Attachment 4

Exhibit B

City of Beverly Hills

Hazard Mitigation Action Plan

2010-2015

Date Adopted by City Council: August 17th, 2010
Date FEMA Approved: March 4, 2011

HAZARD MITIGATION ACTION PLAN

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EXECUTIVE SUMMARY

FIVE-YEAR ACTION PLAN MATRIX

Changes to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which provides the basis for federal assistance to state and local governments impacted by a disaster, have placed a new emphasis on local mitigation planning. Hazard Mitigation, also known as prevention before the occurrence of a disaster, is now considered to be the first step in preparing for emergencies, rather than the final step in recovery. The Disaster Mitigation Act 2000 required state and local governments to develop hazard mitigation plans by November 2004. On March 2, 2004 the City Council approved the development of such a plan. In October 2004, the City Council approved the plan and in December 2004 the Federal Emergency Management Agency (FEMA) approved the final plan.

Plan Update

The mitigation planning regulation at 44 CFR §201.6(d)(3) states:
A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five (5) years in order to continue to be eligible for mitigation project grant funding.
This *Local Multi-Hazard Mitigation Planning Guidance* describes elements of the five-year plan updates as required at 44 CFR §201.6(d)(3).

The plan update is now completed and on August 17th, 2010 the City Council adopted the resolution approving the Hazard Mitigation Action Plan 2011-2015. This plan constitutes the update required every five years.

The development of the plan has been a collaborative staff and community effort. The planning process has been facilitated by the City's Office of Emergency Management with participation from all City departments and the public. The City of Beverly Hills Hazard Mitigation Action Plan (also known as the Hazard Mitigation Plan or HMP) includes resources and information to assist City departments, residents, public and private sector organizations, and others interested in participating in planning for hazards. During the update of the City's HMP, each section of the plan was updated with the most current information using a variety of resources. Each Project Coordinator was assigned to update a section of the plan. Each of the plan sections provides information on the history, economic and social impact of a specific hazard. More information regarding the updating process is included in "Section1:Introduction".

The mitigation plan provides a list of activities that may assist City of Beverly Hills in reducing risk and preventing loss from future hazard events. The strategies address multi- hazard issues, as well as activities for earthquakes, wildfires, terrorism, earth movements, flooding, and wind storms. This plan meets the requirements of the Disaster Mitigation Act of 2000. By preparing this plan, the City of Beverly Hills is eligible for federal mitigation funding after disasters and to apply for mitigation grants before disasters strike.

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 departments, 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 hazard events.

The mitigation plan is organized as follows:

EXECUTIVE SUMMARY: FIVE-YEAR ACTION PLAN

The Five-Year Action Plan provides an overview of the mitigation plan mission, goals, and strategies.

PART I: MITIGATION ACTION PLAN

Section 1: Introduction

The Introduction describes the background and purpose of developing the mitigation plan and the planning process.

Section 2: Community Profile

This section presents the history, geography, demographics, and socioeconomics of City of Beverly Hills.

Section 3: Risk Assessment

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

Section 4: Multi-Hazard Mitigation Strategies

This section provides information on the plan goals and strategies that address the six hazards identified.

Section 5: Plan Maintenance

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

PART II: HAZARD SPECIFIC INFORMATION

Hazard specific information on the six most likely hazards is addressed in the plan. Each of these sections provides information on the background and history of the hazard, hazard causes and characteristics, a risk assessment as well as the economic and social impacts of the hazard. Various City data and maps are used to provide background and context for the narrative.

Hazards addressed in the plan are as follows:

Section 6: Earthquake
Section 7: Fire
Section 8: Terrorism
Section 9: Flooding
Section 10: Earth Movement (Landslide)
Section 11: Windstorm

PART III: RESOURCES

Resources include, but are not limited to, all information, materials, resources, etc. used to gather information to assemble the entire Hazard Mitigation Plan.

WHO PARTICIPATED IN THE PLAN UPDATE

The update of the plan has been a collaborative staff and community effort. The planning process has been facilitated by the City's Office of Emergency Management with participation from all City departments. The Steering Committee was comprised of the Fire Chief, the Police Chief, Director's of the Office of Emergency Management, Community Development, Community Services, Administrative Services, Information Technology, Public Works, and the City Attorney's Office. The public was invited to participate in the original development of the plan in 2004 and again for the update in 2010.

The Steering Committee was chosen to create the form and substance of the plan as well as to provide imperative feedback, guidance and approval. This original Steering Committee drafted the Mission Statement, Plan Goals, identified the hazards, and helped update and approved the plan and strategies. Project Coordinators were appointed by each City Department Head. Each Project Coordinator was assigned to update a section of the plan and to collaborate with the Steering Committee and other Project Coordinators on the final work product.

WHAT IS THE PLAN MISSION

The City of Beverly Hills Hazard Mitigation Plan is to promote sound public policy and programs designed to protect the public, critical facilities, infrastructure, private and public property and the environment from natural and manmade hazards. This will be achieved by implementing this plan to guide the City towards creating and maintaining a safer more sustainable community.

WHAT ARE THE PLAN GOALS

The plan goals describe the overall direction that City of Beverly Hills' departments and citizens can take to minimize the impacts of hazards. The Plan goals help to guide direction of future activities aimed at reducing risk and preventing loss from hazards. The goals are stepping-stones between the broad direction of the mission statement and the specific recommendations that are outlined in the strategies. Plan goals were approved during the 2004 public process. The goals were reviewed by Steering Committee in 2010 and deemed appropriate and true to for the updated plan in 2010. Goals and mission are discussed in depth in Section 4 of this plan.

PLAN GOALS

To Protect Life, Property, Environment

Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to hazards.

Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards.

Encourage preventative measures for existing and new development in areas vulnerable to hazards.

Public Awareness

Develop and implement education and outreach programs to increase public awareness of the risks associated with hazards.

Develop and implement education and outreach programs to increase public awareness of the mitigation measures associated with hazards.

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

Partnerships and 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, county, and regional hazard mitigation activities.

Integrate the Safety Element of the General Plan into the Hazard Mitigation Plan.

Emergency Management

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

Update current ordinances, make recommendations for City guidelines, codes, and permitting process and establish new ordinances that support mitigation.

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

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

HOW ARE THE STRATEGIES ORGANIZED

The strategies are a listing of activities in which City departments and citizens can be engaged to reduce risk. Each strategy includes an estimate of the time line for implementation. The strategies are organized within a detailed matrix, which lists all of the multi-hazard and hazard-specific strategies included in the mitigation plan. Departments developed these strategies based on department goals, data collection, research and the public participation process. The following overview chart

HAZARD	**The hazard the strategy mitigates.**
PROJECT NAME	**Name of the Mitigation project strategy.**
DESCRIPTION	**Strategy Description**
ACTION ITEM	**What actions will be completed to complete the strategy.**
COORDINATING DEPARTMENT	**The department with regulatory responsibility to address hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation. The main department responsible is in bold, the supporting departments are not.**
IDEAS FOR IMPLEMENTATION	**Each project includes ideas for implementation and potential resources, which may include grant programs or human resources.**
TIMELINE/COMPLETION DATE	**Each project includes an estimate of the time line for implementation.**
TOTAL COST	**Estimate of cost of project.**
FUNDING SOURCE(S)	**Where the funding will be obtained.**
CONSTRAINTS	**Constraints may apply to some of the action projects. These constraints maybe a lack of city staff, lack of funds, or vested property rights which might expose the City to legal action as a result of adverse impacts on private property**

PLAN GOALS ADDRESSED **The plan goals addressed by each project are included as away to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins.**			
	Public Awareness		Protect Life and Property
	Partnerships and Implementation		Emergency Management

Chart 1. MITIGATIONS STRATEGIES OVERVIEW CHART (**Lead departments denoted in **BOLD****)

2010 Mitigation Strategies Overview Chart

Hazard		Mitigation Strategy	Responsible Department	Timeline	Plan Goals Addressed: To Protect Life, Property, Environment	Public Awareness	Partnerships and Implementation	Emergency Management
Earthquake	1	**Reinforce Existing Buildings.** Continue to require upgrade of unreinforced masonry (URM) buildings to address any structural and nonstructural seismic deficiency of existing buildings	Community Development	2010	X	X		X
Earthquake	2	**Assistance Programs.** Develop assistance programs for senior citizens who own single-family homes to seismically retrofit their homes per current safety standards. Assistance programs should include maintaining lists of approved contractors, outreach to senior citizens and education efforts.	Community Development	2015	X			X
Earthquake	3	**Seismic data collection sampling stations.** Work with CalTech to establish more seismic data collection sampling stations inside Beverly Hills. This will significantly improve the accuracy and details of the shakemap (ground acceleration data) which eventually allows better analysis (Virtual Beverly Hills damage assessment), planning and emergency response.	Information Technology	2012	X	X	X	X
Fire	4	**Code Update.** Review and update existing city codes to reflect recommendations set forth by the FireWise assessment and Joint Wild land Interface Task Force.	**Community Development,** Fire	2014	X	X	X	X
Fire	5	**Zone 9 (Closed water Pressure Zone) Hillside Fire Protection.** Increase water pressure and access to water in case of an emergency in Zone 9 for conflagrations in the vicinity of Coldwater Canyon and areas contiguous to the City and the City of Los Angeles' Franklin Canyon Reservoir. It will also improve distribution of water supply and reduce energy costs at the Monte Cielo pump station for domestic service into Zone 9.	**Public Works,** Fire	2015	X	X	X	X
Fire	6	**Wood Roof Public Education DVD.** Educate Residents on the potential fire hazard regarding Wood Roofs.	**Fire,** Community Development	2011	X	X	X	X
Fire	7	**Firewise/Waterwise Mitigation Demonstration Garden.** Educate the community on what type of plants are both FireWise and Waterwise.	Fire, Public Works, Community Services	2013	X	X	X	X

Hazard		Mitigation Strategy	Responsible Department	Timeline	Plan Goals Addressed			
Fire	8	**Vegetation Management Public Education.** Develop public education material to the residents regarding Vegetation Management around their homes	Fire	2013	X	X		X
Fire	9	**New Development Impacts.** Review and revise the Zoning Code to reflect the general plan's policies for permitted uses and development standards.	Community Development	2015	X	X		X
Fire	10	**Fire Department Access.** Design private and public access drives and roadways to preserve and maintain Fire Department access to properties.	Community Development, **Fire**	2014	X	X		X
Fire	11	**Evacuation Route.** Develop and Educate Residents on a Citywide evacuation route during a disaster	**Police,** OEM, Fire	2013	X	X	X	X
Fire	12	**Firewise Community Board.** Evaluate and implement recommendations made by the Firewise Communities Program.	**Fire,** OEM	2015	X	X	X	X
Terrorism	13	**Critical Infrastructure Assessment.** Conduct an analysis and assessment of critical infrastructure areas and how each area interfaces with both cyber and physical components if attacked or compromised. Identify the cascade affect, if any, impacting operations should an attack or compromise occur.	Police	2011	X	X	X	X
Terrorism	14	**Network Intrusion Prevention System.** Obtain high level security system to prevent cyber terrorist attack on City systems and databases.	**Information Technology,** Emergency Management	2011	X		X	X
Flood	15	**Reservoirs Replacements and Maintenance.** Update the City's Urban Water Master Plan (UWMP) and related capital improvement programs, including monitoring its water reservoirs. Adopt state-of-the-art water monitoring systems to remotely monitor the City's water usage, leaks, and ruptures. Continue to implement existing flood mitigation activities and programs.	Public Works	2013	X			X
Flood	16	**Update Flood Ordinance.** Remove locally designated flood ordinance.	**Community Development ,** Public Works	2015	X	X	X	X
Landslide	17	**Geotechnical Investigation.** Conduct additional geotechnical investigation to update the landslide hazard maps in the City of Beverly Hills to improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	**Public Works,** Community Development	2013	X			X
Windstorm	18	**Street Tree Master Plan Phase III.** Continue the use of the STMP as a mechanism eliminating structurally defective trees thus eliminating potential damages to lives or property.	**Community Services**	2015	X			X
Multi-Hazard	19	**CERT Program Redevelopment.** Study cost effective ways to offer CERT program to the community	**Fire,** Emergency Management	2011	X	X	X	X
Multi-Hazard	20	**Emergency Management Exercises.** Conduct periodic fire emergency management exercises with City personnel and surrounding jurisdictions.	Emergency Management	Ongoing	X		X	X

Hazard		Mitigation Strategy	Responsible Department	Timeline	Plan Goals Addressed			
Multi-Hazard	21	**Building and Fire Code Updates**. Continue to update the City's building and fire codes once every three years, or whenever the State updates the California building and fire codes, to reflect the highest and best available standards for seismic design and performance of buildings and to conform to State requirements.	**Community Development,** Fire	2014	X		X	X
Multi-Hazard	22	**Inter-jurisdictional Coordination.** Continue to coordinate with and support the Los Angeles County Certified Unified Program Agency (CUPA), the Los Angeles County Fire Department, and their Health & Hazardous Materials Division (HHMD) in carrying out inspections, emergency response, enforcement, and site mitigation oversight of hazardous materials and waste	Fire	Ongoing	X	X	X	X
Multi-Hazard	23	**Joint Effort in Emergency Disaster Management.** Ensure that emergency disaster management is the mutual responsibility of all City Departments and a variety of stakeholders, including the Citizen Corp Program, Beverly Hills Unified School District, private schools, local residents, and the business community.	OEM	2013	X	X	X	X
Multi-Hazard	24	**Disaster Notification/Information Outreach.** Educate community on how to seek information during a disaster - examples: website, Telephone Notification System (TNS), Twitter, local access cable channel, hotline number	OEM	2012	X	X	X	X
Multi-Hazard	25	**Commissioner Emergency Training.** Conduct disaster preparedness for all City Commissioners in order to have commissioners prepared to assist City during a hazard event.	OEM	2014	X		X	X
Multi-Hazard	26	**Hazardous Materials Awareness.** Conduct outreach to all City residents on how to properly store and secure hazardous materials so to avoid spillage and breakage during a hazard event.	OEM	2014	X	X		X
Multi-Hazard	27	**Medical Facility Identification.** Identify all possible medical facilities in the City that are capable of providing medical services, such as triage, during a large hazard event.	OEM	2014	X	X	X	X

HOW WILL THE PLAN BE IMPLEMENTED, MONITORED, EVALUATED

The Plan Maintenance section of this document details the formal process that will ensure that the City of Beverly Hills Hazard Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan revision every five years. This plan constitutes the needed revisions and includes any new mitigation strategies, programs and activities that mitigate against the loss of life or property due to hazard activity. This section describes how the City will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how City of Beverly Hills government intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms such as the City's General Plan, Capital Improvement Plans, and Building & Safety Codes.

PLAN ADOPTION

The City Council adopts the City of Beverly Hills Hazard Mitigation Plan. Once the plan has been adopted, the City's Director of Emergency Management will be responsible for submitting it to the State Hazard Mitigation Officer at the Governor's Office of Emergency Management. The Governor's Office of Emergency Management will then submit the plan to the Federal Emergency Management Agency (FEMA) for review. This review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, City of Beverly Hills will gain eligibility for Hazard Mitigation Grant Program funds.

Plan implementation and evaluation will be a shared responsibility among all of the Hazard Mitigation Steering Committee Members. According to federal requirements, the Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect program changes. Copies of the plan will be made available to all interested parties.

The approved Hazard Mitigation Plan 2010-2015 will be significant in the future growth and development of the community. The Beverly Hills Hazards Mitigation Plan renewal was approved by the City Council on August 17th , 2010. The City Council Resolution adopting the plan is set forth as Appendix E.

COORDINATING BODY

A City of Beverly Hills Hazard Mitigation Steering Committee was responsible for coordinating implementation of plan strategies and undertaking the formal review process.

CONVENER

The City Council will adopt the City of Beverly Hills Hazard Mitigation Plan, and the Hazard Mitigation Steering Committee will take responsibility for plan implementation. The Director of the Office of Emergency Management will serve as a convener to facilitate the Hazard Mitigation Steering Committee meetings, and will assign tasks such as updating and presenting the Plan to the members of the committee. Plan implementation and evaluation will be a shared responsibility among all of the Hazard Mitigation Steering Committee Members.

IMPLEMENTATION THROUGH EXISTING PROGRAMS

The City of Beverly Hills addresses statewide planning goals and legislative requirements through its General Plan, Capital Improvement Plans, and City Building & Safety Codes. The Hazard

Mitigation Plan provides a series of recommendations that are closely related to the goals and objectives of these existing planning programs. The City of Beverly Hills will have the opportunity to implement recommended mitigation strategies through existing programs and procedures.

Through 2009, the City updated its General Plan which included, as part of a mitigation strategy offered in the 2004 HMP, the creation of the Safety Element of the plan. The Safety Element has been completed and approved in 2010 by the City Council. In developing the current mitigation strategies, there was much reference to the Safety Element of the General Plan to ensure cohesiveness between the HMP and the Safety Element.

FINANCIAL ANALYSIS

For each mitigation strategy listed in the plan, careful consideration was given to the reasonable costs of implementation. A Cost Benefit chart can be found in the plan which addresses the feasibility of implementation of each strategy developed. Costs related to the program will be tracked through the program budget. Cost-benefit analysis' were conducted on projects during the evaluation process. Projects that lacked reasonable implementation and financial feasibility were eliminated.

FORMAL REVIEW PROCESS

The City of Beverly Hills Hazard Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The evaluation process includes a firm schedule and timeline, and identifies the departments and organizations participating in plan evaluation. The convener will be responsible for contacting the Hazard Mitigation Steering Committee members and organizing the annual meeting. Committee members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan.

CONTINUED PUBLIC INVOLVEMENT

The City of Beverly Hills is dedicated to involving the public directly in the continual review and updates of the Hazard Mitigation Plan. Copies of the plan will be catalogued and made available at City Hall and at the Public Library. The existence and location of these copies will be available on the City's website and through bulletins. The plan also includes the address and the phone number of the City Planning Division, responsible for keeping track of public comments on the Plan. The City's Office of Emergency Management website contains an email address and phone number to which the public can direct their comments and concerns on the plan.

PART I: MITIGATION ACTION PLAN

SECTION 1
INTRODUCTION

The purpose of this document is to develop, and update a plan for responding to the many potential hazards that could affect the City of Beverly Hills. As part of this process, the City partners with residents, business community and various stakeholders to create a Hazard Mitigation Plan (HMP) that addresses the potential impacts of hazardous events and does this in a way that makes sense to the community. Identifying the risks posed by hazards and developing strategies to reduce potential impacts from those hazards can assist in protecting the life and property of residents, property owners and workers in the city. In turn, this tends to reduce the level of risk presented by, and helps reduce losses from, future hazard events.

Southern California is vulnerable to earthquakes, flooding, terrorism, windstorms and fires. These hazards can potentially expose residents and businesses to the financial and emotional costs of losing their homes and livelihoods and needing to recover once a hazardous event has subsided. The region's and the community's risk associated with hazards increases as the region's and the community's population grows.

The City of Beverly Hills is a 5.7 square mile municipality surrounded by the cities of Los Angeles and West Hollywood. It was incorporated in 1914. According to the California Department of Finance, as of 2008, approximately 35,000 people live in Beverly Hills. The city's daytime population has been estimated as low as 110,000 and as high as 150,000. The City of Beverly Hills is the 53rd most populous city of the 88 cities in Los Angeles County (California Department of Finance).

As a General Law City, the City is governed by five City Council members elected for overlapping terms. The City employs close to 1,000 full and part time employees. City departments include Administrative Services, City Clerk, Community Development, Community Services, Fire, Police, and Public Works. The City of Beverly Hills Police and Fire Departments maintain a response time of less than three minutes, and under four minutes, respectively. High standards for training and state of the art equipment have resulted in an incidence rate of crime that is lower than that in any surrounding agency.

The City of Beverly Hills is known for the lush garden-like setting that is a result of the City's municipal parks, botanical gardens, and tree lined streets. The City estimates that there are over 24,000 trees lining the City's streets. Community residents also pride themselves in the rich and lush landscaping.

Today Beverly Hills is an important retail, financial, and professional center. According to the Los Angeles County Assessor's Office, net assessed property valuation exceeds $21.6 billion, and real estate is priced accordingly. The Business Triangle, which is that area of the City between Santa Monica Boulevard, Wilshire Boulevard and Canon Drive, attracts many commercial businesses. The rent along Rodeo Drive, which is a north-south running street close to the center of the business triangle, can be as high as $264 per square foot annually ($22.00 per square foot per month).

Residential housing is costly in the City as well. Prices for a single-family, 4-bedroom home in Beverly Hills averages about $2.5 million. While single family properties range from two-bedroom bungalows to 40+ room mansions. Approximately 92% of the City is zoned for residential use. In 2007, approximately 63% of the total dwelling units were in multi-family neighborhoods, and 37% were in single-family neighborhoods. City records indicate that approximately 82% of the dwelling units in multi-family neighborhoods are apartments and 18% are condominiums. Census 2000 data shows 57% of city residents are renters. (www.beverlyhills.org/about/demo.asp)

With its celebrity residents, international boutiques, luxury hotels, and acclaimed restaurants, Beverly Hills has become a popular destination for vacationers and international visitors.

The following threat assessments identify and summarize the hazards that could impact the City of Beverly Hills:

- The southeast portion of the City may be subject to flooding, due to flash flooding and urban flooding (storm drain failure/infrastructure breakdown).
- An earthquake would impact the total population.
- The City has little industry and therefore is not affected by stationary hazardous materials users.
- Historically the southeast section of the City was vulnerable to flooding due as its lower elevation and a outdated storm drain system. Due to the completion of the LA County's Holly Hill Storm Drain upgrade project it would appear that this risk has been downgraded to minimal.
- The entire Los Angeles basin is considered as a risk area for a nuclear event or act of terrorism.
- The City is at high risk at its interface for Urban Wildfire.
- The area above Sunset Blvd. has been declared a High Fire Hazard zone.

Emergencies and disasters could cause damage to residents, businesses, infrastructure and the environment. Any disaster would cost tremendous amounts of money in terms of response and recovery dollars, and economic disruption. Certain disasters would most likely result in injuries or death of residents and visitors. The magnitude of these costs, and the potential to cause injury and deaths will increase as the population increases.

Throughout its history, the City of Beverly Hills has dealt with various hazards affecting the area. State, County and local history shows that the region in which BH is located is susceptible to earthquakes, earth movements including landslides and mudslides, flooding, fires (including wildland and structural) and wind storms. The potential impacts of hazards associated with the terrain make the environment and population vulnerable to geologically-based natural disasters.

While the City cannot prevent disasters from happening, the effects can be reduced or eliminated through well organized public education and awareness efforts, and preparedness and mitigation actions. Most hazards cannot be fully mitigated; therefore the community must be prepared to provide an efficient and effective response and recovery.

Chart 2 reflects significant disasters that occurred in Los Angeles County within the last ten years. There have been no significant hazards in the City of Beverly Hills between 2004 – 2009. Chart 3 shows disasters within the City of Beverly Hills within last ten years.

Map 1. City of Beverly Hills

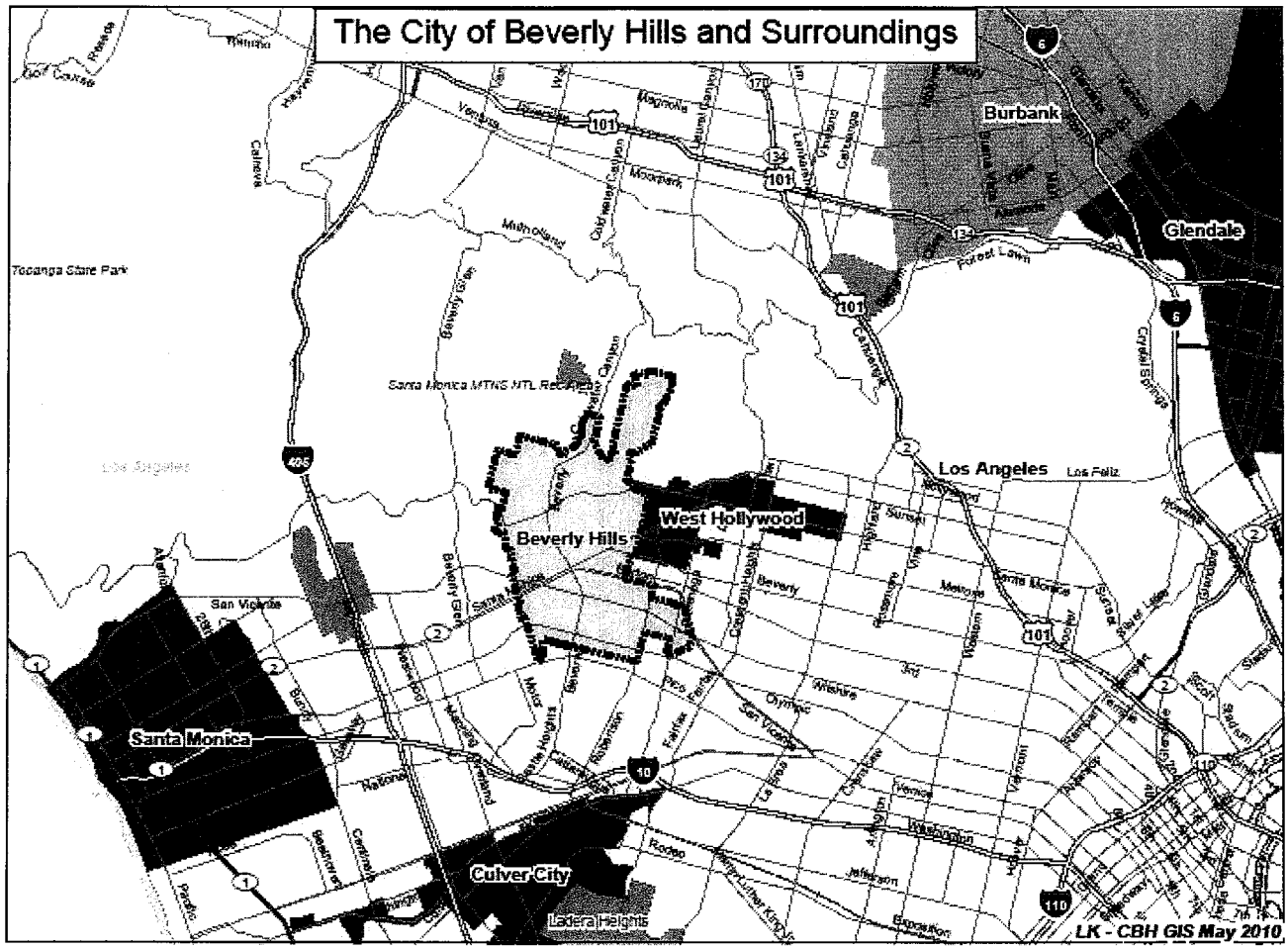


Chart 2.

FEMA Major Disaster Declarations, Los Angeles County 1999 – 2009									
Hazard Type	**Disaster Name**	**Disaster #**	**Year**	**Counties Declared**	**State Declaration**	**Federal Declaration**	**# of Deaths**	**# of Injuries**	**Cost of Estimated Damages**
Fire	Station Fire	2830	2009	Los Angeles County	8/28/2009	8/28/2009	2	Several	Over $2 Billion
Fire	Sayre Fire/Freeway Complex Fire	1810	2008	Los Angeles, Orange, Riverside, and Santa Barbara Counties.	11/15/2008	11/15/2008	0	5	$65,950,000
Fire	Corral Canyon Fire	1731	2007	**Los Angeles**, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura Counties.	10/21/2007	10/24/2007	0	8	Over $100 million
Flooding /Landslide	California Severe Storms, Flooding, Debris Flows, and Mudslides	1577	2005	Kern, **Los Angeles,** Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura Counties.	1/15/2005	2/4/2005	0	0	Unknown at this time
Flooding /Landslide	Severe Storms, Flooding, Landslides, and Mud and Debris Flows	1585	2005	Kern, **Los Angeles,** Orange, Riverside, San Bernardino, San Diego and Ventura Counties	3/16/2005	4/14/2005	0	0	Unknown at this time
Fire	Southern California Wildfires	DR-1498	2003	Ventura, Los Angeles, San Bernardino, Riverside, San Diego	10/24-26/03	10/27/2003	22	Several	$2.5 Billion
Sources: FEMA, Cal EMA, http://fire.lacounty.gov/, http://www.inciweb.org/, http://cdfdata.fire.ca.gov/incidents, http://www.oes.ca.gov									

***Note: Based on different agency estimates, cost of these large disaster events are constantly changing depending on variables added after the fact such as insurance claims, reparation costs, etc. This reflects the most current information at the time of this plan's composition.**

Chart 3. City of Beverly Hills Disasters since 1989

Hazard Type	Disaster Name	Disaster #	Year	Federal Declaration	Cost of Damage to the City
Civil Unrest	Los Angeles Civil Disorder	DR-942	1992	5/22/1992	$166,380
Flood	1992 Late Winter Storms	DR-979	1992	1/15/1993	$267,390
Earthquake	Northridge Earthquake	DR-1008	1994	1/17/1994	1,439,219.00
Severe Storm	Severe Winter Storms	DR-1044	1995	1/13/1995	$11,198
Severe Storm	Severe Winter Storms	DR-1884	2010	3/8/2010	$41,835

***Private Property Loss Amount: Unknown**

WHY DEVELOP A MITIGATION PLAN?

Changes to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which provides the basis for federal assistance to state and local governments impacted by a disaster, have placed a new emphasis on local mitigation planning. Hazard Mitigation, also known as prevention before the occurrence of a disaster, is now considered to be the first step in preparing for emergencies, rather than the final step in recovery. FEMA required state and local governments to develop hazard mitigation plans by November 2004. The consequences of not having an approved Local Hazard Mitigation Plan are significant. Without one, the City would be ineligible for FEMA mitigation programs include the Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and most importantly, potential loss of public assistance funding for repetitively damaged facilities following a disaster. Based on past disasters, the City of Beverly Hills has or will receive over nine hundred thousand in past hazard mitigation money and over two and a half million dollars in public assistance funding. This funding is not in jeopardy but demonstrates the importance of completing the original plan and updating as required.

Some of the required contents of a Hazard Mitigation Plan exist in current City planning documents. The General Plan, existing building codes, the Mountain Fire District Mitigation Plan, the Storm Water Master Plan, the Master Plan and the Multi-Hazard Disaster Plan contain requirements of the Local Hazard Mitigation Plan. Departments along with respective project coordinators reviewed existing documentation. (Note the Resource Directory for further documentation) Also writing this plan will assist in the writing of the Seismic Safety Element of the General Plan.

The Disaster Mitigation Act of 2000 (DMA 2000), Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities, identifies and prioritizes mitigation actions, encourages the development of local mitigation and provide technical support for those efforts. This mitigation plan serves to meet those requirements.

This plan assists the City 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. Upon completion, the Local Hazard Mitigation Plan will include mitigation strategies that outline the City's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools. This plan will formalize all mitigation and associated data completed in the past and create a direction for mitigation in the future.

The resources and information within the Mitigation Plan:

(1) Establish a basis for coordination and collaboration among City Departments and the public in City of Beverly Hills;
(2) Identify and prioritize future mitigation projects; and
(3) Assist in meeting the requirements of federal assistance programs.

WHOM DOES THE MITIGATION PLAN AFFECT?

The City of Beverly Hills Hazard Mitigation Plan affects the entire city. This plan provides a framework for planning for hazards. The resources and background information in the plan is applicable City-wide, and the goals and recommendations can lay groundwork for mitigation plans and partnerships.

PLANNING PROCESS

The development of the original and updated plan was a collaborative city and community effort. It was coordinated by the Office of Emergency Management with participation from all City departments. Both times a Steering Committee was established, composed of the Fire Chief, Police Chief, Director's of the Office of Emergency Management, Community Development, Community Services, Administrative Services, Information Technology, Public Works, and the City Attorney's Office. The Steering Committee was chosen to facilitate the progression of the plan, provide imperative feedback, guidance and approval. The original Steering Committee wrote the Mission Statement, Plan Goals, decided and approved the hazards, and approved the plan and strategies. Project Coordinators were appointed by the Department Head and a Project Coordinator Committee was established. Each Project Coordinator was assigned to update a section of the plan. Each of the plan sections provides information on the history, economic and social impact of a specific hazard. The sections provide current mitigation measures instituted previously by the City of Beverly Hills and cites various sources as to where to obtain more information on each hazard. Various data and maps are used. In the writing of this updated plan, City of Beverly Hills staff collected data and compiled research to reflect the most current data. Research materials came from a variety of sources.

Information in the Mitigation Plan is based on research from a variety of sources. Staff from the City of Beverly Hills conducted data research and analysis, facilitated steering committee meetings and commission meetings, and developed the original mitigation plan and updated version.

THE STEERING COMMITTEE AND PROJECT COORDINATORS 2010-2015

The Hazard Mitigation Steering Committee convened about every four weeks over the course of eight months to guide renewal of the Mitigation Plan. The 2010-2015 committee played an

integral role in developing the mission, goals, and strategies for the mitigation plan. The Steering Committee was comprised of the following representatives:

Jeff Kolin
City Manager

Mahdi Aluzri
Assistant City Manager

Susan Healy Kenne
Director of Community Development
Community Development Department

David Gustavson
Director of Public Works, Transportation and Engineering
Public Works, Transportation & Engineering

Tim Scranton
Fire Chief
Beverly Hills Fire Department

Steve Zoet
Acting Director of Community Services
Community Services Department

Pamela Mottice-Muller
Director of Emergency Management
Office of Emergency Management

David Snowden
Chief of Police
Beverly Hills Police Department

Roxanne Diaz
Assistant City Attorney
City Attorney's Office

Steve G. Miller
Chief Financial Officer
Administrative Services

David Schirmer
Chief Information Officer
Information Technology Department

Project Coordinators were chosen by the Steering Committee to update each Hazard's section within the overall plan.

Project Coordinators and Hazards

George Chavez - Landslide
Project Civil Engineer
Public Works, Transportation & Engineering

Larry Sakurai & Peter Noonan- Community Profile
Senior Planner
Community Development Department/Planning

Jesse DeAnda - Earthquake
Building Inspector
Community Development Department / Bldg & Safety

Ken Pfalzgraf - Windstorm
Urban Forest Supervisor
Recreation and Parks

Greg Barton- Fire
Deputy Fire Chief
Beverly Hills Fire Department

Shana Epstein- Flood
Environmental Utilities Manager
Public Works

Sgt. Lincoln Hoshino , Officer Tad Nelson- Terrorism
Police Sergeant
City of Beverly Hills Police Department

As shown in Appendix D, the Hazard Mitigation Steering Committee and various other stakeholders met regularly for more than eight months to update the plan. This process involved much dialogue, discussion and input on the development of the plan.

RESOURCES/OUTSIDE INPUT

City of Beverly Hills staff examined multiple existing mitigation plans from around the country, current FEMA hazard mitigation planning standards (31`86 series) and the State of California Hazard Mitigation Plan Guidance.

HAZARD SPECIFIC RESEARCH

In the writing of the original plan, City of Beverly Hills staff collected data and compiled research on hazards. Research materials came from a variety of sources. The City of Beverly Hills staff conducted research using data and speaking with experts, current mitigation activities,

resources and programs, and potential strategies from research materials and stakeholder input. During the update of the plan, the same process was conducted to reflect the most current data.

Project Coordinators updated their sections of the plan referencing various sources including, but not limited to:

Federal Emergency Management Agency
California Emergency Management Agency (CalEMA)
California Department of Finance
Los Angeles County Office of Emergency Management
City of Beverly Hills School District
Los Angeles County Fire Department
Los Angeles County Public Works
Los Angeles County Assessor's Office
Edison International
City of Beverly Hills Chamber of Commerce
Firewise Program
United States Census
City of Beverly Hills Records
Los Angeles County Records
City of Beverly Hills General Plan

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.
- 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 & objectives, including proposed strategies, programs & 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 All Hazard Mitigation Plan into other planning mechanisms.
- Formal adoption by the City Council.

- Plan Review by both State CalEMA and FEMA

These requirements are spelled out in greater detail in the forthcoming plan sections and supporting documentation.

PUBLIC/COMMUNITY PROCESS

Public participation is a key component of strategic planning processes. Citizen participation offers the residential and business community the opportunity for inclusion of their interests and concerns into the process. The Federal Emergency Management Agency requires public input during the development of local hazard mitigation plans. The public was invited to participate in the update of the plan. Information was provided on the City's website, at several Commission meetings, AM radio station, cable and in the City newspaper.

The City of Beverly Hills' Hazards Mitigation Plan integrates a cross section of local resident and business community input. To accomplish meaningful participation, rather than appointing, educating and grappling with scheduling concerns of a project-specific steering committee, it was deemed more efficient and more representatives to enlist the expertise of existing city commissions, homeowner groups and business interest's representative of all stakeholders in the community. Targeted groups have been provided presentations on the purpose behind and development of the City's Hazards Mitigation Plan. Information provided from these groups has been considered in the planning process of the plan.

