to have occurred along the eastern end of the Oak Ridge fault. The interval between major ruptures on this fault is unknown.
San Andreas Fault Zone	The San Andreas Fault Zone is the dominant active fault in California. It is located 16 miles northeast of the City. There have been numerous historic earthquakes along the San Andrea fault. This fault is capable of producing a moment magnitude of 8 - 8.5 earthquake. Geologists estimate the recurrence interval of a major quake along this fault to be 130 -140 years.
San Fernando Fault	The San Fernando Fault is located six miles south of the City. This fault is part of the Sierra Madre-San Fernando (Sylmar) earthquake. The fault has reverse displacement. It is modeled as being capable of generating a maximum moment magnitude of 6.7. It is estimated that this fault will experience a major rupture approximately every 200 years.
San Gabriel Fault Zone	The San Gabriel Fault Zone is primarily right-lateral strike-slip and approximately 140 km long. Nearby communities include Castaic, Saugus, and Sunland. Intervals between major ruptures is unknown.
Santa Susana Fault	The Santa Susana Fault is an active fault located one mile south of the City. This fault is a reverse fault that extends from the northern edge of Simi Valley through the northern end of the San Fernando Valley. This fault has a length of about 16 miles and an estimated maximum moment magnitude of 6.6. The interval between major ruptures on this fault is uncertain.
Verdugo Fault	The Verdugo Fault is approximately 21 km long and is a reverse fault with a probable moment magnitude of 6.0 – 6.8. The Verdugo Fault is located near the communities of Sun Valley, Burbank, and Glendale.

Earthquake Probability

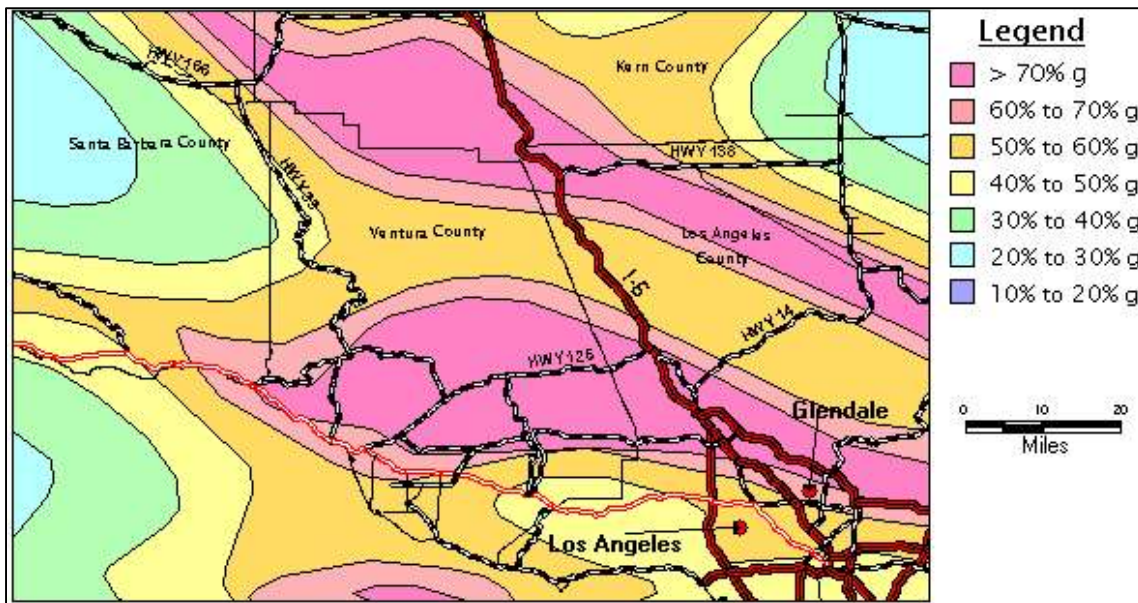
PSHA Map Index

Earthquake shaking hazards are calculated by projecting earthquake rates based on earthquake history and fault slip rates, the same data used for calculating earthquake probabilities. New fault parameters have been developed for these calculations and are included in the report of the Working. Calculations of earthquake shaking hazard for California are part of a cooperative project between USGS and CGS, and are part of the [National Seismic Hazard Maps](#). CGS Map Sheet 48 (revised 2008) shows potential seismic shaking based on National Seismic Hazard Map calculations plus amplification of seismic shaking due to the near surface soils.

Contour maps have been developed for all 1 degree by 2 degree areas of California (State of California Department of Conservation, 2008). The probabilistic seismic hazard map shows the hazard from earthquakes that geologists and seismologists agree could occur in California. It is probabilistic in the sense that the analysis takes into consideration the uncertainties in the size and location of earthquakes and the resulting ground motions that can affect a particular site.

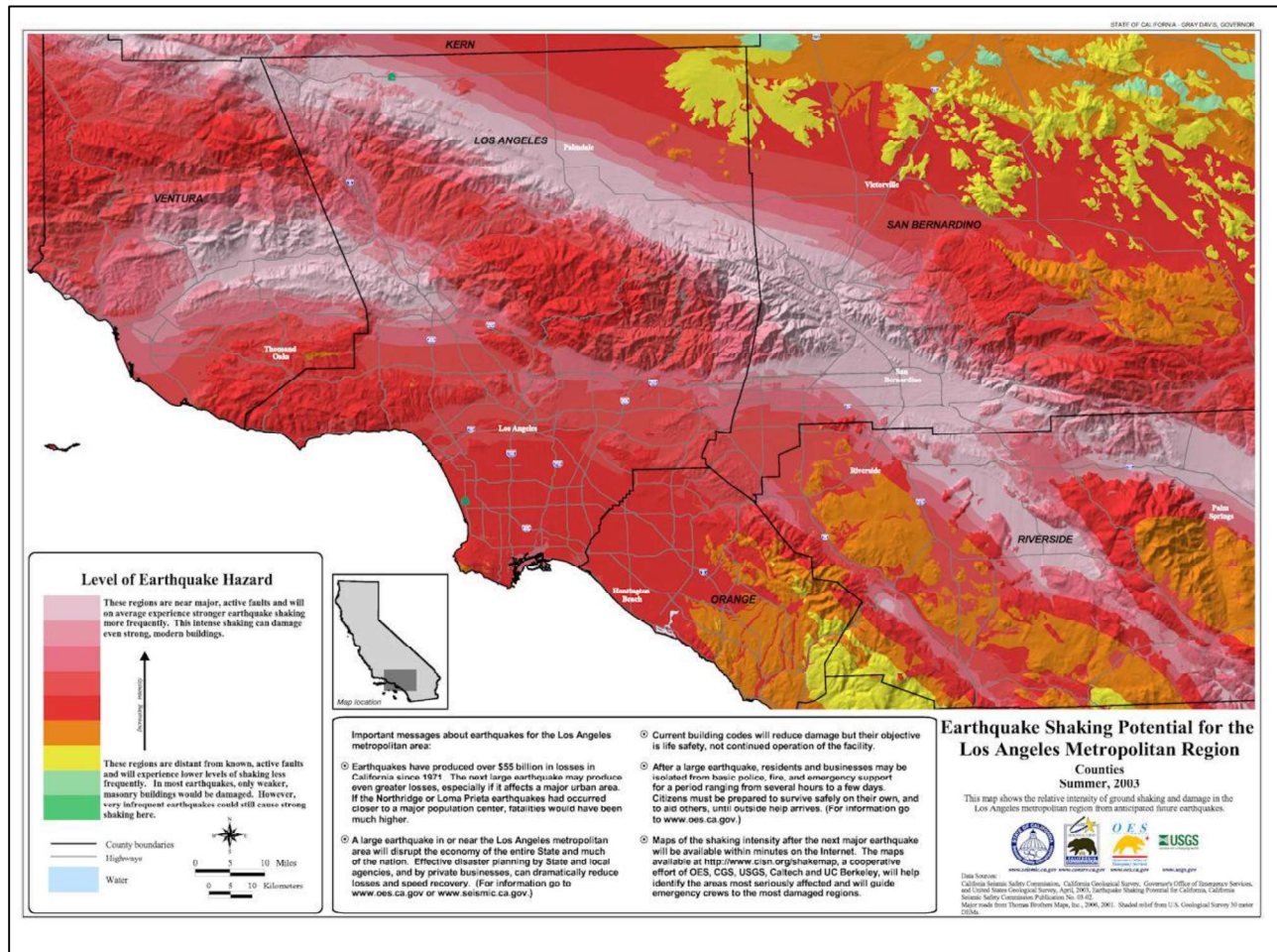
The maps are typically expressed in terms of probability of exceeding a certain ground motion. For example, the 10% probability of exceedance in 50 years maps depict an annual probability of 1 in 475 of being exceeded each year. This level of ground shaking has been used for designing buildings in high seismic areas. The maps for 10% probability of exceedance in 50 years show ground motions that are not expected to be exceeded in the next 50 years. In fact, there is a 90% chance that these ground motions will NOT be exceeded. This probability level allows engineers to design buildings for larger ground motions than expected during a 50-year interval, which will make buildings safer than if they were only designed for the ground motions that we expect to occur in the next 50 years.

The map below indicates the probabilistic ground shaking (Peak Ground Acceleration [PGA] with a 10% probability of being exceeded in 50 years, assuming a uniform soft rock site condition) for the Santa Clarita area.



Map 20: Probabilistic Ground Shaking Map

Map 21: Earthquake Shaking Potential for the Los Angeles Metropolitan Region shows the relative intensity of ground shaking and projected damage in the Los Angeles area from anticipated future earthquakes.



Map 21: Earthquake Shaking Potential for the Los Angeles Metropolitan Region

ShakeMap Scenarios

Predicted ground shaking patterns throughout Southern California for hypothetical scenario earthquakes are available from the United States Geological Survey as part of their on-going “ShakeMap” program. These maps are provided in terms of Instrumental Intensity, which is essentially Modified Mercalli Intensity (MMI) estimated from instrumental ground motion recordings. The following scenarios depict strong ground shaking patterns four earthquake scenario events:

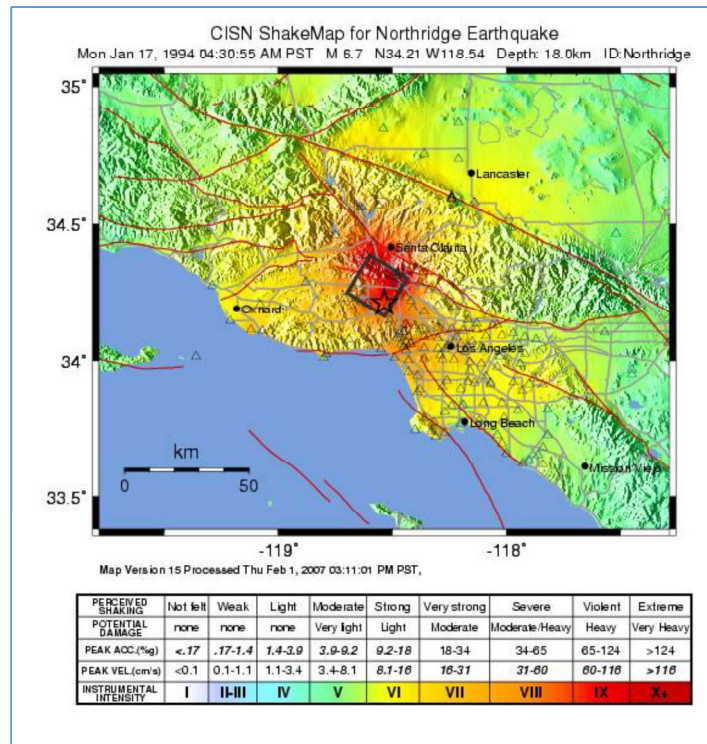
- M 6.7 1994 Northridge Earthquake
- M 7.8 Earthquake on the San Andreas Fault ShakeOut Scenario
- M 6.7 Earthquake on the San Fernando Fault Scenario
- M 7.9 Fort Tejon Earthquake Scenario

Modeling various scenarios is useful in estimating the likely impact to local populations, infrastructure, and facilities. This information can be used to assist emergency managers and the public to better prepare for future events.

1994 Northridge Earthquake

The most recent significant seismic event in the area was the 1994 Northridge Earthquake. In terms of human impact, 60 people were killed, more than 7,000 injured, and 20,000 were left homeless in the greater Los Angeles Basin.

The shaking heavily damaged communities throughout the San Fernando Valley, Simi Valley, and the areas north and west of Los Angeles. It is estimated that the event resulted in over \$20 billion in losses (USGS). More than 1,600 buildings were “red-tagged” as unsafe to enter and another 7,300 buildings were “yellow tagged” and restricted to limited entry. Thousands of other structures experienced minor damage. The impact to local infrastructure included sink holes in local roads, damaged water lines, ruptured gas lines, electrical power outages, pipeline distribution systems damage, and communications disruptions. Furthermore, seven major freeway bridges in the area collapsed and 170 were damaged, including the Interstate 5 / Highway 14 Interchange south of Santa Clarita, disrupting traffic in the Los Angeles region for weeks following the earthquake.



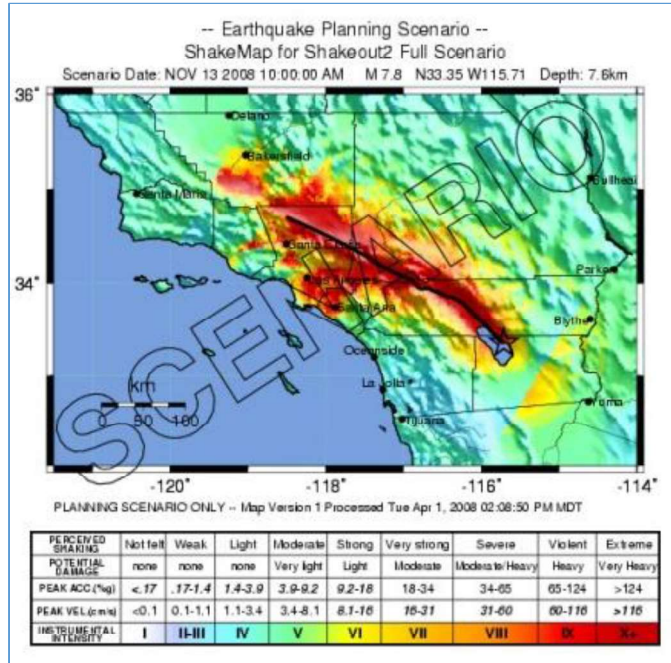
Map 22: Northridge Earthquake ShakeMap

SOURCE: <http://earthquake.usgs.gov/earthquakes/shakemap/sc/shake/Northridge/>

San Andreas Fault ShakeOut Scenario

A San Andreas Earthquake has been used as the scenario for the annual ShakeOut Earthquake Exercise and also serves as a basis for statewide emergency response exercises.

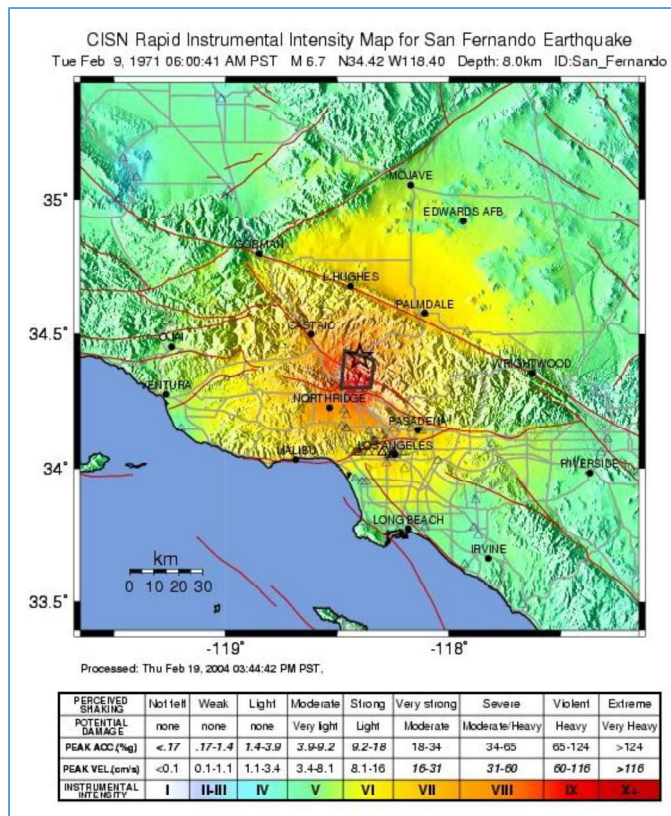
Over 300 scientists, engineers, and others developed the San Andreas ShakeMap to study the likely consequences of a 7.8 Mw earthquake on the San Andreas Fault with an epicenter at Bombay Beach, on the Salton Sea in Imperial County. The scenario estimates over 1,800 deaths, 50,000 injuries, \$200 billion in damages and other losses, and severe, long lasting disruptions with regional implications.



Map 23: San Andreas Fault Scenario ShakeMap

San Fernando Earthquake

The 6.7 Mw earthquake that struck on February 9, 1971 at 6:00 A.M. killed 65 people, injured more than 2,000, and caused property damage estimated at \$505 million (USGS). The shaking heavily damaged communities throughout the San Fernando Valley and greatly damaged schools throughout the Los Angeles basin, caused landslides throughout the San Gabriel Valley and the mountains north of Los Angeles, as well as damaged buildings in downtown Los Angeles. Two hospitals collapsed. Twelve overpass bridges and two freeway interchanges collapsed in Los Angeles County and a portion of the Van Norman Dam collapsed, prompting evacuations over fears of a dam failure.



Map 24: San Fernando Earthquake ShakeMap

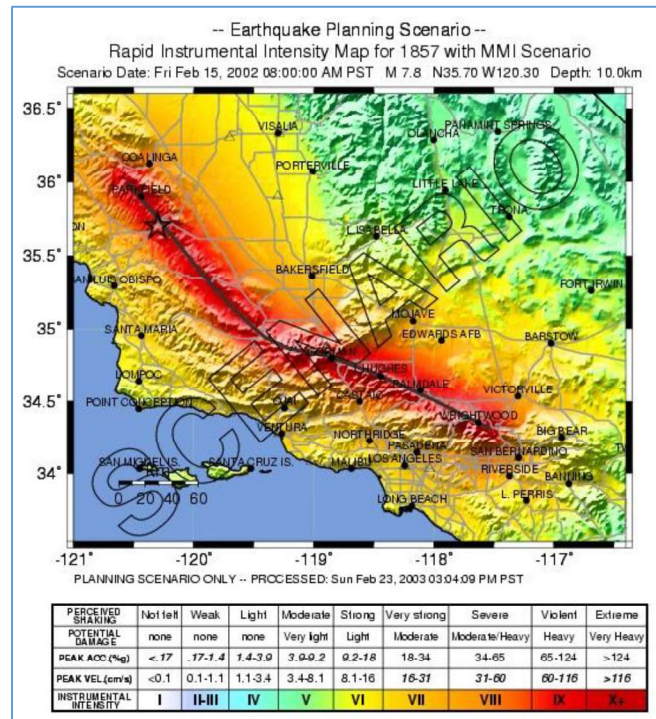
Quake related landslides closed all connector roads between Los Angeles and Lancaster, and the newly constructed Newhall Pass interchange connecting the Golden State Freeway with the Antelope Valley Freeway collapsed. Travel between the Santa Clarita Valley and Los Angeles required a major detour through San Bernardino.

1857 Fort Tejon Earthquake Scenario

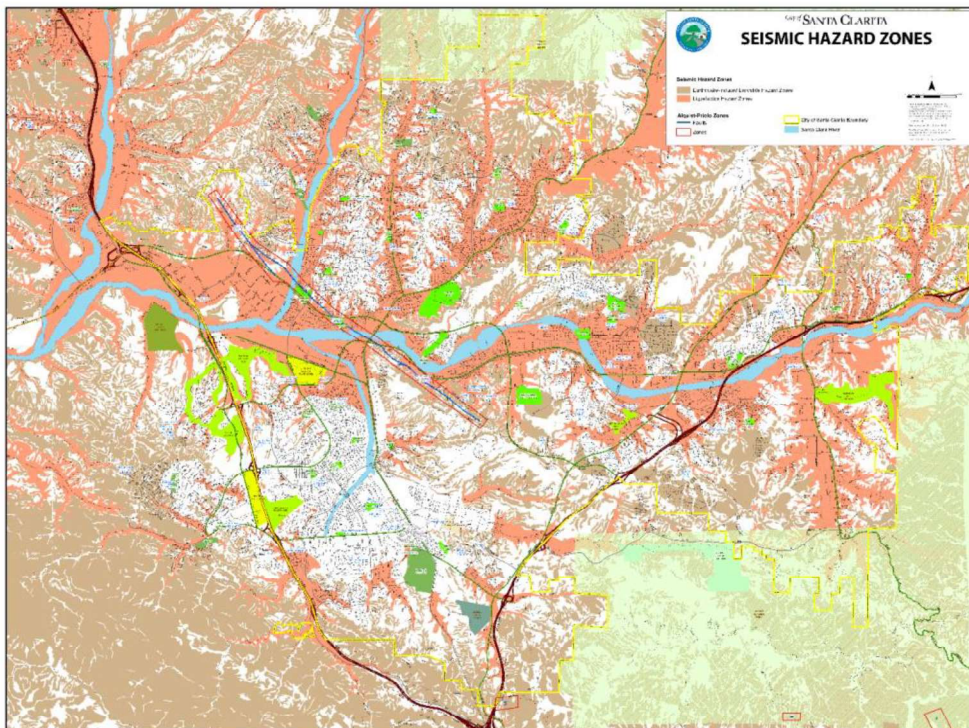
One of the largest quakes in United States history was the Fort Tejon quake in 1857. Estimated to be 7.9 M_w , the quake originated in Parkfield, Monterey County and traveled along the San Andreas Fault for over 360 miles. Named the Fort Tejon earthquake because the fort was the closest population center to the epicenter, a quake of similar scale today would cause Violent to Extreme shaking and Moderate to Heavy damage in the Santa Clarita area as the fault passes through what is modern-day Palmdale.

Designated Hazard Areas in Santa Clarita

The entire City of Santa Clarita is in a seismically active region. Map 26: Santa Clarita Seismic Hazard Zones identifies the areas subject to earthquakes, earthquake-induced landslides, and liquefaction (see Appendix D: Maps **Error! Reference source not found.** for an expanded view).



Map 25: Fort Tejon Earthquake ShakeMap



Map 26: Santa Clarita Seismic Hazard Zones

Earthquake Vulnerabilities

Earthquake can have an extensive and devastating impact on the community, structures, and the economy. The following section summarizes key vulnerabilities for the City of Santa Clarita.

Death and Injury

Death and injury can occur both inside and outside of buildings due to collapsed buildings falling equipment, furniture, debris, and structural materials. Downed power lines and broken water and gas lines can also endanger human life.

Fire

Downed power lines or broken gas mains can trigger fires. When fire stations suffer building or lifeline damage, quick response to extinguish fires is less likely. Furthermore, major incidents will demand a larger share of resources, and initially smaller fires and problems will receive little or insufficient resources in the initial hours after a major earthquake event. Loss of electricity may cause a loss of water pressure in some communities, further hampering firefighting ability.

Liquefaction

Buildings above liquefiable soils may settle or tip due to a loss of load bearing capacity of the soil. Liquefaction occurs when soil grains in loose, saturated silty, sandy, or gravel soils attempt to rearrange themselves in a denser configuration when subjected to strong earthquake ground motions. The resulting increase in pressure of the water in the voids of the soil temporarily transforms the soil into a fluid, causing the soil to lose much of its strength. As the pore-water pressure builds, ground water and liquefied soil may find their way to the surface, creating sand boils on the ground surface. Several types of damaging ground failures can occur due to liquefaction, including lateral spreading, ground settlement, and sink holes.

Lateral spreading occurs when the subsurface soil liquefies. Gravity and inertial forces from the earthquake cause the mass to move downslope. Lateral spreading can occur on very shallow slopes (nearly flat ground), and they can cause ground displacements ranging from inches to tens of feet. This type of movement can damage utilities and structures supported by shallow or deep foundations.

Buildings

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. Though structures built before 1993 (when building codes were not as comprehensive in terms of seismic safety) are at greatest risk, all buildings are at risk in one form or another. No building is earthquake-proof, regardless of the code they were designed under, there is always a possibility that the right type of earthquake with the right frequency can severely damage or destroy any structure. Because the City of Santa Clarita is a much newer city, as compared to other cities within Southern California, the buildings are generally newer and are therefore less prone to catastrophic failure.

Debris

Debris removal is a key support requirement for the clean-up of brick, glass, wood, steel or concrete building elements, office and home contents, and other materials. Developing a strong debris management strategy is essential in post-disaster recovery. Note: In a major disaster that includes implementation of the National Response Plan, one of the primary missions of the U.S. Army Corps of Engineers (USACE) is debris removal. Consequently if such an event occurs, the City of Santa Clarita will need to work closely with USACE.

Dams

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.

There are two dams very near the City of Santa Clarita: the Bouquet Canyon Dam and the Castaic Dam. Both are located in the unincorporated area but, if a failure were to occur, areas of the City of Santa Clarita would be severely impacted.

Transportation Infrastructure

Damaged infrastructure strongly affects the economy of the community because it disconnects people from work, school, food, and leisure, and separates businesses from their customers and suppliers. Residents in the City of Santa Clarita commute frequently by automobiles and public transportation such as buses and light rail (Metrolink). An earthquake can greatly damage bridges and roads, hampering emergency response efforts and the normal movement of people and goods.

- Even modern bridges can sustain damage during earthquakes, leaving them unsafe for use. Some bridges have failed completely due to strong ground motion. Bridges are a vital transportation link - with even minor damages making some areas inaccessible. Because bridges vary in size, materials, location and design, any given earthquake will affect them differently. Bridges built before the mid-1970's have a significantly higher risk of suffering structural damage during a moderate to large earthquake compared with those built after 1980 when design improvements were made.
- Much of the interstate highway system was built in the mid to late 1960's. The bridges in the City of Santa Clarita are state, county or privately owned (including railroad bridges). Cal Trans has retrofitted most bridges on the freeway systems (I-5 and Hwy 14); however there are still some county maintained bridges that are not retrofitted. The FHWA requires that bridges on the National Bridge Inventory be inspected every 2 years. The Los Angeles County Department of Public Works through Caltrans funding reviews all City bridges every two years and forwards a comprehensive report to the City with recommended work.

Lifeline Infrastructure (Networks and Pipelines)

Lifelines are the connections between communities and outside services. They include water, waste water, and gas pipelines, electrical delivery systems, and communication networks. Ground shaking and amplification can cause pipes to break open, power lines to fall, roads and railways to crack or move, and radio and telephone communication to cease. Lifelines need to be usable after earthquake to allow for recovery and rebuilding efforts as well as to relay important information to the public.

Disruption of Critical Services

Critical facilities include police stations, fire stations, hospitals, shelters, and other sites that provide important services to the community. These facilities and their services need to be functional after an earthquake event.

Businesses and the Economy

Seismic activity can cause great loss to businesses, both large-scale corporations and small retail shops. When a company is forced to stop production for just a day, the economic loss can be tremendous, especially when its market is at a national or global level. Seismic events can create economic loss that presents a burden to large and small shop owners who may have difficulty recovering their businesses.

Forty percent of businesses do not reopen after a disaster and another twenty-five percent fail within one year according to the Federal Emergency Management Agency (FEMA). Similar statistics from the United States Small Business Administration indicate that over ninety percent of businesses fail within two years after being struck by a disaster.

The Institute of Business and Home Safety (Institute for Business and Home Safety, 2013) has developed “Open for Business”, which is a disaster planning toolkit to help guide businesses in preparing for and dealing with the adverse effects natural hazards. The kit integrates protection from natural disasters into the company's risk reduction measures to safeguard employees, customers, and the investment itself. The guide helps businesses secure human and physical resources during disasters, and helps to develop strategies to maintain business continuity before, during, and after a disaster occurs.

Individual Preparedness

Because the potential for earthquake occurrences and earthquake related property damage is relatively high in the City of Santa Clarita, increasing individual preparedness is a significant need. Strapping down heavy furniture, water heaters, and expensive personal property, as well as being earthquake insured, and anchoring buildings to foundations are just a few steps individuals can take to prepare for an earthquake.

Potential Damage

Hazus Multi-Hazard

Risk analysis is a phase of a hazard assessment and involves estimating the damage and costs likely to be experienced in a geographic area over a period of time (Burby, R. - Ed., 1998). Factors included in assessing earthquake risk include population and property distribution in the hazard area, the frequency of earthquake events, landslide susceptibility, buildings, infrastructure, and disaster preparedness of the region. This type of analysis can generate estimates of the damages to the region due to an earthquake event in a specific location. FEMA's software program, Hazus, uses mathematical formulas and information about building stock, local geology and the location and size of potential earthquakes, economic data, and other information to estimate losses from a potential earthquake (FEMA HAZUS-MH, 2015).

For greater Southern California there are multiple worst case scenarios, depending on which fault might rupture, and which communities are in proximity to the fault. But damage will not necessarily be limited to immediately adjoining communities. Depending on the hypocenter of the earthquake, seismic waves may be transmitted through the ground to unsuspecting communities. In the Northridge 1994 earthquake, Santa Monica suffered extensive damage, even though there was a range of mountains between it and the origin of the earthquake.

Damage caused from a major earthquake is likely to run into the billions of dollars. Although building codes in the region are some of the most stringent in the world, tens of thousands of older existing buildings were built under much less rigid codes. California has laws affecting unreinforced masonry buildings (URM's) and although many building owners have retrofitted their buildings, hundreds of pre-1933 buildings still have not been brought up to current standards. The City of Santa Clarita has made an effort to provide education and assistance on the reinforcement of masonry buildings.

Non-structural bracing of equipment and contents is often a cost-effective type of seismic mitigation. Inexpensive bracing and anchoring may be the most cost effective way to protect critical equipment. Non-structural bracing of equipment and furnishings will also reduce the chance of injury for the occupants of a building.

Hazus-MH Scenario for Santa Clarita

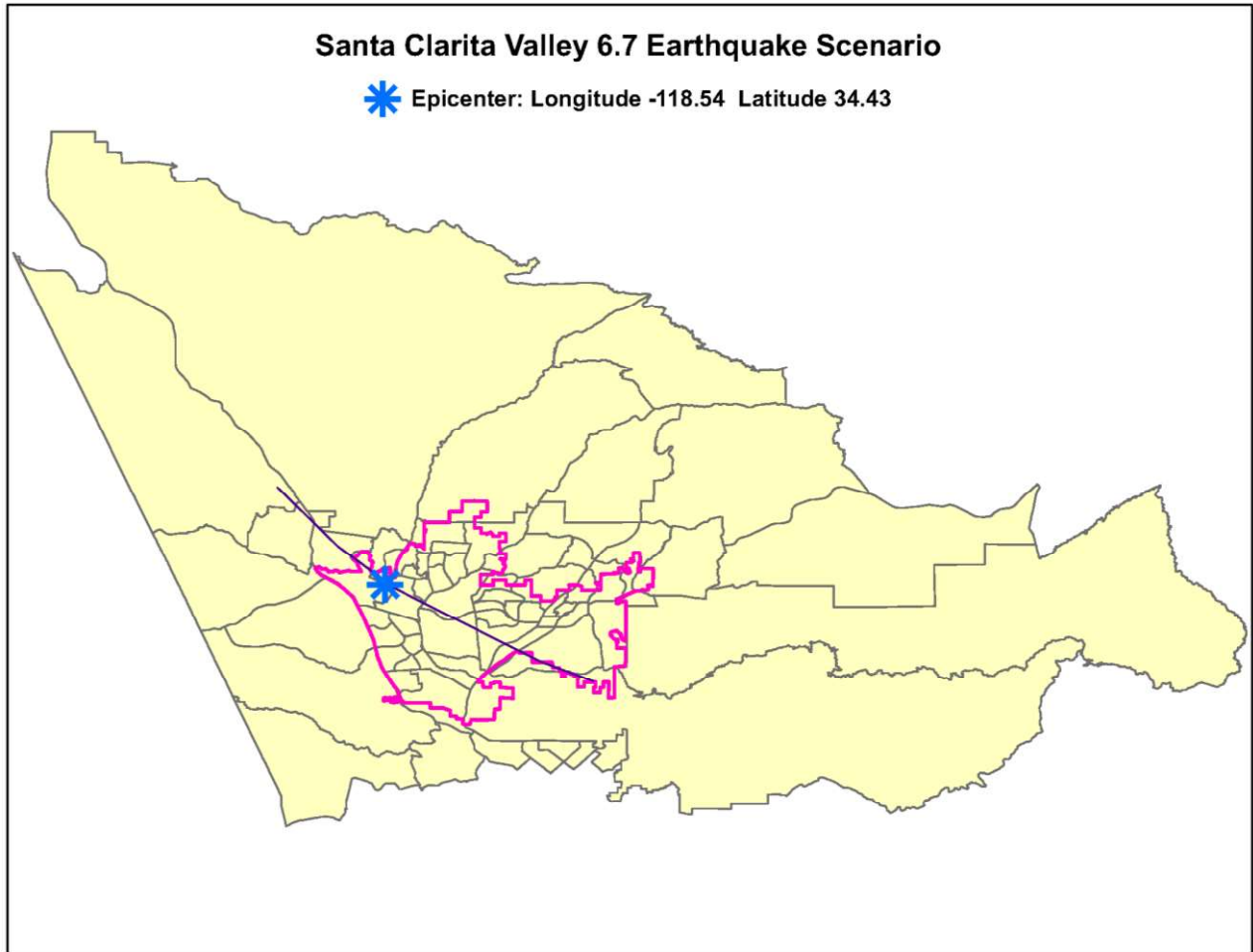
Based on an earthquake scenario with the same Moment Magnitude of 6.7 as the 1994 Northridge Earthquake, the City of Santa Clarita GIS Department developed the following Hazus-MH statistics (based on 2010 U.S. Census data).

Earthquake Scenario

Scenario Name	SCV 6.7 Earthquake Scenario
Type of Earthquake	Source
Fault Name	San Gabriel
Historical Epicenter ID #	186
Probabilistic Return Period	NA
Longitude of Epicenter	-118.54
Latitude of Epicenter	34.43
Earthquake Magnitude	6.70
Depth (Km)	0.00
Rupture Length (Km)	25.59
Rupture Orientation (degrees)	0.00
Attenuation Function	West US, Extensional 2008 - Strike Slip

Baseline Data

Size of Area	The geographical size of the region is 851.51 square miles and contains 68 census tracts. There are over 76 thousand households in the region which has a total population of 239,202 people (2010 Census Bureau data).
Number and Value of Buildings	There are an estimated 73 thousand buildings in the region with a total building replacement value (excluding contents) of 20,332 (millions of dollars). Approximately 93.00 % of the buildings (and 81.00% of the building value) are associated with residential housing.
Transportation System and Utility Lifeline Value	The replacement value of the transportation and utility lifeline systems is estimated to be 3,240 and 613 (millions of dollars), respectively.



Map 27: HAZUS 6.7 M Earthquake Scenario

Building Damage Estimate

Hazus estimates that about 19,768 buildings will be at least moderately damaged. This is over 27.00 % of the buildings in the region. There are an estimated 1,128 buildings that will be damaged beyond repair. The definition of the ‘damage states’ is provided in Volume 1: Chapter 5 of the Hazus technical manual. The table below summarizes the expected damage by general occupancy for the buildings in the region.

Table 34: Expected Building Damage by Occupancy Type

Occupancy Type Category	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	80	0.30	55	0.20	44	0.30	17	0.46	6	0.52
Commercial	1,086	4.08	890	3.32	931	6.21	411	11.24	146	12.92
Education	38	0.14	33	0.12	32	0.21	13	0.36	4	0.35
Government	12	0.05	12	0.04	13	0.09	7	0.18	2	0.21
Industrial	367	1.38	312	1.17	365	2.43	171	4.67	62	5.48
Other Residential	2,689	10.11	2,599	9.71	2,584	17.25	1,451	39.68	459	40.70
Religion	66	0.25	51	0.19	47	0.31	20	0.56	7	0.62
Single Family	22,261	83.69	22,825	85.24	10,967	73.20	1,567	42.84	442	39.19
Total	26,599		26,777		14,982		3,658		1,128	

The table below summarizes the expected damage by general building type.

Table 35: Expected Building Damage by Building Type (All Design Levels)

Building Type Category	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	24,038	90.37	24,594	91.85	11,759	78.49	1,644	44.94	463	40.99
Steel	386	1.45	287	1.07	388	2.59	185	5.05	62	5.50
Concrete	370	1.39	322	1.20	294	1.96	142	3.88	41	3.62
Precast	264	0.99	229	0.86	326	2.18	160	4.37	61	5.38
RM	750	2.82	422	1.57	485	3.24	234	6.39	60	5.29
URM	54	0.20	62	0.23	107	0.72	87	2.37	65	5.80
MH	738	2.77	861	3.22	1,622	10.83	1,207	32.99	377	33.43
Total	26,599		26,777		14,982		3,658		1,128	

Note: The number of structures and estimates of potential building damage in earthquake induced landslide and liquefaction zones is provided in the Landslide / Mudslide / Subsidence section under

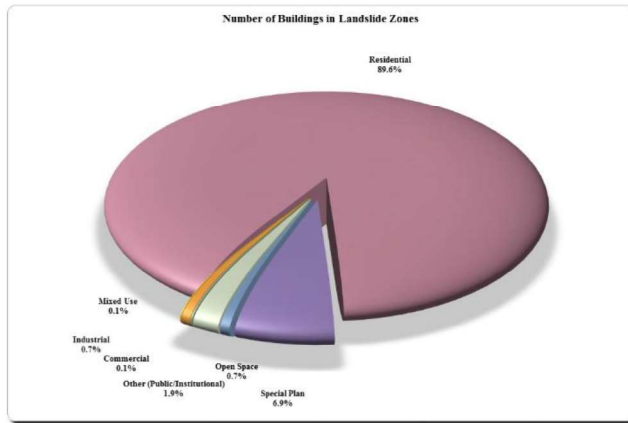


Figure 33: Number of Buildings in Landslide Zones

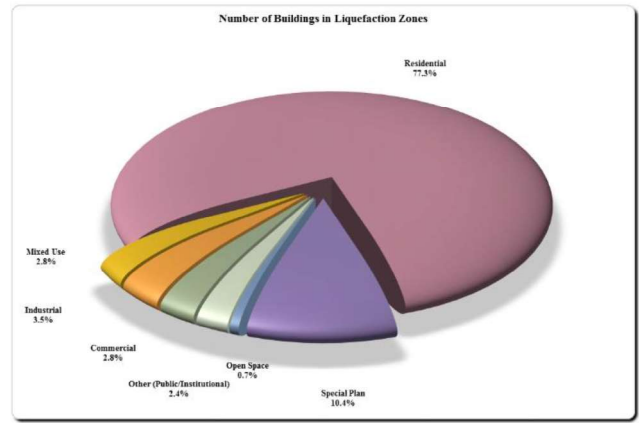


Figure 34: Number of Buildings in Liquefaction Zones

Estimated Earthquake Induced Landslide and Liquefaction Damage.

Essential Facility Damage

Before the earthquake, the region had 453 hospital beds available for use. On the day of the earthquake, the model estimates that only 245 hospital beds (54.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 92.00% of the beds will be back in service. By 30 days, 100.00% will be operational

Table 36: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	2	0	0	2
Schools	74	0	0	4
EOCs	0	0	0	0
Police Stations	1	0	0	0
Fire Stations	0	0	0	0

Transportation Damage

Table 37: Expected Damage to Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 % After Day 1	After Day 7
Highway	Segments	130	0	0	130	130
	Bridges	227	13	0	215	218
	Tunnels	2	0	0	2	2
Railways	Segments	5	0	0	5	5
	Bridges	3	0	0	3	3
	Tunnels	0	0	0	0	0
	Facilities	1	1	0	1	1
Light Rail	Segments	5	0	0	5	5
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	4	3	0	2	4
Bus	Facilities	2	2	0	0	2
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	1	0	0	1	1

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Utility Lifeline Damage

The Expected Utility System Facility Damage table provides information on the damage to the utility lifeline systems. The Expected Utility System Pipeline Damage table includes estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis.

Table 38: Expected Utility System Facility Damage

System	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	5	5	0	0	5
Waste Water	2	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	3	0	0	0	0
Electrical Power	2	0	0	0	0
Communication	2	0	0	0	0

Table 39: Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	3,071	0	0
Waste Water	1,843	0	0
Natural Gas	1,228	0	0
Oil	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris. The model estimates that a total of 0.60 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 37.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 24,000 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 1,722 households to be displaced due to the earthquake. Of these, 1,145 people (out of a total population of 239,202) will seek temporary shelter in public shelters.

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time. The table below provides a summary of the casualties estimated for this earthquake

Table 40: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	7	2	0	1
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	3	1	0	0
	Industrial	17	5	1	1
	Other-Residential	193	41	4	8
	Single Family	265	39	2	3
	Total	484	88	7	13
2 PM	Commercial	415	112	18	35

		Level 1	Level 2	Level 3	Level 4
	Commuting	1	1	2	0
	Educational	107	27	4	8
	Hotels	1	0	0	0
	Industrial	124	34	5	10
	Other-Residential	34	7	1	1
	Single Family	45	7	0	1
	Total	727	188	31	56
5 PM	Commercial	358	96	15	29
	Commuting	58	75	129	25
	Educational	15	4	1	1
	Hotels	1	0	0	0
	Industrial	78	21	3	6
	Other-Residential	72	16	2	3
	Single Family	103	15	1	1
	Total	684	227	150	65

Economic Loss

The total economic loss estimated for the earthquake is 2,691.30 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 2,587.85 (millions of dollars); 14 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 62 % of the total loss. The tables on the following page provide a summary of the losses associated with building damage.

Table 41: Building Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	0.00	1.42	58.95	4.93	2.25	67.55
	Capital-Related	0.00	0.61	54.55	2.99	0.62	58.76
	Rental	21.25	17.35	33.88	2.19	1.21	75.87
	Relocation	80.15	18.65	50.34	9.53	9.18	167.86
	Subtotal	101.40	38.03	197.72	19.64	13.26	370.04
Capital Stock Losses	Structural	157.86	36.43	72.91	28.05	8.84	304.07
	Non-Structural	771.45	204.02	244.21	111.16	32.05	1,362.88
	Content	254.86	51.23	126.21	79.52	17.11	528.93
	Inventory	0.00	0.00	3.91	17.79	0.23	21.93
	Subtotal	1,184.16	291.67	447.24	236.51	58.22	2,217.81
	Total	1,285.56	329.70	644.96	256.15	71.48	2,587.85

Transportation and Utility Lifeline Losses

Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. The tables below provide a detailed breakdown in the expected lifeline losses.

Table 42: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2,464.88	\$0.00	0.00
	Bridges	560.71	\$42.11	7.51
	Tunnels	3.73	\$0.05	1.44
	Subtotal	3029.30	42.20	
Railways	Segments	67.11	\$0.00	0.00
	Bridges	0.31	\$0.01	1.86
	Tunnels	0.00	\$0.00	0.00
	Facilities	2.66	\$1.08	40.50
	Subtotal	70.10	1.10	
Light Rail	Segments	78.81	\$0.00	0.00
	Bridges	0.00	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	10.65	\$3.83	35.96
	Subtotal	89.50	3.80	
Bus	Facilities	2.57	\$1.22	47.45
	Subtotal	2.60	1.20	
Airport	Facilities	10.65	\$1.81	17.01
	Runways	37.96	\$0.00	0.00
	Subtotal	48.60	1.80	
	Total	3240.10	50.10	

Table 43: Utility System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	\$0.00	0.00
	Facilities	196.50	\$53.34	27.15
	Distribution Line	61.40	\$0.00	0.00
	Subtotal	257.89	\$53.34	
Waste Water	Pipelines	0.00	\$0.00	0.00
	Facilities	157.20	\$0.00	0.00
	Distribution Line	36.90	\$0.00	0.00
	Subtotal	194.03	\$0.00	
Natural Gas	Pipelines	0.00	\$0.00	0.00
	Facilities	0.00	\$0.00	0.00
	Distribution Line	24.60	\$0.00	0.00
	Subtotal	24.57	\$0.00	
Oil Systems	Pipelines	0.00	\$0.00	0.00
	Facilities	0.40	\$0.00	0.00
	Subtotal	0.35	\$0.00	
Electrical Power	Facilities	259.60	\$0.00	0.00
	Subtotal	259.60	\$0.00	
Communication	Facilities	0.20	\$0.00	0.00
	Subtotal	0.24	\$0.00	
	Total	736.67	\$53.34	

Existing Mitigation Activities

Agencies and Regulations

In California, many agencies are focused on seismic safety issues: the State’s Seismic Safety Commission, the Applied Technology Council, the California Emergency Management Agency, United States Geological Survey, Cal Tech, the California Geological Survey as well as a number of universities and private foundations. These organizations, in partnership with other state and federal agencies, have undertaken a rigorous program in California to identify seismic hazards and risks including active fault identification, bedrock shaking, tsunami inundation zones (not applicable for the City of Santa Clarita), ground motion amplification, liquefaction, and earthquake induced landslides. Seismic hazard maps have been published and are available through the State Division of Mines and Geology.

California Earthquake Mitigation Legislation

The State of California is very active in addressing the threats it faces from earthquakes. As the State’s population continues to grow, and urban areas become even more densely built up, the risk continues to increase. The table below provides a sample of some of earthquake related codes.

Table 44: Partial List of California Laws on Earthquake Safety

California Code	Code Description
Government Code Section 8870-8870.95	Creates Seismic Safety Commission.
Government Code Section 8876.1-8876.10	Established the California Center for Earthquake Engineering Research.
Public Resources Code Section 2800-2804.6	Authorized a prototype earthquake prediction system along the central San Andreas fault near the City of Parkfield.
Public Resources Code Section 2810-2815	Continued the Southern California Earthquake Preparedness Project and the Bay Area Regional Earthquake Preparedness Project.
Health and Safety Code Section 16100-16110	The Seismic Safety Commission and State Architect, will develop a state policy on acceptable levels of earthquake risk for new and existing state-owned buildings.
Government Code Section 8871-8871.5	Established the California Earthquake Hazards Reduction Act of 1986.
Health and Safety Code Section 130000-130025	Defined earthquake performance standards for hospitals.
Public Resources Code Section 2805-2808	Established the California Earthquake Education Project.
Government Code Section 8899.10-8899.16	Established the Earthquake Research Evaluation Conference.

California Code	Code Description
Public Resources Code Section 2621-2630 2621.	Established the Alquist-Priolo Earthquake Fault Zoning Act.
Government Code Section 8878.50-8878.52 8878.50.	Created the Earthquake Safety and Public Buildings Rehabilitation Bond Act of 1990.
Education Code Section 35295-35297 35295.	Established emergency procedure systems in kindergarten through grade 12 in all the public or private schools.
Health and Safety Code Section 19160-19169	Established standards for seismic retrofitting of unreinforced masonry buildings.
Health and Safety Code Section 1596.80-1596.879	Required all child day care facilities to include an Earthquake Preparedness Checklist as an attachment to their disaster plan.

(California Building Standards Commission, 2013) (California State Legislature, 2015)

Building Codes

In California, each earthquake is followed by revisions and improvements in the Building Codes. 1933 Long Beach Earthquake resulted in the Field Act, affecting school construction. The 1971 Sylmar Earthquake brought another set of increased structural standards. Similar re-evaluations occurred after the 1989 Loma Prieta Earthquake and 1994 Northridge Earthquake. These code changes have resulted in stronger and more earthquake resistant structures. The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. This state law was a direct result of the 1971 San Fernando Earthquake, which was associated with extensive surface fault ruptures that damaged numerous homes, commercial buildings, and other structures. Surface rupture is the most easily avoided seismic hazard.

The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. The State Department of Conservation operates the Seismic Mapping Program for California. Extensive information is available at their website: <http://gmw.consrv.ca.gov/shmp/index.htm>. Existing mitigation activities include current mitigation programs and activities that are being implemented by county, regional, state, or federal agencies or organizations.

The City of Santa Clarita Building Code sets the minimum design and construction standards for new buildings. The City adopts the California Code of Regulations, Title 24 (the California State Building Codes), as the set of codes regulations construction within its jurisdiction. The City of Santa Clarita adopts additional amendments to the State Codes based on local climatic, geological and/or topographical conditions. These codes set the minimum design and construction standards for new building in the City’s jurisdiction.

The City of Santa Clarita Department of Building and Safety enforces building codes pertaining to earthquake hazards. These codes include:

- 2013 California Building Code
- Seismic Design Category ‘E’ or ‘F’ as determined by USGS Maps and CBC Chapter 16

Chapters 16 and 16A of the 2013 California Building Code (Design) specifically addresses seismic hazards design considerations (California Building Standards Commission, 2013):

- 1603 Earthquake Design
- 1604 Anchorage - Structural Walls
- 1605 Load Combinations
- 1613: Earthquake Loads
- 1615: Structural Integrity
- 1616: Additional Requirements

Requirements for New Development Projects

The City of Santa Clarita also requires that site-specific seismic hazard investigations be performed for new essential facilities, major structures, hazardous facilities, and special occupancy structures such as schools, hospitals, and emergency response facilities. The City has required site specific soils and geology investigations for projects such as these since its incorporation. The consultants preparing these reports routinely include a section on many hazards such as seismic activity, tsunamis, liquefaction and other as appropriate. However, the City of Santa Clarita does not plan check, inspect or approve “essential facilities” such as hospitals, schools and emergency response facilities (police, fire, etc.). These are under the jurisdiction of the Department of the State Architect.

The City of Santa Clarita Planning Department enforces the zoning and land use regulations relating to earthquake hazards. As part of the City General Plan, specific reference is made to codes that 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.

Hospitals

“The Alfred E. Alquist Hospital Seismic Safety Act (“Hospital Act”) was enacted in 1973 in response to the moderate Magnitude 6.6 Sylmar Earthquake in 1971 when four major hospital campuses were severely damaged and evacuated. Two hospital buildings collapsed killing forty seven people. Three others were killed in another hospital that nearly collapsed.

In approving the Act, the Legislature noted that:

Hospitals, that house patients who have less than the capacity of normally healthy persons to protect themselves, and that must be reasonably capable of providing services to the public after a disaster, shall be designed and constructed to resist, insofar as practical, the forces generated by earthquakes, gravity and winds (Health and Safety Code Section 129680).

When the Hospital Act was passed in 1973, the State anticipated that, based on the regular and timely replacement of aging hospital facilities, the majority of hospital buildings would be in compliance with the Act’s standards within 25 years. However, hospital buildings were not, and are not, being replaced at that anticipated rate. In fact, the great majority of the State’s urgent care facilities are now more than 40 years old. Henry Mayo, the City of Santa Clarita’s major hospital has stated that it will use every means it has to keep its doors open to serve the community when there is a disaster.

The 6.7 M_w Northridge Earthquake in 1994 caused \$3 billion in hospital-related damage and evacuations. Twelve hospital buildings constructed before the Act were cited (red tagged) as unsafe for occupancy after the earthquake. Those hospitals that had been built in accordance with the 1973 Hospital Act were very successful in resisting structural damage. However, nonstructural damage (for example, plumbing and ceiling systems) was still extensive in those post-1973 buildings.

Senate Bill 1953 (“SB 1953”), enacted in 1994 after the Northridge Earthquake, expanded the scope of the 1973 Hospital Act. Under SB 1953, all hospitals are required, as of January 1, 2008, to survive earthquakes without collapsing or posing the threat of significant loss of life. The 1994 Act further mandates that all existing hospitals be seismically evaluated, and retrofitted, if needed, by 2030, so that they are in substantial compliance with the Act (which requires that the hospital buildings be reasonably capable of providing services to the public after disasters). SB 1953 applies to all urgent care facilities (including those built prior to the 1973 Hospital Act) and affects approximately 2,500 buildings on 475 campuses.

SB 1953 directed the Office of Statewide Health Planning and Development (“OSHPD”), in consultation with the Hospital Building Safety Board, to develop emergency regulations including:

“...earthquake performance categories with sub-gradations for risk to life, structural soundness, building contents, and nonstructural systems that are critical to providing basic services to hospital inpatients and the public after a disaster.” (Health and Safety Code Section 130005).

In 2001, recognizing the continuing need to assess the adequacy of policies, and the application of advances in technical knowledge and understanding, the California Seismic Safety Commission created an Ad Hoc Committee to re-examine the compliance with the Alquist Hospital Seismic Safety Act. The formation of the Committee was also prompted by the recent evaluations of hospital buildings reported to OSHPD that revealed that a large percentage (40%) of California’s operating hospitals are in the highest category of collapse risk.” (California Seismic Safety Commission, 2001).

Earthquake Education

University Research and Education Programs

Earthquake research and education activities are conducted at several major universities in the Southern California region, including Cal Tech, USC, UCLA, UCSB, UCI, and UCSB. The local clearinghouse for earthquake information is the **Southern California Earthquake Center (SCEC)**. The Southern California Earthquake Center (SCEC) is a community of scientists and specialists who actively coordinate research on earthquake hazards at nine core institutions, and communicate earthquake information to the public. SCEC is a National Science Foundation (NSF) Science and Technology Center and is co-funded by the United States Geological Survey (USGS).

Los Angeles County ESP

In addition, Los Angeles County along with other Southern California counties, sponsors the **Emergency Survival Program (ESP)** <http://www.lacoa.org/esp.htm>. The ESP is an educational resource for learning how to prepare for earthquakes and other disasters. Many school districts have very active emergency preparedness programs that include earthquake drills and periodic disaster response team exercises.

Santa Clarita Emergency Management Program

The City of Santa Clarita has implemented an aggressive Emergency Management Program that includes of education and public outreach to the residents and businesses within Santa Clarita. In addition, the City, community, schools, hospitals and businesses actively participate in the State’s annual Great Shakeout exercise.

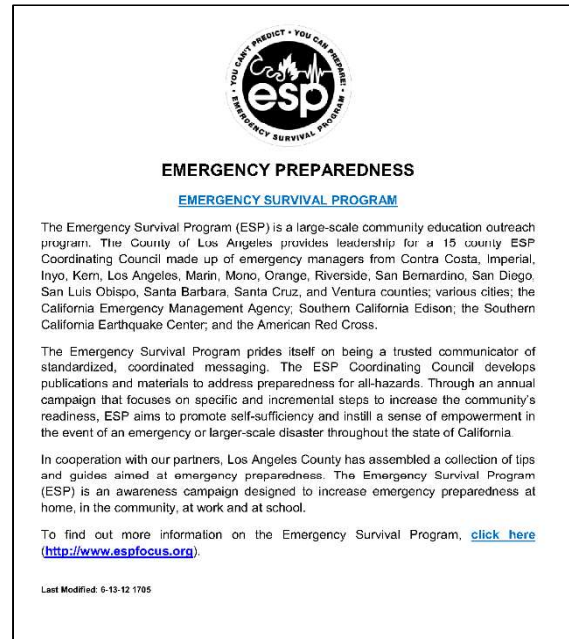


Figure 28: Los Angeles County Emergency Survival Program

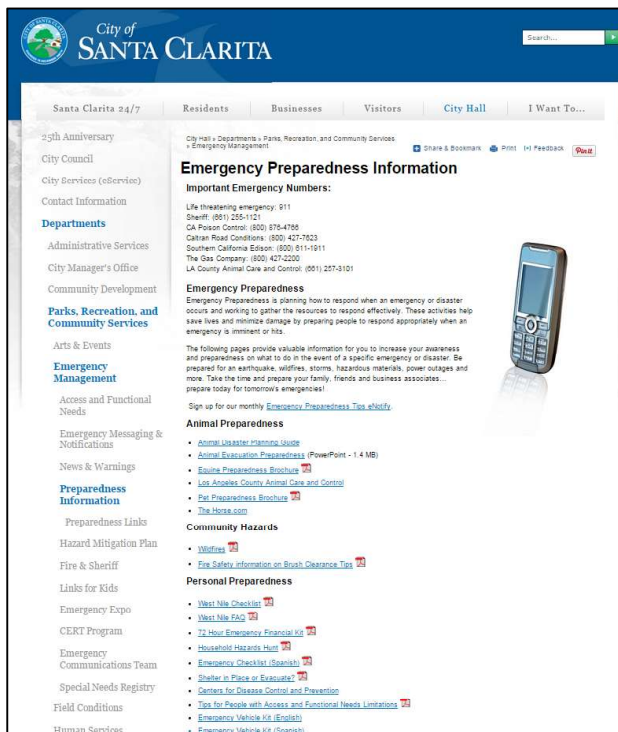


Figure 29: Santa Clarita Preparedness Info Page

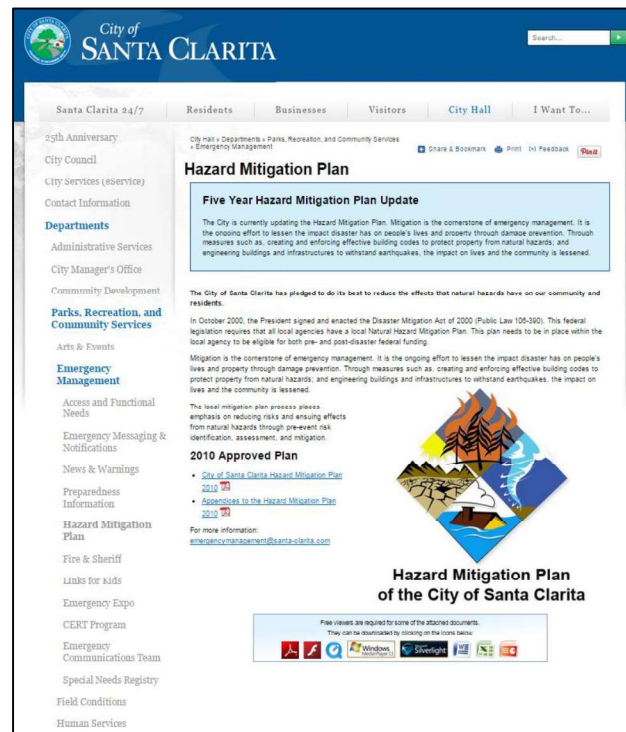


Figure 30: Santa Clarita HMP Page

Earthquake Mitigation Action Items

The earthquake strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from earthquake events. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP.

Strategy Number	Priority	Timeline	Status
E001	Low	Ongoing	E001-01: Complete E001-02: Ongoing
Strategy Description	Identify funding sources for structural and nonstructural retrofitting of structures that are identified as seismically vulnerable.		
Activities	E001-01: Provide information for property owners, small businesses, and organizations on sources of funds (loans, grants, etc.) E001-02: Explore options for including seismic retrofitting in existing programs such as low-income housing, insurance reimbursements, and pre and post disaster repairs.		
Coordinating Organization	Public Works, City Manager's Office		
Plan Goals Addressed	Partnerships and Implementation Public Awareness		
Funding Source	General Fund and/or Grant Funding		
Comments	<p><u>E001-01</u>: 2013: The "Red Guide to Recovery" was secured by the City through a grant. These books will be given to people who experience a disaster to their property.</p> <p><u>E001-02</u>: Certain building renovation and repair projects require retrofitting to components of entire lateral force-resisting systems. The extent of the retro fitting depends upon the scope of the renovation. Timeline and priority remain the same for this action item.</p>		

Strategy Number	Priority	Timeline	Status
E002	Moderate	5 Years	E002-03: Completed E002-04: Ongoing E002-05: Ongoing
Strategy Description	Seismically retrofit city-owned facilities to meet essential and critical building codes and standards, as needed.		
Activities	E002-03: Seismically retrofit City Hall (primary EOC.) E002-04: Seismically retrofit Transportation Maintenance Facility to perform as an essential facility (alternate EOC). E002-05: Seismically retrofit Sports Complex Facility to perform as a critical facility (community shelter).		
Coordinating Organization	Building and Safety Division		
Plan Goals Addressed	Protect Life and Property Emergency Services		
Funding Source	Capital Improvement Projects		
Comments	<p><u>E002-03</u>: City Hall seismic retrofit completed in summer of 2014. Project was completed when City staff were able to secure both environmental and grant application funding for the FEMA Pre-Disaster Mitigation Grant for \$825,000 with an additional City match of \$275,000, for a total budget of \$1,000,000. This was one of three City Hall Seismic Retrofit grant applications submitted by the City during the previous reporting period of July 2010 to June 2011. The installed system includes fluid viscous dampers which move on piston rods; there are 553 structures around the world that currently use this type of seismic construction system, most commonly in Japan.</p> <p><u>E002-04</u>: There has not been an opportunity to apply for FEMA grant funding for this project in FY2012-2013. City continues to research funding requirements for alternate EOCs.</p> <p><u>E002-05</u>: There has not been an opportunity to apply for FEMA grant funding for this project in FY2012-2013. City continues to research funding requirements for Community Shelters.</p>		

Strategy Number	Priority	Timeline	Status
E003	Moderate	Ongoing	E003-06: Completed E003-07: Training and Workshops Conducted / Ongoing Annually E003-08: Ongoing E003-09: Ongoing
Strategy Description	Educate citizens about seismic risks, the potential impacts of earthquakes and opportunities for mitigation actions.		
Activities	<p>E003-06: Print and distribute emergency preparedness booklet.</p> <p>E003-07: Organize and hold an annual Earthquake Forum.</p> <p>E003-08: Distribute emergency preparedness information through other social media outlets.</p> <p>E003-09: Encourage residents to prepare an earthquake kit, an evacuation plan and mitigate non-structural hazards.</p>		
Coordinating Organization	Parks and Recreation and Community Services, Community Services Division, Building and Safety Division		
Plan Goals Addressed	Protect Life and Property and Public Awareness		
Funding Source	General Fund		
Comments	<p><u>E003-06</u>: Completed in fall of 2013.</p> <p><u>E003-07</u>: Two faith-based/non-profit continuity of operations training were conducted in September 2010 and February 2011. Incorporated into 2013 Santa Clarita Emergency Expo, which was produced by KHTS AM 1220 radio and supported in sponsorship with the City, Henry Mayo Newhall Hospital, utilities, and the private sector. 3,000 people attended the Expo. Also conducted one public workshop in December 2010 to educate local designers and contractors about new structural provisions for earthquake safety required for new buildings constructed with updated permits.</p> <p>In addition to earthquake forums, Building and Safety conducts public outreach meetings to inform the building industry of changes to the building code prior to each three-year adoption cycle. The information includes changes to seismic design requirements.</p> <p><u>E003-08</u>: The City uses Twitter, Facebook, City of Santa Clarita website, City Daily Briefs, and the City e-Notify system to provide preparedness outreach, training opportunities, and workshop information to community partners and residents. Examples include the Great Shakeout, National and Earthquake Preparedness Months. The Communication staff continues to increase use of social media for preparedness and emergency response. Preparedness video downloadable for social media. City E-Notification requests for emergency preparedness information has increased by 12%.</p> <p><u>E003-09</u>: Outreach efforts are ongoing; for example, in 2012-2013, 25 separate outreach efforts were made to homeowner associations, service organizations, senior apartments, parent-teacher associations, and church groups. In 2011-2012, 23 preparedness outreaches to similar groups were conducted. Additionally, a component in the CERT program addresses this preparation.</p>		

Strategy Number	Priority	Timeline	Status
E004	Moderate	2 - 5 Years	E004-010: Revised / ETA 2 Years E004-11: Revised / Ongoing E004:12: Ongoing
Strategy Description	Encourage seismic strength evaluations of critical facilities in the City of Santa Clarita to identify vulnerabilities for mitigation of schools and universities, public infrastructure, and critical facilities to meet current seismic standards.		
Activities	<p>E004-010: Develop an inventory of schools, universities, and critical facilities that do not meet current seismic standards. Develop an inventory of City-owned critical facilities that require seismic upgrades.</p> <p>E004-011: Provide building code-related assistance to owners of structures that are interested in performing structural upgrades.</p> <p>E004-012: Encourage water providers to replace old cast iron pipes with more ductile iron, and identify partnership opportunities with other agencies for pipe replacement.</p>		
Coordinating Organization	Building and Safety Division, local water agencies, school districts, and LA County Public Works		
Plan Goals Addressed	Protect Life and Property Emergency Services		
Funding Source	General Fund		
<u>Comments</u>	<p><u>E004-010</u>: Schools and universities were removed. These facilities are regulated by the California Division of the State Architect. The City of Santa Clarita has no jurisdiction over them. The phrase "meets current seismic standards" must be defined. Each update of the seismic provisions of the California Building Code may cause an existing building to "not meet current standards." Item should be revised to "Develop an inventory of city-owned critical facilities that require seismic upgrades." Timeline: 2 years. Note: The City is currently evaluating stress cracks in structural concrete tilt-up panels at the Sports Complex Gymnasium building to assess risk/hazard and to propose a retrofit and/or repair. Will evaluate if more detailed engineering evaluation for earthquake retrofitting is needed.</p> <p><u>E004-011</u>: The City encourages owners of buildings undergoing remodeling or alteration to upgrade their building to current seismic standards where practical, as well as to where existing affected conditions warrant. The City does this during its Plan Review process prior to the issuance of building permits. In addition, the City adopted amendments to the State Building Code in January 2011; these amendments make it a requirement to retrofit existing buildings to achieve seismic safety standards when undergoing significant remodeling or alteration and the existing building is found to be substantially deficient or otherwise poses a risk of hazard from earthquake forces. This item revised to: <i>Provide building code-related assistance to owners of structures that are interested in performing structural upgrades.</i> In addition, the City's Building and Safety staff are aware of the need to encourage seismic strengthening of existing older buildings when undergoing alterations or change of use if significant hazards or deficiencies are noted during the plan check process.</p> <p><u>E004-012</u>: The water companies have been replacing old pipes with ductile iron as repairs are needed. The future replacement plan has not been determined.</p>		

Strategy Number	Priority	Timeline	Status
E005	Moderate	Ongoing	E005-13: Revised / Ongoing E005-14: Completed E00-15: Revised / Ongoing
Strategy Description	Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.		
Activities	<p>E005-13: Provide information to City Facilities staff on securing bookcases, filing cabinets, light fixtures, and other objects that can cause injuries and obstruct exits.</p> <p>E005-14: Encourage facility managers, business owners, and teachers to refer to FEMA's practical guidebook: "Reducing the Risks Nonstructural Earthquake Damage."</p> <p>E005-15: Encourage homeowners and renters to use "Earthquake Risk Around the U.S. - How to Protect Your Property" link for economic and efficient mitigation techniques.</p>		
Coordinating Organization	Building and Safety Division, Parks and Recreation and Community Services, Community Services Division, school districts, Chamber of Commerce, Valley Industrial Association (VIA), Building and Industry Association (BIA), and residents		
Plan Goals Addressed	Protect Life and Property, and Public Awareness		
Funding Source	General Fund		
Comments	<p><u>E005-13</u>: This activity is ongoing. Social media outlets are used to push non-structural hazard mitigation messages, especially in October in preparation for the Statewide Great Shakeout-Drop, Cover, Hold On Drill. This item was revised to: <i>Provide information to City Facilities staff on securing bookcases, filing cabinets, light fixtures, and other objects that can cause injuries and obstruct exits.</i> The school districts have their own criteria and are under the direction of the State of California and several schools and colleges in the area participate in the CERT program.</p> <p><u>E005-14</u>: Information was disseminated to the Santa Clarita Chamber of Commerce and the Valley Industrial Association to post on their respective websites.</p> <p><u>E005-15</u>: This item is revised to reflect the updated title of the website: "Earthquake Risk Around the U.S. - How to Protect Your Property." This link is on the Building and Safety webpage (http://www.santa-clarita.com/index.aspx?page=548) under "Homeowner Information."</p>		

Strategy Number	Priority	Timeline	Status
E006	High	5 Years	E006-17: Completed E006-18: Ongoing
Strategy Description	Identify and require analysis and modification of structures that are vulnerable to earthquake damage: pre-cast concrete, soft-story structures, and non-ductile frame buildings.		
Activities	<p>E006-17: Perform a seismic retrofit analysis of Santa Clarita City Hall - the primary emergency operations center (EOC) for the Santa Clarita Valley.</p> <p>E006-18: Implement a program to investigate critical connections within existing buildings for unrepaired damage caused by the 1994 Northridge Earthquake. Where damage is uncovered, mandate further investigation and repairs in accordance with City Council direction.</p>		
Coordinating Organization	Building and Safety Division of Public Works Dept., FEMA, Cal-OES		
Plan Goals Addressed	Protect Life and Property Public Awareness Partnerships and Implementation Emergency Services		
Funding Source	Hazard Mitigation Grant Program, FEMA		
Comments	<p><u>E006-17</u>: City Hall seismic retrofit completed in summer of 2014. System includes fluid viscous dampers which move on piston rods; there are 553 structures around the world that currently use this type of seismic construction system, most commonly in Japan.</p> <p><u>E006-18</u>: This program will require significant resources for both public and private buildings to identify damaged structures, perform invasive testing, prepare calculations and plans, and perform the upgrades. This task is unfeasible as a city-wide program. However, on large alterations and/or additions, building owners are required to upgrade affected structural systems to meet current seismic provisions. As funding is identified, City Hall will be repaired/strengthened.</p>		

Earthquake Resource Directory

Local and Regional Resources

Los Angeles County

Office of Emergency Management
County of Los Angeles Chief Executive Office
(323) 980-2260

Los Angeles County Public Works Department

900 S. Fremont Ave.
Alhambra, CA 91803
(626) 458-5100
<http://ladpw.org>

Southern California Earthquake Center (SCEC)

3651 Trousdale Parkway, Suite 169
Los Angeles, CA 90089-0742
(213) 740-5843
www.scec.org

Southern California Earthquake Data Center (SCEDC)

California Institute of Technology
252 S. Mud
Pasadena, CA 91125

State Resources

California Department of Conservation: Southern California Regional Office

655 S. Hope Street, #700
Los Angeles, CA 90017-2321
(213) 239-0878
www.consrv.ca.gov

California Department of Transportation (Caltrans)

120 S. Spring Street
Los Angeles, CA 90012
(213) 897-3656
www.dot.ca.gov/

California Division of Mines and Geology (DMG)

801 K Street, MS 12-30
Sacramento, CA 95814
(916) 445-1825
www.consrv.ca.gov/cgs/index.htm

California Office of Emergency Services (Cal-OES)

3650 Schriever Avenue
Mather, California 95655-4203
(916) 845-8510
<http://www.caloes.ca.gov/>

California Planning Information Network

1400 Tenth Street
Sacramento, CA 95814
(916) 322-2318
www.calpin.ca.gov

California Resources Agency

1416 Ninth Street, Suite 1311
Sacramento, CA 95814
(916) 653-5656
<http://resources.ca.gov/>

California Seismic Safety Commission

1755 Creekside Oaks Dr. # 100
Sacramento, CA 95833
(916) 263-5506
<http://www.seismic.ca.gov>

California State Legislature

<http://leginfo.legislature.ca.gov/>

South Carolina Earthquake Education and Preparedness (SCEEP)

College of Charleston
66 George Street
Charleston, South Carolina 29424
843.805.5507
<http://scearthquakes.cofc.edu>

Federal and National Resources

Building Seismic Safety Council (BSSC)

1090 Vermont Ave., NW, Suite 700
Washington, DC 20005
(202) 289-7800
www.bssconline.org

Federal Emergency Management Agency, Hazus - MH

500 C Street SW
Washington, DC 20472
(202) 646-2500

Federal Emergency Management Agency, Mitigation Division

500 C Street, S.W.
Washington, D.C. 20472
(202) 566-1600
www.fema.gov/fima/planhowto.shtm

Federal Emergency Management Agency, Region IX

1111 Broadway, Suite 1200
Oakland, CA 94607
(510) 627-7100
www.fema.gov

The Geological Society of America

3300 Penrose Place
Boulder, CO 80301-1806
303-357-1000
<http://gsabulletin.gsapubs.org>

Institute for Business & Home Safety

4775 E. Fowler Avenue
Tampa, FL 33617
(813) 286-3400
www.ibhs.org

United States Geological Survey

345 Middlefield Road
Menlo Park, CA 94025
(650) 853-8300
www.usgs.gov/

Western States Seismic Policy Council (WSSPC)

125 California Avenue, Suite D201, #1
Palo Alto, CA 94306
(650) 330-1101
www.wsspc.org/home.html

Publications

Burby, R, “Cooperating with Nature: Confronting Natural Hazards with Land Use Planning for Sustainable Communities” (1998), Joseph Henry Press

FEMA, “Public Assistance Debris Management Guide” (July 2000).