During the renewal process, the City presented a draft of the plan to the Public Works, Recreation and Parks, Planning, and Health & Safety commissions, whose meetings are aired on local cable channel *Beverly Hills Television Channel 10* and are open to the public. The public was invited to provide input and comments on the renewal of the plan at these meetings. In addition, the plan was posted online, on the Office of Emergency Management webpage. The public was invited to provide view the plan online or at key public locations. The following is a screenshot of the public notice on the City's website.

HOME CITY SERVICES ATTRACTIONS DOING BUSINESS GOVERNMENT ABOUT BEVERLY HILLS I WANT TO SEARCH GO

Homepage City Services Emergency Management Hazard Mitigation EMAIL PRINT

Current Disaster Information
Emergency Videos and PSAs
Emergency Preparedness
Hazard Mitigation Plan - DRAFT
Health and Safety Commission
Helpful Links
Mass Communication System Opt-In
What is Emergency Management?

City of Beverly Hills Hazard Mitigation Plan Renewal

The City of Beverly Hills is updating its Hazard Mitigation Plan (HMP) and we would like to hear from you!

The Disaster Mitigation Act of 2000 requires that local governments, as a condition of receiving federal disaster mitigation funds, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities, identifies and prioritizes mitigation actions, encourages the development of official mitigation and provide technical support for those efforts. This mitigation plan serves to meet those requirements.

This plan will be designed to assist the City 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.

Your opinion is important to the City. We invite you to share your comments and suggestions on the **draft updated Hazard Mitigation Plan** at the Recreation and Parks Commission meeting on July 27th, 2:00pm,City Hall Council Chambers.

In addition, hard copies of the plan are available at the following key public locations:

City Hall
455 N. Rexford Dr.
Beverly Hills, CA 90210

City of Beverly Hills Library
444 North Rexford Dr.
Beverly Hills, CA 90210

City of Beverly Hills Farmers Market information booth
9300 block of Civic Center Dr.
Sundays through August 2010

We invite you to submit your comments no later than August 7, 2010.

Email your comments to Pamela Mottice-Muller, Director of Emergency Management, pmottice@beverlyhills.org .

Thank you for your participation!

The notice lets the public know where they may view physical copies of the plan as well.

The renewal process has been a collaborative effort with input from all departments and the community. The city has utilized its strong partnerships and communication networks with Area A cities, e.g. the four Westside cities Beverly Hills, Culver City, Santa Monica and West Hollywood. The cities have worked closely to share information and aid in development and creation of their respective plans. In addition, as part of the public process in 2004 and 2009, the City worked closely with the Neighborhood Watch.

See Appendix D for more information on public input opportunities.

Citizen's Corp Initiative

After September 11, President Bush implemented the Citizen Corps initiative. This initiative supported community based programs through citizen volunteer efforts. The national mission of Citizen Corps is to harness the power of every individual through education, training, and volunteer service to make communities safer, stronger, and better prepared to respond to the threats of terrorism, crime, public health issues, and disasters of all kinds. Groups representing the City of Beverly Hills Citizen Corps are as follows:

- Neighborhood Watch
- Citizen Emergency Response Team (CERT)
- Volunteers in Policing (VIP)

- Disaster Communications System (DCS)
- Medical Reserve Task Force (MRS)

Citizen Corp continues to be an important part of the City's emergency management program.

Neighborhood Watch
Neighborhood Watch meetings were conducted which covered the importance of Neighborhood Watch and how Neighborhood Watch relates to the elements of "Citizen Corp.", as well as, emergency preparedness, and a terrorism overview. Every year in the spring, the Neighborhood Watch covers topics of emergency management. A video presentation was also disseminated city wide over the City's Cable Channel. The topic for 2009 presentation was "Emergency/Disaster Preparedness and Mitigation." In 2010, the topic was "Personal Safety and the Internet."

As shown in Appendix F, numerous opportunities were provided for public participation and input into the plan.

HOW IS THE PLAN USED

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 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. Council members 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 Hazard Mitigation Plan that remains current and relevant to City of Beverly Hills.

The mitigation plan is organized as follows:

EXECUTIVE SUMMARY: FIVE-YEAR ACTION PLAN

The Five-Year Action Plan provides an overview of the mitigation plan mission, goals, and strategies. The plan strategies are included in this section, and address multi- hazard issues, as well as hazard-specific activities that can be implemented to reduce risk and prevent loss from future hazard events.

PART I: MITIGATION ACTION PLAN

Section 1: Introduction

The Introduction describes the background and purpose of developing the mitigation plan for City of Beverly Hills and the planning process.

Section 2: Community Profile
This section presents the history, geography, demographics, and socioeconomics of City of Beverly Hills. It serves as a tool to provide an historical perspective of hazards in the City.

Section 3: Risk Assessment
This section provides information on hazard identification, vulnerability and risk associated with hazards in City of Beverly Hills.

Section 4: Multi-Hazard Goals and Strategies
This section provides information on the plan goals and strategies that address the six hazards addressed in the mitigation plan.

Section 5: Plan Maintenance
This section provides information on plan implementation, monitoring and evaluation.

PART II: HAZARD SPECIFIC INFORMATION

Hazard specific information on the six chronic hazards is addressed in this plan. Each of the hazard-specific sections includes information on the history, hazard causes and characteristics, hazard and risk assessment, area of susceptible to the hazard and existing mitigation activities and local, state, and national resources. The hazards addressed in the plan are as follows:

Section 6: Earthquake
Section 7: Fire
Section 8: Terrorism
Section 9: Flooding
Section 10: Earth Movement (Landslide)
Section 11: Windstorm

PART III: RESOURCES

Resources include, but are not limited to, all information used to gather information to assemble the entire Hazard Mitigation Plan.

Appendix A: Resources
This section provides a list of resources for City, regional, state, and federal agencies and organizations that may be referenced directly and indirectly within the City of Beverly Hills Hazard Mitigation Plan. The resources are also provided for public information.

Appendix B: Crosswalk
This section includes the Local Hazard Mitigation Plan Review Crosswalk for California local governments.

Appendix C: Natural Hazard Risk Analysis Rating Form
This section includes the survey by which community members rated the hazards.

Appendix D: Planning Meetings/ Public Involvement Meetings
This section provides a list of dates, descriptions and locations of all meetings that involved the community in the process to update of the Hazard Mitigation Plan in addition to all meetings pertaining to the planning process of the update of the HMP.

Appendix E: City Council Plan Adoption
This section contains a copy the CEQA Categorical Exemption and of the city Council Resolution adopting the renewed Hazard Mitigation Plan, 2010-2015.

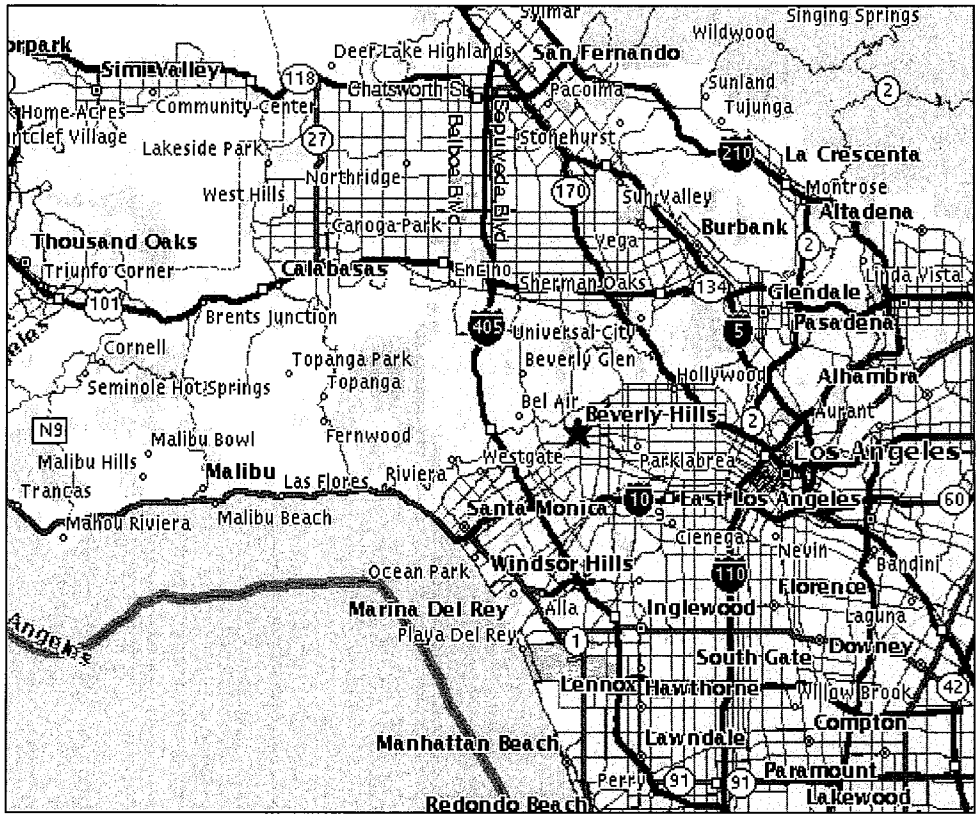
Appendix F: Acknowledgements
This section acknowledges the efforts of all involved in the renewal process of the HMP.

SECTION 2
COMMUNITY PROFILE

INTRODUCTION

The City of Beverly Hills is an approximately 5.7 square mile city located in the urbanized central region of Los Angeles County. Beverly Hills can be described as being essentially "built-out", however this description can be misleading. Being built-out, as opposed to being "not built-out", describes the relative amounts of vacant land remaining in a city. Development began in Beverly Hills over a century ago and today there are few, if any, vacant parcels of land in the city that have never been built on in the past; therefore the city is "built-out". This is in opposition to other cities that have been formed more recently, mainly along the greater Los Angele's regions fringe that may consist of up to 50-percent or more vacant land. To construct a new building in the city of Beverly Hills today, typically an existing structure must first be removed. Since building codes have changed over time, typically the reconstruction or renovation of a property will result in a new or renovated building that meets all current building codes, and would be more capable of withstanding many natural hazards. The added safety resulting from advances in building design and construction oftentimes stands in contrast to the design and construction of older structures, and the ability of older structures to withstand major natural hazards.

Map 2: Geography and the Environment



Beverly Hills is located in the area of Los Angeles County, and within the borders of the City of Los Angeles known as the "Westside". The Westside area includes the cities of Beverly Hills, West Hollywood, Culver City, Santa Monica and parts of the City of Los Angeles and the County of Los Angeles. The Westside area is almost fully urbanized and includes several major business and retail centers such as: the "Business Triangle" in Beverly Hills; Century City, Westwood Village, the Beverly Center, the Grove, and Miracle Mile in the City of Los Angeles; the "Melrose Triangle" and "Sunset Strip" in West Hollywood; and the central area of the City of Santa Monica in Santa Monica. The Westside also includes dense residential areas such as the Wilshire corridor, Park La Brea, north central City of Santa Monica, and the Beverly Center area. Several major institutions are also located on the Westside such as University of California Los Angeles (UCLA), Santa Monica Community College, UCLA Hospital, Cedar Sinai Hospital, Sony Pictures, Fox Studios, CBS, the Los Angeles County Museum of Art (LACMA), the Pacific Design Center, the J. Paul Getty Museum, and the Getty Villa.

The Beverly Hill's street system consists of a grid of local serving, and regional serving streets. Regional access to the City is provided by the San Diego (405) and Santa Monica (10) Freeways. Major east/west streets include Wilshire, Santa Monica and Olympic Boulevards. Major north/south streets include Beverly and Doheny Drives, and Robertson and La Cienega Boulevards.

CLIMATE

Beverly Hills enjoys a dry, sub-tropical, Mediterranean- like climate. Very little precipitation, low humidity, and an abundance of sunshine are enjoyed by residents, employees and visitors to the City. Virtually no precipitation is recorded between May and October; however an average of 15 inches of rain is measured annually. Monthly averages are shown in Chart 4.

Month	High		Low	
January	67°	19°	45°	7°
February	67°	19°	47°	8°
March	68°	20°	48°	19°
April	70°	21°	51°	11°
May	72°	22°	54°	12°
June	74°	23°	58°	14°
July	78°	26°	61°	16°
August	79°	26°	62°	17°
September	79°	26°	60°	16°
October	76°	24°	56°	13°
November	72°	22°	50°	10°
December	68°	20°	46°	7°
Source: Western Regional Climate Center				

Chart 4. Local Climate

MINERALS AND SOILS

Local soils conditions are discussed in the "Earthquake Hazards" chapter of this Report.

LAND AND DEVELOPMENT

Development in Southern California from the earliest days was a cycle of boom and bust. World War II, however, dramatically changed that cycle. Military personnel and defense workers came to Southern California to fill the logistical needs created by the war effort. The available housing was rapidly exhausted and existing commercial centers proved inadequate for the influx of people. Immediately after the war, construction began on the freeway system, and the face of Southern California was forever changed. Housing developments and shopping centers sprung up everywhere and within a few decades the central basin of Los Angeles County was virtually built out, including most of the City of Beverly Hills.

This building boom occurred during the middle of the last century resulting in over half of the community's present day apartment and condominium buildings being constructed prior to the

year 1960. Additionally, many of the office and retail buildings and shops in the city also occurred during this time period, which is prior to adoption of the State's building codes that required increased building design and construction for earthquake safety.
Today, approximately 92-percent of the City is designated in the City's General Plan for residential land uses and the remaining 8-percent for commercial, office and retail land uses.

HOUSING AND COMMUNITY DEVELOPMENT, BUILDING AGE AND CONSTRUCTION TYPE

Beverly Hills, like many other communities in Southern California, was created as a real estate development in 1907. A substantial number of single family homes were constructed prior to 1920. The City's primary period of residential growth was in the late 1920s and 1930s.

Approximately 35 percent of the existing housing stock was built prior to 1940, and over 60 percent of the existing units were built prior to 1960. In contrast, only 13 percent of the County's housing stock in 1990 was constructed prior to 1940. The table below provides more data on housing construction dates.

Chart 5. Number of Units Built by Year

Year structure Built	Number of Units	Percent of Total Units
1999 to March 2000	47	**.03**
1995 to 1998	247	**1.6**
1990 to 1994	477	**3.0**
1980 to 1989	1,188	**7.5**
1970 to 1979	1,165	**10.2**
1960 to 1969	2,356	**14.9**
1940 to 1959	4,441	**28.0**
1939 or earlier	5,484	**34.5**
Total	**15,855**	**100.00**

Source: 2000 U.S. Census

Building age is important because building codes change over time in response to experience. By knowing the code under which a building was constructed, one can ascertain information about specific design requirements and construction types.
After the 1933 Long Beach Earthquake, the state adopted building code provisions for seismic safety. The law required all buildings to be designed for earthquake loads. The initial requirements were relatively low, but buildings designed to that standard still do have some load capacity.

An earthquake in the Puget Sound area in 1949 resulted in parapet correction requirements throughout the Los Angeles region. In the late 1950s, the Code's earthquake load was again increased based on experience gained over the years.

After the 1971 San Fernando earthquake, building codes underwent a major change in loads and detailing requirements to improve toughness and ductility in buildings. Toughness is the ability to sustain earthquake loads and ductility and the ability to rock back and forth with the ground motions without collapse or other failure. These changes were incorporated into the 1976 Code,

which is still used as a benchmark for determining buildings that may require investigation and might pose a potential threat.

POPULATION AND DEMOGRAPHICS

Demographics

The community of Beverly Hills is expected to gradually increase as the region's population grows. Population growth, and shifts in how and where people spend their time in the City create a need to develop and update strategies, coordinate resources, and increase public awareness on a regular, on-going basis to assure that the procedures and practices that the City has in place remain relevant.

The number of City residents has increased at a slow rate over the past thirty years, and growth predictions indicate that this trend will continue. A snapshot of demographics is provided below.

Chart 6: General Demographic Information

Subject	Number	Percent	Subject	Number	Percent
Total Population	33,784	100.00	Race		
Male	15,371	45.5	White		85.1%
Female	18,413	54.5	Asian		7.1%
Age			Two or more races		4.5%
0-19	7427	22.0%	African American		1.8%
20-44	11,362	33.6%	Other		1.5%
45-64	9,046	26.8%	Total		100%
65 years and over	5049	17.6%	Total Housing Units Total occupied housing units	15,856 15,035	
Median Age		41.3	Owner occupied housing units	6,518	
Number of Households			Renter occupied housing units	8,517	
Family Households		8,263	Homeowner vacancy rate	--	1.6%
Non-Family Households		6,772	Rental vacancy rate	--	3.3%
Total Households		15,035	Average Household size of		
Average Household Size	2.24 persons		owner-occupied units	2.73	
1990–2000 Change in Population		+5.7%	Average household size of		
1980-2000 Change in Population		+4.4%	Renter-occupied units	1.87	
1970-2000 Change in Population		+1.1%			

Source: 2000 U.S. Census

ANALYZING DEVELOPMENT TRENDS

GROWTH PROJECTIONS

The Southern California Association of Government's (SCAG) most recent population projection (prepared for the 2001 Regional Transportation Plan) projects that the City's population will be 34,547 in 2025, only slightly greater (approximately +.025%) than the 33,784 enumerated in the 2000 Census. Likewise, the employment projection, estimated at 56,667 in 2000, is only expected to reach 63,310 by 2025 (6).

By contrast, the population of Los Angeles County is expected to increase from 9.5 million people to 12.3 million people, almost a 30 percent increase. Employment in the County is expected to increase by almost 23 percent by 2025.

Within the six-county SCAG region, employment increases are generally not projected to be located near areas of population increase, implying substantially increased traffic congestion as people drive further to more distantly located jobs.

Employment and Industry
Major industries represented in Beverly Hills include Tourism, Entertainment, Financial Services, Hospitality, Professional Services, Real Estate and Retail. The City of Beverly Hills is the largest employer in the city. Other major employers include the Regent Beverly-Wilshire, Beverly Hilton, Peninsula and Beverly Hills hotels; the Beverly Hills Unified School District; Creative Artists, William Morris/ Endeavor, ; Neiman Marcus, Saks Fifth Avenue, Barney's New York, and many other retailers; banks and investment firms; medical and law offices; service-related businesses (hair salons, day spas, etc); and restaurants.

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 hazard event, large and small businesses can develop strategies to prepare for hazards, respond efficiently, and prevent loss of life and property.

Daytime Population
Beverly Hills is a major center for employment in the economic sectors of tourism, hotel, retail, hospitality, and restaurant industries, as well as a center for legal, medical, financial and other professions. In addition to those employees and clients of these industries and professions who are both residents and non-residents, the City's daytime population includes a large number of people who must, by virtue of the City's geographic location, drive or take public transportation through the City to their places of employment and other destinations. Although it is difficult to determine the maximum number of people in or traveling through the City at any given moment, the following activities and people would make up the total daytime population:

- Employees of private businesses
- Hotel Guests
- Shoppers
- Restaurant clientele
- Professional clients
- Persons driving or taking public transportation
- Schools
- Day workers

Beverly Hills is a major job center for the Los Angeles region. The City's daytime population has been estimated as low as 110,000 and as high as 250,000, due in large part to the number of businesses located in the City (3). All these people, resident and non-resident alike, are dependent in varying degrees on the City's ability to provide services, particularly in the event of a major disaster or emergency.

The Westside area has approximately 10-percent of the jobs in Los Angeles County, but only approximately 6-percent of all residents. This discrepancy between the higher percentage of jobs

on the Westside and the lower percentage of people who reside on the Westside suggests that a substantial number of employees commute in to the Westside area from other areas in the county, and the region. This further indicates that during and after a hazard event a substantial number of employees on the Westside would not be close to home and would be dependent on some form of transportation.

The Los Angeles region is known for its vehicle traffic. Private automobiles are the dominant means of transportation in region, including the City of Beverly Hills. However, since Beverly Hills is located in the middle of a large metropolitan area, a large number of buses and cars travel through the City each day on their way to bordering cities and regions. As a result of the commuting nature of the Los Angeles area, there is widespread intersection congestion throughout the Westside throughout most of the daylight hours, increasing during the morning and evening peak commute periods.

On the Westside, an estimate of the vehicle miles driven on a daily average suggests that 8-percent of the total mileage driven by commuters in Los Angeles County occurs on the Westside, whereas, only 6-percent of the county's roadways are located on the Westside (5). The discrepancy between the higher number of vehicle miles driven and the lower percentage of roadways on the Westside suggests on average, most roadways on the Westside experience more traffic than the roadways were designed to carry.

Land Use Development

Although there is construction and buildings in hazard areas, the City has comprehensive mitigation measures, noted in each section of this plan, to mitigate against the loss of life and or property in hazard areas. Land use illustrates what can be built and captures all of the major future potential projects in given zoning. Map 3 illustrates the current land uses in the City and chart 6a provides a breakdown. The City's Community Development department has conducted preliminary research on potential housing lost in case of a cataclysmic hazard event.

In a cataclysmic event in which all multifamily residential (MFR) housing 50 years old or older failed, the City could potentially loose 6,004 units, or 37% of the city's total housing. This would potentially leave approximately 14,042 people, or 40% of the city's total population without housing.

In a cataclysmic event in which all MFR housing that was 25 years old failed the City could potentially loose 9,158 units, or 57% of the city's total housing and have approximately 21,420 people, or 61% of the city's total population without housing.

(Methodology: Estimates were calculated using appropriate formulas based on the following assumptions: assumed population of 35,000, 16,142 total housing units in city , 6,004 MFR units 50 years or older, 9,158 MFR units 25 years or older.)

Map 3. Current Land Use in the City of Beverly Hills

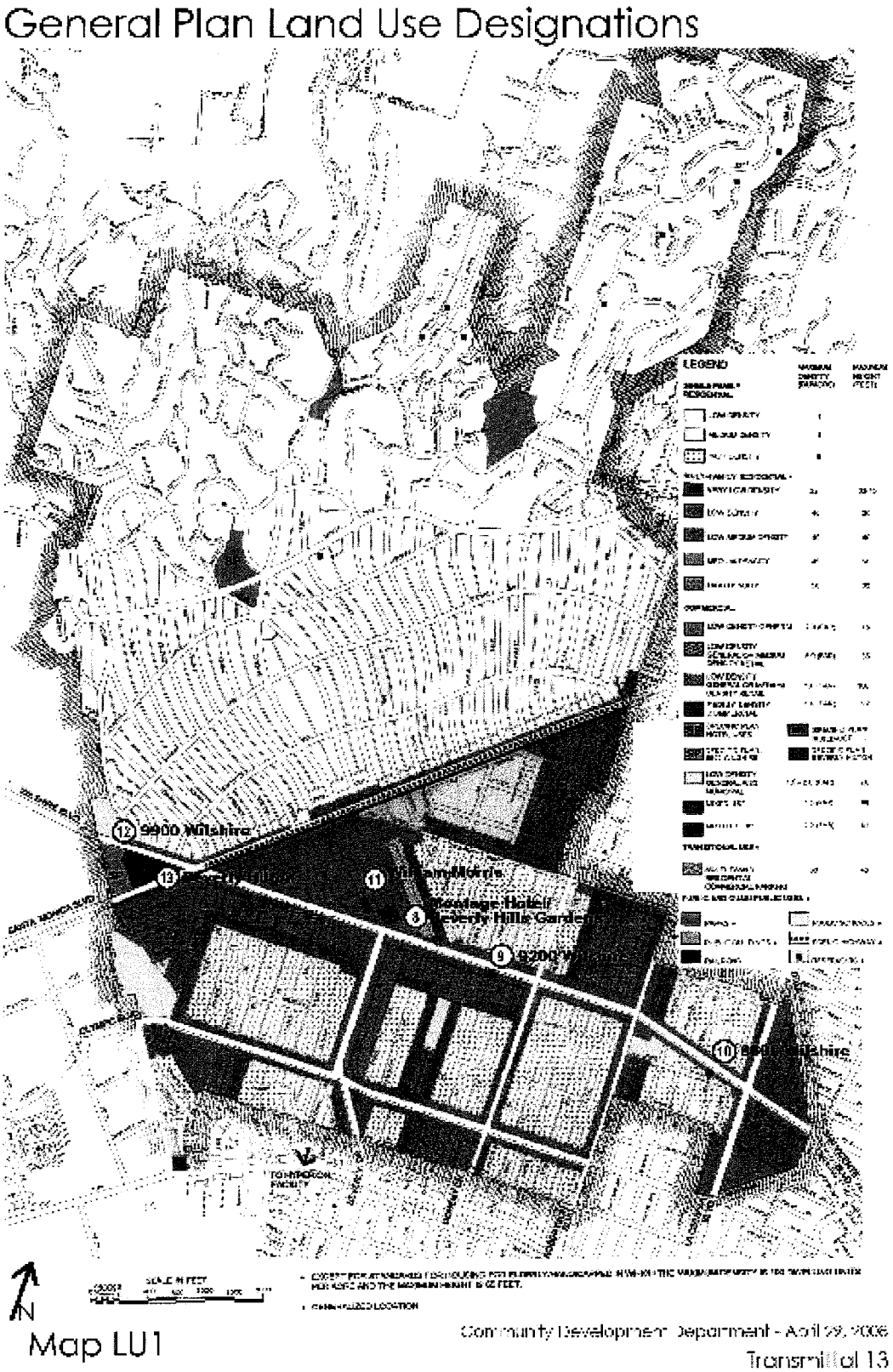


Chart 6a. Existing Land Uses		
Existing Land Uses	**Acres**	**Percent of City**
Residential		
Low-Density SF	1,068	38.3
Medium-Density SF	731.8	26.2
High-Density SF	347.5	12.4
Very Low-Density MF	1.8	0.1
Low-Density MF	12.9	0.5
Medium-Density MF	123.6	4.4
High-Density MF	82.7	3
Subtotal Residential	2,368.6	84.9
Mixed Use		
Mixed Use	3.3	0.1
Subtotal Mixed Use	3.3	0.1
Commercial	248.8	8.9
Subtotal Commercial	248.8	8.9
Civic Center/Public Facilities		
Civic Center/Public Facilities	28.5	1
Subtotal Civic Center/Public Facilities	28.5	1
Public Schools		
Public Schools	53.5	1.9
Subtotal Public Schools	53.5	1.9
Parks/Recreation/Open Space		
Parks/Recreation/Open Space	88.5	3.2
Subtotal Parks/Recreation/Open Space	88.5	3.2
	5,582	
Total	**2,791.21**	**100**
Source: SCAG Existing Land Use 2000		

HOUSING

In the 1990 Census, 56 percent of the total units in the City were renter-occupied and 44 percent were owner-occupied. For condominiums, 74 percent were owner-occupied and 26 percent were renter-occupied.

In 2000, approximately 62% of the total dwelling units were apartments and condominiums, and 37% were single family houses. City records indicate that approximately 82% of the multifamily residential units were apartments and 18% were condominiums (City of Beverly Hills Housing Element 1998-2005).

As of January 1, 2000 there were a total of 15,890 dwelling units in the City. Approximately 63 percent were multi-family residential units, and 37 percent were single family detached units.

The City's current Housing Element includes an assessment of housing needs for the period of 2006 - 2014. For this period, the State and the local Metropolitan Planning Association (MPO - the South Coast areas MPO is the Southern California Association of Governments or SCAG") has provided the number of gross new residential housing units that the City must plan for. This number is call the "Regional Housing Needs Assessment", or "RHNA" (*pronounced "rhee-nah"*). The community's "Regional Needs Housing Allocation" numbers are as follows. Although, the State and region require the City to plan for additional housing units, planning for those units will not result in an increase in housing density not included in the City's General Plan. The following chart 7 illustrates the housing the city must plan for based on population growth estimates.

Chart 7. New Gross Housing Units the City Must Plan For

Number of Units to Plan for Based on Affordability				
(Median Household Income (MHI) for Los Angeles County)				
	Very Low (50% and below)	Low (51–80%)	Moderate (81–120%)	Above Moderate (Greater than 120%) – e.g. "Market-Rate"
1998-2005 RHNA Numbers	35	42	40	139
Units Created (Net)	0	0	0	222
Carry-Over	35	42	40	0
New 2006-2014 RHNA Numbers	111	71	77	178
Total 2006-2014 RHNA Numbers (carry-over + new)	**146**	**113**	**117**	**178**

SOURCE: City of Beverly Hills, Community Development Department

Housing Costs

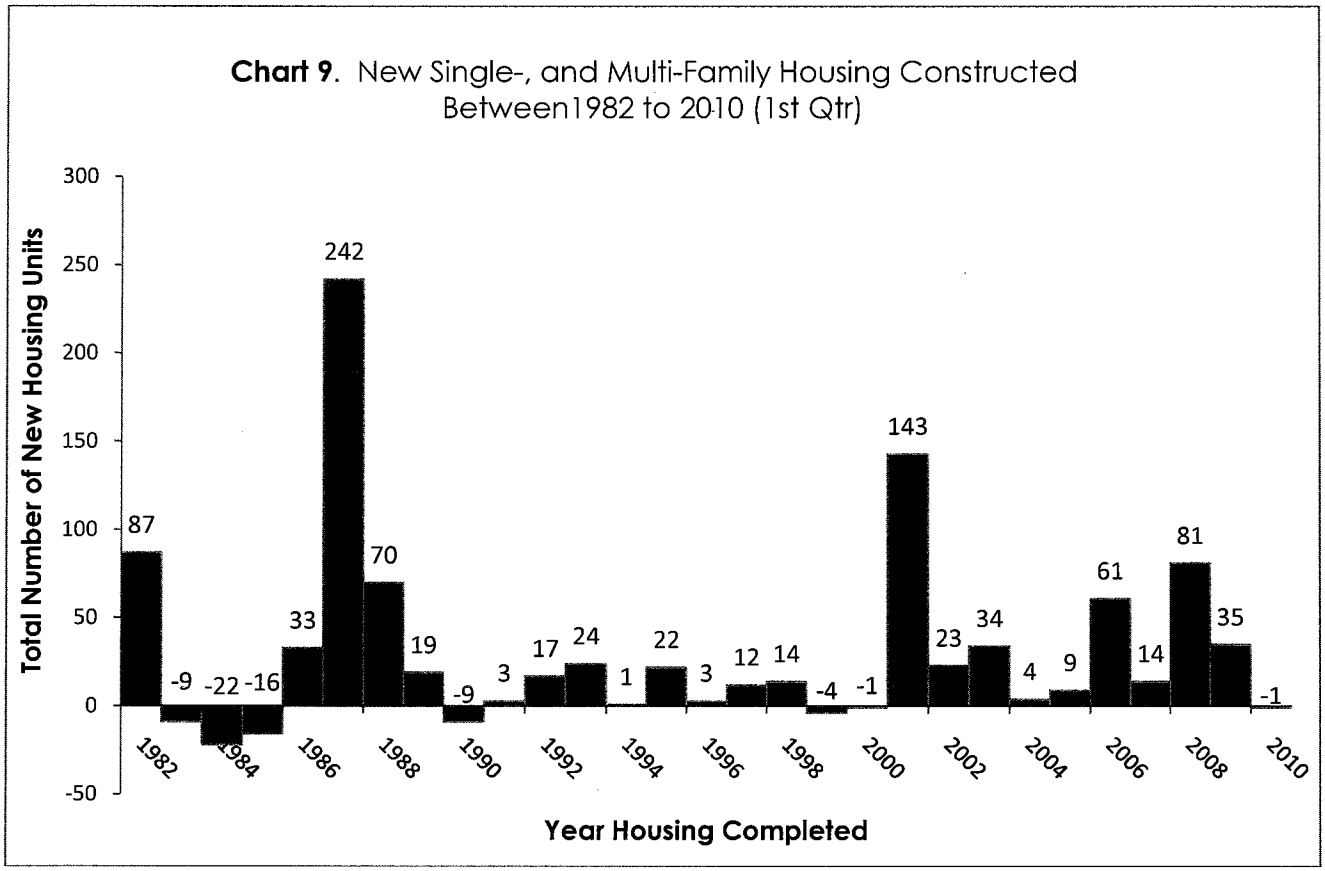
In 2009, housing prices were still high, even though the national and regional housing markets had experienced large declines in the value of residential properties. The following Chart 8 Illustrates home sales in the City for 2009.

Chart 8. City of Beverly Hills Home Sales

City of Beverly Hills Home Sales, 2009 – Single-Family and Condominiums		
Zip Code	Number of Sales	Median Price
Single-family Homes		
90210*	212	$2,775,000
90211	36	$1,335,000
90212	24	$1,800,000
Condominiums		
90210	26	$830,000
90211	24	$680,000
90212	21	$740,000
SOURCE: DataQuick Information Systems (2009)		

Development Trends

Since the City is built-out, in order to construct new homes, existing housing must first be demolished. Construction of new single family homes, apartments and condominiums in the City over the last 28 years has varied annually, with annual housing production reaching as much as 242 new units in 1987, and minus 22 units in 1984 (more homes were demolished this year and constructed). Chart 9 illustrates how housing production has fluctuated in the City since 1982.



On average, the number of new units constructed in the City between 1982 and 2010 has been 30 new units per year. Throughout this time period however, the annual number of new units created has fluctuated. For instance, the average annual number of new units created between the years of 2004 and 2010 was 29, while the average number of units created per year between 1982 and 1993 was 36 new units, and the average number of units created per year between 1994 and 2003 was 24. Chart 10 summarizes the average number of new housing units for each of these time periods:

Chart 10. Average New Residential Units Created Annually

1982-1993	36
1994-2003	24
2004-2010(1st Qtr)	29

Charts 9 and 10 suggest that the number of new homes being constructed in the City fluctuates based on local development cycles, and that the local housing development cycles are decreasing over time. A decrease in new housing development would be expected, given that residential development in Beverly Hills began nearly a century ago with the major housing development period occurring prior to 1960.

COMMUNITY DEVELOPMENT PROGRAMS

The City's Office of the City Manager administers a number of programs to meet the housing needs of the community. These programs are contracted out to local service providers and funded through Community Development Block Grants (CDBG). Programs funded through the City's CDBG funds are as follows: (City of Beverly Hills Housing Element 1998-2005 (pp. 7-8).

Handyworker Program (CDBG)

During the period running from January 1, 1998 through June 30, 2000, 90 existing dwelling units occupied by very low or low income households received rehabilitation work under this program. Under this program, residents can also retrofit their homes to meet current seismic building standards. The Handyworker program is funded by a Community Development Block Grant (CDBG) received from Los Angeles County.

Senior Homeshare (General Fund) and Senior Case Management (CDBG)

During this same period, 426 persons of all income ranges (with a majority of 80% being at or below 80% of Los Angeles County median income) received assistance. A total of 380 Section 8 rental certificates were issued or recertified. Most of these certificates are used by the residents of a 150-unit HUD Section 202 senior housing project.

Assistance to Homeless Persons (CDBG)

Assistance has been provided in the form of grants to service agencies to help with counseling, meals, medical needs, etc. Grants were provided to two nonprofit organizations to partially fund two homes shelters constructed and inter-jurisdictional efforts, and an outreach program to contact and provide assistance to homeless people on the street was implemented

SECTION 3

RISK ASSESSMENT

The goal of mitigation is to reduce the future impacts of a hazard. Hazards can cause property damage, disruption to economics, and force the expenditure of large amounts of public and private funds to assist with recovery. However, mitigation should be based on risk assessment. Risk assessment is measuring the potential loss from a hazard event by assessing 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. A risk assessment consists of three major components: hazard identification, vulnerability analysis and risk analysis.

FEDERAL REQUIREMENTS FOR RISK ASSESSMENTS

Recent federal regulations for hazard mitigation plans outlined in 44 CFR Part 201 include a requirement for risk assessment. This risk assessment requirement is intended to provide information that will help communities to identify and prioritize mitigation activities that will reduce losses from the identified hazards. There are hazards profiled in the mitigation plan, including earthquakes, earth movements including landslide, flooding, fires (including wildland and structural), wind storms and terrorism. The Federal criteria for risk assessment and information on how the City of Beverly Hills Hazard Mitigation Plan meets those criteria are outlined Chart 11 below.

Chart 11. Federal Criteria for Risk Assessment

Section 322 Plan Requirement	How is this addressed?
Identifying Hazards	Each hazard section includes an inventory of the best available data sources that identify hazard areas. The City developed maps identifying the location of the hazard in the City which appear throughout the plan and are listed in the table of contents.
Profiling Hazard Events	Each hazard section includes documentation of the history, and causes and characteristics of the hazard in the City which appear in the "history" section under each of the hazards in Part II of the plan.
Assessing Vulnerability: Identifying Assets	The "hazard identification" and "risk assessment" sections under each hazard in Part II of the plan provides a summary of the vulnerability assessment of each hazard and where data is available, contains 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 and if data is available, the economic and physical losses, are discussed under the "What is susceptible to…" section under each hazard in Part II of the plan. Vulnerability assessments have been completed for the hazards addressed in the plan, and quantitative estimates were made for each hazard where data was available.

Assessing Vulnerability: Analyzing Development Trends	The City of Beverly Hills Community Profile Section of this plan provides a description of the development trends in the City, including the geography and environment, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns.

WHAT IS RISK ASSESSMENT?
The City conducted a risk assessment by soliciting City Staff and community input as demonstrated by the following actions.

Hazard Identification
The Steering Committee discussed all possible natural hazards that may affect the City of Beverly Hills. Several sources participated in assessing which hazards are most likely to occur within the City of Beverly Hills and which ones would be most significant. Weighing the history, the probability, and the magnitude of each hazard to the City, the Steering Committee and Project Coordinators chose to incorporate the following natural hazards into the Mitigation Plan:

- Earthquake
- Earth Movement (Landslide/Debris Flow)
- Flood (including Reservoir Failure)
- Fire (including Wildland and Structural Fire)
- Windstorm
- At the request of the City Manager and the Police Chief, Terrorism was also added.

Community
In 2004, staff and community members were asked to rank the hazards list from most likely to least likely to occur in the City of Beverly Hills. The following is the tabulation of those polled:

1. Earthquake
2. Terrorism
3. Fire
4. Flood
5. Land Slide
6. Wind Storm

A sample of the survey form is attached in Appendix C.

Earthquake and Wildfire tied in first to be the likely and most devastating hazards to occur within the City of Beverly Hills. Based on these three assessments and the Steering Committee approve the top three hazards to the City of Beverly Hills are as follows: Earthquakes, Fires including wildland and structural fires, and Terrorism.

Because of the historical occurrence of these hazards to Southern California, the Steering Committee decided a reevaluation of hazards was not warranted for this update and the same hazards were studied and updated for the 2010-2015 HMP.

OTHER NATURAL DISASTERS

There are a number of possible disasters that can happen at any given time, at any given place. However, based on historical analysis the probabilities were narrowed down to five natural and one manmade disasters that are most common or likely to occur within the City of Beverly Hills. The following two natural disasters are not ruled out as possibilities, but are categorized as not very likely to occur.

Natural

Tsunami

A tsunami has never occurred within the city of Beverly Hills. Although the city enjoys a close proximity to the ocean, there is no record of a Tsunami or repercussions from a Tsunami. State modeling data shows the City of Beverly Hills would sustain no water if a Tsunami hits the Southern California Coast, and would have little to no affect on the city.

Drought

The region of Southern California is currently undergoing a six year drought however there are no accounts that indicate a serious threat to life or property due to a drought within the city.

Manmade

Terrorism

The only manmade disaster that is included in the plan for the City of Beverly Hills is terrorism. The City has been preparing diligently to prevent this type of catastrophe. The following are possibilities, as all disasters are, but the likelihood based on history and the affect they would have on life or property have been taken into consideration.

Power Outage

Power services are provided to the city by Edison International. Power outages can occur whenever there is a severer disruption to the power lines or grid. For instance during a severe storm, an earthquake and/or wildfire. The city is equipped with backup generators in case of a power outage. City buildings, including the Fire, Police, Public Works and City Hall are backed by fully ready and capable generator in case the power source is disrupted.

Power outages do occur in the city whether associated with a disaster or not. Edison's aging infrastructure often causes power outages within sections of the city. Edison has and continues to work to replace this infrastructure thus causing a decrease in outages.

Aircraft Crash

The airports nearest to the City of Beverly Hills, which handle the greatest amount of air traffic, are Santa Monica Airport, Los Angeles International Airport, Long Beach Airport, John Wayne Airport, Ontario Airport, and Burbank Airport. The City has recently seen an increase of aircraft over the City however no commercial airlines fly over the city. Most of these aircraft are small airplanes or helicopters departing from or landing at Santa Monica Airport. There is no record of a major plane crash within the city, except in 1946 when Howard Hughes once crashed a small engine plane in the City.

Civil Unrest
Though Los Angeles County experienced a Civil Unrest in 1992, the City of Beverly Hills suffered no loss of life or property. There is only one history of repeated civil unrest within the City of Beverly Hills which is addresses more thoroughly in the Terrorism section of this plan.

Hazardous Material Accidents
The City of Beverly Hills could be affected by hazardous materials incidents. The spills/releases of material can result from both stationary and mobile sources. The level of exposure from stationary sources is considered to be very low, due to the types of business and industry conducted within the City. The exposure to the City from mobile sources is slightly higher, due to the types of thoroughfares within the City, Santa Monica Blvd., which crosses through the center of the City. There is no record of a hazard material spill or incident in the City. Because of the low probability and the lack of mitigation need the Steering Committee did not address this disaster.

PROFILING HAZARDS
This process describes the causes and characteristics of each hazard, how it has affected City of Beverly Hills in the past, and what part of the City of Beverly Hills'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 and City's vulnerability, see the appropriate hazard chapter.

ASSESSING VULNERABILITY, ESTIMATING POTENTIAL LOSSES, AND INVENTORYING ASSETS
Assessing vulnerability is a three step process. First, we must identify existing structures and critical facilities that are located within the hazard area. Government critical facilities are of particular concern because these buildings provide essential products and services to the general public that are necessary to preserve the welfare and quality of life in the City and to fulfill important public safety, emergency response, and/or disaster recovery functions. The list of government critical facilities has been identified and are listed as follows. The City of Beverly Hills has mitigated or will be mitigating most of the issues identified in these government critical facilities.

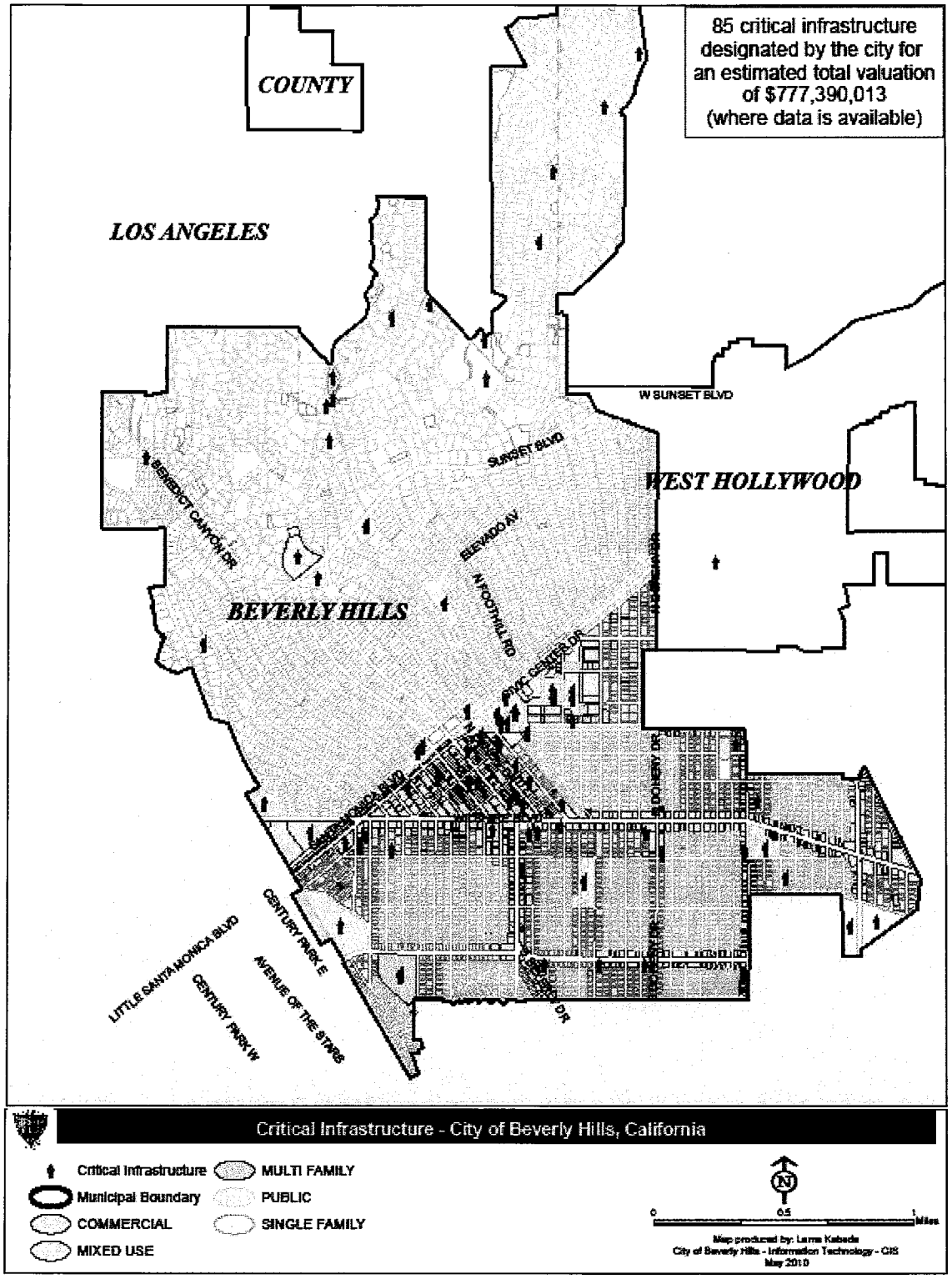
Once existing structures are identified, the plan includes an estimate of losses for the identified asset. Estimating potential loss involves assessing the damage, injuries, and financial costs likely to be sustained in a geographic area over a given period of time. This level of analysis involves using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

Regarding repetitive loss properties, FEMA has classified the City under Zone "C", which classifies the City as an "area of minimal flood hazard". Thus the city does not have severe flooding issues and has no repetitive loss properties.

CRITICAL FACILITIES AND INFRASTRUCTURE

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. The list and maps on the following pages illustrate the critical facilities, essential facilities, public infrastructure, and emergency transportation routes within the City of Beverly Hills. The City has identified a total of 85 public and private critical facilities, with an estimated valuation over $777 million, in the City. Map 4 illustrates a combination of public and private critical facilities.

Map 4. Public and Private Critical Facilities



GOVERNMENT FACILITIES

The following is a list of government owned Critical Facilities, as identified by the Office of Emergency Management in conjunction with Community Development and Public Works. Estimated valuation for these buildings is over $157 million dollars and Map 5 illustrates the following publicly owned Critical Facilities.

Roxbury Park
Size: 15900 sqft.
Facility Description: Use: Recreation facility and emergency shelter
Estimated Value: $2,250,000
Location:
471 S. Roxbury Drive,
Beverly Hills, CA 90210

Beverly Hills City Hall
Government Facilities
Size: 68000 sqft.
Facility Description: Uses: Administration and General Government
Current Value: $13,297,000
Location:
455 N. Rexford Drive,
Beverly Hills, CA 90210

Operations Service Center
Government Facilities
Size: 68000 sqft.
Facility Description: Use: Vehicle and Facilities repair, fuel, Public Works operations support
Estimated value: $13,482,000
Location:
331/333 N Foothill Road,
Beverly Hills, CA 90210

La Cienega Park
Government Facilities
Size: 9400 sqft.
Facility Description: Use: Recreation facility and emergency shelter
Estimated Value: $13,953,000
Location: 8400 Gregory Way,
Beverly Hills, CA 90210

Roxbury Park
Size: 15900 sqft.
Facility Description: Use: Recreation facility and emergency shelter
Estimated Value: $2,250,000
Location:
471 S. Roxbury Drive,
Beverly Hills, CA 90210

Beverly Hills City Hall
Size: 68000 sqft.
Facility Description: Uses: Administration and General Government
Current Value: $13,297,000
Location:
455 N. Rexford Drive,
Beverly Hills, CA 90210

Operations Service Center
Size: 68000 sqft.
Facility Description: Use: Vehicle and Facilities repair, fuel, Public Works operations support
Estimated value: $13,482,000
Location:
331/333 N Foothill Road,
Beverly Hills, CA 90210

La Cienega Park
Size: 9400 sqft.
Facility Description: Use: Recreation facility and emergency shelter
Estimated Value: $13,953,000
Location: 8400 Gregory Way,
Beverly Hills, CA 90210

Fire Headquarters Station
Size: 45000 sqft.
Facility Description: Use: Fire Operations and Ad ministration
Estimated Value: $11,332,000
Location:

445 N. Rexford Drive,
Beverly Hills, CA 90210

Fire Station #2
Size: 6300 sqft.
Facility Description: Use: Fire operations
Current Value: $1,801,000
Location:
1100 N. Coldwater Canyon Drive,
Beverly Hills, CA 90210

Fire Station #3
Size: 14000 sqft.
Facility Description: Use: Fire operations
Current Value: $1,750,000
Location:
180 S. Doheny Drive,
Beverly Hills, CA 90210

Police Department
Size: 92000 sqft.
Facility Description: Use: Police operations and administration
Estimated Value: $27,420,000 (parcel value)
Location:

Library
Size: 31,897 sqft.
Facility Description: Use: Public Library
Estimated Value: $27,420,000 (parcel value)
Location:
9355 Civic Center Way
Beverly Hills, CA 90210

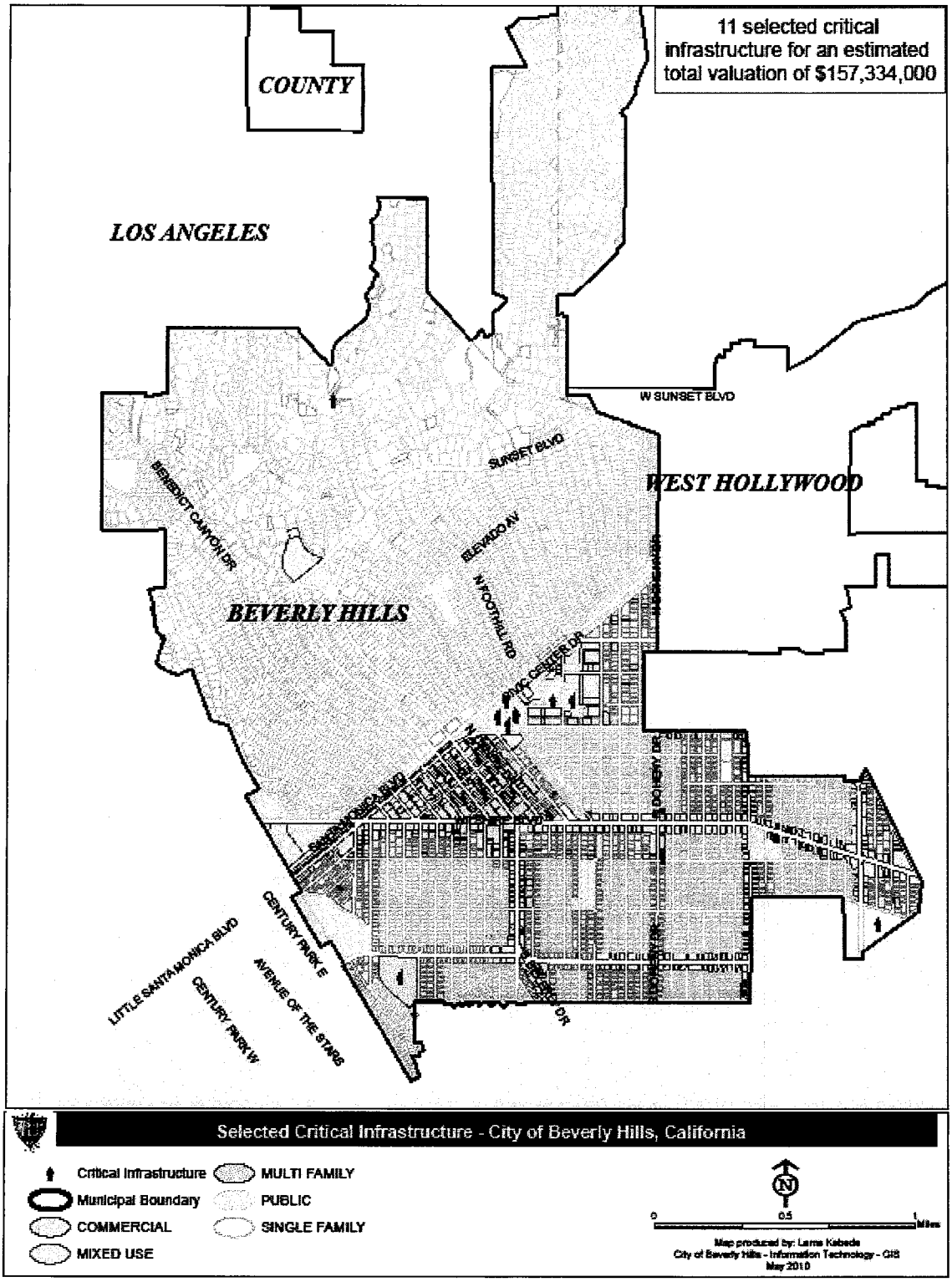
464 N. Rexford Drive,
Beverly Hills, CA 90210

Public Works Facility
Size: 43000 sqft.
Facility Description: Use: Public Works operations, administration and water treatment plant
Estimated Value: $20,000,000
Location:
345 Foothill Road
Beverly Hills, CA 90210

Information Technology Center
Size: 31,897 sqft.
Facility Description: Use: Public Works operations, administration and water treatment plant
Estimated Value: $27,420,000 (parcel value)
Location:
9355 Civic Center Way
Beverly Hills, CA 90210

Note: Police Department, Library and IT Center share the same parcel and building value was assessed as one.

Map 5. Public Critical Facilities



CRITICAL INFRASTRUCTURE

Roadways and Bridges

Interstate Highway No. 2, (Santa Monica Boulevard) is the only highway traversing through Beverly Hills. This section of Highway 2 is constructed on street grade and has no elevated bridges. There are 143 miles of public streets and alleys in Beverly Hills. There are four major arterials in Beverly Hills, Sunset, Wilshire, Santa Monica and Olympic Boulevards. These major streets are reconstructed or resurfaced within the last 10 years. All the public streets and alley are old and they are maintained under the City's Pavement Management Program. In the event that the street is damaged in a disaster, the roadway will be repaired in a timely manner by the City's Street Maintenance division or outside Contractor.

The City of Beverly Hills also has identified non-government facilities that are critical to the City of Beverly Hills such as the hotels, schools (which will complete a separate plan), restaurants and other large businesses in the City. These facilities are not listed here but it is recognized that these businesses are essential to the well being of the City and mitigation efforts surrounding these businesses and buildings are strongly encouraged. A list of these buildings can be found in the Disaster Plan and in the Administrative Services Department. A list of business tax revenue is available if needed.

POTENTIAL EFFECTS OF HAZARDS ON THE BUILT ENVIRONMENT

Subtle but very measurable changes occur constantly in all communities. These changes can increase the degree of loss that could occur due to a major disaster. A number of factors contribute to this potential increased degree of loss:

- As the population increases, a greater number of people are susceptible to risks within a defined geographic space.
- Inflation constantly increases the worth of real property and permanent improvements.
- The amount of property owned per capita increases over time.

HOW BUILDING VALUES WILL BE AFFECTED

The City's building stock's assessed valuation is significant. In addition to the potential loss of buildings (brick and mortar), indirect losses from specific occupants can also be anticipated. For example, "business interruption," which is not usually discussed in damage reports, may have been the largest loss caused by the Northridge earthquake.

Safety services and administrative costs associated with closed structures could be considerable and would depend in part on owner cooperation. The City would also incur costs for the cleanup of public property.

COMMERCIAL STRUCTURE VALUATION

The City's commercial stock consists of approximately 718 parcels. For Year 2009, valuation of the commercial stock is approximately $2,865,712,250. Other factors to consider include:

- Less-affected buildings in areas of substantial damage will lose value due to the loss of neighborhood value.
- When a commercial structure is destroyed, the City loses much of the property tax on that parcel for a significant period of time until a replacement building is in place.

- Sales tax is lost. If a professional office structure is constructed to replace a retail structure, the sales tax would not be regained.

MULTI-FAMILY RESIDENTIAL STRUCTURES

The City has approximately 3,088 multi-family residential parcels. Approximately 95% of these were constructed prior to the adoption of the 1986 Code standards. This construction type has a valuation estimated to be $1,100,271,740. The City estimates that approximately 70% of multifamily residential structures are considered to be potentially at risk. Construction types include the following:

- **Unreinforced Masonry structures.** In 1989, the City enacted a mandatory retrofit program. Each of the 90 buildings identified under this program has been strengthened.

- **Wood Frame Buildings**. Most early wood frame structures are not connected to their foundations with anchor bolts which could allow buildings to slide off their foundations. Others are constructed on short wood studs between the first floor and the foundation using cripple stud walls. This type of construction can collapse and topple, dropping the building to the ground. There are over 1,000 buildings with either of these potential deficiencies. Approximately 6,500 dwelling units, housing over 12,000 residents, are potentially at risk.

- **Wood Frame Buildings with Soft Story and/or Tuck-under Parking.** Many multi-family residential buildings have an at-grade parking level directly under the building which is supported on small round or square columns. Prior to the 1976 Code, there were no provisions to control the amount of movement of these support columns. Excessive movement of these columns can result in collapsed garages. Injuries, loss of life and a partial or complete building collapse could occur. Damage of this type resulted in deaths at the Northridge Meadows apartment building in the 1994 Northridge earthquake. Approximately 450 buildings with this weakness have been identified in the City. These buildings contain 2,315 dwelling units, housing approximately 4,400 residents.

TOTAL NUMBER OF BUILDINGS IN BEVERLY HILLS

The total number of Residential Housing Units per 2000 U.S. Census: 15,855. Of this amount, 6,000 are single family units and 2,191 (including 626 garage structures) are multi family units. There are 1,565 commercial buildings (many of which contain multiple tenants). The total value of buildings in Beverly Hills: $8.2 billion (9946 parcels). (Note: This number is based on the most recent Los Angeles County Assessor's valuation as of the date this report was written.)

There are a total of 9946 parcels, with many buildings and structures located within hazard zones, in the City of Beverly Hills. The estimated total value of all buildings (per the available data) is $8,296,289,219. The following information assesses a fiscal amount on the properties.

BUILDINGS AND VALUATION IN HAZARDS AREAS [1]

The City of Beverly Hills contains a significant amount of property in hazard areas. The following estimated figures are based on the City's most recent information from the Los Angeles County Tax Assessor's Office. The methodology for creating the assessments was using Los Angeles County Tax Assessor's building values, tax year 2009. Since this is hazard loss estimation, land values have not been considered. Chart 12 describes the building value and critical infrastructure within hazard areas.

Chart 12. Building Value in Hazard Areas

Hazard	Num of Parcels	Land use	Total Building Value	Critical Infrastructure
Fire	1628	Commercial, Single Family & Public	$ 1,597,169,045.00	15
Flood	0	n/a	$0.00	0
Landslide	666	Single Family & Public	$ 533,438,127.00	2
Liquefaction	3150	Commercial, Apartment, Multi Family, Single Family & Public	$ 1,679,984,517.00	12

Very High Fire Hazard Severity Zone (VHFHSZ).
Approximately 1628 parcels are located within this zone.
Estimated valuation: $1.6 billion.

Flood Zone
The City has no designated flood zones. The City previously had two locally designated areas with flooding conditions in the southeast sector of the cities of Beverly Hills. However, the Los Angeles County Department of Public Works in 2005 completed a massive storm water relief upgrade Hollyhills Unit 7 drainage system and the City has not experienced flooding in this area since this project was completed.

Landslide Areas
666 parcels fall within the landslide areas with an estimated total valuation of $533 million.

Liquefaction Areas
3150 parcels fall within the liquefaction areas with an estimated total valuation of $1.7 billion.

**Note: Given the uncertain nature of a terrorist attack on a specific building, infrastructure, etc. a specific valuation number cannot be provided. **

[1] Valuation calculation was derived as follows: square footage of existing buildings (based on the most current Los Angeles County Assessor Data for square footage) x $150/s.f. replacement cost. Replacement cost was provided in addition to the assessor's valuation due to fluctuations in real estate prices. While $150/s.f. is a reasonable assumption for construction costs, many buildings in Beverly Hills have a sq. ft. construction cost of $400 or more. (Note: This Valuation estimate is for improvements only and does not include land value.)

CAPABILITY ASSESSMENT

The following practices, ordinances and policies current steps practiced by the City of Beverly Hills to facilitate the mitigation process. The ordinances and codes are used in a proactive manner to stand as preventative measures.

Storm Water Management Ordinances: Yes
Stream Management Ordinances: No
Zoning Management Ordinances: Yes
Subdivision Management Ordinances: No
Erosion Management Ordinances: No
Floodplain Management Ordinances: No
Elevation Certificates Maintained: Yes
National Flood Insurance Program Community: No**
Land Use Plan: Yes
Land Use Plan Last Update: 2010
Community Zoned: Yes
Established Building Codes: Yes
Building Codes Last Updated: 12/19/2002
Type of Building Codes: California Building Code
Local Electric Utilities: Southern California Edison
Local Water Utilities: City of Beverly Hills
Local Sewage Treatment Utilities: City of Los Angeles
Local Natural Gas Utilities: Southern California Edison
Local Telephone Utilities: Pacific Bell
Fire Insurance Rating: ISO Rating, Class 1
Fire Insurance Rating Date: 10/03/2008

***FEMA has classified the City under Zone "C", which does not require mandatory flood mitigation enforcement. Properties are therefore not required to carry flood insurance.*

ASSESSING VULNERABILITY

The last step in assessing the City's vulnerability to hazards is to analyze development trends in the city – This process provides stakeholders a basis in making decisions on the type of mitigation approaches to consider and the locations in which mitigation should be approved.

This plan provides comprehensive description of the character of City of Beverly Hills. Information includes the geography and environment, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns. Analyzing these components of City of Beverly Hills helped in identifying potential problem areas, and serves as a guide for incorporating the goals and ideas contained in this mitigation plan into other community development plans.

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

throughout the hazard sections provide recommendations to collect further data to map hazard locations and conduct hazard assessments.

Summary

Hazard mitigation strategies can reduce the impacts concentrated around businesses, public infrastructure, and critical facilities. Hazard mitigation for industries and employers may include developing relationships with emergency management services and their employees before disaster strikes, and establishing mitigation strategies together. Collaboration among the public and private sector to create mitigation plans and actions can reduce the impacts of hazards.

SECTION 4

MULTI-HAZARD MITIGATION STRATEGIES

This section describes the framework that focuses the plan on developing successful mitigation strategies. The framework is made up of three parts: the Mission, Goals, and strategies. The Steering Committee and the Project Coordinators developed and approved the mission, goals and strategies of the plan. Plan goals were approved during the 2004 public process. The goals were reviewed by Steering Committee in 2010 and deemed appropriate and true to for the updated plan in 2010.

MISSION

The City of Beverly Hills Hazard Mitigation Plan is to promote sound public policy and programs designed to protect the public, critical facilities, infrastructure, private and public property and the environment from natural and manmade hazards. This will be achieved by developing and implementing this plan to guide the City towards creating and maintaining a safer more sustainable community.

GOALS

The plan goals describe the overall direction that City of Beverly Hills agencies, organizations, and citizens can take to minimize the impacts of hazards. The Plan goals help to guide direction of future activities aimed at reducing risk and preventing loss from hazards. The goals are stepping-stones between the broad direction of the mission statement and the specific recommendations that are outlined in the strategies. The following are the plan goals.

PLAN GOALS

To Protect Life, Property, Environment

Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to hazards.

Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards.

Encourage preventative measures for existing and new development in areas vulnerable to hazards.

Public Awareness

Develop and implement education and outreach programs to increase public awareness of the risks associated with hazards.

Develop and implement education and outreach programs to increase public awareness of the mitigation measures associated with hazards.

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

Partnerships and 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, county, and regional hazard mitigation activities.

Integrate the Safety Element of the General Plan into the Hazard Mitigation Plan.

Emergency Management

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

Update current ordinances, make recommendations for City guidelines, codes, and permitting process and establish new ordinances that support mitigation.

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

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

PREVIOUS HAZARD MITIGATION STRATEGIES

The following Chart 13 summarizes the status of Hazard Mitigation Strategies for the City of Beverly Hills 2004-2009. The chart contains the coordinating departments, the status and the plan goals each hazard addressed. If mitigation strategies were not completed, a brief explanation is given following the chart.

Chart 13. 2004-2009 MITIGATION STRATEGIES OVERVIEW CHART STATUS

Lead departments denoted in **BOLD**

2004 MITIGATION STRATEGIES STATUS **Lead departments denoted in BOLD**							
				Plan Goals Addressed			
Hazard	Mitigation Strategy	Responsible Department	Status	To Protect Life, Property, Environment	Public Awareness	Partnerships and Implementation	Emergency Management
Earthquake	**1. Earthquake Mitigation** Evaluate Mel Green Report	Community Development	Completed 2005	X	X	X	X
Earthquake	**2 Seismic Modifications for Water System Reservoirs and Pump Stations** Improve seismic deficiencies by retrofitting piping, valves, tanks, and pump stations	Public Works	In progress	X			X
Earthquake	**3. Operations Service Center Building Mitigation**	Public Works	Completed 2006	X			
Earthquake	**4. Update the Safety Element of the General Plan** Update the Safety Element of the General Plan	Planning	Completed 2010	X			X
Fire	**5. FireWise Program** To create a sustainable balance that will allow communities to live safely while maintaining environmental harmony in a wildland/urban interface setting by implementation of Firewise Program.	**Public Works**, Engineering & Trans., Fire	Completed; Firewise program started 2005	X	X	X	X
Fire	**6. Wildland Interface Task Force** Establish a Wildland Interface Task force to implement Firewise programs.	Fire	Completed	**X**	X	X	X
Fire	**7. Code Update** Review and update existing city codes to reflect recommendations set forth by the FireWise assessment and Joint Wildland Interface Task Force.	**Community Development, Fire**	In progress	**X**	X	X	X

Hazard	Mitigation Strategy	Responsible Department	Status	Plan Goals Addressed			
Fire	**8. Zone 9 (Closed water Pressure Zone) Hillside Fire Protection** To increase water pressure and access to water in case of an emergency. The project will increase water supply reliability and capacity in Zone 9 for conflagrations in the vicinity of Coldwater Canyon and areas contiguous to the City and the City of Los Angeles' Franklin Canyon Reservoir.	Fire	In progress	X		X	X
Terrorism	**9. Police Officer Training** - Train and equip all police officers to operational level	Police	Completed	X			X
Terrorism	**10. First Responder** - Train and equip all first responders and field personnel to awareness level	**Police,** Office of Emergency Management (OEM), All Departments	Completed		X		
Terrorism	**11. Risk Assessment** - Assist City staff with critical facilities assessment	**Police**, OEM	Completed		X		
Terrorism	**12. Target Hardening** Upgrade city facilities to improve security	**Police,** OEM, Community Development, Engineering & Trans., Project Administration	Completed 2006	X			X
Terrorism	**13. Terrorism Liaison** - Participate in Terrorism Early Warning Group	**Police, Fire**	Completed 2004 and On-going participation	X			
Terrorism	**14. Cyber-Terrorism Prevention** - Upgrade Information Technology Security infrastructure and upgrade disaster recovery	Information Technology	In progress; First round of upgrades complete.	X		X	X
Terrorism	**15. Terrorism Public Awareness** - Provide community outreach and education to individuals and businesses concerning actions they can take in preparation for possible terrorist events.	**Police**, OEM, Community Relations	Completed 2005 & On-going			X	X
Flood	**16. Storm Drain System Improvements** Locate facilities throughout the city that will facilitate mitigation deficiencies defined in the Storm Drain System Master Plan.	**Public Works** , Engineering & Trans.	Will not be completed	X	X		X
Flood	**17. Flood Ordinance Revision** Update the Flood Ordinance	**Engineering & Transportation** Community Development/ Building & Safety	Completed 2009		X		X

Hazard	Mitigation Strategy	Responsible Department	Status	Plan Goals Addressed			
Landslide	**18. Geotechnical Investigation** Conduct additional geotechnical investigation to update the landslide hazard maps in the City of Beverly Hills to improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	**Engineering& Transportation,** Community Development	Will not be completed	X			
Landslide	**19. Hillside Development Construction** Encourage application of designs and construction technologies for steep slopes to reduce the potential adverse impacts from development	**Engineering and Transportation,** Community Development	Completed			X	
Landslide	**20. Public Outreach of Landslide.** Provide information to educate residents to prevent landside on hillside slopes.	**Engineering & Transportation,** OEM, Communication Department, Public Works	Completed 2010		X		
Windstorm	**21. Public Awareness Campaign** Provide public education materials to City of Beverly Hills residents and all School District staff, parents and age-appropriate students with mitigation materials pertaining to the protection of life and property before, during, and after a windstorm.	**Recreation & Parks,** Communications and Marketing, OEM	Completed 2008	X	X	X	
Windstorm	**22. Tree pruning and Fire Code Sections** Create local City and utility awareness of tree pruning and Fire Code Sections relevant to wind-resistant utility operations.	**Fire**, Community Development, Public Works, OEM, Recreation & Parks, Engineering & Trans.	In progress- estimated 2011			X	
Windstorm	**23. Equipment Testing** Encourage Critical City Facilities to purchase and/or test backup power facilities for use during a power failure.	Public Works	Completed 2008 and testing is ongoing			X	
Multi-Hazard	**24. Conservation Classroom** To educate the community about water conservation so water resources are available as demands increase and/or supply decreases	Public Works	Completed 2008		X	X	
Multi-Hazard	**25. Emergency Alert System Upgrade** - To purchase, install and integrate additional equipment to make the necessary upgrades to the system so that the cable TV warning system will have the capability to notify all cable television subscribers with in the City.	Information Technology	Will not be completed - See Notes.	X	X		X

Hazard	Mitigation Strategy	Responsible Department	Status	Plan Goals Addressed			
Multi-Hazard	**26. Business Community Awareness Program -** Provide education on Hazard Mitigation and preparedness to business community.	**OEM**, Communication & Marketing	Completed 2008	X	X		
Multi-Hazard	**27. Citizen Corp -** Expand the City's citizen Corps Program	**OEM**, Fire, Police	Completed 2007		X	X	X
Multi-Hazard	**28. Emergency Evacuation Routes** Identify safe evacuation routes in high-risk debris flow and landslide areas.	**Police**, Fire, Engineering & Transportation , Public Works, OEM	Completed 2009	X			X
Multi-Hazard	**29. Alley Clearance**	**Public Works**, Recreation & Parks	Completed 2006	X	X	X	X

STATUS OF PRIOR MITIGATION STRATEGIES

The City of Beverly Hills HMP was approved in 2004 and Federal guidelines require an update every five years. Of the 29 mitigation strategies that were outlined in the City's previous 2004 -2009 hazard mitigation plan, 21 have been completed, 5 are in progress, and the remainder strategies will not be currently completed for various reasons. Since the City completed the majority of the hazard mitigation strategies, this renewal plan is updated to include new strategies. Where noted "On-Going", the City continues to provide these services and programs as a means of education and public awareness such as the Police Department provides Homeland Security information through the Neighborhood Watch programs.

The Safety Element of the City of Beverly Hills General Plan was updated on January 12, 2010 and addressed several existing and future mitigation strategies. The following provides a summary on the status of the 2004 mitigation strategies.

1. Earthquake Mitigation – Completed in 2005.

2. Seismic Modifications for Water System Reservoirs and Pump Stations – A firm was hired to begin initial design studies. After initial design studies it was determined that it would be best to replace piping, valves, tanks, and pump stations instead of the original retrofitting recommendation. Project was delayed initially because of funding constraints but construction is set to begin summer 2010.

3. Operations Service Center Building Mitigation – Completed in 2006.

4. Update the Safety Element of the General Plan – Completed in 2010.

5. FireWise Program - Firewise is a program developed within the National Wildland/ Urban Interface Fire Protection Program and it is the primary federal program addressing interface fire. In 2005 the City of Beverly Hills was recognized as a *Firewise Community USA* site. The City was honored to be only the 3rd community in California and 114 in the Nation to receive this distinction. The national Firewise Communities program is a multi-agency effort designed to reach beyond the fire service by involving homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fire - before a fire starts.

6. Wildland Interface Task Force – Completed 2006.

7. Code Update - Wildland Interface code update was completed with the 2007 California code adoption. However, Code Adoption (Update) in general is an ongoing effort and will be singled out as a separate mitigation strategy.

8. Zone 9 (Closed water Pressure Zone) Hillside Fire Protection – this strategy involves an agreement with the City of Los Angeles Department of Water and Power and has been delayed due to internal processing and procurement. Project is set to move forward.

9. Police Officer Training - Training of officers completed and training for new hires is ongoing. Includes Weapons of Mass Destruction - WMD training.