Jones, L; Bernknopf, R; Cox, D; Goltz, J; Hudnut, K; Mileti, D; Perry,S; Ponti, D; Porter, K; Reichle, M; Seligson, H; Shoaf, K; Treiman, J; and Wein, A., “The ShakeOut Scenario” (2008), USGS Open File Report 2008-1150

www.scvhistory.com, “Santa Clarita Tent City Hall”, Santa Clarita Valley TV, (1994).

Wolfe, Myer R. et. al., “Land Use Planning for Earthquake Hazard Mitigation: Handbook for Planners” (1986), University of Colorado, Institute of Behavioral Science, National Science Foundation.

SECTION 10. HAZARDOUS MATERIALS RELEASES

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	3	Likely		Severe
Magnitude / Severity	2	Limited		High
Warning Time	4	Less than 6 Hours	○	Moderate
Duration	3	Less than 1 Week		Low
CPRI Rating	2.85	Moderate		

Hazardous Materials Hazard Information and Background

Hazardous materials include hundreds of substances that can potentially pose a significant risk to the general population if released. These substances may be highly toxic, reactive, corrosive, flammable, radioactive or infectious. They are present in nearly every community in the U.S., where they may be manufactured, used, stored, transported, or disposed. Because of their nearly ubiquitous presence, there are hundreds of hazardous material release events annually in the U.S. that contaminate air, soil, and groundwater resources, potentially triggering millions of dollars in clean-up costs, human and wildlife injuries, and occasionally cause human deaths.

Releases of explosive, caustic and flammable materials have caused injuries and deaths and necessitated large-scale evacuations. Toxic chemicals in gaseous and liquid form have caused injuries among emergency response personnel as well as passersby. When toxic materials have entered either surface, ground or reservoir water supplies, serious health effects have resulted. Releases of hazardous chemicals can be especially damaging when they occur in highly populated areas or along transportation routes used simultaneously by commuters and hazardous materials haulers.

A hazardous chemical release in the City of Santa Clarita would most likely involve either transportation of chemicals by railroad or truck, use of chemicals at a business, or illegal dumping of chemical waste. The Los Angeles County Fire Department’s Health Hazardous Materials Division (LACoFD HHMD) is responsible for maintaining information about the types of hazardous materials used, produced, or stored in Santa Clarita.

The information required by the Fire Department is exhaustive. It includes but is not limited to location of hazardous materials; emergency contacts; location of utility shut-offs; location of emergency medical assistance; site diagrams; and type of hazardous material training received by employees. The City is also home to a number of smaller chemical users such as school laboratories and stores with supplies of pool chemicals, etc. A complete list of businesses with hazardous materials stored or used on site is maintained by the LACoFD HHMD.

Facilities that store or handle hazardous materials above the threshold quantities of 55 gallons for liquids, 200 cubic feet for gases, or 500 pounds for solids are required by the California Health and Safety Code to submit a Hazardous Materials Business Plan (inventory statement) and an Emergency Response/Contingency Plan to the LACoFD HHMD, the Administering Agency for the County’s Hazardous Material Area Plan. The inventory statements include a list of the facility’s stored hazardous substances, their volumes, locations, and 24 hour emergency contacts. This information is maintained on a computerized data base. Emergency response vehicles maintained by the LACoFD HHMD carry this data base and allows emergency responders to

identify the types, amounts, and locations of hazardous substances during an emergency at a fixed facility. LACoFD HHMD is the lead agency in Santa Clarita in the event of a hazardous materials incident and maintains an Emergency Operations Section (EOS) that is specifically trained and equipped to respond to emergencies involving potentially hazardous materials.

There are four County fire stations that house apparatus and personnel trained to respond and mitigate hazardous materials incidents. These are known as Hazardous Materials Taskforces and are comprised of nine personnel specially trained at the minimum level of Hazardous Materials Technician. Hazardous Materials Taskforce 150 is housed at Fire Station 150 located in the City of Santa Clarita and is certified by the Office of Emergency Services (OES), State of California, as a Type 1 Hazardous Materials Taskforce.

Oil, Fuel and Water Pipeline Hazard Identification

Disruption to the distribution of oil, fuel or water to the City of Santa Clarita can result in illness, injury, and fatalities. Pipeline breaks can disrupt roads, highways, lifelines, public services, and the general health of local residents. An explosion or accident at a distribution or pipeline center may cause injury or death, as well as threaten water and air quality. Businesses and public services without gas and water will be forced to scale back operations or close. The examples listed below provide brief descriptions of the types of impacts that can be anticipated.

Injuries and Fatalities

There is a potential for injuries to industry employees, the public, and first responders who are in close proximity to a pipeline if there is a pipeline failure (accidental or caused by a deliberate act). If the accident results in an explosion or a large release of fumes from toxic chemicals, there is a potential for deaths and the destruction of property. Similarly, the sudden release of large quantities of high pressure water can damage roads and underground utilities, flood structures, and cause injuries or deaths.

Lifelines

Natural gas, fuel and water pipelines are part of the critical infrastructure that provides lifelines to communities. A disruption to these lifelines will impede the ability to provide potable water, natural gas, and fuel that the public depends on to ensure its health and safety. Examples include:

- Water pumping stations, wells, and sewage treatment plants are dependent on electrical power. While pumping stations have backup generators in case of power outages, an extended outage may affect the ability of the stations to provide or preserve the safety of water. This will have public health implications to children, the elderly, and those with compromised immune systems, and affect the ability of some businesses to remain open.
- The delivery of gasoline and fuel is necessary to ensure that transportation is not interrupted and that first responders have the ability to use the correct vehicles and equipment necessary to provide services.
- Restaurants, hotels, hospitals, and any establishments that require fuel and hot water to wash utensils and tools and to regulate temperature will not be able to operate at full capacity.

Economy

The direct economic impacts due to hazardous materials releases include lost business output and productivity, property damage, and the loss of product. In addition, transportation disruptions can impact a widespread area including freeways and roads resulting in gridlock and other indirect losses to the local economy.

Hazardous Materials Regulations

Department of Toxic Substance Control

The role of the Department of Toxic Substances Control (DTSC), a Division of the California Environmental Protection Agency, is to protect California and Californians from exposures to hazardous wastes by regulating hazardous waste, cleaning up existing contamination, and looking for ways to reduce the hazardous waste produced in California. The DTSC regulates hazardous waste in California primarily under the authority of the federal Resource Conservation and Recovery Act (RCRA) of 1976, and the California Health and Safety Code.

Other laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning. In addition, DTSC reviews and monitors legislation to ensure that the position reflects DTSC's goals. From these laws, DTSC's major program areas develop regulations and consistent program policies and procedures. The regulations spell out what those who handle hazardous waste must do to comply with the laws. Under RCRA, DTSC has the authority to implement permitting, inspection, compliance and corrective action programs to ensure that people who manage hazardous waste follow state and federal requirements. As such, the management of hazardous sites in the City of Santa Clarita is under regulation by the DTSC, to ensure that state and federal regulations pertaining to hazardous waste are followed.

Business Reporting

Businesses are required to disclose all hazardous materials and wastes above certain designated quantities which are used, stored, or handled at their facility. Any significant changes must be reported to LACoFD HHMD within 15 days on an ongoing basis, and updated at least annually. Businesses must also prepare safety and hazard mitigation plans, review the plans regularly, and perform training at least annually. Any releases or threatened releases of hazardous materials must be reported to the LACoFD HHMD and to the California Office of Emergency Services (Cal-OES) Warning Center. Those businesses using certain Regulated Substances (a list of substances comprises about 260 specific flammable or toxic chemicals) must also develop a Risk Management Plan (RMP) upon request by LACoFD HHMD. The RMP includes analysis of operations on-site, and projection of off-site consequences with accompanying mitigation plans.

Business practices and the laws that regulate them have changed dramatically over the year. Many businesses through intentional action, lack of awareness, or accidental occurrences have caused contamination of and around their properties. The City of Santa Clarita and the surrounding unincorporated area of Los Angeles County contains properties that were once contaminated and are now clean, as well as a few properties that are contaminated with a clean-up process underway.

Cleanup Sites in Santa Clarita












The California Department of Toxic Substance Control maintains a list of all contaminated sites in the state for which it is providing oversight and enforcement of clean-up activities. The list is maintained in the EnviroStor Data Management System. Table 45: Cleanup Sites in Santa Clarita (EnviroStor) lists the sites in the City and the surrounding unincorporated county area. As of August 2015, there were 45 cleanup sites in the Santa Clarita area (by address) and no Superfund sites.

Table 45: Cleanup Sites in Santa Clarita (EnviroStor)

<input type="checkbox"/>	Federal Superfund	<input checked="" type="checkbox"/>	Military Evaluation
<input type="checkbox"/>	State Response	<input type="checkbox"/>	Tiered Permit
<input type="checkbox"/>	Voluntary Cleanup	<input type="checkbox"/>	Corrective Action
<input type="checkbox"/>	School Cleanup	<input checked="" type="checkbox"/>	Operating
<input type="checkbox"/>	Evaluation	<input checked="" type="checkbox"/>	Post-Closure
<input type="checkbox"/>	School Investigation	<input type="checkbox"/>	Non-Operating

	PROJECT NAME	STATUS	PROJECT TYPE	ADDRESS	CITY
<input checked="" type="checkbox"/>	AEROSPACE DYNAMICS INTERNATIONAL, INC.	REFER: 1248 LOCAL AGENCY	EVALUATION	25571-25575 RYE CANYON ROAD	VALENCIA
<input checked="" type="checkbox"/>	AMERICAN CYANAMID CO	ACTIVE	CORRECTIVE ACTION	21444 GOLDEN TRIANGLE RD	SAUGUS
<input checked="" type="checkbox"/>	AMERICAN CYANAMID CO	CLOSED	NON-OPERATING	21444 GOLDEN TRIANGLE RD	SAUGUS
<input checked="" type="checkbox"/>	BRIDGEPORT ELEMENTARY SCHOOL SITE	NO FURTHER ACTION	SCHOOL INVESTIGATION	GRANDVIEW DRIVE/NEWHALL RANCH ROAD	SANTA CLARITA
<input checked="" type="checkbox"/>	CASTAIC LAKE WATER AGENCY -WHITTAKER OFF-SITE GROUNDWATER CONTAMINATION	ACTIVE	VOLUNTARY CLEANUP	AREA WEST & NORTH OF 22116 SOLEDAD CANYON ROAD	SANTA CLARITA
<input checked="" type="checkbox"/>	CHARLES HELMERS ELEMENTARY SCHOOL	NO FURTHER ACTION	SCHOOL INVESTIGATION	27300 GRANDVIEW AVENUE	VALENCIA
<input checked="" type="checkbox"/>	ELECTROFILM INC	PROTECTIVE FILER	NON-OPERATING	7116 LAUREL CANYON	NORTH HOLLYWOOD BLVD (mailing address)
<input checked="" type="checkbox"/>	EMBLEM ELEMENTARY SCHOOL ADDITION	NO FURTHER ACTION	SCHOOL INVESTIGATION	22635 ESPUELLA DRIVE	SAUGUS
<input checked="" type="checkbox"/>	FAIR OAKS RANCH ELEMENTARY	NO ACTION REQUIRED	SCHOOL INVESTIGATION	LOST CANYON ROAD	CANYON COUNTRY
<input checked="" type="checkbox"/>	FORMER FLAMINGO CLEANERS	ACTIVE	VOLUNTARY CLEANUP	26512 BOUQUET CANYON ROAD	SANTA CLARITA
<input checked="" type="checkbox"/>	GOLDEN VALLEY HIGH SCHOOL	NO FURTHER ACTION	SCHOOL INVESTIGATION	GOLDEN VALLEY ROAD EXTENSION	SANTA CLARITA
<input checked="" type="checkbox"/>	GOLDEN VALLEY RANCH SCHOOL	NO FURTHER ACTION	SCHOOL INVESTIGATION	EAST OF 14 FREEWAY/NORTH OF PLACERITA CANYON ROAD	CANYON COUNTRY

	PROJECT NAME	STATUS	PROJECT TYPE	ADDRESS	CITY
<input type="checkbox"/>	ITT AEROSPACE CONTROLS	REFER: OTHER AGENCY	TIERED PERMIT	28150 INDUSTRY DRIVE	VALENCIA
<input type="checkbox"/>	JM MCGRATH ELEMENTARY SCHOOL	NO FURTHER ACTION	SCHOOL INVESTIGATION	DOCKWEILER DRIVE/VALLE DEL ORO	SANTA CLARITA
<input type="checkbox"/>	KEYSOR-CENTURY CORP.	REFER: OTHER AGENCY	TIERED PERMIT	26000 SPRINGBROOK AVENUE	SAUGUS
<input checked="" type="checkbox"/>	LA DEF AREA HOUS SITE	INACTIVE - NEEDS EVALUATION	MILITARY EVALUATION		SANTA CLARITA
<input type="checkbox"/>	LEONA COX COMMUNITY SCHOOL	NO ACTION REQUIRED	SCHOOL INVESTIGATION	18643 OAKMOOR STREET	CANYON COUNTRY
<input checked="" type="checkbox"/>	MERLE NORMAN COSMETICS, INC.	NO FURTHER ACTION	VOLUNTARY CLEANUP	26407 GOLDEN VALLEY RD	SANTA CLARITA
<input type="checkbox"/>	MINT CANYON COMMUNITY SCHOOL	NO ACTION REQUIRED	SCHOOL INVESTIGATION	16400 SIERRA HIGHWAY	CANYON COUNTRY
<input checked="" type="checkbox"/>	NATIONAL TECHNICAL SYSTEMS	NO FURTHER ACTION	VOLUNTARY CLEANUP	20988 GOLDEN TRIANGLE ROAD	SANTA CLARITA
<input checked="" type="checkbox"/>	NEWHALL AIRFIELD	INACTIVE - NEEDS EVALUATION	MILITARY EVALUATION		NEWHALL
<input checked="" type="checkbox"/>	NIKE 94 MCA HOU SITE	INACTIVE - NEEDS EVALUATION	MILITARY EVALUATION		SAUGUS
<input checked="" type="checkbox"/>	NIKE BTRY - LOS PINETOS	INACTIVE - NEEDS EVALUATION	MILITARY EVALUATION		LOS PINETOS
<input type="checkbox"/>	NOVACAP, INC.	REFER: OTHER AGENCY	TIERED PERMIT	25111 ANZA DRIVE	VALENCIA
<input type="checkbox"/>	OAK HILLS ELEMENTARY SCHOOL	NO ACTION REQUIRED	SCHOOL INVESTIGATION	VALENCIA BOULEVARD/U STREET	NEWHALL
<input checked="" type="checkbox"/>	OLD ORCHARD SHOPPING CENTER	ACTIVE	STATE RESPONSE	23357 LYONS AVENUE	SANTA CLARITA
<input type="checkbox"/>	PHASE V SCHOOL SITE	NO FURTHER ACTION	SCHOOL INVESTIGATION	INTERSTATE 5/VALENCIA BOULEVARD	STEVENSON RANCH
<input checked="" type="checkbox"/>	PPG INDUSTRIES-WORKS 24	PROTECTIVE FILER	NON-OPERATING	25663 W AVE STANFORD	VALENCIA
<input checked="" type="checkbox"/>	PPG INDUSTRIES-WORKS 24	NO ACTION REQUIRED	CORRECTIVE ACTION	25663 W AVE STANFORD	VALENCIA
<input checked="" type="checkbox"/>	SANTA CLARITA LLC	CLOSED	NON-OPERATING	22116 SOLEDAD CANYON RD	SAUGUS
<input checked="" type="checkbox"/>	SAUGUS INDUSTRIAL CENTER (FORMER KEYSOR-CENTURY CORP.)	ACTIVE	VOLUNTARY CLEANUP	26000 SPRINGBROOK ROAD	SANTA CLARITA
<input checked="" type="checkbox"/>	SAUGUS SWAP MEET PROPERTY	INACTIVE - ACTION REQUIRED	VOLUNTARY CLEANUP	22500 SOLEDAD CANYON ROAD	SANTA CLARITA
<input checked="" type="checkbox"/>	SOS - PLACERITA CANYON	CERTIFIED / OPERATION & MAINTENANCE	STATE RESPONSE	25977 SAND CANYON RD	SANTA CLARITA
<input checked="" type="checkbox"/>	SPECIAL DEVICES INC	CERTIFIED O&M - LAND USE RESTRICTIONS ONLY	CORRECTIVE ACTION	16830 W PLACERITA CYN RD	NEWHALL

	PROJECT NAME	STATUS	PROJECT TYPE	ADDRESS	CITY
	STEVENSON RANCH	NO ACTION REQUIRED	SCHOOL INVESTIGATION	STEVENSON RANCH PARKWAY/PICO CANYON ROAD	NEWHALL
	TERRY YORK CHRYSLER	REFER: 1248 LOCAL AGENCY	EVALUATION	23923 CREEKSIDE RD.	VALENCIA
	TERRY YORK HONDA	REFER: 1248 LOCAL AGENCY	EVALUATION	23901 CREEKSIDE RD.	VALENCIA
	THATCHER GLASS MANUFACTURING COMPANY	NO FURTHER ACTION	VOLUNTARY CLEANUP	25655 SPRINGBROOK AVENUE	SAUGUS
	TRANSTECHNOLOGY CORP/SPACE ORD SYS DIV	* INACTIVE	CORRECTIVE ACTION	25977 SAND CANYON RD	CANYON COUNTRY
	TRANSTECHNOLOGY CORP/SPACE ORD SYS DIV	CLOSED	NON-OPERATING	25977 SAND CANYON RD	CANYON COUNTRY
	VALENCIA TOWN CENTER CINEMA GARAGE	REFER: 1248 LOCAL AGENCY	EVALUATION	24305 TOWN CENTER DRIVE	VALENCIA
	WESTRIDGE-VALENCIA SCHOOL	INACTIVE - ACTION REQUIRED	SCHOOL INVESTIGATION	35555 ANNAPOLIS ROAD	VALENCIA
	WHITTAKER BERMITE - OU6 AREA 317	REFER: SMBRP	CORRECTIVE ACTION	22116 W SOLEDAD CYN RD	SANTA CLARITA
	WHITTAKER BERMITE/RAIL STATION - SITE A	INACTIVE - ACTION REQUIRED	EVALUATION	22116 WEST SOLEDAD CANYON ROAD	SANTA CLARITA
	WHITTAKER/BERMITE FACILITY	ACTIVE	STATE RESPONSE	22116 SOLEDAD CANYON RD	SANTA CLARITA

Hazardous Materials Release History

Laws governing hazardous materials came into effect at a rapid rate during the 1980s and 1990s, largely as a result of the public's perception of risk. For example, the December, 1984 release of methyl isocyanate gas from a pesticide manufacturing plant in Bhopal, India, resulted in the deaths of over 3,000 people, with long-term health consequences that may never be calculated. The media had covered numerous hazardous materials incidents throughout the United States for years, but since the City's incorporation, **no significant events have occurred in Santa Clarita.** A significant event, for the purposes of this report, is defined as an evacuation of a neighborhood and or closure of a residential or commercial area for a prolonged period of time. Senate Bill 1082 (1993) established the "Unified Hazardous Waste and Hazardous Materials Management Regulatory Program". The Unified Program consolidates, coordinates, and makes consistent the following hazardous materials and hazardous waste programs (Program Elements):

- Hazardous Waste Generation (including onsite treatment under Tiered Permitting)
- Aboveground Petroleum Storage Tanks (only the Spill Prevention Control and Countermeasure Plan or "SPCC")
- Underground Storage Tanks (USTs)
- Hazardous Material Release Response Plans and Inventories
- California Accidental Release Prevention Program (Cal ARP)
- Uniform Fire Code Hazardous Material Management Plans and Inventories

The LACoFD HHMD regulates generation and onsite treatment of hazardous waste throughout the Los Angeles County CUPA.

History of Oil and Fuel Events in Southern California

In the State of California there are 123,753 miles of natural gas and hazardous liquid pipeline, transmission, gathering and distribution lines. There are natural gas transmission pipelines that run throughout the Santa Clarita area and a hazardous liquids pipeline that runs north of the city through Edwards Air Force Base. The Pipeline & Hazardous Materials Safety Administration (PHMSA) provides reports on pipeline incidents in the U.S. and by State. From 2003 through 2014 there have been 21 fatalities and 73 injuries along with \$565,988,438 (2013 dollars) in property damage from significant and serious pipeline incidents in California (Pipeline & Hazardous Materials Safety Administration (PHMSA), U.S. Department of Transportation, 2014).

- Significant Incidents are those incidents reported by pipeline operators when any of the following conditions are met:
 1. Fatality or injury requiring in-patient hospitalization
 2. \$50,000 or more in total costs, measured in 1984 dollars
 3. Highly volatile liquid releases of 5 barrels or more or other liquid releases of 50 barrels or more
 4. Liquid releases resulting in an unintentional fire or explosion
- Serious incidents, a subset of Significant Incidents, are incidents which involve a fatality or injury requiring in-patient hospitalization.

Although significant or serious pipeline incidents occurred in the City of Santa Clarita during this period, there is an ongoing risk.

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Historic Losses and Impacts

Examination of past incidents provides an opportunity to assess the common causes and impacts of hazardous materials spills on the areas. The table below depicts the hazardous materials incidents that were reported to Cal-OES for 2015. In total, 17 incidents were reported in the Santa Clarita area. In general the reported incidents consisted of relatively small quantities with waste water and sewage representing the largest spill types.

Table 46: Hazardous Materials Incidents for the Santa Clarita Area (2015)

Location	City	Incident Date	Spill Site	Site	CAUSE	Injuries #	Fatals #	Substance	Qty	Measure	Type	Pipeline
SB 5 near Calgrove Blvd.	Santa Clarita	8/7/2015	Road	None	Unknown			Diesel Fuel	150	Gal(s)	PETROLEUM	No
Northbound Interstate 5 between MM 170 and 200	Santa Clarita	8/5/2015	Road		Road Debris			Diesel	100	Gal(s)	PETROLEUM	No
31500 Hasley Canyon Rd	Saugus	7/19/2015	Oil Field		Weather			Waste Water	100	Bbl.(s)	PETROLEUM	No
MP 35.0	Santa Clarita	7/7/2015	Rail Road	No	Trespasser		1	Train vs. Trespasser	1	N/A	RAILROAD	No
Copper Hill Drive X Haskell Cyn	Santa Clarita	6/30/2015	Road	Storm Drain/ Unknown Waterway	Collision			Diesel Fuel	5	Gal(s)	PETROLEUM	No
23450 Newhall Ave	Santa Clarita	6/18/2015	Residence	Unknown Waterway	Blockage			Sewage	500	Gal(s)	SEWAGE	No
NB5 just north of Gavin Canyon (south of Calgrove)	Santa Clarita	5/8/2015	Road		Human Error			Diesel Fuel	30	Gal(s)	PETROLEUM	No
34256 Bouquet Canyon RD	Santa Clarita	4/18/2015	Waterways	Bouquet Canyon Creek	Auto Accident		2	Motor Oil	1	Qt.(s)	PETROLEUM	No
NB I5, South of Calgrove Bl	Santa Clarita	4/15/2015	Road	Storm Drain	Collision	1		Diesel	100	Gal(s)	PETROLEUM	No
23360 Valencia Blvd, Cinema Center	Santa Clarita	4/2/2015	Merchant/ Business	Santa Clara River	Blockage			Sewage - Raw	1,000	Gal(s)	SEWAGE	No

Location	City	Incident Date	Spill Site	Site	CAUSE	Injuries #	Fatals #	Substance	Qty	Measure	Type	Pipeline
Mathilda Ln at Santa Catrina	Santa Clarita	3/23/2015	Residence		Blockage			Sewage - Raw	5	Gal(s)	SEWAGE	No
25930 McBean Parkway	Santa Clarita	3/19/2015	Merchant/Business		Blockage			Sewage	180	Gal(s)	SEWAGE	No
SB 15 / SR14	Santa Clarita	3/1/2015	Road		Collision			Fuel - Diesel	60	Gal(s)	PETROLEUM	No
22352 Barbacoa Dr.	Saugus	2/8/2015	Residence		Blockage			Sewage	50	Gal(s)	SEWAGE	No
Herrick St & Paxton Ave	Valencia	1/25/2015	Pipe Line		Unknown			Hydro Test Water	Unknown	Gal(s)	WATER	Yes
SB 15 JSO Calgrove Exit	Newhall	1/21/2015	Road		Collision			Fuel - Diesel	20-30	Gal(s)	PETROLEUM	No
28251 Kelly Johnson Pkwy	Santa Clarita	1/13/2015	Merchant/Business		Unknown			Diesel	5	Gal(s)	PETROLEUM	No

I-5 Tunnel Incident

October 13, 2007 the disastrous Interstate 5 tunnel fire occurred when a big rig crashed inside a truck route tunnel spewing gas and oil that later ignited. The entire tunnel was ablaze. The result was a 31-plus big rig and vehicle pileup that cost three lives and caused the closure of Interstate 5. Interstate 5 is California's main north/south freeway, and economic corridor. Locally, the freeway handles upwards of 250,000 cars per day. Due to the impact to local streets, the City activated the EOC, along with its state-of-the-art traffic monitoring and control technology, which gave the City of Santa Clarita's traffic engineers the ability to view local roadways and make real-time changes to traffic signal timing lights as freeway detours emptied thousands of cars into the City of Santa Clarita. The city coordinated a traffic detour plan with Caltrans, LA County Sheriff and CHP where traffic was diverted on the three detour routes through City. Twenty four thousand vehicles were detoured on each route, in addition to 4,750 trucks.

Since the freeway would not open for the Monday morning rush hour, the City of Santa Clarita worked with Metrolink and coordinated a transportation plan to add additional commuter trains and parking at the City's three Metrolink Stations. City staff not only were able to obtain additional parking for commuters at nearby lots, but City transit staff were positioned at each Metrolink of its three station by 5 a.m., personally directing commuters to the newly expanded parking Monday morning and providing shuttle service for quick access to the stations. The Governor declared a State of Emergency that enabled the City to submit claims for reimbursement totaling \$12,281.

Hazard Materials Release Probability, Frequency and Magnitude

Hazardous materials are everywhere and are accidentally released or spilled many times during any given day. The California State Warning Center receives approximately 10,000 hazardous material spill reports per year on hazardous material incidents and potential hazardous material incidents. Of these incidents most are minor but some do cause significant impacts like injuries, evacuation, and clean-up.

In Santa Clarita the vast majority of hazardous material incidents are handled prior to their becoming a major disaster. Nevertheless, the emergency organization needs to be flexible and evolutionary in its response to a developing incident.

The increasing volume and variety of hazardous materials that are generated, stored, or transported within Santa Clarita is a problem of great concern to public officials and the community. A major hazmat accident and/or spill could endanger the health and safety of untold numbers of men, women and children who may be within a mile of the accident scene.

The severity of hazmat releases are directly related to the type, volume, composition, characteristics, and chemical state of the material(s) involved. Releases of highly hazardous, infectious, radioactive, flammable, corrosive, or industrial chemicals, fuels, or wastes, can result in large, regional impacts if gasses or vapors are formed, if surface water is impacted, or if they occur in populated areas. The emergency response capabilities of the City are excellent; however, location and characteristics of a spill can determine the amount of time necessary to stabilize a release, keep down costs, and minimize the amount of damage that could result to people, assets, and resources.

Potential Damage

All persons and properties in Santa Clarita are susceptible to a hazardous material release or spill with little or no warning. The magnitude and severity to which the population and properties depends on factor multiplied by various conditions. These factors and conditions include the material, the materials toxicity, the duration of the release and environmental conditions such as the wind, water action, and geological terrain.

Until more data is available, the City's Technology Services Division, GIS Group used the Hazardous Materials Users data from the LACoFD HHMD and the city's own GIS data to identify the structures and transportation corridors that lie within a one-mile buffer zone from all major transportation corridors and railroad tracks. All areas within the one-mile buffer zone are considered to be in a "high" hazard area.

Table 47: Hazardous Materials identifies all structures by general occupancy type that are in a high risk hazardous materials zone. Structural losses due to hazardous materials incidents are usually minor and are primarily focused on clean-up and decontamination. No readily available information exists for estimating loss-to-exposure ratios. Consequently a 1% loss estimate was used for planning purposes.

Table 47: Hazardous Materials Potential Building Count and Valuation by General Occupancy Type

Occupancy Type	# of Buildings in High Risk Zone	Valuation of Buildings in High Risk Zone	If a 1% Loss Occurs	Valuation of Buildings if a 1% Loss Occurs
Commercial	823	\$2,417,856,049	8	\$24,178,560
Industrial	1,038	\$1,588,831,904	10	\$15,888,319
Mixed Use	923	\$712,475,725	9	\$7,124,757
Residential	28,337	\$18,030,665,790	283	\$180,306,658
Special Plan	3,011	\$4,023,496,428	30	\$40,234,964
Open Space	120	\$60,819,580	1	\$608,196
Other (Public / Institutional)	717	\$298,644,745	7	\$2,986,447
TOTAL	34,969	\$27,132,790,221	350	\$271,327,902

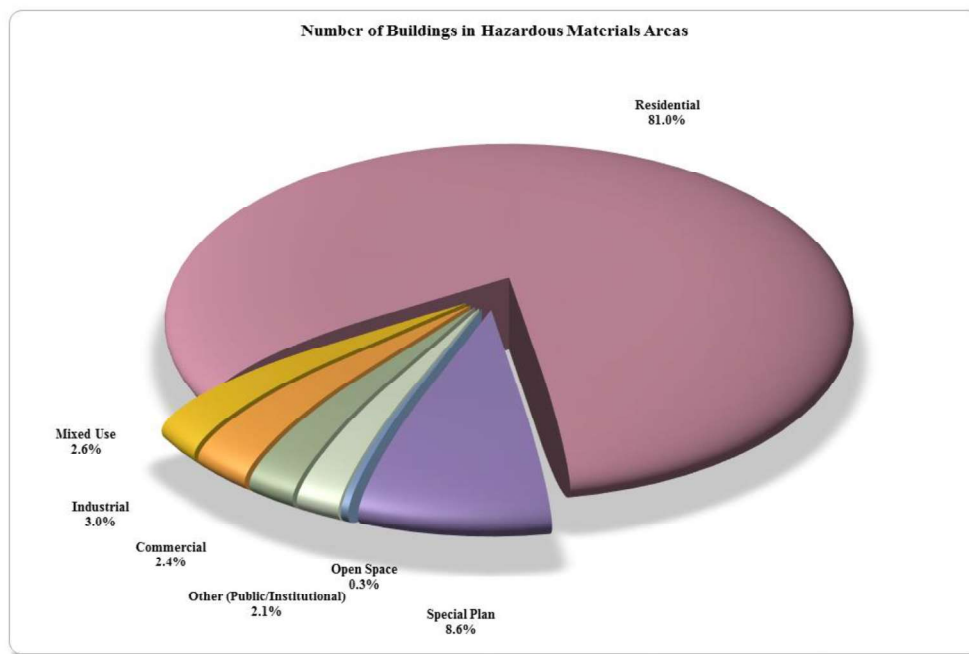


Figure 31: Number of Buildings in Hazardous Materials Areas

Hazardous Materials Release Vulnerabilities

The primary vulnerabilities for hazardous materials releases in Santa Clarita are from commercial vehicles; fixed facility; pipelines, and clandestine dumping.

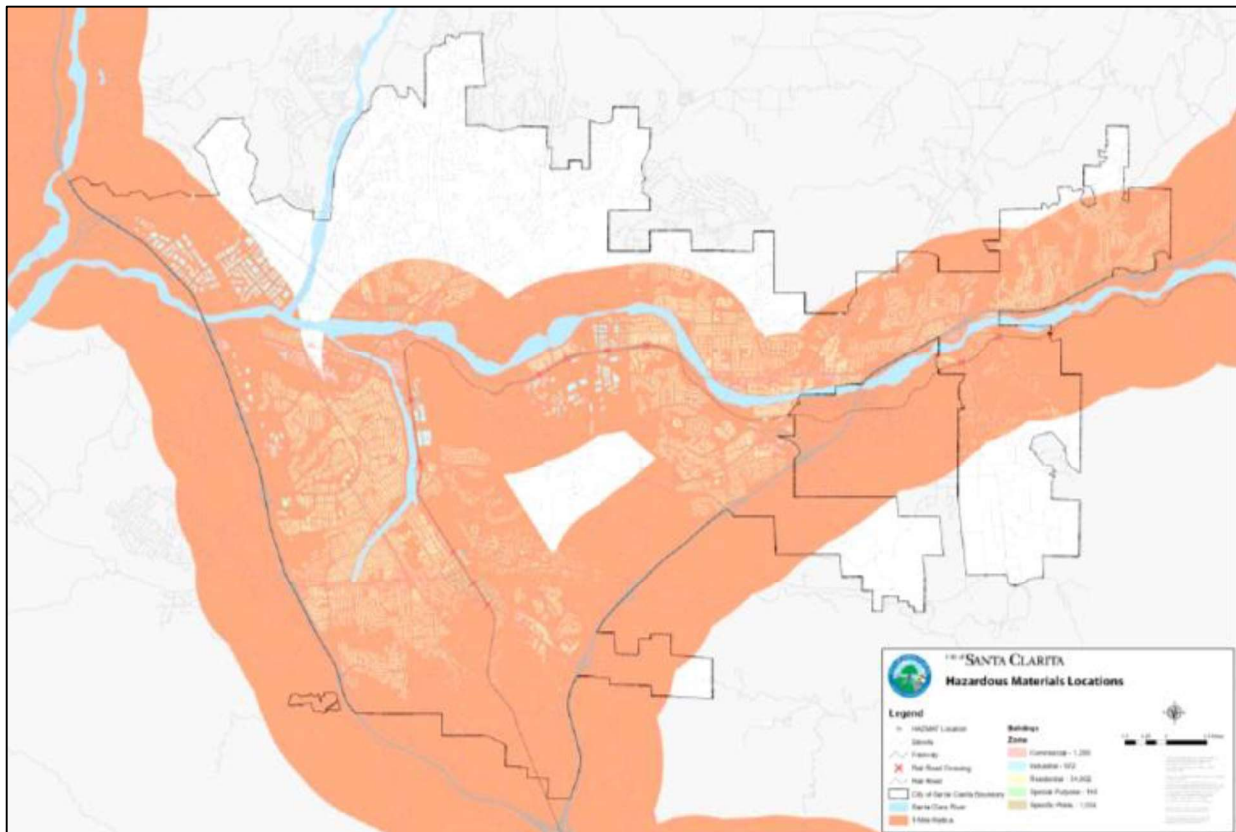
Transportation

The greatest probability of a major hazmat incident is from a transportation accident, including freeways, highways, roads, and rail freight. Historically, hazardous material incidents frequently occur on the heaviest traveled streets and at major intersections and freeway interchanges.

Hazardous materials are transported to and through the City by vehicles using I-5, SR-14, and SR-126, and the Union Pacific Railroad. The risk of hazardous material spills during transport exists and may increase with continued industrial development in the City.

Fixed Facility

The second most likely serious hazmat threat exists from an accidental spill and/or incident at one of the facilities that manufacture, warehouse, and process toxic chemicals and/or generate hazardous waste materials within or next to City boundaries. There are approximately 723 businesses and government facilities in Santa Clarita using and/or storing materials which are classified as hazardous. The map below provides an overview of where these hazardous material users are located.



Map 28: Hazardous Materials Locations

See Appendix D: Maps, Hazardous Materials Locations for an expanded view.

Although there are numerous facilities involved with hazardous materials throughout the City, they are less of a threat due to required plant inventory statements, emergency response/contingency plan and evacuation plans. The LACoFD HHMD reviews these plans and makes sure they are in compliance with current laws and regulations. The City will coordinate all hazardous materials incidents with the LACoFD.

The California Environmental Reporting System (CERS at <http://cers.calepa.ca.gov/>) is a statewide web-based system to support California Unified Program Agencies (CUPAs) and Participating Agencies (PAs) in electronically collecting and reporting various hazardous materials-related data as mandated by the California Health and Safety Code and 2008 legislation (AB 2286). Under oversight by Cal/EPA, CUPAs implement Unified Program mandates that streamline and provide consistent regulatory activities. CERS provides information and training to businesses on reporting requirements and provides a portal for the electronic submission of Unified Program information on hazardous materials.

Illegal Clandestine Dumping

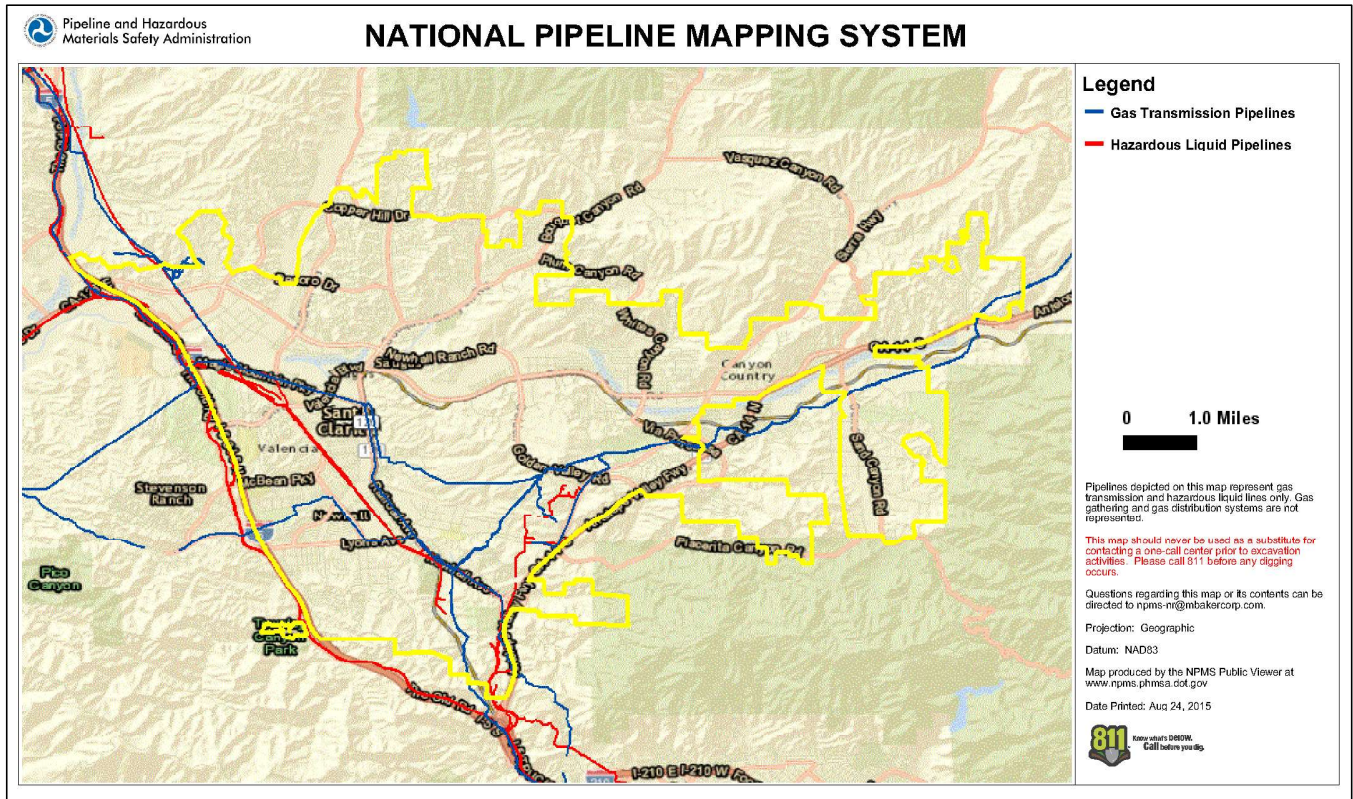
Clandestine dumping is the criminal act of disposing of toxic materials and hazardous waste on public or private property. Acts of Illegal disposal of hazardous materials/wastes has declined over the last several years, but high disposal costs and restricted disposal options will likely result in the continuation of this environmental crime.

Pipelines

Natural gas service to Santa Clarita is provided by the Southern California Gas Company (SCG). SCG operates numerous natural gas pipelines in Santa Clarita. Natural gas service lines in the Santa Clarita Valley range in size from 2 to 34 inch mains. In the eastern part of the Valley, a 30-inch diameter gas line runs along the Santa Clara River. In the western portion of the Valley a 34 inch and 22 inch main cross the river. Fire is a serious threat if leaking products are ignited.

The City does have a detailed map of the area pipelines, but for security purposes this map is not available to the public. High level maps are available via the USDOT Pipeline & Hazardous Materials Safety Administration (PHMSA) National Pipeline Mapping System.

The PHMSA National Pipeline Mapping system is a publicly available tool that shows major gas transmission and hazardous liquid pipelines in the U.S. (Pipeline & Hazardous Materials Safety Administration (PHMSA), U.S. Department of Transportation, 2014). See map on the next page.



Map 29: Pipelines in the City of Santa Clarita and Surrounding Areas

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Existing Mitigation Activities

The following hazardous materials release mitigation activities are performed on an ongoing basis:

- The Santa Clarita Chamber of Commerce and other key facilities, such as the Henry Mayo Newhall Hospital and the County of Los Angeles have created brochures on the risks of toxic substances and their control.
- City of Santa Clarita public outreach programs continue to include information on handling hazardous materials, and informing residents on what they should avoid and how to respond in case of a catastrophic release.
- Annually, at the beginning of the calendar year, the LACoFD Hazardous Materials Division (HMD) mails each permitted hazardous materials user business a Hazardous Materials Business Plan (HMBP) Certification Form requiring the business owner/operator to certify that their HMBP is current and up to date. Beyond this annually required recertification, hazardous materials handling businesses are inspected every third year.

Do you Know if your facility is affected by the new changes in the law?
Does your facility required to deal with CERS hazardous materials reporting?

- A new change has been added to the Health & Safety Code (HSC), Chapter 6.95, Article 1, §25507. Due to Assembly Bill 408 as of January 1, 2012; Senate Bill 483 as of January 1, 2014 and Senate Bill 1261 as of January 1, 2015 some modification have been made to the reporting requirements. All these changes are noted in the **Hazardous Materials Reporting Matrix (HMRM)**.
- The Los Angeles County Code (LACC) contains additional exemptions or higher reporting thresholds for specified hazardous materials.

Please review the **HMRM** to determine if your facility is affected by the changes to the reporting requirements. When applicable, a facility must update the hazardous materials inventory using the California Environmental Reporting System (CERS – <http://cers.caleta.ca.gov/>) and submit the changes for review and acceptance. State law requires that changes or updates to a facility's reportable inventory be submitted in CERS **within 30 days** (HSC §25508.1). In addition, the facility is required to submit the hazardous materials inventory annually by the deadline set by LA County CUPA. Failure to comply may result in enforcement action pursuant to HSC, section 25508(a)(3) or a penalty fee levy against your facility pursuant to Los Angeles County Code section 12.64.060.

If the hazardous material you store on your facility is not listed in the **HMRM**, the reporting thresholds under State law are ≥55 gallons (liquids), 500 pounds (solids), 200 cubic feet (gases), or at the threshold planning quantity for extremely hazardous substances. HSC § 25503.5(a)(1)

If you have any questions, please contact your district office www.fire.lacounty.gov/ahmd/ or Hazardous Materials Technical Support Unit at **323-890-4000**. You can also reach us via email at asclhmd@fire.lacounty.gov

HAZARDOUS MATERIALS REPORTING MATRIX	
HAZARDOUS MATERIALS TYPE	QUANTITIES
Irritants or Sensitizers <small>(classified as a hazards materials in 8 CCR § 5194 solely as an irritant or sensitizer)</small>	≥ 5,000 pounds (solids) or ≥550 gallons (liquids) [HSC § 25507(a)(4)(A)]
Paint <small>(to be recycled or managed under an approved architectural paint recovery program)</small>	≥ 10,000 pounds (solids) or 1,000 gallons (liquids) [HSC § 25507(a)(4)(B)]
Simple Asphyxiant or Pressure Release Hazard <small>http://www.calopa.ca.gov/CUPA/Bulletins/2012/Jun07UP1107.pdf</small>	≥ 1,000 cubic feet (at STP) [HSC § 25507(a)(5)(A)]
Oxygen, Nitrogen, & Nitrous Oxide <small>(maintained by a physician, dentist, podiatrist, veterinarian, pharmacist, or EMS provider)</small>	≥ 1,000 cubic feet (at STP) [HSC § 25507(a)(5)(B)]

Carbon Dioxide (CO2)for Beverage Carbonation non-liquefied compressed gas	>6000 cubic feet [LACC Title 12§ 12.64.040(a)]
Carbon Dioxide (CO2)for Beverage Carbonation liquefied compressed gas (refrigerated)	>3500 cubic feet [LACC Title 12§ 12.64.040(a)]
Carbon Dioxide (CO2) cryogenic, refrigerated, or compressed gas	≥ 1,000 cubic feet (at STP) [HSC § 25507(a)(5)(C)]
Non-Flammable Refrigerant Gases <small>(as defined in the CFC, that are used in refrigeration systems, (e.g. fluorocarbons, chlorofluorocarbons)</small>	≥ 1,000 cubic feet (at STP) [HSC § 25507(a)(5)(D)]
Gases used in Closed Fire Suppression Systems	≥ 1,000 cubic feet (at STP) [HSC § 25507(a)(5)(E)]
Radioactive Material	Quantities that require an emergency plan pursuant to Schedule C, Part 30, 40, or 70 of Chapter 1 of 10 CFR [HSC § 25507(a)(6)]
Perchlorate Material <small>(as defined in subdivision (c) of Section 25210.5)</small>	≥ 55 gallons, 500 pounds or 200 cubic feet [HSC § 25210.5]

Figure 32: LACoFD HazMat Reporting Matrix

Hazardous Materials Release Mitigation Strategies and Action Items

The hazardous materials release mitigation strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from hazardous materials releases. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP.

Strategy Number	Priority	Timeline	Status
HM001	Low	Ongoing	HM001-01: Ongoing HM001-02: Ongoing HM001-03: Ongoing
Strategy Description	Conduct a public awareness and educational campaign to raise awareness about hazardous and toxic materials.		
Activities	<p>HM001-01: Support LACoFD’s efforts to disseminate and keep current emergency information on hazardous materials. Include phone numbers for contacting the proper agencies.</p> <p>HM001-02: Continue to promote and update information on hazardous materials that may be found in the home and the proper antidotes for them.</p> <p>HM001-03: Conduct information meetings on how to “shelter-in-place for residences as well as businesses.</p>		
Coordinating Organization	LACoFD (contract city) and Community Services, Community Services Division		
Plan Goals Addressed	Public Awareness Partnerships and Implementation		
Funding Source	General Fund		
Comments	<p>HM001-01: The City promotes the dissemination of emergency contract numbers to the public on the City's websites, publications, and at preparedness outreach events. The City maintains and updates community and partner agency contact information in the Emergency Operations Center and for the Emergency Operations Plan.</p> <p>HM001-02: In 2011-2012, the City of Santa Clarita and the Santa Clarita Valley's Sheriff's Department partnered to offer a Safe and Secure Community Collection Event for proper personal document destruction, electronic waste, and prescription medications disposal. The Safe and Secure Disposal event was held at the College of the Canyons. Also, City of Santa Clarita staff continues to provide various outreaches on hazardous waste materials (HHW) and proper disposal mechanisms through print and electronic media. Print media include the Green Guide in the Seasons brochure and waste haulers newsletters. Electronic media include a social media app, E-notify, and greensantaclarita.com. The City also provides free door-to-door collection of HHW and partners with Los Angeles County to provide a HHW drop-off event each year.</p> <p>HM001-03: .The ongoing Community Emergency Response Training (CERT) curriculum with the Los Angeles County Fire Department includes “shelter in place” training. At community preparedness outreach events, the City presents how to "shelter in place" as part of its CERT public outreach program.</p>		

Strategy Number	Priority	Timeline	Status
HM002	High	2 Years	HM001-04: Complete Map Updates Ongoing
Strategy Description	Create an inventory of the sites that are contaminated with chemicals and other hazardous materials, and promote clean-up efforts.		
Activities	HM001-04: Create a hazardous materials users GIS layer for the city's hazard map		
Coordinating Organization	Technology Services Division, LACoFD (contract city) and LA Co Industrial Waste Division		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation Emergency Services		
Funding Source	General Fund		
Comments	<p>HM-002-04: Completed. The City's GIS staff was granted approval to download natural gas and oil pipeline map layers from the Pipeline and Hazardous Material Safety Administration's National Pipeline Mapping System. These added GIS layers will help to support emergency response in the event of a pipeline incident.</p> <p>In coordination with LACFD Hazmat, the City now has all of the addresses of sites with hazardous material handlers within the City. This information was added to the City's GIS mapping program.</p>		

Hazardous Materials Resource Directory

Los Angeles County Resources

Los Angeles County Fire Department, Health Hazardous Materials Division

5825 Rickenbacker Road
Commerce, CA 90040
Phone: (323) 890-4045
fire.co.la.ca.us

Los Angeles County Department of Public Works, Environmental Programs Division

900 S. Fremont Ave, 3rd Floor Annex
Alhambra, CA 91803-1331
Call toll free at 1(888) CLEAN LA'
ADA Information: (626) 458-4081 / TDD: (626) 282-7829
<http://ladpw.org>

County Sanitation Districts of Los Angeles County

(Wastewater Treatment, Solid Waste Facilities, Water Reuse, Industrial Waste, and Household Hazardous Waste Collection Events)
1-800-238-0172
www.lacsd.org

Los Angeles County Environmental Hotline

(Hazardous Waste Collection Programs)
1 (888) CLEAN-LA / 1 (888) 253-2652
www.888cleanla.com

State Resources

California Department of Toxic Substances Control

1001 I Street
Sacramento, CA 95814-2828
<http://www.dtsc.ca.gov/>

California Environmental Protection Agency (CAL/EPA)

(916) 445-3846
www.calepa.ca.gov

California Integrated Waste Management Board (CIWMB)

Information on waste reduction programs, recycling centers, composting and grass cycling.
(916) 255-2200
www.ciwmb.ca.gov

California Office of Emergency Services

3650 Schriever Avenue
Mather, CA 95655
<http://www.oes.ca.gov>

Federal Resources

Hazardous Materials Information Center

Washington, D.C.
1-800-HMR-4922 (1-800-467-4922)
(202) 366-4488

National Office of Housing and Urban Development (HUD)

51 7th Street S.W.
Washington, DC 20410
1-800-HUDS-FHA (1-800-483-7342)
www.hud.gov/hhchild.html

Office of Hazardous Materials Standards

U.S. DOT/RSPA (DHM-10)
400 7th Street S.W.
Washington, D.C. 20590-0001

U.S. Department of Transportation

Pipeline & Hazardous Materials Safety Administration (PHMSA)
East Building, 2nd Floor
1200 New Jersey Ave., SE
Washington, DC 20590

Additional Resources

Earth's 911

Information on environmental programs nationwide.
1-800-CLEAN-UP (1-800-253-2687)
www.1800cleanup.org

Los Angeles Regional Drug & Poison Information Center

1-800-8-POISON (1-800-876-4766)
www.calpoison.org
24-hour emergency information on poison contact including swallowing, eye or skin irritation, inhalation, animal or insect bites, food or drug reactions, and pet exposure.

National Inhalant Prevention Coalition (NIPC)

Information on toxic products that are used as inhalants.
1-800-269-4273
www.inhalants.org

US Consumer Product Safety Commission (CPSC)

1-800-638-2772
www.cpsc.gov
Product safety information or to report unsafe products.

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SECTION 11. LANDSLIDE / MUDSLIDE / SUBSIDENCE

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	3	Likely		Severe
Magnitude / Severity	2	Limited		High
Warning Time	4	Less than 6 Hours	○	Moderate
Duration	3	Less than 1 Week		Low
CPRI Rating	2.85	Moderate		

Landslide /Mudslide / Subsidence Hazard Information and Background

Landslides are a serious geologic hazard in almost every state in America. Nationally, landslides cause 25 to 50 deaths each year (Mileti, 1999) and (California Department of Public Health, 2015). The best estimate of direct and indirect costs of landslide damage in the United States range between \$1 and \$2 billion annually (Harrod, 1989).

As a seismically active region, California has had significant number of locations impacted by landslides. In addition to earthquakes, there are other factors that may influence the occurrence of landslides. These factors include the slope, the moisture content of the soil, and the composition of the soils and subsurface geology. Heavy rain or the improper grading of a construction site may also trigger a landslide. Landslides can 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.

The Santa Clarita planning area consists of steep slopes and eroded hillsides of clays and shales. Shales are extremely susceptible to pervasive fracturing which weaken slopes. These slopes are apt to fail if disturbed by heavy rains or grading. Potential landslide areas have been identified. Clays become slippery when wet and are likely to slide against underlying rock if water enters a slope. Moreover, clays are considered expansive soils. When saturated, expansive soils lose all cohesiveness and fail. Damage from expansive soils can be hastened by landscape irrigation or long-term rainfall. Landslides caused by heavy rains and irrigation pose a danger to development on hillsides (City of Santa Clarita, 2008).

Much of the land area within the Planning Area consists of mountainous or hilly terrain. As a result, there are a number of areas in portions of the Planning Area where landslides and/or unstable soils are present.

Landslide / Mudslide / Subsidence Terminology

Earth Movement Term	Definition
Debris Flow / Mudslide	A debris flow or mud slide 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.
Earthflow	Earthflows are slow moving landslides with plastic or liquid movements in which a land mass (e.g. soil and rock) breaks up and flows during movement.
Landslide	A landslide is the movement of a mass of rock, debris, or earth 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 can be initiated by rainfall, earthquakes, volcanic activity, changes in groundwater, disturbance and change of a slope by man-made construction activities, or any combination of these factors.
Liquefaction	Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world.
Sinkhole	Sinkholes are formed when rain dissolves underground limestone or when surface materials collapse into underlying cavities in the rock. Abrupt collapse-type sinkholes have become more common over the past twenty-five years, primarily due to activities of humans such as withdrawal of groundwater, diversion of surface water, or construction of ponds.
Subsidence	Land subsidence is a gradual settling or sudden sinking of the Earth’s surface (National Oceanic and Atmospheric Administration, 2015).

Threat Descriptions

Landslides, Debris Flows, and Mudslides

Landslides can be broken down into two categories: (1) rapidly moving (generally known as **debris flows** and **mudslides**), 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.

Earthflows are plastic or liquid movements in which land mass (e.g. soil and rock) breaks up and flows during movement. Debris flows normally occur when a landslide moves downslope as a semi-fluid mass scouring, or partially scouring soils from the slope along its path. Earthflows are relatively intact landslides, generally made up mostly of soils, which move downslope at slow to moderate velocities - a person can normally walk away from these landslides (Oregon Department of Geology, 1998). Flows often occur during heavy rainfall, can occur on gentle slopes, and can move rapidly for large distances. Faulting introduces competing influences that can both PROMOTE (via fault damage zones) and SUPPRESS (via large-magnitude earthquakes) the occurrence of slow-moving landslides (Joel Scheingross, 2013).

Environmental and Geologic Landslide Triggers

Landslides are often triggered by periods of heavy rainfall. Earthquakes, subterranean water flow and excavations may also trigger landslides. Certain geologic formations are more susceptible to landslides than others. Human activities, including locating development near steep slopes, can increase susceptibility to landslide events. Landslides on steep slopes are more dangerous because movements can be rapid.

Human Activity Triggers

Although landslides are a natural geologic process, the incidence of landslides and their impacts on people can be exacerbated by human activities. Grading for road construction and development can increase slope steepness. Grading and construction can decrease the stability of a hill slope by adding weight to the top of the slope, removing support at the base of the slope, and increasing water content. Other human activities effecting landslides include: excavation, drainage and groundwater alterations, and changes in vegetation (Department of Land Conservation and Development, 2000).

Wildland fires in hills covered with chaparral are often a precursor to debris flows in burned out canyons. The extreme heat of a wildfire can create a soil condition in which the earth becomes impervious to water by creating a waxy-like layer just below the ground surface. Since the water cannot be absorbed into the soil, it rapidly accumulates on slopes, often gathering loose particles of soil in to a sheet of mud and debris. Debris flows can often originate miles away from unsuspecting persons, and approach them at a high rate of speed with little warning.

Liquefaction

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world. Liquefaction occurs in saturated soils, that is, soils in which the space between individual 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. When liquefaction occurs, the strength of the soil decreases and, the ability of a soil deposit to support foundations for buildings and bridges is reduced (University of Washington, 2000).

Sinkholes

A sinkhole is an area of ground that has no natural external surface drainage--when it rains, all of the water stays inside the sinkhole and typically drains into the subsurface. Sinkholes can vary from a few feet to hundreds of acres and from less than 1 to more than 100 feet deep. Some are shaped like shallow bowls or saucers whereas others have vertical walls; some hold water and from natural ponds. Typically, sinkholes form so slowly that little change is noticeable, but they can form suddenly when a collapse occurs. Such a collapse can have a dramatic effect if it occurs in an urban setting.

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by groundwater circulating through them. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces just get too big. If there is not enough support for the land above the spaces then a sudden collapse of the land surface can occur. These collapses can be small, or, as this picture shows, or they can be huge and can occur where a house or road is on top (USGS, 2015).

Although sinkholes are more common in other areas of the country, the City of Santa Clarita is at relatively low risk due to a lack of sinkhole incidents. Nevertheless, sinkholes can occur anywhere at any time. Geologic shifts can re-route normal subterranean drainage patterns and damage underground pipelines which can cause sinkholes to develop. For example, sinkholes can develop from:

- Large changes in the water table caused by too much to too little rain
- Drilling a well into the cavity
- Constructing buildings above the cavity
- Diverting drainage to the areas where a cavity exists

Subsidence

Subsidence is the sinking of the ground because of underground material movement and is most often caused by the removal of water, oil, natural gas, or mineral resources out of the ground by pumping, fracking, or mining activities. Subsidence can also be caused by natural events such as earthquakes, soil compaction, glacial isostatic adjustment, erosion, sinkhole formation, and adding water to fine soils deposited by wind (a natural process known as loess deposits).

Subsidence can happen over very large areas like whole states or provinces, or very small areas (National Oceanic and Atmospheric Administration, 2015)

Rock Falls

Rock falls occur when blocks of material come loose on steep slopes. Weathering, erosion, or excavations, such as those along highways, can cause falls where the road has been cut through bedrock. They are fast moving with the materials free falling or bouncing down the slope. In falls, material is detached from a steep slope or cliff. The volume of material involved is generally small, but large boulders or blocks of rock can cause significant damage.

Landslide / Mudslide / Subsidence History

Landslides are a common hazard in California. Weathering and the decomposition of geologic materials produces conditions conducive to landslides and human activity further exacerbates many landslide problems. Many landslides are difficult to mitigate, particularly in areas of large historic movement with weak underlying geologic materials. As communities continue to modify the terrain and influence natural processes, it is important to be aware of the physical properties of the underlying soils as they, along with climate, create landslide hazards. Even with proper planning, landslides will continue to threaten the safety of people, property, and infrastructure, but without proper planning, landslide hazards will be even more common and more destructive.

The increasing scarcity of build-able land, particularly in urban areas, increases the tendency to build on geologically marginal land. Additionally, hillside housing developments in Southern California are prized for the view lots that they provide.

2004-2005 Mudslides

Between June of 2004 and March of 2005, the City of Santa Clarita received 38.51” of rainfall.¹⁷ The severe rains, in combination with dry soils and burned vegetation, caused several mud slides, the most severe of which destroyed two homes and caused a single family home in the Friendly Valley area of Santa Clarita to be red tagged and another to be yellow tagged. In all, 64 homes and/or buildings reported damage. These severe storms caused the City of Santa Clarita to declare a state of emergency. The City claimed \$1.8 million in public damages and private damages totaled over \$4 million.

1971 Juvenile Hall, San Fernando, California

Landslides caused by the February 9, 1971, San Fernando, California, earthquake Cost, \$266.6 million (2000 dollars). 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, California, electrical converter station, and several pipelines and canals (Schuster, n.d.).

1994 Northridge, California Earthquake Landslides

As a result of the magnitude 6.7 Northridge, California, earthquake, more than 11,000 landslides occurred over an area of 10,000 km². Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. The earthquake destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. This event also 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 (Schuster, n.d.).

¹⁷ Preliminary figures from the National Weather Service from July 1, 2004 through March 24, 2005.

Historic Losses and Impacts

The table below depicts events from 1991 to 1997 that have occurred in the City of Santa Clarita (note that the cause of each occurrence varies).

Table 48: Historic Landslides in Santa Clarita 1991 to 1997

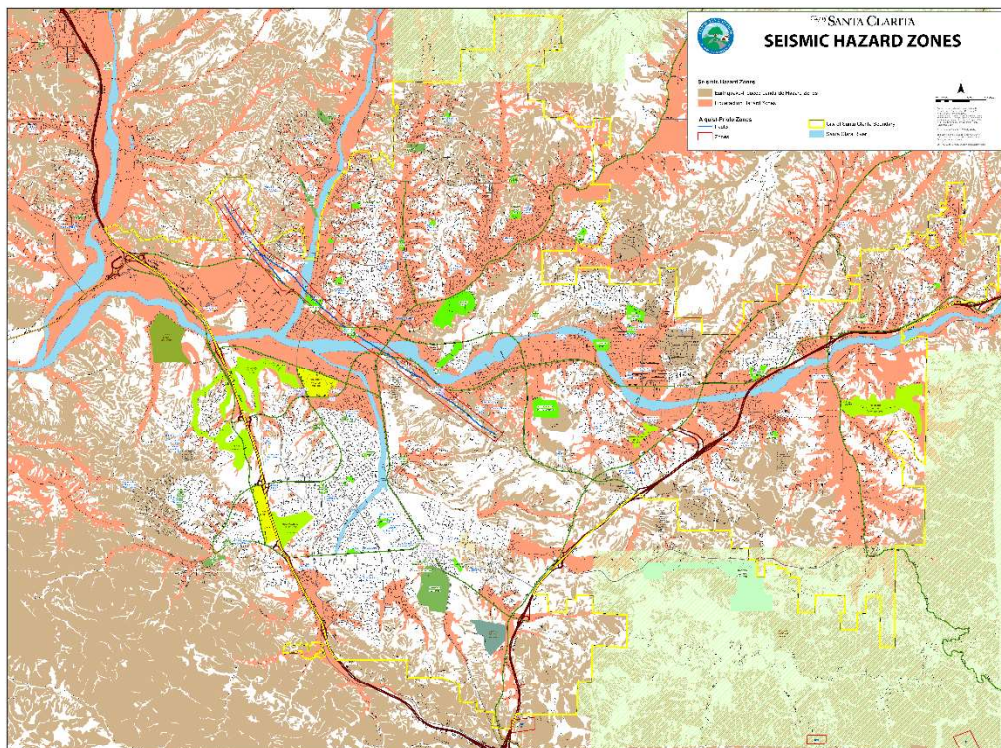
Location	Landslide Description
Goldstream	Rear hill slope failure and V-ditch washing out
Oat Flat Ct., Area	Slope failure, retaining wall put in place without proper footing
Abdale	Vacant lot, slope failures from 1960s
Green Mountain	V-ditches blocked and some surface slope failures
Larkhaven	Slide area from the 1960s
Fairgate	Very large hole dug on slope, filled and small retaining wall done without engineering, permits or inspections. Slope failure problem, earth movement with v-ditch at top destroyed.
Beach Grove	Slope failure
Maple Bay	Slope failure
Bougainvillea Way	Large bolder and surface slide behind house
Rosemont Drive	V-ditch unclean causing overflow on to rear up slope of homes because all down drain are full of rock and silt
Point Arena, Fairgate	Rear property V-ditch falling apart
Bella Court	Lot sinking and movement, house not being lived in. Vacant.

Landslide / Mudslide / Subsidence Probability, Frequency and Magnitude

The California Division of Mines and Geology (CDMG) has prepared Seismic Hazard Zone Maps of the Newhall, Mint Canyon, Oat Mountain, and San Fernando 7.5 minute quadrangles have been used to create the City's Seismic Hazard Map (see Appendix D: Maps **Error! eference source not found.**). These four maps comprise the City of Santa Clarita area. According to the CDMG roughly 26% of the land in the Newhall Quadrangle lies within the landslide hazard zone, and approximately 30-40% of the area is subject to liquefaction (California Department of Conservation, Division of Mines and Geology , 1997).

As a part of the geologic data compilation, an inventory of existing landslides in the Newhall Quadrangle was prepared. For each landslide included on the map a number of characteristics (attributes) were compiled. These characteristics include the confidence of interpretation (definite, probable and questionable) and other properties, such as activity, thickness, and associated geologic unit(s). Landslides rated as definite and probable were carried into the slope stability analysis. Landslides rated as questionable were not carried into the slope stability analysis due to the uncertainty of their existence. Historically, landslides have occurred within the City limits. These landslides are depicted on the Newhall and Mint Canyon quadrangles. The majority of the landslides are mapped within the Saugus and Mint Canyon formations.

Data were then incorporated into the City's GIS system to identify areas of earthquake induced liquefaction and landslide hazard. In general areas underlain by unconsolidated alluvium, such as along the Santa Clara River and tributary washes, are prone to liquefaction. Areas that are on topographic highlands, such as hill slopes are subject to landslide. Map 30: Santa Clarita Seismic Hazard Zones: Liquefaction and Landslide Areas identifies the areas subject to earthquake-induced liquefaction and landslides.






Map 30: Santa Clarita Seismic Hazard Zones: Liquefaction and Landslide Areas

Seismic hazard maps differ from the geologic maps in the following way: Seismic hazard maps show areas that have the potential to be affected by liquefaction and landslides, whereas geologic maps show existing landslides. Potential hazard areas are not shown on geologic maps.




Map 31: Landslide Overview Map of the Conterminous US (Western Portion) on the next page depicts the United States Geological Survey's (USGS), Landslide Overview Map of the Conterminous United States. This map identifies the Santa Clarita Valley as having a high landslide incidence and high susceptibility/low incidence.



Landslide Incidence

-  Low (less than 1.5% of area involved)
-  Moderate (1.5%-15% of area involved)
-  High (greater than 15% of area involved)

Landslide Susceptibility/Incidence

-  Moderate susceptibility/low incidence
-  High susceptibility/low incidence
-  High susceptibility/moderate incidence

Susceptibility not indicated where same or lower than incidence. Susceptibility to landsliding was defined as the probable degree of response of [the areal] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of landsliding. Some generalization was necessary at this scale, and several small areas of high incidence and susceptibility were slightly exaggerated.

Source: USGS
<http://landslides.usgs.gov/learning/nationalmap/index.php>

Landslide Vulnerabilities

The terrain of the City of Santa Clarita is varied in topography and has significant ridgelines. There is high potential for landslide activity. The City has liquefaction and landslide zones as indicated on the Seismic Hazard Zones Map (see Appendix D: Maps **Error! Reference source not found.**).

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 can occur on relatively gentle slopes and can cause significant property damage, but are far less likely to result in serious injuries than rapidly moving landslides (Oregon Emergency Management Interagency Hazard Mitigation Team, 2000).

“Failure of a slope occurs when the force that is pulling the slope downward (gravity) exceeds the strength of the earth materials that compose the slope. They can move slowly, (millimeters per year) or can move quickly and disastrously, as is the case with debris-flows. Debris-flows can travel down a hillside of speeds up to 200 miles per hour (more commonly, 30 – 50 miles per hour), depending on the slope angle, water content, and type of earth and debris in the flow. These flows are initiated by heavy, usually sustained, periods of rainfall, but sometimes can happen as a result of short bursts of concentrated rainfall in susceptible areas. Burned areas charred by wildfires are particularly susceptible to debris flows, given certain soil characteristics and slope conditions” (Bernard Pipkin, 2010).

Areas of risk include:

- Areas where wildfires or construction have destroyed vegetation
- Areas where landslides have occurred before
- Steep slopes and areas at the bottom of slopes or canyons
- Slopes that have been altered for construction of buildings and roads
- Channels along a stream or river
- Areas where surface runoff is directed

Debris flows often with speeds greater than 20 mile per hour, and can often move much faster (Smith). This high rate of speed makes debris flows extremely dangerous to people and property in its path. Similarly mudslides can strike with sudden force and result in loss of life, injury, and property damage.

Critical Infrastructure

Landslides can affect utility services, transportation systems, and critical lifelines. Communities may suffer immediate damages and loss of service. Disruption of infrastructure, roads, and critical facilities may also have a long-term effect on the economy. Utilities, including potable water, wastewater, telecommunications, natural gas, and electric power are all essential to service community needs. Loss of electricity has the most widespread impact on other utilities and on the whole community. Natural gas pipes may also be at risk of breakage from landslide movements as small as an inch or two.

Roads and Bridges

Losses incurred from landslide/sinkhole hazards in the City of Santa Clarita have been associated with roads. The City of Santa Clarita's Streets Division is responsible for responding to occurrences of earth movement events that inhibit the flow of traffic or are damaging a road or a bridge. The streets division does its best to communicate with residents impacted by such occurrences, but can usually only repair the road itself, as well as the areas adjacent to the occurrence where the city has the right of way.

Lifelines and Critical Facilities

Lifelines and critical facilities should remain accessible, if possible, during a natural hazard event. The impact of closed transportation arteries may be increased if the closed road or bridge is critical for hospitals and other emergency facilities. Therefore, inspection and repair of critical transportation facilities and routes is essential and should receive high priority.

Losses of power and phone service are also potential consequences of landslide events. Due to heavy rains, soil erosion in hillside areas can be accelerated, resulting in loss of soil support beneath high voltage transmission towers in hillsides and remote areas. Flood events can also cause landslides, debris flows, and mudslides, which can have serious impacts on natural gas and other pipelines that are located in vulnerable soils.

Potential Magnitude of Earthquake Induced Landslides and Liquefaction

The City’s Technology Services Division, GIS Group used the CDMG’s Seismic Hazard Zone Reports data and the city’s own GIS data to identify the structures that lie within the landslide or liquefaction hazard zones. It is understood that if a structure is identified in a landslide or liquefaction hazard area that it has a higher probability of being impacted by a landslide or liquefaction than a structure that is not in the seismic hazard area. The table below provides a summary of structures in the city’s seismic hazard zones.

Table 49: Landslide and Liquefaction Potential Building Count and Valuation by General Occupancy Type

Occupancy Type	Number of Buildings in Landslide Hazard Zone	Valuation of Buildings in Landslide Hazard Zone	Number of Buildings in Liquefaction Hazard Zone	Valuation of Buildings in Liquefaction Hazard Zone
Commercial	3	\$1,631,968	632	\$2,330,763,651
Industrial	15	\$10,188,405	785	\$1,111,088,380
Mixed Use	2	\$6,168,155	632	\$444,623,100
Residential	2,057	\$928,024,027	17,220	\$12,840,807,028
Special Plan	158	\$37,175,832	2,323	\$6,076,424,625
Open Space	16	\$1,410,413	149	\$20,751,286
Other (Public / Institutional)	44	\$1,542,205	525	\$113,926,185
TOTAL	2,295	\$986,141,005	22,266	\$22,938,384,255

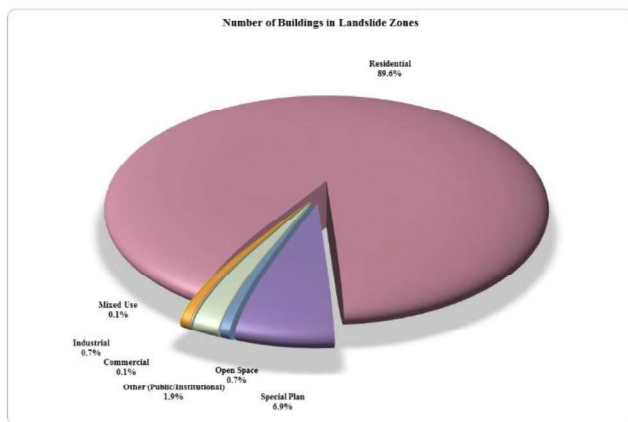


Figure 33: Number of Buildings in Landslide Zones

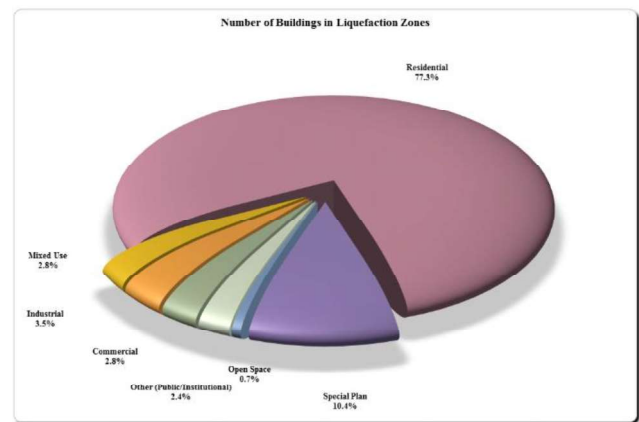


Figure 34: Number of Buildings in Liquefaction Zones

Estimated Earthquake Induced Landslide and Liquefaction Damage

In the event of landslides or liquefaction, the following estimate has been developed based on the number of properties by type in these types of areas in Santa Clarita. The purpose of the estimate is to provide an example for planning purposes. The estimate is based on damage to 1% of properties in landslide or liquefaction areas.