10. First Responder - Training of first responders is complete and ongoing for new hires.

11. Risk Assessment- Assessment is complete and ongoing; critical structures identified.

12. Target Hardening - City Security Program in place. Access control increased with card key access. CCTV program initiated.

13. Terrorism Liaison – Completed in 2004 and the Police Department continues to participate in the Los Angeles County Sheriff's Department Terrorism Early Warning Group.
14. Cyber-Terrorism Prevention – In 2008 the City conducted critical updates to the server and storage infrastructure. Updated electrical systems and HVAC in the Data Center for greater reliability and environmental controls. In 2009 the City strengthened network and systems security by updating the firewall system, enhancing network security with system upgrades and enhanced monitoring tools, and updating the storage area network. Planned to be completed in 2010 are an upgrade to Enterprise Storage System and replacement of Library Tape Open system.
15. Terrorism Public Awareness – Education is On-going through Neighborhood Watch programs.
16. Storm Drain System Improvements – Due to financial constraints, this mitigation strategy could not be completed.
17. Flood Ordinance Revision - The study has been completed and indicates that the flooding potential due to accumulating stormwater flow in the streets has been abated by construction of the Los Angeles County La Cienega stormwater improvements. Thus, it was decided the ordinance will be repealed in the near future.
18. Geotechnical Investigation - The 2004 maps appear to be based on the California Department of Conservation Seismic Hazard maps, which in turn appear to be based on the steepness of slopes in the hazard areas. It seems likely that any significant improvement over these maps would require additional geotechnical investigation, which could involve a review of soil reports in these areas, but may require other primary observations or other research. A detailed study would require greater funding than $30,000. Due to budget constraints this will not be completed.
19. Hillside Development Construction - Public Works and Community Development departments have been working together. The City has completed the multi-departmental development review process which is in continual improvement at this time. Additionally on-going, General Plan amendments on January 12, 2010 included policies addressing this mitigation strategy.
20. Public Outreach of Landslide – Completed 2010
21. Public Awareness Campaign – Completed 2008
22. Tree pruning and Fire Code Sections - The City is currently considering view preservation regulations for the Trousdale and Hillside areas, focused on landscaping and plant material issues. The study may result in a plant material palette and landscape maintenance standards that can reduce fire danger and potential interfere with utility infrastructure and is expected to be completed 2011.
23. Equipment Testing – Completed 2008 and ongoing. All critical facilities have been equipped with backup generators and are tested on a regular basis by the Department of Public Works and appropriate records kept.
24. Conservation Classroom – the room was constructed in 2006 and public education continues.
25. Emergency Alert System Upgrade – California State law changed since publishing of the 2004 Hazard Mitigation Plan and this system is currently precluded by law.
26. Business Community Awareness Program – Outreach to the Business Community was a focus during 2006. Creating a culture of preparedness in the City's business

community workshop was held for major businesses in the community. Staff held presentations at the City's major businesses in the City who were unable to attend. Topics that were covered include preparedness, mitigation, response and recovery.
27. Citizen Corp – Completed in 2007.
28. Emergency Evacuation Routes – Multi-hazard evacuation plans were completed in 2009.
29. Alley Clearance – program was started in 2006 and continues. Alleys are cleared four times a year and residents are informed of proper alley maintenance through literature and public announcements on local cable access channel.

HAZARD MITIGATION STRATEGIES

The mitigation plan identifies strategies developed and submitted through data collection, research, and the public participation process. Mitigation plan activities may be considered for funding through Federal and State grant programs, and when other funds are made available through the city. To help ensure activity implementation, each action item includes information on the time line and coordinating organizations.

Constraints may apply to some of the strategies. These constraints may be a lack of city staff, lack of funds, or vested property rights which might expose the City to legal action as a result of adverse impacts on private property.

HOW ARE THE STRATEGIES ORGANIZED

The strategies are a listing of activities in which City departments and citizens can be engaged to reduce risk. The strategies are organized within the following matrix, which lists all of the multi-hazard and hazard-specific strategies included in the mitigation plan. Data collection and research and the public participation process resulted in the development of these strategies. The matrix includes the following information for each of the strategies:

HAZARD	**The hazard the strategy mitigates.**
PROJECT NAME	**Name of the mitigation project/strategy.**
DESCRIPTION	**Strategy Description**
ACTION ITEM	**What actions will be completed to complete the strategy.**
COORDINATING DEPARTMENT	**The department with regulatory responsibility to address hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation. The main department responsible is in bold, the supporting departments are not.**
IDEAS FOR IMPLEMENTATION	**Each project includes ideas for implementation and potential resources, which may include grant programs or human resources.**
TIMELINE/COMPLETION DATE	**Each project includes an estimate of the time line for implementation.**

TOTAL COST	**Estimate of cost of project.**		
FUNDING SOURCE(S)	**Where the funding will be obtained.**		
CONSTRAINTS	**Constraints may apply to some of the action projects. These constraints maybe a lack of city staff, lack of funds, or vested property rights which might expose the City to legal action as a result of adverse impacts on private property**		
PLAN GOALS ADDRESSED **The plan goals addressed by each project are included as away to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins.**			
	Public Awareness		Protect Life and Property
	Partnerships and Implementation		Emergency Management

MITIGATION STRATEGIES BY HAZARD

The following are the new, detailed mitigation strategies for the City of Beverly Hills. The mitigation strategies here are organized in the following order: Earthquake, Fire, Terrorism, Flood, Landslide, Windstorm and Multi-Hazard. Strategies marked multi-hazard are projects that would mitigate multiple hazards. Chart 14 depicts the new mitigation strategies.

Chart 14.

2010 Mitigation Strategies Overview Chart

Hazard		Mitigation Strategy	Responsible Department	Timeline	Plan Goals Addressed: To Protect Life, Property, Environment	Public Awareness	Partnerships and Implementation	Emergency Management
Earthquake	1	**Reinforce Existing Buildings.** Continue to require upgrade of unreinforced masonry (URM) buildings to address any structural and nonstructural seismic deficiency of existing buildings	Community Development	2010	X	X		X
Earthquake	2	**Assistance Programs.** Develop assistance programs for senior citizens who own single-family homes to seismically retrofit their homes per current safety standards. Assistance programs should include maintaining lists of approved contractors, outreach to senior citizens and education efforts.	Community Development	2015	X			X
Earthquake	3	**Seismic data collection sampling stations.** Work with CalTech to establish more seismic data collection sampling stations inside Beverly Hills. This will significantly improve the accuracy and details of the shakemap (ground acceleration data) which eventually allows better analysis (Virtual Beverly Hills damage assessment), planning and emergency response.	Information Technology	2012	X	X	X	X
Fire	4	**Code Update.** Review and update existing city codes to reflect recommendations set forth by the FireWise assessment and Joint Wild land Interface Task Force.	**Community Development,** Fire	2014	X	X	X	X
Fire	5	**Zone 9 (Closed water Pressure Zone) Hillside Fire Protection.** Increase water pressure and access to water in case of an emergency in Zone 9 for conflagrations in the vicinity of Coldwater Canyon and areas contiguous to the City and the City of Los Angeles' Franklin Canyon Reservoir. It will also improve distribution of water supply and reduce energy costs at the Monte Cielo pump station for domestic service into Zone 9.	**Public Works,** Fire	2015	X	X	X	X
Fire	6	**Wood Roof Public Education DVD.** Educate Residents on the potential fire hazard regarding Wood Roofs.	**Fire,** Community Development	2011	X	X	X	X
Fire	7	**Firewise/Waterwise Mitigation Demonstration Garden.** Educate the community on what type of plants are both FireWise and Waterwise.	Fire, Public Works, Community Services	2013	X	X	X	X

Hazard		Mitigation Strategy	Responsible Department	Timeline	Plan Goals Addressed			
Fire	8	**Vegetation Management Public Education.** Develop public education material to the residents regarding Vegetation Management around their homes	Fire	2013	X	X		X
Fire	9	**New Development Impacts.** Review and revise the Zoning Code to reflect the general plan's policies for permitted uses and development standards.	Community Development	2015	X	X		X
Fire	10	**Fire Department Access.** Design private and public access drives and roadways to preserve and maintain Fire Department access to properties.	Community Development, **Fire**	2014	X	X		X
Fire	11	**Evacuation Route.** Develop and Educate Residents on a Citywide evacuation route during a disaster	**Police,** OEM, Fire	2013	X	X	X	X
Fire	12	**Firewise Community Board.** Evaluate and implement recommendations made by the Firewise Communities Program.	**Fire,** OEM	2015	X	X	X	X
Terrorism	13	**Critical Infrastructure Assessment.** Conduct an analysis and assessment of critical infrastructure areas and how each area interfaces with both cyber and physical components if attacked or compromised. Identify the cascade affect, if any, impacting operations should an attack or compromise occur.	Police	2011	X	X	X	X
Terrorism	14	**Network Intrusion Prevention System.** Obtain high level security system to prevent cyber terrorist attack on City systems and databases.	**Information Technology,** Emergency Management	2011	X		X	X
Flood	15	**Reservoirs Replacements and Maintenance.** Update the City's Urban Water Master Plan (UWMP) and related capital improvement programs, including monitoring its water reservoirs. Adopt state-of-the-art water monitoring systems to remotely monitor the City's water usage, leaks, and ruptures. Continue to implement existing flood mitigation activities and programs.	Public Works	2013	X			X
Flood	16	**Update Flood Ordinance.** Remove locally designated flood ordinance.	**Community Development ,** Public Works	2015	X	X	X	X
Landslide	17	**Geotechnical Investigation.** Conduct additional geotechnical investigation to update the landslide hazard maps in the City of Beverly Hills to improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	**Public Works,** Community Development	2013	X			X
Windstorm	18	**Street Tree Master Plan Phase III.** Continue the use of the STMP as a mechanism eliminating structurally defective trees thus eliminating potential damages to lives or property.	**Community Services**	2015	X			X
Multi-Hazard	19	**CERT Program Redevelopment.** Study cost effective ways to offer CERT program to the community	**Fire,** Emergency Management	2011	X	X	X	X
Multi-Hazard	20	**Emergency Management Exercises.** Conduct periodic fire emergency management exercises with City personnel and surrounding jurisdictions.	Emergency Management	Ongoing	X		X	X

Hazard		Mitigation Strategy	Responsible Department	Timeline	Plan Goals Addressed			
Multi-Hazard	21	**Building and Fire Code Updates**. Continue to update the City's building and fire codes once every three years, or whenever the State updates the California building and fire codes, to reflect the highest and best available standards for seismic design and performance of buildings and to conform to State requirements.	**Community Development,** Fire	2014	X		X	X
Multi-Hazard	22	**Inter-jurisdictional Coordination.** Continue to coordinate with and support the Los Angeles County Certified Unified Program Agency (CUPA), the Los Angeles County Fire Department, and their Health & Hazardous Materials Division (HHMD) in carrying out inspections, emergency response, enforcement, and site mitigation oversight of hazardous materials and waste	Fire	Ongoing	X	X	X	X
Multi-Hazard	23	**Joint Effort in Emergency Disaster Management.** Ensure that emergency disaster management is the mutual responsibility of all City Departments and a variety of stakeholders, including the Citizen Corp Program, Beverly Hills Unified School District, private schools, local residents, and the business community.	OEM	2013	X	X	X	X
Multi-Hazard	24	**Disaster Notification/Information Outreach.** Educate community on how to seek information during a disaster - examples: website, Telephone Notification System (TNS), Twitter, local access cable channel, hotline number	OEM	2012	X	X	X	X
Multi-Hazard	25	**Commissioner Emergency Training.** Conduct disaster preparedness for all City Commissioners in order to have commissioners prepared to assist City during a hazard event.	OEM	2014	X		X	X
Multi-Hazard	26	**Hazardous Materials Awareness.** Conduct outreach to all City residents on how to properly store and secure hazardous materials so to avoid spillage and breakage during a hazard event.	OEM	2014	X	X		X
Multi-Hazard	27	**Medical Facility Identification.** Identify all possible medical facilities in the City that are capable of providing medical services, such as triage, during a large hazard event.	OEM	2014	X	X	X	X

MITIGATION STRATEGIES BY HAZARD

The following are the detailed mitigation strategies for the City of Beverly Hills. The mitigation strategies here are organized in the following order: Earthquake, Fire, Terrorism, Flood, Landslide, and Windstorm. and Multi-Hazard. Strategies marked multi-hazard are projects that would mitigate multiple hazards.

Chart 15. Detailed Mitigation Strategies

EARTHQUAKE

Hazard	Earthquake
Project Name	**Reinforce Existing Buildings**
Strategy	Continue to require upgrade of unreinforced masonry (URM) buildings to address any structural and nonstructural seismic deficiency of existing buildings. (GP Policy S 5.3)
	Encourage property owners to reinforce and strengthen "at risk" buildings, including:
	• Buildings with tuck-under parking that constitutes a "soft-story";
	• Wood buildings with short cripple studs under the first floor;
	• Wood buildings constructed without positive connection from the foundation to the structure;
	• All pre-1981 on-ductile concrete frame buildings or "soft-story" buildings three stories or more in height; and
	Tilt-up concrete wall buildings. (GP Program 2.4)
Action Items	Continue implementation of the Hazardous Building Abatement Ordinance
Coordinating Department	Community Development
Ideas for Implementation	Develop and implement a program for property owners to reinforce and strengthen other "at risk" buildings in the City to minimize loss of life and property damage in the event of seismic or geologic hazards. (GP Policy S 5.4)
Timeline/Completion Date	2014
Total Cost	$45,000
Funding Source(s)	General Fund
Constraints	Funding

Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Earthquake		
Project Name	**Assistance Programs**		
Strategy	Develop assistance programs for senior citizens who own single-family homes to seismically retrofit their homes per current safety standards.		
Action Items	Continue to provide a full range of public services including, building permitting and safety, public safety (fire and police response and prevention), emergency preparedness and disaster response and recovery, hazardous waste response/services, solid waste collection and recycling programs, community services (parks, libraries, and recreational facilities and programs), infrastructure maintenance, human services as well as cultural resources programs within the community. (GP Program 6.1) Maintain lists of approved contractors, outreach to senior citizens and education efforts. (GP Policy S 5.6)		
Coordinating Department	Community Development		
Ideas for Implementation	Program continuation		
Timeline/Completion Date	2015		
Total Cost	$30,000		
Funding Source(s)	General Fund, enterprise funds, grants		
Constraints	Funding		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Earthquake
Project Name	**Seismic Data Collection Sampling Stations**
Strategy	Work with CalTech to establish more seismic data collection sampling stations inside Beverly Hills. This will significantly improve the accuracy and details of the shakemap (ground acceleration data) which eventually allows better analysis (Virtual Beverly Hills damage assessment), planning and emergency response.
Action Items	Project will be launched only if funding is secured by Emergency Operations Center (EOC). Once the sampling stations are established, Caltech will generate detailed shakemaps which will be integrated by IT into the VBH/ UNITE application.

Coordinating Department	IT		
Ideas for Implementation	IT has identified the need but do not have plans to fund this project. Caltech has offered for free installation of equipments, once the equipments are purchased. The information can also improve the accuracy of data for adjacent cities.		
Timeline/Completion Date	2012		
Total Cost	$100,000		
Funding Source(s)	Funding source has not been identified. Project will be launched only if funding is secured.		
Constraints	Funding		
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

FIRE

Hazard	Fire		
Project Name	**Code Update**		
Strategy	Review and update existing city codes to reflect recommendations set forth by the FireWise assessment and Joint Wild land Interface Task Force.		
Action Items	1. Review existing codes relevant to fire protection and prevention in the wildland interface and in high rise commercial and residential buildings. 2. Rewrite codes to reflect new recommendations 3. Submit new codes for approval 4. Enforce new codes		
Coordinating Department	**Community Development,** Fire		
Ideas for Implementation	Continue to work on revisions.		
Timeline/Completion Date	2014		
Total Cost	Staff time		
Funding Source(s)	General fund		
Constraints	Time		
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard		Fire	
Project Name		**Zone 9 (Closed water Pressure Zone) Hillside Fire Protection**	
Strategy		Increase water pressure and access to water in case of an emergency. The project will increase water supply reliability and capacity in Zone 9 for conflagrations in the vicinity of Coldwater Canyon and areas contiguous to the City and the City of Los Angeles' Franklin Canyon Reservoir. It will also improve distribution of water supply and reduce energy costs at the Monte Cielo pump station for domestic service into Zone 9.	
Action Items		Solidify a water transfer agreement specifically for system integration and supplemental fire protection between the cities of Beverly Hills and Los Angeles. The City of Los Angeles will design and construct the required capital improvements. The City of Beverly Hills will finance the improvements as part of the terms and conditions of the agreement. In addition, the City of Beverly Hills will design and construct separate water lines for fire hydrants and domestic service in this area.	
Coordinating Department		**Public Works**, Fire, Community Services	
Ideas for Implementation		Same as action items.	
Timeline/Completion Date		2015	
Total Cost		$2.5 - 3 million	
Funding Source(s)		Water Enterprise Fund	
Constraints		Coordination with the City of Los Angeles' Department of Water and Power.	
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard		Fire	
Project Name		**Wood Roof Public Education DVD**	
Strategy		Educate residents on the potential wood roofs fire hazard.	
Action Items		Develop public education DVD to educate the residents on the potential Fire Hazard with Wood Roofs	
Coordinating Department		**Fire** , Community Development	
Ideas for Implementation		Develop educational resource for the community	
Timeline/Completion Date		2011	
Total Cost		$10,000	
Funding Source(s)		Grants, General Fund	
Constraints		Staff Time and Funding	
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships & Implementation	X	Emergency Management

Hazard		Fire	
Project Name		**Firewise/Waterwise Mitigation Demonstration Garden**	
Strategy		Educate the community on what type of plants are both FireWise and Waterwise.	
Action Items		Improve the current Firewise/Waterwise Garden to expand the plant material and public education material.	
Coordinating Department		**Fire,** Public Works, Community Services	
Ideas for Implementation		Develop educational resource for the community	
Timeline/Completion Date		2013	
Total Cost		$40,000	
Funding Source(s)		Grants, General Fund	
Constraints		Staff Time and Funding	
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard		Fire	
Project Name		**Vegetation Management Public Education**	
Strategy		Develop public education material to the residents regarding Vegetation Management around their homes	
Action Items		Develop public education materials to educate the residents on vegetation management around their homes.	
Coordinating Department		**Fire** , Community Development, Public Works	
Ideas for Implementation		Develop educational resource for the community	
Timeline/Completion Date		2013	
Total Cost		$10,000	
Funding Source(s)		Grants, General Fund	
Constraints		Staff Time and Funding	
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Fire
Project Name	**New Development Impacts**
Strategy	Continue to require property owners to conduct regular maintenance on their properties to reduce the fire danger and maintain a fire-safe landscape. (GP Policy S 3.2)
Action Items	Review and revise the Zoning Code to reflect the general plan's policies for permitted uses and development standards. In addition, regulations to address the following areas must be included in the Zoning Code (GP Program 2.1): Revise and develop requirements and standards pertaining to the location and design of development to protect environmental resources, protect development, and populations from the risks of environmental hazards such as earthquakes, wildfires, and excessive noise. Continue to regulate development for compliance with general plan goals, policies, and development standards, through the development review, and design review processes.
Coordinating Department	Community Development
Ideas for	Update Zoning Code and Development Regulations.
Implementation	Development Review Process.
Timeline/Completion Date	Phased series of Code amendments and updates through 2015.
Total Cost	$100,000
Funding Source(s)	General Fund, staff time,
Constraints	Funding, Time, schedule collaboration

Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard	Fire
Project Name	**Fire Department Access**
Strategy	Design private and public access drives and roadways to preserve and maintain Fire Department access to properties. (GP Policy S 3.4)
Action Items	Survey available and feasible techniques, and amend the Building Code, Fire Code, and related codes where appropriate, to achieve the General Plan's policy objectives at least once every three years or as required by State law. The City's survey of the Building and Fire Codes shall include the following consideration: Require that new development/redeveloped structures include public and private access drives and roadways designed to maintain adequate Fire Department access to the property such that there will be no reduction of fire protection services below acceptable levels. (GP Program 2.4)

Coordinating Department		**Community Development**, Fire	
Ideas for Implementation		Update Building and Fire Codes	
Timeline/Completion Date		2014	
Total Cost		$150,000	
Funding Source(s)		General Fund	
Constraints		Funding	
X	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Hazard		Fire	
Project Name		**Evacuation Route**	
Strategy		Develop and Educate Residents on a Citywide evacuation route during a disaster	
Action Items		Develop complete evacuation route and material to educate the public in which route to take during a disaster.	
Coordinating Department		**Police**, Office of Emergency Management (OEM), Fire	
Ideas for Implementation		Develop complete evacuation route and educational resource for the community	
Timeline/Completion Date		2013	
Total Cost		$30,000	
Funding Source(s)		Grants, General Fund	
Constraints		Staff Time and Funding	
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard		Fire	
Project Name		**Firewise Community Board**	
Strategy		Evaluate and implement recommendations made by the Firewise Communities Program.	
Action Items		1. Form community council who will be responsible for enacting the recommendations and shepherding them through the various processes that are required.	
Coordinating Department		**Fire** , OEM	
Ideas for Implementation		Conduct study	
Timeline/Completion Date		2015	
Total Cost		Staff time	
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

TERRORISM

Hazard	Terrorism
Project Name	**Critical Infrastructure Assessment**
Strategy	Conduct an analysis and assessment of critical infrastructure areas and how each area interfaces with both cyber and physical components if attacked or compromised. Identify the cascade affect, if any, impacting operations should an attack or compromise occur.
Action Items	Assess Dept. of Water; City Fiber Network; Police Department HQ and facilities; Fire Department HQ and facilities; Power sub-station(s); and Traffic Management system(s).
Coordinating Department	**Police,** Community Development
Ideas for Implementation	Utilize personnel from of our City's IT Department and the Police Department's High Tech Task Force and Tactical Assessment and Deployment Office, to conduct the analysis and assessment. Employ a methodology utilized by the U.S. Secret Service (Critical Systems Protection Initiative – CSPI) for conducting the analysis and assessment.
Timeline/Completion Date	2011
Total Cost	TBD (Based on PD and IT staffing levels and availability)
Funding Source(s)	A grant is preferred in order to reduce the cost to the City for overtime pay or compensatory time. Otherwise, staff time.
Constraints	Staffing. Acquiring telecommunications, fiber and private sector data as it relates to our Critical Infrastructure areas could require networking with state and federal agencies, resulting in unexpected delays due to potential security clearance requirements associated with obtaining sensitive information.

Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard	Terrorism
Project Name	**Network Intrusion Prevention System**
Strategy	Obtain high level security system to prevent cyber terrorist attack on City systems. The system will provide the City with the ability to be proactive with respect to network defense.
Action Items	Purchase and implementation of network intrusion prevention system.
Coordinating Department	**Information Technology**

Ideas for Implementation	Award bid. Present to City Council for approval. Order system. Schedule consultant for onsite installation, configuration, testing and knowledge transfer.		
Timeline/Completion Date	2011		
Total Cost	$125,000		
Funding Source(s)	General Fund		
Constraints	None		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

FLOOD

Hazard	Flood		
Project Name	**Reservoirs Replacements and Maintenance**		
Strategy	Update the City's Water Master Plan and related capital improvement programs, including monitoring its water reservoirs. Adopt state-of-the-art water monitoring systems to remotely monitor the City's water usage, leaks, and ruptures. Continue to implement existing flood mitigation activities and programs.		
Action Items	Replace five steel tank reservoirs that were identified for seismic retrofit needs. In addition improvements will be made to monitor water levels and quality.		
Coordinating Department	Public Works		
Ideas for Implementation	Continue with work plan.		
Timeline/Completion Date	2013		
Funding Source(s)	Water Enterprise Fund		
Constraints	Sustainable internal resources to continue the programs including personnel.		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships & Implementation	X	Emergency Management

Hazard	Flood
Project Name	**Update Flood Ordinance**
Description/Strategy	Based on the lack of flood zones in the City, remove locally designated flood ordinance.
Action Items	Remove building requirements in municipal code if no threat is found.
Coordinating Department	**Community Development,** Public Works

Ideas for Implementation	Rewrite ordinance to include above changes.		
Timeline/Completion Date	2012		
Total Cost	Staff time		
Funding Source(s)	General Fund		
Constraints	Time		
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

LANDSLIDE

Hazard	Landslide		
Project Name	**Geotechnical Investigation**		
Strategy	Conduct additional geotechnical investigation to update the landslide hazard maps in the City of Beverly Hills to improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.		
Action Items	1. Select a Geotechnical Consultant to perform the study. 2. Review recommendations and implement sound ones		
Coordinating Department	**Community Development,** Public Works		
Ideas for Implementation	Write a request for proposals for qualified contractors.		
Timeline/Completion Date	2013		
Total Cost	$30,000		
Funding Source(s)	General funds		
Constraints	Funding		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

WINDSTORM

Hazard	Windstorm
Project Name	**Street Tree Master Plan (STMP) Phase III**
Strategy	Continue the use of the STMP as a mechanism eliminating structurally defective trees thus eliminating potential damages to lives or property.
Action Items	Annual assessment/processing of trees
Coordinating Department	**Community Services**
Ideas for Implementation	Street Tree Master Plan (STMP) Phase III
Timeline/Completion Date	Ongoing
Total Cost	$400,000/year

Funding Source(s)		Capital Improvement Program (CIP)	
Constraints		Stability of Recreation and Parks fund resources	
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

MULTI HAZARD

Hazard		Multi-Hazard	
Project Name		**CERT Program Redevelopment**	
Strategy		Study cost effective ways to offer CERT program to the community	
Action Items		Evaluate how to reinstate the CERT program using a variety of cost saving methods, volunteers and on duty fire personnel.	
Coordinating Department		**OEM,** Fire	
Ideas for Implementation		Work with other public agencies - Cities, County, State- who have developed lower cost programs	
Timeline/Completion Date		2011	
Total Cost		Staff time	
Funding Source(s)		General Fund	
Constraints		None	
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard	Multi-Hazard		
Project Name	**Emergency Management Exercises**		
Strategy	Conduct periodic emergency management exercises with City personnel and surrounding jurisdictions. (GP Policy S 2.3)		
Action Items	1. Develop/Schedule Exercise 2. When preparing for exercises, always study possibilities to include other jurisdictions. In addition, work with surrounding jurisdictions and agencies to coordinate and test emergency preparedness and response and recovery plans, emphasizing rapid reconstruction of the City following a disaster event. Explore possible joint efforts to share emerging technology, particularly in the area of security and emergency management enhancements. (GP Program 7.1)		
Coordinating Department	Emergency Management		
Ideas for Implementation	Conduct at least one annual citywide disaster exercise		
Timeline/Completion Date	Ongoing		
Total Cost	Staff time		
Funding Source(s)	General fund		
Constraints	Time, schedule collaboration		
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard	Multi-Hazard
Project Name	**Building and Fire Codes Updates. (GP Policy S 5.2)**
Strategy	Continue to update the City's building and fire codes once every three years, or whenever the State updates the California building and fire codes, to reflect the highest and best available standards for seismic design and performance of buildings and to conform to State requirements.
Action Items	Reflect the highest and best available standards for fire safety design. Increase the requirement for brush clearance to increase defensible space around structures in the Very High Fire Hazard Severity Zone. Incorporate the Fire Wise assessment and Joint Wild land Interface Task Force recommendations into the City's Fire Code. Continue implementation of the Hazardous Building Abatement Ordinance by encouraging property owners to reinforce and strengthen "at risk" buildings.
Coordinating Department	Community Development
Ideas for Implementation	Survey available and feasible techniques, and amend the Building Code, Fire Code, and related codes where appropriate, to achieve the General Plan's policy objectives at least once every three years or as required by State law.
Timeline/Completion Date	2014

Total Cost		$100,000	
Funding Source(s)		General Fund	
Constraints		Time, funding	
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard		Multi-Hazard	
Project Name		**Inter-jurisdictional Coordination**	
Strategy		Continue to coordinate with and support the Los Angeles County Certified Unified Program Agency (CUPA), the Los Angeles County Fire Department, and their Health & Hazardous Materials Division (HHMD) in carrying out inspections, emergency response, enforcement, and site mitigation oversight of hazardous materials and waste. (GP Policy S 6.1)	
Action Items		The City will work with surrounding jurisdictions and agencies to coordinate and test emergency preparedness and response and recovery plans, emphasizing rapid reconstruction of the City following a disaster event. This will include exploring possible joint efforts to share emerging technology, particularly in the area of security and emergency management enhancements. (GP Policy 7.1)	
Coordinating Department		OEM	
Ideas for Implementation		Intergovernmental Agreements.	
Timeline/Completion Date		Ongoing	
Total Cost		None	
Funding Source(s)		Staff time	
Constraints		Time	
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard	Multi-hazard		
Project Name	**Joint Effort in Emergency/ Disaster Management**		
Strategy	Ensure that emergency disaster management is the mutual responsibility of all City Departments and a variety of stakeholders, including the Citizen Corp Program, Beverly Hills Unified School District, private schools, local residents, and the business community. (GP Policy S 7.5)		
Action Items	Partner with local private, non-profit, and quasi public organizations and groups, to address their mutual communities of interest to support and enhance programs that benefit the community at large. These groups may include but are not limited to the areas of cultural arts, historic preservation, business and economic development such as the Chamber of Commerce, Team Beverly Hills, the Beverly Hills Unified School District, emergency management, energy and telecommunications service providers such as Southern California Edison Company and Southern California Gas Company and others that strive to promote the City and enhance the quality of life within the community. (GP Program 7.3)		
Coordinating Department	OEM		
Ideas for Implementation	Convene all parties involved to plan		
Timeline/Completion Date	2013		
Total Cost	Staff time		
Funding Source(s)	General, grants		
Constraints	Funding		
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard		Multi Hazard	
Project Name		**Disaster Notification/Information Outreach**	
Strategy		Educate community on how to seek information during a disaster - examples: website, Telephone Notification System (TNS), Twitter, local access cable channel, hotline number	
Action Items		1. Encourage community to sign up for TNS and Twitter 2. Develop outreach card 3. Distribute card in various ways such as Farmer's Market, Library, Website, cable access channel 4. Health and Safety Commission to complete outreach efforts and remaining Commissions to follow	
Coordinating Department		Emergency Management	
Ideas for Implementation		Develop outreach plan	
Timeline/Completion Date		2012	
Total Cost		Staff time	
Funding Source(s)		General Fund	
Constraints		None	
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard		Multi Hazard	
Project Name		**Commissioner Emergency Training**	
Strategy		Conduct emergency management disaster preparedness training for all City Commissioners in order to have commissioners prepared to assist City during a hazard event.	
Action Items		1. Explore the possibility of training commissioners internally 2. Develop type and level of training 3. Provide training	
Coordinating Department		OEM	
Ideas for Implementation		Use previous training models used for City Council	
Timeline/Completion Date		2014	
Total Cost		Staff time	
Funding Source(s)		General Fund	
Constraints		None	
Plan Goals Addressed			
	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

Hazard		Multi Hazard	
Project Name		**Hazardous Material Awareness**	
Strategy		Conduct outreach to all City residents on how to properly store and secure hazardous materials so to avoid spillage and breakage during a hazard event.	
Action Items		1. Decide what method to best distribute this type of information: via, education literature mailed home, cable access TV spot, radio etc. 2. Implement message to all City residents and businesses	
Ideas for Implementation		Create plan for implementation	
Timeline/Completion Date		2014	
Total Cost		Staff time	
Funding Source(s)		General Fund	
Constraints		None	
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
	Partnerships and Implementation	X	Emergency Management

Project Name		**Medical Facility Identification**	
Strategy		Identify all possible medical facilities in the City that are capable of providing medical services, such as triage, during a large hazard event	
Action Items		1 Create a list of criteria to choose said medical facilities in the City 2. Obtain medical business list from business licensing 3. Work with City IT Department to create a list and add list of medical facilities to Virtual BH layers 4. Add list of medical facilities to emergency management plan. 5. Contact facilities and staff	
Coordinating Department		OEM	
Ideas for Implementation		Create plan for implementation	
Timeline/Completion Date		2014	
Total Cost		Staff time	
Funding Source(s)		General Fund	
Constraints		None	
Plan Goals Addressed			
X	Public Awareness	X	Protect Life and Property
X	Partnerships and Implementation	X	Emergency Management

EVALUATION OF MITIGATION STRATEGIES

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

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

Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce "ripple-effects" throughout the community, greatly increasing the disaster's social and economic consequences.

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

The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur.

The benefit/cost analysis and cost-effectiveness analysis are important tools in evaluating whether or not to implement a mitigation activity but often a mitigation strategy is completed just because it meets the emergency management goal to protect life, property and the environment within the City.

Studying alternatives, calculating the costs and benefits, determining the project cost, estimating the benefits, considering costs and benefits to society and the environment are ways mitigation strategies are considered to be worthwhile.

ANALYSIS OF MITIGATION STRATEGIES AND PROJECTS

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

FEMA's approaches to identify the costs and benefits associated with hazard mitigation strategies, measures, or projects fall into two general categories: benefit/cost analysis and cost effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity can assist the City in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later.

All projects were evaluated and prioritized based on the following categories in Chart 16. All projects below reflect a project staff deemed worthy the mitigation cost, effect and benefit and for all purposes plan to complete. They have been determined in the cost analysis that the project cost completion and mitigation outweigh the cost of the project itself. Information and further information on cost analysis in this section is derived in part from the Federal Emergency Management Agency Publication 331, Report on Costs and Benefits of Natural Hazard Mitigation.

Chart 16. Prioritization and Benefit Analysis of Mitigation Strategies

Hazard	Project Name	Effect on Overall Risk to Life and Property	Ease of Implementation	Political and Community Support	Funding	Overall Priority
Earthquake	**Reinforce Existing Buildings**	Very High	Difficult	Mixed	Funded	High
Earthquake	**Assistance Programs**	Very High	Easy	Mixed	Funded	High
Earthquake	**Seismic data collection sampling stations**	Medium	Medium	Mixed	Unfunded	Low
Fire	**Code Update**	Medium	Moderate	Moderate	Funded	High
Fire	**Zone 9 (Closed water Pressure Zone) Hillside Fire Protection**	Very High	Moderate	Mixed	Funded	Very High
Fire	**Wood Roof Public Education DVD**	Medium	Moderate	High	Funded	High
Fire	**Firewise/Waterwise Mitigation Demonstration Garden**	Low	Difficult	High	Unfunded	Medium
Fire	**Vegetation Management Public Education**	High	Easy	High	Unfunded	Medium
Fire	**New Development Impacts**	Medium	Difficult	Mixed	Funded	High
Fire	**Fire Department Access**	Very High	Difficult	High	Funded	Very High
Fire	**Evacuation Route**	Very High	Easy	High	Unfunded	Medium
Fire	**Firewise Community Board**	Low	Moderate	High	Unfunded	Low
Terrorism	**Critical Infrastructure Assessment**	Very High	Difficult	High	Funded	Very High
Terrorism	**Network Intrusion Prevention System**	Medium	Easy	High	Funded	Very High
Flood	**Reservoirs Replacements and Maintenance**	Very High	Moderate	Mixed	Funded	Very High
Flood	**Update Flood Ordinance**	Low	Easy	Low	Funded	Low
Landslide	**Geotechnical Investigation**	High	Moderate	Mixed	Unfunded	Medium
Windstorm	**Street Tree Master Plan Phase III**	Low	Moderate	Low	Funded	Medium
Multi-Hazard	**CERT Program Redevelopment**	Medium	Moderate	High	Unfunded	Medium
Multi-Hazard	**Emergency Management Exercises**	High	Moderate	Mixed	Funded	High
Multi-Hazard	**Building and Fire Code Updates**	Medium	Moderate	Mixed	Funded	Very High
Multi-Hazard	**Inter-jurisdictional Coordination**	High	Moderate	Mixed	Funded	Low
Multi-Hazard	**Joint Effort in Emergency Disaster Management**	High	Moderate	Mixed	Funded	Low
Multi-Hazard	**Disaster Notification/Information Outreach**	Medium	Easy	Mixed	Funded	High
Multi-Hazard	**Commissioner Emergency Training**	Low	Easy	High	Funded	High
Multi-Hazard	**Hazardous Materials Awareness**	Medium	Easy	Low	Unfunded	Low
Multi-Hazard	**Medical Facility Identification**	Medium	Easy	Mixed	Partially funded	Medium

The two main approaches used to identify the costs and benefits associated with hazard mitigation strategies, measures, or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis.

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

In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented (i.e., if net benefits exceed net costs, the project is worth pursuing). A project must have a benefit/cost ratio greater than 1 in order to be funded. For example a cost benefit analysis was completed to assist in the decision on the Public Works Building Replacement Mitigation Project.

Cost-Effectiveness Analysis
Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating natural hazards can also be organized according to the perspective of those with an economic interest in the outcome.

CURRENT MITIGATION STRATEGIES
All strategies and their priorities were studied using some or all of the methods discussed above. Priorities were decided based on these methods. All projects or strategies were deemed to be worthwhile before they were included in this plan. Chart 11: Prioritization and Benefit Analysis of Mitigation Strategies provides an overview of all strategies, and ranks the following the effect on overall risk to life and property, ease of implementation, political and community support, and overall priority. This chart also shows the funding status. This chart was completed by the Steering Committee and Project Coordinators in multiple meetings. The Department responsible for the hazard took the initiative in ranking and prioritizing the strategies. These rankings and prioritizing were then extensively discussed with the group and the Commissions and the final priority and analysis was agreed upon.

FUTURE STRATEGIES
Several of the preceding mitigation strategies will inherently create future mitigation projects. In addition, the City of Beverly Hills Office of Emergency Management is consistently working with various City departments to analyze existing, create new and implement current mitigation programs and projects . Mitigation strategies are evaluated and included in the plan maintenance. Incorporating hazard mitigation with other community projects is encouraged.

SECTION 5

PLAN MAINTENANCE

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

MONITORING AND IMPLEMENTING THE PLAN

The City Council will be responsible for adopting the City of Beverly Hills Hazard Mitigation Plan 2010-2015. This governing body has the authority to promote sound public policy regarding hazards. Once the plan has been adopted, the City's Director of Emergency Management will be responsible for submitting it to the State Hazard Mitigation Officer at California Emergency Management Agency. The Governor's Office of Emergency Management will then submit the plan to the Federal Emergency Management Agency (FEMA) for review. This review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. The updated Hazard Mitigation Plan will be significant in the future growth and development of the community. The Beverly Hills Hazards Mitigation Plan will go to council for approval on August 17th, 2010.

Coordinating Body

The City of Beverly Hills Hazard Mitigation Steering Committee will be responsible for coordinating implementation of the plan's strategies and undertaking the formal review process.

Continued Public Involvement

City of Beverly Hills is dedicated to involving the public directly and indirectly in the review and updates of the Hazard Mitigation Plan. The Steering Committee members are responsible for the annual review and update of the plan.

The public will also have the opportunity to provide feedback about the plan. Copies of the Plan will be catalogued and kept in appropriate departments and public locations.

A public meeting and Commission update meetings will also be held after each annual evaluation or when deemed necessary by the Hazard Mitigation Steering Committee. The meetings will provide the public a forum for which they can express its concerns, opinions, or ideas about the plan. The Community Safety Partnership, no longer exists but the Health & Safety Commission was created in 2008 can be used to facilitate the public process in the future.

The seven-member commission is appointed by the City Council to maintain and improve the overall health and safety of the community. The Health and Safety Commission is the advisory to the City Council and other officials and staff of the City. The Commission has the following purposes and responsibilities:

- Promote, communicate and broaden the community's opportunities for citizen participation on issues of public health, welfare, safety and comfort, mitigation of community safety risks and hazards and disaster preparedness.
- Provide a forum for members of the community to bring generalized concerns regarding public health, welfare, safety and comfort.
- Aid in the development of strategies relating to disaster preparedness, disaster hazard mitigation, disaster management and health and safety risk reduction.
- Support the work of all City Departments, the business sector and the efforts of residents before, during and after a medical, natural or man-made disaster.
- Assist in communicating the City's health, safety and disaster preparedness messages to the community as well as educating the community more generally regarding these issues.
- Strengthen ties with the community's disaster related stakeholders.
- Assist with City-sponsored activities and programs that promote public health, welfare, safety and comfort, mitigation of community safety risks and hazards and disaster preparedness.

The Fire Department will convene a community based Firewise Committee to study the Fire Department's strategies. The Director of Emergency Management will assist in the coordination of future public process. Representatives could be obtained from a variety of sources including General Plan committee members, Team Beverly Hills graduates and other interested parties. Additionally, the school district and the Chamber of Commerce will be included in this process.

Convener

The City Council will adopt the City of Beverly Hills Hazard Mitigation Plan, and the Hazard Mitigation Steering Committee will take responsibility for plan implementation. The Office of Emergency Management will serve as a convener to facilitate the Hazard Mitigation Steering Committee meetings. Plan implementation and evaluation will be a shared responsibility among all of the Hazard Mitigation Steering Committee Members.

IMPLEMENTATION THROUGH EXISTING PROGRAMS

City of Beverly Hills addresses statewide planning goals and legislative requirements through its General Plan, Capital Improvement Projects, and City Building and Safety Codes. 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 Beverly Hills will have the opportunity to implement recommended mitigation strategies through existing programs and procedures.

A meeting will be held every six months after the formal adoption of the mitigation plan. The meetings of the Hazard Mitigation Steering Committee 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.

EVALUATING AND UPDATING THE PLAN AND THE FORMAL REVIEW PROCESS

The City of Beverly Hills Hazard Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in development or programs that may affect mitigation priorities. Steering Committee members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan. The Steering committee will also be responsible for updating the plan.

The committee will review the goals and strategies 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 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 departments responsible for the various strategies 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.

The Office of Emergency Management will be designated to make appropriate changes to the Plan before submitting it to the Steering Committee members, and presenting it to the City Council. Every five years the updated plan will be submitted to the State Hazard Mitigation Officer and the Federal Emergency Management Agency for review.

PREVIOUS MITIGATION PLANS, PROJECTS AND ACTIONS

Please see specific hazards sections for previous and existing mitigation projects. In regards to public awareness, the City of Beverly Hills Office of Emergency Management offers the community numerous emergency preparedness and safety programs, including the annual Safety Expo and Safety Week program, Community Emergency Response Training (CERT), CPR Classes, Disaster Communication System (DCS) training, Crime Prevention and Neighborhood Watch, Fire Service Day, and other programs.

Online, the Office of Emergency Management offers several videos to help motivate the public to be prepared, including an Emmy Award Winning video on earthquake survival. Disaster planning videos include the following topics:

Earthquake Survival.
Resiliency
School Pickup
Meeting Place
Cell Phones
Emergency Food
Advanced Planning
Family Preparedness

On *Beverly Hills Television Channel 10*, the Office of Emergency Management implements "Disaster Alert," an instructional series about the importance of disaster preparedness. In this series, the Office of Emergency Management presents vital information on preparing your home, business and loved ones for an earthquake or other emergencies. Community members learn what to do before, during and after a disaster.

PART II: HAZARD SPECIFIC INFORMATION

SECTION 6
EARTHQUAKES

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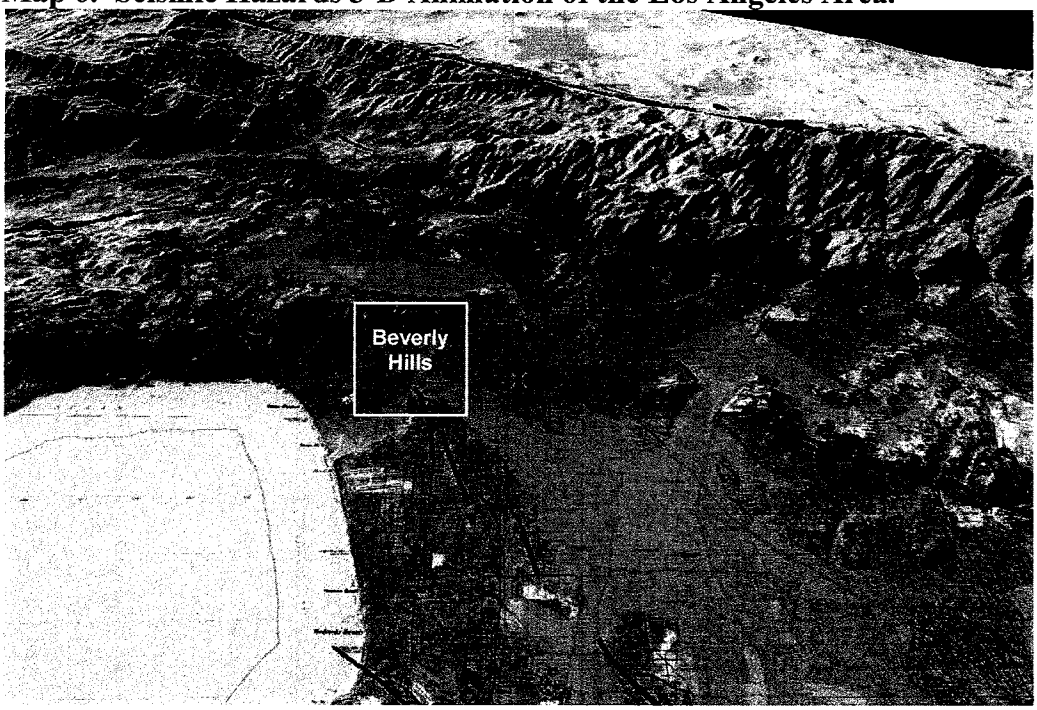
WHY ARE EARTHQUAKES A THREAT TO THE CITY OF BEVERLY HILLS?

The City of Beverly Hills is located in a region that is subject to high seismic activity. There are several active faults in or near the city. A major earthquake occurring on any one of these faults could result in substantial number of deaths and injuries and extensive damage to both public and private property. The economic impact in direct and indirect costs will be billions of dollars.

Building codes have evolved over the years and seismic design provisions have been added to or improved upon following major earthquakes. Buildings in Beverly Hills are older than that of many communities in Southern California. The result from the city's building inventory study in 1999 revealed that 84% of the city's commercial buildings and 95% of the multifamily buildings were built prior to the 1976 Uniform Building Code which is used by many earthquake design professionals as a benchmark for determining buildings that may require investigation and may pose a potential threat.

In conclusion, the combination of the city's older building stock built with earlier, less stringent earthquake provisions and the city's proximity to active seismic zones makes earthquakes a major threat to the City of Beverly Hills. Map 6 shows a seismic hazard map of the Los Angeles Area.

Map 6. Seismic Hazards 3-D Animation of the Los Angeles Area.



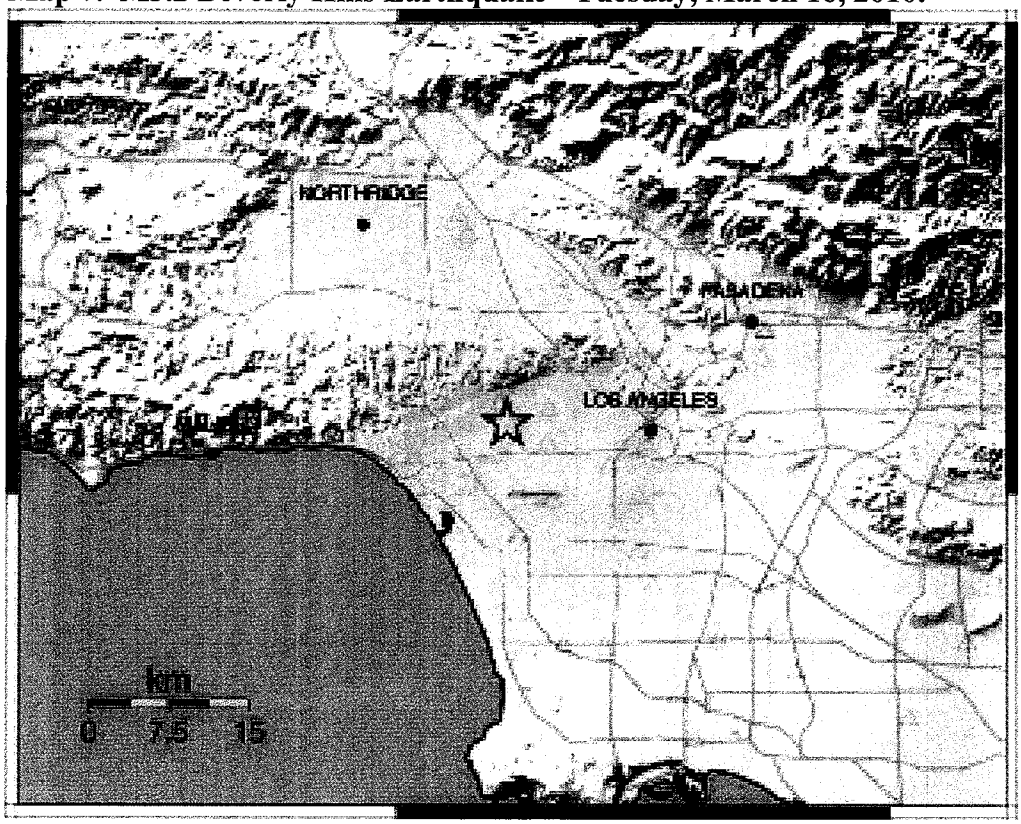
http://www.consrv.ca.gov/cgs/geologic_hazards/earthquakes/3d_snaps.htm

HISTORY OF EARTHQUAKE EVENTS IN BEVERLY HILLS

The most recent seismic activity near City of Beverly Hills was on March 16, 2010. This even was not significant. The moderate size (M3.2) earthquake occurred in Whittier Narrows area (see Map 7).

This earthquake was widely felt throughout the Los Angeles Basin and in parts of San Fernando Valley and was well recorded by the Caltech-USGS TriNet. The focal depth of this earthquake was about 4 km, making the shaking most severe in the Hollywood basin. The earthquake was located near the intersection of the Newport-Inglewood and Hollywood faults. The focal mechanism showed horizontal strike-slip motion on a north-northwest striking plane, suggesting that this event may have been associated with the north end of the Newport- Inglewood fault. This earthquake differed from of the deep thrust faulting earthquake sequences recorded in the last two decades in the Los Angeles area such as 1987 M5.9 Whittier Narrows and 1994 M6.7 Northridge. The occurrence of this earthquake suggested activation of a shallower strike-slip regime of faults in the Los Angeles basin, which has mostly remained dormant over the last decade

Map 7. M3.2 Beverly Hills Earthquake - Tuesday, March 16, 2010.



Source: http://earthquake.usgs.gov/earthquakes/shakemap/sc/shake/14601172

There has been no significant earthquake event in the City of Beverly Hills or in Southern California since the 1994 Northridge earthquake. The most recent earthquake event in southern California that significantly affected Beverly Hills was the 1994 Northridge Earthquake. At 4:31 A.M. on Monday, January 17, a moderate but very damaging earthquake with a magnitude of 6.7 struck the San Fernando Valley. In the following days and weeks, thousands of aftershocks occurred, causing additional damage to affected structures.

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

The earthquake occurred early in the morning on a holiday. This circumstance considerably reduced the potential effects. Many collapsed buildings were unoccupied, and most businesses were not yet open. The direct and indirect economic losses were estimated at $40 billion. Although the City of Beverly Hills is approximately 35 miles away from the epicenter of the Northridge Earthquake, several buildings in the City were red tagged and numerous block walls and chimneys were damaged. Should a similar magnitude earthquake occur in or near Beverly Hills and if it were to occur during a workday, when schools are in session, and the population of the City swells to 200,000, the number of casualties could be substantial -- up to 100's deaths and 1,000's injuries.

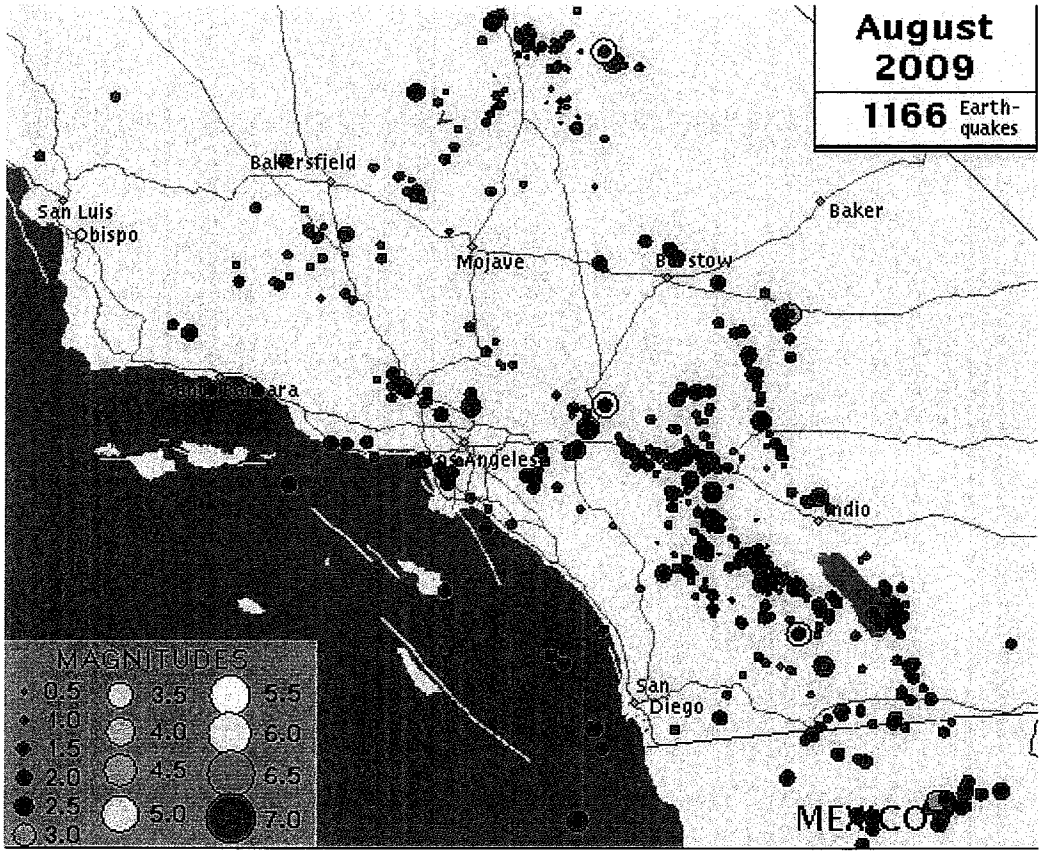
Chart 17. Significant Southern California Earthquakes since 1933

Date	Time (local)	Location	Magnitude
03.10.1933	5:54 pm	Long Beach	6.4
03.25.1937	8:49 am	San Jacinto	6.0
05.18.1940	8:37 pm	Imperial Valley	6.9
10.21.1942	9:30 am	Fish Creek Mountains	6.6
03.15.1946	5:49 am	Walker Pass	6.0
04.10.1947	7:58 am	Manix	6.5
12.04.1948	3:43 pm	Desert Hot Springs	6.0
07.21.1952	3:52 am	Kern County	7.5
11.21.1952	11:46 pm	San Simeon	6.2
03.19.1954	1:54 am	Arroyo Salada	6.4
04.09.1968	6:29 pm	Borrego Mountain	6.5
02.09.1971	6:01 am	San Fernando	6.6
10.15.1979	4:54 pm	Imperial Valley	6.4
07.08.1986	2:21 am	North Palm Springs	5.9
10.01.1987	7:42 am	Whittier Narrows	5.9
11.23.1987	5:54 pm	Elmore Ranch	6.2
11.24.1987	5:15 am	Superstition Hills	6.6
04.22.1992	9:50 pm	Joshua Tree	6.1
06.28.1992	4:57 am	Landers	7.3

Date	Time (local)	Location	Magnitude
06.28.1992	8:05 am	Big Bear	6.3
01.17.1994	4:30 am	Northridge	6.7
10.16.1999	2:46 am	Hector Mine	7.1
12.22.2003	11:15 am	San Simeon	6.5

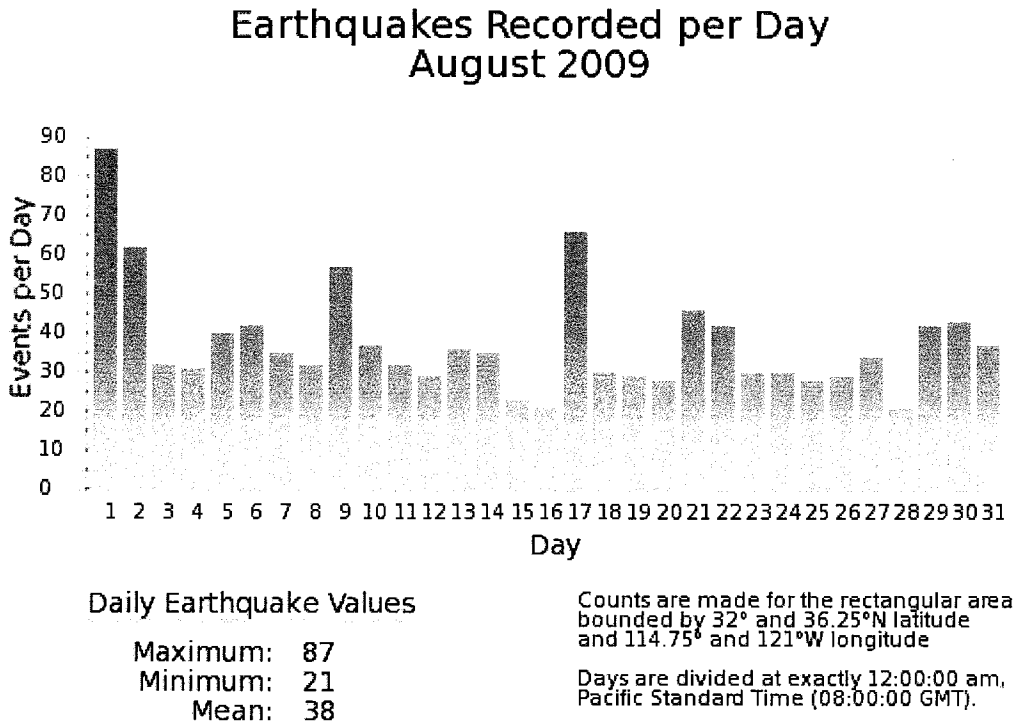
Recently Southern California experienced a large magnitude earthquake.
On April 4th, 2010, United States Geological Survey reported that the 7.2 quake, was caused by two rock masses grinding and scraping together along a roughly 45-mile zone. The epicenter was in near Mexicali, Mexico, approximately 240 miles south of Beverly Hills. The earthquake was of such magnitude it was felt as far away as southern Utah and Portland, Oregon. The City reported no loss of life or property.
There are hundreds of earthquakes in Southern California of earthquakes every month. A few are damaging, but most are not even felt. The following Map 8 and Chart 18 show earthquakes in Southern California on a recent typical month.

Map 8. Earthquakes in Southern California (during the month of August 2009)



Source: http://www.data.scec.org/monthly/pop.php?year=2009&month=8&type=map

Chart 18. Daily Earthquakes, August 2009



Source: http://www.data.scec.org/monthly/pop.php?year=2009&month=8&type=graph

The following chart 19 shows historical Southern California seismic events of 3.25 magnitude or greater from 1930 – 2009.

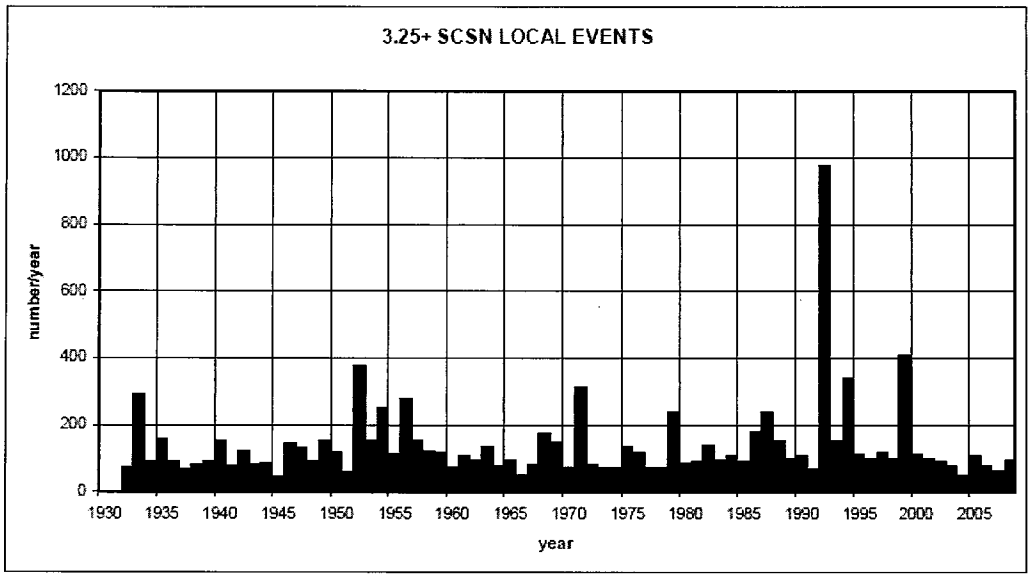


Chart 19. Southern California Seismic Network (SCSN) Events, 1930 -2009

Source: Kate Hutton, Seismological Laboratory, Caltech

CAUSES AND CHARACTERISTICS OF EARTHQUAKES IN SOUTHERN CALIFORNIA AND BEVERLY HILLS

The City of Beverly Hills' exposure to geologic and seismic hazards is directly related to the location of the City to active faults. Faults in Southern California can be attributed to the San Andreas Fault system. This system is a major crustal discontinuity that separates the southeast-moving North American plate from the northwest- moving Pacific plate, and extends for more than 1100 kilometers along nearly the entire length of the state of California.

The "Big Bend" of the San Andreas Fault is responsible for much of the complexity of faulting in southern California. This bend is a convergent (restraining) bend, creating a localized collision of tectonic plates, and a tremendous amount of compressional stress. To release this stress, additional faults have formed over time. A typical response to large-scale compression is crustal shortening. This allows compression to continue by "squeezing" up the rocks in the compressional zone. This is accomplished by thrust faults -- low-angle reverse faults that drive sections of crust over one another to create a thicker pile of crust with a shorter (horizontal) length. The surface traces of such faults are shown in pale yellow on the map view below. The 1994 Northridge earthquake (magnitude 6.7) occurred on one of these numerous thrust faults.

Not all the compressional force generated by the "Big Bend" of the San Andreas Fault goes into thrust faults. The collision boundary is not square with the plate motion, but at an angle, in such a way that some of the material "caught in the middle" has a chance to move laterally out of the way. This is exactly what happens. Large zones of left- lateral faulting, shown here in green, have formed in an effort to relieve some of the stress

created by the fault bend. An example of this left-lateral faulting is the Hollywood / Santa Monica fault zone and the Garlock fault which intersects with the San Andreas near the northern end of the "Big Bend" and continues eastward for several hundred kilometers. In addition, several right- lateral strike-slip faults south of the Big Bend, and west of the southern San Andreas Fault zone, seem to be managing some of the overall slip between the two tectonic plates. Refer to Map 11 for faults near the city of Beverly Hills.

But San Andreas is only one of dozens of known earthquake faults that crisscross Southern California. Some of the better known faults include the Newport-Inglewood, Santa Monica, Hollywood, Puente Hills, Whittier, Chatsworth, Elsinore, Los Alamitos, and Palos Verdes faults. Beyond the known faults, there are a potentially large number of "blind" faults that underlie the surface of Southern California. One such blind fault was involved in the Whittier Narrows earthquake in October 1987.

One set of clues that one may consider using to identify apparent problems with seismic activity is the topography of the Los Angeles basin -- the mountains, hills, and valleys present in the area. Low-angle faults (including some blind faults) can alter the surface, creating plateaus and hills by gradually uplifting a region. When such an uplifted area can be found prominently on one side of a fault, the other side is low- lying and basically flat, there is a fair probability that the fault has a non-vertical dip, and so epicenters positioned off the fault trace are quite possible. Also, a belt of hills with no associated fault trace is an excellent signal that there may be a blind fault at work beneath those hills.

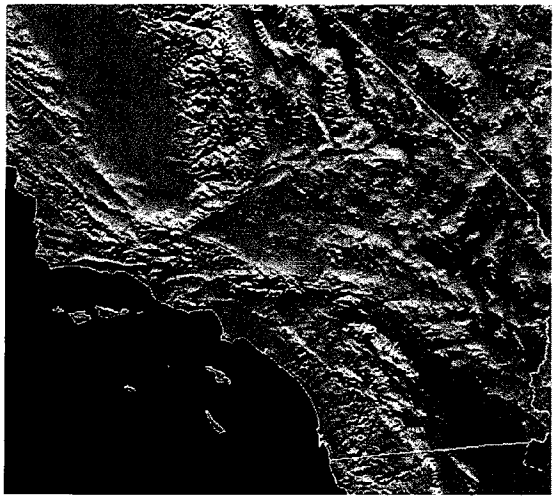
Topography

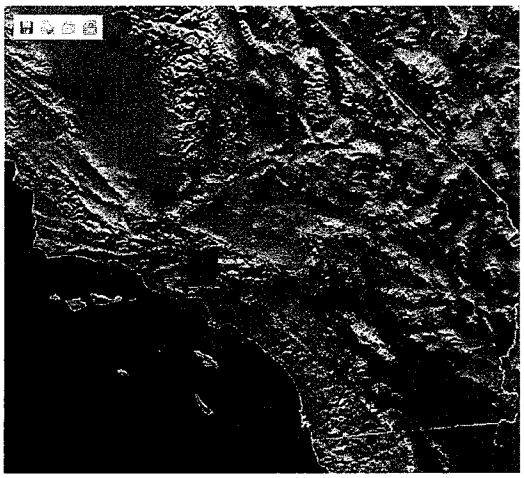
The Santa Monica Mountains, located in the northern portion of the City, are in the Transverse Ranges Physiographic province. The coastal plain of the Los Angeles Basin, located in the southern portion of the City, is part of the peninsular Ranges Physiographic Province. The majority of the City lies in a transitional area between the mountains and the coastal plain. This transitional area consists of broad coalescing alluvial fans that have developed over geologic time from debris that have been eroded from the Santa Monica mountains.

The presence of these three distinct physiographic features (the mountains, the alluvial fans, and the Los Angeles coastal plain) within the City provides considerable topographic relief. The lowest point within the city is 120 feet above sea level at Olympic Blvd and La Cienega Blvd and the highest point is 1400 feet above sea level along Carla Ridge Dr in Trousdale Estates area.

Areas north of Sunset Blvd are characterized by the typical rugged topography of the Santa Monica Mountains with steep sided ridges and narrow ravines or valleys. Between Sunset Boulevard and Santa Monica Boulevard, the surface of the alluvial fans slopes about 2 to 3 percent in a south southeast direction. South of Santa Monica Boulevard the terrain flattens as the alluvial fans merge into the coastal plain.

Map 9. Topography of the Los Angeles Basin (Red dots represent earthquake occurrences from 1932 – 1996).





Source:http://www.data.scec.org/Module/module.html

The City of Beverly Hills is located along the boundary between the Transverse Ranges and Peninsular Ranges physiographic of southern California as shown in Map 9. The Transverse Ranges consist of a complex series of elongate, east-west trending mountains, such as the Santa Monica Mountains, and intervening valleys. In contrast, the Peninsular Ranges province consists of northwest-southwest trending mountains, such as the Santa Ana Mountains, and intervening valleys. Both the Transverse Ranges and Peninsular Ranges physiographic provinces are seismically active and contain many active faults.

Local Soil Conditions

The areas north of Sunset Boulevard in the Santa Monica Mountains are underlain primarily by Triassic metamorphic, Jurassic granitic, and upper Miocene sedimentary rocks. The alluvial fans that underlie most of the City south of Sunset Boulevard consist of Quaternary debris generated from erosion of the Santa Monica Mountains.

Certain soils greatly amplify the shaking in an earthquake. Passing from rock to soil, seismic waves slow down but get bigger. Hence a soft, loose soil may shake more intensely than hard rock at the same distance from the same earthquake.

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

Earthquake Faults in or near Beverly Hills

Numerous active earthquake faults present a potential danger to the City of Beverly Hills. Of these, those that probably present the most danger are as follows:

The Newport/Inglewood Fault
This fault extends to just south of the City and is capable of producing a 6.9 magnitude earthquake. It has a slip rate at 1mm/yr. Because of its proximity to the City, it is thought to present a greater danger to the City in terms of death and destruction than the San Andreas. The Newport-Inglewood is a right- lateral fault system. The movement on this fault caused the 1933 Long Beach magnitude 6.3 earthquake, and the 1920 Inglewood earthquake (estimated magnitude 4.9). The 1933 earthquake resulted in 120 deaths and over $50 million in property damage. Most of the damaged buildings were of unreinforced masonry. Many school buildings were destroyed.

The Santa Monica Fault
This fault actually runs through the northern part of the City and with a slip rate of 1 mm/yr, it is capable of producing a 6.6 magnitude earthquake. Thus, like the Newport/Inglewood Fault, the Santa Monica Fault is also thought to present a great danger to the City.

The Santa Monica Fault is a part of a major east-west trending, northward dipping, left lateral-reverse fault system that forms the southern boundary of the Transverse Ranges physiographic province. This system of faults is located along the southern front of the Santa Monica Mountains and extends from offshore in Santa Monica Bay to the San Gabriel Mountains. Other faults that appear to be a part of this system are the Anacapa (Dume) fault, Malibu Coast fault, Raymond fault (located to the east of the City in Pasadena area).

The Hollywood Fault
This fault is located near the base of the Santa Monica Mountains. The fault dips steeply to the north beneath the Santa Monica Mountains. Movement on the fault has juxtaposed the granitic, metamorphic, and sedimentary rocks of the Santa Monica Mountains up and over the sedimentary deposits south of the mountains. This fault actually runs through the northern part of the City and with a slip rate of 1 mm/yr, it is capable of producing a 6.4 magnitude earthquake. Thus, like the Newport/Inglewood Fault, the Hollywood Fault is also thought to present a great danger to the City. The Hollywood Fault is also a part of a major east-west trending, northward dipping, left lateral-reverse fault system that forms the southern boundary of the Transverse Ranges physiographic province. Other faults that appear to be a part of this system are the Anacapa (Dume) fault, Malibu Coast fault, Raymond fault (located to the east of the City in Pasadena area).

The Puente Hills Fault
This fault system runs under downtown Los Angeles could generate an earthquake of magnitude 7.0 or greater. The fault snakes underground for at least 25 miles, from Puente Hills in northern Orange County through downtown Los Angeles and west toward Beverly Hills.

The Sierra Madre/San Fernando Fault System
This fault system includes the Cucamonga, Sierra Madre, San Fernando and Santa Susana faults. Of this system of faults, the San Fernando Fault is most likely to present a danger

to the City of Beverly Hills. Located approximately fourteen (14) miles to the north of City of Beverly Hills, this fault, caused great destruction and numerous deaths and injuries in 1971. With a slip rate of 3 mm/yr, this fault is capable of producing a 7.0 magnitude earthquake with a.

The Whittier Fault
Located approximately twenty-three (23) miles to the southeast, this fault is capable of a 7.0 magnitude earthquake. During the Whittier Narrows earthquake of October 1987, an earthquake occurred which registered a magnitude of only 5.9, several buildings in Beverly Hills sustained damage, including one of the City's parking structures. The most recent seismic event along this fault occurred on March 16th, 2010, a moderate size (M3.2) earthquake. This event was not significant and caused no reported damage or injuries in the City of Beverly Hills.

The San Andreas Fault
Undoubtedly the most well known fault in California, the San Andreas Fault is located approximately nearly forty (40) miles to the east and with a slip rate of 24 mm/yr, it is capable of an 8.5 magnitude earthquake. Although capable of causing major damage throughout the Los Angeles Basin, it is now thought by many experts that because of its distance from Metropolitan Los Angeles (including Beverly Hills), it probably presents less danger to the City than some of the other faults mentioned above.

The Raymond Fault
Located near San Marino and South Pasadena, with a slip rate of 0.5 mm/yr, this fault is capable of producing a 6.5 magnitude earthquake. The exact nature of the slip along the Raymond fault has been a subject of debate for quite some time. The fault produces a very obvious south- facing scarp along much of its length, and this has made many favor reverse-slip as the predominant sense of fault motion. However, there are also places along this scarp where left-lateral stream offsets of several hundred meters can be seen.

The matter will not be conclusively resolved until the Raymond fault ruptures at the surface, but some new light was shed on the debate in late 1988, when the Pasadena Earthquake occurred.

Apparently located on the Raymond fault, the motion of this quake was predominantly left-lateral, with a reverse component only about 1/15th the size of the lateral component. Curiously enough, this corresponds very well with a scarp height of about 30 meters (reverse slip) versus a left- lateral stream offset of about 400 meters (lateral slip), which are found along the scarp of the Raymond fault south of Pasadena. If the Raymond fault is indeed primarily a left- lateral fault, it could be responsible for transferring slip southward from the Sierra Madre fault zone to other fault systems.

EARTHQUAKE HAZARD IDENTIFICATION
Southern California earthquakes have been identified by several sources including the Steering Committee, the Project Coordinators and the Office of Emergency Management to be the most likely disaster to occur within the City of Beverly Hills.