Table 50: Estimate of Liquefaction Damage by Occupancy Type

Occupancy Type	Number of Buildings in Landslide Hazard Zones if a 1% Loss Occurs	Valuation of Properties Damaged if a 1% Loss Occurs	Number of Buildings in Liquefaction Hazard Zones if a 1% Loss Occurs	Valuation of Properties Damaged if a 1% Loss Occurs
Commercial	0.03	\$16,320	6.32	\$23,307,637
Industrial	0.15	\$101,884	7.85	\$11,110,884
Mixed Use	0.02	\$61,682	6.32	\$4,446,231
Residential	20.57	\$9,280,240	172.2	\$128,408,070
Special Plan	1.58	\$371,758	23.23	\$60,764,246
Open Space	0.16	\$14,104	1.49	\$207,513
Other (Public / Institutional)	0.44	\$15,422	5.25	\$1,139,262
TOTAL	22.95	\$9,861,410	222.66	\$229,383,843

Existing Mitigation Activities

Landslide mitigation activities include current mitigation programs and activities that are being implemented by local or city organizations.

Codes

The City of Santa Clarita Unified Development Code (UDC) addresses development on steep slopes in subsection 17.080.040. This section outlines standards for steep slope hazard areas on slopes of 10 percent or more. Generally, the ordinance requires soils and engineering geologic studies for developments proposed on slopes of 10 percent or greater. More detailed surface and subsurface investigations shall be warranted if indicated by engineering and geologic studies to sufficiently describe existing conditions. This may include soils, vegetation, geologic formations, and drainage patterns. Site evaluations may also occur where stability might be lessened by proposed grading/filling or land clearing.

State Guidelines

The California Division of Mines and Geology (CDMG) has developed Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California, 1997. This document provides recommendations to effectively reduce seismic hazards to acceptable levels as defined in California Code of Regulations (CCR Title 14, Section 3721). In addition, the City of Santa Clarita's Geographic Information System (GIS) Division has analyzed the data and developed various hazard maps for use in planning and mitigation hazards.

Landslide/Mudslide/Subsidence Mitigation Strategies and Action Items

The landslide/mudslide/subsidence strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from earth movement events. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP.

Strategy Number	Priority	Timeline	Status
L001	High	Ongoing	L001-01: Ongoing L001-02: Ongoing L001-03: Ongoing
Strategy Description	Increase knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.		
Activities	<p>L001-01: Develop public information to emphasize risks when building on potential or historical landslide areas.</p> <p>L001-02: Continue to map new earth movement hazards and make information available to staff, developers, and residents so that soil types, slope percentage, drainage, or other critical factors are used to identify landslide prone areas.</p> <p>L001-03: Encourage design and placement of utilities outside of landslide areas to decrease the risk of service disruption.</p>		
Coordinating Organization	Public Works Department., Development Services Division, Developers, and Homeowners, and local water and utility agencies		
Plan Goals Addressed	Protection of Life and Property Public Awareness Partnerships and Implementation Emergency Services		
Funding Source	General Fund		
Comments	<p><u>L001-01</u>: This is addressed on a case-by-case basis; all queries in these cases are given landslide hazard information. A development prerequisite requires the mitigation of landslides as recommended by geological studies.</p> <p><u>L001-02</u>: Maps are available from the CA Department of Conservation's Division of Mine and Geology for earthquake-induced landslide and liquefaction hazard zones. Hazard zone information mapped-out and available for public dissemination.</p> <p><u>L001-03</u>: This is addressed on a case-by-case basis.</p>		

Strategy Number	Priority	Timeline	Status
L002	High	Ongoing	L002-04: Ongoing L002-05:Ongoing L002-06:Ongoing
Strategy Description	Continue public education information program that includes material for residents with information on how to protect their property from landslides and debris flows.		
Activities	<p>L002-04: Provide information on plant ground cover for slopes and building of retaining walls.</p> <p>L002-05: Provide information for mudflow areas, including information on building channels or deflection walls to direct the flow around buildings (be conscientious of diverting debris flow and the flow lands on a neighbor’s property).</p> <p>L002-06: Provide information on installation of flexible pipe fittings to avoid gas or water leaks.</p>		
Coordinating Organization	Building & Safety Division, Develop Services Division, Community Preservation, LA County. State of Ca., and Building and Industry Association (BIA)		
Plan Goals Addressed	Protect Life and Property Public Awareness Natural System		
Funding Source	General Fund		
Comments	<p>L002-04: Community Development's Planning Division addresses this issue in Santa Clarita's Unified Development Code for required landscaping on hillsides, including both cut and fill slopes. In addition, the Urban Forestry division provides information pertaining to proper planting selections to residents as requested, to include how to select proper ground cover, shrubs, and trees suitable for slope stabilization.</p> <p>L002-05: An information booklet available through the County of Los Angeles Public Works Department and through their Coordinated Agency Recovery Effort (CARE) website. This is a multi-agency public outreach program to disseminate information about recovery efforts and potential storm impacts. www.dpw.lacounty.gov/care. The LADPW also utilizes an e-notification alert system for mud and debris flow; residents can register to receive updates from this system.</p> <p>L002-06: This information is available on the Southern California Gas website. Collateral materials have been requested from SCG.</p>		

Strategy Number	Priority	Timeline	Status
L003	Moderate	Ongoing	L003-07: Complete L003-08: Ongoing L003-09: Ongoing
Strategy Description	Review, monitor and update codes, regulations, and local ordinances.		
Activities	L003-07: Study ordinances including Zoning, Grading, Hillside, Subdivision, etc. and make recommendations to mitigate landslide prone areas. L003-08: Review and enforce building codes for construction standards, including minimum foundation requirements, in landslide prone areas. L003-09: Review drainage control regulations to control drainage, and reduce the risk of landslides resulting from saturated soils.		
Coordinating Organization	Building & Safety Division, Develop Services Division, Community Preservation, LA County, State of Ca., and Building and Industry Association (BIA)		
Plan Goals Addressed	Protect Life and Property Public Awareness		
Funding Source	General Fund		
Comments	L003-07: In response to the adoption of the General Plan in 2011, the City's entire Unified Development Code is being rewritten and updated to reflect these goals and subject areas. Specifically, the update includes a review and modification of the City's hillside development ordinances in an effort to reduce development-related impacts upon hillsides throughout the City (UDC adopted June 11, 2013). L003-08: Addressed on a case-by-case basis. Foundation recommendations are derived from geological reports and distributed to Building and Safety for inclusion on plans. L003-09: Addressed on a case-by-case basis. Grading and drainage plans are required and include recommendations from geological reports, e.g. planting of native vegetation, minimizing landscape watering, and inclusion of back drains.		

Strategy Number	Priority	Timeline	Status
L004	High	Ongoing	L004-10: Ongoing L004-11: Ongoing
Strategy Description	Limit activities in identified potential and historical landslide areas through regulation and public outreach.		
Activities	L004-10: Analyze existing regulations regarding development in landslide prone areas. L004-11: Continue the open space designation efforts. Open space designations keep landslide prone areas undeveloped.		
Coordinating Organization	Building & Safety Division, Develop Services Division, Planning Services Division, Developers and residents		
Plan Goals Addressed	Protect Life and Property Public Awareness Partnerships and Implementation Emergency Services		
Funding Source	General Fund		
Comments	<p>L004-10: The City's General Plan (June 2011) includes policies to preserve open space to meet the community's multiple objectives for resource protection for long-term community benefit. The general plan also included a land use map that contained land uses/residential densities in known areas prone to landslides. The plan proposed 27,000 acres of permanently-secured open space and an additional 147,000 acres of open space for National Forest areas.</p> <p>L004-11: The City's General Plan that was adopted in 2011 and 2013 proposed zoning maps designate appropriate open space parcels in addition to policies for the pursuit of additional open space. The City's Open Space District will allow for the continued acquisition and designation of open space areas and will increase the City's ability to keep landslide-prone areas undeveloped.</p>		

Strategy Number	Priority	Timeline	Status
L005	High	5 Years	L005-12: Ongoing L005-13: Ongoing L005-14: Ongoing
Strategy Description	Identify and potentially improve if feasible landslide prone areas		
Activities	L005-12: Consider acquiring landslide prone property as city open-space. L005-13: Consider vegetation management on landslide prone property. L005-14: Encourage public/private partnerships that encourage homeowners to mitigate landslide potential.		
Coordinating Organization	Planning Division, Develop Services Division, City Manager’s Office, Landscape Maintenance District		
Plan Goals Addressed	Protect Life and Property Public Awareness Natural Systems Partnerships and Implementation Emergency Services		
Funding Source	General Fund/ Special District		
Comments	L005-12: In addition to acting on its own (based on General Plan policies), the City will partner with conservation agencies and other entities to acquire and maintain open space - some of which could be located in landslide-prone areas. L005-13: Referenced in L2-4 above. In coordination with LACFD fuel modification guidelines, the City will consider best management practices for vegetation management on landslide-prone property. L005-14: Homeowners work with the City to mitigate landslide potential by either building slopes in landscaped maintenance districts or by requiring Homeowner Associations submit landscape plans for common areas to the City for review and approval.		

Landslide Resource Directory

Los Angeles County Resources

Los Angeles County Department of Public Works

State Resources

Department of Conservation Headquarters
California Geological Survey Headquarters/Office of the State Geologist
California Division of Forestry
Department of Water Resources
California Emergency Management Agency (Cal-OES)
California Department of Transportation (Caltrans)

Federal Resources and Programs

Federal Emergency Management Agency (FEMA)
Natural Resource Conservation Service (NRCS)
US Geological Survey, National Landslide Information Center
National Oceanic and Atmospheric Administration, National Weather Service

Publications

Barrows, A. and Smith, T., DMG Note 13 (No Date), California Department of Conservation, California Geological Survey.

Brabb, E.E., and B.L Harrod. (Eds) (1989) Landslides: Extent and Economic Significance, Proceedings of the 28th International Geological Congress Symposium on Landslides, Washington D.C., Rotterdam: Balkema.

California Department of Conservation, Division of Mines and Geology, Seismic Hazard Evaluation of the Newhall 7.5-Minute Quadrangle, Los Angeles County, California (1997).

California Department of Public Health (No Date), Be Informed Natural Disasters Landslides and Mudslides.

City of Santa Clarita, General Plan (2011).

Department of Land Conservation and Development (2000), Planning For Natural Hazards: The Oregon Technical Resource Guide, Ch. 5.

Federal Emergency Management Agency (2000), Public Assistance Debris Management Guide.

Highland, L.M., Schuster, R.I. (No Date), Significant Landslide Events in the United States, USGS.

Mileti, Dennis, (1999), Disasters by Design: A Reassessment of Natural Hazards in the United States, Joseph Henry Press, Washington D.C.

National Oceanic and Atmospheric Administration, (Revised 2015). What is subsidence?

Olshansky, Robert B., Planning for Hillside Development (1996) American Planning Association.

Olshansky, Robert B. & Rogers, J. David (1987), Unstable Ground: Landslide Policy in the United States Ecology Law Quarterly.

Oregon Department of Geology, (1998), Joint Interim Task Force on Landslides and Public Safety Report to the 70th Legislative Assembly.

Oregon Office of Emergency Management, Interagency Hazard Mitigation Team, State Hazard Mitigation Plan (2000).

Pipkin, B, Trent, D, Hazlett, R., Geology and the Environment (2010).

Scheingross, J., Minchew, B., Mackey, B., Simons, M., Lamb, M., Hensley, S., The influence of Large-Magnitude Earthquakes And Fault Zone Damage on the Spatial Distribution of Slow-Moving Landslides (2013), Keck Institute for Space Studies and the National Science Foundation.

USGS Landslide Program Brochure. National Landslide Information Center (NLIC), United States Geologic Survey.

SECTION 12. SEVERE WEATHER: EXTREME HEAT

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	4	Highly Likely		Severe
Magnitude / Severity	2	Limited		High
Warning Time	1	More than 24 Hours	○	Moderate
Duration	3	Less than 1 Week		Low
CPRI Rating	2.85	Moderate		

Severe Weather Hazard Information and Background

Severe weather manifests itself in the Santa Clarita Valley in many ways. Extreme heat presents an ongoing threat to health and safety and can lead to secondary events such as energy disruptions due to high cooling demands and increased risk of wildfires. The overall effects of extreme heat are not limited to Santa Clarita, but *impact the entire community*.

Extreme Heat

Extreme heat places an extraordinary demand on the regional power grid to supply air conditioners with the needed electricity to operate. In addition, long periods of extreme heat can affect the local water table and soil quality, making the risk of flash flooding prevalent. Temperatures often exceed 100° F between the months of July and September. In addition, weather conditions in Santa Clarita are extremely dry and continued drought conditions have resulted in extremely low rainfall since 2012 (see Climate Change: Drought Section of this HMP).

Extreme heat and drought affects the overall condition of vegetation throughout the valley. Generally, under such conditions, vegetation tends to become dryer. This creates a greater risk of fire danger. Because much of the Santa Clarita Valley surrounding the City is in its natural state, increased fire danger has a significant impact on the health and property of the entire regional population.

Extreme Heat Impact on Air Quality

According to the South Coast Air Quality Management District, the City of Santa Clarita's air quality ranks among the worst in the nation. Specifically, high levels of ozone threaten the area on a year-round basis. The effects of ozone are made worse in a higher temperature environment. Nevertheless, it should be recognized that air pollution has been on the decline in the Santa Clarita Valley (The Santa Clarita Valley Signal by Karen Jonas, Staff Writer, 2012)<http://www.signalscv.com/archives/67541>.

Extreme Heat and Humidity

The table below show the Heat Index (HI) as a function of heat and relative humidity (Table 51: Air Temperature and Relative Humidity). The Heat Index describes how hot the heat-humidity combination makes it feel. As relative humidity increases, the air seems warmer than it actually is because the body is less able to cool itself via evaporation of perspiration. As the Heat Index rises, so do health risks.

Table 51: Air Temperature and Relative Humidity

		<i>The Heat Index</i>												
Air Temp (° F)	Relative Humidity													
	40	45	50	55	60	65	70	75	80	85	90	95	100	
110°	136	143	152											
105°	123	129	135	141	148									
100°	111	115	119	124	129	135	141	147						
95°	101	104	107	110	114	117	122	126	131	136	141			
90°	92	94	96	98	100	103	106	109	112	115	119	127	132	
85°	84	85	86	88	89	91	93	95	97	99	102	104	107	
80°	80	80	81	81	82	82	83	84	84	85	86	86	87	
<i>Exposure to full sunshine can increase Heat Index values by up to 15° F</i>														

(National Weather Service, 2015)

The National Weather Service (NWS) will initiate its Heat Index Program Alert procedures when the high is expected to exceed 105° - 110° (depending on local climate) for at least two consecutive days.

Table 52: Possible Heat Disorders for People in High Risk Groups

Heat Index	Category	Possible Heat Disorders for People in High Risk Groups
130° or higher	Extreme Danger	Heatstroke risk extremely high with continual exposure.
105° - 129°	Danger	Sunstroke, Heat Cramps, and Heat Exhaustion likely, Heatstroke possible with prolonged exposure and/or physical activity.
90° - 105°	Extreme Caution	Sunstroke, Heat Cramps, and Heat Exhaustion possible with prolonged exposure and/or physical activity.
80° - 90°	Caution	Fatigue possible with prolonged exposure and/or physical activity.

(National Weather Service, 2015)

Heat exhaustion occurs when the body is dehydrated resulting in an imbalance of electrolytes.

- Symptoms -- headache, nausea, dizziness, cool and clammy skin, pale face, cramps, weakness, profuse perspiration
- First Aid -- move to a cooler spot, drink water with a small amount of salt added (one teaspoon per quart)
- Without Intervention -- it can lead to collapse and heatstroke

Heatstroke occurs when perspiration cannot occur and the body overheats.

- Symptoms -- headache, nausea, face flushed, hot and dry skin, no perspiration, body temperature over 101°F, chills, rapid pulse
- First Aid -- cool person immediately, move to shade or indoors, wrap in a cool, wet sheet, get medical assistance
- Without Intervention -- it can lead to confusion, coma, and death

Extreme Heat History

Heat waves do not cause damage or elicit the immediate response as do floods, fires, earthquakes, and typical disaster scenarios. However, extreme heat conditions have claimed more lives over the past 50 years than all other declared disaster events combined. For example:

- The 1989 Loma Prieta Earthquake resulted in 63 deaths
- The 1994 Northridge Earthquake was responsible for the loss of 55 lives
- The 2003 Southern California Firestorms resulted in 24 deaths
- The 2009 Station Fire caused 2 fatalities

In comparison, the worst single heat wave event in California occurred in Southern California in 1955 when an eight-day heat wave resulted in 946 deaths.

Extreme Heat Losses and Impacts

Extreme heat events occur annually in the City of Santa Clarita with multiple days with temperatures over 100 degrees Fahrenheit. It is expected that these hazards will continue to occur seasonally, especially from June to September. Table 53: Extreme Maximum Temperatures by Month (2000 – 2014) provides a summary of high temperature events in the Santa Clarita area (NOAA National Climate Data Center, Global Historical Climatology Network, 2014).

Table 53: Extreme Maximum Temperatures by Month (2000 – 2014)
GHCND: USC00046161 NEWHALL 5 NW, CA US

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014	82	92	91	94	101	98	108	105	109	No Data	No Data	No Data
2013	77	78	94	94	105	110	109	104	105	91	87	78
2012	83	84	85	98	100	101	107	109	104	107	93	78
2011	82	80	89	93	95	99	105	111	106	104	85	85
2010	76	78	84	85	93	94	104	110	108	100	92	80
2009	76	75	85	98	102	102	108	108	108	98	91	73
2008	74	80	85	96	103	109	103	103	104	100	88	84
2007	76	83	96	100	96	100	106	109	110	91	85	84
2006	70	78	76	82	94	104	116	106	107	91	97	83
2005	72	65	82	87	95	97	106	104	96	94	94	87
2004	70	73	86	94	96	94	100	103	101	92	74	76
2003	81	74	83	81	98	100	104	100	100	94	74	71
2002	75	78	81	93	96	101	104	102	102	92	77	66
2001	72	79	82	88	100	94	100	98	99	92	78	66
2000	73	70	77	87	100	104	101	103	100	87	76	74

Red = 100 degrees and above

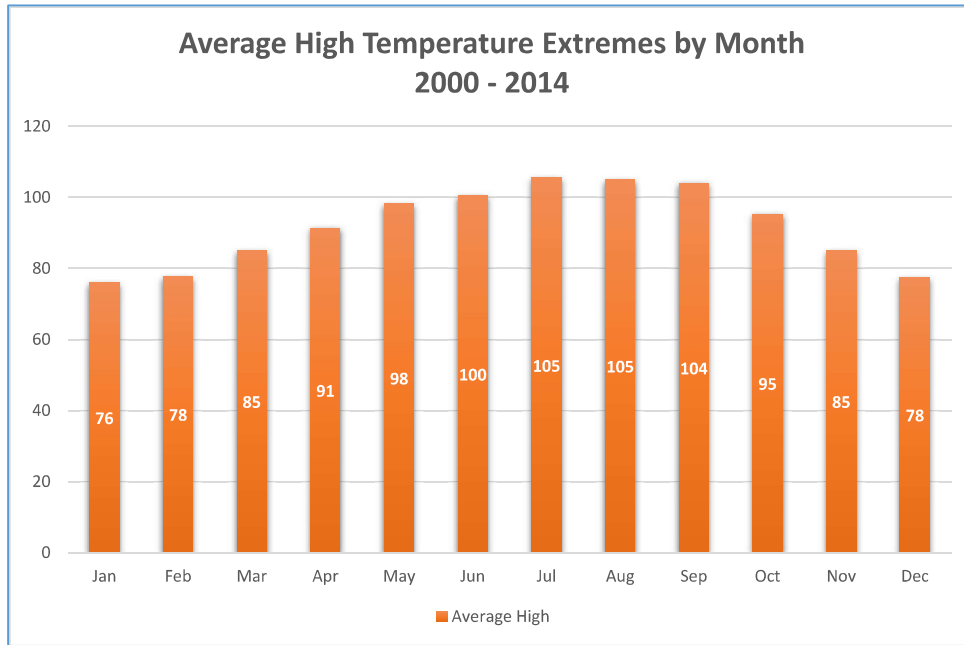


Figure 35: Average High Temperature Extremes by Month

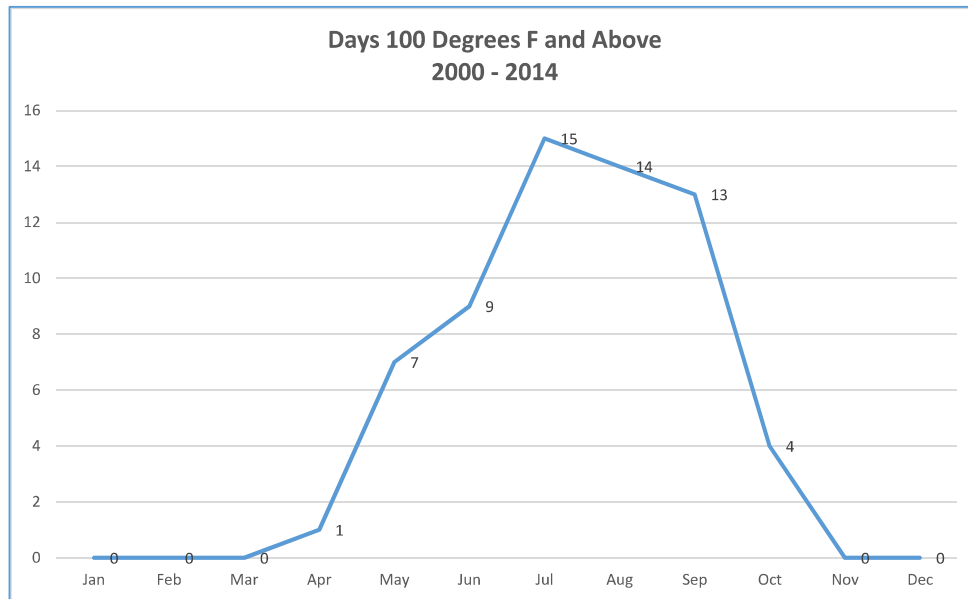


Figure 36: Days 100 Degrees Fahrenheit and Above

Table 54: Average 100 Degree (F) Days by Month

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Days 100 Degrees Fahrenheit and Above	0	0	0	1	7	9	15	14	13	4	0	0

Significant peak heat events identified by the National Weather Service (National Weather Service, National Climate Data Center, 2015) for the Santa Clarita Valley Zone and surrounding area are provided in the table below. There have been three major events listed since January 2000. A heat wave in June 2008 and another heat wave in late August 2007 lasting to early September 2007 (listed as two events). Note: No property or crop damages were reported for any of the events listed in the Santa Clarita Valley Zone.

Table 55: Extreme Heat Data for the Santa Clarita Valley Zone 2000 to 2015

Date	Type	Magnitude (Temperature in Fahrenheit)	Deaths	Injuries	Event Summary
6/21/2008 to 6/20/2008	Excessive Heat	100 F to 114 F	0	0	The combination of strong high pressure centered over Arizona and weak offshore flow generated extreme heat conditions across Central and Southern California. Across many sections of the area, afternoon temperatures climbed to between 100 and 114 degrees which set numerous high temperature records. The extreme heat resulted in several power outages due to excessive electrical use.
9/3/2007 to 9/01/2007	Excessive Heat	105 F to 112 F	0	0	The heat wave which started at the end of August continued into the first few days of September. The combination of above normal temperatures and relative humidity continued to produce excessive heat conditions across sections of Southern California. At the end of the heat wave, 18 heat-related deaths were reported across Los Angeles county.
8/30/2007	Excessive Heat	105 F to 112 F	0	0	From the 29th through the 31st, strong high pressure built over the southwest United States. With this pattern, above normal temperatures developed across the mountains and valleys of Southern California. An influx of monsoonal moisture from northern Mexico increased the relative humidity across the area. The combination of very hot temperatures and increased relative humidity produce heat index values between 105 and 112 degrees. The excessive heat resulted in numerous heat-related injuries and deaths. The heat wave extended into the first few days of September.

Extreme Heat Probability, Frequency and Magnitude

Temperatures are nearly always in excess of 90° F between the months of June and September. As a result, the population is subjected to an extended period where outdoor activity can lead to a variety of heat related ailments including heat stroke, heat cramps, and fatigue. It is estimated that the local hospital, Henry Mayo Newhall Hospital, treats multiple cases of heat-related illness per year in the Santa Clarita Valley.

Table 56: Average Monthly Temperature details the average maximum and minimum temperatures for the City of Santa Clarita area based on data from the Newhall Weather Monitoring Station (NOAA National Climate Data Center, Global Historical Climatology Network, 2014).

Table 56: Average Monthly Temperature

GHCND: USC00046161 NEWHALL 5 NW, CA US

Month	Monthly Mean Maximum Temperature	Monthly Mean Minimum Temperature
Jan	62	46
Feb	63	44
Mar	70	47
Apr	73	48
May	81	54
Jun	86	58
Jul	94	63
Aug	94	63
Sep	91	62
Oct	73	52
Nov	65	46
Dec	57	42
Annual Average	76	52

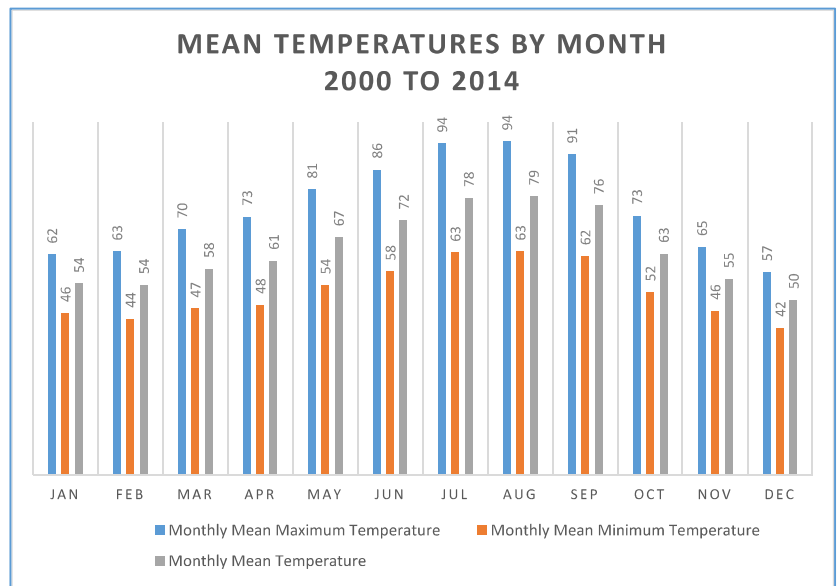


Figure 37: Mean Temperatures by Month

Although recent heat waves have not resulted in any fatalities in the City of Santa Clarita, in California extreme periods of heat have resulted in fatalities. For example in 2006 a severe heat wave resulted in 140 heat related deaths (California Department of Health Services, Epidemiology and Prevention for Injury Control Branch, 2007). Note: A later study conducted by the California Office of Environmental Health Hazard Assessment put the figure at two to three times higher at 350 to 450 deaths (Chong, 2009). While most of the fatalities occurred in the California Central Valley, the event provides valuable lessons regarding the risk to public health during extreme heat. For example, 90% of the heat related deaths were from socioeconomically depressed areas (i.e., zip codes where more than 50 percent of the residents live under the Federal Poverty threshold).

Extreme Heat Vulnerabilities

Health Impacts of Prolonged Periods of Excessive Heat

Heat emergencies are often slow to develop. It could take a number of days of oppressive heat for a heat wave to have a significant or quantifiable impact. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations.

Typical summer temperatures in California contribute to the untimely demise of 20 people on average per year. For example:

- The September 2007 heat wave in the Los Angeles area resulted in 18 heat related deaths.
- The July 2006 heat wave in California caused the death of at least 136 people over a 13 day period.

Vulnerable Populations

Situational and physical characteristics help to identify vulnerable populations that may not comfortably or safely access and use disaster resources. Specifically, when discussing heat related emergency preparedness, the following groups could be considered vulnerable or at greater risk in a heat emergency:

- Infants and small children under age three
- Women who are pregnant
- Elderly people (age 65 and older)
- The obese
- The bedridden
- Mentally ill
- Those with cognitive disorders
- Those with medical conditions (e.g., heart disease, diabetes, high blood pressure)
- Those requiring life-saving medications (e.g., for high blood pressure, depression, insomnia)
- Individuals with drug or alcohol addictions
- Those with mobility constraints
- Non-ambulatory
- Those under extreme working conditions
- The poor
- Socially isolated
- Non-English speakers who may not have access to information

Animals, including domestic pets, livestock, and poultry are also susceptible to extreme heat. For example, dogs and cats are in danger of heat stroke in temperatures of 110 degrees Fahrenheit. The heat wave of 2006 resulted in 15 reported pet deaths and more than 25,000 cattle, and 700,000 fowl heat-related deaths.

Existing Mitigation Activities

City of Santa Clarita Heat Emergency Plan

The City of Santa Clarita has a Heat Emergency Plan to provide direction and guidance to the City for responding to a Heat Emergency Advisory. An Excessive Heat Warning will be issued by the Oxnard NWS office when heat index values are expected to be higher than the following thresholds for any length of time:

Table 57: Excessive Heat Warning Temperature Thresholds

Location	Excessive Heat Warning Temperature Threshold
Mountains	100 degrees Fahrenheit or higher
Coastal sections (including downtown Los Angeles)	105 degrees Fahrenheit or higher
Valleys	110 degrees Fahrenheit or higher

When the City becomes aware that the NWS has initiated an Excessive Heat Warning, the city will implement its heat emergency standard operating procedures and consider activating Cooling Centers. The following locations have been designated by LA County Public Health as Cooling Centers in the City of Santa Clarita (Los Angeles County Office of Emergency Management, 2015).

Table 58: Designated Cooling Centers in Santa Clarita

Location	Address	Telephone	Hours of Operation	
Santa Clarita Santa Clarita Old Town Public Library	Main Street Santa Clarita, CA 91321	(661) 259-8942	Mon – Thur Friday Sat Sun	9 am – 8 pm 10 am – 6 pm 10 am - 5 pm 1 pm – 5 pm
Santa Clarita Santa Clarita Public Library	18601 Soledad Canyon Santa Clarita, CA 91351	(661) 250-3301	Mon – Thur Friday Sat Sun	9 am - 8 pm 10 am - 6 pm 10 am - 5 pm 1 pm – 5 pm
Santa Clarita Santa Clarita Public Library	23743 West Valencia Bl. Santa Clarita, CA 91355	(661) 259-8332	Mon – Thur Friday Sat Sun	10 am – 9 pm 10 am – 6 pm 10 am – 5 pm 1 pm – 5 pm
Santa Clarita Santa Clarita Valley Senior Center	22900 Market Street Santa Clarita, CA 91321	(661) 259-9444	Mon – Fri	8 am - 4:30 pm

The general public information message during the extreme heat event is: “during peak heat hours, stay in an air conditioned area. If you do not have air-conditioning in your home, visit public facilities such as shopping malls, parks and libraries to stay cool.”

Severe Weather – Extreme Heat Mitigation Strategies and Action Items

The severe heat strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from severe heat events. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP.

Strategy Number	Priority	Timeline	Status
SW-EH001 (previously SW1)	Moderate	Ongoing	SW-EH001-01: Ongoing
Strategy Description	Continue to enhance participation in Southern California Edison’s Independent System Operator Notification Procedure Process for Rolling Blackouts.		
Activities	SW-EH001-01: Continue to participate with Southern California Edison’s notification system to inform the community of impending rolling blackouts.		
Coordinating Organization	Public Works Department, and Southern California Edison		
Plan Goals Addressed	Public Awareness Partnerships and Implementation Emergency Services		
Funding Source	General Fund		
Comments	<u>SW-EH001-01</u> : The City participates in Quarterly FLASH Communication drills and annual notification tests conducted by Southern California Edison in preparation for power outages and rolling blackouts.		

Strategy Number	Priority	Timeline	Status
SW-EH002 (previously SW2)	Moderate	Ongoing	SW-EH002-02: Ongoing SW-EH002-03: Ongoing
Strategy Description	Create a Public Education Program Regarding Proper Precautions Against Exposure to Heat and Potential Hazards of Exposure to Extreme Heat.		
Activities	SW-EH002-02: Partner with the Los Angeles County Department of Health Services to create and or/adopt their existing information regarding heat, how to monitor and/or adjust behavior depending on the specific heat index, and information to seek should specific ailments from exposure to heat occur. SW-EH002-03: Maintain and update cooling center inventory on a bi-annual schedule.		
Coordinating Organization	Community Services Division, Environmental Services and Los Angeles County Public Health		
Plan Goals Addressed	Public Awareness Partnerships and Implementation Emergency Services		
Funding Source	General Fund		
Comments	<p><u>SW-EH002-02</u>: In preparation for extreme heat weather issues, the City and the LA County Dept. of Public Health coordinate the distribution of heat advisories and alerts to the Santa Clarita community. Information is distributed to schools, senior centers, and SC Chamber of Commerce and other community partners. This is completed via social media, press releases, media interviews, and handouts (electronic and physical).</p> <p><u>SW-EH002-03</u>: The Santa Clarita Valley Senior Center and the Valencia Library are the designated cooling centers.</p>		

Strategy Number	Priority	Timeline	Status
SW-EH3 (previously SW3)	Moderate	Ongoing	SW-EH003-04: Ongoing SW-EH003-05: Ongoing
Strategy Description	Create a Public Education Program Regarding Proper Precautions Against Exposure to Poor Air Quality.		
Activities	<p>SW-EH003-04: Partner with the Los Angeles County Department of Health Services to create and/or adopt their existing information regarding poor air quality.</p> <p>SW-EH003-05: Partner with the South Coast Air Quality Management District to develop a mechanism to notify sensitive populations within the City on days when air quality standards exceed state and federal standards.</p>		
Coordinating Organization	Environmental Services, South Coast Air Quality Management District (AQMD), LA County Public Health, and National Weather Service		
Plan Goals Addressed	<p>Public Awareness</p> <p>Partnerships and Implementation</p> <p>Emergency Services</p>		
Funding Source	General Fund		
Comments	<p><u>SW-EH003-04</u>: The City distributes the Los Angeles County Department of Health Services public warning information on poor air quality at a number of City events, including Earth Day and River Rally. This type of information typically occurs during extreme heat-related events.</p> <p>2011-2012 - The City celebrated the 25th annual Rideshare Week by hosing a Ride Share open house. Employees were encouraged to rideshare, learn about air quality, and the benefits of carpooling. Additionally, air quality information was updated on GreenSantaClarita.com and emailed to over 400 residents through the eNotify email system.</p> <p>The City's Environmental Services and Economic Development divisions are currently investigating opportunities to hold an Alternative Fuel event for residents and businesses to learn the benefits of purchasing cleaner burning vehicles.</p> <p><u>SW-EH003-05</u>: The South Coast Air Quality Management District (SCAQMD) has developed and made available a notification system via text/email about air quality. The City has partnered with the Los Angeles County Department of Health Services to disseminate poor air quality warning systems in coordination with the SCAQMD. Alerts, press releases, and notifications are distributed to community partners and the public. A free app is available via SCAQMD, called AIRNow, to give air quality information on-demand.</p>		

Severe Weather Resource Directory

California Department of Health Services

Epidemiology and Prevention for Injury Control Branch
PO Box 997377, MS 0500
Sacramento, CA 95899-737
Phone: (916) 558-1784
Website: <https://www.cdph.ca.gov>

Los Angeles County Office of Emergency Management

County of Los Angeles Chief Executive Office
(323) 980-2260

National Weather Service

Los Angeles/Oxnard Weather Forecast Office
520 North Elevar Street
Oxnard, CA 93030
Phone: (805) 988-6610
Website: <http://www.nwsla.noaa.gov/>

NOAA National Climate Data Center, Global Historical Climatology Network

National Centers for Environmental Information
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Website: <http://www.ncdc.noaa.gov/>

US Department of Commerce

National Oceanic and Atmospheric Administration
National Weather Service
1325 East West Highway
Silver Spring, MD 20910
Website: www.ncdc.noaa.gov/stormevents

Western Regional Climate Center

2215 Raggio Parkway
Reno, NV 89512-1095
Website: <http://www.wrcc.dri.edu/>

Publications

Air Pollution on the Decline, (Jonas, Karen - Staff Writer), June 10, 2012

The Santa Clarita Valley Signal

24000 Creekside Road

Santa Clarita, CA 91355

Website: <http://www.signalscv.com/>

California's 2006 Heat Wave was Much Deadlier than Previously Reported, (Chong, Jia-Rui),
July 21, 2009

Los Angeles Times

1375 Sunflower Avenue

Costa Mesa, CA 92626

Phone: (714) 966-5600

Website: <http://www.latimes.com>

SECTION 13. CYBER ATTACK

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	3	Likely		Severe
Magnitude / Severity	2	Limited		High
Warning Time	4	Less than 6 Hours	○	Moderate
Duration	2	Less than 24 Hours		Low

Cyber-Attack Hazard Information and Background

The globally-interconnected digital information and communications infrastructure known as “cyberspace” underpins almost every facet of modern society and provides critical support for the U.S. economy, civil infrastructure, public safety, and national security.

Since the release of the federal government’s 2003 *National Strategy to Secure Cyberspace* (The White House, 2003) and the 2009 *Cyberspace Policy Review* (The White House, 2009), government officials’ recognition of the potential threats and liabilities posed by cyber-attacks have increased in parallel with the concomitant sophistication and availability of technological tools. However, this presents a fundamental challenge as the techniques, methods, and tools used to operate and manage computer networks are constantly evolving, and therefore the cyber-attack landscape evolves with them.

For example, several high-profile data hacks of large companies such as Home Depot and Target, as well as reports of cyber espionage conducted by foreign governments in the past five years, strongly implies that a willingness to use cyber-attacks will continue in the short to medium-term.

This section outlines the City of Santa Clarita’s assessment of the specific threats posed to it by cyber intrusions as well as relevant mitigation actions it will attempt to undertake in the next five year period.

Threats

Cybersecurity threats can be characterized by a variety of factors, but can be most easily described as either *external threats* (where attacks originate outside of established networks) or *internal/insider threats* (where attacks originate from users who have existing access to an internal network).

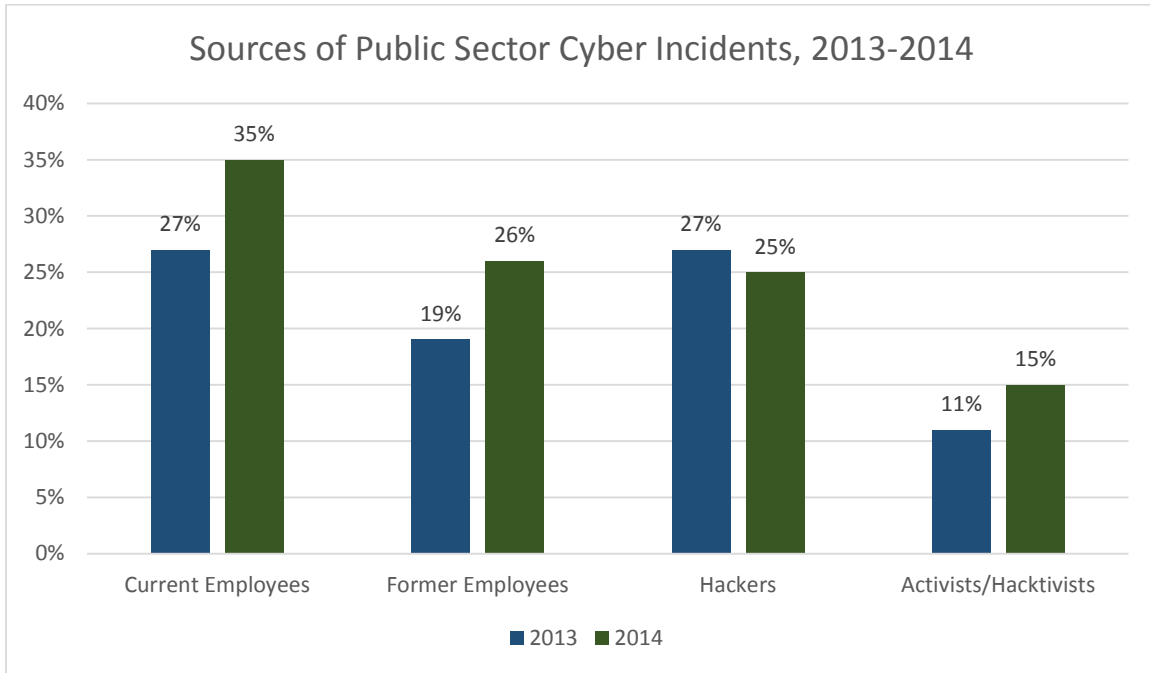


Figure 38: Sources of Public Sector Cyber Incidents, 2013-2014

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External Threats

In terms of industry experts, the common term for the rash of new, sophisticated cyber threats is *Advanced Persistent Threats* (APT), which can have the following characteristics:

- Individuals will wait for vulnerabilities to present themselves or combine small security weaknesses into a large-scale, damaging attack.
- Dedicated, state-sponsored teams are not dissuaded from targeting organizations even if strong security protocols are in place.
- An APT can occur in a cascading, deliberate manner, helping it bypass even the strongest and best-configured firewalls and intrusion-detection systems. Invalid source specified.

The following sections outline common threats that can come from outside an organization.

“Backdoor” Network Access

“Backdoors” are methods and exploits hackers use to establish unauthorized access to a network from a remote location. Backdoor programs are applications that open computers to access by remote systems. These programs typically respond to specially-build client programs but can be designed to respond to legitimate messaging applications. **Invalid source specified.**

These exploits are typically used to gain repeated access to a network without being logged in as the systems administrator, and allow hackers to use networks without the knowledge or awareness of others. Keeping hackers out of networks and resolving these exploits requires careful monitoring of networks by system administrators as well as careful review of event logs of network activities. **Invalid source specified.**

“Hacktivism”

Groups such as Anonymous target and attack organizations in the name of social causes and seek to cause significant financial and reputational damage to their targets. Hacktivists have targeted a variety of public and private sector organizations in recent years; since 2010, one of the most prominent examples is the coordinated campaign by the hacker groups LulzSec and Anonymous to engage in the theft and leakage of classified government information, including email spools and documentation, as well as the targeting of banks and other core institutions. In a more direct example, in August 2011, Anonymous hacked its way into 70 law enforcement computer systems, defacing websites and exposing sensitive information, such as email, tips on suspected crimes and profiles of gang members. This included city municipal law enforcement agencies **Invalid source specified.** and **Invalid source specified.**

Remote Access Trojans

Remote Access Trojans (RATs) are an especially pernicious form of malware programs that utilizes back door software exploits to gain administrative control over a target computer. RATs are usually downloaded and installed alongside user-requested programs or sent as email attachments. Once a system is compromised, the intruder may use it to distribute RATs to other vulnerable computers and establish a botnet (see “Common Threats” below). RATs can operate virtually undetected due to administrative access privileges, allowing them to record keystrokes, modify system settings or files, and more **Invalid source specified.** and **Invalid source specified.**

Distributed Denial of Service

A Distributed Denial of Service (DDoS) attack is an attempt to make an online service unavailable by overwhelming it with traffic from multiple sources. They target a wide variety of important resources, from banks to news websites, and present a major challenge to ensuring the ability to publish and access important information. These types of attacks can be especially problematic to organizations that are not prepared for them, and they are known for being easily accessible. For example, according to a 2012 research paper published by Trend Micro, DDoS attacks can be purchased on the black market for as little as \$150 **Invalid source specified.** and **Invalid source specified.**

Internal or “Insider” Threats

While different organizations tend to see more attempted external attacks, IT teams must also be conscious of and concerned about insider threats. Current personnel remain a primary source of insider actions, followed by former employees. Increasingly, many agencies have become aware of the threats posed by insiders, such as service providers, consultants, and contractors who have been given access to sensitive information and/or data networks. This implies a new level of resiliency that should be addressed in future hazard mitigation measures.

Insider incidents can range from external groups pressuring city officials to give up sensitive information, to leaving a laptop in a car, to emailing or improperly disposing of personal, confidential information. “Insider threats” are generally an individual or individuals with privileged access to an IT system in an organization. An insider threat can be originate as a current or former employee, contractor, or business partner with access to the organization’s network, system, or data and intentionally misuses them.

Insider threats can be categorized in four ways (Ja, 2015):

Table 59: Insider Cyber Threat Categories

Insider Cyber Threat Category	Description
Compromised Actor	Insiders with access credentials or computing devices that have been compromised by an outside threat actor, either by exploitation or other means. These cases are more challenging to address since the real attack is from outside the network, which can mean a much lower chance/risk of being identified.
Unintentional Actor	Insiders who expose data accidentally. A large number of data breach incidents result from employee negligence towards security measures, policies, and practices.
Emotional Attacker	Insiders who steal data or destroy agency/company networks intentionally.
Tech-savvy Actor	Insiders who use their knowledge of weaknesses and vulnerabilities to breach clearance and access sensitive information. These can post some of the most dangerous insider threats, and are likely to sell confidential information to external parties.

Common Threats

The following table describes a set of common threats that can originate from either internal or external actors. (Government of Canada, 2015)

Table 60: Common Cyber Threats

Name	Description	Capabilities
Botnet	A collection of software robots, or “bots,” that creates an army of infected computers (known as “zombies”) that are remotely controlled by the originator. One’s computer can be compromised without the user realizing it.	<ul style="list-style-type: none"> • Send spam emails with viruses attached • Spread all types of malware • Can use one’s computer as part of a denial of service attack against other system
Hacking	Actions taken by someone to gain unauthorized access to computer. The availability of information online on the tools, techniques and malware makes it easier for even non-technical people to undertake malicious activities. The process by which cyber criminals gain access to your computer.	<ul style="list-style-type: none"> • Find weaknesses (or pre-existing bugs) in one’s security settings and exploits them in order to gain access to sensitive information • Install a Trojan Horse, providing a back door for hackers to enter and search for information
Malware	Malicious software that infects one’s computer, such as computer viruses, worms, Trojan horses, spyware, and adware.	<ul style="list-style-type: none"> • Intimidate users with false information • Reformat the hard drive of ones’ s computer • Alter or delete files • Steal sensitive information • Send emails on user’s behalf • Take control of entire computer and all software running on it
Pharming	Means to point users to malicious and illegitimate website by redirecting a legitimate URL. Even if the URL is entered correctly, it can still be redirected to a fake website.	<ul style="list-style-type: none"> • Convince user that fake sites are real, giving false security on to the level of protection of personal information
Ransomware	Type of malware that restricts access to one’s computer and displays a message that demands payment in order for the restriction to be removed. The two most common means of infection appear to be phishing emails that contain malicious attachments and website pop-up advertisements.	<ul style="list-style-type: none"> • There are two common types of ransomware: <ol style="list-style-type: none"> 1. Lock screen ransomware: displays an image that prevents you from accessing your computer 2. Encryption ransomware: encrypts files on your system’s hard drive and sometimes on shared network drives, USB drives, etc.

Name	Description	Capabilities
Spam	Mass distribution of unsolicited messages, advertising or pornography to addresses which can easily found through things like social networking sites, company websites, and personal blog.	<ul style="list-style-type: none"> • Create a burden for communications service providers and businesses to filter economic messages. • Phish for user information by tricking him/her to following links • Provide a vehicle for malware, scams, fraud, and threats to user privacy
Spoofing	Website or email that is created to look like it comes from a legitimate source. Email address may include user name, making it difficult to discern whether or not the sender is real.	<ul style="list-style-type: none"> • Sends spam using user email address, or a variation of email address, to contact list • Recreates websites that closely resemble the authentic site
Spyware	Software that collects personal information about you without you knowing. They often come in the form of a 'free' download and are installed automatically with or without your consent. These are difficult to remove and can infect your computer with viruses.	<ul style="list-style-type: none"> • Collect information about user without him/her knowing about it and give it to third parties • Send usernames, passwords, surfing habits, list of applications downloaded, settings, and the version of operating system to third parties • Change the way computer runs without user knowledge • Take users to unwanted sites or inundate them with uncontrollable pop-up ads
Trojans	Malicious programs disguised as, or embedded within, legitimate software. They are typically executable files that will install themselves and run automatically once they are downloaded.	<ul style="list-style-type: none"> • Delete user files • Use user computer to hack other computers • Watch user through webcams • Log user keystrokes (such as credit card numbers) • Record usernames, passwords, and other personal information
Viruses	Malicious computer programs that are often sent as an email attachment or download with the intent of infecting a computer.	<ul style="list-style-type: none"> • Send spam • Provide criminals with access to user computer and contact lists • Scan and find personal information like passwords on user computer • Hijack web browsers • Disable security settings • Display unwanted ads
Wi-Fi Eavesdropping	Virtual "listening in" on information that's shared over an unsecured (i.e. not encrypted) Wi-Fi network	<ul style="list-style-type: none"> • Potentially access user computer with right equipment • Steal personal information including logins and passwords
Worms	Software program in computer memory that self-propagates by sending to itself to different computers on a network	<ul style="list-style-type: none"> • Spread to everyone in user contact list • Cause a tremendous amount of damage by shutting down parts of the Internet, wreaking havoc an internal network and costing organizations enormous amounts of lost revenue

Threats to Utilities/Critical Infrastructure

Utilities

As stated in other sections of this HMP, Santa Clarita utilizes the services of Southern California Edison (SCE) to meet its electrical utility needs. Therefore, any cyber threats posed to Santa Clarita's utility system would be routed through SCE's utility infrastructure. As part of its "Smart Grid" initiative, SCE has implemented system-wide measures to protect the exponentially large amounts of data from cyber-security threats. As part of its end-to-end security coverage, SCE's cyber-related efforts involve external engagement with technology suppliers, standards organizations and policy makers, and internal engagement to address the security requirements of SCE systems (Southern California Edison, 2010).

Technological Advances

The progression of technological tools and systems has continued in the last five years. Since 2010, the use of mobile devices has markedly increased for both home and enterprise consumers. Additionally, the advent of cloud-based (i.e. virtual) collaboration and storage tools have transformed many traditional models of technological use. Both, however, are vulnerable to both external and insider cyber threats.

Mobile Devices

The increased reliance on mobile devices has spawned new threats. Downloadable applications can render users vulnerable to fraud, theft, and other privacy concerns; additionally, because mobile devices are constantly connected to the Internet or local Wi-Fi networks, this creates additional persistent security concerns. Moreover, the proliferation of smart-devices in the workplace has increased the avenues for cyber intrusions even further. This trend will continue to grow due to associated productivity and cost gains from mobile devices; for example, in a 2014 study conducted by Egnyte, a cloud-based network and storage provider, 85% of workers say their smartphone is their most relied-upon device, and nearly two-thirds of companies permit employees' personal devices to connect to corporate networks (Egnyte, 2014).

Cloud Computing

Cloud computing has simultaneously transformed business and government as well as created new security challenges, many of which are still emerging due to the newness of the technology. According to industry experts, the most significant security risks associated with cloud computing is the tendency to bypass IT departments and information officers. In many cases, the shift to exclusively use cloud technologies, although affordable and "lean," undermines important business-level security policies, processes, and best practices. Without these standards, businesses and governments are vulnerable to security breaches that can quickly erase any gains made by the switch to "software as a service," which is enabled by cloud computing solutions (Cloud Security Alliance, 2013).

History of Cyber Attacks

While the City of Santa Clarita has not experienced a severe incident related to cyber-attack, from 2010 to 2015 the frequency of cyber-attacks on public and private sector organizations in general have continued to increase, with numerous high-profile cases striking companies or organizations with customers in California. Recent examples of include:

- According to a report on data breaches released by the California Attorney General's office, more than 2.5 million Californians had personal information put at risk through electronic data breaches in 2012. (State of California - Department of Justice - Office of the Attorney General, 2013)
- December 2013 – In one of the largest data breaches ever recorded, hackers stole credit and debit card numbers of more than 40 million Target customers, as well as personal information like email and mailing addresses of nearly 70 million people. The breach was reported to be have been caused by malware installed on the company's networks that collected customer information. During that period, the company's profit for the quarter dropped 46% and ultimately led to a \$10 million settlement with Target customers. (CNN, 2013)
- April 2014 – Home Depot underwent the largest commercial credit-card breach on record, with 56 million credit card numbers stolen as well as 53 million customer email addresses. (Banjo, 2014)
- November 2014 – Sony Pictures underwent a sophisticated cyber-attack that was widely acknowledged to be the work of North Korea. Several of the company's internal data centers were wiped clean, and a range of proprietary information was accessed and stolen, including contracts, salary lists, film budgets, copies of films, Social Security numbers, and E-mail correspondence between corporate executives. (Hesseldahl, 2015)
- February 2015 – Anthem, a health insurance management company with customers in California, underwent an external attack where hackers were able to breach a database that contained as many as 80 million records of current and former customers, as well as employees. The information accessed included names, Social Security numbers, birthdays, addresses, E-mail and employment information, including some income data. (Goldstein, 2015)
- May 2015 – Denial of Service attack on Common Core computerized testing websites managed by the Oakland Unified School District. State investigators determined the event was an example of sabotage on the school server system, preventing students from taking required aptitude tests (Lin, 2015).
- June 2015 – Hackers working for the Chinese government breached the computer system of the U.S. Office of Personnel Management, compromising the personal and security clearance data for over four million current and former federal workers. (Nakashima, 2015)
- July 2015 – Cyber-attack on the University of California-Los Angeles' computer networks for the university's health department. Officials determined that attackers gained access to parts of the network that contained information such as patient names, addresses, dates of birth, Social Security numbers, medical record numbers, and other pertinent medical information (Luna Jr., 2015).

Probability, Frequency, and Magnitude of Cyber Attack

Local governments such as the City of Santa Clarita are increasingly being targeted by cyber criminals on the basis that they have fewer resources to defend themselves. With the advent of more online systems and services being used to collect information such as Social Security Numbers, driver's license numbers, and home addresses, this means that it is a matter of when, not if, a major data breach will occur for the sake of obtaining this information. In fact, in 2012, more than two-thirds of U.S. government data breaches were at non-federal agencies, such as the 2012 theft of Social Security Numbers of up to 280,000 people when the Utah state government servers were hacked in 2012. According to the Privacy Rights Clearinghouse, since 2009 more than 94 million records of government employees' personally identifiable information (PII) have been exposed (Kuchler, 2014) and (Rapid7, 2012).

The theft of PII can also present monetary liabilities for the City of Santa Clarita; as a result of numerous incidents involving public governments and agencies, there is a growing trend toward public agencies facing fines and penalties. For example, after a data breach involving the protected health information of 1,581 people, Skagit County of Northwest Washington agreed to a \$215,000 monetary settlement with the U.S. Department of Health and Human Services' Office for Civil Rights (OCR). In announcing the settlement, the OCR stated that "agencies need to adopt a meaningful compliance program to ensure the privacy and security of patients' information" (VedderPrice, 2014).

Cyber Attack Vulnerabilities

In general, cyber-attacks represent a major security risk and can increase vulnerabilities to economic disruption, critical infrastructure damage, privacy violations, and identity theft. In an increasingly interconnected world, cyber vulnerabilities are therefore magnified. As a consequence, the resilience of Santa Clarita's computer systems, software, and critical infrastructure to cybersecurity threats poses a continuing challenge in the face of the increased use of networked technologies in local government, as well as the ongoing maintenance and system upgrades made to critical infrastructure. Recent trends suggest that persistent cyber intrusions are commonplace for many organizations and continue to increase every year; those in the public-sector are not immune from this reality.

Cyber threats also have the potential to have a large impact on critical infrastructure, particularly for systems that are at risk of becoming outdated. These include computer systems underpinning everyday infrastructure such as Distributed Control Systems (DCS) and Site Control and Data Acquisition (SCADA) Systems which are used to control key utility functions.

Existing Mitigation Activities

In addition to operating critical infrastructure computer systems, public sector agencies at all levels perform essential services in the agriculture, food, water, public health, emergency services, defense, social welfare, information and telecommunications, energy, transportation, banking and finance, chemicals, and postal and shipping sectors that depend upon cyberspace for their delivery. Therefore, any mitigation strategies that are adopted for cyber threats must be applicable to a variety of functions.

In the 2003 *National Strategy to Secure Cyberspace*, the federal government identified major actions and initiatives designed to secure government agencies' cyberspace; these have been adapted to apply to Santa Clarita and can be considered the strategic goals of any efforts to mitigate cyber threats.

- Continuously assess threats and vulnerabilities to Santa Clarita cyber systems;
- Authenticate and maintain authorized users of Santa Clarita cyber systems;
- Secure Santa Clarita's wired and wireless local area networks;
- Improve security in city government outsourcing and procurement; and
- Establishment of information technology security programs and participation in information sharing and analysis efforts with other state and local government agencies.

To facilitate the implementation of these strategies, the City of Santa Clarita will continue to work to implement the following mitigation measures to secure its networks and devices.

Cyber-Attack Mitigation Strategies and Action Items

The cyber-attack strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from cyber events. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP.

Strategy Number	Priority	Timeline	Status
CY001	High	Ongoing	CY001-01: Complete / Monitoring Ongoing CY001-02: Updates Ongoing CY001-03: Ongoing CY001-04: Complete/ Updates Ongoing
Strategy Description	Ensure that every physical and virtual computing infrastructure currently utilized by the City are secure. Revise current standard IT operating procedures to meet industry best practices.		
Activities	CY001-01: Ensure that all hardware and software currently utilized by city staff are updated including: anti-virus, spyware, and malware mitigation measures. CY001-02: Conduct updates of cyber threat management tools. CY001-03: Review ways to increase bandwidth on Local Area Networks and Wi-Fi networks used by the city to ensure capability to handle sudden, increased data usage. CY001-04: Implement controls of access ports used for City services and take action to reduce the threat of cyber threats.		
Coordinating Organization	Technical Services		
Plan Goals Addressed	Protect Life and Property		
Funding Source	General Fund		
Comments	<u>CY001-01</u> : Hardware / Software security controls in place. Monitoring ongoing. <u>CY001-02</u> : Tools in place. Monitoring and updates ongoing. <u>CY001-03</u> : Evaluations ongoing. <u>CY001-04</u> : Controls in place. Monitoring and updates ongoing.		

Strategy Number	Priority	Timeline	Status
CY002	Moderate	Ongoing	CY002-05: Complete CY002-06: Complete / Ongoing CY002-07: Under Review CY002-08: Under Review CY002-09: Under Review CY002-10: Under Review
Strategy Description	Adopt and comply with all relevant United States Computer Emergency Readiness Team (US-CERT) and other national requirements for local governments and utilize existing resources and programs made available by US-CERT and other federal agencies for system resilience and security testing.		
Activities	CY002-05: Integrate incident notification requirements into existing IT department policies. CY002-06: Conduct Cyber Resilience Reviews. CY002-07: Adopt National Institute of Standards and Technology’s (NIST) Framework for Improving Critical Infrastructure Cybersecurity. CY002-08: Include National Cybersecurity and Communications Integration Center (NCCIC) into IT Department policies and procedures. CY002-09: Consider participation in DHS C3 Voluntary Program, which provides resources to help State, local, tribal, and territorial governments address their cybersecurity needs. CY002-10: Consider having DHS Cyber Security Advisors/Protective Security Advisors conduct assessments of Santa Clarita cyber and critical infrastructure resources.		
Coordinating Organization	Technical Services		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund and/or Grant Funding		
Comments	<u>CY002-05</u> : Incident notification included in IT department policies. <u>CY002-06</u> : Reviews conducted on a scheduled basis. <u>CY002-07</u> : Additional policies and standards such as the NIST Framework under review for incorporation into IT department policies and procedures. <u>CY002-08</u> : Inclusion of NCCIC under review for incorporation into IT department policies and procedures. <u>CY002-09</u> : Participation in DHS C3 under review. <u>CY002-10</u> : Conducting security evaluations by DHS under review. More information on national resources for State and Local officials: https://www.us-cert.gov/ccubedvp/getting-started-slitt		

Strategy Number	Priority	Timeline	Status
CY003	High	Ongoing	CY003-11: Complete / Updates Ongoing CY003-12: Ongoing CY003-13: Ongoing CY003-14: Ongoing CY003-15: Ongoing CY003-16: Ongoing CY003-17: Ongoing CY003-18: Ongoing CY003-19: Ongoing CY003-20: Ongoing
Strategy Description	Review IT Department staff credentials, policies, and procedures and update them to meet industry best practices for software security, access management, and cybersecurity mitigation.		
Activities	CY003-11: Conduct regular updates to IT department policies to incorporate the latest cyber security best practices. CY003-12: Review and strengthen internal IT administrator password and credential controls. CY003-13: Review current password management practices and controls. CY003-14: Perform regular testing to confirm that critical systems are not subject to compromise. CY003-15: Maintain procedures for performing “remote wipes” of lost or stolen smartphones or tablet computers. CY003-16: Assess the need for cyber-insurance coverage. CY003-17: Periodically test IT cyber incident response plans. CY003-18: Conduct regular risk assessments to identify potential cybersecurity threats. CY003-19: Proactively and systematically archive or delete obsolete data and users. CY003-20: Evaluate third-party/vendor risk and indemnification provisions to ensure they cover the full costs of a data breach, including notification costs and credit monitoring.		
Coordinating Organization	Technical Services		
Plan Goals Addressed	Protect Life and Property Maintain and Improve Emergency Services		
Funding Source	General Fund		
Comments	<u>CY003-11</u> : IT policies and procedures routinely updated. <u>CY003-12</u> : Internal IT admin passwords and credentials undergo ongoing reviews. <u>CY003-13</u> : City password management reviewed continually. <u>CY003-14</u> : Testing routinely performed. <u>CY003-15</u> : Development of policies and procedures for remote “wipes” of systems ongoing. <u>CY003-16</u> : Cyber insurance coverage review ongoing. <u>CY003-17</u> : IT cyber incident response plans routinely tested. <u>CY003-18</u> : Cyber security risk assessments ongoing. <u>CY003-19</u> : Obsolete data/user removals ongoing. <u>CY003-20</u> : Vendor cyber capabilities and contract provisions under review and ongoing as new vendors are added.		

Strategy Number	Priority	Timeline	Status
CY004	High	Ongoing	CY004-21: Ongoing CY004-22: Under Review CY004-23: Ongoing
Strategy Description	Ensure that existing Santa Clarita training protocols reflect current and industry best practices in the fields of cyber, information, and critical infrastructure security. Where necessary or applicable, include cyber-security training requirements towards staff professional training/development goals and/or performance reviews.		
Activities	CY004-21: Conduct cybersecurity training to help IT staff maintain expertise and foster operational readiness. CY004-22: Utilize the DHS State, Local, Tribal, and Territorial Cyber security Engagement Program to provide cybersecurity risk briefings to City officials. CY004-23: Conduct periodic employee training on privacy and security policies and incident response procedures.		
Coordinating Organization	Technical Services		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund		
Comments	<u>CY004-21</u> : Cyber security training ongoing. <u>CY004-22</u> : Cyber security briefing protocols under review. <u>CY004-23</u> : Employee privacy, security, and response training ongoing. Note: NSLTT Cybersecurity Engagement Program managed by DHS Office of Cybersecurity and Communications, Stakeholder Engagement and Cyber Infrastructure Resilience Division.		

Strategy Number	Priority	Timeline	Status
CY005	Moderate	Ongoing	CY005-24: Ongoing CY005-25: Ongoing
Strategy Description	Partner with other cities in Los Angeles County as well as other counties (where possible to pool and share resources during an incident.		
Activities	<p>CY005-24: Conduct outreach to Los Angeles County and Area B cities to determine their existing IT capabilities and review opportunities for strategic partnerships to share IT resources in times of need.</p> <p>CY005-25: Conduct outreach to the Los Angeles Chapter of the Information Systems Security Association to review partnership and networking opportunities with local IT professionals.</p>		
Coordinating Organization	Technical Services		
Plan Goals Addressed	Partnerships and Implementation		
Funding Source	General Fund		
Comments	<p>CY005-24: Outreach efforts to Los Angeles County and Area B cities ongoing.</p> <p>CY005-25: Outreach efforts to local cyber security groups ongoing.</p>		

Strategy Number	Priority	Timeline	Status
CY006	Moderate	Ongoing	CY006-26: Ongoing
Strategy Description	Partner with the California Office of Emergency Services and the California Cybersecurity Integration Center		
Activities	<p>CY006-26: Partner with the California Office of Emergency Services and the California Cybersecurity Integration Center to assess the risks to Santa Clarita’s critical infrastructure and information technology networks, enable cross-sector coordination and sharing of recommended best practices and security measures, and support cybersecurity assessments, audits, and accountability programs that are required by state law to protect the information technology networks of California's agencies and departments.</p>		
Coordinating Organization	Technical Services		
Plan Goals Addressed	Partnerships and Implementation		
Funding Source	General Fund		
Comments	<u>CY006-26</u> : Outreach to Cal-OES and the California Cybersecurity Integration Center ongoing.		

Cyber Attack Resource Directory

State Resources

California Office of Emergency Services, California Cybersecurity Integration Center

Federal Resources and Programs

The White House

U.S. Department of Homeland Security (DHS)

DHS National Protection and Programs Directorate, Office of Cybersecurity & Communications

National Cybersecurity and Communications Integration Center (NCCIC)

United States Computer Emergency Readiness Team (US-CERT)

Industrial Control Systems Cyber Emergency Response Team (ICS-CERT)

National Institute of Standards and Technology (NIST)

Publications

The Notorious Nine: Cloud Computing Top Threats in 2013. (2013) Cloud Security Alliance.

This document outlines recent trends in cloud computing threats and vulnerabilities.

Miller, Russel, The Changing Face of Cyber-Attacks: Understanding and Preventing Both External and Insider Security Breaches (2014), CA Security Management.

This document outlines the nature of how external cyber-threats are evolving, where organizations fall short in resilience and mitigation measures, and the nature of insider/internal cyber threats.

Managing Cyber Risks in an Interconnected World: Key Findings from The Global State of Information Security Survey 2015 (2014), PricewaterhouseCoopers.

This document summarizes the most recent trends in information security based upon analysis and surveys of IT professionals.

Data Breaches in the Government Sector (2012), Rapid7.

This report summarizes the trends and costs of cyber-attacks on the government sector from 2009 to 2012, with statistics accounting for costs and impacts of PII theft.

Lyne, James, Security Threat Trends 2015 (2014), Sophos

This document outlines the top ten anticipated cyber-security trends the world will see in 2015 and beyond.

Chiu, Dove; Weng, Shih-Haw; and Chiu, Joseph, Backdoor Use in Targeted Attacks (2014), Trend Micro.

This technical document outlines the nature and efficacy of using backdoor exploits in cyber-attacks.

Goncharov, Max, Russian Underground 101 (2012), Trend Micro.

This document provides a summary of the cybercriminal underground and types of basic hacker activity in Russia.

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SECTION 14. ENERGY DISRUPTION

Electrical power outage lasting more than 24 hours

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	2	Possibly		Severe
Magnitude / Severity	3	Critical		High
Warning Time	2	12 to 24 Hours	○	Moderate
Duration	3	Less than 1 Week		Low
CPRI Rating	2.75	Moderate		

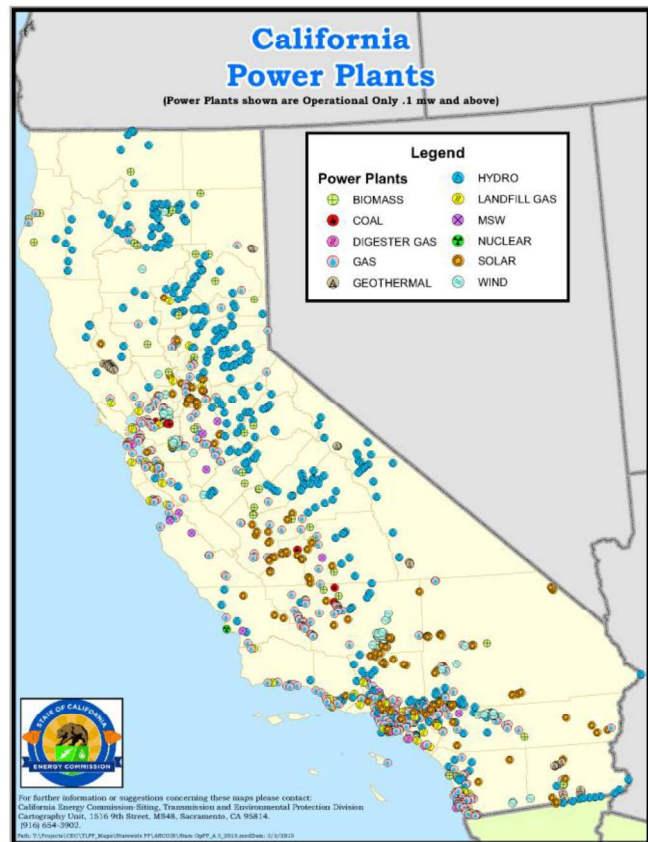
Energy Overview

The City of Santa Clarita is supplied with energy by two primary providers:

- Electricity: Southern California Edison
- Natural Gas: Southern California Gas

Electricity

There are no electric power generating plants in the City of Santa Clarita. (California Energy Commission, 2015). The nearby Castaic Power Plant operated by the Los Angeles Department of Water and Power and Department of Water Resources of the State of California does provide peak load power via a pumped storage hydroelectric plant which is part of the California State Aqueduct. In addition, electric transmission lines and substations are located throughout the City. Private solar power also supplements the power grid but in general does not provide for backup power in the event of a power outage.