RISK ANALYSIS

Risk analysis involves estimating the damage and costs likely to be experienced in a geographic area over a period of time (Burby, R. (Ed.) Cooperating with Nature: Confronting Natural Hazards with Land Use Planning for Sustainable Communities (1998), Washington D.C., Joseph Henry Press). 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 http://www.fema.gov/hazus/hazus2.htm (May 2001). The HAZUS software is available in the Information Technology Department but has not been run in the last years.

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.

Earthquake Related Hazards in Beverly Hills

Amount of damage to a building does not depend solely on how hard it is shaken. In general, smaller buildings such as houses are damaged more by higher frequencies, so usually a house must be relatively close to the hypocenter to be severely damaged. Larger structures such as high-rises are damaged more by lower frequencies and will be more noticeably affected by the largest earthquakes, even at considerable distances.

In addition to regional aspects of the earthquake hazard, there are location-specific hazards that can cause additional damage: surface rupture, ground shaking, amplification, settlement, liquefaction, and landslides. State laws require that every person buying a home or real property in California to be told if the property is in on one of these zones.

Ground Shaking

Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by the earthquake. It is the primary cause of earthquake damage. The strength of ground shaking depends on the magnitude of the earthquake, the type of fault, and distance from the epicenter (where the earthquake originates). Buildings on poorly consolidated and thick soils will typically see more damage than buildings on consolidated soils and bedrock.

Earthquake Induced Landslides

Earthquake induced landslides are secondary earthquake hazards that occur from ground shaking. They can destroy the roads, buildings, utilities, and other critical facilities necessary to respond and recover from an earthquake. The City of Beverly Hills has a

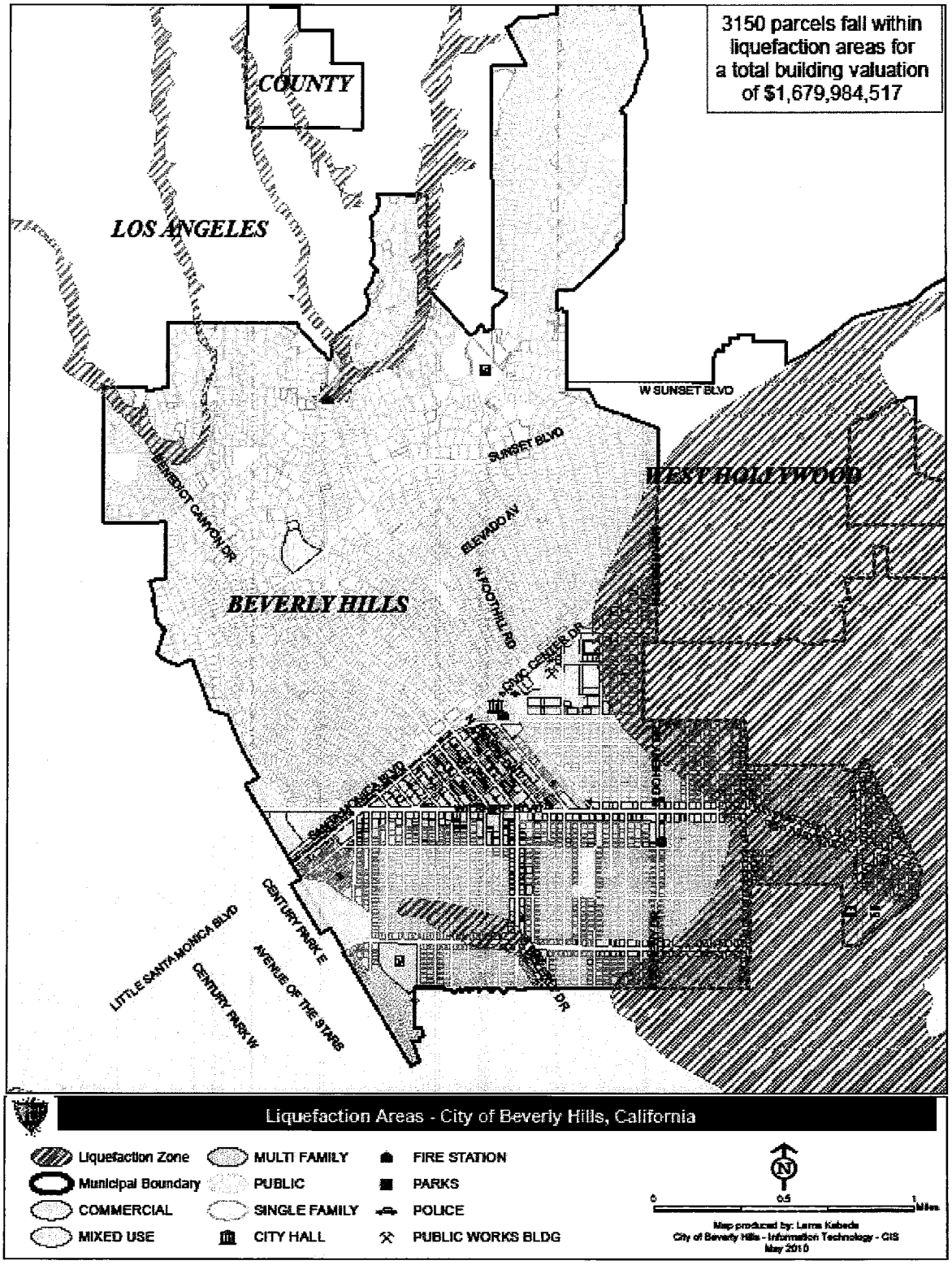
high likelihood of encountering such risks, especially in areas with steep slopes. See earth movement (Landslide) section for more information.

Earthquake Induced Liquefaction
Liquefaction occurs when ground shaking causes wet granular soils to change from a solid state to a liquid state. This results in the loss of soil strength and the soil's ability to support weight. Buildings and their occupants are at risk when the ground can no longer support these buildings and structures.

Liquefaction- induced ground failure has historically been a major cause of earthquake damage in Southern California. During the 1971 San Fernando and 1994 Northridge earthquakes, significant damage to roads, utility pipelines, buildings, and other structures in the Los Angeles area was caused by liquefaction-induced ground displacement. Localities most susceptible to liquefaction-induced damage are underlain by loose, water saturated granular sediments at depths less than 40 feet subsurface. These geological and groundwater conditions exist in the City of Beverly Hills.

Liquefaction Zone
Some areas of the city have a high water table. Where this condition occurs, it is possible for the ground to liquefy during an earthquake, becoming like quicksand. If this occurs, buildings may settle or tilt. Such damage occurred in the Marina District in San Francisco in the 1989 Loma Prietta earthquake. The potential for liquefaction is considered for all new construction in the city. In Beverly Hills, there are about 3,150 parcels with an estimated valuation of $1.6 billion dollars that are within the Liquefaction Zone – See Map 10 below.

Map 10. City of Beverly Hills Liquefaction Zones.

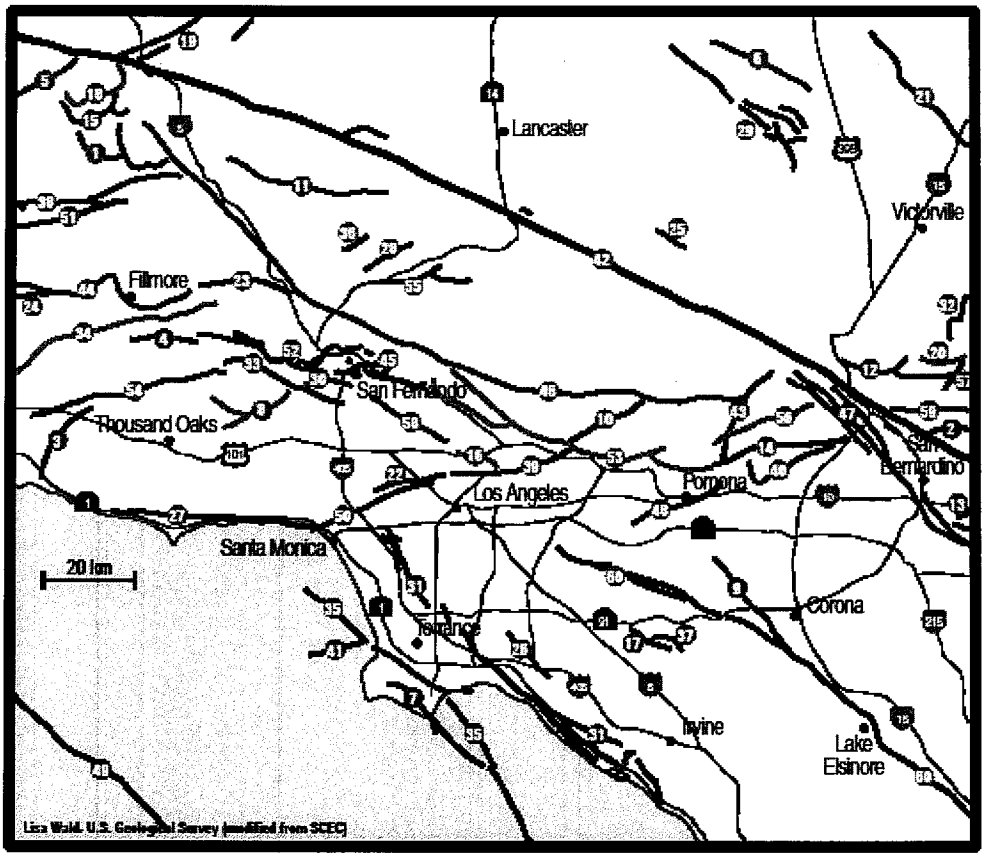


Amplification
Soils and soft sedimentary rocks near the earth's surface can modify ground shaking caused by earthquakes. One of these modifications is amplification. Amplification increases the magnitude of the seismic waves generated by the earthquake. The amount of amplification is influenced by the thickness of geologic materials and their physical properties. Buildings and structures built on soft and unconsolidated soils can face greater risk (Planning for Natural Hazards: The California Technical Resource Guide, Department of Land Conservation and Development, July 2000). Amplification can also occur in areas with deep sediment filled basins and on ridge tops.

Settlements
Dissipation of seismically induced port water pressure in saturated granular soils may lead to settlements after the shaking has stopped. The areas most susceptible to this potential hazard are the same areas that are in the liquefaction zone. Earthquake induced settlements can also occur in dry or moist granular materials simply as a result of shaking without pore water pressure buildup.

Map 11 depicts the fault zones near and around the City of Beverly Hills.

Map 11: Known Earthquake Faults Near the City of Beverly Hills



1 Alamo thrust
2 Arrowhead fault
3 Bailey fault
4 Big Mountain fault
5 Big Pine fault
6 Blake Ranch fault
7 Cabrillo fault
8 Chatsworth fault
9 Chino fault
10 Clamshell-Sawpit fault
11 Clearwater fault
12 Cleghorn fault
13 Crafton Hills fault zone
14 Cucamonga fault zone
15 Dry Creek
16 Eagle Rock fault
17 El Modeno
18 Frazier Mountain thrust
19 Garlock fault zone
20 Grass Valley fault
21 Helendale fault
22 Hollywood fault
23 Holser fault
24 Lion Canyon fault
25 Llano fault
26 Los Alamitos fault
27 Malibu Coast fault
28 Mint Canyon fault
29 Mirage Valley fault zone
30 Mission Hills fault
31 Newport Inglewood fault zone
32 North Frontal fault zone
33 Northridge Hills fault
34 Oak Ridge fault
35 Palos Verdes fault zone
36 Pelona fault
37 Peralta Hills fault
38 Pine Mountain fault
39 Raymond fault
40 Red Hill (Etiwanda Ave) fault
41 Redondo Canyon fault
42 San Andreas Fault
43 San Antonio fault
44 San Cayetano fault
45 San Fernando fault zone
46 San Gabriel fault zone
47 San Jacinto fault
48 San Jose fault
49 Santa Cruz-Santa Catalina Ridge f.z.
50 Santa Monica fault
51 Santa Ynez fault
52 Santa Susana fault zone
53 Sierra Madre fault zone
54 Simi fault
55 Soledad Canyon fault
56 Stoddard Canyon fault
57 Tunnel Ridge fault
58 Verdugo fault
59 Waterman Canyon fault
60 Whittier fault

Damages for a large earthquake almost anywhere in Southern California are likely to run into the billions of dollars. Although building codes 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 Beverly Hills has 121 unreinforced masonry buildings. All have been retrofitted.

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

Peak Ground Accerlation in Beverly Hills

The peak acceleration is the maximum acceleration experienced by the particle attached to the earth during the course of the earthquake motion. This movement can be described by its changing position, velocity as a function of time, or by its changing acceleration as a function of time.

Although predicting an earthquake is not possible, by using Federal Emergency Management Agencies methodology (FEMA 386-2), peak ground acceleration and average return period can be identified. These results were used to approximate the amount of damage.

The calculated maximum peak ground acceleration is 0.45g within the City of Beverly Hills for a 10 percent probability of being exceeded in 50 years (which corresponds to an average return period of about 475 years)

For PGA of 0.45g, earthquake loss estimation tables provide a simplified indication of the damages to different kinds of buildings (FEMA 386-2).

- 20 - 27% of wood frame single family homes would be lost for 120 - 200 days
- 19 – 22% of wood frame apartment building would be lost for 130 – 220 days
- 20 – 27% of steel frame office buildings would be lost.
- 27 – 35% of reinforced masonry buildings would be lost for 65-90 days

The calculated maximum peak ground acceleration is 0.2g within the City of Beverly Hills of a 50 percent probability of being exceeded in 50 years (which corresponds to an average return period of about 72 years).

For PGA or 0.2g, earthquake loss estimation tables provide a simplified indication of the damages to different kinds of buildings (FEMA 386-2)

- Approximately 3% of wood frame single family homes would be lost for 9 – 15 days.

- Approximately 3% of wood frame apartment building would be lost for 10 – 16 days.
- 3 - 5% of steel frame office buildings would be lost.
- 6 - 8% of reinforced masonry buildings would be lost for 10 – 20 days.

Source: **FEMA 386-2 – Understanding Your Risks identifying hazards and estimating losses.**

WHAT IS SUSCEPTIBLE TO EARTHQUAKES

Collapse or damage to residential and commercial buildings, schools, and lifelines due to an earthquake will result in loss of life and injury. Results from a consultant report prepared in 2004 states that 743 of the city's 885 buildings (84%) and 1480 of the city's 1565 multifamily buildings (95%) were constructed prior to the 1976 code provisions. The consultant goes on to say that the damage or collapse of the 1565 multifamily buildings will mean approximately 10,000 dwelling units may become uninhabitable. Post-disaster services for care and temporary housing will be significant.

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. City of Beverly Hills has many buildings that were built before the adoption of the 1976 UBC when building codes were not as strict. In addition, retrofitting is not required except under certain conditions and can be expensive. Therefore, the number of buildings at risk remains high.

Infrastructure and Communication

Residents in the City of Beverly Hills commute frequently by automobiles and public transportation such as buses and light rail. An earthquake can greatly damage bridges and roads, hampering emergency response efforts and the normal movement of people and goods. 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,

Damage to Lifelines

Lifelines are the connections between communities and outside services. They include water and gas lines, transportation systems, electricity 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. Disruption to transportation makes it especially difficult to bring in supplies or services. Lifelines need to be usable after earthquake to allow for rescue, recovery, and rebuilding efforts and to relay important information to the public.

Disruption of Critical Services

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

Businesses
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 activity can create economic loss that presents a burden to large and small shop owners who may have difficulty recovering from their losses.

> 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 (http://www.chamber101.com/programs_committee/natural_disasters/DisasterPreparedness/Forty).

Individual Preparedness
Because the potential for earthquake occurrences and earthquake related property damage is relatively high in the City of Beverly Hills, 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. The City's Office of Emergency Management implements public and employee education on these mitigation actions.

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. This is the biggest concern in the city's high fire hazard zone.

Debris
After damage to a variety of structures, much time is spent cleaning up brick, glass, wood, steel or concrete building elements, office and home contents, and other materials. The city has an agreement with the old debris management company. In 2005 the city signed with a new commercial contractor which will help to ensure debris removal after a disaster.

EXISTING MITIGATION ACTIVITIES

Building Study
In 2005, the City of Beverly Hills completed its analysis of a consultant study on the city's building stock and their susceptibility to earthquakes. The City has used this study to help update the City's Seismic Element of the general plan in 2010, to implement stronger mitigation measures in retrofitting older building stock and several other building and safety measures.

Seismic Modifications for Water System Reservoirs and Pump Stations
In order to be seismically prepared, the City is currently working to repair and amend its piping, valves, tanks, and pump stations. A firm has been hired to begin initial design studies and project construction is set to begin summer 2010.

Operations Service Center Building Mitigation
In order to replace antiquated infrastructure, in 2006 the City demolished the Public Works facilities and merged 4 buildings into one new Public Works Operations Building.

Updated Safety Element of the General Plan
In January 2010, the City updated its Safety Element whose primary purpose of the Safety Element is to reduce the potential risk of death, injuries, property damage, and economic and social dislocation resulting from earthquakes, both urban and wildland fires, terrorism, floods, earthquakes, landslides, public health emergencies, and other natural and man-made disasters. This element specifically addresses fire, flood, geologic and seismic hazards, hazardous materials, noise, and natural and man-made disaster preparedness.

RSVP- A public awareness brochure was created to educate citizens on to mitigate various natural or man- made hazards all together. The Public Works department is in the process of retrofitting the steel in the reservoir tanks throughout the city. Completion date is to be determined.

The Great California Shake-out
In 2008 and 2009, the City of Beverly Hills participated in the Great California Shake-Out, a state-wide earthquake drill whose mission is to prepare all people and organizations in case of a major earthquakes, and also to practice how to properly protect individuals when it happens.

Code Development
In California, each earthquake is followed by revisions and improvements in the Building Codes. The 1933 Long Beach 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 and 1994 Northridge earthquakes. 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. (http://www.consrv.ca.gov).

The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides (http://www.consrv.ca.gov/CGS/rghm/ap/). The State Department of Conservation operates the

Seismic Mapping Program for California. Extensive information is available at their website: ttp://gmw.consrv.ca.gov/.

City of Beverly Hills' Codes
Implementation of earthquake mitigation policy most often takes place at the local government level. The City of Beverly Hills Community Development Department Building and Safety enforces building codes pertaining to earthquake hazards.

In November 2007, the City of Beverly Hills adopted the most recent California Building Code. Additionally, the following is list of seismic related amendments in the City of Beverly Hills:

Chart 20. Seismic Building Codes

Section	Title
1612.3.1	Basic Load combinations
1612.3.2	Alternate Basic Load combinations
1629.4.2	Near-source factor – Steel
1630.1.1	Earthquake Loads; light-frame walls
1630.4.2	Redundancy factor
1630.7	Horizontal Torsional Moments
1630.8.2.1	Elements supporting discontinued system
1630.8.2.2	Detailing requirements for Steel
1630.10.2	Story Drift
1633.2.9	Diaphragms supporting concrete or masonry walls and diaphragm chords and drag members
1701.5	Special inspection for structural welding
1702	Structural Observation
1806.6.1	Additional requirements regarding steel plate washer for anchor bolts
Division IV and V of Chapter 22	Seismic Provisions for Structural Steel buildings

- In 1989, in accordance with Senate Bill 547, buildings were surveyed and identified buildings thought to be unreinforced masonry. With the number of such buildings and the extent and severity of the risk, the city developed a mitigation program – Resolution (No. 89-R-7896) mandatory retrofit program. 121 potentially hazardous buildings were identified and have been retrofitted.

- In 1986, the City contacted with the geotechnical consulting firm of Woodward-Clyde to prepare a geotechnical report on the City's seismic hazards in order to update the Seismic Element of the City's General Plan. The Seismic Element of the plan was updated in 2010.

California Earthquake Mitigation Legislation

California is painfully aware of the threats it faces from earthquakes. Dating back to the 19th century, Californians have been killed, injured, and lost property as a result of earthquakes. As the State's population continues to grow, and urban areas become even more densely built up, the risk will continue to increase. For decades the Legislature has passed laws to strengthen the built environment and protect the citizens. The table 1 below provides a sampling of some of the 200 plus laws in the State's codes.

Chart 21. Partial List of California Building Codes

Partial List of the Over 200 California Laws on Earthquake Safety	
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.
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.
Source: http://www.leginfo.ca.gov/calaw.html	

EARTHQUAKE MITIGATION STRATEGIES

For full Earthquake Mitigation Strategies please see Section 4.

SECTION 7

WILDFIRE

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WHY ARE WILDFIRES A THREAT TO THE CITY OF BEVERLY HILLS

For thousands of years, fires have been a natural part of the ecosystem in Southern California. However, wildfires present a substantial hazard to life and property in communities such as Beverly Hills which are built within or adjacent to hillsides and mountainous areas. The areas in Beverly Hills most susceptible to a large and destructive wildland/urban interface fire include the areas north of Sunset Blvd., extending north to the city limits. There is a huge potential for losses due to wildland/urban interface fires in Southern California and Beverly Hills in particular. The narrowness of the roads, the presence of medium to heavy native fuel beds, and the high density of very large structures built in this area all contribute to the potential for disaster. These factors are exacerbated several times per year when Santa Ana wind conditions make the threat of fire even greater than normal. According to the California Division of Forestry (CDF), there were over seven thousand reportable fires in California in 2003, with over one million acres burned (http://www.fire.ca.gov/php/2003fireseasonstats_v2.asp). According to CDF statistics, in the October, 2003 Firestorms, over 4,800 homes were destroyed and 22 lives were lost (http://www.fire.ca.gov/php/fire_er_content/downloads/2003LargeFires.pdf).

The 2003 and 2007 Southern California Fires

The fall of 2003 marked one of the most destructive wildfire season in California history. In a ten day period, 12 separate fires raged across Southern California in Los Angeles, Riverside, San Bernardino, San Diego and Ventura counties. The massive "Cedar" fire in San Diego County alone consumed of 2,800 homes and burned over a quarter of a million acres. Chart 22 highlights the 2003 fires significant statistics.

Chart 22. October 2003 Firestorm Statistics

County	Fire Name	Date Began	Acres Burned	Homes Lost	Homes Damaged	Lives Lost
Riverside	Pass	10/21/03	2,397	3	7	0
Los Angeles	Padua	10/21/03	10,446	59	0	0
San Bernardino	Grand Prix	10/21/03	69,894	136	71	0
San Diego	Roblar 2	10/21/03	8,592	0	0	0
Ventura	Piru	10/23/03	63,991	8	0	0
Los Angeles	Verdale	10/24/03	8,650	1	0	0
Ventura	Simi	10/25/03	108,204	300	11	0
San Diego	Cedar	10/25/03	273,246	2,820	63	14
San Bernardino	Old	10/25/03	91,281	1,003	7	6
San Diego	Otay / Mine	10/26/03	46,000	6	11	0
Riverside	Mountain	10/26/03	10,000	61	0	0
San Diego	Paradise	10/26/03	56,700	415	15	2
Total Losses			**749,401**	**4,812**	**185**	**22**

Source: http://www.fire.ca.gov/php/fire_er_content/downloads/2003LargeFires.pdf

Additionally, Southern California saw a multitude of fires in 2007. According to CAL Fire, total suppression costs (fiscal year July 2007 - June 2008) were $524 million, structural damages totaled $254.1 million, and there were a total of 3,079 structures destroyed in California.
In total, over 1,500 homes were destroyed and over 600,000 acres of land burned from Santa Barbara County to the U.S.–Mexico border. An estimated nine people died as a direct result of the fires, and 85 others were injured, including at least 61 firefighters. The following chart 23 illustrates statistics of the Los Angeles and Ventura County fires.

Chart 23. 2007 Los Angeles and Ventura Firestorm Statistics

Fire Name	Date / Time Started	Area Burned	Structures Destroyed	Injuries/Deaths
Ranch (Castaic / Piru)	October 20 at 9:42 p.m.	58,401 acres	10	0
Buckweed	October 21 at 12:55 p.m.	38,356 acres	63	4
Canyon	October 21 at 4:50 a.m.	4,565 acres	22	3
Magic	October 22 at 2:17 p.m.	2,824 acres	0	0
Meadowridge	October 23 at 12:30 p.m.	40 acres	0	0
Nightsky	October 21 at 10:35 a.m.	35 acres	0	0
October	October 22 at 10:40 p.m.	25 acres	3	0
source: http://www.fire.ca.gov/				

"Structures" is meant to include all loss - homes and outbuildings, etc.

HISTORY OF FIRES IN SOUTHERN CALIFORNIA AND BEVERLY HILLS

There has not yet been a wildland fire of any significance in Beverly Hills, and the last large wildland fire adjacent to the city occurred in Franklin Canyon over 50 years ago. Large fires have always been part of the Southern California landscape. "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."
http://www.usgs.gov/public/press/public_affairs/press_releases/pr1805m.html). Chart 24 illustrates the most recent compilation of large historic fires in California.

Chart 24. Large Historic Fires in California 1961-2009

	Fire Name	Date	County	Acres	Structures	Deaths
1	Tunnel	October 1991	Alameda	1,600	2,900	25
2	Cedar	October 2003	San Diego	273,246	2,820	14
3	Old	October 2003	San Bernardino	91,281	1,003	6
4	Jones	October 1999	Shasta	26,200	954	1
5	Paint	June 1990	Santa Barbara	4,900	641	1
6	Fountain	August 1992	Shasta	63,960	636	0
7	City of Berkeley	September 1923	Alameda	130	584	0
8	Bel Air	November 1961	Los Angeles	6,090	484	0
9	Laguna Fire	October 1993	Orange	14,437	441	0
10	Paradise	October 2003	San Diego	56,700	415	2
11	Laguna	September 1970	San Diego	175,425	382	5
12	Panorama	November 1980	San Bernardino	23,600	325	4
13	Topanga	November 1993	Los Angeles	18,000	323	3
14	49er	September 1988	Nevada	33,700	312	0
15	Simi	October 2003	Ventura	108,204	300	0
16	Sycamore	July 1977	Santa Barbara	805	234	0
17	Canyon	September 1999	Shasta	2,580	230	0
18	Kannan	October 1978	Los Angeles	25,385	224	0
19	Kinneloa	October 1993	Los Angeles	5,485	196	1
19	Grand Prix	October 2003	San Bernardino	59,448	196	0

"Structures" is meant to include all loss - homes and outbuildings, etc.
Source: http://www.fire.ca.gov/FireEmergencyResponse/HistoricalStatistics/PDF/20LSTRUCTURES.pdf

During the 2002 fire season, more than 6.9 million acres of public and private lands burned in the US, resulting in loss of property, damage to resources and disruption of community services (http://www.nifc.gov/stats/wildlandfirestats.html).Taxpayers spent more than $1.6 billion (http://research.yale.edu/gisf/assets/pdf/ppf/wildfire_report.pdf) to combat more than 88,400 fires nationwide. Many of these fires burned in wildland/urban interface areas and exceeded the fire suppression capabilities of those areas. Since 2000, fire suppression costs have averaged $1 billion dollars for state, private and federal lands (NIFC).

In April of 2007, the City experienced the Beverly Fire. The event was an 11 acre fire in Los Angeles and destroyed one home and damaged two homes in Beverly Hills. The

event lasted several hours and over 400 people were evacuated from their homes. City of Beverly Hills Fire Department worked closely with several agencies including County of Los Angeles Fire Department, Los Angeles County Sheriff's Department, City of Los Angeles Fire and Police Departments, City of Culver City Fire Department , and the City of Santa Monica Fire Department. Because of the City of Beverly Hills careful planning and expedited response, damage was minimal and there was no loss of life.

CAUSES AND CHARACTERISTICS OF WILDFIRES IN SOUTHERN CALIFORNIA AND BEVERLY HILLS

There are three categories of interface fire (Planning for Natural Hazards: The Oregon Technical Resource Guide, (July 2000) Department of Land Conservation and Development). 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; and the occluded wildland/urban interface exists where islands of wildland vegetation occur inside a largely urbanized area. Certain conditions must be present for significant interface fires to occur. The most common conditions include: hot, dry and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and a large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel topography, weather, drought and development.

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

The higher elevations of Southern California's mountains are typically heavily forested. The magnitude of 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.

WILDFIRE HAZARD IDENTIFICATION

The city faces an ongoing threat from wildfires along its hillsides and mountainous areas where wildland and residential areas interface. Fires can be sparked by human activity and natural causes. The next section will further describe the areas in which the hazard can occur.

The Interface

Beverly Hills is like many Southern California communities that are challenged by the increasing number of houses being built on the urban/wildland interface. The National Wildland Coordinating Group defines urban/wildland interface as "the line, area, or zone

where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel.

In 1992, Assembly Bill -337, known as the "Bates Bill", required all cities and counties in California to identify within their communities "The Very High Wildland Fire Hazard Severity Zones" or VHFHSZ.

In Beverly Hills, this VHFHSZ was identified as all of the area north of Sunset Boulevard and extending north to the city limits. This is a densely populated area with homes embedded in natural and landscaped vegetation. A total of 1628 parcels fall within this area for a total valuation of $1.5 billion dollars. See map 12.

Once the city identified this VHFHSZ and submitted it to the California Department of Forestry and Fire Protection, the state required that an ordinance be passed covering the following elements in the identified zone:

- Minimum standards on roof coverings
- Minimum standards on clearances around occupied dwellings by removal of combustible vegetation
- Minimum standards on clearances of tree limbs around chimneys
- Regulations regarding the maintenance of trees and their litter on and around structures

When passing the ordinance, Beverly Hills chose to exceed the minimum requirements set forth by the state. In May 2008, the City of Beverly Hills updated its Fire code to include a new VHFHSZ map. The code reads as follows:

> **Section 4704.3 Very High Fire Hazard Severity Zone Map**. The city of Beverly Hills city council hereby designates very high fire hazard severity zones as recommended by the director of the California department of forestry and fire protection and as designated on a map titled very high fire hazard severity zone, May 1, 2008 and retained on file at the office of the fire marshal, 445 North Rexford Drive.

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 km^2 was staggering: $250 million in 1906 dollars, or about $5 billion at today's prices.

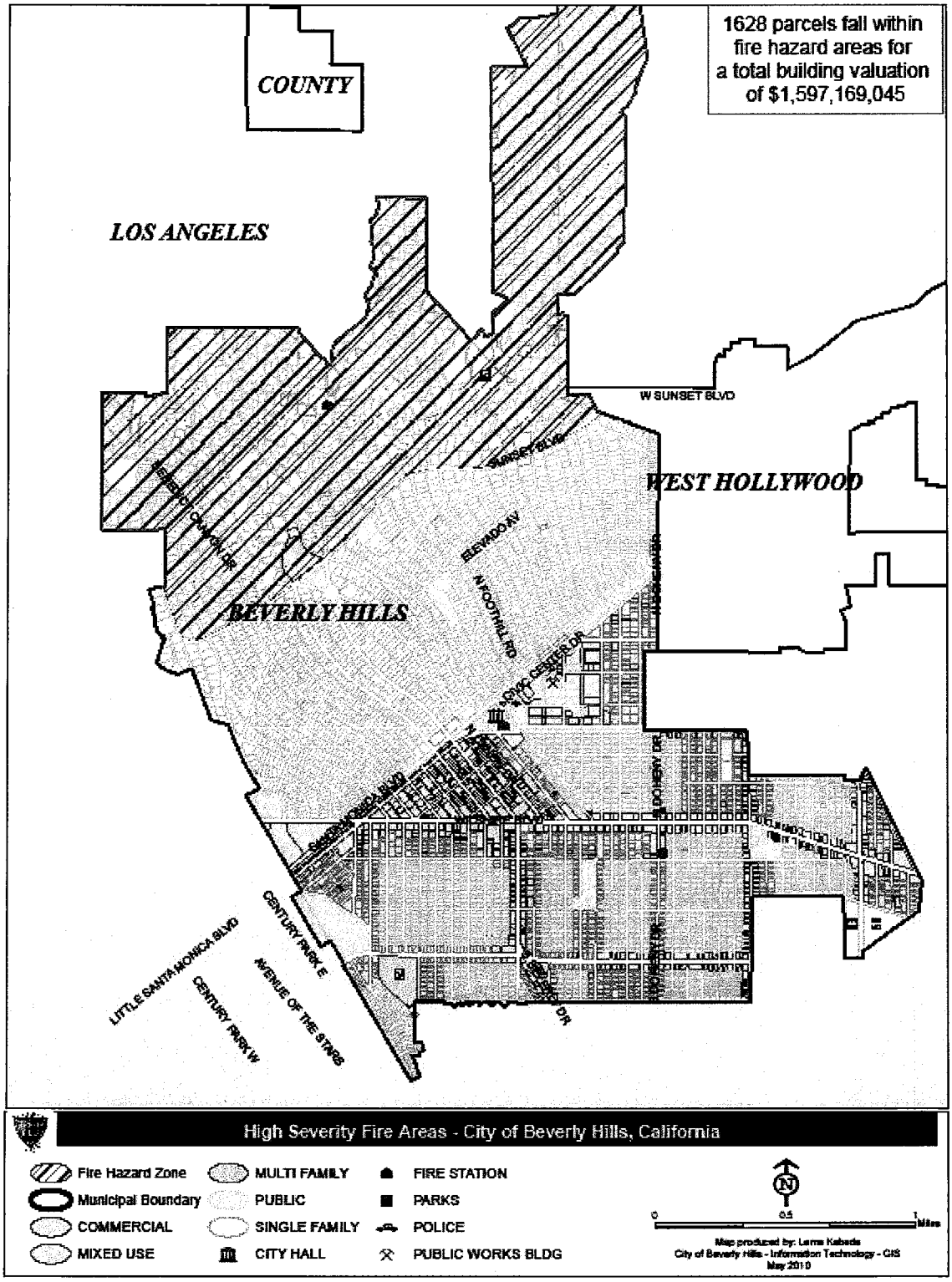
The 1989 Loma Prieta Earthquake, the 1991 Oakland hills fire, and Japan's recent Hokkaido Nansei-oki Earthquake all demonstrate the current, real possibility of a large fire, such as a fire following an earthquake, developing into a conflagration. In the United States, all the elements that would hamper 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." (http://www.eqe.com/publications/revf93/firefoll.htm)

This scenario highlights the need for fire mitigation activity in all sectors of the region, urban/wildland interface or not. Beverly Hills could conceivably experience such a fire in the areas outside of the VHFHSZ either as a result of an earthquake or some other phenomenon. Possible scenarios include a disruption in the water system that could allow a normally controllable structure fire to escape containment by fire forces and spread to adjoining buildings. Another scenario is a fire that starts in the flatlands and could be wind driven from the roof of one building to the roofs of adjoining buildings. In the area outside the VHFHSZ, 169 wood shake or shingle roofs exist and there is a potential for fires being driven from roof to roof faster than firefighting efforts can keep up under strong Santa Ana wind conditions.

Other large dollar loss or large life loss fire potential exists within the city as well. Beverly Hills is home to 5 very large hotels having occupancies in excess of 500 persons per day, 35 High Rise buildings, and a densely populated retail and commercial district. Of particular concern are two High Rise buildings that are residential occupancies and did not fall under the 1998 retrofit sprinkler mandate imposed on buildings 55 feet or higher. These are the only two High Rise buildings in the city that are not set up with sprinkler systems and no plans exist to install the systems.

Identifying the hazard area as set forth above is the first step in assessing the City's vulnerability to wildland fires. Other key factors 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. These factors can affect how quick a fire can spread.

Map 12. City of Beverly Hills Fire Hazards Zones



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. Like much of Southern California, chaparral is a primary fuel prevalent in Beverly Hills along with grasses, non-native vegetation and large trees such as Junipers, Palm, Eucalyptus and Pines. All of these fuel types are highly combustible. Added to this is the fact that a large percentage of the fuel beds in the Santa Monica Mountains contain dead and down vegetation. This "die back" condition as it is known is due largely to drought conditions that have been experienced in recent years. This condition makes these fuel beds far more receptive to ignition and spread of wildfires than if the vegetation were alive and healthy. This type of fuel model is of particular concern when the fires are wind driven as it can lead to short and long range spotting which can affect the entire city, not just the VHFHSZ.

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

Topography
Topography influences the movement of air, thereby directing a fire course. For example, if the percentage of uphill slope doubles, the rate of spread in wildfire will likely double. Gulches and canyons can funnel air and act as chimneys, which intensify fire behavior and cause the fire to spread faster. 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. The areas above Sunset Boulevard, east of Benedict Canyon Dr, and extending to the eastern city limit contain all of the topographic features mentioned above. Another area of concern in Beverly Hills is that most of the developed area in the city is on south facing slopes. Southern facing slopes are exposed to more thermal heating by the sun and fires will start and spread more readily due to the pre-heated condition of the fuel and the lower fuel moisture content. Numerous canyons, saddles, and ridges in the VHFHSZ will also contribute to erratic fire behavior due to the funnel and subsequent acceleration effect it will have on wind traveling through the area.