Map 32: California Power Plants

Energy Disruption Hazard Information and Background

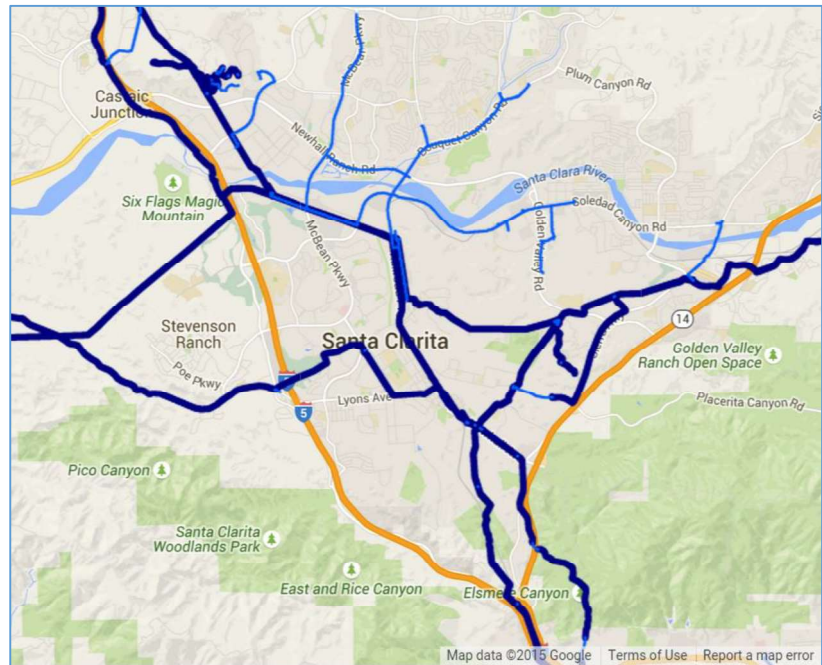
Energy is a critical force that powers business, manufacturing, the transportation of goods and services, as well as homes. The energy infrastructure in the United States consists of thousands of miles of electric transmission lines, oil and natural gas pipelines, and other geographically dispersed energy related resources. Energy infrastructure threats can be a result of natural or man-made disasters or a result of energy related issues such as spikes in demand during peak energy use, unanticipated power plant or refinery shutdowns, transmission system congestion, and equipment or system failures. Any of these events can result in the reduction of supply and disrupt distribution.

Natural Gas

Southern California Gas is the local area supplier for natural gas in the City of Santa Clarita. SCG operates multiple natural gas transmission and high pressure distribution pipelines that traverse the City (Southern California Gas Company, 2011).

Other Pipelines

In addition to natural gas pipelines, there are numerous high volume water and petroleum pipelines that cross through the City. See Hazardous Materials Releases Section of this HMP for additional information. This section includes a high level pipeline map as well as a history of incidents in the Santa Clarita area.



Dark Blue Transmission Lines: Generally large diameter pipelines that operate at pressures above 200 psi and transport gas from supply points to the gas distribution system.

Light Blue High Pressure Distribution Lines: Pipelines that operate at pressures above 60 psi and deliver gas in smaller volumes to the lower pressure distribution system.

Map 33: Natural Gas Pipelines

Power Outages

The major energy disruption concern would be a large power outage in the City of Santa Clarita that happens during the hottest part of summer or the coldest part of winter since an event during these periods would be especially likely to result in injury and possibly fatalities. Although an outage at any time will disrupt roads, highways, lifelines, public services, and the general health of local residents. The examples listed below provide brief descriptions of the types of impacts that can be anticipated.

Injuries

There is a potential for injuries both at home and on the roads during a power outage. During an outage, traffic signals will no longer function, creating the potential for automobile and pedestrian accidents. If the outage occurs at night, streetlights will not work, increasing the probability of accidents and corresponding injuries. Emergency responders will have difficulty navigating traffic if the outage causes traffic issues on city streets, and police will probably be used to manage traffic at high-volume intersections, reducing their ability to respond to accident sites. Finally, injuries and fatalities as a result of smoke from household generators and fumes from gas appliances or barbeque equipment are common during power outages.

Transportation Infrastructure

Residents in the Santa Clarita area commute frequently by automobiles and public transportation. A power outage will affect usability of roads, railways, highways, and freeways. Traffic signals and streetlights will not continue to operate over long periods of time even if supplied with emergency backup batteries and Metrolink Train service to the Santa Clarita Valley will stop until power is returned.

Lifelines

Many lifelines are dependent on power, including water pumping stations, food distribution, telecommunications systems, some natural gas and fuel pipelines, and sewage systems. A power outage will prevent these systems from running normally as they are reliant on electricity for operations. A disruption to lifelines will impede the ability to distribute important information to the public, as well as endanger public health and safety. Examples include:

- Water pumping stations, wells, and sewage treatment plants are dependent on electrical power. While the pumping stations have backup generators in case of power outages, an extended outage may affect the ability of the stations to provide or preserve the safety of water.
- Perishable foods are dependent on refrigeration provided by electrical power. Without electricity, these foods expire relatively quickly, leading to the potential of foodborne illness.
- The telecommunications infrastructure is comprised in part of hard-wired telephone and cable TV systems, microwave transmission stations, cellular telephone systems, and radio systems. Industries dependent on the telecommunications sector include oil and gas, electric power, transportation, emergency services, government services, water, and banking and finance. Most telecommunications providers have backup power plans and agreements to procure the fuel needed to run during a power outage, although an extended outage may impede the ability of telecommunications providers to continue to deliver service to the dependent industries.
- Some gas and fuel pipelines (as well as water pumping stations) may be dependent on electricity at pumping and filtering stations. Utility offices and command centers may be reliant on gas or other fuels to maintain continuity of operations.

Services

Public facilities are electricity dependent and will be disrupted during a power outage. An extended outage will affect the ability of some organizations to continue to provide public services as well as affect the ability of residents to function normally. Examples include:

- Most hospitals have backup generators to get through short power outages and plans to get through longer outages and battery systems to keep critical equipment functioning. Nevertheless, generators have been known to fail during power outages. In the case of generator failures, hospitals may have to move patients to other facilities and postpone scheduled non-emergency services.
- Emergency call centers are dependent on electricity to run and to dispatch emergency services. During a power outage they may be out of service until the power returns.
- An outage may cause pump failures that result in a loss of water pressure in some areas, hampering firefighting efforts.
- ATMs and banks rely on electricity to provide money and services. Credit card and point of sale systems rely on electricity to process transactions. Without access to banks and ATMs, cash may be in short supply during a power outage, and many stores will only be able to accept cash transactions. Some stores will not be able function as cash registers, inventory systems, and electronic entry doors are dependent on electricity.
- Gas stations rely on electricity to power gas pumps; therefore many gas stations will be inoperable during a power outage.
- Government services that rely on banking, transportation, or communications, such as electronic checks, may be delayed during an outage.

Personal Safety

There will be risks to personal safety during a prolonged power outage. A prolonged outage will compromise medications that require refrigeration (such as diabetes medications) and access to home medical equipment. Closed pharmacies mean lack of access to prescription refills. Stress caused by power outages may exacerbate existing medical conditions such as respiratory disease, asthma and cardiovascular conditions. Power outages may stress people trapped in elevators, subways, mines, or other enclosed or isolated spaces (Bell, 2012). Home accidents such as food and carbon monoxide poisoning increase, and heat related illness or hypothermia is a concern depending on the location and date of the outage (Broder J, 2005).

Economy

Direct economic impacts due to power outages include lost business output and productivity, property damage, government overtime costs, and commodities losses caused by a lack of refrigeration. Indirect impacts include diversion of capital investments into blackout protection systems (Electricity Consumers Resource Council, 2004). Estimated permanent economic losses from the thirteen hour Southwest Blackout in September 2011 resulted in losses of \$97 to \$118 million dollars (National University System Institute for Policy Research).

Manufacturing companies may suffer heavy losses from a power outage, caused by production line losses, equipment failure, and loss of productivity. Companies outside of the manufacturing sector, i.e., service companies and retail establishments will also suffer losses in a power outage. These losses will be in terms of lost opportunity costs, customer dissatisfaction, and revenue loss. Small businesses are especially vulnerable as they generally have fewer resources and are less likely to have prepared or planned for such an event.

Energy Threats

Energy threats can be categorized into four types of events (The National Association of State Energy Officials - NASEO, 2009):

- Deliberate attacks caused by people – (e.g. terrorists, criminals, hackers, delinquents, employees)
- Natural disasters caused by nature (e.g., floods, wind, earthquakes)
- Accidental events caused by technological failure (e.g., pipeline rupture, chemical spills, nuclear system failure)
- Systemic threats caused by the physical inability of the energy delivery system (generation and distribution) to meet demand

Deliberate Attacks

Deliberate attacks are intentional, malicious acts caused by people that are aimed at personnel, equipment, infrastructure, or computer systems (cyber-attacks). Many power plants and other infrastructure are remotely controlled by supervisory control and data acquisition (SCADA) systems. SCADA systems are vulnerable to attack by hackers who can access the system and perform acts of sabotage against a target, and an attack against SCADA can shut down an energy provider's operations. A deliberate attack such as a Denial of Service attack can slow or shut down a provider's Web site and make it difficult for customers to access personal or billing information.

Deliberate attacks in the Santa Clarita Valley area can also include acts of vandalism, sabotage, and the theft of equipment and cabling. Physical attacks can target distribution points, transmission lines, and pipelines.

Natural Disasters

Natural hazard events have the potential to cause disruptions in the energy supply. In the Santa Clarita area, the following types of events can cause outages or other energy events:

- Drought (limiting hydroelectric generation)
- Earthquakes
- Flooding
- Severe Storms
- Subsidence (damaging underground power lines, utility vaults, and pipelines)
- Wildfires
- Windstorms

The City of Santa Clarita is vulnerable to natural hazards that affect the power supply due to its proximity to multiple earthquake faults, valley flooding, storms, high winds, brush fires inside and outside of the city limits, and potential subsidence of the valley floor.

While the effects of any one of these natural events should be localized and effect only part of an area, it is probable that a widespread event such as a drought, severe storm, or earthquake will cause widespread energy outages and disrupt the delivery of electricity, natural gas, CNG, petroleum, and other energy products.

Accidental Events

Accidental events that cause energy disruptions can be due to technological failure, chemical spills, nuclear contamination, pipeline rupture, nuclear system failure, or accidental actions or inaction.

Accidents can be a localized event such as a car crashing into a power pole or can be more widespread such as the Southwest Blackout of 2011 that was caused by an employee making repairs at an electrical substation. As the energy infrastructure ages, there is the possibility of equipment failure that can cause intermittent power or pipeline failures.

Systemic Threats

Systemic threats affect the entire energy distribution and production network, including production plants and distribution infrastructure. Systemic events occur when energy delivery systems are physically unable to meet demand. Examples of systemic threats include gasoline or petroleum shortages, as well as electrical shortages caused when increased use strains the system during peak events such as a heat wave.

History of Power Outages

History of Energy Outages in Southern California

Power outages are not uncommon in Southern California, and the region is at risk of outages caused by seismic activity and windstorms. The City of Santa Clarita is occasionally affected by localized unplanned power outages. In addition, during the summer months when temperatures peak, rolling blackouts and brownouts are a continual threat. Large power outages / events in Southern California include:

Table 61: Large Power Outages in Southern California

Event Year	Event	Affected Areas	Cause
2011	Southwest Blackout	California – San Diego, Orange, Riverside, and Imperial Counties. Also affected states in Northern Mexico, as well as counties in Arizona.	Man-made – human error.
2000 – 2001	California Electricity Crisis	The State of California	Man-made – energy shortages caused by market manipulation, regulation and deregulation, price caps, supply and demand.
2005	Los Angeles Blackout	The City of Los Angeles, West Los Angeles, San Fernando Valley, Hollywood	Man-made – human error
1996	Western North American Blackouts	Arizona, California, Colorado, Idaho, Montana, Nebraska, Nevada, New Mexico, Oregon, South Dakota, Texas, Utah, Washington and Wyoming, Alberta, British Columbia, and Baja California Norte in Mexico.	Man-made – trees too close to power lines caused systemic failures.

The City of Santa Clarita was threatened with electricity shortages during the 2000 – 2001 Electricity Crisis. In addition, large power outages in other areas of California have been caused by human error (December 1998, San Francisco), structural failure (1982, Tracy, California), and earthquakes (1989 Loma Prieta Earthquake).

Probability, Frequency, and Magnitude of an Energy Disruption

Power Outage Vulnerabilities

The major concern regarding the impact on communities from power outage events is the failure of critical infrastructure and the danger to public health. Critical infrastructure failures may require days or weeks to repair. The impact to business and industry can result in immediate and long term economic loss. The diagram below depicts the complex interdependencies associated with the electrical power grid (FCC Public Safety and Homeland Security Bureau).

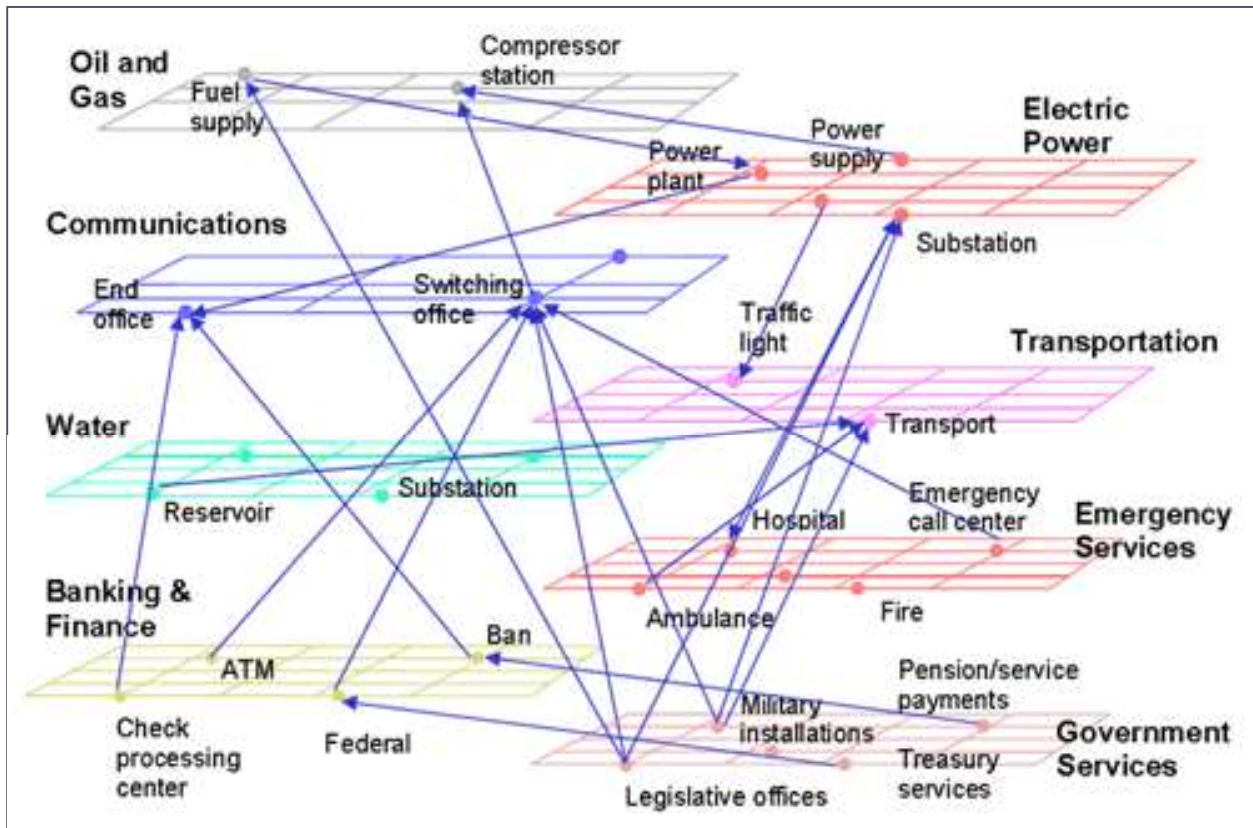


Figure 39: Infrastructure Interdependencies

Critical Infrastructure

Critical infrastructure can fail during a power outage, especially if the event lasts longer than a few days. Outages will affect water and sewer systems, pipelines, transportation networks, emergency facilities, telecommunications networks, hospitals, and other essential sites. Power outages that last a few hours may be an inconvenience as most critical infrastructures have generators or backup power capabilities, but prolonged outages will affect the usability of generators and the accessibility of fuel sources. The failure of services such as the sewage system may pose a hazard to the health of the local community.

Many of these infrastructures are dependent on each other. Pipelines depend on electricity, and while fuel can be used to run generators, once the existing fuel supplies run out it is difficult to procure new supplies without electricity. If gasoline is unavailable, the transportation systems become unreliable. These “infrastructure interdependencies” can create larger issues during a power outage.

Business and Industry

Power outages impact businesses (Marx, Rodriguez, Greenko, Das, Heffernan, Karpati, Mostashari, Balter, Layton, Weiss, 2005) by causing shutdowns during the course of the event. Damage to physical property, interruptions in the supply chain, damage to refrigerated or heated goods that rely on electricity to maintain a certain temperature, and losses to goods on production lines that have to shut down at the time of the event are expected during a power outage. Some computer based businesses will not be able to function without access to the Internet.

Public Health and Safety

A Yale University study of the August 2003 blackout that affected the Northeast and Midwest regions of the United States and parts of Canada showed an increase in accidents and illness that lead to an increased number of deaths during the event (Bell, 2012). A study by the New York City Department of Health and Mental Hygiene for the same event showed an increase in foodborne related illness as a direct result of the outage (Marx, Rodriguez, Greenko, Das, Heffernan, Karpati, Mostashari, Balter, Layton, Weiss, 2005). Injuries due to slips and falls and heat related illness or hyperthermia are commonly reported during power outages. Hospitals become full as people try to plug in electricity dependent medical equipment or procure prescription medications.

Natural Gas, Oil, and Water Distribution Vulnerabilities

The United States is heavily dependent on transmission pipelines to distribute energy and fuel sources. Virtually all natural gas, which accounts for about 28 percent of energy consumed annually, is transported by transmission pipelines. Increased urbanization is resulting in more people living and working closer to existing natural gas transmission pipelines that were placed prior to government agencies adopting and implementing land use and other pipeline safety regulations.

Compounding the potential risk is the age and gradual deterioration of natural gas, oil, and water transmission systems due to natural causes. Significant failure, including pipeline breaks and explosions, can result in loss of life, injury, property damage, and environmental impacts. Causes of and contributors to pipeline failures include construction errors, material defects, internal and external corrosion, operational errors, control system malfunctions, outside force damage, subsidence, and seismicity. Growth in population, urbanization, and land development near

natural gas transmission pipelines, together with the addition of new facilities to meet new demands, may increase the likelihood of gas pipeline damage due to human activity and the exposure of people and property to pipeline failures. California is reported to have 12,414 miles of natural gas transmission pipeline. No complete seismic hazard mitigation inventory for pipeline networks exists in California.

Earthquakes

Liquefaction is a significant contributor to pipeline failure after an earthquake. When soil liquefies, it can lose all shear strength or shear resistance, essentially becoming a fluid with the density of soil. If a pipeline or any other underground structure has a density less than the liquefied soil, it is then subjected to buoyant forces and thrust to the surface. This happens with underground pipes, tanks, and other low-density structural and non-structural components.

Pipelines subjected to significant displacement may develop leaks or breaks. These may be caused by ground deformation or by strong ground shaking. Ground deformation may include fault rupture as well as landslides, liquefaction, or subsidence.

Critical Infrastructure

Critical infrastructure can fail during a power outage caused by an earthquake, especially if the event is prolonged and lasts longer than a few days. Outages will affect pipelines, and prolonged electrical outages will affect the usability of generators and the accessibility of fuel sources as pipelines depend on electricity. Once existing fuel supplies run out it is difficult to procure new supplies without electricity. If gas is unavailable, the transportation systems become unreliable. These “infrastructure interdependencies” can create larger issues during a power outage.

Wells, water pumps, dams and reservoirs are dependent on electricity. Most utility wells and pumps are equipped with backup generators, but if there is a power failure that disrupts the ability to procure additional fuel supplies for the generators, these systems can also fail as part of the infrastructure interdependencies mentioned above.

Business and Industry

The loss of fuel or water directly impact businesses as businesses and industry cannot function without fuel and potable water. The manufacturing, services, retail, and public health and safety sectors are all reliant on gas and water to provide products and services. Without fuel there will be fewer people on the roads and in the shopping districts to purchase goods and services, and small businesses may open for fewer hours, if at all.

Public Health and Safety

Immediate threats to health and public safety in the event of a pipeline leak, break, or explosion are those caused by physical injury and the leak of hazardous materials into the air and water supply. Threats to health in the event that fuel and / or water are unavailable due to an event include the spread of foodborne and communicable diseases.

Existing Mitigation Strategies

Building codes, zoning ordinances, and growth and development plans can be used to mitigate power disruptions and to plan mitigation strategies. Building codes can be used to ensure that minimum required construction standards are met to safeguard public health and safety, and can also be used to increase a community's ability to deal with electrical outages by requiring that facilities are adequately prepared for power disruptions. Zoning ordinances can specify the type of land use that is acceptable in various locations in a community, and thus affect the electric power requirements of an area as areas zoned "residential" will have a different electricity profile than areas zoned "commercial" or "industrial."

The City of Santa Clarita has adopted various California State codes. The following description of building codes and design criteria can be found on the City's website (<http://www.santa-clarita.com/Index.aspx?page=554>):

Effective January 1, 2014, the Building and Safety Division of the Department of Public Works began enforcement of the 2013 State Building Codes for all new residential and non-residential construction projects. Projects submitted after January 1, 2014, shall comply with the new codes. Projects submitted prior to January 1, 2014, shall comply with the 2010 state building codes.

Codes:

- 2013 California Building Code
- 2013 California Residential Code
- 2013 California Electrical Code
- 2013 California Mechanical Code
- 2013 California Plumbing Code
- 2013 California Fire Code
- 2010 California Energy Code
- 2013 Calgreen Code

The City of Santa Clarita uses these codes as part of a strategy to mitigate the potential for electrical and other energy outages as well as to ensure public safety. According to the Electrical Power Disruption – Toolkit for Local Government (Cal-OES, 2012):

Local governments can take steps that will improve their ability to cope with electric power disruptions in the longer term. These steps include, but are not limited to, the use of building codes, zoning ordinances, climate action plans and growth and development projections.

CaLEAP

CaLEAP (California Local Energy Assurance Planning) is a California Energy Commission (CEC) sponsored project to assist local governments throughout the State in preparing plans to ensure that key assets are resilient to disaster events that impact energy (California Energy Commission, 2015). The process considers all aspects of Emergency Management (prepare for, respond to, recover from, mitigate against).

CaLEAP Methodology

The diagram below provides an overview of the CaLEAP planning methodology.

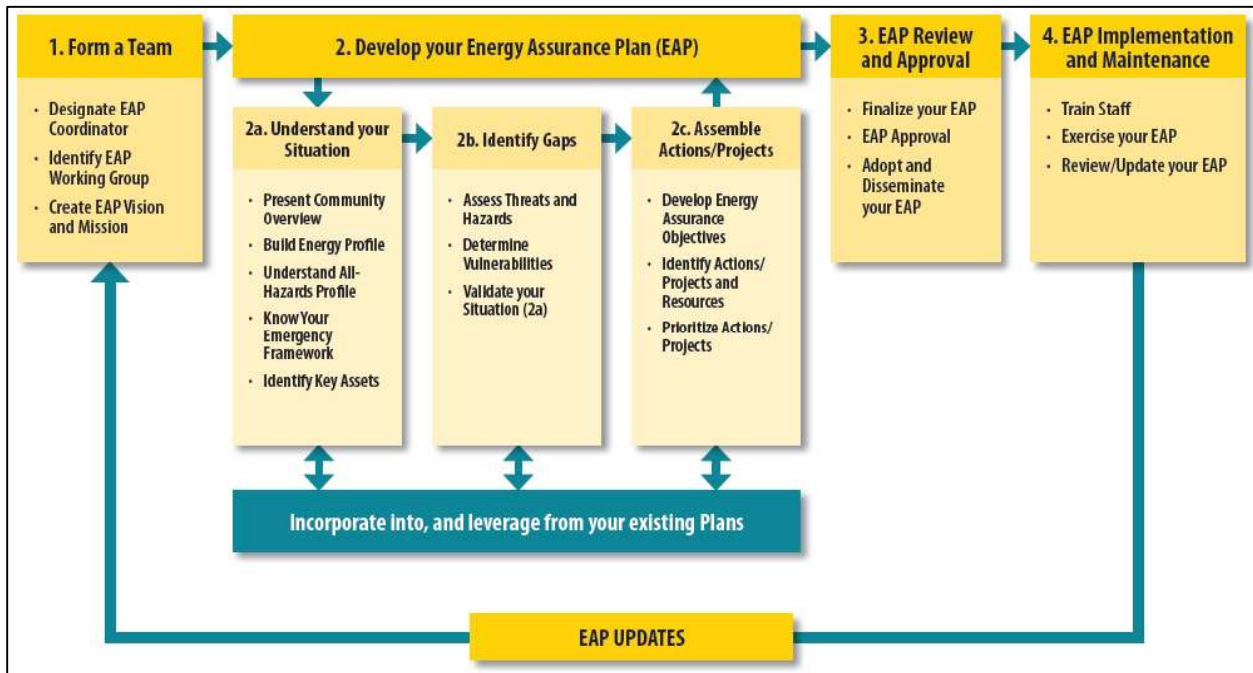


Figure 40: CaLEAP Methodology

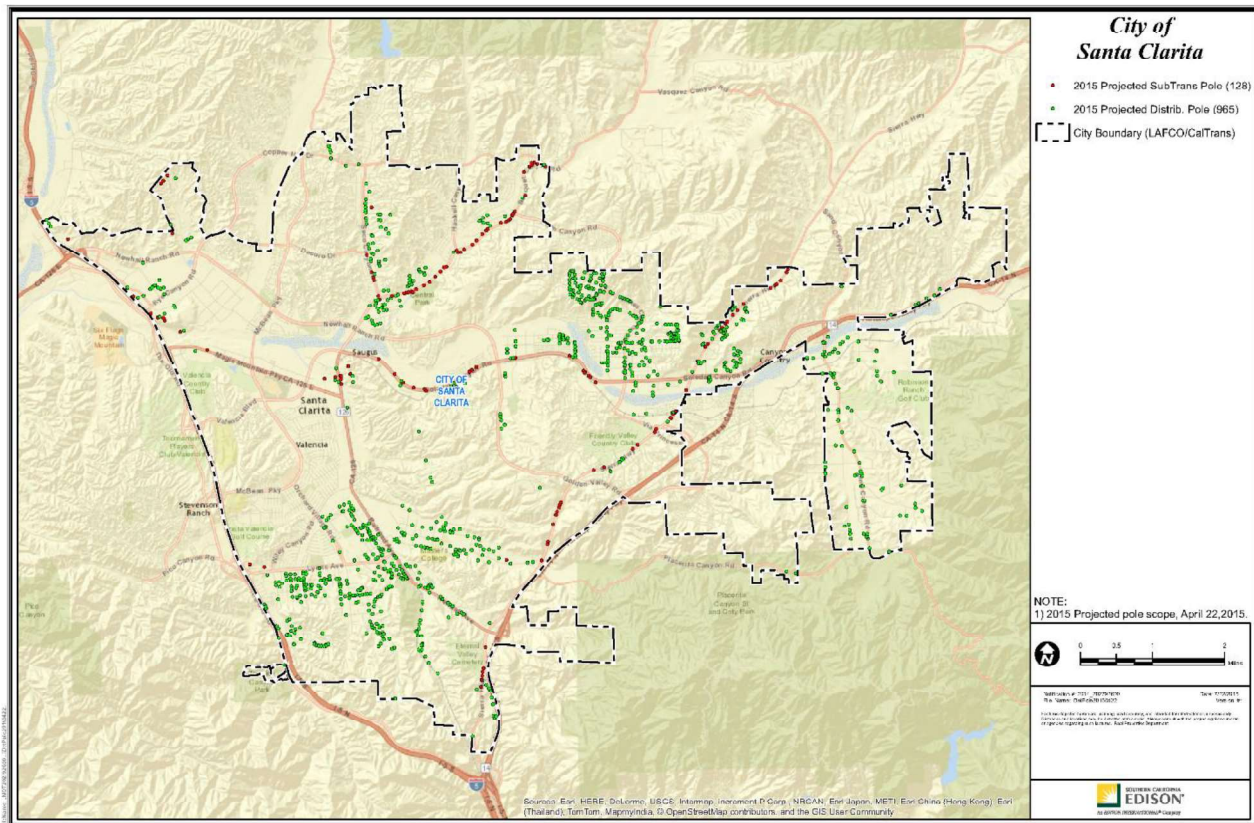
Components of an Energy Assurance Plan

An Energy Assurance Plan (EAP) is an emergency management plan that focuses on energy and the functionality of “key assets” within the community. The EAPs should incorporate an all-hazards approach; meaning that impacts from all potential disasters including manmade incidents (equipment failures, terrorism, sabotage) and natural events (earthquakes, wildfires, floods) are to be considered when analyzing the impacts of energy loss. The focus is more on the effect rather than causes. A comprehensive EAP identifies:

- Energy roles and responsibilities
- Sources and usage of energy
- Energy interdependencies
- Essential services “key assets”
- Vulnerabilities of “key assets” from various disaster events
- Solutions to reduce and/or eliminate the impacts on key assets

Electric Utility Pole Replacement Program

Per Southern California Edison, the Pole Loading, Intrusive Pole Inspection and Pole Remediation programs are part of a 12-year plan to perform pole assessments and replacements of wood, light duty steel, and fiberglass/composite poles in the electrical system and to bring poles into compliance with new, regulated safety standards. Poles are inspected and replaced relative to specified compliance due dates. The number of poles scheduled to be replaced in the system will vary from year-to-year. Within the City of Santa Clarita, SCE has identified 816 poles to be replaced in 2015 and 15 poles in 2016. SCE’s plan is to continue to communicate the scope of work and progress each year to the City as well as to joint pole owners and renters. The map below provides an overview of pole replacement program locations.



Map 34: SCE Pole Replacement Map for Santa Clarita

Energy Disruption Mitigation Strategies and Action Items

The energy disruption mitigation strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from energy disruptions. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP.

Strategy Number	Priority	Timeline	Status
EA001	Moderate	Ongoing	EA001-01: New Project Inspection Complete Remediation Partially Complete
Strategy Description	Power Pole Inspection and Remediation		
Activities	EA001-01: Partner with Southern California Edison to inspect and remediate older wood power poles.		
Coordinating Organization	Public Works, SCE		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund		
Comments	<p>EA001-01: New Mitigation Project (not in previous 2010 HMP)</p> <p>The City has partnered with Southern California Edison's Pole Loading/Intrusive Pole Inspection and Pole Remediation programs. These programs are 12-year plans designed to perform pole assessments and replacements of wood, light duty steel, and fiberglass/composite poles into compliance with new, regulated safety standards. Poles are inspected and replaced relative to specified compliance due dates. The number of poles scheduled to be replaced in the system vary from year to year.</p> <p>Within Santa Clarita, SCE identified 816 poles to be replaced in 2015 and 15 poles for 2016. SCE's plan will be to continue to communicate the scope of work and progress to the City each year as well as to joint pole owners and renters.</p>		

Strategy Number	Priority	Timeline	Status
EA002	Moderate	Ongoing	EA002-02: New Project Ongoing/In Progress
Strategy Description	Natural Gas Pipeline and Infrastructure Mitigation and Improvement		
Activities	EA002-2: Partner with Southern California Gas Company to identify and improve the delivery of gas to the community including the identification of vulnerable infrastructure.		
Coordinating Organization	Public Works, SCG		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund		
Comments	EA-002-02: New Mitigation Project (not in previous 2010 HMP)		

Strategy Number	Priority	Timeline	Status
EA003	Moderate	Ongoing	EA003-03: New Project Ongoing/In Progress
Strategy Description	Mitigate the Impact of Electrical Outages on Special Needs Residents		
Activities	EA003-3: Assess the key vulnerabilities of Special Needs residents and develop a program to mitigate the impact of energy disruptions. <ul style="list-style-type: none"> • Create a program with Southern California Edison to share its database of special needs customers with the City. • Work with CERT members to identify special needs residents in their communities. • Assess the feasibility of a battery back-up program for special needs residents (i.e., people with life safety, medical, and other critical power needs). 		
Coordinating Organization	Emergency Management, Public Safety, Public Works, SCE		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund and/or Grant Funding		
Comments	EA003-03: New Mitigation Project (not in previous 2010 HMP) <ul style="list-style-type: none"> • Addressing the requirements of special needs residents and programs to ensure ongoing power will mitigate the impact of power outages. • Identification of requirements for special needs populations will enable the City to develop specific programs and projects to protect at-risk populations. 		

Strategy Number	Priority	Timeline	Status
EA004	Moderate	Ongoing	EA004-04: New Project Ongoing/In Progress
Strategy Description	Energy Needs and Hazards Public Outreach		
Activities	EA004-04: Promote SNAP participation among residents as part of an annual Public Safety Fair to promote hazard mitigation and preparedness.		
Coordinating Organization	Emergency Management, Public Safety, Public Works, SCE, SCG		
Plan Goals Addressed	Public Awareness Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund		
Comments	EA004-04: New Mitigation Project (not in previous 2010 HMP)		

Strategy Number	Priority	Timeline	Status
EA-005	Moderate	Ongoing	EA005-05: Complete, included in this HMP EA005-06: Complete, included in this HMP EA005-07: Ongoing
Strategy Description	Develop an Energy Assurance Plan in Accordance to the State of California Energy Assurance Planning Framework (per CaLEAP)		
Activities	EA005-05: Identify energy risks and vulnerabilities. EA005-06: Document existing mitigation efforts and responsibilities. EA005-07: Develop and implement new energy assurance strategies. This may include identification of critical City locations and evaluating the potential for installing backup generators.		
Coordinating Organization	Emergency Management, Public Safety, Public Works, SCE, SCG		
Plan Goals Addressed	Public Awareness Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund		
Comments	EA005-05: Complete, included in this HMP EA005-06: Complete, included in this HMP EA005-07: Ongoing: For example, USACE has worked with the City to identify generator hook-up capabilities at key City locations.		

Energy Disruption Resources

American Journal of Public Health

American Public Health Association
800 I Street, NW
Washington, DC 20001

California Local Energy Assurance Planning (CaLEAP)

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814
(916) 651-3747

Electricity Consumers Resource Council

1101 K Street, NW Suite 700
Washington, D.C. 20005
(202) 682-1390

Epidemiology

2897 N. Druid Hills Rd NE, #279
Atlanta, Georgia 30329-3924

Federal Communications Commission

445 12th Street SW
Washington, DC 20554
(888) 225-5322

Injury, International Journal of the Care of the Injured

Elsevier Inc. (Publisher)
245 Peachtree Center Avenue, Suite 1900
Atlanta, GA 30303
(404) 669-9400

National Association of State Energy Officials

2107 Wilson Blvd., Suite 850
Arlington, VA 22201
(703) 299-8800
<http://www.naseo.org>

National University System Institute for Policy Research

11355 North Torrey Pines Road
La Jolla, CA 92037-1011
(858) 642-8498

Southern California Edison

2244 Walnut Grove
Rosemead, CA 91770

Southern California Gas

P.O. Box 3150
San Dimas, CA 91773

SECTION 15. FLOOD

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	3	Likely		Severe
Magnitude / Severity	2	Limited		High
Warning Time	1	More than 24 Hours	○	Moderate
Duration	3	Less than 1 Week		Low
CPRI Rating	2.40	Moderate		

Flood Hazard Information and Background

Flooding in Santa Clarita could occur as a result of any of the following conditions: (1) heavy, prolonged rainfall; (2) the collapse or leakage of a nearby dam; (3) a smaller precipitation event in a degraded watershed or drainage system resulting from a recent fire or excessive grading; and (4) a sudden release of water caused by the rupture of the California aqueduct. In the Santa Clarita Valley the primary flood hazard areas occur in and along natural drainage channels, rivers, washes, and blue-line streams (a stream that flows most or all of the year and is marked on topographic maps with a solid blue line – FEMA).

Santa Clarita enjoys a mild Southern California Mediterranean climate. Winters are temperate and semi-moist, typically in the 40° - 65° range. Although Southern California has experienced drought conditions since 2012, Santa Clarita receives an average of approximately 18 inches of rain per year under normal conditions primarily between the months of November and March (Western Regional Climate Center, 2015). However, flooding is most common October through March during El Niño years which have the potential to bring intense rainfall to the area.

Table 62: Average Total Precipitation (inches)
Period of Record Monthly Climate Summary 07/01/1918 to 01/20/2015

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Total Precipitation (inches)	3.38	3.84	2.98	1.52	0.5	0.1	0.03	0.13	0.3	0.64	1.79	3.04	18.25

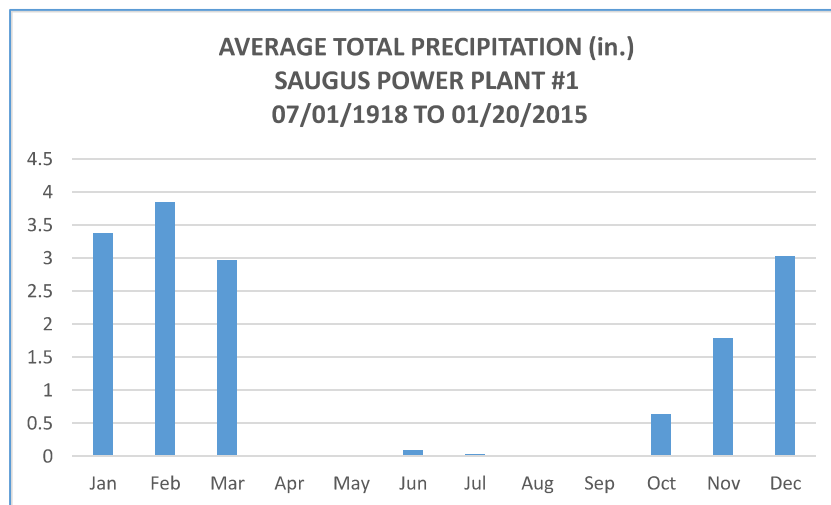


Figure 41: Average Total Precipitation

Flood Terminology

Table 63: Flood Terminology

Flood Term	Definition
100 Year Flood	The 100-year flooding event is the flooding level that has 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. Other similar terms include 50 Year Flood and 500 Year Flood.
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 choose to 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 may serve as base flood elevation for the tie down of mobile homes. The regulations of the National Flood Insurance Program focus on development in the 100-year floodplain.
El Niño and La Niña	<p>El Niño and La Niña are opposite phases of what is known as the <i>El Niño-Southern Oscillation (ENSO)</i> cycle. The ENSO cycle is a scientific term that describes the fluctuations in temperature between the ocean and atmosphere in the east-central Equatorial Pacific (approximately between the International Date Line and 120 degrees West).</p> <p>El Niño means <i>The Little Boy</i>, or <i>Christ Child</i> in Spanish. El Niño was originally recognized by fishermen off the coast of South America in the 1600s, with the appearance of unusually warm water in the Pacific Ocean. The name was chosen based on the time of year (around December) during which these warm waters events tended to occur.</p> <p>El Niño and La Niña episodes typically last nine to 12 months, but some prolonged events may last for years. While their frequency can be quite irregular, El Niño and La Niña events occur on average every two to seven years. Typically, El Niño occurs more frequently than La Niña.</p> <p>Typical El Niño effects are likely to develop over North America during the upcoming winter season. Those include warmer-than-average temperatures over western and central Canada, and over the western and northern United States. Wetter-than-average conditions are likely over portions of the U.S. Gulf Coast and Florida, while drier-than-average conditions can be expected in the Ohio Valley and the Pacific Northwest.</p> <p>La Niña means <i>The Little Girl</i> in Spanish. La Niña is also sometimes called <i>El Viejo</i>, <i>anti-El Niño</i>, or simply "<i>a cold event</i>." La Niña is the <i>cold phase</i> of ENSO. La Niña episodes represent periods of below-average sea surface temperatures across the east-central Equatorial Pacific. Global climate La Niña impacts tend to be opposite those of El Niño impacts. In the tropics, ocean temperature variations in La Niña also tend to be opposite those of El Niño. During a La Niña year, winter temperatures are warmer than normal in the Southeast and cooler than normal in the Northwest.</p>

Flood Term	Definition
Floodplain	A floodplain is a land area adjacent to a river, stream, lake, estuary, or other water body that is subject to flooding. This area, if left undisturbed, acts to store excess floodwater. The floodplain is made up of two sections: the floodway and the flood fringe.
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 floodwater 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. The NFIP floodway definition is “the channel of a river or other watercourse and adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. Floodways are not mapped for all rivers and streams but are generally mapped in developed areas.
Flood Fringe	The flood fringe refers to the outer portions of the floodplain, beginning at the edge of the floodway and continuing outward. This is the area where development is most likely to occur, and where precautions to protect life and property per the NFIP regulations must be met.
Seiche	A seiche is the creation of large waves on a lake or reservoir due to earthquake shaking. They can be triggered by long period ground motion from distant earthquakes, or from ground displacement beneath the body of water. In reservoirs, seiches can generate short-term flooding of downstream areas. In addition, earthquake-induced landsliding can cause seiche-like waves. A seiche may occur at Castaic or Bouquet Dams which could threaten the community of Santa Clarita.

Flood Types

Two types of flooding primarily affect the City of Santa Clarita: riverine flooding and urban flooding. In addition, any low-lying area has the potential to flood. The flooding of developed areas may occur when the amount of water generated from rainfall and runoff exceeds a storm water system's (ditch or sewer) capability to remove it.

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. 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.

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 floodwaters that rise very rapidly and peak with violent force. 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.

The City of Santa Clarita is bisected by the Santa Clara River, the largest Significant Ecological Area (SEA) in the Santa Clarita Valley. It extends through the City of Santa Clarita and along the entire Santa Clara River watershed. The river supports a variety of natural habitats, although a great portion of the river channel remains dry for most of the year. In scattered areas, however, the water table under the stream bed is high and contains lush riparian. The assemblage of vegetation, described as a broad wash association in the SEA descriptions, is unlike that found in steeper mountain canyons and is rare in the Los Angeles basin. The Santa Clara River is the only major river drainage from the San Gabriel Mountains that remains un-channelized for most of its length.

The Santa Clara River which runs through the City of Santa Clarita is susceptible to flooding events. Flooding poses a threat to life and safety, and can cause severe damage to public and private property.

Description of Drainage Area

Physiography and Topography

The Santa Clara River originates in the watershed areas of the San Gabriel Mountain and flows approximately 84 miles westward. It then empties into the Pacific Ocean near Ventura, California, approximately 60 miles northwest of Los Angeles. It drains an area of approximately 1,634 square miles. An estimated 90 percent of the drainage area is mountainous with steep, rocky ridges and numerous canyons. The remaining 10 percent consist of narrow alluvial valleys and coastal plain. Generally, the upper sub basins of various tributaries drain mountainous terrain at substantially steeper slopes than the lower sub basins which traverse a relatively plain area. Three major mountain ridges border on or near the drainage area; namely, Coast Range on the west, Tehachapi Mountains to the north, and San Gabriel Mountains to the south. Maximum elevation occurs within the subject basin at Mount Pinos near the western end of the northern boundary, and is approximately 8,826 feet above Mean Sea Level. Gently sloping alluvial valleys are found along the Santa Clara River downstream from the mouth of Soledad Canyon and along the downstream parts of some of the principal tributaries.

Principal tributaries in the downstream order are:

- Soledad Canyon
- Live Oak Springs Canyon
- Sand Canyon
- Mint Canyon
- Bouquet Canyon
- South Fork of the Santa Clara River
- San Francisquito Canyon
- Castaic Creek

The South Fork, as the name implies, flows into the Santa Clara River from the south. Approximately 90 percent of the drainage area is on the north side of the river. Downstream from Soledad Canyon, the riverbed becomes a wide sandy wash that extends to the ocean. Various other blue-line streams and drainage courses allow flow through the City. The flood hazard areas are identified in Appendix D: Maps of this HMP under Dam Inundation.

Reservoirs and Dams

There are 2 major reservoirs and dams that can impact the City of Santa Clarita. A description of each is provided below along with the potential inundation areas if one or both of these dams fail. It should also be noted that the St. Francis Dam disaster in 1928 did have a catastrophic impact on the area and greatly influenced design requirements and safety regulations for all future dams in the U.S.

Castaic Reservoir Data and Inundation Maps

NIDID	CA00044
Type	Earthen
Capacity	323,700 acre feet
Dam Crest Elevation	1535 feet
Dam Length	5,200 feet
Dam Height	340 feet
Dam Crest Width	40 feet
Year Built	1973
Spillway Gates	Ungated/Unrestricted
Use	Storage, Irrigation, Municipal Water & Recreation
Owned By	California Department of Water Resources

Castaic Reservoir inundation maps, prepared by the California Department of Water Resources, indicate areas of potential flooding in Castaic, Val Verde, and Valencia in the event of a dam failure. Under such conditions, floodwaters would rapidly travel southward, flooding Castaic, Val Verde, and Valencia within 15 minutes. At the Castaic Junction, the flow would cease at Magic Mountain Parkway.



Figure 42: Castaic Reservoir

Bouquet Reservoir Inundation

NIDID	CA00088
Type	Earthen
Capacity	36,505 acre feet
Dam Crest Elevation	3008 feet
Dam Length	1180 feet
Dam Height	190 feet
Dam Crest Width	50 feet
Year Built	1934
Spillway Gates	Ungated/unrestricted
Use	Storage/Municipal Water
Owned By	Los Angeles Department of Water & Power

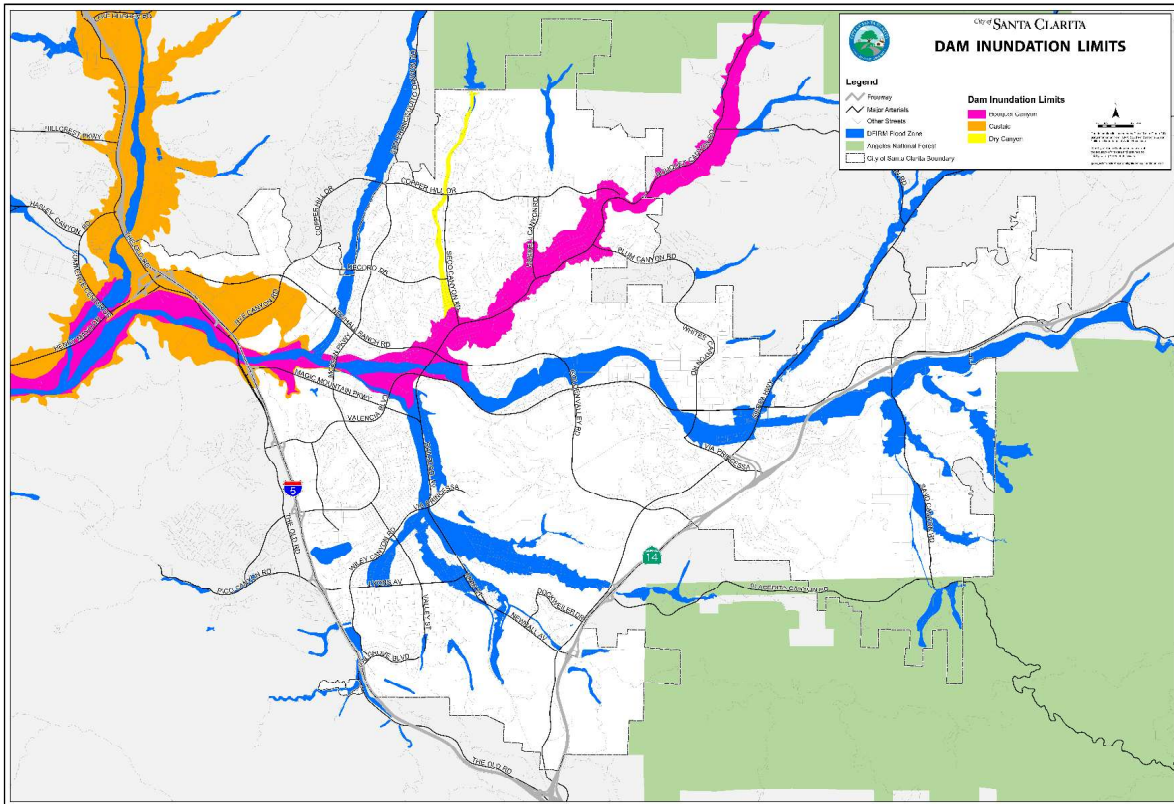
In the event of a failure of the Bouquet Reservoir possible flood areas include Saugus and Valencia. In such a situation, any structure situated north of McBean Parkway in the Bouquet Canyon area at an elevation under 1,200 feet would be exposed to flood waters within 49 minutes of dam failure. This area includes Rosedell Elementary School and Saugus High School and residential areas around King Crest and Alaminos Drive. After flooding down Bouquet Canyon, the floodwaters would enter the Santa Clara River. The water level would rise and likely inundate Newhall Ranch Road and parts of Interstate 5 south of Castaic Junction.



Figure 43: Bouquet Reservoir
 (Kfasimpaur)

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Santa Clarita Area Dam Inundation Map



Map 35: Dam Inundation Map

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National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a Federal program created by Congress to mitigate future flood losses nationwide through sound, community-enforced building and zoning ordinances and to provide access to affordable, federally backed flood insurance protection for property owners. The NFIP is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act (NFIA) of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act (NFIRA) of 1994 and the Flood Insurance Reform Act (FIRA) of 2004.

The NFIP is administered by the Federal Emergency Management Agency (FEMA), a component of the U.S. Department of Homeland Security (DHS). In support of the NFIP, FEMA identifies flood hazard areas throughout the United States and its territories. Most areas of flood hazard are commonly identified on Flood Insurance Rate Maps (FIRMs). A FIRM is an official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

Areas not yet identified by a FIRM may be mapped on Flood Hazard Boundary Maps (FHBMs). Several areas of flood hazards are identified on these maps. One of these areas is the Special Flood Hazard Area (SFHA).

The SFHA is a high-risk area defined as any land that would be inundated by a flood having a 1-percent chance of occurring in a given year (also referred to as the base flood). The high-risk-area standard constitutes a reasonable compromise between the need for building restrictions to minimize potential loss of life and property and the economic benefits to be derived from floodplain development. Development may take place within an SFHA, provided that development complies with local floodplain management ordinances, which must meet the minimum Federal requirements. Flood insurance is required for insurable structures within high-risk areas to protect Federal financial investments and assistance used for acquisition and/or construction purposes within communities participating in the NFIP.

Flood is defined in the Standard Flood Insurance Policy (SFIP), in part, as: A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is your property) from overflow of inland or tidal waters, from unusual and rapid accumulation or runoff of surface waters from any source, or from mudflow.

The National Flood Insurance Act of 1968 allows FEMA to make flood insurance available only in those areas where the appropriate public body has adopted adequate floodplain management regulations for its flood-prone areas. Individual citizens cannot regulate building or establish construction priorities for communities. Without community oversight of building activities in the floodplain, the best efforts of some to reduce future flood losses could be undermined or nullified by the careless building of others. Unless the community as a whole is practicing adequate flood hazard mitigation, the potential for loss will not be reduced sufficiently to affect disaster relief costs. Insurance rates also would reflect the probable higher losses that would result without local floodplain management enforcement activities.

Participation in the NFIP is based on an agreement between local communities and the Federal Government that states that if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses.

The City of Santa Clarita participates in the National Flood Insurance Program as listed in the FEMA Community Status Book Report (FEMA, 2015) and the ongoing eligibility requirements are specified under 44CFR§59.21.

Table 64: FEMA Community Status Book Report: California

CID	Community Name	County	Init FHBM Identified	Init FIRM Identified	Curr Eff Map Date	Reg Emer Date	Tribal
060729	SANTA CLARITA	LOS ANGELES	10/24/78	09/29/89	09/26/08	03/23/89	No

Source: <http://www.fema.gov/cis/CA.html>

Flood Maps and Flood Insurance Studies

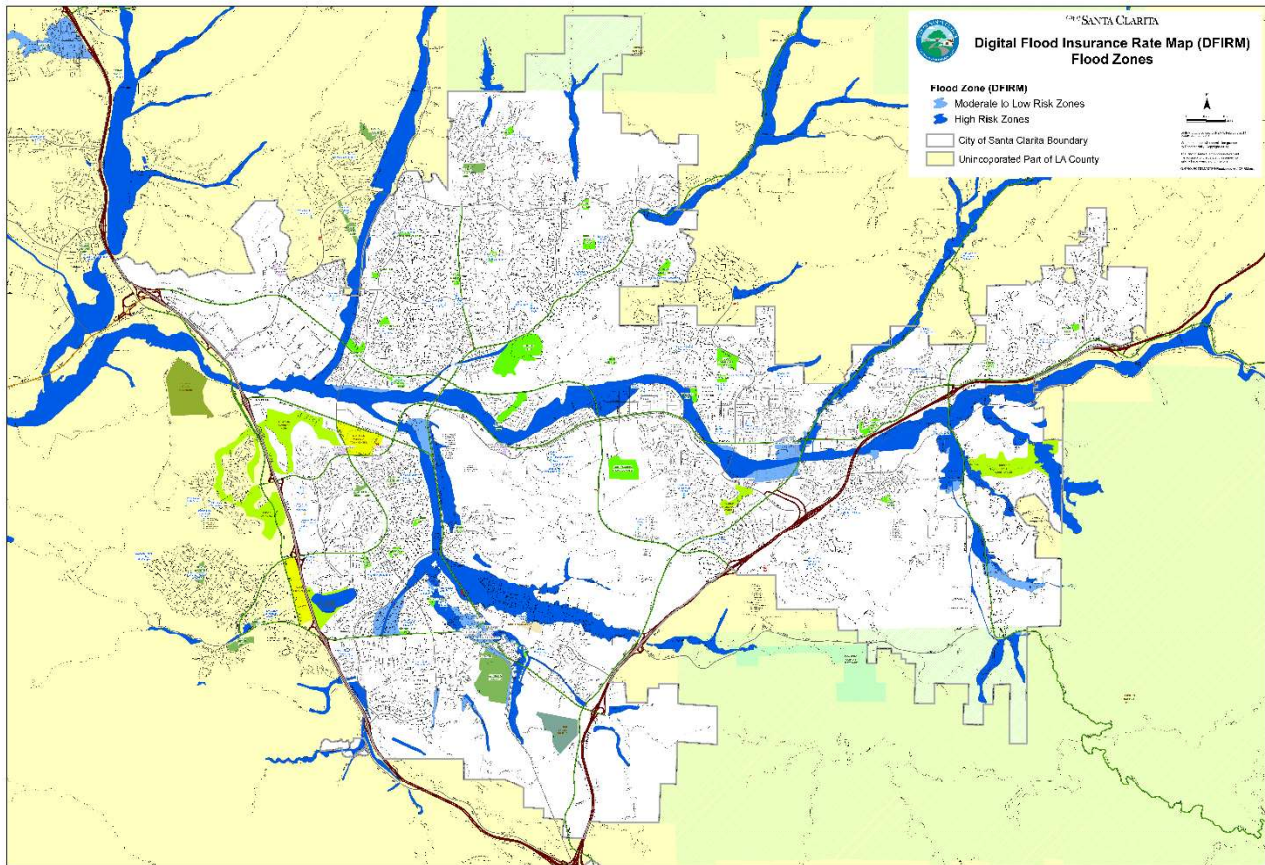
Flood maps and Flood Insurance Studies (FIS) are often used to identify flood-prone areas. The National Flood Insurance Program (NFIP) was established in 1968 as a means of providing low-cost flood insurance to the nation’s flood-prone communities. The NFIP also reduces flood losses through regulations that focus on building codes and sound floodplain management. NFIP regulations (44 Code of Federal Regulations Chapter 1, Section 60, 3) require that all new construction in floodplains must be elevated at or above base flood level. Furthermore, the City of Santa Clarita has municipal codes that provide for the protection of residential and non-residential structures in Flood Hazard Areas.

Flood Insurance Rate Maps (FIRM)

A Flood Insurance Rate Map (FIRM) is an official map produced by FEMA that delineates communities where NFIP regulations apply. FIRMs are used by insurance agents and mortgage lenders to determine if flood insurance is required and what insurance rates should apply.

FIRMs combine water surface elevations with topographic data to illustrate areas that would be inundated during a 100-year flood, floodway areas, and elevations marking the 100-year flood level. In some cases they also include base flood elevations (BFEs) and areas located within the 500-year floodplain. Flood Insurance Studies and FIRMs produced for the NFIP provide assessments of the probability of flooding at a given location. However, it is important to note that these studies and maps represent flood risks at a point in time and do not incorporate subsequent floodplain changes due to new development or other changes in the geography of the area.

All Special Flood Hazard Areas (SFHAs) are all zones beginning with the letter A (A, AE, AO, AH) and are considered the 100-year or high risk zones. The 500-year or X zones and the D zones are considered low-to-medium risk zones.



Map 36: DFIRM Flood Zone Map for the City of Santa Clarita

(City of Santa Clarita, GIS, 2015)

Revisions to the DFIRMs were accepted by FEMA (April 25, 2011 and August 9, 2013). These changes were made to account for changes in the local area.

Repetitive Loss Properties

The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP). The definition of severe repetitive loss as applied to this program was established in section 1361A of the national Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- (a) That has at least four (4) NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than ten (10) days apart.

The primary objective of the Repetitive Loss Properties Strategy is to eliminate or reduce the damage to properties and the disruption of life caused by repeated flooding of the same properties. Specific target groups of repetitive loss properties are identified and serviced separately from other NFIP policies by the Special Direct Facility (SDF). If the property is mitigated for flood issues, the property will be removed from the target group at the next policy renewal, and the policy then will be transferred from the SDF to the Write Your Own (WYO) company that previously serviced the policy.

Depending on individual circumstances, appropriate mitigation measures commonly include elevating buildings above the level of the base flood, demolishing buildings, and removing buildings from the Special Flood Hazard Area. Mitigation can include local drainage-improvements that meet NFIP standards.

Santa Clarita Repetitive Loss Properties

In terms of the City of Santa Clarita, three properties within the City experienced repeated flooding and were considered by FEMA as repetitive loss properties. Repetitive loss properties include every NFIP insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced. In the case of all three properties, the homeowner's mitigated the flooding issues and have since been removed from the repetitive loss list by FEMA as of June 2011 (see summary below). Consequently as of September 2015, there are no listed repetitive loss properties in the City of Santa Clarita.

- One of the repetitive loss properties is located in the Newhall area of Santa Clarita. The flooding was a result of the property's inability to adequately absorb all of the water from heavy rains. A storm drain channel was constructed directly adjacent to that property draining stormwater from this, and all adjoining neighborhoods in this sub-basin of Newhall, and drains into the South Fork of the Santa Clara River. The mitigation information was received by FEMA and the property is no longer considered a repetitive loss property as of March 1990.

- The second property is located in the Canyon Country area of Santa Clarita. The flooding was a result of improper grading and blockage of drainage paths. The owner of the property re-graded the entire lot and installed drainage swales and area drains to convey the stormwater directly to the storm drain system. The mitigation information was received by FEMA and the property is no longer considered a repetitive loss property as of January 2005.
- The third property is located in the Valencia area of Santa Clarita. The flooding was a result of improper grading and a lack of adequate drainage facilities in the rear yard of the residence. The owner of the property re-graded the backyard, installed area drains, and an underground pipe that conveys the water to the front connected to the storm drain system. The mitigation information was received by FEMA and the property is no longer considered a repetitive loss property as of June 2011.

History of Flood Events

Los Angeles County Flood History

The following table provides a listing of major flood events (Disaster Declarations for Los Angeles County (FEMA, 2015) that have occurred in Los Angeles County since 1965. Note: recent drought conditions have resulted in a lack of flooding in the area. Nevertheless, the potential for future flooding still exists.

Table 65: Major Flood Events in Los Angeles County

Declaration Date	FEMA Disaster Number	State	Federal	Disaster Description
03/08/10	1884	Yes	Yes	Severe Winter Storms, Flooding, and Debris and Mud Flows
04/15/05	1585	Yes	Yes	Severe Storms, Flooding, Landslides, and Mud/debris slides
02/04/05	1577	Yes	Yes	Severe Storms, Flooding, Debris Flows, and Mudslides
02/09/98	1203	Yes	Yes	Severe Winter Storms and Flooding
03/12/95	1046	Yes	Yes	Severe winter storms, flooding, mud/landslides
01/10/95	1044	Yes	Yes	Severe winter storms, flooding, mud/landslides
10/28/93	1005	Yes	Yes	Fires, mudslides, flooding, soil erosion
2/3/93	979	Yes	Yes	Severe Storm, Winter Storm, Mud & Landslides, Flooding
2/25/92	935	Yes	Yes	Severe winter storm
2/9/83	Unknown	Yes	Yes	Flood/Winter Storms

Declaration Date	FEMA Disaster Number	State	Federal	Disaster Description
2/9/83	677	Yes	Yes	Flood, Severe Storm
2/21/80	615	Yes	Yes	Flood
2/15/78	Unknown	Yes	Yes	Severe Storm
2/1/73	Unknown	Yes	No	High Ocean Tides and Wind-driven waves
2/23/73	364	Yes	Yes	Coastal Flooding
5/19/71	Unknown	Yes	No	High Ocean Tides and Wind-driven waves
1/26/69	Unknown	Yes	Yes	Flood, storms
12/7/65	Unknown	Yes	Yes	Flood, Severe Storm

Santa Clarita Flood History

Localized flooding has been experienced intermittently in some areas of the Santa Clarita Valley due to local drainage conditions. During heavy rains some areas of Castaic, Newhall, Friendly Valley, and Bouquet Canyon have experienced mudflows or flooding.

Two areas of the City of Santa Clarita that are known to experience intermittent flooding are portions of Placerita Canyon and Sand Canyon. During storm events, transmission of storm flows within the street right-of-way may cause localized flooding in these areas, rendering some roads impassable.

Throughout most areas of the City, curbs and gutters have been designed to contain and carry storm flows into drainage structures; in these areas stormwater within the street that is contained by the curbs is an indication that the combined roadway-drainage system is functioning correctly. In areas of new development, major drainage improvements will be constructed by developers as part of the infrastructure requirements for new master-planned communities. Portions of Sierra Highway north of the Santa Clara River are subject to flooding from Mint Canyon. The lack of adequate flood control facilities in this area represents the last major constraint to development along this arterial corridor in Canyon Country.

Per the City of Santa Clarita General Plan: Safety Element (City of Santa Clarita, Planning Department, 2011), *“it is expected that new development along Sierra Highway will generate requirements for flood control improvements in this area. Within both jurisdictions, localized, short-term flooding resulting from excessive rainfall, soil erosion resulting from wildland fires, or inadequate local drainage infrastructure will be addressed by providing or requiring local improvements as needed”*.

The following flood events had a direct impact on the City of Santa Clarita and nearby areas.

Year	Flood Event Description
1928 St. Francis Dam Disaster	Construction began on the 600-foot-long, 185-foot-high St. Francis Dam in August 1924. With a 12.5 billion-gallon capacity, the reservoir began to fill with water on March 1, 1926. On March 12, 1928, the dam failed, sending a 180-foot-high wall of water crashing down San Francisquito Canyon, washing out the original Santa Clara River Bridge and parts of Piru, Fillmore, Santa Paula, Montalvo, Saticoy, and Ventura. An estimated 470 people were dead by the time the floodwaters reached the Pacific Ocean south of Ventura 5 1/2 hours later. It was the second-worst disaster in California history, after the great San Francisco earthquake and fire of 1906, in terms of lives lost. Damages were estimated at \$862.2 million (year 2010 dollars). This event pre-dates Santa Clarita cityhood.
1983 El Nino	In January and February of 1983, the Sand Canyon Road Bridge was washed out by El Nino floods. This event pre-dates Santa Clarita cityhood.
1992 Winter Storms/1992 Late Winter Storms	<p>The winter storms in February of 1992 resulted in flooding, rainstorms, and mud slides in the City of Santa Clarita. FEMA declared parts of Los Angeles County a disaster area on February 12, 1992 (FEMA 935-DR-CA).</p> <p>In December of 1992, rain and high winds resulted in FEMA declaring Los Angeles County a disaster area on February 19, 1993 (FEMA 979-DR-CA). Impacts from these two storm events combined included:</p> <ul style="list-style-type: none"> • The evacuation of a mobile home park , due to debris being blocked from the run-off into the culvert off of the Gavin pass and directly impacting the Wiley Canyon Stream which is adjacent to a farm and mobile home park. The City engaged in debris removal and protective measures to restore the site. Subsequent projects realigned the road and mitigated drainage issues. • City Park, Canyon Country Park suffered damage to the lower part of a slope which sloughed off. City installed French drains to mitigate this from happening again. • Roadway flooding occurred along the Soledad Canyon Corridor by the Saugus Speedway. City added riprap embankments along with an adjacent trail system to lessen the flooding hazard. • A complete drainage system was developed by the City, and Los Angeles County to mitigate drainage issues from the Sand Canyon Area to prevent road closure occurrences (there was only one egress in the Canyon). • Ongoing mitigation activities of the Soledad Canyon road way–ongoing work. • A dewatering project by the community near the riverbed.

Year	Flood Event Description
1995 Severe Winter Storms	<p>In January of 1995, severe winter storms resulted in FEMA declaring Los Angeles County a disaster area on January 6, 1995 (FEMA 1044-DR-CA). Impacts from this storm event included:</p> <ul style="list-style-type: none"> • Extreme runoff of the Newhall creek, following a brush fire. • Emergency excavation of debris from the stream channel, preventing potential flooding and wash out of a mobile park. The excavation assisted with the future development of a park along the river embankment.
1995 Late Winter Storms	<p>In February of 1995, late winter storms resulted in FEMA declaring Los Angeles County a disaster area on March 12, 1995 (FEMA 1046-DR-CA).</p>
1998 El Nino	<p>In February of 1998, the El Nino condition resulted in FEMA declaring Los Angeles County a disaster on February 9, 1998 (FEMA 1203-DR-CA). Impacts from this storm event included a washout of the Bouquet Canyon Bridge (a key arterial roadway within the City). Water from the Santa Clara River beat against abutments of the bridge caused a sinkhole on the bridge. Mitigation activities included the widening of the bridge.</p>
2005 Severe Storms	<p>In January and February of 2005, severe storms resulted in a Federal declaration of a disaster for Los Angeles County (FEMA 1577-DR-CA). Public damages were approximately \$1.8 million while residents suffered approximately \$4 million. The winter storms resulted in the loss of one mobile home on the Santa Clara River, and the loss of trails and paths along the Santa Clara River and several tributaries. Significant damage and flooding occurred to a mobile home park adjacent to Newhall Creek. Fast moving water gushed through the Polynesian Mobile Home Park causing 150 residents to evacuate from the mobile home park for several days. No serious injuries were reported (Jia-Rui Chong, Amanda Covarrubias and Richard Fausset, Los Angeles Times, 2005).¹⁸ In all 38 mobile homes were red tagged, 15 mobile homes were destroyed, 5 residential homes were red tagged due to landslide potential. Building and Safety surveyed 31 residential sites regarding debris flow, hillside slope movement, landslides, culverts and property damage.</p>
2010 Severe Storms	<p>In January and February of 2010, severe winter storms, flooding, and debris and mud flows resulted in a Federal declaration of a disaster for Los Angeles County (FEMA 1884-DR). Impacts from this storm event included:</p> <ul style="list-style-type: none"> • Typical roadway debris and tree removal. • Slope erosion at the City’s Sports Complex—Water erosion caused some hill sloughing, causing debris to impact recreational area and the pools.

¹⁸ Jia-Rui Chong, Amanda Covarrubias and Richard Fausset. "3 Killed as Unrelenting Storms Batter Southland", *Los Angeles Times*, Jan. 10, 2005.

Flood Probability, Frequency, Magnitude, and Potential Damage

100-Year and 500-Year Flood Probability and Frequency

Some areas of the City of Santa Clarita are located in 100-year and 500-year floodplains as indicated on Map 36: DFIRM Flood Zone Map for the City of Santa Clarita. Detailed Flood Insurance Rate Map (FIRM) are available directly from the FEMA Flood Map Service Center (<https://msc.fema.gov>). The 100-year and 500-year recurrence intervals indicate a 0.01 and 0.002 annual probability of a flooding event, respectively. Although the recurrence interval represents the long-term average period between floods of specific magnitude, significant floods could occur at shorter intervals or even within the same year.

Flood Vulnerabilities

Potential Magnitude of Floods

The primary effect of flooding is the threat to life and property. People and animals may drown; structures and their contents may be washed away or destroyed; roads, bridges, and railroad tracks may be washed out; and crops may be destroyed. Furthermore, mudslides and sinkholes may occur causing the potential for further loss of life, infrastructure damage, and property losses.

Floods may also create health hazards due to the discharge of raw sewage from damaged septic tank leach fields, sewer lines, and sewage treatment plants and due to flammable, explosive, or toxic materials carried off by flood waters. In addition, vital public services may be disrupted.

Potential Flood Damages

Buildings in High Risk Flood Zones

The City’s Technology Services Division, GIS Group used the FEMA FIRM data and the City’s own GIS data to identify the structures that lie within the flood hazard zones. It is understood that if a structure is identified in a flood hazard area that it has a higher probability of being impacted by a flood than a structure that is not in the flood hazard area. The table below identifies these structures in the city’s flood hazard zones.

Table 66: Building Count and Valuation in Flood Zones by General Occupancy Type

Occupancy Type	# of Buildings in High Risk Flood Zone	Valuation of Buildings in High Risk Flood Zone	# of Buildings in Low Medium Risk Flood Zone	Valuation of Buildings in Low Med. Risk Flood Zone
Commercial	275	\$46,527,310	7	\$1,463,533
Industrial	271	\$120,996,246	1	\$0
Mixed Use	89	\$12,943,773	112	\$216,497,164
Residential	1,466	\$507,344,197	1,216	\$836,465,153
Special Plan	143	\$7,822,400	249	\$42,966,207
Open Space	69	\$21,974,708	1	\$0
Other (Public / Institutional)	154	\$26,249,612	41	\$2,807,740
TOTAL	2,467	\$743,858,246	1,627	\$1,100,199,797

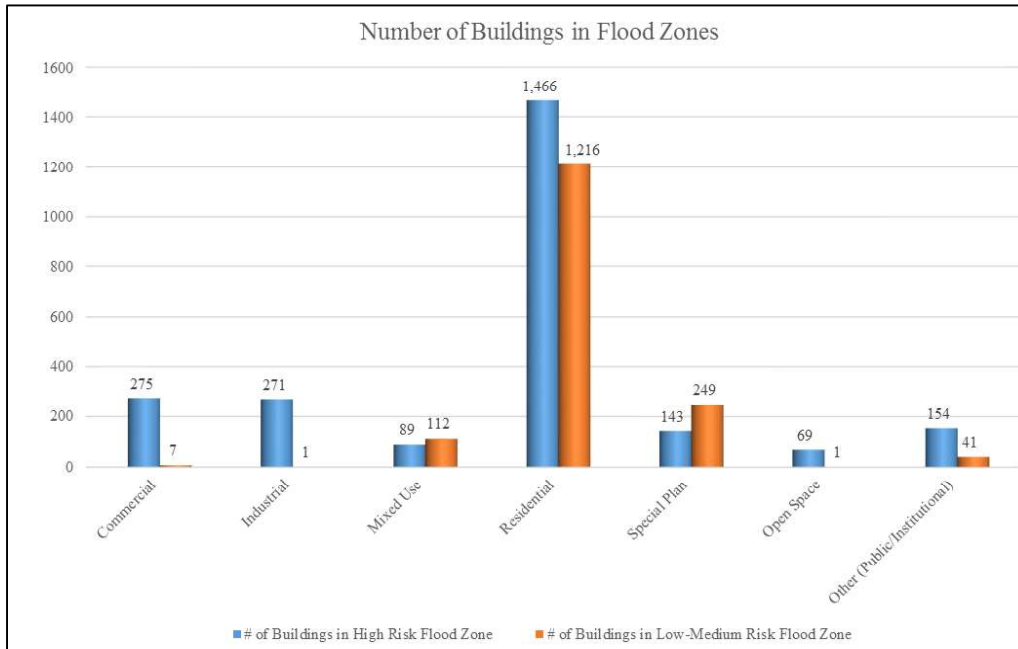


Figure 44: Number of Buildings in Flood Zones

Estimated Flood Damage

In the event of flooding, the following estimate has been developed based on the number of properties by type in Santa Clarita. The purpose of the estimate is to provide an example for planning purposes. The estimate is based on damage to 1% of properties in High Risk areas and 0.5% of properties in Medium/Low Risk areas.

Table 67: Estimate of Flood Damage by Occupancy Type

Occupancy Type	Number of High Risk Properties Damaged if a 1% Loss Occurs	Valuation of Properties Damaged if a 1% Loss Occurs	Number of Low/Med. Risk Properties Damaged if a 0.5% Loss Occurs	Valuation of Properties Damaged if a 0.5% Loss Occurs
Commercial	3	\$465,273	0.05	\$7,318
Industrial	3	\$1,209,962	0.00	\$0
Mixed Use	1	\$129,438	0.50	\$1,082,486
Residential	15	\$5,073,442	5.92	\$4,182,326
Special Plan	1	\$78,224	1.09	\$214,831
Open Space	1	\$219,747	0.00	\$0
Other (Public / Institutional)	2	\$262,496	0.20	\$14,039
TOTAL	25	\$7,438,582	7.76	\$5,500,999

Existing Flood Mitigation Activities

Flood Mitigation Codes and Ordinances

The City has adopted measures which govern development in the floodplain areas. The following table provides a summary of applicable codes and ordinances.

Table 68: Flood Mitigation Codes and Ordinances

Reference	Description
Chapter 18.01 of the Santa Clarita Municipal Code	Chapter 18.01 of the Santa Clarita Municipal Code includes Flood Resistant Construction requirements (effective on all new building permit applications received by the City on or after January 1, 2014) and is current through Ordinance 15-5 passed June 23, 2015.
Ordinance No. 08-11	Ordinance No. 08-11 is the City’s Floodplain Management Ordinance. It was adopted in compliance with FEMA and the National Flood Insurance Program. City Resolution No. 88-93 establishes and assures compliance with Section 44 of the Code of Federal Regulations and other floodplain management requirements.
Chapter 11.60 of the Los Angeles County Code	The City has adopted Chapter 11.60 of the Los Angeles County Code by reference. This chapter adopts floodway maps, governs construction within floodways, and establishes water surface elevations. The floodway maps are more precise and more restrictive than the Flood Insurance Rate Maps (FIRMs). The maps designate floodway areas in which no construction is allowed and flood fringe areas where construction is allowed upon complying with all applicable flood-proofing requirements. The ordinance and maps provide greater control over new developments and assures more adequate protection from flood hazards. FEMA is undergoing new Flood Insurance Studies (FIS) for the Santa Clara River and its major tributaries and these studies will be used to develop new FIRMs with regulatory floodways to be adopted in 2017. These maps will supersede the Los Angeles County floodway maps but the Los Angeles County floodway maps will still be used in floodplain areas not restudied by FEMA.
Uniform Building Code (UBC)	The City has also adopted the Uniform Building Code (UBC), which has provisions for flood hazard areas. Section 308(a) of the UBC requires the proposed buildings and walls to comply with Title 44 of the Code of Federal Regulations and the floodway ordinance prior to issuance of permits.
Building Code Section 308(b)	Building Code Section 308(b) addresses geologic hazards. It prohibits the construction of buildings in areas, which are subject to hazard from landslide, settlement, or slippage from loose debris, slope wash, and mud flows. It requires all proposed structures to be reviewed and to be determined to be geologically safe. Where the applicant cannot demonstrate that the building will be safe, the Building Official may deny issuance of a permit.
Chapter 10.06 of the Municipal Code	Chapter 10.06 of the Municipal Code is the Floodplain Management Ordinance. This chapter prohibits any obstructions, alterations, and encroachments within channels, rivers, and washes.

Santa Clara River Plan

The Santa Clara River Plan was adopted to ensure that adequate flood control protection is maintained by encouraging the use of non-structural flood and erosion control techniques whenever possible, and the use of structural flood and erosion control techniques when necessary.

The wide, dry natural river bottom and occasional riprap or concrete face levees, typifies the physical character of the Santa Clara River. Throughout most of the year, the river appears to be a non-threatening dry river wash. However, citizens who experienced the 1969 flood will testify to the river's devastating power that threatened human lives and property. The desire to maintain the river's natural character, yet provide adequate safety through the use of appropriate non-structural flood/erosion control measures, requires a commitment that future planning decisions respect the river's potential threat.

Objectives

- Prohibit human-made structures within the floodway and adjacent riparian and wetland areas, unless it can be demonstrated to significantly benefit the public's health, safety, and welfare.
- Maintain the natural character of the river.
- Utilize recreational features that are compatible with the floodplain storage needs.

Additionally, impacts to any wetlands will require at a minimum, filing a Section 1603 Agreement application. Impacts to non-vireo habitat totaling more than one will also require either a nationwide permit or individual permit under the 404 guidelines.

Los Angeles County Flood Control District

Many existing storm drains and drainage facilities are located within the City. The Los Angeles County Flood Control District (LACFCD) is responsible for regular maintenance and routine inspections of these facilities and systems. The City entered into an agreement with the LACFCD on March 14, 1989, to allow the transfer and maintenance of all new storm drains constructed within the City. The agreement states that the Flood Control District is authorized by the Flood Control Act to accept the transfer and conveyance of flood control facilities for the operation maintenance and repair. The City requires that all new drains and facilities be constructed to LACFCD flood control improvement standards. The new facilities are routinely transferred over to the Flood Control District upon completion. The City's Public Works - Storm Water Group maintains a small percentage of City storm drains.

Santa Clarita Emergency Management

Emergency Preparedness Coordinator

Since 1989, the City of Santa Clarita has had a full time Emergency Preparedness Coordinator. The City's Emergency Management Coordinator is responsible for maintaining the Local Hazard Mitigation Plan and Emergency Response Plan as well as the City's Emergency Operations Plan. Duties also include coordinating with federal, state, and local agencies during response and recovery operations. Finally the Emergency Response Coordinator provides education and training to City officials and staff on the Emergency Operating Center.

Multi-Hazard Functional Plan and Emergency Operations Plan

The “Multi-Hazard Functional Plan” has been submitted to the State of California Office of Emergency Services (Cal-OES) and addresses the City’s preparedness, response, recovery, and mitigation in the event of a major disaster. Disasters incorporated into the plan include flooding, dam failure, major earthquake, hazardous materials incident, national security emergency, transportation incident, and major fires in either the wild land or urban areas. The Multi-Hazard Functional Plan is consistent with the Los Angeles County Emergency Operations Plan, the Standardized Emergency Management System and the National Incident Management System.

Federal Resources

National Flood Insurance Program (NFIP)

The three components of the National Flood Insurance Program (NFIP) are:

- Flood Insurance
- Floodplain Management
- Flood Hazard Mapping

Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary.

Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Flood damage is reduced by nearly \$1 billion a year through communities implementing sound floodplain management requirements and property owners purchasing of flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance.

In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps the Nation's floodplains. Mapping flood hazards creates broad-based awareness of the flood hazards and provides the data needed for floodplain management programs.

Flood Insurance Rate Maps (FIRM) and Flood Insurance Studies (FIS)

Floodplain maps are the basis for implementing floodplain regulations and for delineating flood insurance purchase requirements. A Flood Insurance Rate Map (FIRM) is the official map produced by FEMA, which delineates SFHA in communities where NFIP regulations apply. FIRMs are also used by insurance agents and mortgage lenders to determine if flood insurance is required and what insurance rates should apply. Water surface elevations are combined with topographic data to develop FIRMs. FIRMs illustrate areas that would be inundated during a 100-year flood, floodway areas, and elevations marking the 100-year-flood level. In some cases they also include base flood elevations (BFEs) and areas located within the 500-year floodplain. Flood Insurance Studies and FIRMs produced for the National Flood Insurance Program provide assessments of the probability of flooding at a given location. Development Services Division Floodplain Management Review Requirements. Copies of Santa Clarita DFIRMs are available from the FEMA Flood Map Service Center (<https://msc.fema.gov>).

California Department of Water Resources Review

California Department of Water Resources reviewed the City policies and procedures regarding implementation of the local floodplain management regulations on April 30, 1992. A report was issued on May 11, 1992, which commended the City and staff on the excellent work in implementing the National Flood Insurance Program. The findings of the report indicated that there were no problems with the regulations, enforcement, programs, or data currently being used by the City. The City undergoes a review of the program approximately every five years and has continued to meet the requirements and remain in compliance.

Santa Clarita Floodplain Management

Development Proposal Reviews

The Development Services Division of the Public Works Department reviews all development proposals for compliance with flood regulations. Any project within a **Special Flood Hazard Area (SFHA)** must meet floodplain management regulations and comply with applicable flood ordinances and policies. Development and construction requirements are established for each project through conditions of approval. All conditions must be met prior to occupancy of the structure.

All structures are required to be located outside of the floodway. Structures proposed to be built in the flood fringe area are required to be elevated and/or adequately protected and must comply with FEMA and City design standards. Structures finished floors must be elevated a minimum of one foot above the Base Flood Elevation. Elevation certificates must be provided and are kept on file in the Development Services Division.

Storm Drain Management

The Santa Clarita Department of Public Works is responsible for storm drain management within the City. All storm drains and drainage devices must be constructed per Los Angeles County Flood Control Design Standards. Plans for those projects are submitted to the County for review and approval. Upon construction of the storm drains, the drains are transferred to the Los Angeles County Flood Control District for maintenance.



Figure 45: Storm Drain Debris Mitigation

Community Rating System

The City of Santa Clarita has participated in the Community Rating System (CRS) since 2001. The CRS is a voluntary program for National Flood Insurance Program (NFIP) participating communities. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. The CRS has been developed to provide incentives in the form of premium discounts for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. The NFIP's CRS program ranks Cities according to outreach conducted and flood protection provided for residents in floodplains. Since Santa Clarita's inception to the CRS program in 2001, the City maintained a class 9 rating, giving community members a 5 percent reduction in federal flood insurance premiums.

Due to City of Santa Clarita staff efforts and outreach in 2009, the NFIP improved Santa Clarita's "Community Rating" from a "9" to an "8" in the NFIP CRS, resulting in a 5 percent increase in discounts applied to flood insurance policies. Community members residing in local floodplains areas were receiving a 10 percent discount on new federal flood insurance policies written after the new rating went into effect on October 1, 2009. Due to additional efforts by staff, the rating was lowered from an "8" to a "7" (May 2014). Community members residing in floodplain areas now receive a 15 percent discount on flood insurance policies.

Information regarding the Flood Insurance Program and Community Rating System is provided to the public via the City of Santa Clarita website. The site also contains links regarding floodplain management, FIRM updates, and mitigation resources.

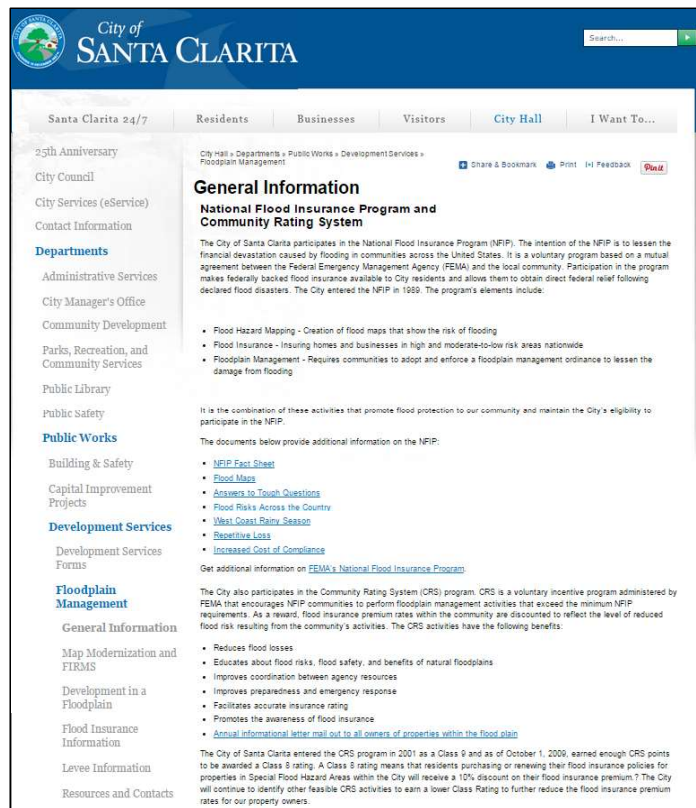


Figure 46: Santa Clarita Flood Information Web Page

Flood Mitigation Strategies and Action Items

The flood strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from flood events. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP.

Strategy Number	Priority	Timeline	Status
F001	High	Ongoing	F001-01: Ongoing F001-02: Ongoing
Strategy Description	Continue Participation in Floodplain Management and Flood Mitigation Programs.		
Activities	F001-01: Continue the participation in the National Flood Insurance Program (NFIP). F001-02: Continue in the participation of the Community Rating System (CRS). This program consists of additional "activities" which are all defined by FEMA and have points associated with each activity.		
Coordinating Organization	Public Works Dept., Developers, Homeowners, and FEMA		
Plan Goals Addressed	Protect Life and Property Natural Systems Emergency Services		
Funding Source	General Fund		
Comments	F001-01 and F001-02: Santa Clarita is good member in-standing in NFIP and received updated April 2015 information on NFIP program changes. FEMA conducted a five-year audit in December 2011 and the City remains in good standing.		

Strategy Number	Priority	Timeline	Status
F002	High	Ongoing	F002-03: Completed F002-04: Completed
Strategy Description	Lower CRS Rating		
Activities	<p>F002-03: Research CRS activities to apply for credit to lower CRS rating from 9 to 8 to further educate public on flood hazards, reduce flooding potential and reduce property owners flood insurance premiums an additional 5% lower than the class 9 discount.</p> <p>F002-04: Research CRS activities to apply for credit to lower CRS rating from 8 to 7 to further educate public on flood hazards, reduce flooding potential and reduce property owners flood insurance premiums an additional 5% lower than the class 8 discount.</p>		
Coordinating Organization	Public Works Dept., FEMA, Cal-OES, Insurance Services Office		
Plan Goals Addressed	Protect Life and Property Public Awareness Natural Systems Partnerships and Implementation		
Funding Source	General Fund		
Comments	<p>F002-03: Goal has been completed and approved as of October 1, 2009.</p> <p>F002-04: FEMA completely overhauled the CRS program, issued a new CRS Coordinator Manual in March 2012, and changed the activity point structure.</p> <p>A five year audit was performed in 2014. At the conclusion of the audit, the City earned enough activity points to lower the CRS rating to a Class 7.</p>		

Strategy Number	Priority	Timeline	Status
F003	High	Ongoing	F003-05: Ongoing F003-06: Ongoing F003-07: Ongoing
Strategy Description	Minimize the Damage and Hazards to Development in Areas Subject to Risk Resulting From Flooding Conditions.		
Activities	<p>F003-05: Promote open space and recreational uses in designated flood zones.</p> <p>F003-06: Continued clearance of the Santa Clara River of non-native plant species that may impede flood flow.</p> <p>F003-07: Continue to review all permits for development in designated flood hazard areas to meet the requirements of the NFIP and reduce damages and loss of life during flooding events.</p>		
Coordinating Organization	Public Works Dept., FEMA, Cal-OES		
Plan Goals Addressed	Protect Life and Property Public Awareness Natural Systems		
Funding Source	General Fund		
Comments	<p>F003-05: The City's Open Space Preservation District has acquired seven areas totaling approximately 2,000 acres. A portion of these locations are within designated flood zones. The City regularly promotes hiking, equestrian, and biking uses in these areas. The City continues to promote recreational uses in designated flood zones. Parks division is obtaining parcels in the river.</p> <p>F003-06: The City spends between \$100,000 and \$200,000 each year to remove non-native plant species from the Santa Clara river. City staff's efforts to find grant funds resulted in securing over \$400,000 for 2012. Staff expects approximately 100 acres of non-native species Arundo and Tamarisk to be removed in the demonstration area. Related: Bouquet Canyon Creek Restoration Project (2011-2012): Multi-year weed abatement and restoration project along a 3.5 mile section of Bouquet Canyon Creek from the Santa Clarita city limit to the Angeles National Forest boundary. Target species to eradicate were the tree tobacco (<i>Nicotiana glauca</i>) and <i>Arundo Donax</i>, with the goals of improving the ecology, increasing ground water recharge, reducing fire threats and infrastructure damage, and increasing the capacity of the natural floodplain. Annexation began in 2011 and as of May 23, 2012, 8.25 tons of tree tobacco and approximately 4.0 acres of <i>Arundo</i> were removed. Native seedlings were introduced with support from the LACFD. From 2012-2013, re-treatment of the removal area is scheduled, followed by more native plantings in 2013-2014. Maintenance of the removal areas are ongoing; the Antelope Valley Resource Conservation District serves as the financial administrator of the grants.</p> <p>F003-07: The City has added a new development review process to address construction that does not require a building permit and continues to regulate all development in floodplains. All new developments must go through a multi-division review and must meet all regulations of the NFIP and CRS programs prior to issuance of any permits.</p>		

Strategy Number	Priority	Timeline	Status
F004	High	2 Years	F004-08: Ongoing – Est. 2 Years F004-09: Ongoing – Est. 1 Year
Strategy Description	Update Existing 30-Yr Old Flood Insurance Rate Maps (FIRMs) to Provide the Most Current Flood Data to Regulate Development Standards.		
Activities	F004-08: Coordinate review and implementation of new Flood Insurance Study F004-09: Submit Letter of Map Review for storm drain improvements in downtown Newhall to reduce floodplain in affected area.		
Coordinating Organization	City of Santa Clarita, HDR Inc., FEMA		
Plan Goals Addressed	Protect Life and Property Public Awareness Natural Systems		
Funding Source	General Fund		
Comments	<p>F004-08: In 2012, City contracted with FEMA's engineering consultant to conduct a more detailed FIS in downtown Newhall than previously performed by FEMA. This FIS was intended to address the decertified levee which created a new flood zone in downtown Newhall. The City also continues to work with FEMA to move forward on draft FISs already completed.</p> <p>F004-09: Letter of Map Revision (LOMR) to officially change FIRM for Newhall Creek Left Overbank flow was submitted and became effective on August 9, 2013. Upon approval, the floodplain residents in areas affected by this flooding source had problems with the flood designations across their properties. In portions of Newhall, the A zones or Special Flood Hazard Areas (SFHA), were supposed to be shown as contained within the streets while the city blocks adjacent were mapped into the Shaded-X zone. Because of archaic mapping methods still in use by FEMA (e.g., did not utilize full hydraulic modeling due to budget/time constraints), the A zones were extending beyond the limits of the streets onto the structures; many residents and business owners still had their structures designated in the A zone. City staff worked with FEMA to correct the issue and a subsequent LOMR became effective on February 7, 2014 to correct the problem.</p>		

Strategy Number	Priority	Timeline	Status
F005	High	2 Years	New Project F005-10: Ongoing
Strategy Description	Ensure that All Elevators in Flood Zones Comply with Building Code Requirements		
Activities	F005-10: Ensure compliance to Building Code requirements for elevator inspections with development projects in flood zones.		
Coordinating Organization	Building and Safety, Development Services		
Plan Goals Addressed	Protect Life and Property		
Funding Source	General Fund		
Comments	New Project (not in previous 2010 HMP) F-005-10: The City's Development Services Manager, Building and Safety Division, and Development Services group continue to coordinate enforcement in the collection of Elevator Certificates during construction projects in flood zones.		

Strategy Number	Priority	Timeline	Status
F006	High	Ongoing	New Project F006-11: Ongoing
Strategy Description	Storm Drain Flood Mitigation		
Activities	F006-11: Upgrade storm drains and culverts at five key locations.		
Coordinating Organization	Public Works		
Plan Goals Addressed	Protect Life and Property		
Funding Source	General Fund and/or Grant Funding		
Comments	New Project (not in previous 2010 HMP) F-006-11: The City was in funding approval process with Cal-OES and FEMA for a \$500,000 grant to Upgrade Storm Drains and Culverts at five locations beginning in 2012. The Upgrade Culverts and Storm Drains Citywide project will repair storm drains, culverts, pipe replacement, and curb and gutter work at five locations on Wiley Canyon Road, Old Wiley Canyon Road, 13th Street, and two locations on Sierra Highway		

Flood Resource Directory

Local and Regional Resources

City Council Approved Plans, Policies, and Codes

City of Santa Clarita Ordinance No. 08-11 – Floodplain Ordinance
City of Santa Clarita Resolution No. 88-93 – Flood Insurance Resolution
City of Santa Clarita Resolution 90-142 – Adoption of Emergency Plan
City of Santa Clarita Code, Chapter 10.06 – Floodplain Management
City of Santa Clarita Building Code, Section 308 – Flood and Geologic Hazards
City of Santa Clarita General Plan
City of Santa Clarita Flood Hazard Mitigation Plan

Federal Resources

Federal Emergency Management Agency
500 C Street, SW
Washington, DC 20472
(202) 566-1600
<http://www.fema.gov/fima/nfip.shtm>

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
1325 East West Highway
Silver Spring, MD 20910
www.nwsla.noaa.gov

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SECTION 16. TERRORISM

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	1	Unlikely		Severe
Magnitude / Severity	3	Critical		High
Warning Time	4	No Warning	○	Moderate
Duration	1	Less than 6 Hours		Low
CPRI Rating	2.05	Moderate		

Terrorism Information and Background

Terrorism is a continuing threat throughout the world and within the United States. U.S. Code defines "international terrorism" and "domestic terrorism" (18 U.S.C. § 2331, 2010):

- "International terrorism" means activities with the following three characteristics:
 - Involve violent acts or acts dangerous to human life that violate federal or state law;
 - Appear to be intended (i) to intimidate or coerce a civilian population; (ii) to influence the policy of a government by intimidation or coercion; or (iii) to affect the conduct of a government by mass destruction, assassination, or kidnapping; and
 - Occur primarily outside the territorial jurisdiction of the U.S., or transcend national boundaries in terms of the means by which they are accomplished, the persons they appear intended to intimidate or coerce, or the locale in which their perpetrators operate or seek asylum.
- "Domestic terrorism" means activities with the following three characteristics:
 - Involve acts dangerous to human life that violate federal or state law;
 - Appear intended (i) to intimidate or coerce a civilian population; (ii) to influence the policy of a government by intimidation or coercion; or (iii) to affect the conduct of a government by mass destruction, assassination, or kidnapping; and
 - Occur primarily within the territorial jurisdiction of the U.S.

Currently, there is no history of terrorist acts or organized political terrorist groups operating in the Santa Clarita area. Consequently, the probability of a terrorist attack in the City of Santa Clarita is considered low (see Risk Assessment section for details), although there are nearby sites that have a higher risk potential near Santa Clarita (Magic Mountain, California Aqueduct, etc.). Nevertheless, it is still important to consider the potential for terrorist activities especially since there are a variety of political, social, religious, cultural, and economic factors that underlie the broad term "terrorist". In addition, since terrorists often focus on high visibility targets and civilian populations, the potential consequences of an attack underscores the need to consider terrorism as a threat.

Furthermore, while "Active Shooter" events are generally considered workplace or school violence incidents and criminal acts, they can also be considered to be forms of terrorism. There are specific characteristics that can link some Active Shooter cases to terrorism. Namely the targeting of vulnerable populations resulting in loss of life and an intent to intimidate. While the

risk of Active Shooter incidents is still considered low, including all forms of terrorism is an important component of a comprehensive mitigation plan.

Terrorism Categories

The categories below serve to differentiate terrorist organizations or individuals according to common goals and motivation. It should be noted that these categories of terrorism and terrorist groups are constantly changing. Furthermore, groups or individuals may also exhibit one or more of the following traits in Active Shooter(s) events.

Table 69: Terrorism Categories

Category	Description
Lone Wolf	A “Lone Wolf” is an individual not connected to a terror cell or larger group, but who commit acts of public violence on behalf of a group, movement, ideology, or as part of a personal grievance.
Separatist	Separatist groups are those with the goal of separation from existing entities through independence, political autonomy, or religious freedom or domination. The ideologies separatists subscribe to include social justice or equity, anti-imperialism, as well as the resistance to conquest or occupation by a foreign power.
Ethnocentric	Groups of this persuasion see race as the defining characteristic of a society, and therefore a basis of cohesion. There is usually the attitude that a particular group is superior because of their inherent racial characteristics.
Nationalistic	The loyalty and devotion to a nation, and the national consciousness derived from placing one nation's culture and interests above those of other nations or groups. This can find expression in the creation of a new nation or in splitting away part of an existing state to join with another that shares the perceived "national" identity.
Revolutionary	Dedicated to the overthrow of an established order and replacing it with a new political or social structure. Although often associated with communist political ideologies, this is not always the case, and other political movements can advocate revolutionary methods to achieve their goals
Political	Political ideologies are concerned with the structure and organization of the forms of government and communities. While observers outside terrorist organizations may stress differences in political ideology, the activities of groups that are diametrically opposed on the political spectrum are similar to each other in practice.
Religious	Religiously inspired terrorism is on the rise. While Islamic terrorists and organizations have been the most publicized, all of the major world religions have extremists that have taken up violence to further their perceived religious goals. Religiously motivated terrorists see their objectives as holy writ, and therefore infallible and non-negotiable
Social	Often particular social policies or issues will be so contentious that they will incite extremist behavior and terrorism. Frequently this is referred to as "single issue" or "special interest" terrorism. Some issues that have produced terrorist activities in the United States and other countries include animal rights, abortion, ecology/environment, and minority rights.

Category	Description
Domestic	These terrorists are "home-grown" and operate within and against their home country. They are frequently tied to extreme social or political factions within a particular society, and focus their efforts specifically on their nation's socio-political arena.
International or Transnational	Often describing the support and operational reach of a group, these terms are often loosely defined, and can be applied to widely different capabilities. <i>International groups</i> typically operate in multiple countries, but retain a geographic focus for their activities. Hezbollah has cells worldwide, and has conducted operations in multiple countries, but is primarily concerned with events in Lebanon and Israel. <i>Transnational groups</i> operate internationally, but are not tied to a particular country, or even region. Al Qaeda is transnational; being made up of many nationalities, having been based out of multiple countries simultaneously, and conducting operations throughout the world. Their objectives affect dozens of countries with differing political systems, religions, ethnic compositions, and national interests

Foreign Terrorist Organizations

The U.S. State Department issues and maintains the Foreign Terrorist Organization (FTO) List which documents current threat groups (U.S. Department of State, 2015). The current FTO List is provided in the table below:

Table 70: Terrorist Group Categories

Date Designated	Name	Date Designated	Name
10/8/1997	Abu Nidal Organization (ANO)	1/30/2003	Lashkar i Jhangvi (LJ)
10/8/1997	Abu Sayyaf Group (ASG)	3/22/2004	Ansar al-Islam (AAI)
10/8/1997	Aum Shinrikyo (AUM)	7/13/2004	Continuity Irish Republican Army (CIRA)
10/8/1997	Basque Fatherland and Liberty (ETA)	12/17/2004	Libyan Islamic Fighting Group (LIFG)
10/8/1997	Gama'a al-Islamiyya (Islamic Group) (IG)	12/17/2004	Islamic State of Iraq and the Levant (formerly al-Qa'ida in Iraq)
10/8/1997	HAMAS	6/17/2005	Islamic Jihad Union (IJU)
10/8/1997	Harakat ul-Mujahidin (HUM)	3/5/2008	Harakat ul-Jihad-i-Islami/Bangladesh (HUJI-B)
10/8/1997	Hizballah	3/18/2008	al-Shabaab
10/8/1997	Kahane Chai (Kach)	5/18/2009	Revolutionary Struggle (RS)
10/8/1997	Kurdistan Workers Party (PKK) (Kongra-Gel)	7/2/2009	Kata'ib Hizballah (KH)
10/8/1997	Liberation Tigers of Tamil Eelam (LTTE)	1/19/2010	al-Qa'ida in the Arabian Peninsula (AQAP)
10/8/1997	National Liberation Army (ELN)	8/6/2010	Harakat ul-Jihad-i-Islami (HUJI)
10/8/1997	Palestine Liberation Front (PLF)	9/1/2010	Tehrik-e Taliban Pakistan (TTP)
10/8/1997	Palestinian Islamic Jihad (PIJ)	11/4/2010	Jundallah
10/8/1997	Popular Front for the Liberation of Palestine (PFLF)	5/23/2011	Army of Islam (AOI)

Date Designated	Name	Date Designated	Name
10/8/1997	PFLP-General Command (PFLP-GC)	9/19/2011	Indian Mujahedeen (IM)
10/8/1997	Revolutionary Armed Forces of Colombia (FARC)	3/13/2012	Jemaah Anshorut Tauhid (JAT)
10/8/1997	Revolutionary People's Liberation Party/Front (DHKP/C)	5/30/2012	Abdallah Azzam Brigades (AAB)
10/8/1997	Shining Path (SL)	9/19/2012	Haqqani Network (HQN)
10/8/1999	al-Qa'ida (AQ)	3/22/2013	Ansar al-Dine (AAD)
9/25/2000	Islamic Movement of Uzbekistan (IMU)	11/14/2013	Boko Haram
5/16/2001	Real Irish Republican Army (RIRA)	11/14/2013	Ansaru
12/26/2001	Jaish-e-Mohammed (JEM)	12/19/2013	al-Mulathamun Battalion
12/26/2001	Lashkar-e Tayyiba (LeT)	1/13/2014	Ansar al-Shari'a in Benghazi
3/27/2002	Al-Aqsa Martyrs Brigade (AAMB)	1/13/2014	Ansar al-Shari'a in Darnah
3/27/2002	Asbat al-Ansar (AAA)	1/13/2014	Ansar al-Shari'a in Tunisia
3/27/2002	al-Qaida in the Islamic Maghreb (AQIM)	4/10/2014	Ansar Bayt al-Maqdis
8/9/2002	Communist Party of the Philippines/New People's Army (CPP/NPA)	5/15/2014	al-Nusrah Front
10/23/2002	Jemaah Islamiya (JI)	8/20/2014	Mujahidin Shura Council in the Environs of Jerusalem (MSC)

Domestic Terrorist Groups

Per the Department of Homeland Security (DHS), violent extremists are defined as “individuals who support or commit ideologically-motivated violence to further political goals.” Violent Extremist threats within the United States can come from a range of groups and individuals, including Domestic Terrorists and Homegrown Violent Extremists (HVEs).

DHS defines Domestic Terrorism as:

“Any act of violence that is dangerous to human life or potentially destructive of critical infrastructure or key resources committed by a group or individual based and operating entirely within the United States or its territories without direction or inspiration from a foreign terrorist group. The act is a violation of the criminal laws of the United States or of any state or other subdivision of the United States and appears to be intended to intimidate or coerce a civilian population, to influence the policy of a government by intimidation or coercion, or to affect the conduct of a government by mass destruction, assassination, or kidnapping.”

A domestic terrorist differs from a homegrown violent extremist in that the former is not inspired by, and does not take direction from, a foreign terrorist group or other foreign power. DHS defines a HVE as: A person of any citizenship who has lived or operated primarily in the United States or its territories who advocates, is engaged in, or is preparing to engage in ideologically-motivated terrorist activities (including providing material support to terrorism) in furtherance of

political or social objectives promoted by a terrorist organization, but who is acting independently of direction by a terrorist organization (DHS, 2015).

The Federal Bureau of Investigations (FBI) does not provide an ongoing list of named domestic terrorist groups. Instead the FBI focuses on various threat categories (FBI, 2009):

- Eco-Terrorists
- Animal Rights Extremists
- Sovereign Citizens Movement
- Anarchist Extremism
- Militia Extremism
- White Supremacy Extremism

The Office of the United States Attorneys also includes the following categories (in addition to those listed above) as domestic terrorist threats (Office of U.S. Attorneys, 2014):

- Anarchists
- Antigovernment Extremists and Unauthorized Militias
- Black Separatists
- Anti-Abortion Extremists
- Other Unaffiliated Disaffected Americans, including “Lone Wolf” Assailants

Terrorism Vulnerabilities

The probability that an individual or location will be targeted by a terrorist is a function of several factors including the attractiveness of target, the potential for success of the event, and the potential for avoiding identification and capture. Categories of potential targets include:

- Bridges and Overpasses
- California Aqueduct, Castaic Dam, and Bouquet Canyon Dam (out of the planning area for this document, but has an impact on the Santa Clarita area)
- Churches, and Religious Centers (e.g., Churches, Mosques, Synagogues, and Temples)
- Clinics and Hospitals
- Controversial Businesses and Defense Industry Companies
- Correctional Facilities (out of planning control for this document)
- Electrical Facilities
- Facilities that Store, Manufacture or Transport Hazardous Materials
- Federal, State, County and City Offices
- Highways and Freeways
- Law Enforcement Offices
- Mass Transit Facilities
- Military Sites and Recruiting stations
- Pipelines (Natural Gas, Petroleum, Water, Waste Water, and Other Hazardous Materials)
- Public Buildings and Assembly Areas
- Research Facilities
- Schools
- Shopping Malls
- Stadiums

- Telecommunications Facilities
- Water and Wastewater Facilities
- Other Places where Large Groups of People Congregate (e.g., public events such as fairs, marathons, etc.)

Impact on the Community

Following a terrorist attack, panic, intense media interest, and the convergence of injured and possibly contaminated persons at local hospitals and urgent care centers can be expected. While local, state, and federal agencies will be mobilized to respond to a terrorist event, it will take time for assistance to arrive. Many specialized resources (such as military response teams) may need to be airlifted to the area requiring local resources to manage the initial phases of an emergency, especially in the case of a mass casualty event. The initial response phase may range from hours to a day or more. Consequently, a rapid assessment of the scope of the incident and activation of local emergency response resources will be critical to manage the situation.

Key issues include:

- Activation of local and regional Emergency Operations Centers (EOCs)
- Activation of local response teams including law enforcement (including SWAT teams), fire suppression resources, paramedic units, and HazMat teams
- Designation of casualty collection points and field triage / treatment sites
- Transportation (for personnel, equipment, and supplies to the impact location as well as casualty and public evacuation)
- Isolation (if needed to prevent further contamination)
- Use of personal protection equipment (PPEs)
- Communications (including internal communication, media response, and public bulletins)
- Decontamination points (if required)
- Activation and notification of Non-Governmental Organizations (NGO's)

Efforts to assess the situation and provide clear, easy to follow emergency management instructions to the public are essential.

The following table describes examples of the considerations expected during the initial stages of a terrorist event.

Table 71: Terrorist Event Considerations

Condition	Description
Down Wind Evacuation	A large release may result in a lethal plume that may travel for miles. Emergency agencies in neighboring jurisdictions must be advised of the release and included in incident management activities.
Traffic Restrictions and Congestion	Roads, freeways and transit systems may need to be closed to contain the incident. Regardless of the need, panic may cause some persons to self-evacuate, traffic congestion and gridlock conditions and confusion may result. These factors will slow response by emergency agencies and specialized resources to affected areas. Detailed traffic management plans will need to be developed.
Self-Transport to Medical Providers	Injured and contaminated victims may leave the immediate site of the incident and then go to hospitals. In most cases, the care provider will not be equipped to decontaminate victims or treat terrorist related casualties. This can extend the scope of the incident, potentially lead to secondary contamination and strain local medical and emergency response resources. Hospitals impacted by an influx of casualties who have not been decontaminated will have to establish decontamination area and may not be able to continue providing treatment.
Panic Victims	In the immediate aftermath of a terrorist event, responders should anticipate a number of people who think they have been exposed to or contaminated by the agent(s) even though there has been no actual exposure. Provisions must be made to manage these persons and provide supportive care as necessary.
Scarce Supplies	Equipment and supplies needed to manage the consequences of a terrorist event will be scarce. Sufficient pharmacological supplies may not be available. Antidotes and other drugs used to treat WMD victims are usually not stockpiled in sufficient quantities for use in a mass casualty incident. Efforts to secure additional supplies will be an immediate need. Personnel involved in managing potential terrorist event must be aware of these concerns. Measures to address these issues must be incorporated into the Incident Action Plan and should be considered and assessed throughout the management of the WMD incident.

Weapons of Mass Destruction (WMD)

Weapons of Mass Destruction (WMD) are a specific type of threat that must be considered by any community. For the Lancaster area, this may involve the activation of a WMD within the area or a large-scale attack in a nearby location. Consequently, ongoing awareness and training of local emergency responders, government, and healthcare providers is important to ensure that such events are quickly identified and managed.

Five Types of WMD That Could be Used by Terrorists

WMD can be segregated into five categories using the acronym B-NICE: Biological, Nuclear, Incendiary, Chemical and Explosive.

1. Four common types of biological agents are bacteria, viruses, rickettsia, and toxins
2. Nuclear terrorism can occur in two different ways
 - a. Detonation or threat of detonation of a nuclear bomb
 - b. Dispersion of radiological material using a conventional explosive or other dispersal device
3. An incendiary device is any mechanical, electrical, or chemical device used to intentionally initiate combustion and start a fire
4. Chemical agents can be classified into five categories: nerve agents, blister agents, blood agents, choking agents, and irritating agents
5. Explosive devices are the most common WMD (70% of all terrorist attacks)

While explosives are the most common method, any of the WMDs listed can be deployed at any time. Consequently threat awareness and vigilance is critical to prevent future attacks. In one well-known case a plot to detonate a car bomb at the Los Angeles International Airport was uncovered by an alert U.S. Customs inspector. On December 14, 1999, Ahmed Ressaam (aka the Millennium Bomber) was arrested after a U.S. Customs inspector had his vehicle searched after he had successfully boarded a ferry from Canada to Port Angeles, Washington. The inspector is credited for noticing Ressaam's behavior as unusual and ordering a secondary customs search and a check of his passport. As a result, chemicals and explosive timing devices were found in the trunk of his vehicle and his passport was identified as counterfeit. Ressaam was subsequently jailed and convicted on multiple counts.

Active Shooter Incidents

According to [A Study of Active Shooter Incidents in the United States Between 2000 and 2013](#), Federal Bureau of Investigations, Washington D.C., 2013, there were 160 Active Shooter incidents in the U.S. between 2000 and 2013, an average of 11.4 per year. These cases resulted in 1,043 killed or wounded (not including shooters). Seventy-percent (70%) of incidents occurred in a commerce/business or educational environment.

The FBI identified 11 separate incident location categories³¹ when seeking to identify the primary locations where the public was most at risk during an incident. These location categories include commercial areas (divided into malls, businesses open to pedestrian traffic, and businesses closed to pedestrian traffic), educational environments (divided into schools [pre-kindergarten through 12th grade] and IHEs), open spaces, government properties (divided into military and other government properties), residences, houses of worship, and health care facilities. When an incident occurred in two or more locations, the FBI sought to identify where the public was most at risk. For example, in instances where casualties occurred inside a private

residence before a shooter moved to a public area, those incidents were categorized at the location where the public was more at risk. In addition, some specialized business locations (i.e., malls and health care facilities) were identified separately to provide added transparency. In all, 24 (15.0%) of the 160 incidents involved shootings at more than one location. This supports the value in quickly assessing the circumstances where the first shooting occurs and may aid law enforcement’s ability to predict other potential targets (FBI, 2014).

The study results identified 73 (45.6%) of 160 incidents that occurred in areas of commerce. These included businesses open to pedestrian traffic (44 [27.5%]), businesses closed to pedestrian traffic (23 [14.3%]), and malls (6 [3.8%]). These distinctions were made in order to determine whether the public was more at risk in areas where pedestrian traffic was likely. Educational environments were identified as the second-largest location grouping (39 [24.4%]). These were further broken down as those occurring in schools (27 [16.9%], including two school board meetings) and IHEs (12 [7.5%]).

Other incidents, in descending order, were located in:

- Open spaces (15 [9.4%]);
- Government properties (16 [10.0%]);
 - Other (non-military) government properties (11 [6.9%])
 - Military properties (5 [3.1%])
- Residences (7 [4.4%]);
- Houses of worship (6 [3.8%]); and
- Health care facilities (4 [2.5%]).

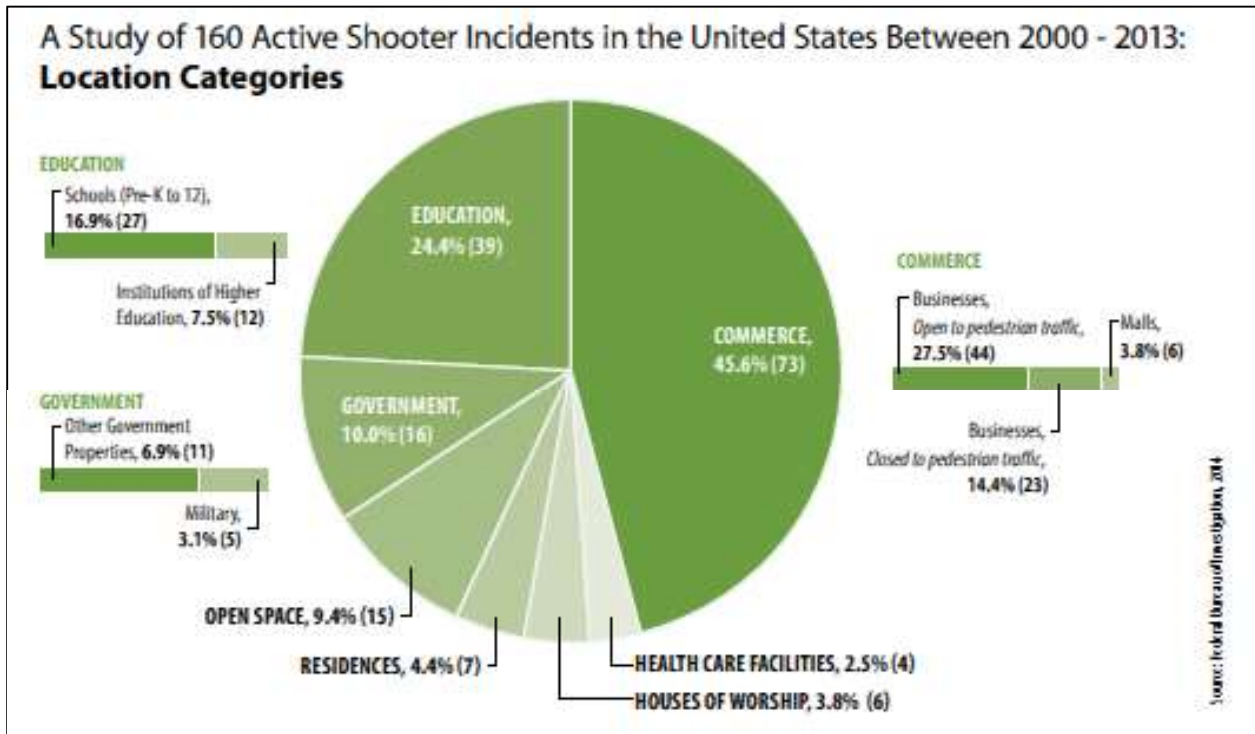


Figure 47: Active Shooter Location Categories

History of Terrorist Events and Active Shooter Incidents

There have not been any Terrorist Acts or Active Shooter Incidents in the City of Santa Clarita. Nevertheless, the possibility cannot be fully eliminated. Understanding the types and history of terrorism in the U.S. provides local planners and public with an understanding of the ongoing threats to the community.

Domestic Terrorism in the U.S.

Domestic Terrorism Examples

The examples below provide a summary of major terrorist events in the U.S. The list contains summaries of the types of incidents that could occur in the area.

Table 72: Domestic Terrorism Examples (1995 – 2013)

Date	Event	Description
April 15, 2013	Boston Marathon Bombings	Two explosive devices were detonated near the finish line for the Boston Marathon resulting in 3 deaths and nearly 200 injuries.
January 8, 2011	Tucson, Arizona Assassination Attempt	Attempted assassination of United States Congresswoman Gabrielle Giffords at a constituent event by a lone wolf shooter. 6 bystanders were killed and 13 more wounded.
February 18, 2010	Austin, Texas IRS Airplane Attack	Aircraft attack on an IRS office building by a believed anti-government / anti-corporate business extremist resulting in 1 death
November 5, 2009	Fort Hood Shootings	Shooting attack of a believed Islamic extremist resulting in 13 deaths and 30 wounded
June 10, 2009	U.S. Holocaust Memorial Museum Shootings	Shooting attack of a believed neo-Nazi resulting in 1 death
September 18, 2001 (start)	U.S. Anthrax Attacks	A series of letters containing anthrax spores lasting several weeks resulting in 5 deaths and 17 infections
September 11, 2001	September 11 Attacks	Two hijacked aircraft hit the Twin Towers of the World Trade Center in New York and a third plane struck the Pentagon (a fourth plane crashed into a field in Shanksville, PA after passengers tried to overcome the hijackers)
July 27, 1996	Centennial Olympic Park Bombing	1996 Summer Olympic bombing in Atlanta, GA resulting in 2 deaths and 111 injuries
April 19, 1995	Oklahoma City Bombing	Truck bomb resulting in 168 people killed

Post 9/11

After September 11, 2001, the United States has increased its security policies and procedures at the national and local level. Since then, Federal Grants for counter-terrorism have increased to approximately seventy-five billion dollars per year from federal and state governments. These grants have provided local counties and cities funds to strengthen their security procedures, implement needed mitigation actions, or provide first responders with specialized training and equipment (Murphy, 2011).

Active Shooter Incidents in the U.S.

Active Shooter Examples

The following examples from 2013 provide an understanding of the cross-section of locations where Active Shooter incidents have occurred in the U.S.

Table 73: Domestic Active Shooter Examples (2013)

Date	Event	Location Category	Description
December 17, 2013	Renown Regional Medical Center	Healthcare	Alan Oliver Frazier, 51, armed with a shotgun and two handguns, began shooting in the Renown Regional Medical Center in Reno, Nevada. One person was killed; two were wounded. The shooter committed suicide at the scene after police arrived.
December 13, 2013	Arapahoe High School	Education	Karl Halverson Pierson, 18, armed with a shotgun, machete, and three Molotov cocktails, began shooting in the hallways of Arapahoe High School in Centennial, Colorado. As he moved through the school and into the library, he fired one additional round and lit a Molotov cocktail, throwing it into a bookcase and causing minor damage. One person was killed; no one was wounded. The shooter committed suicide as a school resource officer approached him.
November 1, 2013	Los Angeles International Airport	Government	At 9:18 a.m., Paul Anthony Ciancia, 23, armed with a rifle, allegedly began shooting in Terminal 3 of Los Angeles International Airport in Los Angeles, California. He pulled the gun from his duffle bag as he approached a security checkpoint, firing as he moved further into the terminal. One unarmed Transportation Security Administration security officer was killed and two were wounded; one additional citizen was also wounded. The shooter was wounded and then apprehended by police.
October 26, 2013	Albuquerque, New Mexico	Open Space	At 11:20 a.m., Christopher Thomas Chase, 35, armed with three handguns and two rifles, began shooting at police officers in Albuquerque, New Mexico. The shooter, who was wearing body armor, forced a citizen to call the police and then ambushed and shot at the two responding officers before fleeing in their vehicle. Other officers were shot at while pursuing the shooter. No one was killed; four police officers were wounded. The shooter was killed by police during the pursuit, which ended when the vehicle crashed into a gas station pump.
October 21, 2013	Sparks Middle School	Education	At 7:16 a.m., Jose Reyes, 12, armed with a handgun, began shooting outside Sparks Middle School in Sparks, Nevada. A teacher was killed when he confronted the shooter; two people were wounded. The shooter committed suicide before police arrived.

Date	Event	Location Category	Description
September 16, 2013	Washington Navy Yard Building	Government	At 8:16 a.m., Aaron Alexis, 34, armed with a shotgun, began shooting in Building 197 at the Washington Navy Yard in Washington, D.C. During the shootings, he shot a security officer and took the officer's handgun, allowing him to continue shooting when he ran out of shotgun shells. Twelve people were killed; seven were wounded, including two police officers. The shooter was killed by police.
August 24, 2013	Lake Butler, Florida	Open Space	At 9:20 a.m., Hubert Allen Jr., 72, armed with a rifle and a shotgun, began shooting at his co-workers from Pritchett Trucking, Inc., as he drove around Lake Butler, Florida. He then returned home, where he committed suicide. Two people were killed; two were wounded.
August 5, 2013	Pennsylvania Municipal Building	Government	At 7:19 p.m., Rockne Warren Newell, 59, armed with a rifle and a handgun, entered the Ross Township Municipal Building in Saylorsburg, Pennsylvania, during a Ross Township meeting. He allegedly shot through a wall into the meeting room and then entered the room and continued firing. Newell had a history of disputes with the township over permits for his home. Three people were killed; two were wounded. The shooter was restrained by citizens until police arrived and took him into custody.
July 26, 2013	Hialeah Apartment Building	Residences	At 6:30 p.m., Pedro Alberto Vargas, 42, set his apartment complex on fire in Hialeah, Florida. Then, armed with a handgun, he began shooting outside the complex. Six people were killed; no one was wounded. The shooter barricaded himself and two hostages inside the apartment building. He was killed by police.
June 21, 2013	Parking Lots for Kellum Law Firm and Walmart	Open Space	At 11:44 a.m., Lakin Anthony Faust, 23, armed with a shotgun, began shooting outside the Kellum Law Firm in Greenville, North Carolina and then crossed the street and continued shooting at individuals in the Walmart parking lot. No one was killed; four were wounded. The shooter was wounded during an exchange of gunfire with police and then taken into custody.
June 7, 2013	Santa Monica College and Residence	Education	At 11:52 a.m., John Zawahri, 23, armed with a handgun, fatally shot his father and brother in their home in Santa Monica, California. He then carjacked a vehicle and forced the driver to take him to the Santa Monica College campus. He allowed the driver to leave her vehicle unharmed but continued shooting until he was killed in an exchange of gunfire with police. Five people were killed; four were wounded.

Date	Event	Location Category	Description
May 26, 2013	Brady, Texas and Jacksonville, North Carolina	Open Space	At 4:30 a.m., Esteban Jimenez Smith, 23, armed with a rifle and a handgun, began shooting from a moving vehicle as he drove down a road in Brady, Texas. He had earlier fatally shot his wife in Jacksonville, North Carolina. Two people were killed, including his wife; five were wounded, including one police officer. The shooter was killed by police.
April 21, 2013	Pinewood Village Apartments	Residences	At 9:30 p.m., Dennis Clark III, 27, armed with a handgun and a shotgun, began shooting in the Pinewood Village Apartments in Federal Way, Washington. He shot his girlfriend in an apartment and then walked outside and continued shooting. Four people were killed, including his girlfriend; no one was wounded. The shooter was killed by police.
April 12, 2013	New River Community College, Satellite Campus	Education	At 1:55 p.m., Neil Allen MacInnis, 22, armed with a shotgun, began shooting in the New River Community College satellite campus in the New River Valley Mall in Christiansburg, Virginia. No one was killed; two were wounded. The shooter was apprehended by police after being detained by an off-duty mall security officer as he attempted to flee.
March 13, 2013	John's Barbershop and Gaffey's Clean Car Center	Commerce	At 9:30 a.m., Kurt Myers, 64, armed with a shotgun, began shooting in John's Barbershop in Mohawk, New York, then drove to Gaffey's Clean Car Center in nearby Herkimer, New York, and continued shooting. The shooter then barricaded himself in an abandoned building in the vicinity. Four people were killed; two were wounded. The shooter was killed later by federal law enforcement officers.
January 30, 2013	Osborn Maledon Law Firm	Commerce	At 10:45 a.m., Arthur Douglas Harmon, III, 70, armed with a handgun, began shooting during a mediation session in the Osborn Maledon law firm in Phoenix, Arizona. Two people were killed; one was wounded. The shooter later committed suicide at another location.
January 10, 2013	Taft Union High School	Education	At 8:59 a.m., Bryan Oliver, 16, armed with a shotgun, allegedly began shooting in a science class at Taft Union High School in Taft, California. No one was killed; two people were wounded. An administrator persuaded the shooter to put the gun down before police arrived and took him into custody

(FBI, 2014)

Terrorism Event Probability, Frequency, and Magnitude

Terrorism

Santa Clarita has not experienced a terrorist act, consequently the overall likelihood is considered low. However the area does include a variety of pipelines, public works projects, electrical facilities, as well as other potential targets that could attract the attention of terrorists. In addition, the consequences of a terrorist act in the Santa Clarita Valley could impact the local area, e.g., disruption of Interstate 5, State Route 14, water pipelines, water supply contamination, natural gas and petroleum pipelines, hazardous materials release. Furthermore, there is a possibility that extremist groups could operate from the area and use it as a base of operations for attacks elsewhere.

Recent trends toward large scale incidents generating significant casualties make preparedness and the mechanisms for effective response essential. In addition to large scale attacks, a full range of assault styles must be considered. Contemporary terrorist activities may include a variety of methods including letter bombings, assassinations with small arms, bio-chemical attacks, car bombs, suicide attacks, and building bombings. Related threats include bomb threats, which disrupt the normal operations of business. Venues likely to suffer the impact of terrorism include facilities that store, manufacture or transport hazardous materials, highways and freeways, telecommunications facilities, federal, state, county and city offices, shopping malls, schools, houses of worship and religious centers, research facilities, electrical facilities, water and wastewater facilities, dams, bridges and overpasses.

Conventional political motivations for terrorism continue, however issues involving organized crime, narcotics trafficking, ecological / animal rights, abortion / right-to-life groups, and perceived economic injustice can also involve terrorist groups or lone individual “Lone Wolf” planning and operations. Another aspect of increased motivation is the growing use of the Internet for terrorist recruitment, training and communications.

Street and skinhead gangs involved in criminal activities are often labeled by law enforcement as “terrorist” organizations, and there is evidence of terrorist recruitment and radicalization of prisoners in the State prison system. Furthermore, gang activity is endemic to all of Los Angeles County including the City of Santa Clarita.

If a terrorist act were to occur in or near Santa Clarita, the consequences or magnitude could range from a localized impact to a widespread event depending on the nature and type of act committed. Mass casualties could occur and local response and emergency resources could be quickly overwhelmed or become victims themselves. A terrorist act also has the potential to disrupt local utility services, communications, and transportation systems that reach beyond the City of Santa Clarita. In fact, coordination of mass evacuation could be required and quickly become a major concern for local responders.

Active Shooter Incidents

There have not been any Active Shooter incidents in Santa Clarita so the probability is estimated as low. Nevertheless, the potential still exists. Local schools, college campuses, houses of worship, shopping malls, hotels, event centers, theaters, large commercial facilities, and local businesses can all have the potential for an Active Shooter incident.

If an Active Shooter incident were to occur in Santa Clarita, the consequences or magnitude could range from a few casualties to several dozen. Local street closures and government / healthcare / business / school / college shutdowns (depending on the location and type of incident) could also last from one to multiple days. Secondly, media coverage would be extensive and cause ongoing disruptions in the area.

Existing Mitigation Activities

The Los Angeles County Sheriff's Department is the lead law enforcement agency for the region in the event of a terrorist event. Individual cities will be responsible for consequence management. The following are practices or projects that are currently active in the Region.

Law Enforcement Role in Combatting Terrorism

The following are steps and efforts that various law enforcement agencies are taking to combat terrorist activities:

- On-going attention to known potential targets within the service area
- Identification of new potential targets within the service area
- Identification of suspicious persons, places, or things which may be related to potential terrorist activity
- Recognition of potential surveillance and intelligence-gathering activities
- Recognition of potential terrorist involvement in routine crimes (ID theft, shoplifting, credit card fraud, forgeries, etc.)
- Organizing and informing community resources regarding anti- terrorism
- Ability to respond safely and effectively to a terrorist incident or a terrorist use of a WMD
- Identify the terrorist group
- Monitor weapons / materials
- Threat / vulnerability assessment
- Counter surveillance
- Target hardening
- Awareness of suspicious behavior as terrorists egress from target

Mitigation and Prevention

The following examples provide a summary of mitigation and prevention activities that support the City of Santa Clarita and County of Los Angeles.

Canine Unit

The Los Angeles County Sheriff maintains five (5) specially training canines to detect explosives as part of the Arson/Explosive Detail and one chemical/biological threat K-9 as part of the Hazardous Materials Detail.

Equipment and JRIC

In September 2012, Los Angeles County received a \$61 million grant from the Department of Homeland Security. The grant is intended to allow the greater Los Angeles region to increase its capacity to prevent, prepare for, respond to, and recover from acts of terrorism and natural disasters by improving interagency communication and emergency response capability (CBS Los Angeles, 2012). In past years the Los Angeles County Sheriff's Department has used previous grants to pay for equipment, such as an aerial video downlink technology, mobile surveillance cameras, tactical robots, radiation detection devices and bomb suits.

The grant funds many law enforcement, training, communications, and equipment programs, as well as the Joint Regional Intelligence Center (JRIC). The JRIC is staffed by federal, state and local intelligence analysts and investigators responsible for gathering and analyzing intelligence in the 44,000-square-mile territory surrounding Los Angeles. The JRIC opened in 2006 and is the largest of approximately 40 facilities nationwide used to coordinate data from 200 agencies in seven counties.

Terrorism Early Warning Group

In 1996, the Los Angeles County Sheriff Department established the Terrorism Early Warning (TEW) Group (Terrorism Early Warning Group, 2008). The purpose of the TEW Group is to act as an interdisciplinary group in which local, state, and federal agencies work together to share information and combine resources, and to enhance the ability to identify and respond to acts and threats of terrorism. This interagency approach allows for early response and enforcement by clearing the communication channels between agencies and creating an environment that facilitates information and intelligence sharing. The result is an effective network that has the ability to identify information which might indicate impending terrorist activity. This group is a significant resource for identifying and assessing potential threats, making appropriate notifications and recommendations, and aiding in mission planning and the efficient allocation of resources.

Emergency Response Actions

The Los Angeles County Sheriff's Department is the lead agency for crisis management, perimeter security, access control, traffic/crowd control, evacuations, notifications, and safeguarding evidence. Crisis management activities may include:

- Investigation, tracking, and maintaining scene integrity.
- Coordinating coroner issues with the Los Angeles County Coroner's Department.
- Use of Special Weapons and Tactics (SWAT) or Rapid Deployment Force (RDF) units
- Assisting with damage assessment and fatalities management

The Los Angeles County Fire Department is the lead agency for fire response, hazardous materials events, and medical/rescue operations. The County Fire Department provides support as necessary to the Sheriff for Crisis Management activities. Existing procedures, such as the Fire Department's Hazardous Materials Response procedures and NBC Response Protocols are used as necessary. The Fire Department assists with:

- Fire and rescue operations
- Emergency medical services coordination
- Perimeter and access control
- Evacuation operations
- Notifications
- Safeguarding evidence
- Damage assessment
- Fatalities management
- Addressing environmental needs
- Obtaining personnel with radiological training
- Insuring decontamination procedures (radiological and chemical) are in place
- Insuring biological agents are contained

City of Santa Clarita Activities

The City of Santa Clarita publishes emergency preparedness information, downloads, and videos on its Web site, including the LA County Emergency Survival Guide that includes a section on terrorism. In addition, the city has an active CERT program with volunteers trained to assist in disasters. Santa Clarita has also implemented the eNotify System that allows the City to E-mail residents that sign-up in case of an emergency situation. Finally, Santa Clarita's Emergency Operations Plan addresses emergency response actions that the EOC Center will take in the event of any catastrophic event including acts of terrorism.

Santa Clarita also has an active Emergency Communications Team (Santa Clarita Emergency Communications Team - SCECT) comprised of amateur radio operators that are trained in disaster communication operations. In addition the City utilizes the Nixle system for emergency notifications (texting and E-mail). Nixle supplements the E notify system as a communications tool. Finally as a Los Angeles Sheriff's Department contract city, Santa Clarita has access to ALERT LA which is a reverse 911 system for mass notification and communication.

Terrorism and Active Shooter Mitigation Strategies

The Terrorism and Active Shooter mitigation strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from an act of terrorism or active shooter incident. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP.

Strategy Number	Priority	Timeline	Status
TAS001	Moderate	Ongoing	TAS001-01: Ongoing
Strategy Description	Improve Internal City Active Shooter Response Capabilities		
Activities	TAS001-01: Conduct Active Shooter training with City staff		
Coordinating Organization	Los Angeles County Sheriff's Department – Tactics and Survival Unit		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund		
Comments	<u>TAS001-01</u> : First round of training completed for staff. Second round of training to be conducted September 2015.		

Strategy Number	Priority	Timeline	Status
TAS002	Moderate	Ongoing	TAS002-02: Scheduled
Strategy Description	Improve Community Active Shooter Response Capabilities		
Activities	TAS002-02 Conduct CERT training to mitigate the number of casualties during an Active Shooter incident and improve response capabilities		
Coordinating Organization	Los Angeles County Fire Department, Emergency Management		
Plan Goals Addressed	Protect Life and Property Increase Public Awareness Partnerships and Implementation		
Funding Source	General Fund		
Comments	<u>TAS002-02</u> : Active Shooter to be included in CERT training commencing Winter 2015-2016.		

Strategy Number	Priority	Timeline	Status
TAS003	Moderate	Ongoing	TAS003-03: New Project
Strategy Description	Identify City-owned Potential Terrorist Targets and Take Action to Harden Vulnerable Sites		
Activities	<p>TAS003-03: Work with the Department of Homeland Security to conduct a review of City-owned and operated facilities. The review to include access controls and security for each site as well as the identification of site vulnerabilities and capabilities.</p> <p>TAS-003-4: Based on the results of the site review, take actions to harden critical City-owned sites.</p>		
Coordinating Organization	City Manager’s Office, Public Works, Emergency Management, Department of Homeland Security		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund		
Comments	<p><u>TAS003-03</u>: Proposed new project (not included in the 2010 HMP). DHS conducts site reviews of Critical Infrastructure and Key Resources so the City would benefit from partnering with DHS to conduct the assessments.</p> <p><u>TAS003-04</u>: Specific sites and hardening requirements to be determined based on the site analysis.</p>		

Strategy Number	Priority	Timeline	Status
TAS004	Moderate	Ongoing	TAS004-05: Ongoing TAS004-06: Ongoing TAS004-07: Ongoing
Strategy Description	Work with Critical Infrastructure Partners to Identify Potential Terrorist Targets and Take Action to Harden Vulnerable Sites		
Activities	<p>TAS004-05: Continue to work with Critical Infrastructure and Key Resource (CIKR) partners including: healthcare facilities, utility providers, event centers, and other major public venues. This includes working with DHS on developing the site list.</p> <p>TAS004-06: Work with or encourage each partner to conduct a review of their critical infrastructure sites to assess the vulnerability to terrorist or active shooter attack.</p> <p>TAS004-07: Work with critical infrastructure partners to harden key sites against terrorist attack or active shooter incidents.</p>		
Coordinating Organization	City Manager’s Office, Emergency Management, Department of Homeland Security, CIKR owners		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation		
Funding Source	General Fund and/or Grant Funding		
Comments	<p><u>TAS004-05</u>: New project (not included in the 2010 HMP). Work with sites and partners ongoing.</p> <p><u>TAS004-06</u>: New project (not included in the 2010 HMP). Work ongoing.</p> <p><u>TAS004-07</u>: New project (not included in the 2010 HMP). Work ongoing.</p> <p>Note: For security purposes partner names and sites not published.</p>		

Terrorism and Active Shooter Resource Directory

Federal Resources

Department of Homeland Security

12th & C Street SW
Washington, DC 20024
(202) 282-8000
www.dhs.gov

Federal Bureau of Investigations

935 Pennsylvania Avenue, NW
Washington, D.C. 20535-0001
(202) 324-3000
www.fbi.gov

Office of U.S. Attorneys

United States Department of Justice
950 Pennsylvania Avenue, NW, Room 2242
Washington, DC 20530-0001
(202) 514-2000
www.justice.gov/usao

U.S. Department of State

2201 C St. NW
Washington DC 20520
(202) 647-4000
www.state.gov

Other Resources

Publications

Blair, J. Pete, and Schweit, Katherine W. (2014). "A Study of Active Shooter Incidents, 2000 - 2013", Texas State University and Federal Bureau of Investigation, U.S. Department of Justice, Washington D.C.

FBI, "Domestic Terrorism in the Post 9/11 Era" (2009), Federal Bureau of Investigations, Washington D.C.

Murphy, K., "Is Homeland Security Spending Paying Off?" (2011), Los Angeles Times.

Terrorism Early Warning Group, "Terrorism Early Warning, 10 Years of Achievement in Fighting Terrorism and Crime" (2008), Los Angeles County Sheriff's Department.

United States Code, 18 U.S.C. § 2331 (2010), Government Publishing Office, Washington D.C.

SECTION 17. SEVERE WEATHER: EXTREME WIND

Category of Risk	Score	Description		Level of Risk
Probability / Frequency	2	Highly Possibly		Severe
Magnitude / Severity	2	Limited		High
Warning Time	1	More than 24 Hours		Moderate
Duration	2	More than 24 Hours	○	Low
CPRI Rating	1.85	Low		

Extreme Wind Hazard Information and Background

Severe weather manifests itself in the Santa Clarita Valley in many ways. Severe winds present a threat to health and safety and can lead to energy disruptions due to downed power lines, hazardous materials releases from overturned tanker trucks, and other events. Severe wind events impact entire regions and are not limited to the City of Santa Clarita.

Wind Damage Scales

Various scales for estimating the potential damage caused by various wind speeds have been developed. The Beaufort Scale developed by Sir Francis Beaufort in 1805 is commonly used and illustrates the effects that varying wind speeds can have on sea swells and structures.

Table 74 Beaufort Scale

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		
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.		

The table below provides another wind damage estimate scale. This scale describes the effects the wind can have on the community infrastructure at various speeds (Washington County Oregon Office of Consolidated Emergency Management, 2010).

Table 75: Effects of Wind Speed

Wind Speed (mph)	Wind Effects
0 - 24	Marginal affects.
25-31	Large branches and/or small trees in motion.
32-38	Trees begin to move significantly. Inconvenient to walk into the wind.
39-54	Twigs and small branches begin to break away from main trunks. Wind generally impedes progress when walking. High profile vehicles become difficult to control.
55-74	Potential damage to building mounted antennas. Some trees with shallow rot systems may be overturned.
75-95	Potential for minimal structural damage, particularly to unanchored buildings such as mobile homes. Power lines and street signs may be overturned.
96-110	Moderate structural damage to walls, roofs and windows. Large signs and branches blown down. Most vehicles uncontrollable on roadways.
111-130	Extensive structural damage to walls, roofs, and windows. Trees overturned. Mobile homes lifted and/or destroyed.
131-155	Extreme damage to structures. Trees entirely uprooted or snapped.
Greater Than 155	Catastrophic damage. Structures destroyed. Flying debris is lethal.

Regardless of the scale used, it is clear that extreme winds can have a significant impact on the City of Santa Clarita and the surrounding community.

Santa Ana Winds

“Santa Ana Winds” are generally defined as warm, dry winds that blow from the east or northeast (offshore). 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). 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. These winds occur below the passes and canyons of the coastal ranges of Southern California and in the Los Angeles basin.

The complex topography of Southern California combined with various atmospheric conditions creates numerous scenarios that may cause widespread or isolated Santa Ana events. Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon. 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 (28.8 mph). These winds accelerate to speeds of 35 knots (40.3 mph) as they move through the canyons and passes, with gusts up to 50 to 60 knots (57.5 mph to 69.0 mph).

The Santa Ana Wind Circulation Map (California Nevada Climate Applications Program (CNAP), University of California at San Diego, 2015) shows the direction of the Santa Ana winds as they travel from the stable, high-pressure weather system called the Great Basin High through the canyons and towards the low-pressure system off the Pacific. Clearly, the City of Santa Clarita is in the direct path of the ocean-bound Santa Ana winds

Clockwise circulation around the center of this high pressure area forces air down slope from the high plateau. The air warms as it descends toward the California coast at the rate of 5 degrees Fahrenheit per 1000 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. Resulting in low humidity and increase risk of wildfires.



Map 37: Santa Ana Wind Circulation Pattern

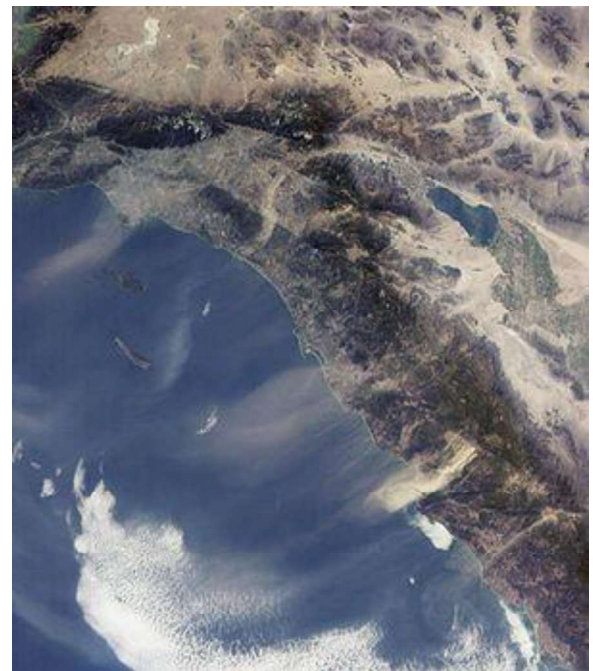


Figure 48: Santa Ana Wind Satellite Image

(NASA / JPL-Caltech, 2002)

Extreme Wind History

Santa Clarita is subject to continual strong winds. Although these winds are far from the force of a tornado, they still represent a significant threat to life and property. Between the months of October and March, winds may reach speeds of up to (and over) 60 miles-per-hour and occasional very high wind events have occurred in the past. A windstorm in the region can range from short term microburst activity lasting only minutes to a long duration, sustained wind event. Significant peak wind events identified by the National Weather Service (National Weather Service, National Climate Data Center, 2015) include the following high wind events for the Santa Clarita Valley Zone. Note: No property or crop damages were reported for any of the events listed in the Santa Clarita Valley Zone.

Table 76: Wind Data for the Santa Clarita Valley Zone 2000 to 2015

Date	Time	Type	Magnitude (Knots)	Magnitude (MPH)	Deaths	Injuries	Event Summary
12/30/2014	23:56	High Wind	54	62	0	0	Strong surface high pressure in the Great Basin generated strong and gusty north to northeast winds across sections of Ventura and Los Angeles counties. The strongest winds were reported in the mountains of Los Angeles county as well as the eastern valleys of Ventura county. Additionally, the northeast winds reached offshore to Catalina Island and resulted in the death of two people, including one harbor patrolman.
4/29/2014	8:56	High Wind	52	60	0	0	Surface high pressure, building into the Great Basin, generated a strong late-season Santa Ana wind event across Ventura and Los Angeles counties. In the mountains, northeast wind gusts in excess of 70 MPH were reported while northeast wind gusts in excess of 60 MPH were reported in some valley areas. As the winds developed, a couple of small wildfires occurred across the mountains of Ventura and Los Angeles counties, but did not grow to any significant levels.
12/9/2013	13:56	High Wind	54	62	0	0	The combination of strong surface high pressure in the Great Basin and a passing upper level low produced strong and gusty northeast winds across sections of Ventura and Los Angeles counties. In the mountains, wind gusts as high as 92 MPH were reported while wind gusts in excess of 60 MPH were reported in some valley areas.
10/4/2013	7:56	High Wind	55	63	0	0	Strong surface high pressure across the Great Basin generated strong Santa Ana winds across Southern California. The strongest winds occurred across Ventura and Los Angeles counties where northeast wind gusts as high as 90 MPH were recorded.

Date	Time	Type	Magnitude (Knots)	Magnitude (MPH)	Deaths	Injuries	Event Summary
5/2/2013	8:57	High Wind	56	64	0	0	Strong northeast Santa Ana winds developed across the mountains and inland valleys of Ventura and Los Angeles counties. Wind gusts as high as 74 MPH were reported. In Ventura county, the Santa Ana winds combined with hot and very dry conditions to help spread the Springs Fire which scorched over 24,000 acres.
4/8/2013	8:57	High Wind	69	79	0	0	An extended northerly wind event developed across Southwestern California. The combination of strong northerly (offshore) pressure gradient and strong winds above the surface produced northerly wind gusts between 65 and 85 MPH across sections of Ventura and Los Angeles counties.
2/23/2013	20:56	High Wind	52	60	0	0	Strong Santa Ana winds developed across the mountains and interior valleys of Ventura and Los Angeles counties. Strong surface high pressure developed in the Great Basin, generating a strong northeasterly pressure gradient. This strong surface gradient, combined with good upper level wind and thermal support, produced wind gusts in excess of 70 MPH.
10/26/2012	9:56	High Wind	50	58	0	0	A strong surface pressure gradient generated gusty north to northeast winds across Ventura and Los Angeles counties. Wind gusts as high as 81 MPH were reported in the mountains with gusts to near 60 MPH reported across interior valleys.
5/23/2012	20:57	High Wind	56	64	0	0	Strong and gusty winds affected the mountains of Los Angeles and Ventura counties as well as the Antelope Valley and the Santa Clarita Valley. In the mountains, northwest to north winds gusting over 70 MPH in some locations were reported. Across the Antelope Valley, gusty west to northwest winds developed with 50 power poles reported down due to the winds while wind gusts in the Santa Clarita Valley reached 64 MPH.
12/16/2011	19:57	High Wind	55	63	0	0	Another round of strong and gusty north to northeast winds developed across the mountains of Ventura and Los Angeles counties as well as the Santa Clarita Valley. Wind gusts between 58 and 78 MPH were reported.