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 (Planning for Natural Hazards: The Oregon Technical Resource Guide, (July 2000), Department of Land Conservation and Development). 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 "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.

Beverly Hills experiences Santa Ana Wind conditions typically in the Fall months and this poses a threat in two ways. A fire starting in Beverly Hills will spread rapidly and has the potential of overwhelming initial attack forces and destroying structures within minutes of ignition. A fire starting adjacent to Beverly Hills in the City of Los Angeles could quickly burn into the city either by direct flame contact or by fire brands being carried by the winds and spotting onto structures or combustible vegetation. Wind bends the flames to pre-heat the fuel ahead and can carry fire brands up to ¼ mile or more ahead of the flame front. The majority of catastrophic fires that Southern California has experienced have occurred in the months of September, October, and November when Santa Ana Winds typically occur. Wind is considered to be the primary factor that influences fire spread.

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. Rain and snowfall were below normal in 2007 and 2008, and state water officials forecast 2009 is continuing the trend. According to the California Department of Water Resources, Southern California is currently in its fourth year of drought conditions.

Development

Growth and development in scrubland and forested areas is increasing the number of human-made structures in Southern California interface areas. Wildfire has an effect on development, yet development can also influence wildfire. 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 fire fighting 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. Narrow and winding roads in these developed areas tend to make evacuation of civilians slow and difficult especially when fire resources are trying to gain access to the area utilizing the same roads. The development in Beverly Hills in the VHFHSZ is exemplified by the above description, however is complicated by the presence of very large homes, very often exceeding 10,000 square feet in livable area. Most of the new development in this zone involves the removal of smaller structures in order to build much larger structures in their place.

WILDFIRE HAZARD IDENTIFICATION

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.

Chart 25 illustrates a 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.)

Chart 25. 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 comply with the Bates Bill, in 1992 the City completed an evaluation of the following factors to determine the areas of the City which would qualify as a Very High Wildland Fire Hazard Severity Zone.

- Fuel
- Topography
- Dwelling density
- Weather
- Infrastructure
- Fire codes and ordinances as they relate to brush issues

Each factor was given a value of 1-4 with a 4 being the highest danger rating. Any total score over 10 qualified the area as being one of VHFHSZ. Each of the three areas evaluated rated 10 or above with the highest area receiving a 12.

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; and
Water availability.

The use of Geographic Information System (GIS) technology in recent years has been a great asset to fire hazard assessment, allowing further integration of fuels, weather and topography data for such ends as fire behavior prediction, watershed evaluation, mitigation strategies and hazard mapping.

RISK ANALYSIS

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.

The National Wildland/Urban Fire Protection Program has developed the Wildland/Urban Fire Hazard Assessment Methodology tool for communities to assess their risk to wildfire. For more information on wildfire hazard assessment refer to http://www.Firewise.org.

WHAT IS SUSCEPTIBLE TO WILDFIRE

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.

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.

A fire starting in the VHFHSZ has the potential to grow to devastating proportions which would destroy a great number of homes, infrastructure facilities, natural habitat, but more importantly, it has the potential for taking many lives. The "Tunnel" fire in the East Bay Hills (Oakland) in 1991 would be the best example of the type of fire potential that exists here in the city. That fire took 25 lives and destroyed over 3,500 dwelling units within a matter of a few hours. Beyond the impact of the loss of life, there will be significant and far reaching economic impacts on the community as it recovers and rebuilds in the aftermath of such a fire.

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, firefighters 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
Water supply, both in terms of volume and pressure, is always a critical factor in fighting fires and particularly in keeping fires in the wildland/urban interface areas manageable by initial attack forces. Generally speaking the water supply to most areas of the City is very good, however an area of concern is the area served by Zone 9. This area is known to have insufficient fire flow and plans are being developed to improve the flow capacity and reliability to this area. 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 fire fighting flows.

EXISTING MITIGATION ACTIVITIES

Wood Roof Ordinance 07-0-2520
In June 2007 the City adopted a new wood rood ordinance, Ordinance **07-0-2520**, which requires property owners to have class A roof assembly, no wood products.

Brush Fire Clearance Ordinance
In 2006, the City adopted Ordinance 06-0-25-01, strengthening its brush clearance requirements for property owners. Among 13 other brush clearance and maintenance

requirements, the ordinance amended the municipal code to require property owners to remove all brush within 200 ft of their property.

Cost-Recovery Fees
In Aril 2010, the City's Fire Department increased the property inspection fee for properties located in the City's VHFHSZ. The inspections are crucial to implement and enforce the City's Brush Fire Prevention/Brush Clearance Program.

Firewise Community
In 2005 the City of Beverly Hills was recognized as a *Firewise Community USA* site. The City was honored to be only the 3rd community in California and 114 in the Nation to receive this distinction. The national Firewise Communities program is a multi-agency effort designed to reach beyond the fire service by involving homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fire - before a fire starts. The Firewise Communities approach emphasizes community responsibility for planning in the design of a safe community as well as effective emergency response, and individual responsibility for safer home construction and design, landscaping, and maintenance.

Evacuation Plan
Developed evacuation plan for the North End of the City of Beverly Hills to address a Wildland-urban interface fire. The Evacuation plan for the North End of Beverly Hills was developed through a collaboration of City of Beverly Hills Staff and neighboring cities that boarder the City of Beverly Hills to develop a comprehensive approach to evacuation. The emergency plan, quick reference guide, operational guides, canyon maps and planning form are intended to assist field personnel who are assigned the incident objectives to perform evacuation during emergencies or disasters.
This evacuation route could be used for an emergency out of the area.

In addition, as part of its aggressive outreach campaign, the City mails "Operation Evacuation" a brochure intended to help each and every resident of the City of Beverly Hills, especially those that live in the Santa Monica Mountains in the canyon regions of Beverly Hills, learn how to help themselves save their life and property in case of a fire hazard.

Public Outreach Campaign
The Fire Department practices a very comprehensive public outreach campaign to ensure all residents are prepared for an urban interface wildfire hazard. The Fire Department sends numerous public education materials to homeowners regarding wildland urban interface fires, proper vegetation control, emergency evacuation routes, personal fire planning guides, and other materials. Materials are mailed and posted online on the City of Beverly Hills Emergency Management webpage.

Water Tank Capacity Amendment
The City repaired and increased Coldwater Canyon water tank next to Station 2. The water capacity for the old Coldwater reservoir was 7.2 million gallons and was upgraded to hold 8.3 million gallons.

Zone 9 (Closed water Pressure Zone) Hillside Fire Protection
This project is set to increase water pressure and access to water in case of an emergency. The project will increase water supply reliability and capacity in Zone 9 for conflagrations in the vicinity of Coldwater Canyon and areas contiguous to the City and the City of Los Angeles' Franklin Canyon Reservoir. It will also improve distribution of water supply and reduce energy costs at the Monte Cielo pump station for domestic service into Zone 9.
This strategy involves an agreement with the City of Los Angeles Department of Water and Power and has been delayed due to internal processing and procurement. Project is set to move forward summer of 2010.

Weed Abatement Programs
Beverly Hills Fire Department maintains an aggressive annual Brush Clearance Inspection program. Mailings to residents begin in early April and physical inspections begin in early May. Properties who have not complied with clearance requirements are ultimately referred to the City prosecutor's office. The City also utilizes mailings, WebPages, and local cable television programs as an integral part in educating the public of the need for brush clearance, non-combustible roofing, and pre-established evacuation routes.

Pre-Attack Plans
For the high-hazard zone, the Beverly Hills Fire Department has developed a set of "Pre-Attack Plans" that enable the fire suppression resources to locate combustible roofs, evacuation routes, and safe refuge areas and Resident Assemblage Points. These plans are a great asset in helping firefighting forces make critical decisions during emergency situations. The plans are also made available to outside agencies who are called for Mutual Aid assistance and that may not be familiar with the area. These plans are reviewed annually by all personnel and updated every year.

Remote Automated Weather Station (RAWS)
In 1998 Beverly Hills became part of the National Fire Weather Danger Rating System by installing a Remote Automated Weather Station (RAWS) just outside the city in Franklin Canyon. This RAWS is tied into other weather stations located throughout L.A. County that provide weather data that is analyzed by a computer which then gives a numerical value to the fire weather danger in Beverly Hills and for L.A. County communities. The RAWS also allows the Beverly Hills Fire Department to monitor its microclimate on demand when needed. Data from this RAWS assists fire officials in determining the need for augmenting or redeploying fire resources depending on current and anticipated weather conditions.

Red Flag Engine Program
Since the addition of the RAWS, the Beverly Hills Fire Department has instituted a Red Flag Engine Program whereby the firefighting resources are augmented in the VHFHSZ on days where the fire weather danger is extremely high. The program calls for hiring additional personnel to staff an engine company which is then housed at Fire Station 2 for the duration of the extreme danger period. In addition to staffing the additional engine company, pre-designated streets which normally allow parking, are posted as no parking zones to allow for ingress of fire resources and egress of civilian traffic.

The Beverly Hills Fire Department provides ongoing community education with the following programs:

- Annual Occupancy Inspections for all public, commercial and R-1 & R-3 occupancies
- CERT (Citizen Emergency Response Team) training

The Beverly Hills Fire Department educates the public in terms of Fire and Life Safety by providing the following special programs upon request:

- Fire Safety Education Programs that consist of the following:
- Local cable television education and informational programs are shown throughout the year, but most often during the months considered to be fire season. A video has been produced warning citizens of the danger of wildland fires and provides information as to how to prevent them and how to react should one start
- Mailings such as the RSVP Program which educates the public on fire retardant roofs, seismic awareness, vegetation management, and overall preparedness.
- Informational brochures have also been prepared and are distributed informing citizens about the need for evacuation plans and tips on home protection.
- Disaster Assistance Programs that are taught to Beverly Hills Unified School District employees
- Fire Safety and Prevention in schools

Telephone Notification System
To assist in the notification and early warning of the residents in the high-hazard zone, an automated computer dialing system is used. This system can make hundreds of calls to a geographical area within minutes and will broadcast a customized message to whomever, or whatever answers the phone.

Local Fire Codes
The Fire Department adopts any new changes to the California Fire Code every three years. The following codes have been adopted and are applied to the northern areas of the community which have been deemed the VHFHSZ.

Section 103 is hereby amended by adding section 103.4.8 as follows:
Section 103.4.8 Very High Fire Hazard Severity Zone.

A Very High Fire Hazard Severity Zone (VHFHSZ) is hereby established and declared to be those districts and areas included within the boundaries described and set forth in a map maintained by the Chief on file in the office of the Fire Marshal.

Appendix II-A, Section 16.1, is hereby amended as follows:
Appendix II-A, Section 16.1(1-5) Clearance of Brush or Vegetative Growth from Structures.

A. All native brush, weeds, grass and hazardous vegetation situated within one hundred (100') feet of ANY structure, regardless of whether said structure is located upon such land or upon adjacent land shall be maintained at a height of not more than three (3") inches above the ground.

B. All native brush, weeds, grass and hazardous vegetation within ten (10') feet of any combustible fence shall be maintained at a height of not more than three (3") inches above the ground.

C. All trees, shrubs, bushes, and other growing vegetation or portions thereof, adjacent to or overhanging any structure shall be kept free of dead limbs, branches, and other combustible matter.

D. All trees shall be trimmed up five (5') feet from the ground and maintained so that no portion is closer than ten (10') feet from the outlet of any chimney.

E. All roof structures shall be kept free of substantial accumulations of leaves, needles, twigs, and other combustible matter.

F. ALL CUT VEGETATION AND DEBRIS SHALL BE REMOVED AND LEGALLY DISPOSED OF. All vegetation, native or otherwise, shall be maintained so as not to constitute a fire hazard or public nuisance.

Exception: Specimen native shrubs can be retained throughout the 100 feet provided they are: spaced at a distance not less than eighteen (18') feet from other native shrubs, brush or structures; maintained free of dead wood and litter; and trimmed up at least two (2') feet from the ground or 1/3 of their height, whichever is less.

G. If the Fire Chief determines in any specific case that difficult terrain, danger of erosion, or other unusual circumstances make strict compliance with the clearance of vegetation provisions of this section undesirable or impractical, he may suspend the enforcement thereof and require reasonable alternative measures.

Appendix II-A, Section 17, is hereby amended as follows:
Appendix II-A, Section 17 - Clearance of Brush or Vegetative Growth from Roadways.

All native brush, weeds, grass and hazardous vegetation situated within ten (10') feet of the outer edge or edges of the usable road surface of any highway, street, alley or driveway serving more than one residence shall be maintained at a height of not more than three (3") inches above the ground.

Section 1003.2.1 is hereby amended as follows:
Section 1003.2.1 New buildings.

An automatic fire extinguishing system shall be required for all occupancies, except U-1 occupancies which are sheds of less than five hundred (500) square feet and agricultural buildings. Systems for R-3 occupancies shall comply with the "N.F.P.A. Standard No. 13D for Residential Sprinkler Systems for One and Two Family Dwellings", 1999 Edition, and systems for all other occupancies shall comply with the "N.F.P.A. Standard No. 13 for Installation of Sprinkler Systems", 1999 Edition.

Section 1003.2.1.1 is hereby added as follows:
Section 1003.2.1.1 Existing buildings.

(1) All existing buildings, except R-1 occupancy cooperatives, apartments, and condominiums, having a usable floor area of five (5) stories, or which exceed a height of fifty-five (55) feet, shall have an automatic fire extinguishing system in compliance with section 1003.2 installed and operational not later than September 1, 1991. "Height," for purposes of this Section, is defined in Section 10-3.100 of Title 10 of the Beverly Hills Municipal Code.

(2) Any existing building which is not required to have an automatic fire extinguishing system pursuant to subparagraph (1) of section 1003.2.1.1 shall install an automatic fire-extinguishing system in compliance with section 1003.2.1 if: (i) additions, alterations or repairs are made within any twelve (12) month period which exceed fifty percent (50%) of the value of such existing building, (ii) an addition is constructed which exceeds fifty percent (50%) of the square footage of the existing building, or (iii) an addition of more than five thousand (5,000) square feet is constructed.

Section 1503.4 is hereby added to the California Building Code as follows:
1503.4 Class A roof covering requirement. This has been changed in July , 2007 to prohibit all wood products. Section 1505.1; 1505.1.1; and 1505.1.1

Notwithstanding any other requirement of the Beverly Hills Municipal Code, no later than July 1, 2013, all roof coverings in the City of Beverly Hills shall be fire retardant Class A, as classified in Section 1504.

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.

Federal Emergency Management Agency (FEMA) Programs
FEMA 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 (National Interagency Fire Center, Boise ID and California Division of Forestry, Riverside Fire Lab).

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 and Taskforce
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. The City of Beverly Hills established a Wildland Interface Task Force to implement Firewise program and to develop additional training needs.

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 US forest lands.

ADDITIONAL 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 Los Angeles County Fire Department 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 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.

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.

In 2004, the area in the VHFHSZ underwent an assessment by the Firewise Communities USA program. From this assessment, a series of recommendations was considered by a council formed by community members. This committee is exploring avenues to enact the recommendations and add more, shepherding them through the various processes that are required.

The Firewise Communities/USA program is designed to provide an effective management approach for preserving wildland living aesthetics. The program can be tailored for adoption by any community and/or neighborhood association that is committed to ensuring its citizens maximum protection from wildland fire. The program

begins with a community assessment that is intended to be used as a resource to create a wildland protection plan. The plan developed from the information in this assessment should be implemented in a collaborative manner and will be updated and modified as needed. This assessment was conducted in early May of 2004 and the plan was delivered to the department in June. The plan is currently under review and consideration for adoption. Some of the highlighted mitigation strategies that have been identified are as follows:

- Replacement of flammable wood roofs - Currently and ordinance requires that all non Class A roof coverings be replaced by the year 2013. An accelerated plan for replacement of these roofs will make the community safer, sooner.
- Residents must be vigilant in removing accumulations of dead foliage and needles from roofs and around structures.
- Eucalyptus is a popular landscaping choice in the assessment area and while these trees themselves are not a significant fire problem, the material they shed is a significant hazard. The dead material that these trees shed can contribute to home ignition potential and needs to be cleared on a consistent basis.
- Other trees such as mimosa, sycamore, walnuts and palms also need annual grooming. Of particular concern are palm tree beards which are easily ignited by flying fire brands. These trees, whether on public or private property need to be groomed on an annual basis.

Another strategy not mentioned in the report, but that could prove significant in the fire department's ability to save structures is to increase the brush clearance requirements. The current ordinance calls for clearance of 100 feet around structures in the VHFHSZ. Many communities have increased this distance to 200 feet. This distance is considered to be the "defensible space" that allow fire departments to safely deploy resources with a reasonable expectation that the structure can be saved. In those communities that have experienced fires where 200 feet is the rule, the fire department has been far more successful in saving the structures threatened even by the worst wind driven fires. Fuel modification/removal programs should also be considered in those areas that due to build up of dead and live fuels combined with topographical features pose the greatest threat to individual structures or the neighborhood. These programs may include prescription burns, use of a "brush crushing" machine or simple removal by tractors or hand crews. The City of Beverly Hills has adopted these stricter guidelines with its Vegetation/Brush Clearance regulations define Ordinance 06-0-25-01.

The wildfire mitigation action items provide direction on specific activities that organizations and residents in Southern California can undertake to reduce risk and prevent loss from wildfire events. Each action item is followed by ideas for implementation, which can be used by the steering committee and local decision makers in pursuing strategies for implementation. Enhance emergency services to increase the efficiency of wildfire response and recovery activities.

WILDFIRE MITIGATION STRATEGIES

As stated in the Federal Wildland Fire Policy, "The problem is not one of finding new solutions to an old problem but of implementing known solutions. Deferred decision making is as much a problem as the fires themselves. If history is to serve us in the resolution of the wildland/urban interface problem, we must take action on these issues now. To do anything less is to guarantee another review process in the aftermath of future catastrophic fires." (http://www.fs.fed.us/land/wdfire7c.htm)

For full FIRE Mitigation Strategies please see Section 4.

SECTION 8

TERRORISM

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WHY IS TERRORISM A THREAT TO THE CITY OF BEVERLY HILLS

Terrorism has touched the U.S. at several locations over the years. After the September 11, 2001 World Trade Center airplane bombing, citizens no longer viewed terrorism as just a foreign problem. In recent years, terrorism has taken on new form with the introduction of chemical, biological, and radiological weapons.

Terrorism is a continuing threat throughout the world and within the United States. A variety of political, social, religious, cultural, and economic factors underlie terrorist activities. Terrorists target civilian targets to spread their message or communicate dissatisfaction with the status quo. The media interest generated by terrorist attacks makes this a high visibility threat.

The City of Beverly Hills is known around the world for its wealth, hosting visiting international dignitaries and celebrities, and to being the home to many famous people. This makes the City a target for terrorist activity.

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 activity runs the gamut from simple letter bombings, assassinations with small arms, bio-chemical attacks, car, and suicide and building bombings to full-out attacks.

Bombings and arson remain significant sources of terrorist activity. Related threats include bomb threats, which disrupt the normal operations. Venues likely to suffer the impact of terrorism include government facilities, entertainment and cultural facilities: the business triangle, City Hall, Rodeo Drive and the popular hotels are possible targets*. Conventional political motivations for terrorism continue, however, issues involving weapons proliferation, organized crime and narcotics trafficking are seen as having increasing influence. The potential for chemical, biological, radiation, nuclear, and explosion or (CBRNE) is a concern. Recent events make CBRNE emergencies a plausible scenario necessitating the detailed contingency planning and preparation of emergency responders to protect the civilian populace in Beverly Hills and in Los Angeles County.

HISTORY OF TERRORIST EVENTS IN BEVERLY HILLS

The City of Beverly Hills is an internationally known community with strong political and economic ties. Beverly Hills is frequently the focus of political events, dignitary visits, demonstrations and marches. It is routine for Heads of State to visit and conduct business within the City. These factors make Beverly Hills an attractive potential target. Acts of terrorism are not new to Beverly Hills. One need only recollect the turbulent times during the 1960's, 70's and 80's, which were noted for anti-war and anti-government incidents, which included marches, riots and bombings within the city limits. One such bombing occurred in June of 1978 at the Doheny Plaza Theater, directed against Palestinians. Another bombing occurred in June of 1980 at the House of Iran, which was an Iranian cultural center.

In the City of Beverly Hills, the Police Department shall be the lead agency for City response. The City's Office of Emergency Management is responsible for consequence management. The following is a chart of Domestic Terrorist incidents in California since 2005, as identified by the Federal Bureau of Investigation (FBI).

Chart 26. Summary of Terrorist Incidents in California , 2005 - Present

Date	Location	Incident Type	Perpetrator	Killed	Injured
1/05-2/05	Auburn, Sutter Creek CA	Attempted Arson and Arson	Earth Liberation Front	0	0
4/13/2005	Sammanish, WA	Arson	Earth Liberation Front	0	0
7/7/2005	Los Angeles, CA	Arson	Animal rights extremists suspected	0	0
9/16/2005	Los Angeles, CA	Arson	Animal Liberation Front	0	0
11/20/2005	Hagerstown, CA	Arson	Earth Liberation Front	0	0
11/29/2005	San Diego, CA	Arson	Earth Liberation Front	0	0
8/2/2008	Santa Cruz, CA	Several civilians including children wounded in incendiary	Animal rights extremists suspected	0	4
3/7/2009	Los Angeles, CA	1 automobile damaged in arson	Animal rights extremists suspected	0	0

source: "Terrorism 2002-2005", Federal Bureau of Investigation (FBI), 2007, National Counter-Terrorism Center

TERRORISM HAZARD IDENTIFICATION

Defining Terrorism

The United States Code defines terrorism as premeditated, politically motivated violence perpetrated against noncombatant targets by sub-national groups or clandestine agents usually intended to influence an audience. The United States Department of Justice defines terrorism as a violent act dangerous to human life, in violation of the criminal laws of the U.S. or any segment to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives. The FBI defines terrorism as the unlawful use of force or violence against persons or property to intimidate or coerce government, the civilian population, or any segment thereof, in furtherance of political or social objectives. Terrorists are categorized based on their actions, not beliefs. Even if we have sympathy for their cause, they are still criminals.

All three of these definitions share important components: (1) criminal action; (2) the action must include violence against civilians; and (3) the action is carried out in order to further political or social objectives; and (4) the action is intended to coerce a government or civilian population.

Law enforcement has been able to categorize various terrorism groups. They are as follows:

→ Right Wing Terrorist Groups

Often engage in survivalist/ paramilitary training to ensure the survival of the U.S. as a white, Christian nation. Many extremists work through political involvement; however, some are members of the "militia" or "patriot" movement, and cannot work within

existing structures of government. It is not illegal activity to belong to a militia. Many members of militias express that an impending armed conflict with the federal government necessitates paramilitary training and the stockpiling of weapons. The growth of the militia movement can be attributed to an effective communication system through the use of the Internet, videotape, gun shows, etc. Another phenomenon related to militias is "Common Law Courts."

Also known as citizen grand juries, common law courts are self-elected vigilante organizations that claim for themselves the authority of law. They use these courts to declare themselves outside the jurisdiction of federal and state laws, issue harassing liens against the property of political opponents, and proclaim their right to arrest, judge, and even kill their opponents.

→ Left-wing Terrorist Groups
Typically, left-wing groups profess a revolutionary socialist doctrine and view themselves as protectors of the American people against capitalism and imperialism. They believe that bombings alone will not result in change, but are tools to gain publicity for their cause.

→ Special Interest Terrorist Groups
Special interest terrorist groups differ from traditional right- and left-wing groups in that they pursue specific objectives. These terrorist groups attempt, through their violent criminal actions, to force members of society to change their attitudes about issues considered important to them. Some special interest groups include animal rights activists, right to life groups, environmental preservation groups and abortion rights groups.

→ International Terrorist Groups
International terrorism against the U.S. is foreign based and/or directed by countries or groups outside the U.S. State sponsors view terrorism as a tool of foreign policy. State sponsors continue to engage in anti-Western terrorist activities by funding, organizing, networking, and providing other support to many extremists.

→ Formalized Terrorist Groups
Some terrorist groups are more formalized and are autonomous organizations with their own infrastructure, personnel, financial arrangements, and training facilities. Examples of such groups include: (1) Hezbollah; (2) Irish Republican Army and (3) Sikh

→ Loosely Affiliated International Radical Extremists
The last type of terrorist groups are loosely affiliated international radical extremists. Such groups are neither surrogates of, nor strongly influenced by any one nation. They can tap into a variety of official and private resource bases.

Weapons of Mass Destruction (WMD)
Terrorists could attack in different ways. Until very recently, no one seriously thought that weapons of mass destruction would ever be used against U.S. targets. Most law enforcement officers know very little about WMD. Law enforcement agencies with more immediate problems have had little time to prepare for a potential WMD attack. The Police Department first responders have become familiar with WMD. Officers have undergone training and are aware of WMD and how they can be used.

WMD can be categorized into five categories using the acronym B-NICE: Biological, nuclear, incendiary, chemical and explosive. The typical routes for exposure to the body include inhalation, ingestion, absorption and/or injection. Each category is further described below.

Biological
The four most common types of biological agents are bacteria, viruses, rickettsia, and toxins. These agents occur in nature, however they can be, and have been, produced by man for use as weapons.

Nuclear
Nuclear terrorism can occur in two different ways: either detonation or threat of detonation of a nuclear bomb; or dispersion of radiological material using a conventional explosive or other dispersal device. Nuclear terrorism threat is on the rise due to recent activity amongst foreign countries and the discussions regarding their nuclear capabilities. Recent revelations have surfaced regarding the ability to purchase uranium. Because of this current climate, the potential for the creation of "Dirty Bombs" or a small nuclear device is a strong possibility.

Incendiary
An incendiary device is any mechanical, electrical, or chemical device used to intentionally initiate combustion and start a fire.

Chemical
Chemical agents can be classified into five categories: nerve agents, blister agents, blood agents, choking agents, and irritating agents. These agents are man-made.

Explosive
Explosive devices are the most common WMD (70% of all terrorist attacks). The Oklahoma City Federal Building bombing and the attack on the World Trade Center in New York are classic examples.

RISK ANALYSIS
The probability that an individual/location will be targeted by a terrorist is a function of several factors: attractiveness of target, potential for success and potential for avoiding identification and capture. Some terrorists are willing to die for their cause and will select targets regardless of the probability of identification or capture. It is difficult to determine what individual or location will be targeted, however, law enforcement experts

agree that a key element is "symbolism." The higher the profile of the target, the better in the terrorist mind. Examples include:

a. Federal, state, and local government buildings
b. Mass-transit facilities
c. Public buildings and assembly areas
d. Controversial businesses
e. Communication and utility facilities
f. Water supply locations
g. Research laboratories
h. Places where large groups of people congregate

It is not possible to estimate the probability of a terrorist attack. However, based on law enforcement's role in combating terrorism as indicated in the chart below, the City has identified critical sites and will assess the vulnerability of these sites to a terrorist attack. As previously indicated, sites that are most likely to suffer the impact of terrorism include government facilities, such as City Hall, and entertainment and cultural facilities such as the business triangle, Rodeo Drive and the more popular hotels. The following chart list several tasks and roles which identify law enforcement's role in combating terrorism.

Chart 27. Law Enforcement Role in Combating Terrorism

A. On-going attention to known potential targets within the service area
B. Identification of new potential targets within the service area
C. Identification of suspicious persons, places, or things which may be related to potential terrorist activity
D. Recognition of potential surveillance and intelligence-gathering activities
E. Recognition of potential terrorist involvement in routine crimes (ID theft, shoplifting, credit card fraud, forgeries, etc.)
F. Organizing and informing community resources regarding anti- terrorism
G. Ability to respond safely and effectively to a terrorist incident or a terrorist use of a WMD.
H. Identify the Terrorist Group
I. Remove Financial Support
J. Monitor Weapons/Materials: No Weapons, No Attack Anywhere
K. Threat/Vulnerability Assessment
L. Counter Surveillance
M. Target Hardening
N. Awareness of Suspicious Behavior as Terrorists Egress From Target
O. Additional Indicators
--Equipment
--Training/Rehearsal Indicators
--General Indicators/Characteristics

WHAT IS SUSCEPTIBLE TO TERRORISM

Damage caused by a terror attack depends on the method of attack. As the intensity of the attack increases, the potential for death and injuries, property damage or destruction and general chaos also increases.

EXISTING MITIGATION ACTIVITIES

Currently the City of Beverly Hills Police Department is implementing projects to help prevent a terrorist situation or be highly prepared if one were to occur. The following are practices or projects that are currently active in the city.

Police Officer First Responder Training – The City of Beverly Hills Police Department has completed training of officers which includes training on Weapons of Mass Destruction (WMD). In addition, training for new hires is on-going. All officers are trained and equipped for operational level. Currently the Police Department conducts its own in-house training. The course, "Hazardous Materials, Weapons of Mass Destruction, First Responder Operations, and Law Enforcement Field Support Course." is a 16 hour training and is mandatory for all newly hired officers. The course of instruction covers the first responder's role for Haz Mat and WMD (nuclear, biological, chemical, biological, incendiary and explosive) incidents, types of Haz Mat and WMD incidents, recognizing Haz Mat and WMD incidents, hazards of Haz Mat and WMD incidents, safe response to Haz Mat and WMD incidents, essential notifications, ICS organization and principles, protective clothing, respiratory protection, and pre-activity and post-activity assessment. Training is also on-going in this area through roll call and scheduled department training sessions as new information and/or response procedures are identified or improved upon.

Risk Assessment/ Critical Infrastructure Vulnerability Study

The Police Department along with the Office of Emergency Management conducted a threat assessment of critical locations in the City. The assessment is complete and ongoing; critical structures were identified.

The City of Beverly Hills Police Department's *High Tech Crime Task Force* and *Special Tactics Unit,* in conjunction with the *Tactical Assessment and Deployment Office,* are continuing to assess and update threat assessments of critical locations in the City. This involves assessing the cyber component along with the physical component of each location.

Specifically, an on-going assessment entails an analysis of the infrastructure components focusing on the cyber component and how that component interfaces with the physical component and vice versa. Also, the Units are analyzing the impacts if one or the other component is attacked or compromised, what would be the cascade affect impacting operations of the infrastructure. All systems are investigated from a segmented as well as integrated perspective and assess the impact of attacks on integrated systems and potential consequences.

The Police Department is fortunate to have a Special Agent from the United States Secret Service assigned to the BHPD operated High Tech Crime Task Force and he, along with

a BHPD officer are working in conjunction with our Special Tactics Unit and Tactical Assessment and Deployment Office to assess the vulnerabilities of the following areas:

1.) Department of Water
2.) City Fiber Network
3.) Police Department HQ and Operations facilities
4.) Fire Department HQ and Operations facilities
5.) Power substation hosted by SCE adjacent to the BHPD main facility.
6.) GIS for all key infrastructure components
7.) Traffic Management System (Cameras maintained and operated by the city, etc.)

Target Hardening
The City has implemented a thorough upgrade City facilities to provide the utmost efficiency for and improve security. The City has installed and monitors a security program which has created a high level of security for all buildings where City business is conducted. The system includes a card key access feature which offers increased control. A Closed Circuit Television program has been initiated.

The following are the series of upgrades that were implemented between 2006-2009.

- A second exit for the Police Station (from garage to Civic Center Drive) as an alternate means for Police to exit facility was created.
- In 2009,all main entrance doors were upgraded to operate with electronic doors. Additional surveillance cameras and monitors where added to support the night-time lock down operations. Cameras were installed in the Police Department (including the jail), Coldwater Park and Fire Station #2, reservoirs (Walker, Green Acres, Woodland Dr, Sunset Blvd / Rexford Dr), water pump station, in the business district at Rodeo Dr/Brighton Way intersection, City Hall Tower, and at Hawthorne, Beverly Vista, and Horace Mann Schools.
- Surveillance cameras are being monitored at the Police Department , through the Watch Commander's desk and Communications/Dispatch Center additionally Public Works, IT, and City Hall.
- Video recording system was installed to reinforce overall safety of the Police Department.
- A permanent guard station was created for visitor check-in for City Hall entrance.
- Conceptual designs have been prepared to reconfigure the roadway at Rexford Drive and Civic Center to resemble a standard "T" intersection to improve safety for pedestrians accessing the facilities.
- Working with the City's IT Department, the Access control system was replaced at City Hall, Police Facility, IT Facility and Library
- Stop sign added, for safety measures at Rexford Drive and Civic Center junction

Emergency Equipment Purchases
The City has invested in a variety of WMD monitoring and response equipment and has purchased PDE's for all first responders.

FBI Joint Terrorism Task Force
City of Beverly Hills Police Department has an officer from the BHPD *Intelligence Unit* assigned as a member of the Federal Bureau of Investigation (FBI) Joint Terrorism Task Force.

Cyber-Terrorism Prevention
In 2008 the City conducted critical updates to the server and storage infrastructure. Electrical systems and HVAC in the Data Center were updated for greater reliability and environmental controls. In 2009 the City strengthened network and systems security by updating the firewall system, enhancing network security with system upgrades and enhanced monitoring tools, and updating the storage area network. This is in-progress mitigation and an upgrade to Enterprise Storage System and replacement of Library Tape Open system is expected to be completed in 2010.

Terrorism Public Awareness – Community Education
Currently the Police Department Crime Prevention Unit through the Neighborhood Watch Program, along with the Office of Emergency Management and Fire Department through its CERT classes are involved in encouraging and educating the public to be vigilant through terrorism awareness programs. This project has been going on since 2002. The goal of the project is to better inform the public on terrorist issues. The Police Department does this through community outreach such as coordinating Neighborhood Watch meetings and community programs.

Intelligence
In July 2004 the Police Department created an intelligence unit as to have a full time intelligence detail team and is still active today. Members of the department have received a variety of security clearances including "Top Secret" clearances. Teams monitor local, state and federal intelligence daily.

Emergency Services Bureau
Created in March of 2004 the Police Department has created a Bureau with the Police Department to deal specifically with emergency services and tactical issues.

Explosive Sniffing Canine
Acquired in 2003, the City of Beverly Hills purchased a canine specifically trained to sniff out explosive materials. The Police Department is responsible for training and maintenance of the canine and its skills. The canine serves as a great asset to the community by possibly preventing the loss of life and property in the case of a bomb threat emergency.

TERRORISM MITIGATION STRATEGIES
Section 4 of this Plan contains a list of the Terrorism Mitigation Strategies.