Date	Time	Type	Magnitude (Knots)	Magnitude (MPH)	Deaths	Injuries	Event Summary
12/1/2011	0:57	High Wind	58	67	0	0	On December 1st, a strong north to northeast wind event, which developed on November 30th, continued across sections of Southern California. Widespread wind gusts between 60 and 70 MPH were reported across the mountains of Ventura county as well as the mountains and valleys of Los Angeles county through December 1st. Widespread power outages were reported, especially across the San Gabriel Valley where over 350,000 residents lost power. In the city of Pasadena, significant wind damage was reported with at least 42 buildings red-tagged due to wind damage. Along with the power outages, numerous trees were uprooted or severely damaged from La Canada-Flintridge to Monrovia. Strong northerly cross winds at Los Angeles International Airport resulted in 23 flights being diverted to Ontario International Airport.
11/1/2011	23:56	High Wind	50	58	0	0	Strong surface high pressure in the Great Basin along with strong north to northeast flow aloft generated strong Santa Ana winds across Ventura and Los Angeles counties. North to northeast wind gusts up to 83 MPH were reported in the mountains while gusts to 59 MPH were reported across the coastal plain.
3/7/2011	17:57	High Wind	62	71	0	0	Strong northwest to north winds developed across sections of Southwestern California. The strongest winds occurred in the mountains of Los Angeles and Ventura counties, the Antelope Valley and the Santa Clarita Valley. Sustained winds as high as 59 MPH were reported along with gusts as high as 76 MPH.
1/20/2011	12:56	High Wind	53	61	0	0	Strong surface high pressure in the Great Basin helped to generate a moderate Santa Ana wind event across Southern California. Strong northeast winds were reported across the mountains and valleys of Ventura and Los Angeles Counties.

Date	Time	Type	Magnitude (Knots)	Magnitude (MPH)	Deaths	Injuries	Event Summary
12/30/2010	0:57	High Wind	53	61	0	0	At the end of December, one final winter storm rolled across Central and Southern California. The storm produced between 0.50 and 1.50 inches of rainfall across the area. As the storm moved through the area, snow levels dropped to around 4000 feet. With the lowering snow levels, 4 to 8 inches of new snowfall was reported in the mountains. Along with the precipitation, this storm system produced strong and damaging northerly winds across the area. Wind gusts in excess of 60 MPH were reported both in the mountains and the valley areas of Southern California. With the ground already saturated from previous rainfall, the strong winds toppled many trees, producing scattered power outages and road blockages.
1/18/2010 - 1/20/2010	13:00 - 14:00	High Wind	56 - 50	64 - 58	0	0	A series of powerful winter storms affected Central and Southern California between the 18th and 22nd of January. As this series of storms moved across the area, they brought heavy rain, flash flooding, gusty winds, heavy snow and even severe weather to the area. By the 22nd, rainfall totals for this series of storms ranged from 4-8 inches over coastal areas to 8-16 inches in the foothills and mountains. Due to some very intense periods of rainfall, flash flooding and mud and debris flows occurred across the area. In the mountains of Ventura and Los Angeles counties, 1 to 3 feet of new snowfall was reported. Strong southerly winds were common as each storm moved across the area with wind gusts as high as 71 MPH reported in some spots. Along with the rain and snow, some severe weather occurred across the area with reports of waterspouts, straight-line winds and even a weak tornado in the city of Ventura.
12/22/2009	9:57	High Wind	51	59	0	0	A strong northwesterly wind event buffeted sections of Los Angeles and Ventura counties with strong winds. The strongest winds were reported in the mountains of Ventura and Los Angeles counties with wind gusts to 78 MPH recorded. However the strong and gusty winds did filter down into the Santa Clarita and San Fernando Valleys as well as the Antelope Valley.

Date	Time	Type	Magnitude (Knots)	Magnitude (MPH)	Deaths	Injuries	Event Summary
10/27/2009	9:36	High Wind	55	63	0	0	A powerful early-season storm dropped into the Great Basin. This storm produced very strong and gusty northerly winds. In the mountains of Los Angeles and Ventura counties, north winds gusting to 81 MPH were reported. The strong wind even filtered down to the valleys of Los Angeles county with wind gusts between 58 and 63 MPH reported while stations in the Antelope Valley reported sustained winds between 45 and 50 MPH. The strong winds did knock down some power lines and trees, producing numerous electric outages across the area.
1/10/2009	12:35	High Wind	63	72	0	0	The combination of strong surface high pressure over the Great Basin and a ridge aloft produced strong and gusty Santa Ana winds across Ventura and Los Angeles counties. Across the higher terrain, wind gusts as high as 73 MPH were reported.
11/15/2008	3:00	High Wind	57	66	0	0	An extended period of offshore winds affected Southern California. North to northeast wind gusts in excess of 65 MPH were reported in some areas. The strong winds, combined with very dry conditions, helped fuel two significant wildfires. The Tea Fire, near Montecito in Santa Barbara county, burned 1,940 acres. The Sayre Fire, north of Sylmar in Los Angeles county, burned 11,262 acres. Both fires produced significant loss of residences.
3/2/2008	12:41	High Wind	51	59	0	0	Strong north to northeast pressure gradients developed across Southern California, producing gusty north to northeast winds across the mountains of Ventura and Los Angeles counties as well as the Santa Clarita Valley.
1/16/2008	15:35	High Wind	50	58	0	0	Strong surface high pressure in the Great Basin produced a moderate Santa Ana wind event across Southern California. Sustained winds between 20 and 40 mph with gusts as high as 80 mph were reported across Ventura and Los Angeles counties. The Santa Ana winds knocked down numerous trees and power lines, producing scattered power outages.
12/26/2007	16:36	High Wind	56	64	0	0	Yet another round of gusty Santa Ana winds affected sections of Southern California. Gusty north to northeast winds affected the mountains of Ventura and Los Angeles counties as well as the Santa Clarita Valley.

Date	Time	Type	Magnitude (Knots)	Magnitude (MPH)	Deaths	Injuries	Event Summary
10/21/2007	6:30	High Wind	60	69	0	0	Between October 20th and 24th, strong surface high pressure developed over the Great Basin and produced a strong and long-lasting Santa Ana wind event across Southern California. This particular Santa Ana wind event was the strongest and most widespread in recent memory with peak wind gusts over 100 mph reported at Laguna Peak and Whitaker Peak. The offshore winds produced very warm and dry conditions across Southern California which led to 9 different wildfires across Santa Barbara, Ventura and Los Angeles counties. Four of the wildfires exceeded 700 acres with one fire burning nearly 60,000 acres.
1/5/2007	3:36	High Wind	56	64	0	0	An inside slider brought gusty offshore winds and light precipitation to the area. Across Santa Barbara, Ventura and Los Angeles counties, strong and gusty north to northeast winds were reported across the mountains and valleys. Wind gusts between 60 and 80 MPH were reported with a peak gust of 98 MPH reported at Laguna Peak in the coastal mountains of Ventura county. Light precipitation was reported across the area with most areas receiving less than one-half inch of rainfall.
12/27/2006	16:35	High Wind	50	58	0	0	The main weather associated with this storm system was the gusty offshore winds that developed behind the storm. The gusty winds affected Santa Barbara, Ventura and Los Angeles counties and gusted as high as 100 MPH. Widespread power outages were reported across the area due to downed power lines. The winds also damaged numerous orchards across Santa Barbara and Ventura counties, resulting in over \$15 million dollars of crop damage. In Lake Casitas, the winds damaged a large boat dock, scattering numerous boats across the lake. One injury due to a falling tree was reported at a campground in Santa Barbara county. Large ocean waves also occurred during this event and resulted in the death of one man who was trying to save two family members who were swept into the ocean by the large waves. The two family members swept into the ocean were eventually saved.

Extreme Wind Probability, Frequency, and Magnitude

Santa Clarita can and does experience high winds at any time of the year. While local winds are generally below 50 MPH, higher velocities sustained winds exceeding 70 MPH (with higher wind gusts) are possible. Common effects of high winds in Santa Clarita include the overturning of trees, and creating unsafe driving conditions for motorists on the local roads and freeways. In some cases, strong winds can reach a force great enough to threaten above ground utilities. Consequently the potential for utility failure is a realistic threat. This is compounded by the fact that most of the high wind events occur during the summer months when the demand on the power grid is at its height. Based on the history of the region; windstorm events can be expected annually across widespread areas of the region.

Extreme Wind Vulnerabilities

Life and Property

Both residential and commercial structures with weak reinforcement are susceptible to damage. Wind pressure can create a direct and frontal assault on a structure, pushing walls, doors, and windows inward. Conversely, passing currents can create 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 community, such as, downed trees, power lines, and damage to property, this can create a major hindrance to emergency response and disaster recovery.

Utilities/ Infrastructure

Windstorms can damage buildings, power lines, and other property and infrastructure due to falling trees and branches. During wet winters, saturated soils can cause trees to become less stable and more vulnerable to uprooting from high winds. Historically, falling trees have been the major cause of power outages in the region. Windstorms, such as Santa Ana wind conditions, can cause flying debris and downed utility lines. For example, tree limbs breaking in winds of only 45 mph can be thrown over 75 feet. As such, overhead power lines can be damaged even in relatively minor windstorm events. Falling trees can bring electric power lines down to the pavement, creating the possibility of lethal electric shock.

Windstorms can result in collapsed or damaged buildings or blocked roads and bridges, damaged traffic signals, streetlights, power poles, communications towers, and other infrastructure damage. Furthermore, roads blocked by fallen trees during a windstorm may have severe consequences to people who need access to emergency services. Emergency response operations can be complicated when roads are blocked or when power supplies are interrupted. Industry and commerce can suffer losses from interruptions in electric services and from extended road closures. They can also sustain direct losses to buildings, personnel, and other vital equipment. There are direct consequences to the local economy resulting from windstorms related to both physical damages and interrupted services. For example, in late 2011 a severe windstorm struck in the nearby San Gabriel Valley. During the event, 70 mph winds resulted in thousands of downed trees, fallen power lines causing wide area outages (more than 400,000 customers of Southern California Edison were impacted), school closures, and the displacement of some residents. The resulting damage to the public infrastructure was estimated at \$33 million (Funes, 2011).

Increased Wildfire 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/wild land 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. The higher fire hazard raised by a Santa Ana wind condition requires that even more care and attention be paid to proper brush clearances on property in the urban/wildlife interface areas.

Santa Ana winds can cause considerable damage, particularly because they are fast, hot, and dry. Generally speaking, Santa Ana winds create ideal conditions for the rapid start and spread of wildfires. The fires that burned in and around the Santa Clarita Valley in October of 2003 were made far more dangerous by the Santa Ana winds which continually changed directions and allowed the fire to spread extremely quickly. Eventually, the fire threatened thousands of homes in the western Santa Clarita Valley before firefighters gained control of the blaze.

The winds are also associated with some of the area's largest and deadliest wildfires, including the state's largest fire on record, the Cedar Fire as well as the Laguna Fire, Old Fire, Esperanza Fire, Santiago Canyon Fire of 1889 and the Witch Fire. In October 2007 the winds fueled major wild fires in Escondido, Malibu, Rainbow, San Marcos, Carlsbad, Ranch Bernardo, Poway, and in the major cities of San Bernardino, San Diego and Los Angeles. The Santa Ana winds were also a factor in the November 2008 California and May 2014 San Diego County wildfires.

Transportation

Windstorm activity can have an impact on local transportation. The problems caused by downed trees and electrical wires blocking streets and highways, are just a few problems caused by windstorms. During periods of extremely strong Santa Ana winds, major highways can be temporarily closed to truck and recreational vehicle traffic. However, typically these disruptions don't regularly occur in Santa Clarita and are not long lasting when they do occur, nor do they carry a severe long-term economic impact on the region. Nevertheless the risk remains and the situation could become a major disaster in the event of a hazardous materials accident caused by extreme winds.

Existing Mitigation Activities

Severe Wind Emergency Response and Volunteer Weather Spotters

Severe wind can result in the involvement of City of Santa Clarita emergency response personnel. In addition, to assist the City of Santa Clarita and the National Weather Service with maintaining situational awareness during high wind events, weather spotter volunteers are used to provide real-time information all around the city. In all, there are 81 volunteer weather spotters in the City that have been trained by the National Weather Service about severe weather hazards.

Partnerships

The City of Santa Clarita continually works with Southern California Edison to mitigate the damage to the electrical infrastructure due to wind events. This includes the installation of underground utility lines and an active tree removal program to eliminate dead trees in the area.

Hazardous Tree Mapping and Tree Removal Program

The City of Santa Clarita works with Urban Forestry to coordinate efforts for mapping potentially hazardous trees. In addition, the City has a portal for the public to report the locations of trees that may pose a risk. The City also has an ongoing tree removal program to mitigate the damage caused by falling trees during a wind event.

Extreme Wind Mitigation Strategies and Action Items

The extreme wind strategies and action items provide guidance on specific activities that agencies, organizations, and residents in the City of Santa Clarita can undertake to reduce risk and prevent loss from extreme wind events. Each action item is followed by activities for implementation, which can be used by the Steering Committee and local decision makers in pursuing strategies for implementation. Note: Only current and active strategies are listed. The status and disposition of strategies for completed, removed, or re-allocated activities from the 2010 City of Santa Clarita Hazard Mitigation Plan are summarized in Section 5: Hazard Mitigation Strategies and Action Items of this HMP. Additional strategies and mitigation actions related to wind-related electrical power outages are provided in the Energy Disruption Section of this HMP.

Strategy Number	Priority	Timeline	Status
SW-EW001 (previously SW4)	Moderate	Ongoing	SW-EW001-01: Ongoing SW-EW001-02: Ongoing SW-EW001-03: Ongoing
Strategy Description	Enhance programs to keep trees from threatening lives, property, and public infrastructure during windstorm events.		
Activities	SW-EW001-01: Partner with responsible agencies and organizations to design and disseminate education information to property owners to reduce risk from tree failure to life, property, and utility systems. SW-EW001-02: Develop partnerships between utility providers and City/County local public works agencies to document known hazard areas. SW-EW001-03: Identify and track potentially hazardous trees.		
Coordinating Organization	Urban Forestry, Landscape Maintenance District, LA County Fire, Utilities		
Plan Goals Addressed	Protect Life and Property Natural Systems		
Funding Source	General Fund		
Comments	<p><u>SW-EW001-01</u>: Urban Forestry distributes informational brochures published by the International Society of Arboriculture (ISA) to residents during special events and routine field work. This information includes "How to Recognize Hazardous Trees." The Urban Forestry Division is also active in professional tree organizations, which are comprised of both municipal and private tree professionals. Specifically, the City is involved with Street Tree Seminar (STS), where 85% of members/attendees are from other municipal agencies. Through seminars and meetings at STS, City staff are able to network with other agencies on different methods used for emergency response.</p> <p><u>SW-EW001-02</u>: Urban Forestry has a positive working relationship with Southern California Edison (SCE). In a cooperative effort, Urban Forestry and SCE provide residents with informational brochures to guide them in selecting an appropriate tree for situations where power lines exist. Both agencies provide ISA's "Right Tree, Right Place" brochure as a guideline for homeowners. The City has partnered with SCE to remove inappropriate trees located under power lines and replace those trees with trees that will not interfere with those lines; the program removes potentially hazardous trees (when grid pruning is performed) at no cost to residents.</p>		

Strategy Number	Priority	Timeline	Status
SW-EW001 (continued)	<p>SW-EW001-03: Urban Forestry uses a tree inventory program (Arbor Pro) that allows it to track, monitor, and address potentially hazardous trees in its inventory. In addition, Urban Forestry participates in the City's eService system (CRM) that residents can use to report hazardous trees to officials. All concerns that are submitted are then inspected by Urban Forestry staff and any corrective actions needed are identified.</p> <p>Additionally, Urban Forestry staff respond to reports of fallen tree limbs on a daily basis, performs routine inspections on major thoroughfares, and continues to identify dead trees in neighborhoods across the City.</p>		

Strategy Number	Priority	Timeline	Status
SW-EW002 (previously SW5)	Moderate	2 years	SW-EW002-04: Complete Monitoring Ongoing
Strategy Description	Enhance strategies for debris management for windstorm events.		
Activities	SW-EW002-04: Develop coordinated management strategies for clearing debris from roads of fallen trees, and clearing debris from public and private property.		
Coordinating Organization	Public Works Department		
Plan Goals Addressed	Protect Life and Property Emergency Services		
Funding Source	General Fund		
Comments	<p>SW-EW002-04: Santa Clarita's Debris Management Plan includes:</p> <ul style="list-style-type: none"> • Phase 1 - Debris is moved to allow for movement of emergency vehicles for emergency response purposes. • Phase 2 - A coordinated debris removal from the public right of way initiated. Determination of whether additional contractors/agencies are needed is based on the severity of the event. <p>Debris monitoring also takes place to measure truck capacities, identification of hazardous waste, and identify recyclable materials within debris.</p> <p>Urban Forestry receives emergency calls and responds to each location to resolve issues by securing the public right of ways. Outside contractors may be called in for severe conditions. The Streets Division will respond and will also contract out to private contractors in severe situations.</p> <p>Both Urban Forestry and Street Maintenance have a standard out-call procedure for emergencies. Designated employees are on-call at all times and on weekends in the event an emergency occurs, and a 30-minute response time is standard.</p> <p>Entering the fall of 2015, Urban Forestry is working with other departments to actively monitor the overall health of forests, focusing efforts on removing dead trees, and proactively pruning/deep watering trees along major thoroughfares in an effort to minimize limb and complete tree failures as a result of drought.</p>		

Strategy Number	Priority	Timeline	Status
SW-EW003 (previously SW6)	Moderate	2 years	SW-EW003-05: Ongoing SW-EW003-06: Ongoing
Strategy Description	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.		
Activities	SW-EW003-05: Open a dialogue with local utility companies to increase the use of underground utilities where possible. SW-EW003-06: Participate in the Underground Utilities Program		
Coordinating Organization	Public Works Department, Planning Division and Southern California Edison		
Plan Goals Addressed	Protect Life and Property Emergency Services		
Funding Source	General Fund		
Comments	<u>SW-EW003-05</u> : Zoning codes require underground power lines that handle voltage amounts in excess of 34KV. The City cooperates with local utilities upon redevelopment of property on a project-by-project basis. <u>SW-EW003-06</u> : No action taken concerning this item during this period. This action would be based on available opportunity in development/redevelopment.		

Strategy Number	Priority	Timeline	Status
SW-EW004 (previously SW7)	High	5 Years	SW-EW004-07: Ongoing SW-EW004-08: Removed
Strategy Description	Create a localized map that charts seasonal dominant wind speeds and directions.		
Activities	SW-EW004-07: Expand Weather Spotters program for high winds and extreme weather to pinpoint areas that are hardest hit in the City. SW-EW004-08: Coordinate with public/private weather entities to obtain weather data and create various weather maps.		
Coordinating Organization	Tech Services. Division, National Weather Service, US Forest Service, and LACoFD		
Plan Goals Addressed	Protect Life and Property Partnerships and Implementation Emergency Services		
Funding Source	General Fund		
Comments	<u>SW-EW004-07</u> : The City continues to host a national weather service spotter training on a yearly basis. There are currently 110 identified weather spotters in the Santa Clarita Valley. <u>SW-EW004-08</u> : The City re-evaluated the need for this activity and removed it from the list since it continually works with other agency partners to coordinate weather related mapping, response, and mitigation activities. For example the City's GIS Department utilizes weather data models and mapping tools provided by the National Weather Service and its website.		

Severe Weather: Extreme Wind Resources

California Nevada Climate Applications Program (CNAP)

Climate Research Division, Scripps Institution of Oceanography

University of California - San Diego

9500 Gilman Drive, La Jolla, CA 92093-0224

<http://meteora.ucsd.edu>

<http://cnap.ucsd.edu>

National Oceanic and Atmospheric Administration

National Weather Service

1325 East West Highway

Silver Spring, MD 20910

www.ncdc.noaa.gov

NOAA/JPL-Caltech

National Oceanic and Atmospheric Administration

1401 Constitution Avenue, NW Room 5128

Washington, DC 20230

<http://photojournal.jpl.nasa.gov/catalog/PIA03445>

Washington County Oregon Office of Consolidated Emergency Management

155 N First Ave.

Hillsboro, Oregon 97124

OCEM Windstorm Handout for Personal Preparedness

<http://www.co.washington.or.us>

Publications

Windstorm Top Local News Story of 2011, December 29, 2011

Juliette Funes

Pasadena Star News

911 E Colorado Blvd

Pasadena, CA 91106

SECTION 18. PUBLIC PROCESS

Public Education and Awareness Programs

Public involvement is a critical element to the strategic planning processes. Public participation offers citizens the chance to voice their ideas, interests, and opinions. The City of Santa Clarita Hazard Mitigation Plan uses a variety of methods for public input into the planning process and to distribute hazard mitigation information. Methods include the following:

- Media outlets such as local newspapers, local magazines, the City of Santa Clarita website, cable television public service announcements, and at various community meetings and organizations
- Community Emergency Response Training (CERT) member announcements
- City managed social media outlets including the City Briefs Blog, Facebook, YouTube, Twitter, Flickr, Periscope, Snapchat, and Instagram
- Nixle Community Information Service
- eNotify – Email Notification System
- Santa Clarita Emergency Communications Team (SCECT) – Amateur radio volunteers
- Public workshops and meetings to identify community hazards, obtain ideas regarding hazard mitigation goals and actions for the plan, and to distribute current risk and mitigation information
- On-line hazard mitigation survey on the City’s website

Public involvement ensures that the HMP and strategies reflect local community issues, concerns, and views on mitigation opportunities and action items. The Federal Emergency Management Agency also requires public input during the development of mitigation plans.

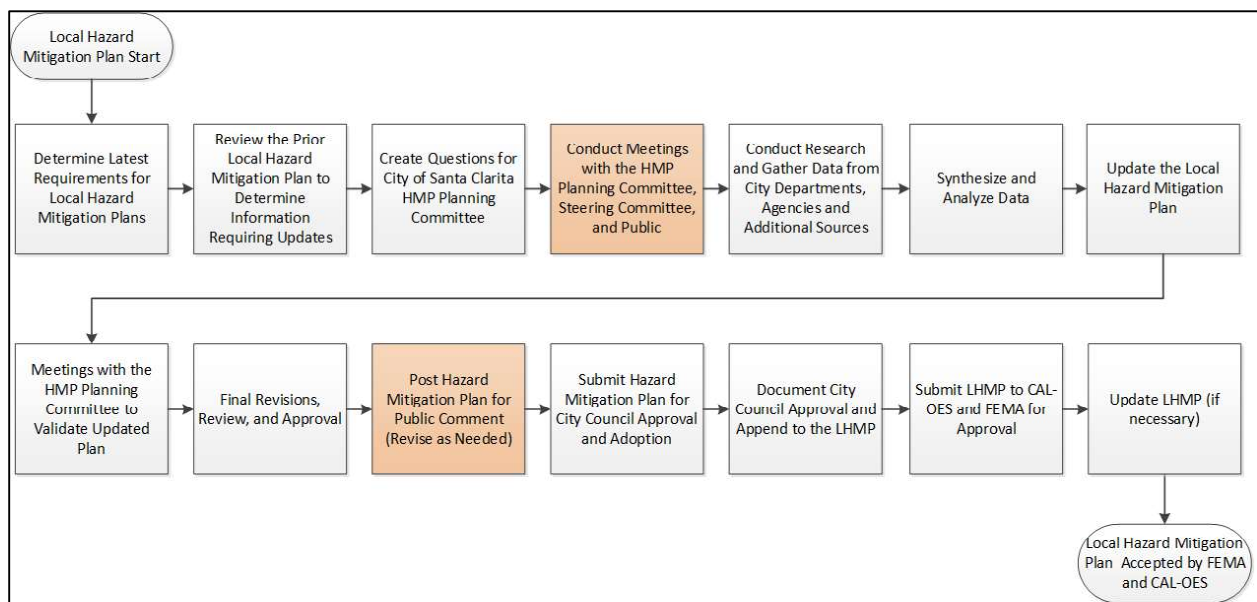


Figure 49: HMP Planning Process – Public Process Components

Media Announcements

The following samples provide examples of media announcements related to hazards and mitigation planning.

The Santa Clarita Valley Signal

Residents encouraged to provide input on hazard mitigation plan

July 27, 2015

Local residents are encouraged to provide input on the City of Santa Clarita's **2015 Hazard Mitigation Survey**, which will help city officials identify, evaluate and assess ways to lessen the impact of damage during natural disasters. The survey is available online now through Saturday, August 15, 2015.

Every five years, as part of the public process, the City of Santa Clarita evaluates what can be done through damage prevention. The City's Hazard Mitigation Survey allows residents to weigh in on preparedness in the event of an emergency. Through the community's input and measures such as, creating and enforcing effective building codes and engineering buildings and infrastructures to withstand earthquakes, the impact on lives and the community is lessened.

Mitigation is the cornerstone of emergency management and resident participation is very important and appreciated. The survey can be accessed by visiting www.surveymonkey.com/r/SCHazardSurvey2015. For more information on the 2015 Hazard Mitigation Survey or other emergency preparedness information, contact the City's Emergency Services Supervisor, Donna Nuzzi, at (661) 250-3721 or emergencymanagement@santa-clarita.com.

<http://www.signalscv.com/section/36/article/140343/>

Figure 50: Santa Clarita Valley Signal HMP Survey Announcement



Figure 51: Santa Clarita Gazette HMP Survey Announcement

CERT Program

The City of Santa Clarita works with the Los Angeles County Fire Department to manage its Community Emergency Response Training (CERT) Teams. In addition to adding to local emergency response capabilities, CERT provides the City with an opportunity to distribute and promote hazard mitigation actions via public volunteers.

Social Media

The City of Santa Clarita utilizes multiple forms of social media to exchange information with the public. Methods of communication include social media outlets including the City Briefs Blog, Facebook, YouTube, Twitter, Flickr, Periscope, Snapchat, and Instagram. These methods provide a means for quickly promoting hazard mitigation and keeping the public up-to-date in the event of a major disaster.

Nixle

The City of Santa Clarita also operates a Nixle Community Information Service to distribute information directly to subscribers via text messages, Email notifications, and social media. While messages generally involve emergency notifications, the subscriber base can also be used for communicating hazard information and notices. Residents are encouraged to sign-up to receive messages and notifications from SCSEMERGENCY.

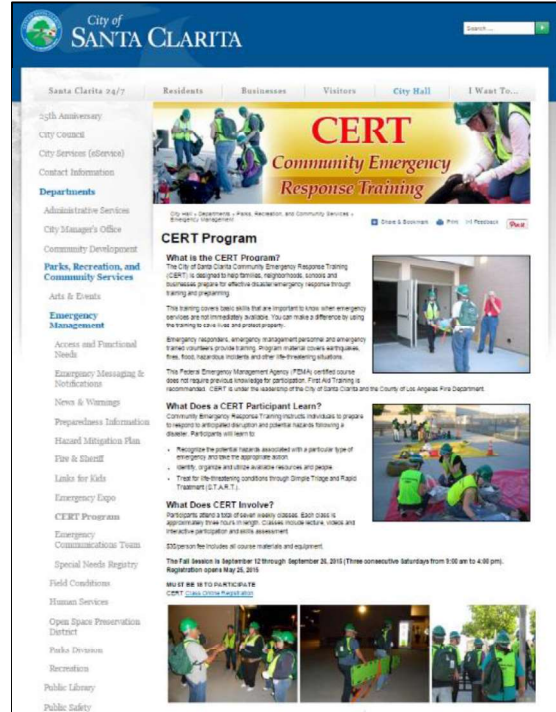


Figure 52: Santa Clarita CERT



Figure 53: Santa Clarita Facebook

Public Hazard Mitigation Planning Workshop

A public meeting was conducted on September 10, 2015 to provide the public with information and solicit input for the 2015 City of Santa Clarita Local Hazard Mitigation Plan.

Location	City of Santa Clarita Activities Center 20880 Centre Pointe Parkway, Santa Clarita
Date / Time	9/10/2015 6:00 PM to 7:00 PM

Workshop Sign-in Sheet

(Note: Addresses, Phone Numbers, and E-mail Addresses masked to maintain personal privacy)

City of Santa Clarita Hazard Mitigation Plan Community Meeting September 10, 2015	
Name	Agency/Organization Name
JOE WOOD	
REX DREW	CCAC
ALAN FERDINIAN	CCAC
BRAND STOKER	City of Los Angeles
Chase Nugent	
DONNA NOZZI	BCIA / CITY OF SANTA CLARITA
Bob Takemura	MLC
TASIN BAKER	MLC
Frederick Kuna	MLC
Lynn Rafael	
Nancy Turner	
Rod Fierro	city of Santa Clarita

Figure 54: Community Meeting Sign-in Sheet

Workshop Results

The public workshop resulted in valuable input and insights from the local community. Key points from the meeting are summarized below.

Public HMP Update Meeting Notes

September 10, 2015

6:00 PM – 7:00 PM

General Public Meeting

Hazards Discussion: The revised list of hazards for the 2015 HMP were reviewed. The list was expanded from 5 named hazards to 11. This included separating Drought, Heat, and Wind into individual categories from the 2010 HMP list under “Severe Weather”. In addition, three new hazards were added: Energy Disruption, Cyber Attack, and Terrorism.

Community members were asked for their input on the revised list and what their major concerns were and if additional hazards should be added to the list. No additional hazards were suggested however the following issues were discussed:

- Communications Disruption
 - Question: How are communications addressed?
 - Response: Communication is a sub-set of all planning efforts.
- Bridge Safety/Mitigation Measures
 - Question: Bridges are sometimes washed out during floods, how is this addressed?
 - Response: The City has been working on improving bridges, i.e., Soledad Bridge is a good example of work done to prevent damage from flooding.
- Single Point of Failure Issues
 - Question: There is one hospital serves the entire city – there is a need to make sure we identify them in the plan and talk about how to mitigate against losing them
 - Response: That is a valid concern but not under the jurisdiction of the City. What the City is doing is working with Henry Mayo Newhall Hospital and local emergency response agencies to coordinate efforts in the event of a major disaster.
- Brush Clearance
 - Question: What about easements? Who is responsible for brush clearance? Is it a City or County responsibility?
 - Response: Responsibility depends on the location. Some areas are County maintained. On private land, responsibility varies based on the exact easement. For example, utility easements are generally restricted to access to power poles only and the property owner is responsible for general maintenance.
- Large Development Projects (including accompanying ingress/egress issues)
 - Question: Some development projects add too many homes and cars to neighborhoods causing parking problems on a daily basis as well as ingress/egress issue in the event of evacuations. Who is responsible for controlling development and issuing permits? Why are permits allowed that do not take these issues into account?
 - Response: Planning approvals are the responsibility of the City’s Planning Department. Please contact the Planning Department directly.

Other Public Meetings and Events

The following public meetings and events were held to provide mitigation and emergency response information to the public. These meetings and events also provided the public with a means for providing input and feedback to the City.

Mitigation Activity Reference Number	Activity Description
MH003-10	City staff continues to conduct ongoing outreach events and workshops with private schools and daycare providers. For example, in 2011-2012, ten educators from private schools participated in the CERT program.
MH003-11	Outreach to stakeholders with the First Start Program to promote the importance of parental education on the role of schools during emergencies is ongoing.
MH003-12	<p>The City, in coordination with the Community and Law Enforcement Awareness Response Committee (CLEAR), the LACSD, and the Santa Clarita Valley Committee on Aging, contributed to the development of a special needs registry. Continuously maintained by the City and the Santa Clarita Valley Sheriff's Station, the registry assists law enforcement to identify individuals who cannot identify themselves due to a disability or special need, such as Alzheimer's, autism, or a speech disorder. Law enforcement personnel can view updates to the Registry in real-time. This registry has improved the effectiveness of search and rescue operations involving persons with disabilities or special needs.</p> <p>Santa Clarita Transit meets on a monthly basis with its Accessibility Advisory Group. Information is routinely distributed at these meetings. The AAC was established by the City of Santa Clarita Transit for the purpose of providing guidance on the quality of its programs and services for seniors and persons with disabilities. Staff also works closely with the Special Education program at the William S. Hart Union High School District.</p>
MH003-13	Ongoing coordination occurs during the annual October Great Shakeout drill. Amateur radio capabilities, cell phone, and landline coordination are tested.
MH003-14	City staff are regularly invited to Parent-Teacher Association meetings to conduct outreach and provide materials on emergency preparedness as well as detailing how the City coordinates with community partners (i.e. schools) during emergencies.

Mitigation Activity Reference Number	Activity Description
MH004-15	<p>Training for the CERT program continues in cooperation with the LACFD and L.A. Sheriff's CERT Volunteer program. All students are taught by LACFD firefighters. The following numbers illustrate the number of participants who completed CERT training:</p> <ul style="list-style-type: none"> • 2010-2011: 125 participants • 2011-2012: 134 participants • 2012-2013: 147 participants • 2014-2015: 172 participants.
MH004-16	<p>The City continues to be a sponsor at the SCV Emergency Expo. The event can include companion events with other partners. For example:</p> <ul style="list-style-type: none"> • In 2011-2012 the Expo was produced by the local radio station KHTS AM 1220 as a companion event to the station's Home and Garden show; attendance was in excess of 2,000 people. • In 2012-2013, 160 people directly engaged at the City's expo booth. They participated in a quiz, with the opportunity to win prizes. Nine City CERT members volunteer at the booth operations. • In FY 2014-2015, 11 CERT volunteers were involved in an Emergency Expo Booth that engaged 541 attendees with a Preparedness "Wheel Game".

2015 Hazard Mitigation Survey

In July 2015, the City of Santa Clarita posted and advertised a public survey. The purpose of the survey was to provide the public with an opportunity to provide input into the 2015 HMP. The survey was used to gather current information from the community related to hazard risks, concerns, experiences, personal preparedness levels, and potential mitigation strategies. In total, the survey resulted in 377 individual responses. The following sections provide a summary of the results of the survey.

Top Hazards

In terms of the top 3 identified hazards, respondents rated Drought as their top concern, followed by Earthquake and Wildfire. The ranking of concerns generally matched those established by the City.

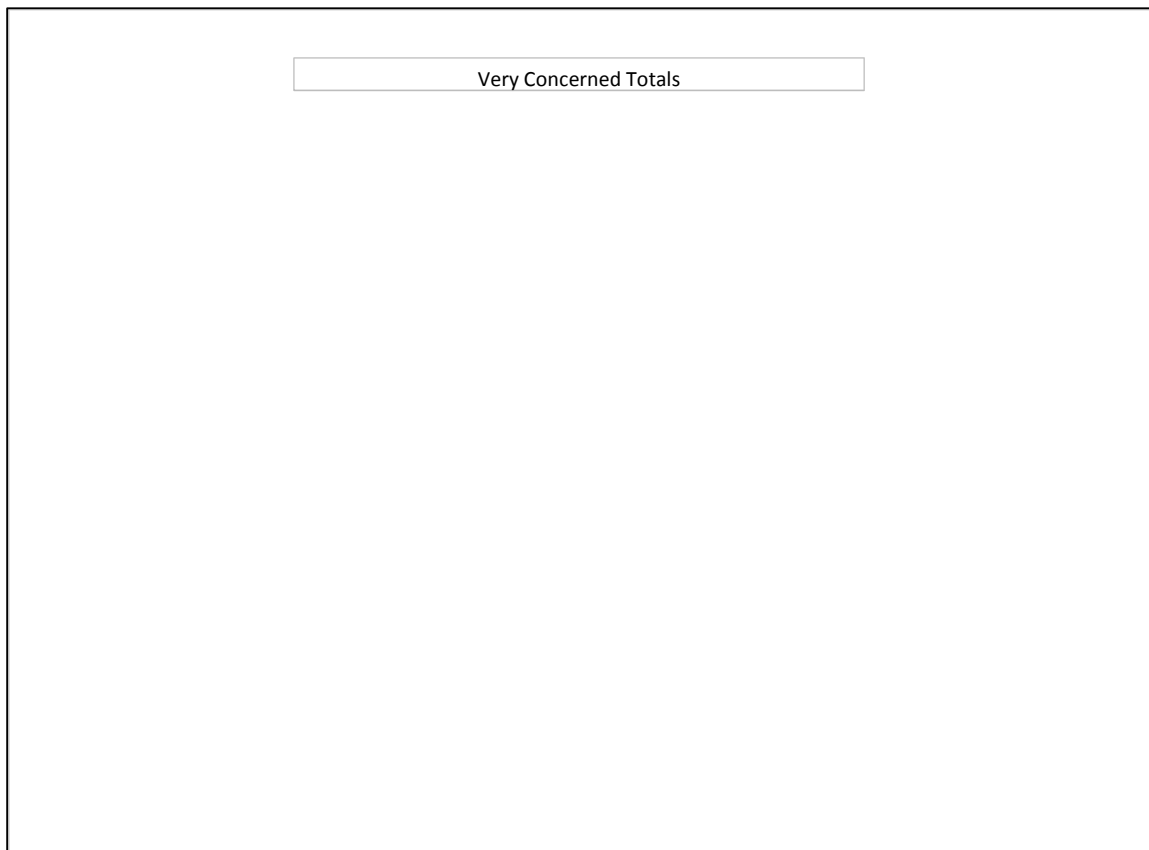


Figure 55: 2015 Survey Top Hazards

Other concerns expressed by individual respondents (1 to 2 each) included:

- Air Quality
- Mass Evacuation Planning
- Overdevelopment
- Pollution (CEMEX, Chiquita Expansion, LubeCo)
- Pollution (Groundwater)
- School Violence (Student-on-Student)
- Senior Safety and Care
- Terrorism
- Wildwood Fire Burn Area Debris

Table 77: 2015 Survey Hazard Rankings

How concerned are you with the following hazards?	Very Concerned	Somewhat Concerned	Not Very Concerned	Not at All Concerned	No Opinion
Severe Weather: Drought	251	96	127	51	53
Earthquakes	238	117	120	40	44
Wildfires	232	113	83	27	88
Utility Failure: Water	172	129	110	27	53
Utility Failure: Power Outage	139	132	101	27	52
Severe Weather: Heat	128	93	109	38	73
Cyber Attack	121	127	82	23	63
Utility Failure: Natural Gas	106	153	86	12	35
Hazardous Materials: Freeway/Roads	89	147	62	17	59
Hazardous Materials: Industry	83	136	75	17	52
Severe Weather: Wind	80	155	62	11	33
Hazardous Materials: Railroad	73	150	52	13	31
Earth Movement: Sink Hole	53	159	47	6	19
Earth Movement: Landslide	53	148	58	9	27
Earth Movement: Mud Flow	50	136	30	9	20
Liquefaction	47	122	15	3	2
Flood	42	119	11	1	4
Dam Failure	38	100	14	4	4

Previous Hazard Experience

The top 3 responses in terms of prior experiences that directly impacted residents were: Wildfire, Drought, and Power Outage (Earthquake ranked just below Power Outage).

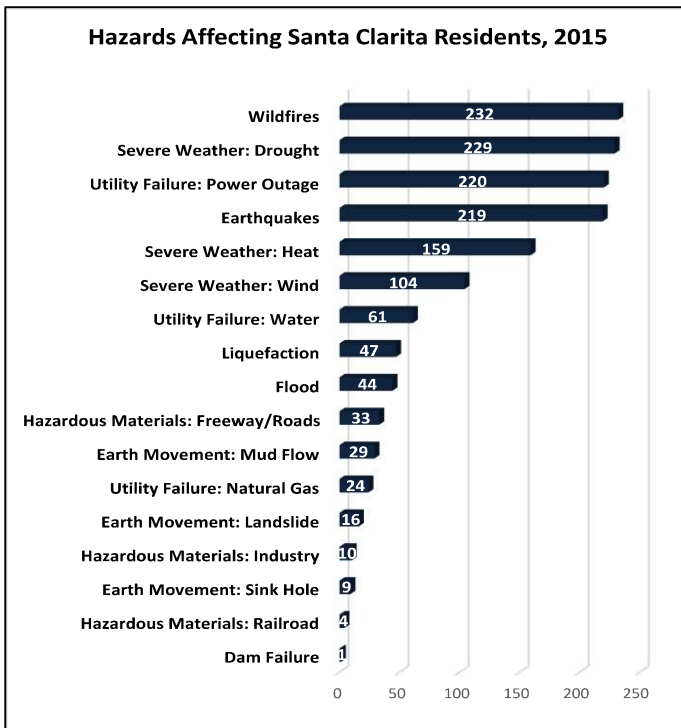


Figure 56: 2015 Survey Hazard Experience

Table 78: 2015 Survey Hazard Experience Rankings

Has any one of these hazards directly affected you while living in Santa Clarita?	
Wildfires	232
Severe Weather: Drought	229
Utility Failure: Power Outage	220
Earthquakes	219
Severe Weather: Heat	159
Severe Weather: Wind	104
Utility Failure: Water	61
Liquefaction	47
Flood	44
Hazardous Materials: Freeway/Roads	33
Earth Movement: Mud Flow	29
Utility Failure: Natural Gas	24
Earth Movement: Landslide	16
Hazardous Materials: Industry	10
Earth Movement: Sink Hole	9
Hazardous Materials: Railroad	4
Dam Failure	1

Other hazard experience noted by individuals (1 to 2 responses each) were:

- Road Blockages
- Wild Animals
- Air Quality
- Effects on the Elderly

Previous Hazard Experience – Multiple Occurrences

The top 3 responses in terms of prior experiences that occurred more than once that directly impacted residents were: Wildfire, Power Outage, and Severe Heat (Drought ranked just below Severe Heat).

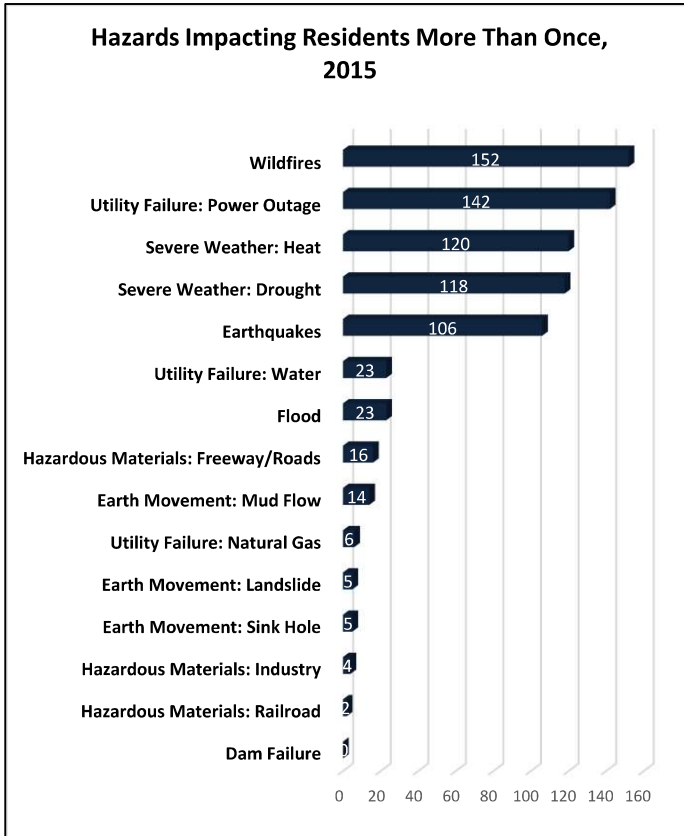


Table 79: 2015 Survey Hazard Experience – Multiple Occurrence Rankings

Has any one of these hazards directly affected you more than once while living in Santa Clarita?	
Wildfires	152
Utility Failure: Power Outage	142
Severe Weather: Heat	120
Severe Weather: Drought	118
Earthquakes	106
Utility Failure: Water	23
Flood	23
Hazardous Materials: Freeway/Roads	16
Earth Movement: Mud Flow	14
Utility Failure: Natural Gas	6
Earth Movement: Sink Hole	5
Earth Movement: Landslide	5
Hazardous Materials: Industry	4
Hazardous Materials: Railroad	2
Dam Failure	0
Wildfires	152
Utility Failure: Power Outage	142

Figure 57: 2015 Survey Hazard Experience – Multiple Occurrences

Other hazard experience with multiple occurrences noted by individuals (1 response each) were:

- Air Quality
- Fallen Trees
- Road Blockages
- Utility Failure: Electric (Non-Natural)
- Wild Animals

Residence Type

The majority of respondents reported that they live in Single-family structures (nearly 80%) with another 9% in Condominiums and 4% in Manufactured Homes. While some may be renters, the majority are likely to be owners with control over their property decisions.

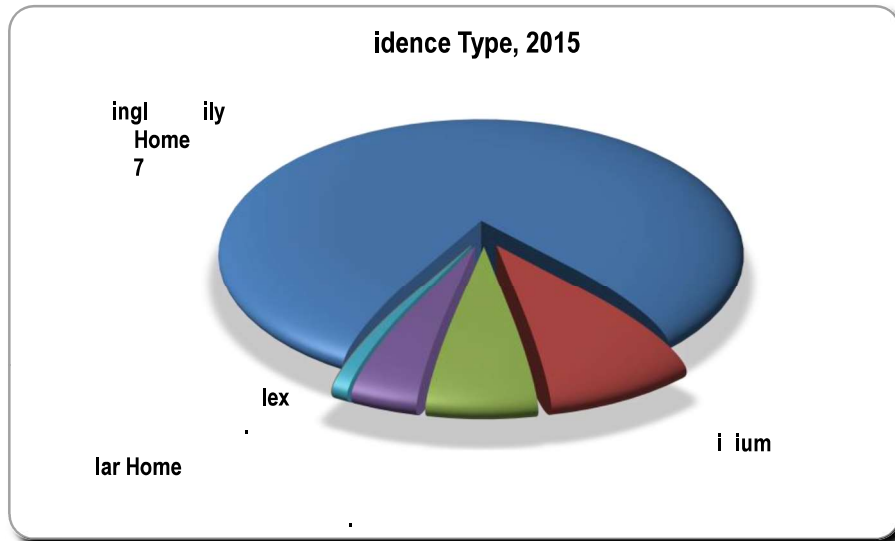


Figure 58: Residence Types

Disaster Preparedness and Mitigation Information

Survey respondents were asked if they had ever received information about how to make their families and homes safer from a disaster. A clear majority (85%) answered “Yes” demonstrating that public awareness is high. Nevertheless there is a significant portion (nearly 15%) that responded “No”. Consequently the City must consider what additional actions could be taken to further promote disaster preparedness and mitigation.

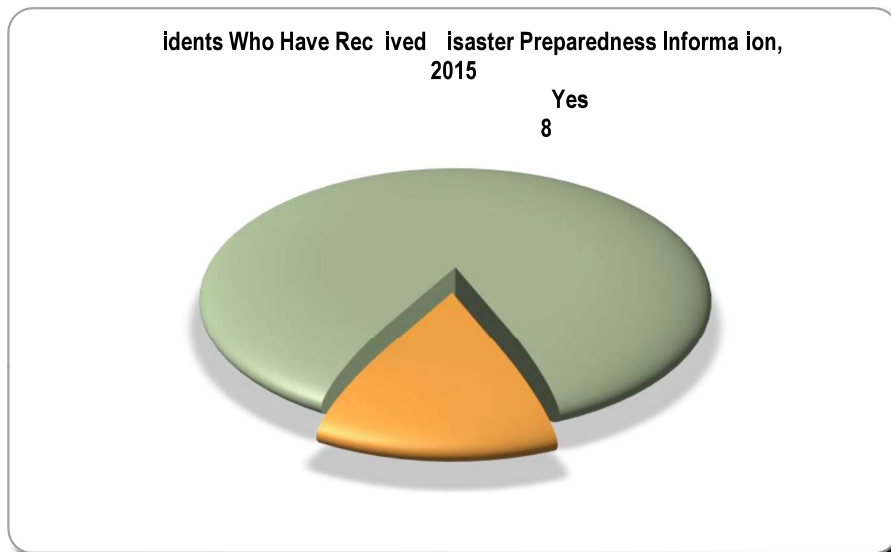


Figure 59: Receipt of Disaster Information

Hazard Influence on Home Buying/Move Decision

Survey respondents were asked if disaster hazards influence their home purchase or move-in decision. Nearly three-quarters (73.4%) answered “Yes”. Indicating an awareness of local hazards and the potential personal impact if a disaster were to occur.

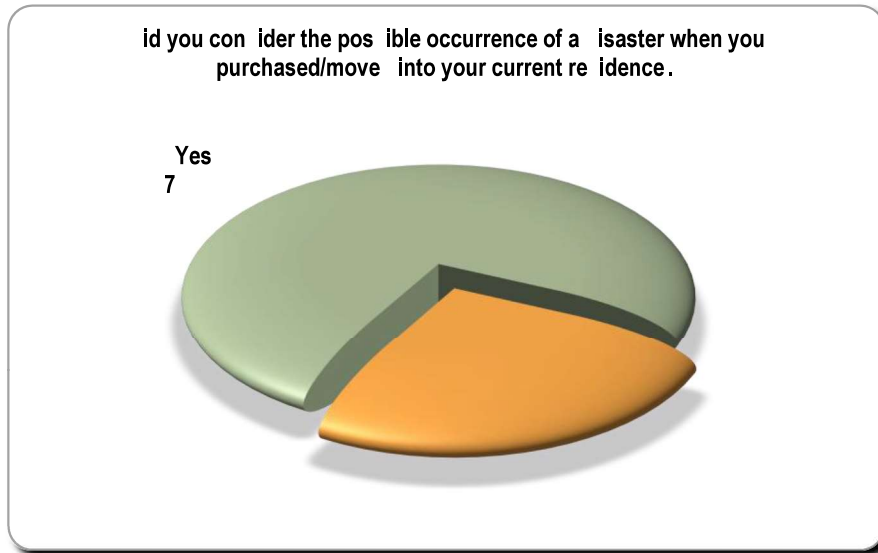


Figure 60: Hazard Influence on Home Buying/Move-in Decisions

Disaster Mitigation Home Improvement

Respondents were further asked if they would be willing to spend more money to make their homes more disaster-resistant. A clear majority of respondents (78.8%) answered “Yes”, indicating that given the opportunity, residents are willing to invest in mitigation.

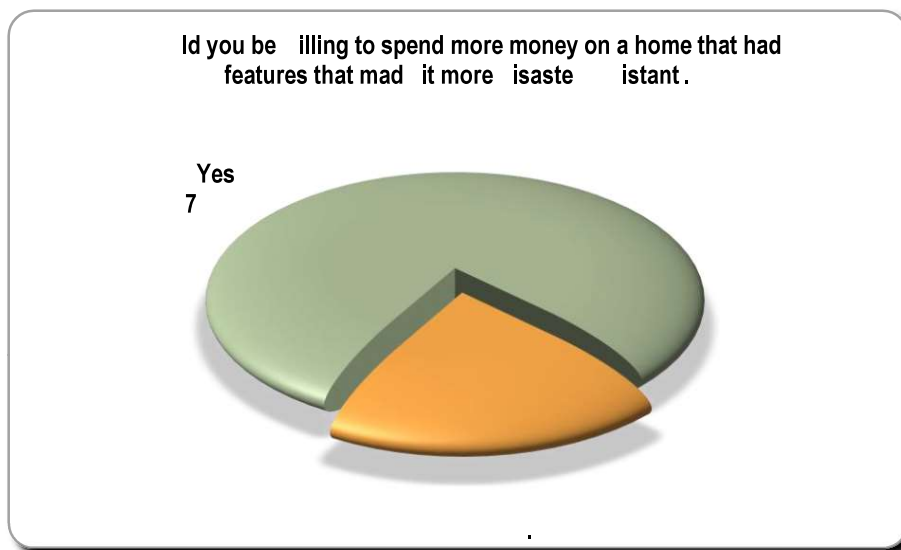


Figure 61: Willingness to Invest in Disaster Mitigation

Home Insurance

Survey respondents were asked if they had purchased earthquake insurance. Slightly more than half (nearly 55%) responded “No”. While homeowners in Santa Clarita are split on the issue of earthquake insurance, the trend is significantly higher than the California residential market average of 10.17% as reported by the California Department of Insurance.

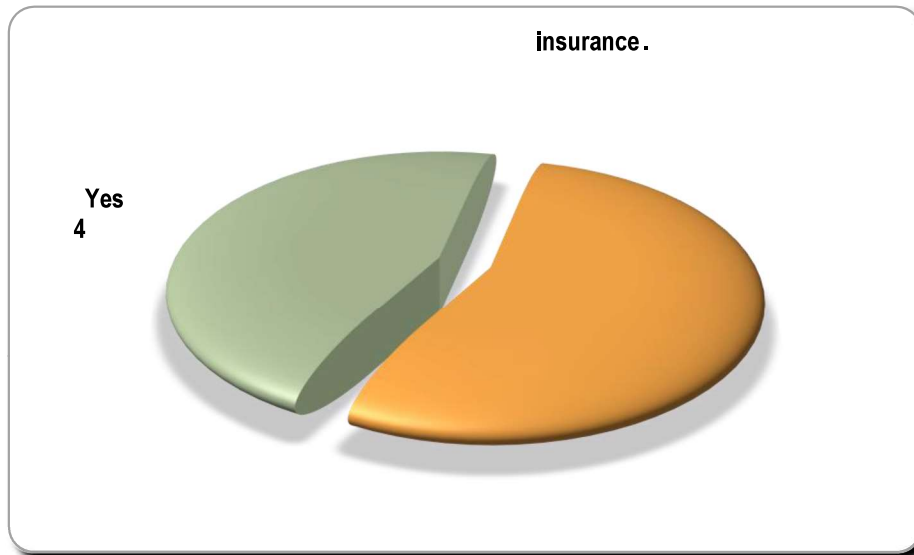


Figure 62: Residential Earthquake Insurance Rate of Coverage

The following table provides a summary of earthquake insurance coverage in California for 2014.

Table 80: California Earthquake Insurance Premiums and Policy Counts for 2014

2014 Experience Year	EQ Premiums	No. of EQ Policies	Exposure (\$) Including CEA	Avg. Prem. Per Policy	Avg. Rate Per Policy	Market Share *	% with EQ **
Total CEA Companies	600,406,520	865,079	338,693,421,511	\$694.05	\$1.77	75.78%	9.70%
Total Residential Mkt (Excluding CEA)	339,785,947	276,500	172,800,586,660	\$1,228.88	\$1.97	24.22%	11.99%
Total Residential Mkt	940,192,467	1,141,579	511,494,008,171	\$823.59	\$1.84	100.00%	10.17%
Total Homeowners Market	821,662,302	765,848	459,362,129,459	\$1,072.88	\$1.79	67.09%	11.91%
Total Rental Market	9,097,406	90,109	3,302,415,882	\$100.96	\$2.75	7.89%	4.71%
Total Condominium	54,575,314	130,723	14,656,181,500	\$417.49	\$3.72	11.45%	15.39%
Total Dwelling Fire	46,079,698	94,107	28,453,910,012	\$489.65	\$1.62	8.24%	5.47%
Total Mobilehome Market	8,777,747	60,792	5,719,371,318	\$144.39	\$1.53	5.33%	19.78%
Total Residential Mkt	940,192,467	1,141,579	511,494,008,171	\$823.59	\$1.84	100.00%	10.17%

SOURCE: California Department of Insurance, 2014 CA EQ Premium, Exposure, and Policy Count Data Call Summary

* Market share represents the percentage of policies to total residential market.

** Percent with EQ represents the percentage of policies that also have EQ coverage.

Flood Insurance

Survey respondents were asked if their homes were located in floodplains. While the majority (69.2%) answered “No” another 22.6% responded that they did not know. While the City does provide detailed floodplain information and floodplain maps via its website, more effort may be needed to ensure full awareness by all residents.

Respondents were further asked if they had flood insurance. Although nearly 76% responded “No”, this is understandable since most do not live in floodplain areas. A key issue is that 15% responded that they “did not know”. This supports the conclusion that additional effort is needed to distribute floodplain risk and mitigation information.

Of those respondents that reported that they did not have flood insurance, most stated that they did not live in floodplains are that flood insurance was not necessary (78%). While 6% stated that flood insurance was too expensive and another 16% had not considered it.

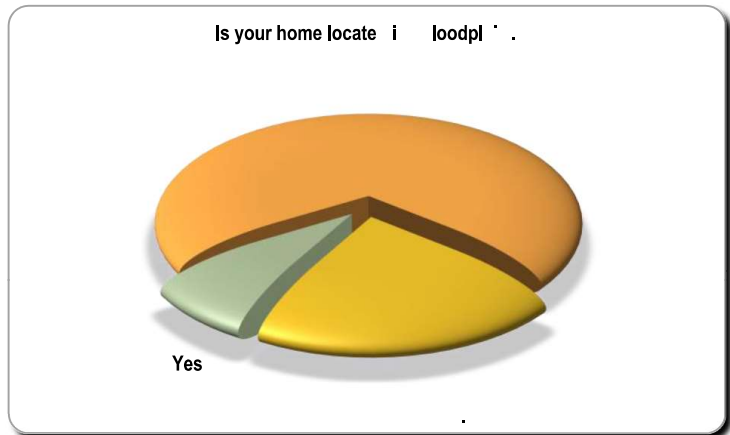


Figure 63: Homes Located in Floodplain

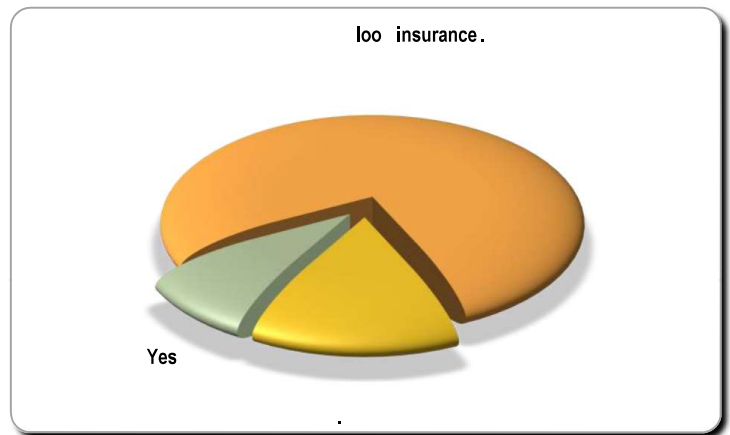


Figure 64: Flood Insurance

If "No," why not?	Percent
Too Expensive	6%
Never Considered It	16%
Not Necessary	30%
Not Located in a Floodplain	48%

Other reasons (2 to 3 responses each) for not acquiring flood insurance included:

- Rental/No Home Ownership
- Conflicting Information re: Home Location and Flood Zones

Non-Structural Mitigation Measures

Survey respondents were asked what non-structural mitigation measures they had implemented to protect against earthquakes, fires, severe weather, and flooding. Nearly all had secured their water heaters from earthquake shaking. Other key mitigation actions included debris clearance, furniture and appliance anchoring, and brush clearance. While all the actions listed were commendable, additional work is needed to further mitigate against all hazards. For example, only 34% reported that they had installed automatic gas shut-off valves.

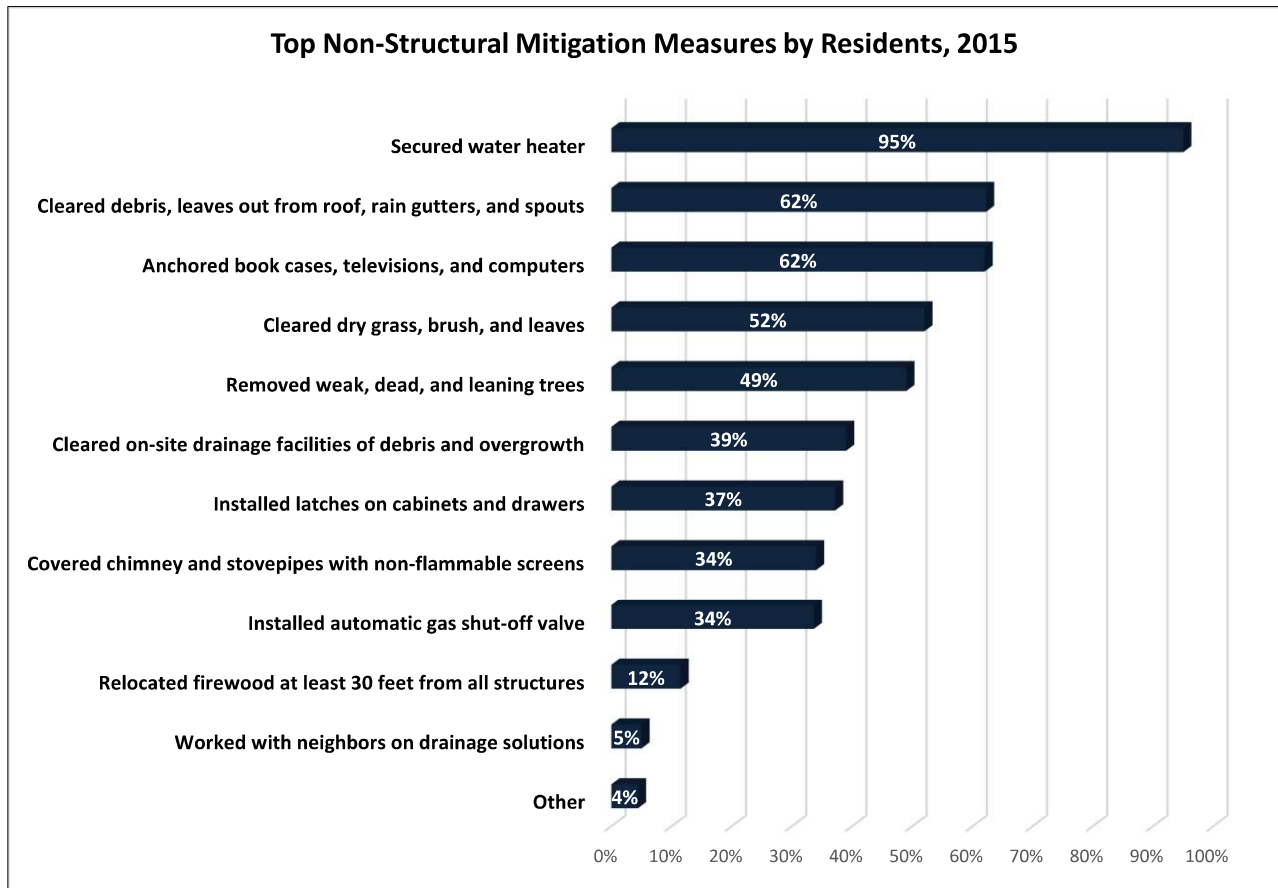


Figure 65: Top Non-Structural Mitigation Measures

Other Non Structural Mitigation Measures, 2015	
Hazard	Number of Respondents
Professional Inspection/Recommendations	1
Misc. Earthquake Prevention Measures (e.g. earthquake putty, sandbagging, home kit, etc.)	3
Misc. Fire Prevention Measures (e.g. flame-resistant tile roof)	2
Disaster Supply/Emergency Kits	3
Installed Tankless Water Heater	1
Reliance on Residential Management (Apartments)	2

Mitigation Incentives

Respondents were asked what mitigation incentives would encourage them to take action to further reduce the likelihood and damage caused by disasters. The top 3 responses were Property Tax Incentives (35.4%), Insurance Premium Discounts (19.8%), and Grant Funding (15.6%). While property taxes are not under the control of the City, the City can work with the State of California to apply for mitigation grant funding. Further, the City can further work with the State and insurance carriers to investigate the potential for premium discounts. For example:

- In 2014 the California Insurance Commissioner announced approval of a program with USAA to provide a 5% discount to policy holders in Firewise communities (“California insurance commissioner approves discounts in Firewise communities”, NFPA, 5/13/2014).
- In 2014, the California Earthquake Authority proposed an average 8% decrease in earthquake insurance rates.
- The City of Santa Clarita has actively worked to reduce areas of flood risk. For example, due to homeowner mitigation efforts, there are currently no repetitive flood loss properties in the city. Furthermore, in March 2013 when FEMA issued a new CRS Coordinator Manual and changed the activity point structure, the City received a new point calculation from its CRS representative (April 2013). At the conclusion of the 2013 CRS audit cycle, the City rating was upgraded to Class 7 in the National Flood Insurance Program. This upgrade qualifies homeowners with a 15 percent discount on the premium cost of flood insurance.

When incentives do arise, the City must act as a conduit to distribute information to local residents. This will help to foster increased participation in mitigation activities and insurance.

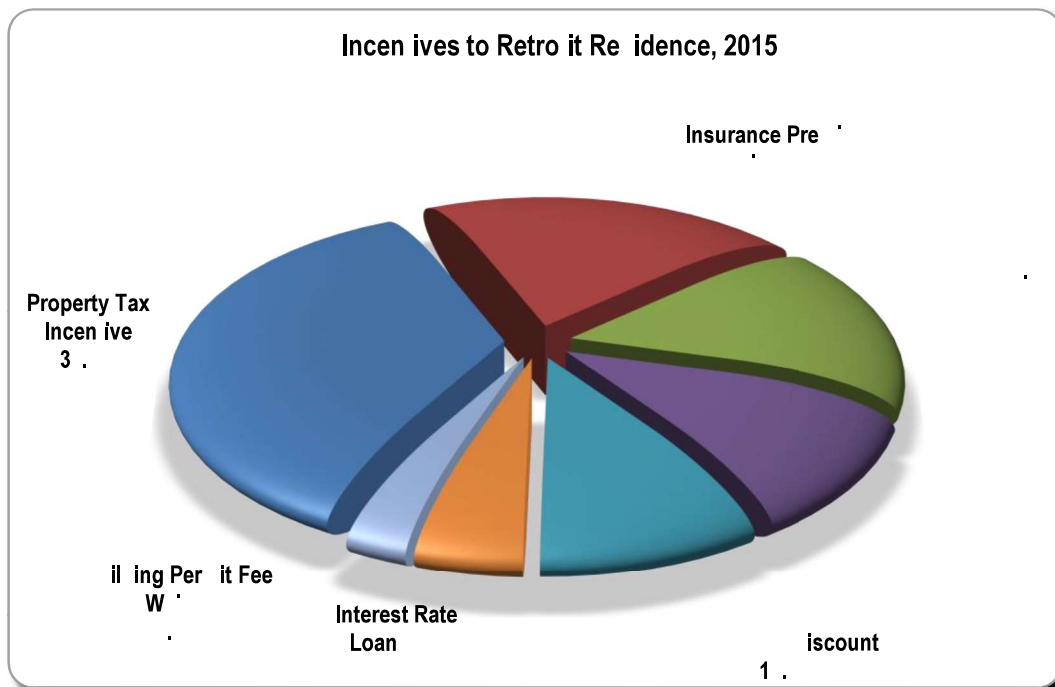


Figure 66: Top Incentives to Retrofit Residences

Other responses included:

Other Incentives to Retrofit, 2015	
Feedback	Number of Respondents
All of the Above	19
Availability of Financial Means	2
Lives in Managed Property so None Apply	2
Combination of Discounts	2

Prioritization of Community-wide Risk Reduction Activities

Respondents were asked rate the relative importance of various mitigation activities in the community. The top 3 responses were “Prevention”, “Emergency Services”, and “Public Education and Awareness”.

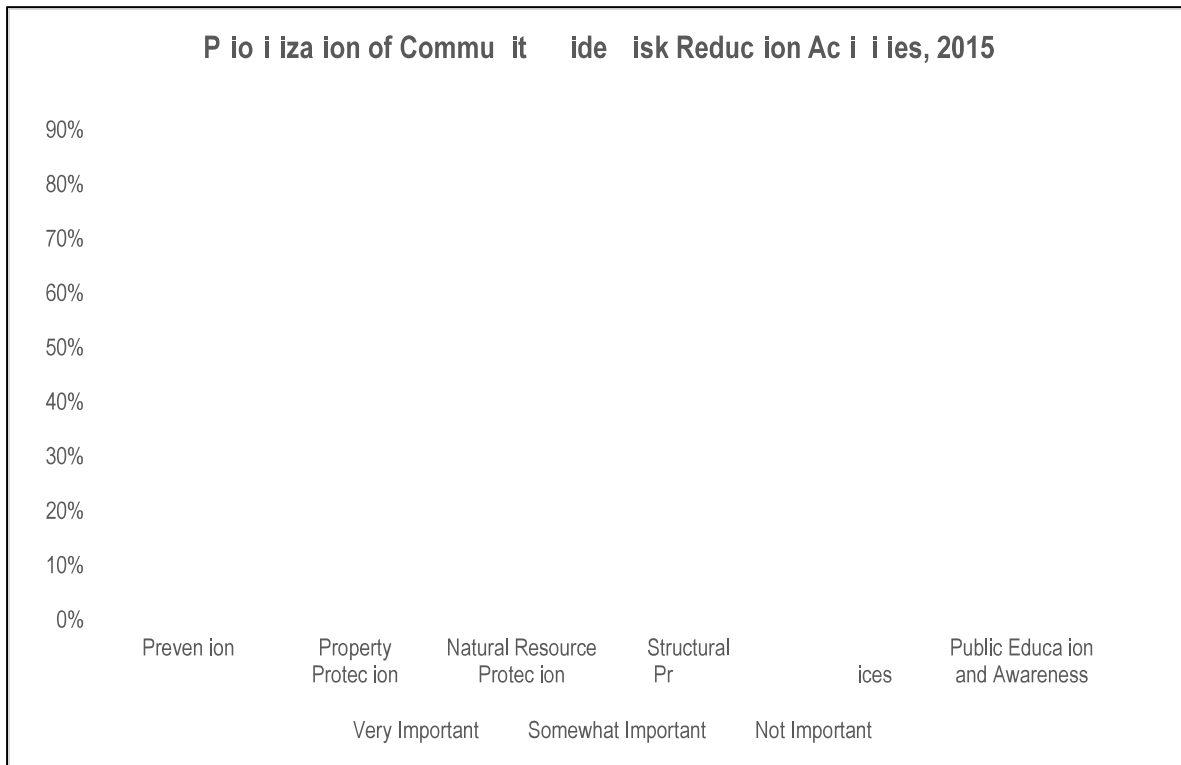


Figure 67: Prioritization of Community-wide Risk Reduction Activities

Mitigation Information Methods

Respondents were asked which methods were most effective for them to receive mitigation information. The top 3 responses rated as either “Most Effective” or “Effective” were “E-mail / E-Notifications”, the “Internet”, and “Workshops”. Consequently, it is apparent that continued use of Internet-based forms of communication will continue to grow as an effective method for distributing mitigation information. However, it is apparent by the survey responses that Twitter was the least favored form of communication.

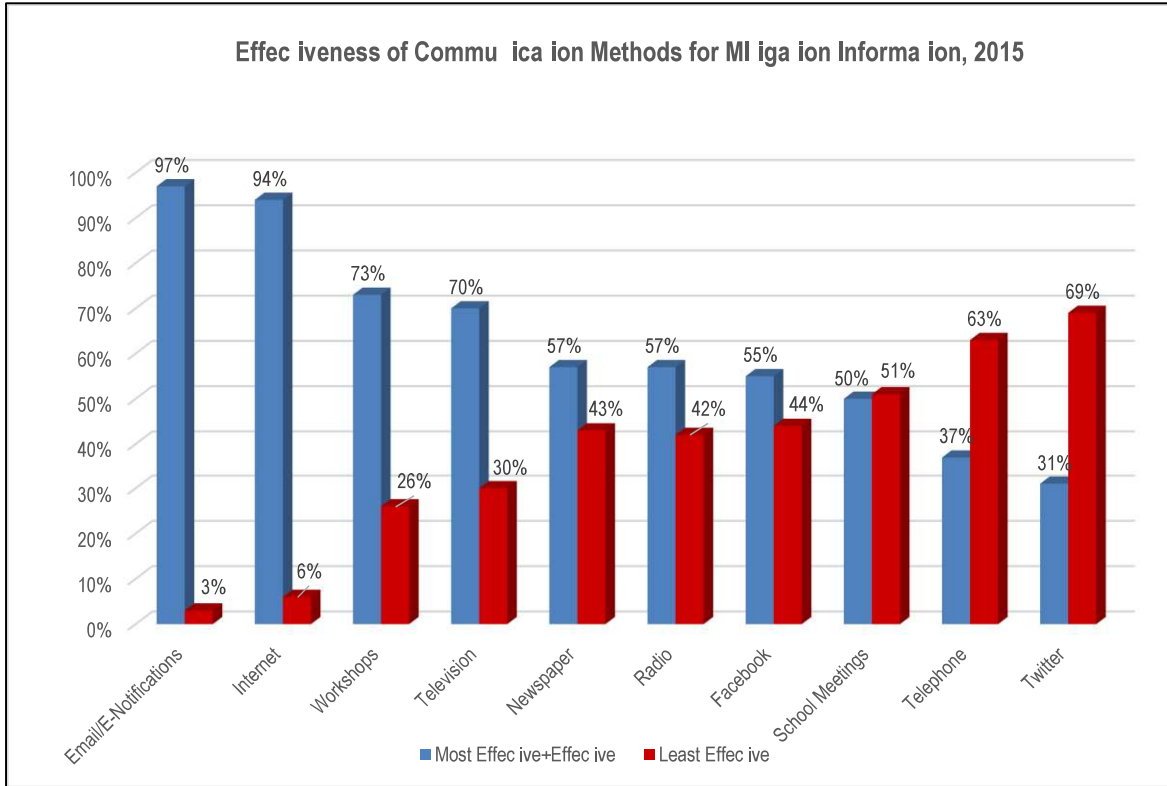


Figure 68: Effectiveness of Communication Methods

Communication Method	Most Effective	Effective	Most Effective + Effective	Least Effective
Email/E-Notifications	71%	26%	97%	3%
Internet	59%	35%	94%	6%
Workshops	28%	45%	73%	26%
Television	30%	40%	70%	30%
Newspaper	19%	38%	57%	43%
Radio	19%	38%	57%	42%
Facebook	29%	26%	55%	44%
School Meetings	11%	39%	50%	51%
Telephone	10%	27%	37%	63%
Twitter	11%	20%	31%	69%

Emergency Messaging

Respondents were asked if they had signed up for the City’s Emergency and Notification Messaging service. Overall, the responses were nearly equal: 48% “Yes” and 52% “No”. As a key information distribution method, the City must work to improve participation in the program.

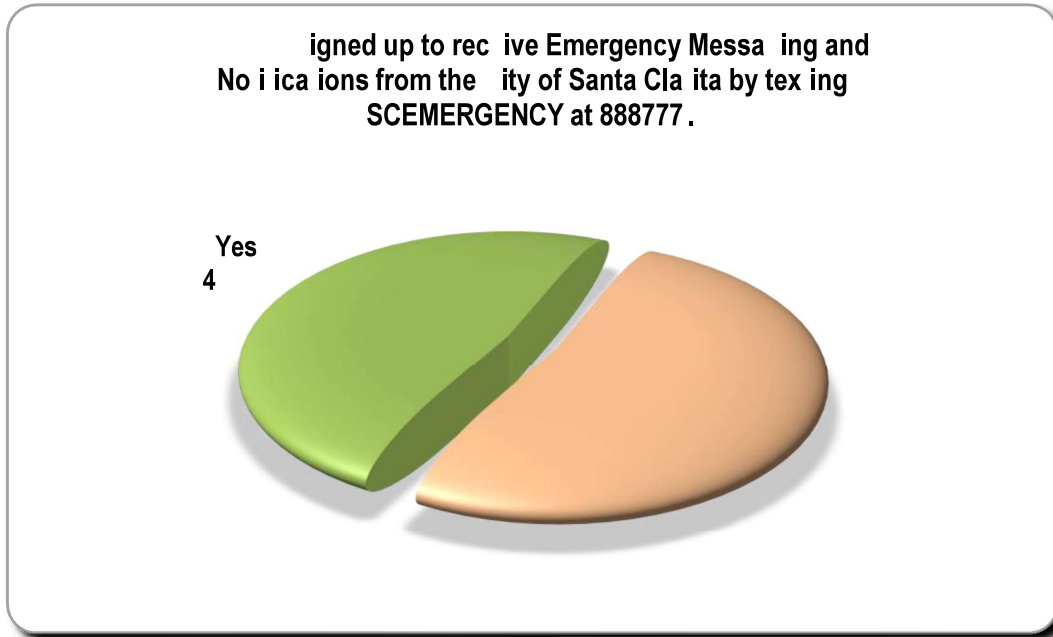


Figure 69: Emergency Messaging and Notification System Sign-ups

SECTION 19. PLAN MAINTENANCE

The City of Santa Clarita is committed to implementing and maintaining the relevancy of this Hazard Mitigation Plan. The 2015 Hazard Mitigation Plan benefitted greatly from the work that was accomplished in 2010 and 2004. The Planning Committee and its selected contractor (MLC & Associates, Inc.) performed a review of the 2010 Plan and augmented those areas in the Plan that required update as well as supplemented the HMP with additional sections to enable the plan to meet the City's current needs. In addition, new hazard mitigation goals and activities were developed with input from the Steering Committee and the public.

Maintenance Responsibilities

Ongoing monitoring and updates to the HMP will be coordinated by the City of Santa Clarita Emergency Management Department in conjunction with the Hazard Mitigation Planning Committee and Steering Committee. Any substantive changes to the Plan will be brought to the City Council for consideration and formal adoption. The Emergency Management Department is also responsible for working with other departments within the City to evaluate and track mitigation project progress.

Monitoring and Implementing the Plan

The City of Santa Clarita will incorporate the mitigation strategies outlined in this HMP into existing planning mechanisms such as the City General Plan, Emergency Operations Plan, Capital Improvement Projects, and Building and Safety Codes, Fair Housing Plan, "Green" City projects, and Water Conservation projects.

Coordinating Bodies

The City of Santa Clarita Emergency Management Department works with the Hazard Mitigation Planning Committee to coordinate implementation of HMP action items. The HMP Planning Committee is also responsible for the City's internal formal review process. The Emergency Management Department Manager and HMP Planning Committee also coordinate activities and projects with representatives from city agencies, including, but not limited to, the current Hazard Mitigation Steering Committee members. The Hazard Mitigation Steering Committee consists of members from local agencies, organizations, and citizens, and includes the following:

- Building Industry Association of Southern California
- California Department of Transportation (Caltrans)
- California Highway Patrol
- Castaic Lake Water Agency
- Castaic School District
- City of Santa Clarita Department of Community Development
- City of Santa Clarita Department of Parks, Recreation and Community Services
- City of Santa Clarita, Department of Administrative Services
- City of Santa Clarita, Department of Public Works
- City of Santa Clarita, Office of the City Manager
- Henry Mayo Newhall Hospital
- Los Angeles County Department of Public Works

- Los Angeles County Fire Department
- Los Angeles County Sheriff's Department
- National Weather Service
- Newhall School District
- Sanitation Districts of Los Angeles County
- Santa Clarita Valley Chamber of Commerce
- Santa Clarita Valley Senior Center
- Santa Monica Mountains Conservancy
- Saugus Union School District
- Southern California Edison
- Southern California Gas Company
- Sulphur Springs School District
- William S. Hart School District

The Hazard Mitigation Steering Committee will meet annually. The meetings will provide an outlet to discuss, review and revise the action items. These meetings will also support the ongoing partnerships that are important to the mitigations Plan's sustainability.

Convener

The Santa Clarita City Council is responsible for adopting the updated Hazard Mitigation Plan.

The Emergency Management Manager will serve as a convener to facilitate Hazard Mitigation Plan activities including Steering Committee, Planning Committee, and public meetings. The Emergency Management Manager will assign tasks such as updating and presenting the Plan to the members of the Steering Committee. Plan evaluation and feedback will be a shared responsibility among all of the Hazard Mitigation Steering Committee members.

Plan Adoption

The Santa Clarita City Council is responsible for adopting the Local Hazard Mitigation Plan (HMP). The City Council has the authority to promote sound public policy regarding hazards. The Emergency Management Department, Emergency Manager is responsible for submitting the revised HMP to the California State Hazard Mitigation Officer at the Office of Emergency Services. Cal-OES is responsible for submitting the updated HMP to the Federal Emergency Management Agency (FEMA) for review and approval. The review process addresses the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Upon the updated HMP has been accepted and approved by FEMA, the City of Santa Clarita will maintain its ongoing eligibility for Hazard Mitigation Grant Program funds.

Ongoing Formal Review Process

The City of Santa Clarita Hazard Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development, land use, environmental changes, or programs that may affect mitigation priorities. The evaluation process includes a firm schedule and time line, and identifies the local agencies and organizations participating in plan evaluation. The convener or designee will be responsible for contacting Hazard Mitigation Steering Committee members and organizing the annual meeting.

The Steering Committee will review the goals and action items in the HMP 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 Steering Committee will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The coordinating organizations responsible for the various action items will report on the status of their projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised.

If needed, the convener will assign responsibility for updating the plan. Plan updates are to be made within four months and will then be submitted to Steering Committee members for review prior to presenting them to the City Council. The Emergency Management Manager will notify all holders of the HMP when changes have been made. Every five years the updated plan will be submitted to the Cal-OES Hazard Mitigation Officer and the Federal Emergency Management Agency for review.

HMP Implementation through Existing City Programs

The City of Santa Clarita addresses statewide planning goals and legislative requirements through its General Plan, Fair Housing Plan, Capital Improvement Projects, City Building and Safety Codes, and other initiatives. The Hazard 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 Santa Clarita will therefore implement recommended mitigation action items through existing programs and procedures whenever possible.

- The City of Santa Clarita Public Works Department's Building and Safety Division is responsible for administering the Building & Safety Codes. In addition, the Hazard Mitigation Steering Committee will work with relevant agencies at the county and state levels to review, develop and ensure Building & Safety Codes that are adequate to mitigate or prevent damage by natural hazards.
- The goals and action items in the mitigation plan may be achieved through activities recommended in the City's Capital Improvement Projects (CIP). Various city departments develop CIP plans, and review them on an annual basis. Upon annual review of the CIPs, the Emergency Management Manager and Hazard Mitigation Planning Committee will work with the city departments to identify areas that the hazard mitigation plan action items are consistent with CIP planning goals and integrate them where appropriate.
- Within six months of formal approval of the mitigation plan, the recommendations documented will be incorporated into the process of existing planning mechanisms at the city level. Meetings of the Hazard Mitigation Planning and Steering Committees will provide an opportunity for committee members to report back on the progress made on the integration of mitigation planning elements into City planning documents and procedures.

HMP Updates

Every five years a HMP revision is produced. Included in each revision are changes in the Community Profile (including changes in the local population and new development), an update to the Risk Assessment, mitigation project updates, and a description on how the City integrated public participation throughout the plan maintenance process.

Continued Public Involvement

City of Santa Clarita is committed to involving the public in reviews and updates to the Hazard Mitigation Plan. The Emergency Management Manager works with the Planning Committee and Steering Committee to coordinate public workshops. In addition, current and draft revisions to the HMP are made available to the public via the City's website. This site also contains an Email address and phone number to which people can direct their comments and concerns to the Emergency Management Manager and/or appropriate City departments. Copies of the HMP are also be catalogued and kept with departments and agencies in the city.

Public meetings are held after each annual evaluation or when deemed necessary by the Emergency Management Manager and/or Hazard Mitigation Planning or Steering Committees. The meetings provide a public forum to provide input and to express its concerns, opinions, or ideas about the HMP. Public meetings are advertised via the City's public access channel, web page, social media accounts, CERT program, and newspapers.

See the **Public Process Section** for examples of public involvement in the Hazard Mitigation Plan and planning process.

SECTION 20. ANNEXES

Annex A: [HMP Steering Committee and Planning Committee Meetings](#)

Annex B: [2015 HMP Update Kick-off Meeting](#)

Annex C: [2015 HMP Update Review Meeting](#)

Annex A: HMP Steering Committee and Planning Committee Meetings

The following Annex documents the meetings conducted as part of this update to the Hazard Mitigation Plan. These meetings include regularly scheduled (ongoing) meetings with Steering Committee members (aka Community Partners) and Planning Committee.

Meeting Records

The HMP Steering Committee and Planning Committee met on the following dates from Fiscal years 2010 to 2015:

FY 2010 to 2011

Date	Meeting	Attendees	Topics
12.6.2010	Planning Committee Meeting	City Staff	Updates
1.31.2011	Area B Meeting	8 City Members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
2.16.2011	Planning Committee Meeting	City Staff	Community Presentation Planning; Updates
4.13.2011	Planning Committee Meeting	City Staff	Community Presentation Planning; Updates
4.14.2011	Area B Meeting	8 City Members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
4.27.2011	Steering Committee & Community Stakeholders Meeting	City Staff, Steering Committee, Community	Presentations on: <ul style="list-style-type: none"> • Special Needs Registry • Seismic Grants • Storm Grants For Culvert • Flood Plain Map Revisions • HAZUS Training
6.7.2011	Planning Committee Meeting	City Staff	Year-end Report Finalization

FY 2011 to 2012

Date	Meeting	Attendees	Topics
11.10.2011	Area B Meeting	8 City Members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
1.12.2012	Area B Meeting	8 City Members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
1.31.2012	Planning Committee Meeting	City Staff	Updates
2.23.2012	Planning Committee Meeting	City Staff	Community Presentation Planning; Updates
3.28.2012	Planning Committee Meeting	City Staff	Updates
4.25.2012	Planning Committee Meeting	City Staff	Community Presentation Planning; Updates
4.12.2012	Area B Meeting	8 City Members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
5.23.2012.	Steering Committee & Community Stakeholders Meeting	City Staff, Steering Committee, Community Meeting	Presentations on: <ul style="list-style-type: none"> • Community Profile Updates for Annexations • Seismic Retrofit Update • Floodplain Map Revisions for Newhall Area • Severe Weather Section— Atmospheric River Research
6.11.2012	Planning Committee Meeting	City Staff	Year-end Report Finalization

FY 2012 to 2013

Date	Meeting	Attendees	Topics
10.11.2012	Area B Meeting	8 City Members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
1.10.2013	Area B Meeting	8 City members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
1.16.2013	Planning Committee Meeting	City Staff	Updates
2.29.2013	Planning Committee Meeting	City Staff	Updates
3.20.2013	Planning Committee Meeting	City Staff & Southern CA Gas Company Staff	Updates
4.24.2013	Planning Committee Meeting	City Staff & LA County Fires Staff	Community Presentation Planning; Updates
5.23.2013.	Steering Committee & Community Stakeholders Meeting	City Staff, Steering Committee, Community Meeting	Presentations on: <ul style="list-style-type: none"> • Natural Gas Pipeline Safety—Southern CA Gas Company • Fire Hazard Zone Map updates—LA County Fire —Forestry Division City of Santa Clarita Debris Management Program and Plan
6.12.2013	Planning Committee Meeting	City Staff	Year-end Report Finalization
6.20.2013	Area B Meeting	8 City Members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.

FY 2013 to 2014

Date	Meeting	Attendees	Topics
7.9.2013	Area B Meeting	8 City Members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
10.17.2013	Area B Meeting	8 City members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
2.27.2014	Planning Committee Meeting	City Staff	Updates
3.27.2014	Planning Committee Meeting	City Staff	Updates
4.24.2014	Planning Committee Meeting	City Staff	Community Presentation Planning; Updates
4.17.2014	Area B Meeting	8 City members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City Plans.
5.8.2014	Planning Committee Meeting	City Staff	Updates
6.26.2014	Planning Committee Meeting	City Staff	Community Presentation Planning; Updates

FY 2014 to 2015

Date	Meeting	Attendees	Topics
7.30.2014	Steering Committee & Community Stakeholders Meeting	City Staff, Steering Committee, Community	Presentations on: <ul style="list-style-type: none"> • Flood Plain Map Revisions—Canyon Country & Wildwood Canyon • Henry Mayo Newhall Hospital- Hospital Hazard vulnerability review. • Seismic Retrofit Demonstration of City Hall Project completion • LA City Depart of Water and Power Aqueduct System—hazard mitigation activities. City EOC – GIS demonstration of City real time incident mapping for EOC operational awareness.
10.9.2014	Area B Meeting	8 City Members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City plans.
1.15.2015	Area B Meeting	8 City members: Agoura Hills, Calabash, Hidden Hills, Malibu, Lancaster, Palmdale, Santa Clarita & Westlake Village	Quarterly Meeting for Hazard Mitigation Guidance. Discussion on City plans.
1.25.2015	Planning Committee Meeting	City Staff	Consultant Process/Update
3.25.2015	Planning Committee Meeting	City Staff	Updates/Consultant Process
4.14.2015	Planning Committee Meeting	City Staff	Updates/Consultant Process

FY 2015 to 2016

Date	Meeting	Attendees	Topics
7.16.2015	Planning Committee Meeting	City Staff	Kick-off and Risk Rating Development Working Session
9.10.2015	Steering Committee Meeting	Steering Committee	Review and Approval of the Updated HMP Meeting also included HMP Planning Committee Members

Annex B: 2015 HMP Update Kick-off Meeting

Santa Clarita 2015 HMP Update Kickoff Planning Committee Meeting July 16, 2015

Additions to Community Profile

- FEMA Region 9, LA Area B
- Population increased from 2010 by almost 35K due to annexation
- Sales Tax makes up 37% of the City's General Fund
- Last major event that shut down major businesses – 1994 earthquake
- Largest earthquake fault in the area: San Gabriel
- SC has special amendments added to its applicable California Building Codes to enforce local regulations
- Half of SC's water comes from Owens, other comes from wells. Three purveyors.
- Utilities governed by Southern Cal Edison, Southern Cal Gas, wastewater managed by LA County
- Arterial road system (i.e. not grid)
- Current population estimates: 22% Hispanic, 4-5% Asian, 70+% Caucasian
- City has its own public Wi-Fi, public access television, social media accounts, and holds organized events for National Preparedness Month
- Verizon – telecom carrier for city

Addition to Hazards/Risks

In addition to the risks listed in the briefing (Earthquake, Wildfire, Flood, Severe Weather, HazMat), the following hazards were mentioned as possible additions or to enhance existing sections of the revised HMP:


- Extreme Wind (as a sub-set of Severe Weather)
- Drought (as a sub-set of Climate Change)
- Cyber Attack
 - Could potentially impact finances, payments, etc.
 - PII for city employees, credit card accounts
 - Building Access
 - Permits and Licensing are all online
 - Backup server/hot site at alternate EOC within city
- Dam Breakage/Malfunction
- Rail Security – HazMat and Oil Train Transport
- Oil/Gas Pipelines
- Chlorine Plant
- Brush/Foliage (wildfire)
- Industrial Centers
- High-voltage Electrical Transmission Lines
- Sewage Systems

Hazard Mitigation Plan Discussion – Mitigation Strategies and Potential Additions

- Mitigation Strategies/Items to Add or Consider:
 - Provision to require/plan to have backup generators at specifically-selected sites to keep SC services going in case of disaster
 - Study to add/widen streets near I-5 to mitigate traffic concerns
 - Section specifically devoted to terrorism, or at least add discussion/reference to it in list of hazards
 - Identified critical infrastructure locations that may not be released to public
- Energy Assurance Plan Discussion
 - Building Code doesn't regulate infrastructure related to Southern California Edison power, etc.
- Intended Additions to HMP
 - Current Capabilities/Activities of Santa Clarita Not Previously Listed
 - Santa Clarita currently working with churches, other organizations to populate online portal with basic information to build a database of capabilities and capacities*
 - HAZUS Training
 - Increased requirements for seismic safety in all new constructions – can be found in building code amendments (most recent building code: January 2014)
 - Flood zone mapping and/or flood planning
 - Vehicle Maintenance Plan (see Fleet Manager0
 - Open Space/Green Space Mapping
 - Backup/battery maintenance for street lights
 - Traffic Control Center
 - Business Community Liaison in EOC
 - Access & Functional Needs Coordinator in EOC
 - Santa Clarita CERT (2,000 volunteers) and LA Sheriff CERT teams. City has contact information for all CERT team members and a Volunteer Coordinator in EOC
 - “Pole Program”

Action Items/Needed Materials for HMP Update

- 7.2 M earthquake damage estimate complete, need 6.7M scenario (similar to the 1994 Northridge Earthquake)
- Coordinate date of public forum, website location, dates and logistics
- Flood mapping/damage estimates
- Community survey
- Community Profile – employers, business centers, population, etc.
- Risk Ratings
- Finalized list of hazards
- Open space/green space mapping






Sign-In Sheet

**City of Santa Clarita HMP Kick-off and Data Gathering Meeting
July 9, 2015**

Location: 20880 Centre Pointe Parkway, Santa Clarita, CA

Name	Title (Role)	Initial (in attendance)
Amalia Marreh	Public Works, Assistant Engineer	A-M
Anthony Calderon	GIS technician	AC
Bill Read	Building & Safety, Assistant Building Official	BR
Christina Monde	Public Works, Associate Engineer	CM
Corie Zamora	Transit, Admin. Analyst	
Curtis Williams	Environmental Services, Admin Analyst	
Dale Sargent	Environment Services, Administrator	DS
Donna Nuzzi	Park, Rec & Com Serv., Emergency Services Supervisor	DN
Edgardo David	GIS, IT Analyst	
Fernando Mendoza	Landscape Maintenance Specialist	FM
Kerry Breyer	Public Works, Senior Engineer	
Kristina Jacob	Parks, Open Space Admin Analyst	KJ
Mike Marshall	Community Development, Assistant Planner II	
Ron Fierro	Public Works, Administrator	RF
Ruben Barrera	Building & Safety, Building Official	

Facilitators

Name	Email
Bob Takemura 	Bob.takemura@MLCHQ.com
Prashant Kumar 	Prashant.kumar@MLCHQ.com
Jason Blake 	Jason.blake@MLCHQ.com


City of Santa Clarita Signin Sheet
1


Figure 70: 2015 HMP Update Kick-off Meeting Sign-in Sheet

Annex C: 2015 HMP Update Review Meeting

City of Santa Clarita – 2015 Hazard Mitigation Plan Update Review Meeting

**HMP Steering Committee /
Community Partners**
September 10, 2015
4:00 PM – 5:00 PM

Community Partner (Steering Committee) members were asked for their input on the revised list and what their major concerns were and if additional hazards should be added to the list. It was decided that Terrorism should be added to the 2015 HMP.

Proposed Hazard List Discussion

In addition to the specific hazards listed for the 2015 HMP update, what other issues are of concern that should be included?

1. Terrorism – definitely needs to be considered. There are frequent high profile events in Santa Clarita, i.e., marathons, bike races and crucial critical infrastructure (large electrical grid and pipelines). Officials must prepare for large-scale attacks on public events.
 - Terrorism includes active shooter scenarios as a subset especially preparing for active shooter incidents in schools.
 - Water pipelines running to the Los Angeles Basin could be targets.
 - Need to continue to promote “See Something, Say Something” campaign.
 - Expanding diversity in the community and the increasing number of faith-based organizations could be targets for terrorism.
2. Hazardous materials sites is also a major concern (already included in the HMP). There are sites near highways/freeways. Risks include fixed sites as well as portable hazardous materials. In addition there is an overlap between hazardous materials and terrorism, e.g., there is a jet fuel storage location in the City.
3. There was a suggestion to include debris removal issues as a separate Debris Management topic however it was determined that this was a sub-component of other sections of the HMP such as wildfire, earthquake, severe weather, and flood.

Mitigation Strategies and Action Items

What other strategies can be added?

1. Cyber-attack strategies and actions
 - a. Use of E-Notification/website to send out security alerts to population was suggested as a good strategy.
 - b. Public Wi-Fi Security measures in place include:
 - i. When someone connects to the public Wi-Fi system, it prevents you from accessing anything internal and puts you in “bubble” to prevent you from accessing someone else’s system.
 - ii. Public-facing services (website) are checked once a month for any issues.
 - iii. The City contracts with third-party vendor to use White Hats to test systems on an annual basis.
2. Other mitigation, preparedness, and public awareness activities include:
 - a. GIS – publicly-available tool to make GIS maps with every layer available, just not property ownership.
 - b. Active Shooter Training conducted by the City on regular basis.
 - c. There are people within City staff to assist in communicating with groups and organizations that don’t speak English. However a formal tracking process is needed (should be managed by Human Resources when new people are hired and during personnel record updates).

Are there any activities your department or group is doing to help people mitigate against disasters?

1. Hospitals
 - a. Community outreach events – elder care centers, Boy Scouts, etc., give them disaster plans and talk to them about it.
 - b. In the process of updating the hospital website and community website with links to new content.
2. School Districts
 - a. During wildfires, we open up high school gymnasiums as public shelters.
3. Churches
 - a. Maintains emergency preparedness programs, notification systems and community watch programs in case assistance is needed.
 - b. Communicates preparedness planning at the home-level (with schools).
 - c. Conducts outreach efforts and distributes Go-Packs to parishioners/community.

City of Santa Clarita Hazard Mitigation Plan Community Partner / Steering Committee Meeting
September 10, 2015

Name	Agency/Organization Name
Kristina Jacobo	City of SC
Terry Stone	HMNH
EDGARDO DAVID	CSC
Mark Passamani	CLWA
Valene Pryor	CLWA
Michael Danka	Wm. S Hart USD
Cris Peter	VWC
SuzAnn Nelson	SCV Senior Center
Andy Lamprey	Los Church
Christina monde	City of Santa Clarita
BILL READ	CITY OF SANTA CLARITA

City of Santa Clarita Hazard Mitigation Plan Community Partner / Steering Committee Meeting
September 10, 2015

Name	Agency/Organization Name
Curtis Williams	City of Santa Clarita
Susan Nelson	City of Santa Clarita
Dale Sargent	" "
Mike Logan	The Sanctuary Church
Jim Schragr	C.O.C.
Diane Jacobo	City
Michele Gookins	Sulphur Springs School
ROBERT PASKWITZ	CAP NEWMAN
Rex Fierro	City of Santa Clarita
Greg Huel	LA COUNTY FIRE
CHRIS GRAY	City of Santa Clarita

City of Santa Clarita Hazard Mitigation Plan Community Partner / Steering Committee Meeting
September 10, 2015

Name	Agency/Organization Name
JESSE SMITH	CAVARTS
Josie Kalbaklian	Recology LA
Chad Cossey	HMNH
DOWNA NUZZI	BCM / CITY OF SANTA CLARITA
Bob Teheaven	MLC
JASON BLAKE	MLC
Prashant Kumar	MLC

Figure 71: 2015 HMP Update Steering Committee Meeting Sign-in Sheets

Annex D: FEMA Santa Clara River Watershed Discovery Meeting



Project Meeting:	Santa Clara River Watershed – Discovery Meeting
Date and Time:	September 18 th and 19 th , 2012
Place:	Saticoy, CA and Santa Clarita, CA

Meeting Objectives

- Introduce the Risk MAP program
- Discuss Risk MAP integration with mitigation planning, grant programs, and the National Flood Insurance Program
- Identify and prioritize community risks, needs, and actions
- Discuss potential project areas for future FEMA funding

Communities in Attendance at Saticoy meeting:

- Ventura County - Watershed Protection District, PWA, and Planning
- City of Oxnard
- Supervisor Long’s office
- Supervisor Zaragoza’s office
- Hawks & Associates (for City of Fillmore)
- City of Santa Paula
- City of Camarillo
- City of Simi Valley

Communities in Attendance at Santa Clarita meeting:

- Los Angeles County
- City of Santa Clarita

Santa Clara River Watershed Community Break-out Groups

Goal 1: Identify communities’ flood risk concerns and potential mitigation actions

- Ventura Co. Communities’ Concerns (potential mitigation actions noted in green font)
 - Storage of materials & vegetation in Santa Clara River
 - Sedimentation of Santa Paula Creek & Santa Clara River
 - Levee certification for levees in Oxnard & Ventura
 - Mobile homes & junk cars in floodplain in Ventura County
 - Issues managing floodplains with lack of staff

www.fema.gov/plan/prevent/fhm/rm_main.shtm • 1-877-FEMA MAP





- Ventura County Emergency Services (ES) would like to conduct controlled burns periodically to remove vegetation from river channels. Uncontrolled vegetation reduces flood conveyance capacity and creates a wildfire risk. Scheduling controlled burns has become close to impossible because of pressure from environmental organizations and a narrow weather window between the dry season (because of wildfire risk if the burn gets out of control) and the wet season (because the vegetation is too wet to burn).
 - County Supervisor Bennet is working with environmental organizations to resolve their objections to controlled burns
 - Ventura County ES and WPD could consult with NRCS on best practices to control vegetation growth in river channels.
 - **Ventura County ES and WPD could apply for grant funding to remove invasive species and replant with native species that are less flammable. Community volunteers from groups such as Boy/Girl Scouts and Future Farmers of America could assist with implementing the project.**
- Ventura Co. & City of Santa Paula thinks depth grids would be helpful
- Moon Mountain Tree Farm
 - Vegetation in floodway
 - Friends of Santa Clara River could help with maintenance
 - Nurseries located in floodplains use wooden box containers for large plants and trees. During flood events such as the flood on Hopper Creek in 2005 the containers float and collide with structures causing damage and creating debris that blocks culverts and increases flood elevations.
 - **Modify local ordinances to require fencing to contain nursery plants and other materials on nursery property.**
 - **Use grant funding to buy out nurseries and prevent future development of the properties.**
 - **Use grant funding to construct flood protection structures around the nurseries.**
- Nature Conservancy is buying land to the mouth of Sespe Creek within the banks but don't understand impacts to communities
 - Outreach needed
- Past flooding damage from San Fransquito Dam break
- Sedimentation is a flooding issue
- Bardsdale
 - **Depth grids will be helpful here because of a new development; could use the information to guide development.**
- Wheeler Canyon
 - Currently Zone A; needs detailed study
- Aliso Canyon needs new study
- Piru Dam has contributed to flooding concerns in the past
- Concern about increased hydrology from 2009 study
- Ventura Co is interested in how a Hazus study for critical facilities would get funded, such as using new floodplains in a Hazus analysis

www.fema.gov/plan/prevent/fhm/rm_main.shtm · 1-877-FEMA MAP

RiskMAP
Increasing Resilience Together



- FEMA can help build that capability at the county through training or could fund part of a project
- City of Santa Paula is concerned about potential flooding issues from development in East Area 1& 2
- Mudslide north of Santa Paula near Ojai Road happened the last time in 2005 during 2 inch rain event
- Sedimentation problems at Sespe Creek and Hwy 126
- Santa Paula airport is occasionally flooded
- Culvert issue at N. 10th Street & Harvard Blvd. & Hwy 126
- City of Oxnard has stormwater issues near the 101 & Victoria Ave.
- Issues at Olivas Park
- Stormwater issues at RR near Wagon Wheel
- A future school development site on a non-accredited levee
- Levees: USACE-built levees along the Santa Clara River (SCR) are owned and maintained by Ventura County Watershed Protection District (VCWPD). The levees are deficient and de-accredited, although currently shown as Provisionally Accredited on the effective FEMA FIRM. FEMA plans to revise the FIRM to show SFHA behind the levees when the LAMP guidance is final. FEMA, VCWPD, USACE, and the impacted communities will meet sometime after the LAMP guidance is final to determine the appropriate LAMP evaluation and mapping method(s) to be used.
- USACE Los Angeles District has completed a SCR watershed study which includes tributaries that are not included on the FEMA SCR study which is currently on hold due to LAMP issues. LACDPW has expressed concerns to FEMA about the hydrology used in the USACE studies, particularly on Newhall Creek. FEMA has agreed to address the County's concerns before incorporating the USACE study results into the FEMA SCR study Physical Map Revision. VCWPD requests that *FEMA verify that the USACE studies meet FEMA mapping standards before they are added to the FIRM as part of the FEMA SCR study Physical Map Revision.*
- VCWPD has previously requested that *FEMA review changes to the SCR study which resulted from corrections that BakerAECOM made to the original MAPIX-Mainland study and Preliminary FIRM.*
- CA DWR Awareness Maps: VCWPD has copies of the Awareness Maps that CA DWR produces for flood risk areas that are not mapped as SFHAs on the FEMA FIRM. VCWPD uses the Awareness Maps in their planning process, but has no interest in incorporating them as Zone A or Zone D areas on the FEMA FIRM.
- FEMA may be able to produce non-regulatory Risk MAP products such as Changes Since Last FIRM and Depth Grids for the SCR Physical Map Revision, even though the FEMA SCR study was not originally a Risk MAP project. VCWPD expressed interest in the idea.
- Concrete and asphalt milling operations located in floodplains are potential sources of hazardous materials during flood events.
 - **Use grant funding to buy out milling operations and prevent future development of the properties.**

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- Use grant funding to construct flood protection structures around the milling operations.
 - Close the gap in the SCR-3 levee to provide flood protection for neighborhoods in the City of Oxnard.
 - Seek Congressional funding for a USACE project to rehabilitate the SCR-3 levee.
- City of Santa Clarita and Los Angeles County Concerns (potential mitigation actions noted in green font)
- Illegal construction is common. Community lawyers choose to look the other way to avoid law suits from wealthy land owners. Difficult to enforce due to complex political situation.
 - Multiple cases of home made flood protection structures that are actually a hazard to neighbors. How to effectively get structures removed?
 - Need an education and outreach program for public perception that 'dry rivers don't flood'.
 - When new hydrology / changes occur through the LOMR process, Santa Clarita would like to see the revised hydrology applied to the downstream modeling to close gaps in mapping.
 - I-5 drainage issues at Calgrove (Towsley Canyon)
 - Culvert undersized & unstudied
 - City of LA, LA county and CalTrans need to be involved
 - Significant flooding occurs along the South Fork Santa Clara River at this location. Santa Clara River transitions from an open channel to a concrete lined channel to an underground culvert at this location. Flooding is caused by undersized culverts. The flooding affects the Smiser Ranch development.
 - A project to provide upstream flood storage is considered too expensive to be feasible.
 - Enlarging the downstream channel capacity is not considered feasible due to limited space.
 - A recent proposal has been made to relocated a road to mitigate flooding in the development.
 - Solidad & Sierra Hwy
 - Undersized culverts cause flooding
 - Channelization mixed with unimproved areas
 - Upstream mitigation potential to alleviate flooding issues
 - LACDPW, the City of Santa Clarita, CA Department of Fish and Game, USACE, and property owners need to agree on a plan for channel improvements to mitigate the flood problem. A property tax on affected property owners could be used to fund the improvements.
 - Town of Acton & other smaller communities
 - LA County can help with drainage issues
 - Flooding issues at Bouquet Canyon just north of Santa Clara River
 - Restoration project for Arundo & Tamarisc removal at the City to Forest boundary
 - Flooding issues along Sierra Hwy

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- Repetitive flooding has occurred at the Polynesian Mobile Home Park at 23450 Newhall Avenue on Newhall Creek in Santa Clarita. A 10-year storm in 2005 carried 4 feet of sediment from the Whitney and Elsemere Canyons into the MHP through a 30-inch culvert under Sierra Highway. Flooding is caused by an undersized bridge over Newhall Creek. A portion of the MHP is mapped in Zone A on the FIRM.
 - **The City of Santa Clarita has annexed Whitney and Elsinore Canyons, so a City project to reduce erosion in the canyon or capture sediment in a debris basin would mitigate the sedimentation problem in the MHP.**
 - **LACDPW can develop a flood control project to contain flooding in the Newhall Creek channel to mitigate flood risk in the MHP.**
- Older drains on private land
 - **Possibly use CBDG funds to improve those drains**
- City of Santa Clarita wants to include modeling in severe weather plan
 - Mark Jackson is the contact with NOAA
 - City wants to work with County and USGS about atmospheric river issues and needs to know who at LA County is working with NOAA & USGS
- City has mudflow issues
 - City requires newer development to have impact walls
- LA County development along Santa Clara River to modify channel
- Erosion issues on Santa Clara River
- Disney Ranch development in LA County is an issue
- There are gaps in the mapping along Whitney Canyon & Newhall Creek
 - City of Santa Clarita has data for this & also for Needham Ranch development in that same area
- The upper Santa Clarita watershed is a confluence for several major power, water, and oil utility corridors. CA DWR operates Castaic Dam and Los Angeles Department of Water & Power (LADWP) operates the Bouquet Reservoir. CA DWR also operates the Pyramid Lake which is part of the State Water Project. The area is seismically active and local emergency services agencies are concerned about the consequences of a major seismic event.
 - City of Santa Clarita and Los Angeles County emergency services agencies should coordinate with dam and reservoir owners (CA DWR and LADWP) obtain the latest Emergency Action Plans and dam inundation mapping information. **The City and County should develop plans to warn/notify/evacuate the population potential affected by a dam failure. The City and County should coordinate with the dam and reservoir owners to plan and conduct dam failure exercises to test their ability to mitigate loss of life from a potential dam failure.**
 - **The utility operators should exchange information with City and County emergency services agencies regarding anticipated consequences of a major seismic event so that the City and County can develop response plans.**

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- Invasive species are creating along a 3.5 mile reach of Bouquet Canyon Creek inhibit groundwater recharge and cause a wildfire threat.
 - An individual property owner is leading the Bouquet Canyon Network, a group of 20 local homeowners, in a multi-year project to eliminate the invasive species and replant. The project is funded by a grant from the Antelope Valley Resource Conservation District. Partners in the project include the NRCS, Los Angeles County Fire-Forestry Division, Southern California Wetlands Recovery Project, and Los Angeles Weed Management Area.
- Levees – Los Angeles County Department of Public Works (LACDPW) submitted levee certification documentation for 11 miles of Santa Clara River Provisionally Accredited levees that are currently under review by FEMA. Other levees that were not certifiable are shown as de-accredited on the 2008 Los Angeles County DFIRM behind-levee areas mapped with as much as 8-9 feet of flood depth, based on the pre-LAMP “without levee” methodology. The City of Santa Clarita questioned whether FEMA could restudy the previously de-accredited levees using the LAMP methodology. FEMA can only apply the LAMP methodology to new levee de-accreditation mapping projects and projects that are currently on hold. *The City’s request should be captured in the Consolidated Mapping Needs Strategy (CNMS) database—BakerAECOM Action item.*
- FEMA may be able to produce non-regulatory Risk MAP products such as Changes Since Last FIRM and Depth Grids for the SCR Physical Map Revision, even though the FEMA SCR study was not originally a Risk MAP project. The City of Santa Clarita and LACDPW expressed interest in this idea.
- The City of Santa Clarita noted that a July 2007 flood study was submitted to FEMA in the Placerita Canyon area that was not incorporated into the 2008 Los Angeles County DFIRM. *FEMA will follow up with the City and LACDPW to investigate this issue.*
- The City of Santa Clarita has a long term plan to reduce or eliminate SFHAs on the FEMA FIRM where it believes floodplains are incorrectly mapped. The City has hired consultants (HDR and Atkins) to do studies and submit LOMRs. The City should identify areas in CNMS where flood studies are needed to update the FIRM when the CNMS web-based application goes live.

Goal 2: Identify communities’ Mitigation/Planning Issues

- VCWPD has a Multi-Hazard Multi-Jurisdictional Hazard Mitigation Plan that is supported by a committee that meets regularly. The plan includes geodata such as locations of high hazard dams.
- The Nature Conservancy awarded a \$5M grant to VCWPD for setback levees on the lower reach of the SCR. The grant is being used to purchase land behind the existing non-certified agricultural levees for future construction of the setback levees.

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- CA DWR met earlier this year with several Ventura County water agencies to collect information about needs, costs, and priorities for flood mitigation projects. The information will be published late this year in the California Flood Futures Report.
- A committee of stakeholders is currently meeting to develop an Integrated Watershed Management Plan for the SCR. The committee is using HAZUS to assess damages from the 100-year and 500-year floods. The committee’s website address is http://portal.countyofventura.org/portal/page/portal/ceo/divisions/ira/WC/Santa_Clara_Watershed/SCRWC.
- The steering committee for Coastal Resilience Ventura, led by the Nature Conservancy, is developing a decision-support tool that Ventura County coastal communities can use to assess the risks associated with sea level rise and develop response plans.
- The primary flood control need identified in the SCR Watershed is to replace aging infrastructure. The ability of the County to raise the necessary funds for infrastructure projects (such as rehabilitation of the SCR levees to meet FEMA standards) is limited.
- The City of Santa Clarita is the third largest incorporated municipality in Los Angeles County with a population of 193,000. Large scale developments along flooding sources are currently planned or under construction.
 - Newhall Ranch is a 20,000 unit development on the Santa Clara River with extensive bank stabilization. A CLOMR was approved several years and construction on the initial phases of the project is underway. The project is opposed by the Santa Clarita Organization for Planning the Environment (SCOPE). The City of Santa Clarita is doing outreach on flood risk to residents of the development.
 - Vista Canyon Ranch is a mixed use development on the Santa Clara River which also involves changes to the riverbank including a new bridge.

Goal 3: Identify Additional Stakeholders

- | | |
|---|---|
| <ul style="list-style-type: none"> ○ Santa Clara River Watershed Committee ○ NRCS ○ Farm Bureau ○ Friends of the Santa Clara River ○ Nature Conservancy ○ Coastal Resilience Ventura ○ USACE ○ U.S. Fish and Wildlife Service | <ul style="list-style-type: none"> ○ Acton Town Council (Census Designated Place) ○ Agua Dulce Town Council (Census Designated Place) ○ Master’s College ○ Rosalyn Wayman, Field Representative, 5th County Supervisory District |
|---|---|

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- Santa Clarita Organization for Planning the Environment (SCOPE)
- CalTrans
- Los Angeles Department of Water and Power
- Fillmore & Western Railway
- CA DWR
- CA Department of Fish and Game
- NOAA
- USGS
- VCTC
- Union Pacific Railroad
- Coast Keepers
- Coastal Conservancy
- Rio School District
- Oakwood Development
- Cabrillo Economic Development Group
- River Park
- Eddison Power
- Economic Development Agencies
- Regional Water Quality Control Board
- Santa Monica Mountains Conservancy
- Sierra Club
- CDBG staff
- Farm Bureau
- United Water
- Keep Sespe Wild
- Santa Paula Airport
- Limoniera
- Bureau of Reclamation - local districts?
- Newhall Ranch
- Blue Star (mining company)

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SECTION 21. APPENDICES

Appendix A: [Bibliography and References](#)

Appendix B: [Acronyms](#)

Appendix C: [Glossary](#)

Appendix D: [Maps](#)

Appendix E: [City Council HMP Adoption Documentation](#)

Appendix A: Bibliography and References

- 18 U.S.C. § 2331. (2010). *United States Code*. Government Publishing Office.
- Ainsworth, J. and Doss, T. (1995, August 18). *Natural History of Fire & Flood Cycles*. Retrieved from California Coastal Commission: <http://www.coastal.ca.gov/fire/ucsbfire.html>
- Arizona Division of Emergency Management. (2008).
- Banjo, S. (2014, November 6). *Home Depot Hackers Exposed 53 Million Email Addresses*. Retrieved from WSJ.com: <http://www.wsj.com/articles/home-depot-hackers-used-password-stolen-from-vendor-1415309282>
- Bell, G. B. (2012, March 1). Lights out: Impact of the August 2003 power outage on mortality in New York, NY. *Epidemiology*, pp. 189–193. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3276729/>
- Bernard Pipkin, D. T. (2010). *Geology and the Environment*.
- Broder J, M. A. (2005, January). Injuries from the 2002 North Carolina Ice Storm and Strategies for Prevention. *Injury, International Journal of the Care of the Injured*, pp. 36(1):21-6. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/15589908>
- Burby, R. - Ed. (1998). *Cooperating with Nature: Confronting Natural Hazards with Land Use Planning for Sustainable Communities*. Washington D.C.: Joseph Henry Press.
- CAL FIRE. (2009, October 16). *Station Fire Incident Information*. Retrieved from http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=377
- CAL FIRE. (2012). *Wildland Hazard & Building Codes*. Retrieved from http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones_maps_citylist.php
- CAL FIRE. (2013, June 8). *Powerhouse Fire Incident Information*. Retrieved from http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=812
- CAL FIRE, U.S. Forest Services, Cal OES. (2009). *California Fire Siege 2007, An Overview*.
- California Building Standards Commission. (2013). *Cuurrent 2013 Codes*. Retrieved from <http://www.bsc.ca.gov/Home/Current2013Codes.aspx>
- California Department of Conservation, Division of Mines and Geology . (1997). *Seismic Hazard Evaluation of the Newhall 7.5-Minute Quadrangle, Los Angeles County, California*.
- California Department of Finance. (2015). *New Population Report*.
- California Department of Finance. (2015, May 1). *New State Population Report: California Grew by 358,000 Residents in 2014*. Retrieved from http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/documents/E-1_2015PressRelease.pdf
- California Department of Finance, E-5. (2014). *2000 and 2010 U.S. Decennial Census*.

- California Department of Forestry & Fire Protection. (2014, October 6). *Top 20 Largest California Wildfires*. Retrieved from http://www.fire.ca.gov/communications/downloads/fact_sheets/20LACRES.pdf
- California Department of Health Services, Epidemiology and Prevention for Injury Control Branch. (2007, May). *Review of July 2006 Heat Wave Related Fatalities in California*. Retrieved from <https://www.cdph.ca.gov/HealthInfo/injviosaf/Documents/HeatPlanAssessment-EPIC.pdf>
- California Department of Public Health. (2015). *Landslides and Mudslides*. Retrieved from <http://www.bepreparedcalifornia.ca.gov/BEINFORMED/NATURALDISASTERS/Pages/LandslidesandMudslides.aspx>
- California Economic Forecast and the Santa Clarita Economic Development Corporation. (2015). *2015 Economic Outlook*.
- California Energy Commission. (2015). *CaLEAP*. Retrieved from CaLEAP: <http://www.caleap.org/>
- California Energy Commission. (2015, March 15). *California Energy Maps*. Retrieved from http://www.energy.ca.gov/maps/powerplants/Power_Plants_Statewide.pdf
- California Nevada Climate Applications Program (CNAP), University of California at San Diego. (2015, August 14). *Santa Ana Wind Circulation Map*. Retrieved from California Nevada Climate Applications Program (CNAP): http://meteora.ucsd.edu/cap/santa_ana.html
- California Seismic Safety Commission. (2001). *Findings and Recommendations on Hospital Seismic Safety*.
- California State Legislature. (2015). *California Legislative Information*. Retrieved from <http://leginfo.legislature.ca.gov/faces/codes.xhtml>
- Cal-OES. (2012). *Electrical Power Disruption – Toolkit for Local Government*.
- CBS Los Angeles. (2012, September 27). *SoCal to Prep for Earthquakes , Terrorism with \$61M DHS Grant*. Retrieved from CBS Los Angeles: <http://losangeles.cbslocal.com/2012/09/27/socal-to-prep-for-earthquakes-terrorism-with-61m-dhs-grant/>
- Chong, J.-R. (2009, July 21). *California's 2006 Heat Wave was Much Deadlier than Previously Reported*. *Los Angeles Times*.
- City of Santa Clarita. (2008). *One Valley One Vision City County General Plan*.
- City of Santa Clarita. (2011). *General Plan*.
- City of Santa Clarita. (2013). *City of Santa Clarita, General Plan – Housing Element, October 2013*.
- City of Santa Clarita. (2013). *Map Gallery*. Retrieved from City of Santa Clarita, GIS Division: <http://www.santa-clarita.com/index.aspx?page=25>
- City of Santa Clarita. (2014). *Santa Clarita Municipal Code Title 18, City Building Code*. Santa Clarita.
- City of Santa Clarita. (n.d.). *2014-2015 City Budget Community Profile*.

- City of Santa Clarita. (2015). *City of Santa Clarita Profile*. Retrieved from <http://www.santa-clarita.com/index.aspx?page=572>
- City of Santa Clarita Community Development Department. (2013). *List of Structures Designated as Historic by the City of Santa Clarita Historic Preservation Ordinance*.
- City of Santa Clarita Planning Division. (2012, September 12). *Santa Clarita Updates*. Retrieved from City of Santa Clarita: <http://www.santa-clarita.com/index.aspx?recordid=1030&page=133>
- City of Santa Clarita Public Works. (2015).
- City of Santa Clarita, Planning Department. (2011). *City of Santa Clarita General Plan - Safety Element*.
- City of Santa Clarita, Community Development. (2015). *Community Development Block Grans (CDBG)*. Retrieved from <http://www.santa-clarita.com/index.aspx?page=1206>
- City of Santa Clarita, Economic Division. (2015). *City of Santa Clarita Economic Division Newsletter, June 2015*.
- City of Santa Clarita, GIS. (2012, December). *City of Santa Clarita Map Gallery*. Retrieved from <http://www.santa-clarita.com/index.aspx?page=25>
- City of Santa Clarita, GIS. (2015).
- City of Santa Clarita, Planning Division. (2015). *Growth Projection Worksheet*.
- Cloud Security Alliance. (2013). *The Notorious Nine: Cloud Computing Top Threats in 2013*. Cloud Security Alliance.
- CNN. (2013, December 22). *Target Credit Card Hack: What You Need to Know*. Retrieved from Money.CNN.Com: <http://money.cnn.com/2013/12/22/news/companies/target-credit-card-hack/?iid=EL>
- Department of Land Conservation and Development. (2000). *Planning For Natural Hazards: The Oregon Technical Resource Guide, Ch 5*.
- DHS. (2008). *Critical Infrastructure and Key Resources Support Annex*. Retrieved from <http://www.fema.gov/pdf/emergency/nrf/nrf-support-cikr.pdf>.
- DHS. (2015, July 20). *Countering Violent Extremism*. Retrieved from Department of Homeland Security: <http://www.dhs.gov/topic/countering-violent-extremism>
- Egnyte. (2014). *Bring Your Own Device Infographic*. Retrieved from Egnyte.com: <http://www.egnyte.com/file-server/byod.html>
- Electricity Consumers Resource Council. (2004, February 4). *The Economic Impacts of the August 2003 Blackout*. FERC U.S. - Canada Power System Outage Task Force.
- Environmental Protection Center. (2015, July 21). *Future Climate Change*. Retrieved from Climate Change: <http://www.epa.gov/climatechange/science/future.html>
- EQE. (1993). Retrieved from <http://www.eqe.com/publications/revf93/firefoll.htm>
- FBI. (2009, September 9). *Domestic Terrorism in the Post 9/11 Era*. Retrieved from https://www.fbi.gov/news/stories/2009/september/domterror_090709

- FBI. (2014). *A Study of Active Shooter Incidents in the United States Between 2000 and 2013*. Washington D.C. : Federal Bureau of Investigations.
- FCC Public Safety and Homeland Security Bureau. (n.d.). *Infrastructure Interdependencies*.
- FEMA. (2015). *Disaster Declarations for California*. Retrieved from <https://www.fema.gov/disasters/grid/state-tribal-government/77>
- FEMA. (2015, May 4). *FEMA Community Status Book Report for California*. Retrieved from <http://www.fema.gov/cis/CA.pdf>
- FEMA Flood Map Service Center. (2015). *Flood Map Service Center*. Retrieved from <https://msc.fema.gov/portal/advanceSearch#searchresultsanchor>
- FEMA HAZUS-MH. (2015, 8 3). *FEMA HAZUS*. Retrieved from <http://www.fema.gov/hazus>
- Firewise Communities. (n.d.). *Wildland/Urban Interface Fire Hazards: A New Look at Understanding Hazard Assessment Methodologies*.
- Funes, J. (2011, December 29). *Windstorm Top Local News Story of 2011*. Retrieved from Pasadena Star News: <http://www.pasadenastarnews.com/20111229/windstorm-top-local-news-story-of-2011>
- Gale A. Norton, Secretary of the Interior. (2002). *Overgrown Forests Require Preventive Measures*. USA Today Editorial,.
- Goldstein, R. A. (2015, February 5). *Millions of Anthem Customers Targeted in Cyberattack*. Retrieved from NYTimes.com: http://www.nytimes.com/2015/02/05/business/hackers-breached-data-of-millions-insurer-says.html?_r=1
- Government of Canada. (2015, March 3). *Common Threats*. Retrieved from Government of Canada - Get Cyber Safe: <http://www.getcybersafe.gc.ca/cnt/rsks/cmmn-thrts-eng.aspx>
- Harrod, E. a. (1989). *Landslides: Extent and Economic Significance. Proceedings of the 28th International Geological Congress Symposium on Landslides*. Washington D.C., Rotterdam: Balkema.
- Hesseldahl, A. (2015, January 18). *How the U.S. Knew North Korea Was Behind the Sony Hack*. Retrieved from Re/Code.com: <http://recode.net/2015/01/18/how-the-u-s-knew-north-korea-was-behind-the-sony-hack/>
- HUD. (2015). *Community Development Block Grant Program*. Retrieved from http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs
- InciWeb. (2009, September 25). *InciWeb Incident Information System*. Retrieved from <http://inciweb.nwcg.gov/photos/CAANF/2009-08-27-00:53-station/picts/pict-20090925-121011-0.jpeg>
- InciWeb. (2013, June 1). *InciWeb Incident Information System*. Retrieved from http://inciweb.nwcg.gov/photos/CAANF/2013-05-30-2029-Powerhouse/picts/2013_06_01-11.24.32.777-CDT.jpeg
- Institute for Business and Home Safety. (2013). Retrieved from <https://www.disastersafety.org/open-for-business/>

- Ixnayonthetimmay. (2007, June 28). *LA County Incorporated Areas Santa Clarita Highlighted*. Retrieved from https://commons.wikimedia.org/wiki/File%3ALA_County_Incorporated_Areas_Santa_Clarita_highlighted.svg
- Ja, A. (2015, June 8). *Insider vs. Outsider Threats: Identify and Prevent*. Retrieved from InfoSec Resources: <http://resources.infosecinstitute.com/insider-vs-outsider-threats-identify-and-prevent/>
- Jia-Rui Chong, Amanda Covarrubias and Richard Fausset, Los Angeles Times. (2005, January 10). 3 Killed as Unrelenting Storms Batter Southland.
- Joel Scheingross, B. M. (2013). The Influence of Large-Magnitude Earthquakes and Fault Zone Damage on the Spatial Distribution of Slow-Moving Landslides. *UAVSAR Workshop 2013*. UAVSAR, Keck Institute for Space Studies and the National Science Foundation. Retrieved from [http://uavsar.jpl.nasa.gov/science/workshops/presentations2013/UAVSAR_WorkShop2013_Fault-zone_Controls_\(Scheingross\).pdf](http://uavsar.jpl.nasa.gov/science/workshops/presentations2013/UAVSAR_WorkShop2013_Fault-zone_Controls_(Scheingross).pdf)
- Jones, L. M. (2008). *The ShakeOut Scenario*. USGS.
- Kfasimpaur. (n.d.). "Bouquet reservoir-kmf" Own work. Licensed under Public Domain via Commons.
- Kuchler, H. (2014, June 5). *US State and Local Government Bodies Lack Cyber Defences*. Retrieved from ft.com: <http://www.ft.com/cms/s/0/b7d7236a-e298-11e3-a829-00144feabdc0.html>
- Lin, D. (2015, May 1). *"Cyber Attack" on California Common Core Testing Shuts Down Access for Hours, State Denies Deliberate Tampering*. Retrieved from SanFrancisco.CBSLocal.com: <http://sanfrancisco.cbslocal.com/2015/05/01/cyber-attack-on-california-common-core-testing-shuts-down-access-for-hours-state-denies-deliberate-tampering/>
- Los Angeles County . (2009). *Los Angeles County Preliminary Draft Santa Clarita Valley Area Plan* .
- Los Angeles County Fire Department. (2015). *Station Listings*. Retrieved from <http://www.fire.lacounty.gov/fire-station-listings/>
- Los Angeles County Fire Department Station 150. (2013, April 6). *Facebook*. Retrieved from <https://www.facebook.com/pages/Los-Angeles-County-Fire-Department-Station-150/295351657242423>
- Los Angeles County Fire Department, Air Operations. (2015). Calgrove Fire Picture.
- Los Angeles County Fire Department, Gregory Hisel, Assistant Fire Chief. (2015, July 2). The Recent Calgrove Fire.
- Los Angeles County Office of Emergency Management. (2015, August 25). *Extreme Heat, List of Cooling Centers*. Retrieved from <http://lacoa.org/PDF/HazardsandThreats/0000Cooling%20Center%20List-2013%20-%20KN.pdf>

- Luna Jr., R. (2015, July 17). *Cyber Attack on UCLA Health May Affect Up to 4.5M*. Retrieved from DailyBruin.com: <http://dailybruin.com/2015/07/17/cyber-attack-on-ucla-health-may-affect-up-to-4-5m/>
- Marx, Rodriguez, Greenko, Das, Heffernan, Karpati, Mostashari, Balter, Layton, Weiss. (2005). Diarrheal Illness Detected through Syndromic Surveillance After a Massive Power Outage: New York City, August 2003. *American Journal of Public Health*.
- Mileti, D. (1999). *Disasters by Design: A Reassessment of Natural Hazards in the United States*. Washington D.C.: Joseph Henry Press.
- Murphy, K. (2011). Is Homeland Security Spending Paying Off? *Los Angeles Times*.
- Nakashima, E. (2015, June 4). *Chinese Breach Data of 4 Million Federal Workers*. Retrieved from WashingtonPost.com: https://www.washingtonpost.com/world/national-security/chinese-hackers-breach-federal-governments-personnel-office/2015/06/04/889c0e52-0af7-11e5-95fd-d580f1c5d44e_story.html
- NASA / JPL-Caltech. (2002, February 9). *Santa Ana Winds Satellite Image*. Retrieved from NASA/JPL-Caltech - <http://photojournal.jpl.nasa.gov/catalog/PIA03445>
- National Centers for Environmental Information. (2015). Retrieved from <http://www.ncdc.noaa.gov/cag/time-series/us>
- National Integrated Drought Information System - NIDIS. (2015, September 1). *U.S. Drought Monitor*. Retrieved from The National Drought Mitigation Center: <http://www.drought.gov/drought/content/products-current-drought-and-monitoring-drought-indicators/us-drought-monitor>
- National Oceanic and Atmospheric Administration. (2015, July 2). *What is Subsidence?* . Retrieved from National Ocean Service: <http://oceanservice.noaa.gov/facts/subsidence.html>
- National University System Institute for Policy Research. (n.d.). *Economic impact of September 9th (2011) Power Outage*. National University System Institute for Policy Research.
- National Weather Service. (2015). *Heat Index*. Retrieved from http://www.nws.noaa.gov/om/heat/heat_index.shtml
- National Weather Service, Climate Prediction Center. (2015). *Discussion for the Seasonal Drought Outlook*. Retrieved from http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_discussion.html
- National Weather Service, National Climate Data Center. (2015, May 31). *Storm Events*. Retrieved from <https://www.ncdc.noaa.gov/stormevents>
- NOAA National Climate Data Center, Global Historical Climatology Network. (2014). *NEWHALL 5 NW, CA US GHCND:USC00046161*. NOAA National Climate Data Center.
- NOAA, NASA. (2009, August 31). *NOAA*. Retrieved from http://www.noaa.gov/features/03_protecting/images/ca_fire.jpg
- Office of U.S. Attorneys. (2014, December 8). *Domestic Terrorism*. Retrieved from <http://www.justice.gov/usao/priority-areas/national-security/domestic-terrorism>

- Oregon Department of Geology. (1998, October 7). Joint Interim Task Force On Landslides and Public Safety Report to the 70th Legislative Assembly. Oregon Department of Geology.
- Oregon Emergency Management Interagency Hazard Mitigation Team. (2000). *State Hazard Mitigation Plan*.
- Peacock, S. M. (n.d.). Retrieved from University of Michigan:
<http://aamc.geo.lsa.umich.edu/eduQuakes/EQpredLab/EQprediction.peacock.html>
- Pipeline & Hazardous Materials Safety Administration (PHMSA), U.S. Department of Transportation. (2014). *California Significant Events Listing*.
- Rapid7. (2012). *Data Breaches in the Government Sector - A Rapid7 Research Report*. Retrieved from Rapid7.com: <https://www.rapid7.com/docs/data-breach-report.pdf>
- Santa Clarita City Risk Administration. (2015).
- Santa Clarita Valley Chamber of Commerce. (n.d.). *Santa Clarita Valley Regional Facts and Figures*. Retrieved from <http://www.scvchamber.com/regional-facts--figures.html>
- Santa Clarita Valley Economic Development Corporation & College of the Canyons. (2015). *2015 Economic Outlook*.
- Santa Clarita Water Division. (2015). *Conservation*. Retrieved from <http://santaclaritawater.com/conservation-2>
- SCAG. (2014). *SCAG Profile of Santa Clarita*.
- SCEC. (2011). *Community Fault Model*.
- SCEC. (2011). *Putting Down Roots in Earthquake Country*. Los Angeles: SCEC. Retrieved from Putting: <http://www.earthquakecountry.info/roots/socal-faults.html>
- Schuster, L. H. (n.d.). *Significant Landslide Events in the United States*. Retrieved from USGS: http://landslides.usgs.gov.html_files/pubs/report1/Landslides_pass_508.pdf
- Smith, A. B. (n.d.). Retrieved from California Department of Conservation, California Geological Survey:
http://www.conservation.ca.gov/cgs/information/publications/cgs_notes/note_33/
- South Carolina Earthquake Education and Preparedness. (n.d.). *Earthquake Size (Magnitude)*. Charleston: College of Charleston.
- Southern California Association of Governments. (2015). *Profile of the City of Santa Clarita*.
- Southern California Earthquake Data Center. (n.d.). California Institute of Technology.
- Southern California Edison. (2004). *Floodplain and Dam Inundation Map, Antelope Transmission Project PEA Segment 1*.
- Southern California Edison. (2010). *SCE Smart Grid Strategy and Roadmap*. Retrieved from SCE.com: https://www.sce.com/NR/rdonlyres/BFA28A07-8643-4670-BD4B-215451A80C05/0/SCE_SmartGrid_Strategy_and_Roadmap.pdf
- Southern California Gas Company. (2011). *Gas Transmission and High Pressure Distribution Pipeline Interactive Map - LA*. Retrieved from <http://www.socalgas.com/safety/pipeline-maps/LA.shtml>

- Southern California Public Radio. (2015). *Fire Tracker Archives*. Retrieved from Fire Tracker: <http://firetracker.scpr.org/wildfires/archives/>
- State of California - Department of Justice - Office of the Attorney General. (2013, July 1). *Attorney General Kamala D. Harris Releases Report on Data Breaches; 2.5 Million Californians Had Personal Information Compromised*. Retrieved from State of California - Department of Justice - Office of the Attorney General: <http://oag.ca.gov/news/press-releases/attorney-general-kamala-d-harris-releases-report-data-breaches-25-million>
- State of California. (2014, May 1). *Summary of State and Federal Water Project Actions in Response to the Drought*. Retrieved from <http://ca.gov/drought/managementactions.html>
- State of California Department of Conservation. (2008). *PSHA Map Index*. Retrieved from http://www.conservation.ca.gov/cgs/rghm/psaha/Map_index/Pages/los_angeles.aspx
- State of California, California Department of Water Resources. (2015). *Drought Information*. Retrieved from California Department of Water Resources: <http://www.water.ca.gov/waterconditions/declaration.cfm>
- Structural Engineers Association of Southern California. (2010). *Summary Report: Study of Historical and Design Wind Speeds in the Los Angeles Area*.
- Terrorism Early Warning Group. (2008). *Terrorism Early Warning, 10 Years of Achievement in Fighting Terrorism and Crime*. Los Angeles: Los Angeles County Sheriff's Department.
- The Geological Society of America. (n.d.). *GSA Bulletin*. Retrieved from <http://gsabulletin.gsapubs.org/content/116/9-10/1158/F1.expansion.html>
- The National Association of State Energy Officials - NASEO. (2009). *State Energy Assurance Guidelines*.
- The Santa Clarita Valley Signal by Karen Jonas, Staff Writer. (2012, June 10). *Air Pollution on the Decline*. Retrieved from The Santa Clarita Valley Signal: <http://www.signalscv.com/archives/67541/>
- The White House. (2003). *The National Strategy to Secure Cyberspace*.
- The White House. (2009). *Cyberspace Policy Review - Assuring a Trusted and Resilient Information and Communications Infrastructure*.
- Theobald, D. M., W. R. Travis, M. A. Drummond, and E. S. Gordon. (2012). The Changing Southwest. Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment. In *The Changing Southwest* (pp. 37-55).
- Tom G. Farr, Cathleen Jones, Zhen Liu. (2015). Progress Report: Subsidence in the Central Valley, California. <http://www.water.ca.gov/waterconditions/>: Jet Propulsion Laboratory / California Institute of Technology.
- U.S. Department of State. (2015). Foreign Terrorist Organizations. <http://www.state.gov/j/ct/rls/other/des/123085.htm>.
- U.S. Global Change Research Program. (2014). *2014 National Climate Assessment*. Washington DC.
- University of Washington. (2000, January 27). *What is Soil Liquefaction?* Retrieved from <http://www.ce.washington.edu/~liquefaction/html/what/what1.html>

- USFS. (2009, November 4). *Angeles NF Station Fire Frequently Asked Questions*. Retrieved from http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_020019.pdf
- USFS and the CA Dept. of Forestry and Fire Protection. (2004). *California Fire Siege 2003, The Story*.
- USGS. (n.d.). Retrieved from nationalatlas.gov:
<http://nationalatlas.gov/articles/geology/features/sanandreas.html>
- USGS. (2003, October 30). *USGS Research Indicates Fire Suppression and Fuel Buildup are Not Responsible for Shrubland Fires in Southern California*. Retrieved from <http://www.usgs.gov/newsroom/article.asp?ID=152#.Vd0aM6BVhBc>
- USGS. (2015, August 7). *Sinkholes*. Retrieved from The USGS Water Science School:
<http://water.usgs.gov/edu/sinkholes.html>
- USGS California Water Science Center. (2015). Retrieved from
<http://ca.water.usgs.gov/data/drought/>
- USGS. (n.d.). *Significant Earthquakes Archive*. Retrieved from
<http://earthquake.usgs.gov/earthquakes/eqinthenews>
- VedderPrice. (2014, September). *State and Local Governments at Risk: How Public Entities Can Reduce the Risk of a Data Breach*. Retrieved from [vedderprice.com:](http://www.vedderprice.com/state-local-governments-at-risk-how-public-entities-can-reduce-risk-of-data-breach/)
<http://www.vedderprice.com/state-local-governments-at-risk-how-public-entities-can-reduce-risk-of-data-breach/>
- Washington County Oregon Office of Consolidated Emergency Management. (2010, April 2). *OCEM Wind Storm Handout for Personal Preparedness*. Retrieved from
<http://www.co.washington.or.us/cao/upload/13-windstorms.pdf>
- Western Regional Climate Center. (2015, January 20). *SAUGUS PWR PLT 1, CALIFORNIA (048014)*.
- Wikipedia. (2015). https://en.wikipedia.org/wiki/Santa_Clarita,_California#Wildfires.

Appendix B: Acronyms

The following is a list of acronyms used throughout the City of Santa Clarita Hazard Mitigation Plan.

Acronym	Description
A&W	Alert and Warning
AA	Administering Areas
AAR	After Action Report
AASHTO	American Association of State Highway and Transportation Officials
ARC	American Red Cross
ATC	Applied Technology Council
B/CA	benefit/cost analysis
BFE	Base Flood Elevation
BIA	Building Industrial Association
BLM	Bureau of Land Management
BSA	California Bureau of State Audits
BSSC	Building Seismic Safety Council
CalARP	California Accidental Release Prevention
CalBO	California Building Officials
CalEPA	California Environmental Protection Agency
Cal-OES	California Office of Emergency Services
CALSTARS	California State Accounting Reporting System
Caltrans	California Department of Transportation
CBO	Community Based Organization
CDBG	Community Development Block Grant
CDF	California Department of Forestry and Fire Protection
CDMG	California Division of Mines and Geology
CEC	California Energy Commission
CEPEC	California Earthquake Prediction Evaluation Council
CERT	Community Emergency Response Team/Training
CESRS	California Emergency Services Radio System
CFR	Code of Federal Regulations
CHIP	California Hazardous Identification Program
CHMIRS	California Hazardous Materials Incident Reporting System
CHP	California Highway Patrol

Acronym	Description
CLETS	California Law Enforcement Telecommunications System
CRS	Community Rating System
CSTI	California Specialized Training Institute
CUEA	California Utilities Emergency Association
CUPA	Certified Unified Program Agency
DAD	Disaster Assistance Division (of the state Office of Emergency Services)
DCS	Disaster Communication Services
DFO	Disaster Field Office
DGS	California Department of General Services
DO	Duty Officer
DOC	Department Operations Center
DOE	Department of Energy (U.S.)
DOF	California Department of Finance
DOJ	California Department of Justice
DPA	California Department of Personnel Administration
DPIG	Disaster Preparedness Improvement Grant
DSA	Division of the State Architect
DSR	Damage Survey Report
DSW	Disaster Service Worker
DWR	California Department of Water Resources
EAS	Emergency Alerting System
EDA	Economic Development Administration
EDIS	Emergency Digital Information System
EERI	Earthquake Engineering Research Institute
EMA	Emergency Management Assistance
EMI	Emergency Management Institute
EMMA	Emergency Managers Mutual Aid
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
EPA	Environmental Protection Agency (U.S.)
EPEDAT	Early Post Earthquake Damage Assessment Tool

Acronym	Description
EPI	Emergency Public Information
EPIC	Emergency Public Information Council
ER	Emergency Relief
ESC	Emergency Services Coordinator
EWP	Emergency Watershed Protection (NRCS Program)
FAS	Federal Aid System
FDAA	Federal Disaster Assistance Administration
FEAT	Governor's Flood Emergency Action Team
FEMA	Federal Emergency Management Agency
FFY	Federal Fiscal Year
FIREScope	Firefighting Resources of Southern California Organized for Potential Emergencies
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance (FEMA Program)
FMA	Flood Management Assistance
FSR	Feasibility Study Report
GIS	Geographic Information System
GIS	Geographical Information System
GSA	General Services Administration
HAD	Housing and Community Development
HAZMAT	Hazardous Materials
HAZMIT	Hazardous Mitigation
Hazus	Hazards U.S.
Hazus	Hazards United States (a multi-hazard damage assessment prediction tool)
HEICS	Hospital Emergency Incident Command System
HEPG	Hospital Emergency Planning Guidance
HIA	Hazard Identification and Analysis Unit
HMGP	Hazard Mitigation Grant Program
HMGP	Hazard Mitigation Grant Program
HMST	Hazard Mitigation Survey Team
HUD	Housing and Urban Development (United States, Department of)
IA	Individual Assistance
IBHS	Institute for Business and Home Safety
IDE	Initial Damage Estimate

Acronym	Description
IFG	Individual & Family Grant (program)
IPA	Information and Public Affairs (of state Office of Emergency Services)
LEMMA	Law Enforcement Master Mutual Aid
LOMR	Letter Of Map Revision
MARAC	Mutual Aid Regional Advisory Council
MOU	Memorandum of Understanding
NCDC	National Climate Data Center
NEMA	National Emergency Management Agency
NEMIS	National Emergency Management Information System
NFIP	National Flood Insurance Program
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NHMP	Natural Hazard Mitigation Plan (also known as "409 Plan")
NIBS	National Institute of Building Sciences
NIFC	National Interagency Fire Center
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAA	National Oceanic and Atmospheric Association
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NSF	National Science Foundation
NWS	National Weather Service
NWS	National Weather Service
OA	Operational Area
OASIS	Operational Area Satellite Information System
OSHPD	Office of Statewide Health Planning and Development
PA	Public Assistance
PDA	Preliminary Damage Assessment
PIO	Public Information Office
RA	Regional Administrator (OES)
RAMP	Regional Assessment of Mitigation Priorities
RAPID	Railroad Accident Prevention & Immediate Deployment
RDMHC	Regional Disaster Medical Health Coordinator

Acronym	Description
REOC	Regional Emergency Operations Center
RES	Regional Emergency Staff
RIMS	Response Information Management System
RMP	Risk Management Plan
SAM	State Administrative Manual
SARA	Superfund Amendments & Reauthorization Act
SBA	Small Business Administration
SBA	Small Business Administration
SCO	California State Controller's Office
SECURE	Santa Clarita Educated Communities United in Response to Emergencies
SEMS	Standardized Emergency Management System
SEPIC	State Emergency Public Information Committee
SHMO	State Hazard Mitigation Officer
SLA	State and Local Assistance
SOP	Standard Operating Procedure
SWEPC	Statewide Emergency Planning Committee
UPS	Uninterrupted Power Source
URM	Unreinforced Masonry
USACE	United States Army Corps of Engineers
USAR	Urban Search and Rescue
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USFA	United States Fire Administration
USFS	United States Forest Service
USGS	United States Geological Survey
USGS	United States Geological Survey
WAN	Wide Area Network
WC	California State Warning Center
WSSPC	Western States Seismic Policy Council

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Appendix C: Glossary

Term	Definition
100 Year Flood	The 100-year flooding event is the flooding level that has 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. Other similar terms include 50 Year Flood and 500 Year Flood.
Acceleration	The rate of change of velocity with respect to time. Acceleration due to gravity at the earth's surface is 9.8 meters per second squared. That means that every second that something falls toward the surface of earth, its velocity increases by 9.8 meters per second.
Acclimatization	The climatic adaptation of an organism to be accustomed to a new environment. The adjustment of sweat-salt concentrations to help an organism lose water to regulate temperature.
Asset	Any manmade or natural feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.
Base Flood	Flood that has a 1 percent probability of being equaled or exceeded in any given year. Also known as the 100-year flood.
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 choose to 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 may serve as base flood elevation for the tie down of mobile homes. The regulations of the National Flood Insurance Program focus on development in the 100-year floodplain.
Bedrock	The solid rock that underlies loose material, such as soil, sand, clay, or gravel.
Building	A structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.
Community Rating System (CRS)	An NFIP program that provides incentives for NFIP communities to complete activities that reduce flood hazard risk. When the community completes specified activities, the insurance premiums of policyholders in these communities are reduced.

Term	Definition
Computer-Aided Design and Drafting (CADD)	A computerized system enabling quick and accurate electronic 2-D and 3-D drawings, topographic mapping, site plans, and profile/cross-section drawings.
Contour	A line of equal ground elevation on a topographic (contour) map.
Critical Facility	Facilities that are critical to the health and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals.
Debris	The scattered remains of assets broken or destroyed in a hazard event. Debris caused by a wind or water hazard event can cause additional damage to other assets.
Debris Flow	A landslide in which a mass of coarse-grained soil flows downslope as a slurry. Material involved is commonly a loose combination of surficial despos, rock fragments, and vegetation.
Debris Slide	A slide of coarse grained soil, commonly consisting of a loose combination of surficial deposits, rock fragments, and vegetation. Strength of the material is low, but there may be a very low strength zone at the base of the soil or within the weathered bedrock.
Dew Point	The temperature at which the moisture content in the air will saturate the air.
Digitize	To convert electronically points, lines, and area boundaries shown on maps into x, y coordinates (e.g., latitude and longitude, Universal Transverse Mercator (UTM), or table coordinates) for use in computer applications.
Displacement Time	The average time (in days) which the building's occupants typically must operate from a temporary location while repairs are made to the original building due to damages resulting from a hazard event.
Duration	How long a hazard event lasts.
Earth Flow	A landslide composed of a mixture of fine-grained soil, consisting of surficial deposits and deeply weathered, disrupted bedrock. The material strength is low through much of the slide mass, and the movement occurs on many discontinuous shear surfaces throughout the landslide mass.
Earthquake	A sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of earth's tectonic plates.

Term	Definition
El Niño and La Niña	<p>El Niño and La Niña are opposite phases of what is known as the <i>El Niño-Southern Oscillation (ENSO)</i> cycle. The ENSO cycle is a scientific term that describes the fluctuations in temperature between the ocean and atmosphere in the east-central Equatorial Pacific (approximately between the International Date Line and 120 degrees West).</p> <p>El Niño means <i>The Little Boy</i>, or <i>Christ Child</i> in Spanish. El Niño was originally recognized by fishermen off the coast of South America in the 1600s, with the appearance of unusually warm water in the Pacific Ocean. The name was chosen based on the time of year (around December) during which these warm waters events tended to occur.</p> <p>El Niño and La Niña episodes typically last nine to 12 months, but some prolonged events may last for years. While their frequency can be quite irregular, El Niño and La Niña events occur on average every two to seven years. Typically, El Niño occurs more frequently than La Niña.</p> <p>Typical El Niño effects are likely to develop over North America during the upcoming winter season. Those include warmer-than-average temperatures over western and central Canada, and over the western and northern United States. Wetter-than-average conditions are likely over portions of the U.S. Gulf Coast and Florida, while drier-than-average conditions can be expected in the Ohio Valley and the Pacific Northwest.</p> <p>La Niña means <i>The Little Girl</i> in Spanish. La Niña is also sometimes called <i>El Viejo</i>, <i>anti-El Niño</i>, or simply "<i>a cold event</i>." La Niña is the <i>cold phase</i> of ENSO. La Niña episodes represent periods of below-average sea surface temperatures across the east-central Equatorial Pacific. Global climate La Niña impacts tend to be opposite those of El Niño impacts. In the tropics, ocean temperature variations in La Niña also tend to be opposite those of El Niño. During a La Niña year, winter temperatures are warmer than normal in the Southeast and cooler than normal in the Northwest.</p>
Erosion	Wearing away of the land surface by detachment and movement of soil and rock fragments, during a flood or storm or over a period of years, through the action of wind, water, or other geologic processes.
Essential Facility	Elements that are important to ensure a full recovery of a community or state following a hazard event. These would include: government functions, major employers, banks, schools, and certain commercial establishments, such as grocery stores, hardware stores, and gas stations.
Extent	The size of an area affected by a hazard or hazard event.
Fault	A fracture in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust, in which adjacent surfaces are differentially displaced parallel to the plane of fracture.

Term	Definition
Federal Emergency Management Agency (FEMA)	Independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response and recovery.
Fire Potential Index (FPI)	Developed by USGS and USFS to assess and map fire hazard potential over broad areas. Based on such geographic information, national policy makers and on-the-ground fire managers established priorities for prevention activities in the defined area to reduce the risk of managed and wildfire ignition and spread. Prediction of fire hazard shortens the time between fire ignition and initial attack by enabling fire managers to pre-allocate and stage suppression forces to high fire risk areas.
Flash Flood	A flood event occurring with little or no warning where water levels rise at an extremely fast rate.
Flood	A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land.
Flood Depth	Height of the flood water surface above the ground surface.
Flood Elevation	Elevation of the water surface above an established datum, e.g. National Geodetic Vertical Datum of 1929, North American Vertical Datum of 1988, or Mean Sea Level.
Flood Fringe	The flood fringe refers to the outer portions of the floodplain, beginning at the edge of the floodway and continuing outward. This is the area where development is most likely to occur, and where precautions to protect life and property per the NFIP regulations must be met.
Flood Hazard Area	The area shown to be inundated by a flood of a given magnitude on a map.
Flood Insurance Rate Map (FIRM)	Map of a community, prepared by the Federal Emergency Management Agency that shows both the special flood hazard areas and the risk premium zones applicable to the community.
Flood Insurance Study (FIS)	A study that provides an examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations in a community or communities.
Floodplain	A floodplain is a land area adjacent to a river, stream, lake, estuary, or other water body that is subject to flooding. This area, if left undisturbed, acts to store excess floodwater. The floodplain is made up of two sections: the floodway and the flood fringe.

Term	Definition
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 floodwater 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. The NFIP floodway definition is “the channel of a river or other watercourse and adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. Floodways are not mapped for all rivers and streams but are generally mapped in developed areas.
Frequency	A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average, and would have a 1 percent chance – its probability – of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered.
Fuel	The material that feeds a fire, it is the key factor in wildfire behavior.
Fuel Loading	The volume or amount of available vegetative fuel.
Functional Downtime	The average time (in days) during which a function (business or service) is unable to provide its services due to a hazard event.
Geographic Area Impacted	The physical area in which the effects of the hazard are experienced.
Geographic Information Systems (GIS)	A computer software application that relates physical features on the earth to a database to be used for mapping and analysis.
Ground Motion	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, but soft soils can further amplify ground motions.
Hazard	A source of potential danger or adverse condition. Hazards in this plan include naturally occurring events such as floods, earthquakes, tornadoes, tsunamis, coastal storms, landslides, and wildfires that strike populated areas. A natural event is a hazard when it has the potential to harm people or property.

Term	Definition
Hazard Event	A specific occurrence of a particular type of hazard.
Hazard Identification	The process of identifying hazards that threaten an area.
Hazard Mitigation	Sustained actions taken to reduce or eliminate long-term risk from hazards and their effects.
Hazard Profile	A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent. In most cases, a community can most easily use these descriptors when they are recorded and displayed as maps.
Hazus (Hazards U.S.)	A GIS-based nationally standardized earthquake loss estimation tool developed by FEMA.
Heat Index	This formula is given in degrees Fahrenheit, a measure of heat when relative humidity is added to the actual air temperature.
Hydrology	The science of dealing with the waters of the earth. A flood discharge is developed by a hydrologic study.
Infrastructure	Refers to the public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology such as phone lines or Internet access, vital services such as public water supplies and sewer treatment facilities, and includes an area's transportation system such as airports, heliports, highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, drydocks, piers, and regional dams.
Intensity	A measure of the effects of a hazard event at a particular place.
Interface	The expansion of populations into the hills and mountains and forest lands.
Landslide	Downward movement of a slope and materials under the force of gravity.
Lateral Spreads	Develop on gentle slopes and entail the sidelong movement of large masses of soil as an underlying layer liquefies in a seismic event. The phenomenon that occurs when ground shaking causes loose soils to lose strength and act like viscous fluid. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength.

Term	Definition
Liquefaction	Results when the soil supporting structures liquefies. This can cause structures to tip and topple.
Lowest Floor	Under the NFIP, the lowest floor of the lowest enclosed area (including basement) of a structure.
Magnitude	A measure of the strength of a hazard event. The magnitude (also referred to as severity) of a given hazard event is usually determined using technical measures specific to the hazard.
Mitigation Plan	A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in the state and includes a description of actions to minimize future vulnerability to hazards.
National Flood Insurance Program (NFIP)	Federal program created by Congress in 1968 that makes flood insurance available in communities that enact minimum floodplain management regulations in 44 CFR §60.3.
National Geodetic Vertical Datum of 1929 (NGVD)	Datum established in 1929 and used in the NFIP as a basis for measuring flood, ground, and structural elevations, previously referred to as Sea Level Datum or Mean Sea Level. The Base Flood Elevations shown on most of the Flood Insurance Rate Maps issued by the Federal Emergency Management Agency are referenced to NGVD.
National Weather Service (NWS)	Prepares and issues flood, severe weather, and coastal storm warnings and can provide technical assistance to Federal and state entities in preparing weather and flood warning plans.
Planimetric	Describes maps that indicate only man-made features like buildings.
Planning	The act or process of making or carrying out plans; the establishment of goals, policies, and procedures for a social or economic unit.
Probability	A statistical measure of the likelihood that a hazard event will occur.
Recurrence Interval	The time between hazard events of similar size in a given location. It is based on the probability that the given event will be equaled or exceeded in any given year.
Relative Humidity	The amount of water vapor in the air at any given time is usually less than required to saturate the air. The relative humidity is the percent of saturation humidity, generally calculated in relation to saturated vapor density.

Term	Definition
Repetitive Loss Property	A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than 10 days apart) of at least \$1,000 each have been paid within any 10-year period since 1978.
Replacement Value	The cost of rebuilding a structure. This is usually expressed in terms of cost per square foot, and reflects the present-day cost of labor and materials to construct a building of a particular size, type, and quality.
Richter Scale	A numerical scale of earthquake magnitude devised by seismologist C.F. Richter in 1935.
Risk	The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.
Riverine	Of or produced by a river.
Santa Ana Winds	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 Basin.
Scale	A proportion used in determining a dimensional relationship; the ratio of the distance between two points on a map and the actual distance between the two points on the earth's surface.
Scarp	A steep slope.
Scour	Removal of soil or fill material by the flow of flood waters. The term is frequently used to describe storm-induced, localized conical erosion around pilings and other foundation supports where the obstruction of flow increases turbulence.
Seiche	A seiche is the creation of large waves on a lake or reservoir due to earthquake shaking. They can be triggered by long period ground motion from distant earthquakes, or from ground displacement beneath the body of water. In reservoirs, seiches can generate short-term flooding of downstream areas. In addition, earthquake-induced landsliding can cause seiche-like waves. A seiche may occur at Castaic or Bouquet Dams which could threaten the community of Santa Clarita.
Seismicity	Describes the likelihood of an area being subject to earthquakes.

Term	Definition
Special Flood Hazard Area (SFHA)	An area within a floodplain having a 1 percent or greater chance of flood occurrence in any given year (100-year floodplain); represented on Flood Insurance Rate Maps by darkly shaded areas with zone designations that include the letter A or V.
Stafford Act	The Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-107, was signed into law November 23, 1988, and amended the Disaster Relief Act of 1974, PL 93-288. The Stafford Act is the statutory authority for most Federal disaster response activities, especially as they pertain to FEMA and its programs.
State Hazard Mitigation Officer (SHMO)	The representative of state government who is the primary point of contact with FEMA, other state and Federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.
Structure	Something constructed. (See also Building)
Substantial Damage	Damage of any origin sustained by a structure in a Special Flood Hazard Area, whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage.
Surface Faulting	The differential movement of two sides of a fracture – in other words, the location where the ground breaks apart. The length, width, and displacement of the ground characterize surface faults.
Tectonic Plate	Torsionally rigid, thin segments of the earth's lithosphere that may be assumed to move horizontally and adjoin other plates. It is the friction between plate boundaries that cause seismic activity.
Topographic	Characterizes maps that show natural features and indicate the physical shape of the land using contour lines. These maps may also include manmade features.
Vulnerability	Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power – if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct ones.

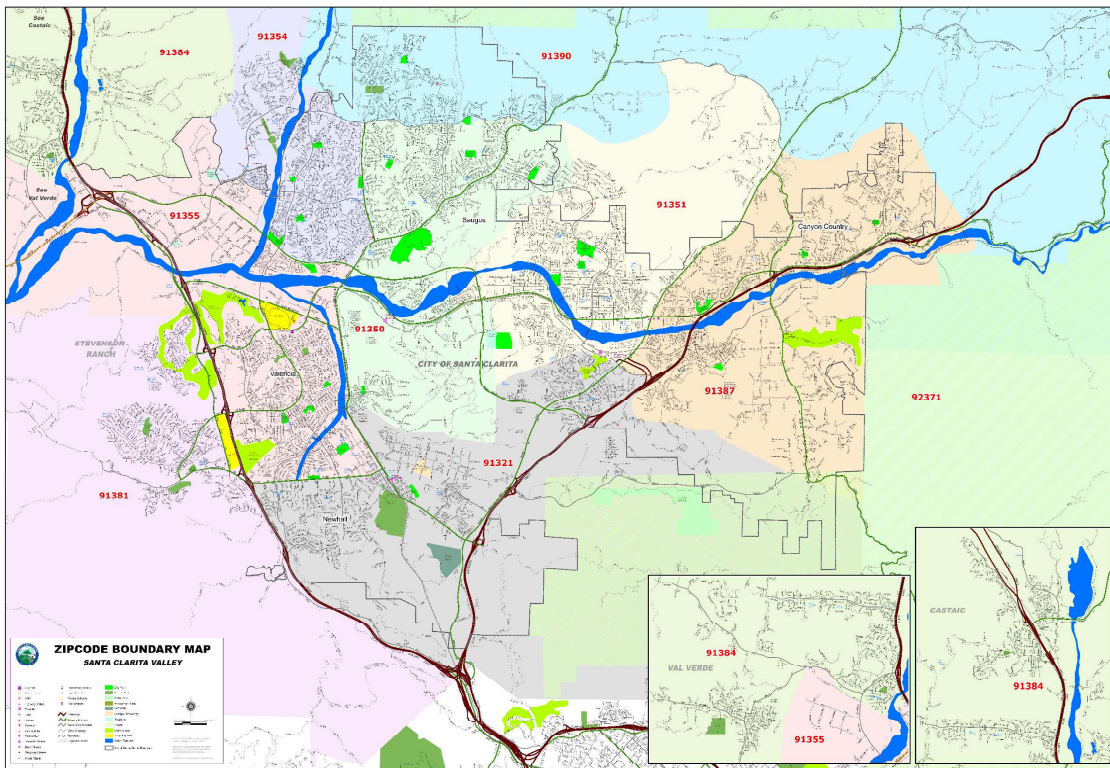
Term	Definition
Vulnerability Assessment	The extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment should address impacts of hazard events on the existing and future built environment.
Wildfire	An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.
Zone	A geographical area shown on a Flood Insurance Rate Map (FIRM) that reflects the severity or type of flooding in the area.

Appendix D: Maps

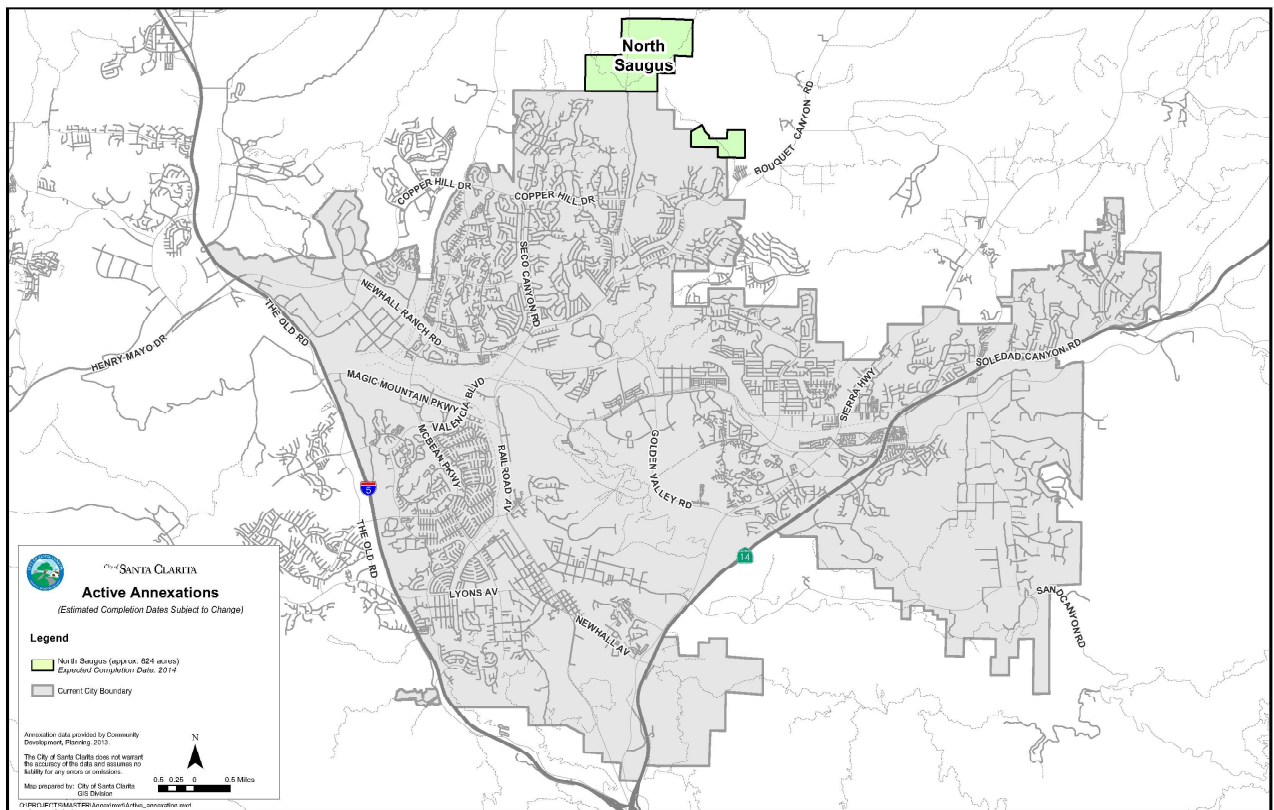
The following maps support the City of Santa Clarita Hazard Mitigation Plan. These maps include:

- City Reference Maps
- Fire Zone Map
- Hazardous Materials Locations Map
- Pipeline Map
- San Andreas and Other Major Fault Map
- Earthquake Shaking Potential for the Los Angeles Metro Region
- Fault Zone Map
- Seismic Hazard Zone Map
- Dam Inundation Map
- Flood Zone DFIRM Map

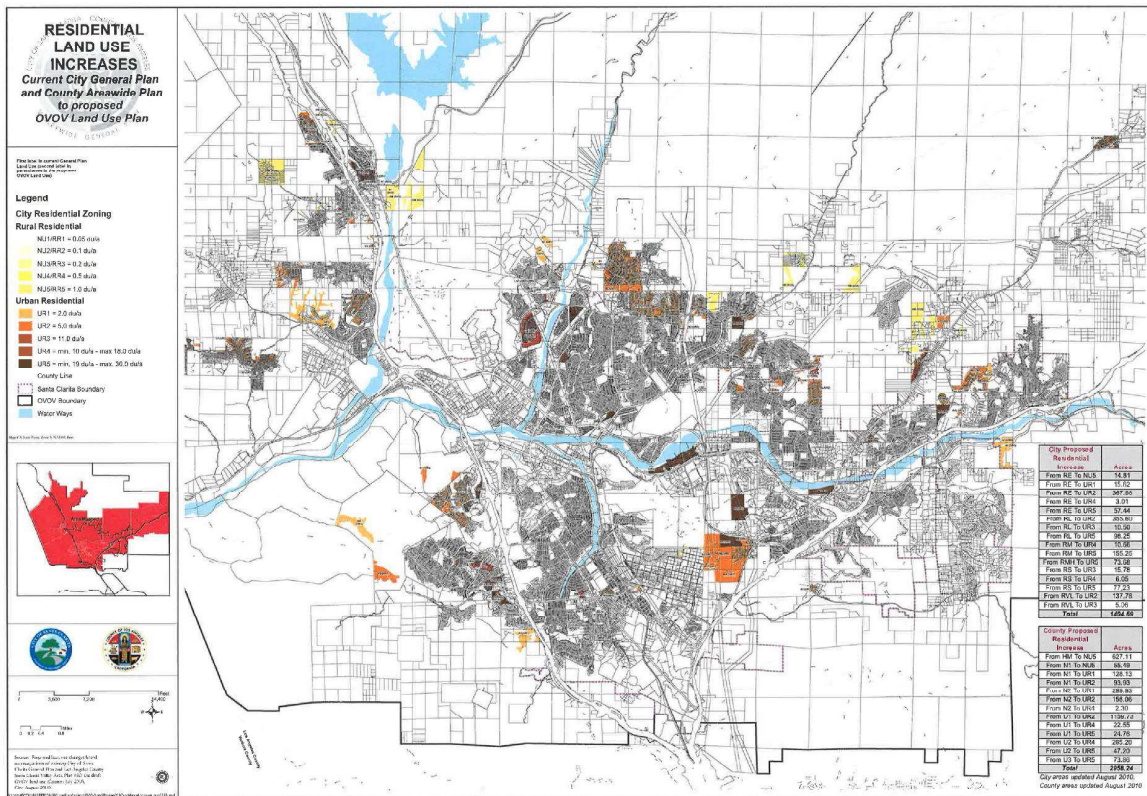
City Reference Maps
Zip Code Map



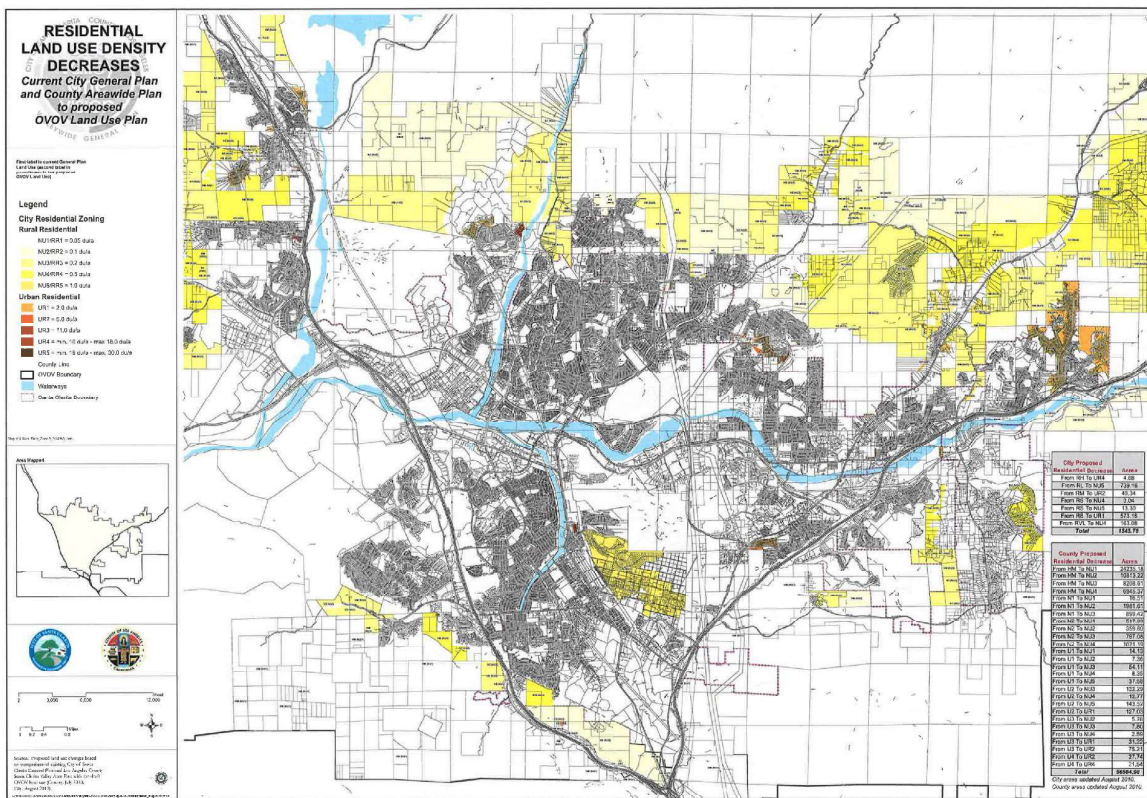
Santa Clarita Map with Annexation Areas



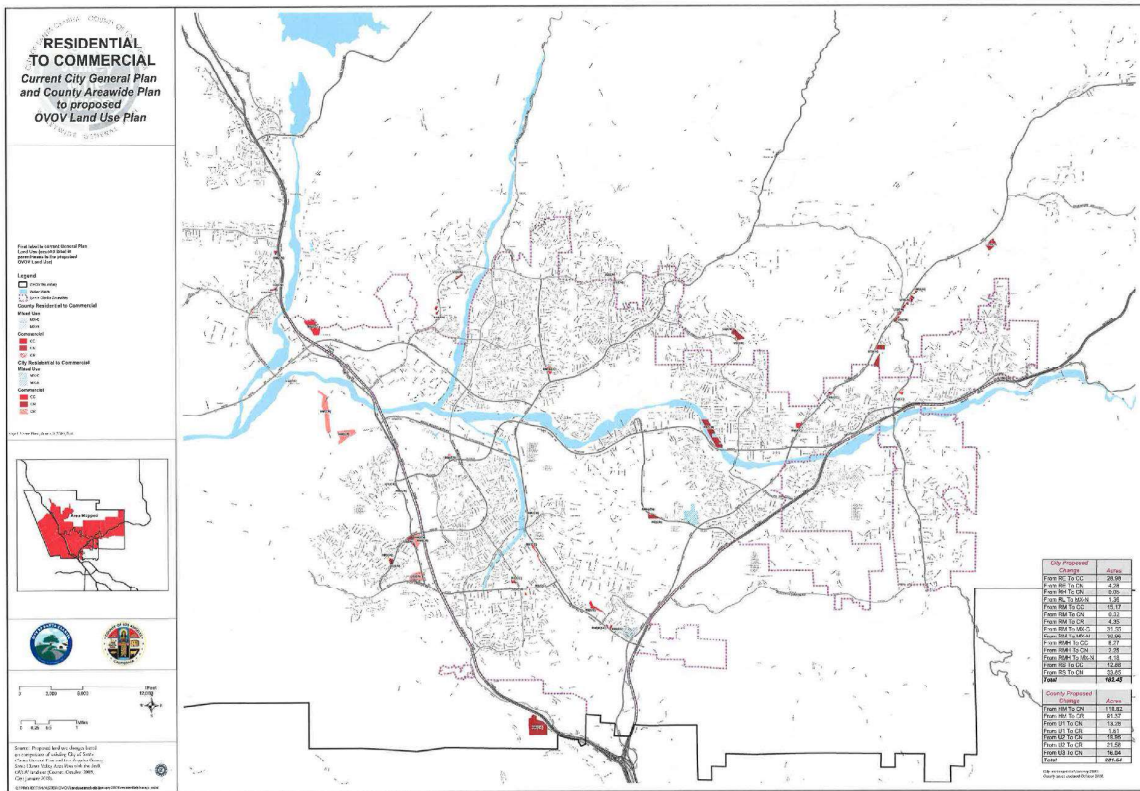
Residential Land Use Increases



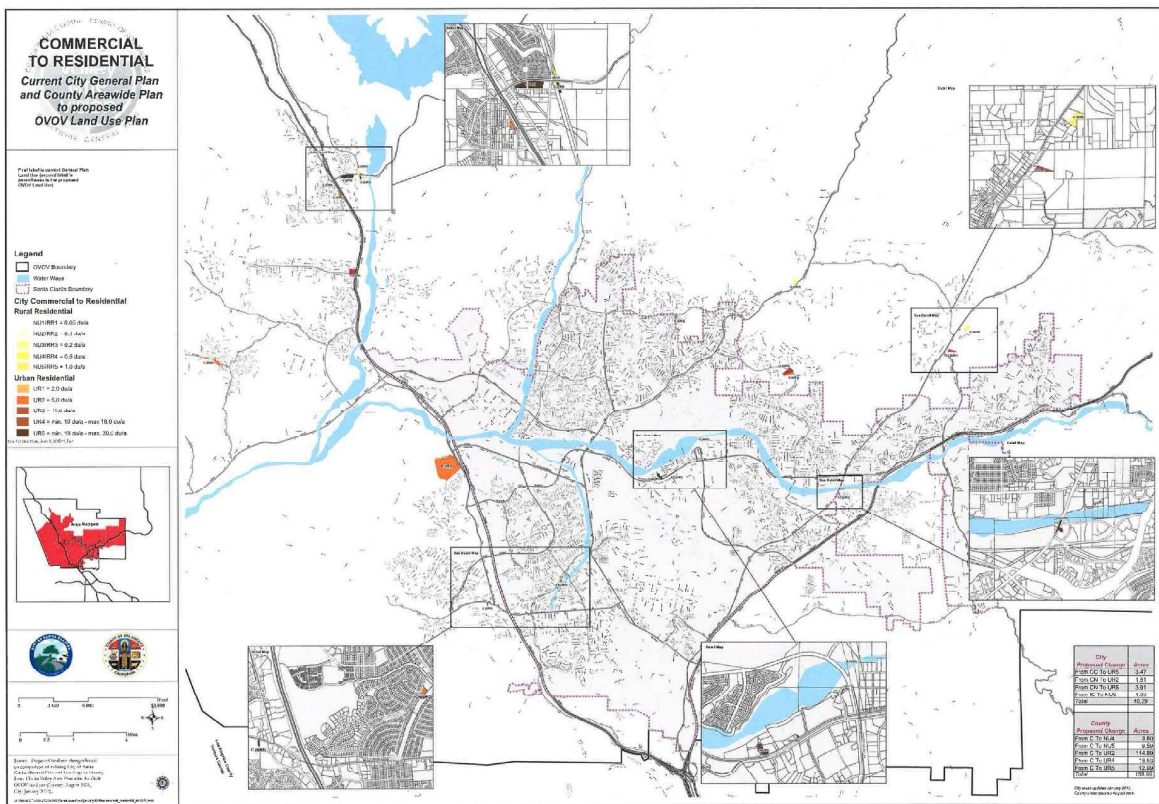
Residential Land Use Density Decreases



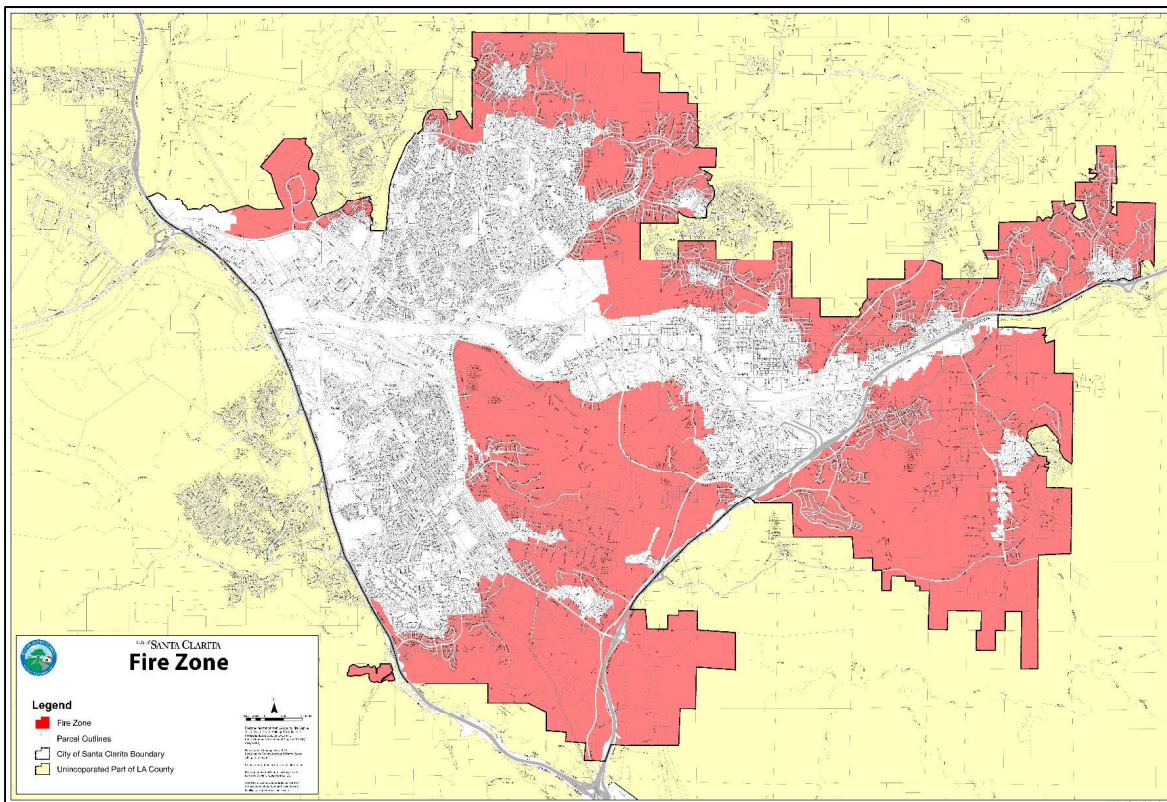
Residential to Commercial



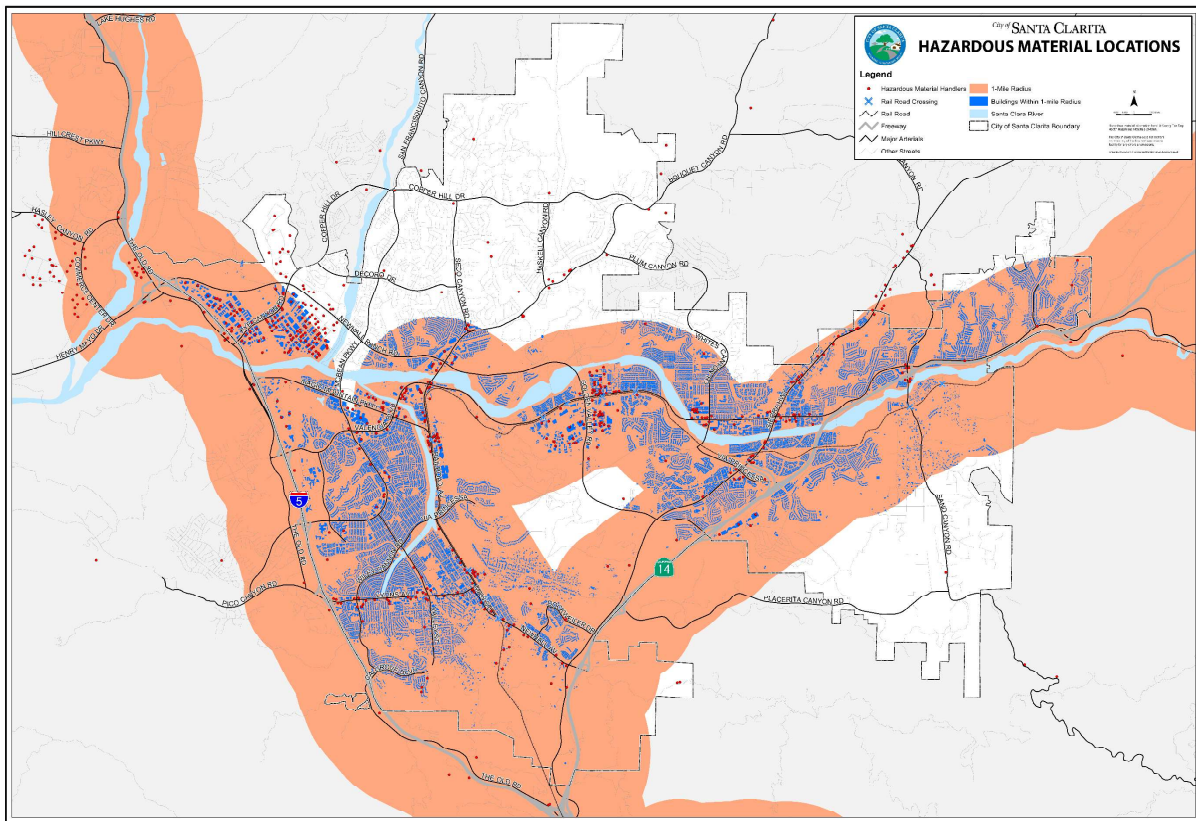
Commercial to Residential



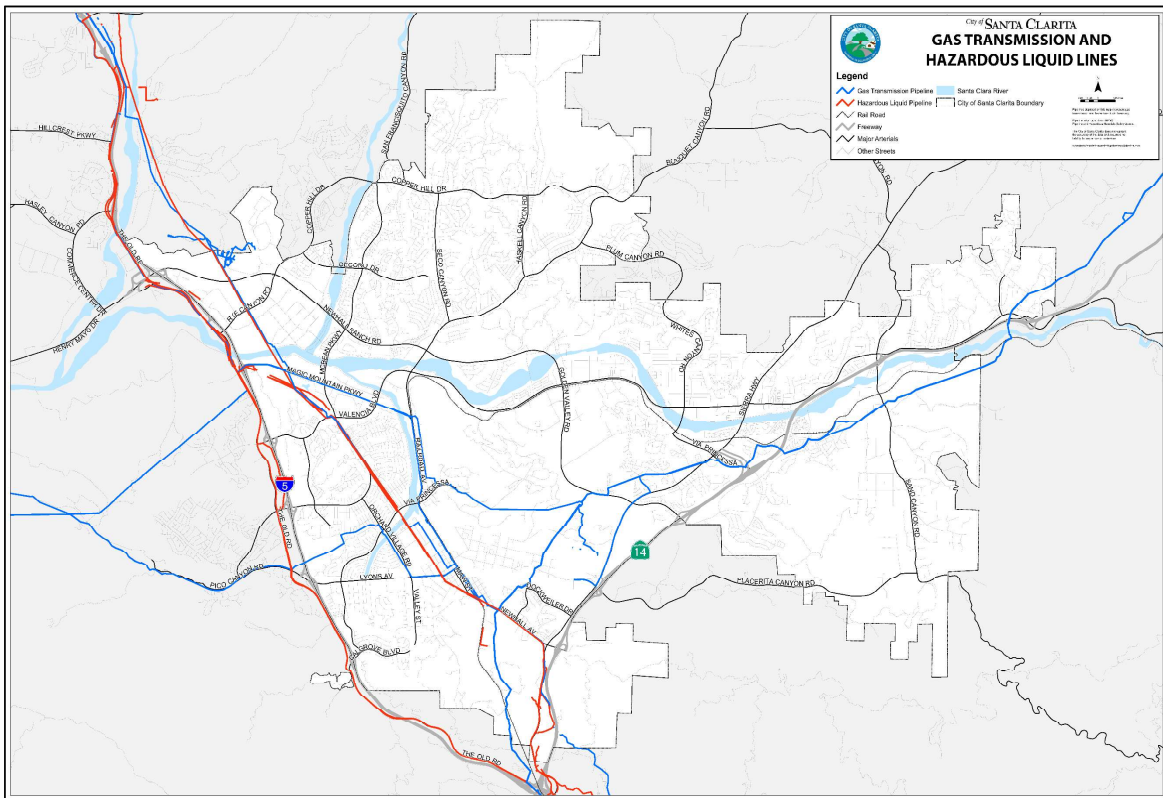
Fire Zone Map



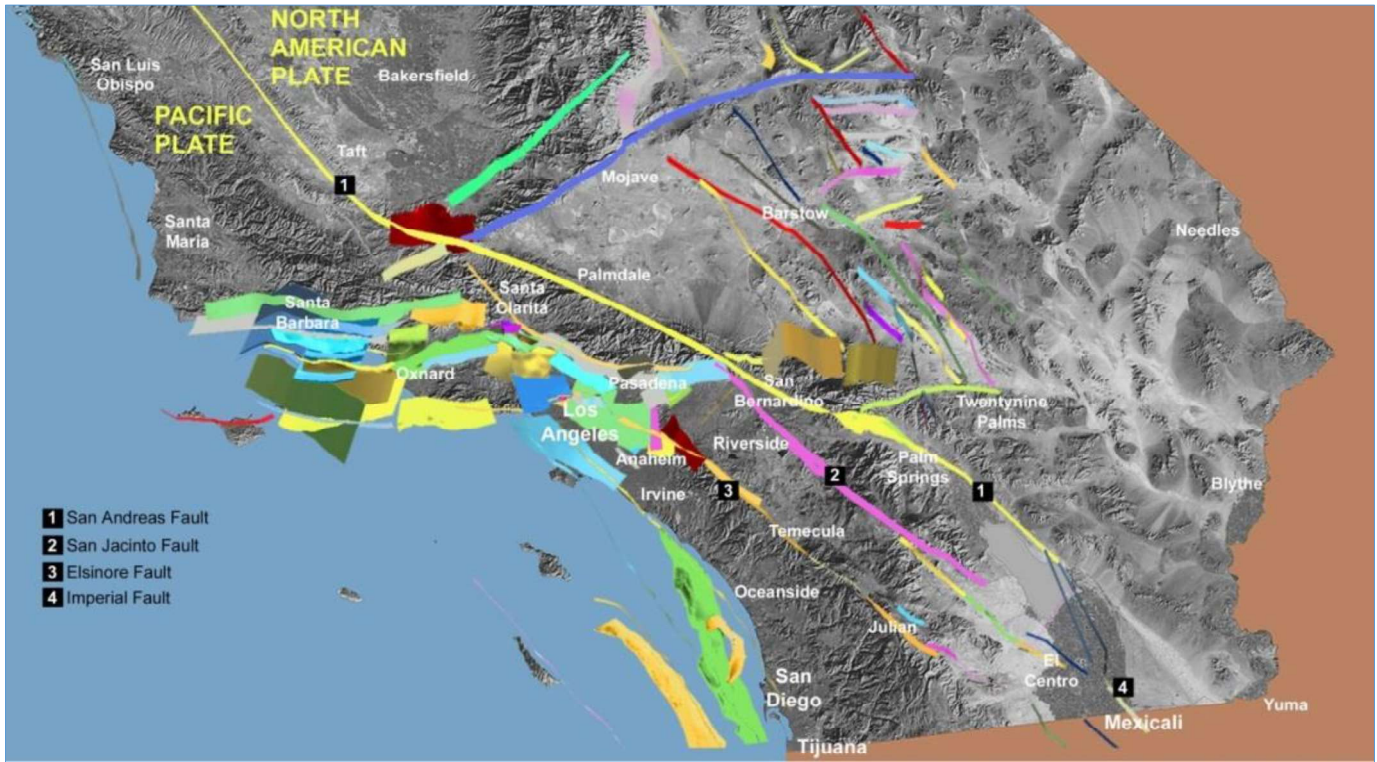
Hazardous Materials Locations



Pipeline Map

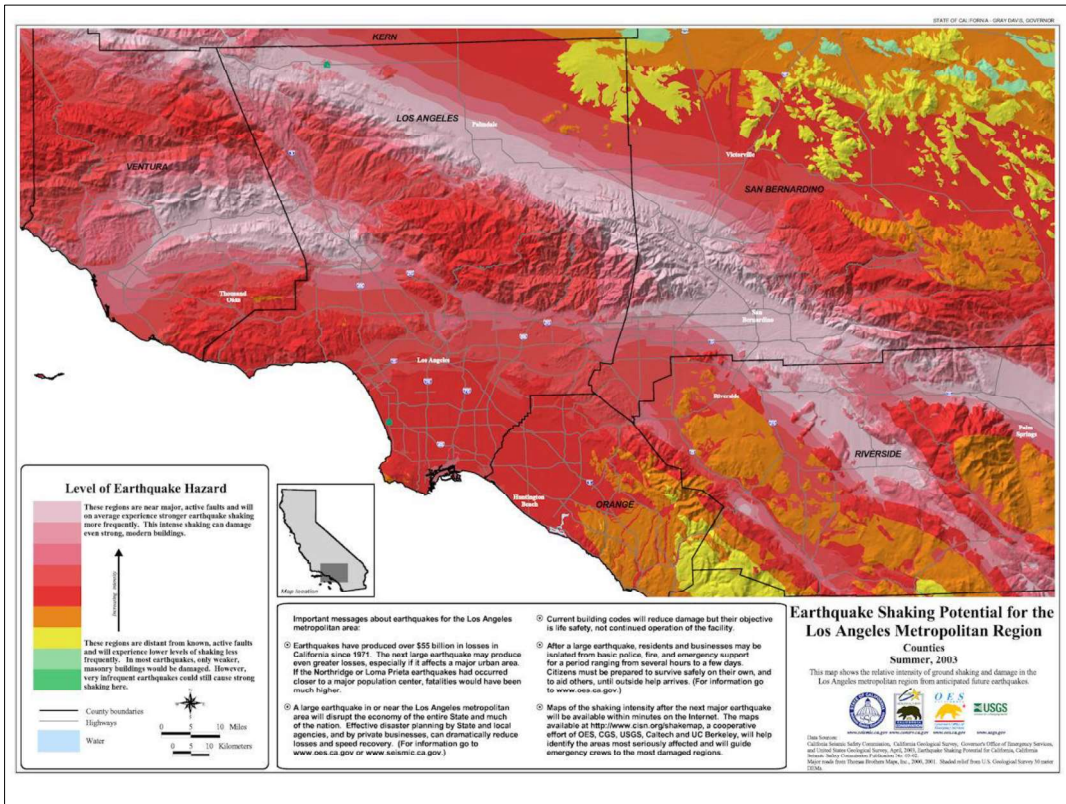


San Andreas and Other Major Faults

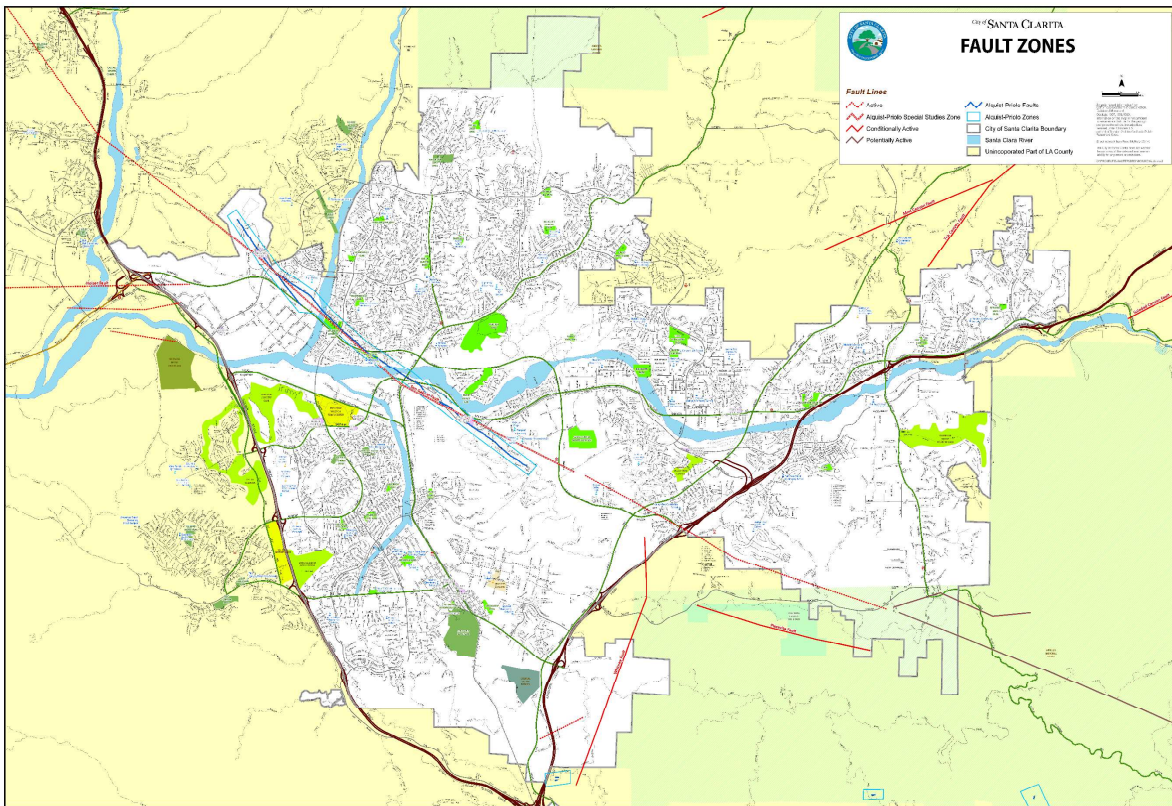


(SCEC, 2011)

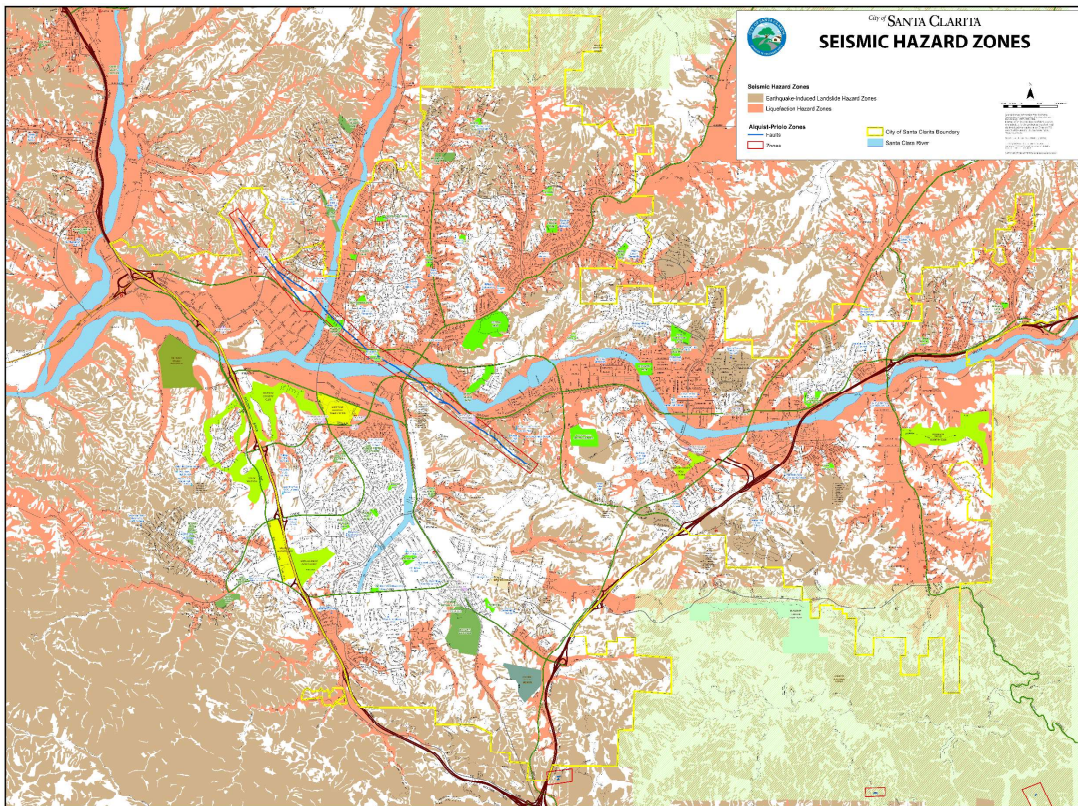
Earthquake Shaking Potential for the Los Angeles Metro Region



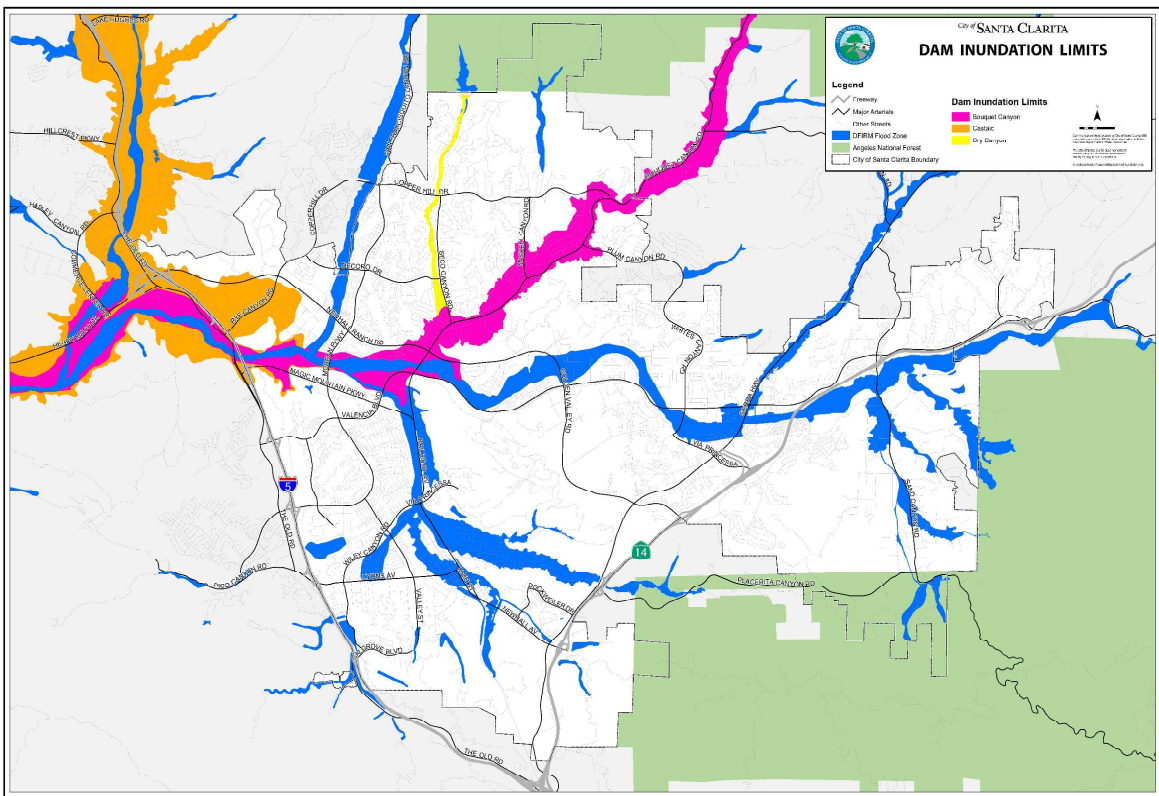
Fault Zones



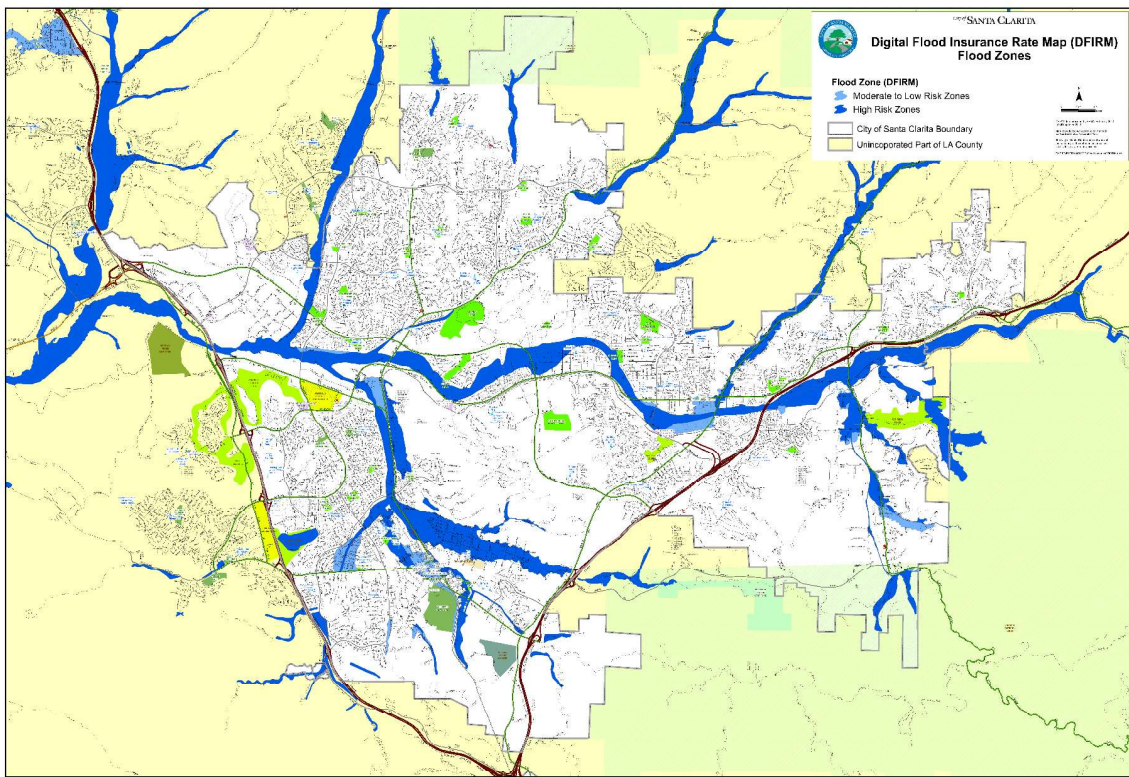
Seismic Hazard Zones (Liquefaction and Landslide)



Dam Inundation Map



Flood Insurance Rate Map – Santa Clarita DFIRM



Appendix E: City Council HMP Adoption Documentation

The Santa Clarita City Council HMP formally adopted the updated 2015 Local Hazard Mitigation Plan (see City Council Adoption Documentation on next page).

SECTION 22. LOCAL MITIGATION PLAN REVIEW TOOL

The Local Mitigation Plan Review Tool on the following pages provide a crosswalk of key plan sections.

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA’s evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan’s strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: City of Santa Clarita	Title of Plan: City of Santa Clarita Hazard Mitigation Plan	Date of Plan: September 15, 2015
Local Point of Contact: Donna Nuzzi	Address:	
Title: Emergency Management Supervisor	City of Santa Clarita	
Agency: City of Santa Clarita	23920 Valencia Boulevard, Suite 120	
Phone Number: (661) 259-2489	E-Mail: DNUZZI@santa-clarita.com	
Santa Clarita CA 91355		

State Reviewer:	Title:	Date:
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FEMA Reviewer:	Title:	Date:
Date Received in FEMA Region <i>(insert #)</i>		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

SECTION 1. REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been ‘Met’ or ‘Not Met.’ The ‘Required Revisions’ summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is ‘Not Met.’ Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1.REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	<p>1. EXECUTIVE SUMMARY Development of the HMP 1-5 and 1-6; Plan Adoption 1-8; Coordinating Body 1-8; Adoption and HMP Convener 1-9; and Acknowledgements 1-10 to 1-12</p> <p>2. INTRODUCTION Hazard Mitigation Plan Process 2-3; Plan Methodology 2-5; Input from the Steering Committee 2-5 and 2-6</p> <p>18. PUBLIC PROCESS Public Education and Awareness Programs 18-1; Media Announcements 18-2; Public HMP Workshop 18-4 and 18-5</p> <p>ANNEX B 2015 HMP Update Kickoff Meeting 20-8 to 20-10</p> <p>ANNEX C 2015 HMP Update Review Meeting 20-11 to 2013</p>		
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	<p>1. EXECUTIVE SUMMARY LA County Op Area and DMA 1-4; Development of the HMP 1-5; Steering Committee 1-5 and 1-6; Implementation through Existing Programs 1-9; Acknowledgements 1-10 to 1-12</p> <p>19. PLAN MAINTENANCE Continued Public Involvement 19-4</p> <p>ANNEX A HMP Steering Committee and Planning Committee Meetings 20-2</p>		
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	<p>1. EXECUTIVE SUMMARY Development of the HMP 1-5; Continued Public Involvement 1-9</p> <p>2. INTRODUCTION Public Workshops and Surveys 2-6</p> <p>18. PUBLIC PROCESS 18-1 to 18-20</p> <p>19. PLAN MAINTENANCE Continued Public Involvement 19-4</p>		

1.REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	1. EXECUTIVE SUMMARY Implementation through Existing Programs 1-9; 19. PLAN MAINTENANCE Monitoring and Implementing the Plan 19-1		
A5. Is there discussion of how the community will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	1. EXECUTIVE SUMMARY Continued Public Involvement 1-9 18. PUBLIC PROCESS 18-1 to 18-20 19. PLAN MAINTENANCE Continued Public Involvement 19-4		
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	1. EXECUTIVE SUMMARY Plan Implementation, Monitoring, and Evaluation 1-8; Formal Review Process 1-9 19. PLAN MAINTENANCE Monitoring and Implementing the Plan 19-1; HMP Updates 19-4		
<u>ELEMENT A: REQUIRED REVISIONS</u>			

1.REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	4. RISK ASSESSMENT Disaster History 4-2 to 4-3; Profiling Hazards – CPRI 4-7 to 4-8, 4-12 7. WILDFIRE 7-1 to 7-23 8. CLIMATE CHANGE – DROUGHT 8-1 to 8-5 9. EARTHQUAKE 9-1 to 9-35 10. HAZMAT 10-1 to 10-16 11. LANDSLIDE 11-1 to 11-12 12. EXTREME HEAT 12-1 to 12-8 13. CYBER ATTACK 13-1 to 13-9 14. ENERGY DISRUPTION 14-1 to 14-9 15. FLOOD 15-1 to 15-20 16. TERRORISM 16-1 to 16-14 17. EXTREME WIND 17-1 to 17-11		
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	4. RISK ASSESSMENT Disaster History 4-2 to 4-3; Profiling Hazards – CPRI 4-7 to 4-8, 4-12 7. WILDFIRE Southern Cal Wildfire History 7-7 to 7-19; Probability, Frequency, and Magnitude 7-20 to 7-23 8. CLIMATE CHANGE – DROUGHT Climate Change and Drought History 8-2; Probability, Frequency, and Magnitude 8-3 to 8-5 9. EARTHQUAKE Earthquake History 9-6 to 9-9; Probability, Frequency, and Magnitude 9-10 to 9-30 10. HAZMAT Hazardous Materials Release History 10-7 to 10-10; Probability, Frequency, and Magnitude 10-11 to 10-15 11. LANDSLIDE Landslide History 11-5 to 11-6; Probability, Frequency, and Magnitude 11-7 to 11-12 12. EXTREME HEAT		

1.REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
	<p>Extreme Heat History 12-5 to 12-6; Probability, Frequency, and Magnitude 12-7 to 12-8</p> <p>13. CYBER ATTACK History of Cyber Attacks 13-8; Probability, Frequency, and Magnitude 13-9</p> <p>14. ENERGY DISRUPTION History of Power Outages 14-6; Probability, Frequency, and Magnitude 14-7 to 14-11</p> <p>15. FLOOD History of Flood Events 15-15 to 15-18; Probability, Frequency, and Magnitude 15-19 to 15-20</p> <p>16. TERRORISM History of Terrorism and Active Shooter Incidents 16-10 to 16-13; Probability, Frequency, and Magnitude 16-14 to 16-15</p> <p>17. EXTREME WIND History 17-4 to 17-9; Probability, Frequency, and Magnitude 17-10 to 17-11</p>		
<p>B3. Is there a description of each identified hazard’s impact on the community as well as an overall summary of the community’s vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))</p>	<p>4. RISK ASSESSMENT Profiling Hazards – CPRI 4-7 to 4-8, 4-12</p> <p>7. WILDFIRE Wildfire Exposures 7-3 to 7-4; Urban Interfaces 7-4 to 7-6; Probability, Frequency, and Magnitude 7-20 to 7-23; Wildfire Vulnerability 7-21</p> <p>8. CLIMATE CHANGE – DROUGHT Probability, Frequency, and Magnitude: Climate Change and Drought Vulnerabilities 8-3 to 8-5</p> <p>9. EARTHQUAKE Probability, Frequency, and Magnitude 9-10 to 9-16; Earthquake Vulnerabilities 9-17 to 19-9; Potential Damage 9-20 to 9-30</p> <p>10. HAZMAT Probability, Frequency, and Magnitude 10-11 to 10-15; HazMat Release Vulnerabilities 10-13 to 10-15</p> <p>11. LANDSLIDE Probability, Frequency, and Magnitude 11-7 to 11-8; Landslide Vulnerabilities 11-9 to 11-12</p> <p>12. EXTREME HEAT Probability, Frequency, and Magnitude: Extreme Heat Vulnerabilities 12-8</p> <p>13. CYBER ATTACK Probability, Frequency, and Magnitude: Cyber Attack Vulnerabilities 13-9</p> <p>14. ENERGY DISRUPTION</p>		

1.REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
	Probability, Frequency, and Magnitude 14-7 to 14-11; ; Power Outage Vulnerabilities 14-7 15. FLOOD Flood Insurance Rate Map 15-13; Probability, Frequency, and Magnitude: Flood Vulnerabilities 15-19 to 15-20 16. TERRORISM Terrorism Vulnerabilities 16-5 to 16-6; Probability, Frequency, and Magnitude 16-14 to 16-15 17. EXTREME WIND History 17-4 to 17-9; Probability, Frequency, and Magnitude 17-10; Extreme Wind Vulnerabilities 17-10 to 17-11		
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	15. FLOOD National Flood Insurance Program 15-11 to 15-13 Repetitive Loss Properties 15-14 to 15-15		
<u>ELEMENT B: REQUIRED REVISIONS</u>			

1.REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	1. EXECUTIVE SUMMARY Development of the HMP 1-5; Plan Adoption 1-8; Coordinating Body 1-8; Adoption and HMP Convener 1-9; Implementation through Existing Programs 1-9 19. PLAN MAINTENANCE Maintenance Responsibilities 19-1; Monitoring and Implementing the Plan 19-1; Implementation through Existing Programs 19-3		
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	15. FLOOD National Flood Insurance Program 15-11 to 15-13 Repetitive Loss Properties 15-14 to 15-15		
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	1. EXECUTIVE SUMMARY Goals of the Plan 1-1 to 1-2; Organization of the Action Items 1-8 5. HAZARD MITIGATION STRATEGIES AND ACTION ITEMS Prioritization of Mitigation Projects 5-1; Hazard Mitigation Strategies and Action Item Summary 5-7 to 5-56		
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	5. HAZARD MITIGATION STRATEGIES AND ACTION ITEMS Hazard Mitigation Strategies and Action Item Summary 5-7 to 5-56 6. MULTI-HAZARD GOALS AND ACTION ITEMS 6-1 to 6-7 7. WILDFIRE Mitigation Strategies and Action Items 7-32 to 7-38 8. CLIMATE CHANGE – DROUGHT Mitigation Strategies and Action Items 8-10 to 8-11 9. EARTHQUAKE Mitigation Strategies and Action Items 9-37 to 9-42 10. HAZMAT Mitigation Strategies and Action Items 10-18 to 10-19 11. LANDSLIDE Mitigation Strategies and Action Items 11-14 to 11-18 12. EXTREME HEAT Mitigation Strategies and Action Items 12-10 to 12-12 13. CYBER ATTACK Mitigation Strategies and Action Items 13-11 to 13-15		

1.REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
	14. ENERGY DISRUPTION Mitigation Strategies and Action Items 14-13 to 14-15 15. FLOOD Mitigation Strategies and Action Items 15-26 to 15-30 16. TERRORISM Mitigation Strategies and Action Items 16-18 to 16-19 17. EXTREME WIND Mitigation Strategies and Action Items 17-13 to 17-5		
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	1. EXECUTIVE SUMMARY Priority of Action Items 1-6; Economic Analysis of Mitigation Projects 1-9 5. HAZARD MITIGATION STRATEGIES AND ACTION ITEMS Prioritization of Mitigation Projects 5-1; STAPLEE Evaluation 5-2; Economic Analysis of Mitigation Strategies and Action Items 5-3 to 5-5; Hazard Mitigation Strategies and Action Item Summary 5-7 to 5-56 (additional details provided in each Hazard Section in the "Mitigation Strategies and Action Items" sub-Section)		
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	1. EXECUTIVE SUMMARY Plan Implementation, Monitoring, and Evaluation 1-8; Implementation through Existing Programs 1-9 19. PLAN MAINTENANCE HMP Implementation through Existing City Programs 19-3		
<u>ELEMENT C: REQUIRED REVISIONS</u>			

1.REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)		Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	1. EXECUTIVE SUMMARY HMP Planning and Updates 1-1 2. INTRODUCTION Hazard Mitigation Plan Process 2-3 3. COMMUNITY PROFILE Land and Development – Future Development 3-11 4. RISK ASSESSMENT Critical Infrastructure and Key Resources 4-16 to 4-21 19. PLAN MAINTENANCE HMP Updates 19-4			
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	5. HAZARD MITIGATION STRATEGIES AND ACTION ITEMS Hazard Mitigation Strategies and Action Item Summary 5-7 to 5-56 (additional details provided in each Hazard Section in the “Mitigation Strategies and Action Items” sub-Section)			
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	5. HAZARD MITIGATION STRATEGIES AND ACTION ITEMS Hazard Mitigation Strategies and Action Item Summary 5-7 to 5-56 (additional details provided in each Hazard Section in the “Mitigation Strategies and Action Items” sub-Section)			
<u>ELEMENT D: REQUIRED REVISIONS</u>				

1.REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)		Location in Plan (section and/or page number)	Met	Not Met
ELEMENT E. PLAN ADOPTION				
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	APPENDIX E: CITY COUNCIL HMP ADOPTION DOCUMENTATION 21-43			
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Not Applicable (Local HMP)			
<u>ELEMENT E: REQUIRED REVISIONS</u>				

1.REGULATION CHECKLIST

Regulation (44 CFR 201.6 Local Mitigation Plans)

**Location in Plan
(section and/or
page number)****Met****Not Met****ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY;
NOT TO BE COMPLETED BY FEMA)**

F1.

F2.

ELEMENT F: REQUIRED REVISIONS

SECTION 2. PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

Element B: Hazard Identification and Risk Assessment

Element C: Mitigation Strategy

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)