SECTION 9

FLOOD

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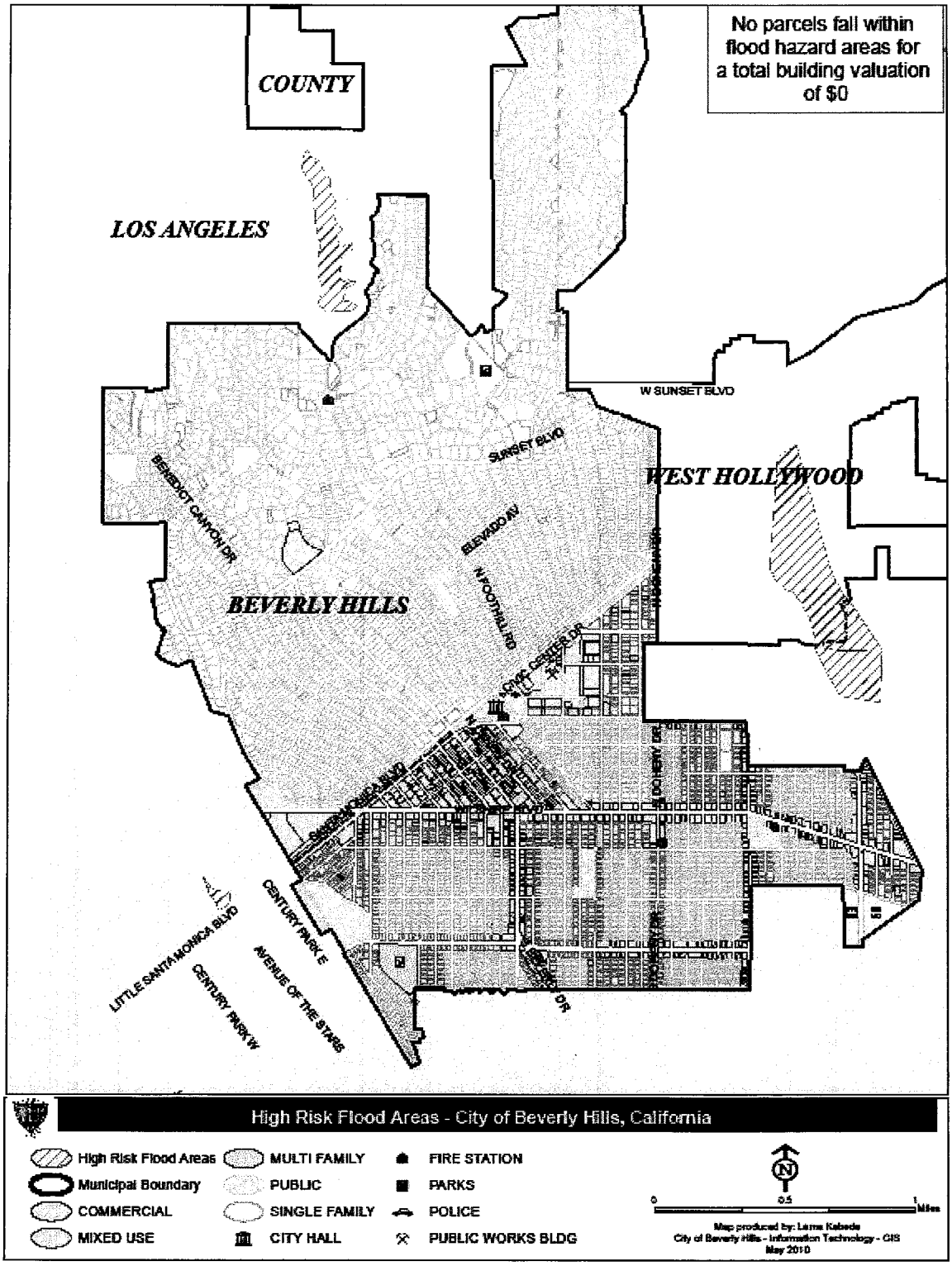
WHY ARE FLOODS A THREAT TO THE CITY OF BEVERLY HILLS

Flooding poses a threat to life and safety, and can cause severe damage to public and private property. Flooding events have occurred predominantly in the southeastern and northeastern sectors of the City, contiguous with the cities of Los Angeles and West Hollywood, respectively. The northeastern sector is bounded by Doheny Drive from Elevado Avenue to Third Street to the east, Santa Monica Boulevard and Civic Center Drive to the west. The southeastern sector is bounded by San Vicente Boulevard to the east, Burton Way/Clifton Way to the north, and La Cienega Boulevard to Olympic Boulevard to the south. This sector experienced a significant event in February 1978, causing the explosion of a natural gas service, loss of business and numerous flooding of multi- family residential and commercial properties with subterranean parking. Similar, but less severe flooding events occurred in 1980, 1992 and 1993. Map 13 illustrates a map of the City of Beverly Hills with no known flood and/or flooding areas in the City. Since 1993, no major flooding has occurred in the City. In the winter of 2010 Southern California experienced major winter storms with no flooding occurrences in the City. Therefore this threat has greatly decreased by the Holly Hills mitigation storm drain project.

Map 13. City of Beverly Hills Flood Areas



The City of Beverly Hills was most recently affected by flooding in February 2003, causing flooding of subterranean garages, loss of personal property, including vehicles, and temporary loss of electric and gas service to the buildings in the 300 North Oakhurst Drive/Doheny Drive areas. Fortunately, none of flooding events in this city has had and significant long-term effects.

HISTORY OF FLOODING IN THE CITY OF BEVERLY HILLS AND THE LOS ANGELES AREA

The City of Beverly Hills, which is located within the Los Angeles Basin, has historically experienced flooding from major winter storm events. The City is at the southern edge of the Santa Monica Mountain range and approximately 12 miles east of the Pacific Ocean. Significant rainfalls typically drain quickly from the elevated areas northerly of and both in and outside the City are channeled through the regional Los Angeles County Flood Control System that traverses through the city.

Long-term precipitation (1950 – 2002) in this area is based on data collected and recorded by the Los Angeles County Department of Public Works (LACDPW) and the City's rain gauge station at City Hall. Annual precipitation ranges from a minimum of zero (recorded in 1989) to a maximum of 59.13 inches (1998 El Nino). Very little precipitation is recorded between the months of May and October although an average of 17.3 inches of rain is measured annually. Rain fall increases northward toward the Santa Monica Mountains to the north and northwest, and decreases toward the center of the Coastal Plain.

Historical annual precipitation and cumulative departure from mean annual precipitation for Beverly Hills demonstrate the severity and extent of dry and wet periods, the information below indicates five cyclical variations in the precipitation pattern between 1930 and 2009.

1. 1930 to 1976: a dry period
2. 1978 to 1983: an overall wet period
3. 1984 to 1990: a relatively dry period
4. 1991 to 1998: a relatively wet period
5. 1999 to 2004: a dry period
6. 2004 – Present: a dry period, and entering fourth year of drought.

The City of Beverly Hills is part of the coastal plain of Los Angeles County. The majority of the surface area in Beverly Hills is completely urbanized restricting percolation of rain water into the ground. Mountain runoff flows from the base of the Santa Monica Mountains in a south, and southeasterly direction.

While the City of Beverly Hills is approximately ten miles west, of Los Angeles, it is not so far away as to not be affected by the heavy rains that brought flooding to Los Angeles. In addition, the towering mountains that give the Los Angeles region its spectacular views also bring a great deal of rain out of the storm clouds that pass through. Because

the mountains are so steep, the rainwater moves rapidly down the slopes and across the coastal plains on its way to the ocean.

"The Santa Monica, Santa Susana and Verdugo mountains, which surround three sides of the valley seldom reach heights above three thousand feet. The western San Gabriel Mountains, in contrast, have elevations of more than seven thousand feet. These higher ridges often trap eastern-moving winter storms. Although downtown Los Angeles averages just fifteen inches of rain a year, some mountain peaks in the San Gabriel's receive more than forty inches of precipitation annually" (Gumprecht, Blake, 1999, Johns Hopkins University Press, Baltimore, MD.)

Naturally, this rainfall moves rapidly downstream, often with severe consequences for anything in its path. In extreme cases, flood-generated debris flows will roar down a canyon at speeds near 40 miles per hour with a wall of mud, debris and water tens of feet high.

In Southern California, stories of floods, debris flows, persons buried alive under tons of mud and rock and persons swept away to their death in a river or flood channel flowing at thirty- five miles an hour are without end. No catalog of chaos could contain all the losses suffered by man and his possessions from the region's rivers and streams.

What Factors Create Flood Risk?
Flooding occurs when climate, geology, and hydrology combine to create conditions where water flows outside of its usual course.

As described earlier, due to the close proximity to the Santa Monica Mountain range and the variations of typography ranging from an elevation of 250 feet to 1600 feet, flood waters have the potential to contribute to flooding hazards. Furthermore, due to continued growth, economic development and an increase of impermeable areas, the regions storm water collection and conveyance system were fast becoming incapable of safely disposing urban runoff. Thus, contributing to flooding conditions in the region and in particular, the flood zone areas earlier described in this section.

As a result of the need for flood control, the Los Angeles County Flood Control District was established in 1915. Currently, the Los Angeles County Flood Control District's Drainage Area flood control system is one of the world's largest and most extensive flood protection infrastructures. More recently, the system has undergone extensive upgrades and includes the recently completed construction of the Hollyhills Unit 7 Drainage System, a regional storm water conveyance system specifically constructed to replace the undersized drainage system that served both flood zone sectors of this city and contiguous areas of Los Angeles.

The Los Angeles County Department of Public Works in 2005 performed an analysis of the Hollyhills Unit 7 drainage system. The City has not experienced flooding in this area since this project was completed.

Another relatively regular source for heavy rainfall, particularly in the mountains and adjoining cities is from summer tropical storms. These tropical storms usually coincide with El Nino years.

El Nino is a disruption of the ocean-atmosphere system in the tropical Pacific having important consequences for weather in California. Among these consequences are increased rainfall across the southern tier of the US and Peru, which has caused destructive flooding and drought in the West Pacific. During El Nino, the trade winds begin to relax in the central and western Pacific leading to a depression of the thermocline in the eastern Pacific and an elevation of the thermocline in the west. The result was a rise in sea surface temperature and a drastic decline in primary productivity, the latter of which adversely affected higher tropic levels of the food chain, including commercial fisheries as well. The weakening of the easterly trade winds during El Nino and the increase of rain fall follows the warm water eastwards, with associated flooding in the west. The eastward displacement of the atmospheric heat source overlaying the warmest water results in large changes in the global atmospheric circulation, which in turn forces changes in weather far removed from the tropical Pacific. December 1997 was near the peak of a strong El Nino year. There was also El Nino in 1991 – 1992, 1993-1994, 1994-1995 and according to the National Service Southern California is in an El Nino period through March 2010.

Flooding is often triggered by periods of short, heavy and intense rain fall. The majority of the surface area in Beverly Hills is completely urbanized, restricting percolation of rain water into the ground. Mountain runoff flows from the base of the Santa Monica Mountains in a southerly direction.

Winter Rainfall

Over the last 125 years, the average annual rainfall in Los Angeles is 14.9 inches. But the term "average" means very little as the annual rainfall during this time period has ranged from only 4.35 inches in 2001-2002 to 38.2 inches in 1883-1884. In fact, in only fifteen of the past 125 years, has the annual rainfall been within plus or minus 10% of the 14.9 inch average. And in only 38 years has the annual rainfall been within plus or minus 20% of the 14.9 inch average. This makes the Los Angeles basin a land of extremes in terms of annual precipitation.

As of March 31, 2010, statewide hydrologic conditions were as follows: precipitation, 105 percent of average to date; runoff, 65 percent of average to date; and reservoir storage, 85 percent of average for the date (California Department of Water Resources). The City of Beverly Hills Public Works Department has recorded 18.8 inches of rain since October 1st, 2009 to date.

Long-term annual precipitation

Two striking features of Los Angeles rainfall are its seasonal nature and its reflection of topographic effects. Over the entire Los Angeles Basin, excluding mountain locations, the average annual precipitation ranges less than 12 inches at the immediate coast to more than 20 inches at the foothills. According to the National Oceanic and Atmospheric

Administration, the monthly average rainfall for Los Angeles between 1921 – 2005 was 14.87.

On average, 92 percent of the seasonal precipitation falls between November 1st and April 30th. This percentage is roughly the same for all stations, regardless of elevation or distance from the ocean.

Seasonal rainfall variability was strongly demonstrated once again in Los Angeles during the 1998 calendar year. LAX received 352 % of normal rainfall within the first six months of 1998, but only 63% of normal in the second half of the year. The end of a very wet El Nino episode and the transition to a dry La Nina circulation was responsible for the change.

On a longer term, the 100- year change in rainfall rates within California in general and Los Angeles County in particular is practically nil: however, there was an apparent increase in the number of heavy precipitation in the last two decades of the twentieth century. From 1943 to 1992 (a period of almost fifty years) extreme rain falls occurred in southern California on only five occasions. This time span covered an era of incredible growth with the Los Angeles Basin and the concurrent flood control construction projects has tamed the flood-prone communities of Los Angeles . Heavy rainfall events were noted in the basin during the years 1992, '93, '95, '97, and '98 – helping to make the decade of the nineties the wettest since the 1930's and early "40s.

Geography and Geology

The greater Los Angeles Basin is the product of rainstorms and erosion for millennia. "Most of the mountains that ring the valleys and coastal plain are deeply fractured faults and, as they (the mountains) grew taller, their brittle slopes were continually eroded. Rivers and streams carried boulders, rocks, gravel, sand, and silt down these slopes to the valleys and coastal plain. In places, these sediments are as much as twenty thousand feet thick" (Ibid). Much of the coastal plain rests on the ancient rock debris and sediment washed down from the mountains. This sediment can act as a sponge, absorbing vast quantities of rain in those years when heavy rains follow a dry period. But like a sponge that is near saturation, the same soil fills up rapidly when a heavy rain follows a period of relatively wet weather. So even in some years of heavy rain, flooding is minimal because the ground is relatively dry. The same amount of rain following a wet period of time can cause extensive flooding.

The City of Beverly Hills geologic features consists of mainly un-consolidated and semi-consolidated alluvial materials underlain and bounded on the north and east by consolidated sediments and crystalline rocks. The deposits consists of a shallow layer of Quaternary fill that has been washed down from the Santa Monica Mountains. The materials are generally poorly sorted sands and gravels, intermingled with silts and clays. The greater Los Angeles basin including this City is for all intents and purposes built out. This leaves precious little open land to absorb rainfall. This lack of open ground forces water to remain on the surface and rapidly accumulate. If it were not for the massive flood control system with its concrete lined river and stream beds, flooding would be a

much more common occurrence. And the tendency is towards even less and less open land. In- fill building is becoming a much more common practice in many areas. Developers tear down an older home which typically covers up to 40% of the lot size and replacing it with three or four town homes or apartments which may cover 90-95% of the lot.

Another potential source of flooding is "asphalt creep." The street space between the curbs of a street is a part of the flood control system. Water leaves property and accumulates in the streets, where it is directed towards the underground portion of the flood control system. The carrying capacity of the street is determined by the width of the street and the height of the curbs along the street. Often, when streets are being resurfaced, a one to two inch layer of asphalt is laid down over the existing asphalt. This added layer of asphalt subtracts from the rated capacity of the street to carry water. Thus the original engineered capacity of the entire storm drain system is marginally reduced over time. Subsequent re-paving of the street will further reduce the engineered capacity even more.

FLOOD HAZARD IDENTIFICATION

A flood, as defined by the National Flood Insurance Program is: 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 from: overflow of inland or tidal waters; unusual or rapid accumulation or runoff of surface waters from any source, or mudflow.

The standard for flooding is the so called "100 year flood" a benchmark used by the Federal Emergency Management Agency (FEMA) to establish a standard flood control throughout the country. Thus, the 100- year flood is also referred to as the regulatory or baseline for all flooding events.

Flood maps and Flood Insurance Studies (FIS) are often used to identify flood-prone areas. The National Flood Insurance Program (NFIP) was established by Congress in 1968 in response to the rising costs of taxpayer funded disaster relief for flood victims and the increasing amount of damage caused by floods. The Mitigation Division, a component of the Federal Emergency Management Agency manages the NFIP. The NFIP is self-supporting for the average historical loss year, which means that operating expenses and flood insurance claims are not paid for by the taxpayer, but through premiums collected for flood insurance policies. The Program has borrowing authority from the U.S. Treasury for times when losses are heavy, however these loans are back with interest.

The Program provides 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. The NFIP and related building code regulations went into effect on March 1, 1978. NFIP regulations (44 Code of Federal Regulations (CFR) Chapter 1, Section 60, 3) require that all new construction in floodplains must be elevated at or above base flood level.

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 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 NFIP provide assessments of the probability of flooding at a given location. FEMA conducted many Flood Insurance Studies in the late 1970s and early 1980s. These studies and maps represent flood risk at the point in time when FEMA completed the studies. However, it is important to note that not all 100-year or 500-year floodplains have been mapped by FEMA. FEMA flood maps are not entirely accurate. These studies and maps represent flood risk at the point in time when FEMA completed the studies, and does not incorporate planning for floodplain changes in the future due to new development. Although FEMA is considering changing that policy, it is optional for local communities. Man-made and natural changes to the environment have changed the dynamics of storm water run-off since then.

FEMA mapped the 100 -year and 500-year floodplains through the Flood Insurance Study (FIS) in conjunction with the United States Army Corps of Engineers (USACE) in August of 1987. There were previous studies done, including a Housing and Urban Development (HUD) study, which mapped the floodplain in March of 1978, The county has updated portions of the USACE and FEMA maps through smaller drainage studies in the county since that time.

Flood Areas in the City
FEMA has classified the City under Zone "C", which does not require mandatory flood mitigation enforcement. Properties are therefore not required to carry flood insurance.

Aside from FEMA's designation, the City of Beverly Hills has a local ordinance that restricts construction below the flood level in two areas. These areas are designated as "Flood Hazard Area" by the City and are prone to water intrusion.

The City of Beverly Hills is susceptible to flash or fast rise flooding because a high percentage of the surface area is composed of impervious streets, roofs, and parking lots. Flooding would tend to occur in the winter months. They can occur within several seconds to several hours, with little or no warning.

Urban flooding primarily affects the City of Beverly Hills. Flooding of areas may occur when the amount of water generated from rainfall and runoff exceeds a storm water system's capability to remove it. These issues are addressed in the Storm Drain Master Plan. In addition, low- lying areas have the potential to flood.

The City has municipal codes that provides for the protection of residential and non-residential structures in Flood Hazard areas. Title 9, Chapter 7, Protection of Subterranean Construction from Water Intrusion provides provisions for floor levels and openings for residential and non-residential structures and protection of new and existing mechanical and electrical systems. This municipal code is supported by Ordinance 96-0-2269, adopted on November 15,1996, which provides a program to assist building owners in certain areas of the City, to identify and voluntarily mitigate potential hazardous conditions that may result in water intrusion from a 100 year storm. In addition, in Chapter 6, Article 3 is guidance for disaster repair and recovery

Storm Drain Master Plan

In November, 1999, the City performed a study titled "The City of Beverly Hills Storm Drain System Master Plan" that was prepared by Psomas Engineering, Inc. The purpose of the master plan was to provide a comprehensive drainage study to insure that changes in population density, land use and impervious surfaces have not caused deficiencies to develop. Furthermore, the hydrologic and hydraulic analysis was to identify and inventory existing storm drain facilities (streets, piping and structures) and those areas where deficiencies occurred, rank their severity, and provide opinions for system upgrades and recommend a Capital Improvement Program (CIP) to initiate corrections.

Although a model of the City's drainage system was performed and identified deficiencies throughout the drainage system, most of the deficiencies were found to be attributed to two important factors. 1) Prior to 1980, when many of these drain were constructed, the Los Angeles County Flood Control District designed systems based on the use of 21% residential impervious factors. The Los Angeles County Department of Public Works has significantly increased this factor to 45%, essentially doubling the runoff flow; and 2) The Los Angeles County Modified Rational Method of Analysis is generally recognized as a conservative model that assumes worst case scenarios and predicts relatively high flows which may only marginally appear during actual events. Basically, the Modified Rational Method estimates runoff from approximate 40 acre areas, then integrates and routes the flows through the drainage system. It was prepared for 10-, 25-, and 100 year return interval storms.

After initial studies it was determined that it would be best to replace piping, valves, tanks, and pump stations instead of the original retrofitting recommendation. Project was delayed initially because of funding constraints but construction is set to begin summer 2010.

Dam and Reservoir Failure Flooding

In addition to flood hazard areas of the City that are prone to water intrusion, the City also has its own water system with its own reservoir. As with every city that has its own water system, there is the risk of a potential full or partial reservoir or dam failure. Loss of life and damage to structures, roads, and utilities may result from a reservoir or dam failure. Economic losses can also result from a lowered tax base and lack of utility profits. Several factors influence the severity of such an event: the amount of water

impounded, and the density, type, and value of development and infrastructure located downstream.

There have been a total of 45 reservoir failures in California, since the 19th century. Chart 28 below shows significant reservoir failures in Southern California are summarized below.

Chart 28. Significant Reservoir Failures in California

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

Source: http://cee.engr.ucdavis.edu/faculty/lund/reservoirs/Reservoir_History_Page/Failures.htm

The two most significant reservoir failures in Los Angeles County are the St. Francis Reservoir in 1928, which killed over 500 people and caused damage estimates topped $20 million, and the Baldwin Hills Reservoir in 1963. Five people were killed. Sixty-five hillside houses were ripped apart, and 210 homes and apartments were damaged.

In the City of Beverly Hills, the Greystone Reservoir is considered by the State Department of Water Resources as a reservoir and dam. The drinking water reservoir is a concrete structure partially below ground with a capacity of 19 million gallons. It is inspected by the state annually.

The Greystone Reservoir is located in the lower Trousdale Estates area, north of Sunset Boulevard. The reservoir was built in 1971 and is a concrete structure with a capacity of 19 million gallons of drinking water. If the reservoir were to fail, the escaping water would flow in a southerly direction. The inundation area would include Doheny Road and Foothill Road to the west, Doheny Drive to the east, Sunset Boulevard and Santa Monica Boulevard, the termination point, to the south.

The City also has a total of ten above and partially below-ground storage reservoirs. Some of these reservoirs are located in the proximity of residential structures, which could be adversely impacted by the discharge of escaping water, in the event of structural failure.

Because reservoir failure can have severe consequences, FEMA requires that all reservoir owners develop Emergency Action Plans (EAP) for warning, evacuation, and post- flood actions. Although there may be coordination with county officials in the development of the EAP, the responsibility for developing potential flood inundation maps and facilitation of emergency response is the responsibility of the reservoir owner. For more detailed information regarding reservoir failure flooding, and potential flood inundation zones, refer to the City of Beverly Hills' Emergency Operation Plan.

In addition to the City's reservoir, the Upper and Lower Franklin Canyon Reservoir are located north of and adjacent to the Coldwater Canyon Park Recreational Center on North Beverly Drive. The Upper and Lower Franklin Canyon Reservoirs are owned and operated by the City of Los Angeles. It was constructed in 1916 by William Mulholland. The Lower reservoir was the primary storage facility. The Upper reservoir was built for stability of the lower one.

During the early 1940's, the Works Project Administration (WPA) constructed the earthen flood control dam. After the 1971 Sylmar earthquake, it was discovered that the two reservoirs could not safely contain the amount of water needed for the City of Los Angeles so they were placed out-of-service and a third reservoir constructed just north of the Lower reservoir. Presently, the Lower reservoir is used to detain flood waters and is a nature preserve.

In the event of a failure of the flood control dam, the escaping water would flow into the Higgins-Coldwater Channel. This below-ground concrete channel is located on the easterly side of Coldwater Canyon Drive, north of the City's fire station and the Coldwater Canyon Reservoir. The Higgin-Coldwater Canyon system was constructed in 1962 by the Corps of Engineers.

See the Dam and Reservoir Emergency Notification List, written by the City of Los Angeles Department of Water and Power for more information on the emergency procedures for this dam.

Debris Flows
Another type of flood-related hazard is debris flows. This is often referred to as mudslides, mudflows, lahars, or debris avalanches, are common types of fast- moving landslides. Debris flows are discussed in Section 10 Earth Movements of this plan.

Floodplain
There are no specific floodplain areas in the City of Beverly Hills.

Floodway/Flood Channels
There are no floodways or above ground flood channels in the City of Beverly Hills. There are flood channels below ground that carry water from the storm drains. These channels are: Benedict Canyon Channel, Rexford Channel, West Hollywood Storm Drain and the Hollyhills Drain.

RISK ANALYSIS

Beverly Hills' risk analysis should include two components: (1) the life and value of property that may incur losses from a flood event (defined through the vulnerability assessment); and (2) the number and type of flood events expected to occur over time. Within the broad components of a risk analysis, it is possible to predict the severity of damage from a range of events. Flow velocity models can assist in predicting the amount of damage expected from different magnitudes of flood events. The data used to develop these models is based on hydrological analysis of landscape features. Changes in the landscape, often associated with human development, can alter the flow velocity and the severity of damage that can be expected from a flood event. Using GIS technology and flow velocity models, it is possible to map the damage that can be expected from flood events over time. It is also possible to pinpoint the effects of certain flood events on individual properties.

Heavy rains in January of 2004 and 2010 resulted in no flooding issues for the City. At the time of publication of this plan, data was insufficient to conduct a risk analysis for flood events in the City of Beverly Hills. However, all hazard maps are being updated for this plan and will result in better data that will assist in understanding risk.

WHAT IS SUSCEPTIBLE TO DAMAGE DURING A FLOOD EVENT

The largest impact on communities from flood events is the loss of life and property; In addition, other losses include vehicles in subterranean garages, loss of electrical and gas services, municipal services (i.e. water, wastewater, solid waste collection and disposal) and transportation.

Property Loss Resulting from Flooding Events

The type of property damage caused by flood events depends on the depth and velocity of the flood waters. Faster moving flood waters can wash buildings off their foundations and sweep cars downstream. Pipelines and other infrastructure can be damaged when high waters combine with flood debris. Extensive damage can be caused by flooding and landslide damage related to soil saturation from flood events. Most flood damage is caused by water saturating materials susceptible to loss (i.e., wood, insulation, wallboard, fabric, furnishings, floor coverings, appliances and vehicles parked in subterranean garages). As depicted in Map 12, 1233 parcels fall within flood areas for a total valuation of 1.09 billion dollars.

Business/Industry

Flood events impact businesses by damaging property and by interrupting business. Flood events can cut off customer access to a business as well as close a business for repairs. A quick response to the needs of businesses affected by flood events can help a community maintain economic vitality in the face of flood damage. There has been no significant long term effect to the business and industry sector.

Public Infrastructure

Publicly owned facilities are a key component of daily life for all citizens of the City. Damage to public water and sewer systems, transportation networks, emergency

facilities, and offices can hinder the ability of the government to deliver services. Previous mitigation measures have fixed many of the flooding problems to ground floor offices at City Hall and Parks and Recreational Centers. Water infusion devices are used in other areas where permanent mitigation is not possible.

The City's water distribution and the wastewater conveyance systems are maintained by city employees. During natural hazard events, or any type of emergency or disaster, dependable road connections are critical for providing emergency services. Roads systems in the City of Beverly Hills are also maintained by city employees.

Storm Water Systems

There is a drainage master plan, and City of Beverly Hills Public Works staff is aware of local drainage threats and deficiencies. The problems are often present where storm water runoff enters culverts or goes underground into storm sewers. Inadequate maintenance can also contribute to the flood hazard in urban areas. The City of Beverly Hills operates a wastewater collection system, which conveys the wastewater to a regional Wastewater Treatment Plant (Hyperion) that is owned and operated by the City of Los Angeles. The City of Beverly Hills wastewater is treated by this facility. The City of Beverly Hills also provides domestic drinking water to the residents as part of city services.

Water Quality problems include bacteria, toxins, and pollution. The City of Beverly Hills imports approximately 90 percent of its drinking water from the Metropolitan Water District of Southern California, The remaining 10 percent is produced locally from four municipal water wells and treated at a reverse osmosis water treatment plant.

Although the City of Beverly Hills has no known flood zones, the City is highly urbanized and as a result of increased paving, can lead to an increase in volume and velocity of runoff after a rainfall event, exacerbating the potential flood hazards. Careful attention should be given to development in the flood areas to ensure that structures are prepared to withstand base flood events. Care should be taken in the development and implementation of storm water management systems to ensure that these runoff waters are dealt with effectively.

EXISTING MITIGATION ACTIVITIES

Flood mitigation activities listed here include current mitigation programs and activities implemented by the City of Beverly Hills.

- Routine inspection and cleaning of all storm water catch basins and culverts on a monthly maintenance schedule.
- Periodic inspection and cleaning of catch basins owned and operated by the Los Angeles Flood Control District in key locations within the City prior to storm events.
- Regularly schedule street cleaning to remove organic and non-organic debris from roadways to mitigate or reduce debris entering catch basins.

Furthermore, the City of Beverly Hills uses building codes, zoning codes, and various planning strategies to address development in areas of known hazards, and applying the appropriate safeguards.

Flood Management Projects
As described previously, the Los Angeles County, Department of Public Works Flood Control District has completed a massive storm water relief upgrade of the Holly Hills Unit 7 Drainage System in 2005. This project was designed specifically to negate the flooding conditions in the southeast sector of the cities of Beverly Hills and Los Angeles. The Los Angeles County, Department of Public Works Flood Control District was the lead agency for this project. As a result of this capitol project, the Los Angeles County Flood Control District will be upgrading the floodplain maps to reflect this change in the near future.

Water Districts
The City of Beverly Hills continues to aggressively replace old cast iron pipes with more ductile iron pipes, which will be more resilient in disaster situations. During a disaster, water districts in the region work together to provide water for the City of Beverly Hills citizens. For example, the City of Beverly Hills has drinking water supply inter-ties with the City of Los Angeles, for emergency situations.

Wastewater Management
As describe previously, the City of Beverly Hills owns and operates a wastewater and storm water collection system. The wastewater and storm water collection system is maintained by City employees at regularly scheduled intervals. These intervals are increased during the fall and winter months, to mitigate the amount of leaves and other organic debris from entering into the storm water conveyance system and catch basins.

The City's wastewater is conveyed and treated at the City of Los Angeles' Hyperion Treatment Plant, which is a regional sewage treatment facility. The City's storm water collection system conveys urban and storm water runoff to a regional system owned and operated by the Los Angeles County, Department of Public Works Flood Control District. The receiving water body is the Ballona Creek, which terminates in Marina Del Ray and the Santa Monica Bay.

Stormwater Systems
There are a variety of surface water management providers in the county that manage water quality and storm water runoff from new development. The City of Beverly Hills is a Co-Permittee of the Los Angeles County, Waste Discharge Requirements for Municipal Urban and Stormwater Discharges and the Municipal National Pollution Discharge Elimination System (NPDES) Permit for Point and Non-Point source discharges. The City has in place a comprehensive program that includes enforcement of the requirements which are a part of the regional NPDES permit. The Program elements consist of: New Development Planning; New Construction and Grading Inspections; Best Management Practices; Industrial and Commercial Inspections; and Public Information and Outreach. Local authority to enforce the NPDES Permit was originally established in 1990 by the

adoption of a Municipal Ordinance, followed by amendments resulting from Permit changes such as the Standard Urban Stormwater Mitigation Plan (SUSMP) as recently as calendar year 2000.

Community Issues Summary
The City of Beverly Hills works to mitigate problems regarding flood issues when they arise. In the past, some areas in the City of Beverly Hills were more susceptible to flooding issues, and have incurred repetitive losses. With the completion of the Los Angeles County Flood Control District's Holly Hills Unit 7 Storm Drain Project, the City of Beverly Hills and contiguous areas of the City of Los Angeles should no longer be susceptible to flooding conditions and flood related damages.

Reservoirs Assessments
In order to maximize the safety of all citizens and expand water conservation efforts, the City installed automatic smart meters that detect continuous flow, tampering and reverse flow. In addition, leak detection program began in 2008. Automatic smart water meters installation began in 2008, with installation expected to be completed in 2011. In addition, a fifth of the City's 171 mile pipeline is tested each year for leaks. Because the project is in progress and other actions are yet to be completed, this will be added as a new mitigation strategy in Section 4.

FLOOD MITIGATION STRATEGIES

Section 4 contains the list of Flood Mitigation Strategies.

SECTION 10

LANDSLIDES (EARTH MOVEMENT)

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WHY ARE LANDSLIDES A THREAT TO THE CITY OF BEVERLY HILLS

Landslides are a serious geologic hazard in almost every state in America. Nationally, landslides cause 25 to 50 deaths each year (Mileti, Dennis, Disasters by Design: A Reassessment of Natural Hazards in the United States (1999) Joseph Henry Press, Washington D.C.). The best estimate of direct and indirect costs of landslide damage in the United States range between $1 and $2 billion annually (Brabb, E.E., and B.L Harrod. (Eds) Landslides: Extent and Economic Significance. Proceedings of the 28th International Geological Congress Symposium on Landslides. (1989) Washington D.C., Rotterdam: Balkema.). As a seismically active region, California has had significant number of locations impacted by landslides. Some landslides result in private property damage; other landslides impact transportation corridors, fuel and energy conduits, and communication facilities. They can also pose a serious threat to human life.

"A landslide is defined as, the movement of a mass of rock, debris, or earth flow 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. Landslides can also occur underwater, causing tidal waves and damage to coastal areas. These landslides are called submarine landslides." (Landslide Hazards, U.S. Geological Survey Fact Sheet 0071-00, Version 1.0, U.S. Department of the Interior - U.S. Geological Survey, http://pubs.usgs.gov/fs/fs-0071-00/).

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.

Landslides can be broken down into two categories: (1) slow moving; and (2) rapidly moving (generally known as debris flows). Slow moving landslides can cause significant property damage, but are less likely to result in serious human injuries. 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.

Landslides tend to 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. (Interagency Hazard Mitigation Team, State Hazard Mitigation Plan (2000) Oregon Emergency Management).

A debris or mud flow is a river of rock, earth and other materials, including vegetation that is saturated with water. This high percentage of water gives the debris flow a very rapid rate of movement down a slope. Debris flows often with speeds greater than 20 mile per hour, and can often move much faster (Barrows, Alan and Smith, Ted, DMG Note 13, http://www.consrv.ca.gov/cgs/information). This high rate of speed makes debris flows extremely dangerous to people and property in its path.

"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." (Interagency Hazard Mitigation Team, State Hazard Mitigation Plan (2000) Oregon Emergency Management).

City of Beverly Hills is located between the Santa Monica Mountains and the coastal plain of the Los Angeles Basin. Majority of the City lies in a transitional area between the mountain and the coastal plain. The present of these distinct physiographic features provides considerable topographic relief. The lowest point within the City is approximately 120 feet above sea level located at Olympic and La Cienega Boulevards. The highest point of the City is approximately 1400 feet above sea level along Carla Ridge Drive in the Trousdale Estates area of the Santa Monica Mountain.

Topography of the City of Beverly Hills is greatly influenced by the Santa Monica Mountains and the Los Angeles Coastal Basin. Hillside areas north of Sunset Boulevard are characterized as rugged topography with steep sided ridges and narrow ravines and these areas have the highest potential of landslide. Areas south of Sunset Boulevard are flat with a mild slope approximately 2 to 3 percent in the south-southwest direction and these areas have little or no danger of landslide.

HISTORY OF LANDSLIDES IN SOUTHERN CALIFORNIA AND BEVERLY HILLS

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.

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.

Earth flows are plastic or liquid movements in which land mass (e.g. soil and rock) breaks up and flows during movement. Earthquakes often trigger flows (Robert Olson Associates, Metro Regional Hazard Mitigation and Planning Guide (June 1999). Debris flows normally occur when a landslide moves down slope as a semi-fluid mass scouring, or partially scouring soils from the slope along its path. Flows are typically rapidly moving and also tend to increase in volume as they scour out the channel (Ibid). Flows often occur during heavy rainfall, can occur on gentle slopes, and can move rapidly for large distances.

Several slope failures have been reported in the northern hillside areas of the City. The major cause of the slope failures were reported to be heavy rainfalls and soil erosion. Also, the hillside residential development has placed additional loads on the subsurface bedrock which contributed to the slope failure. These failure planes are few feet deep and it extended through the soils overlaying bedrock. The reported slope failures occurred in the Santa Monica slate area that are characterized as having landslide potential due to the existence of bedding planes dipping out of the slope. No major lost of property or personal injury reported.

No significant or major debris flow resulted from landslide in the northern hillside area has been recorded in the City. Small debris flows in the City in the past have been localized and cleaned up by the City's Public Works crew. In the event of a major landslide in the hillside area, debris flow will destroy roadway pavement and fill the storm drain catch basins. Any significant surface movement along the streets that access Coldwater Canon Drive and Benedict Canon Drive could isolate residents in those areas.

CAUSES AND CHARACTERISTICS OF LANDSLIDES IN BEVERLY HILLS

Landslide Conditions

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.

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. (Planning For Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (2000), Ch 5.).

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.

In April of 2007, the City experienced the "Beverly Fire" which burned 11 acres fire in Los Angeles and destroyed one home and damaged two homes in Beverly Hills. The natural cover in the area was burned however the City experienced no debris or mud flows due to this event.

Natural Conditions

Natural processes can cause landslides or re-activate historical landslide sites. Seismic tremors can trigger landslides on slopes historically known to have landslide movement. Earthquakes can also cause additional failure (lateral spreading) that can occur on gentle slopes above steep streams and riverbanks.

Particularly Hazardous Landslide Areas

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

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

Excavation and Grading

Slope excavation is common in the development of home sites or roads on sloping terrain. Grading these slopes can result in some slopes that are steeper than the pre-existing natural slopes. Since slope steepness is a major factor in landslides, these steeper slopes can be at an increased risk for landslides. The added weight of fill placed on slopes can also result in an increased landslide hazard. Small landslides can be fairly common along roads, in either the road cut or the road fill. Landslides occurring below new

construction sites are indicators of the potential impacts stemming from excavation.

Beverly Hills Community Development Department requires a geotechnical report for grading activities for the hillside developments. Grading plan is designed and certified by a licensed geotechnical engineer in accordance with the requirements of the Beverly Hills Building Codes. The site grading and excavation will be inspected by a licensed Soils Engineer/Deputy Inspector and the City Building Inspector during construction. Proper planning and geotechnical engineering will greatly reduce the potential for landslide and slope failure.

Drainage and Groundwater Alterations

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

Road and driveway drains, gutters, downspouts, and other constructed drainage facilities can concentrate and accelerate flow. Ground saturation and concentrated velocity flow are major causes of slope problems and may trigger landslides. (Homeowners Guide for Landslide Control, Hillside Flooding, Debris Flows, Soil Erosion, (March 1997).

The Beverly Hills Building Codes require drainage devices to dispose storm runoff from the hillside development. Ultimately the storm runoff is discharged into the City's storm drain system. Catch basins are cleaned annually by City Public Works crew. Additionally to prevent any hazard, during storm events City Public Works crew drive around to make sure catch basins are cleared of debris to prevent any flooding or ponding.

Changes in Vegetation

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

LANDSLIDE HAZARD IDENTIFICATION

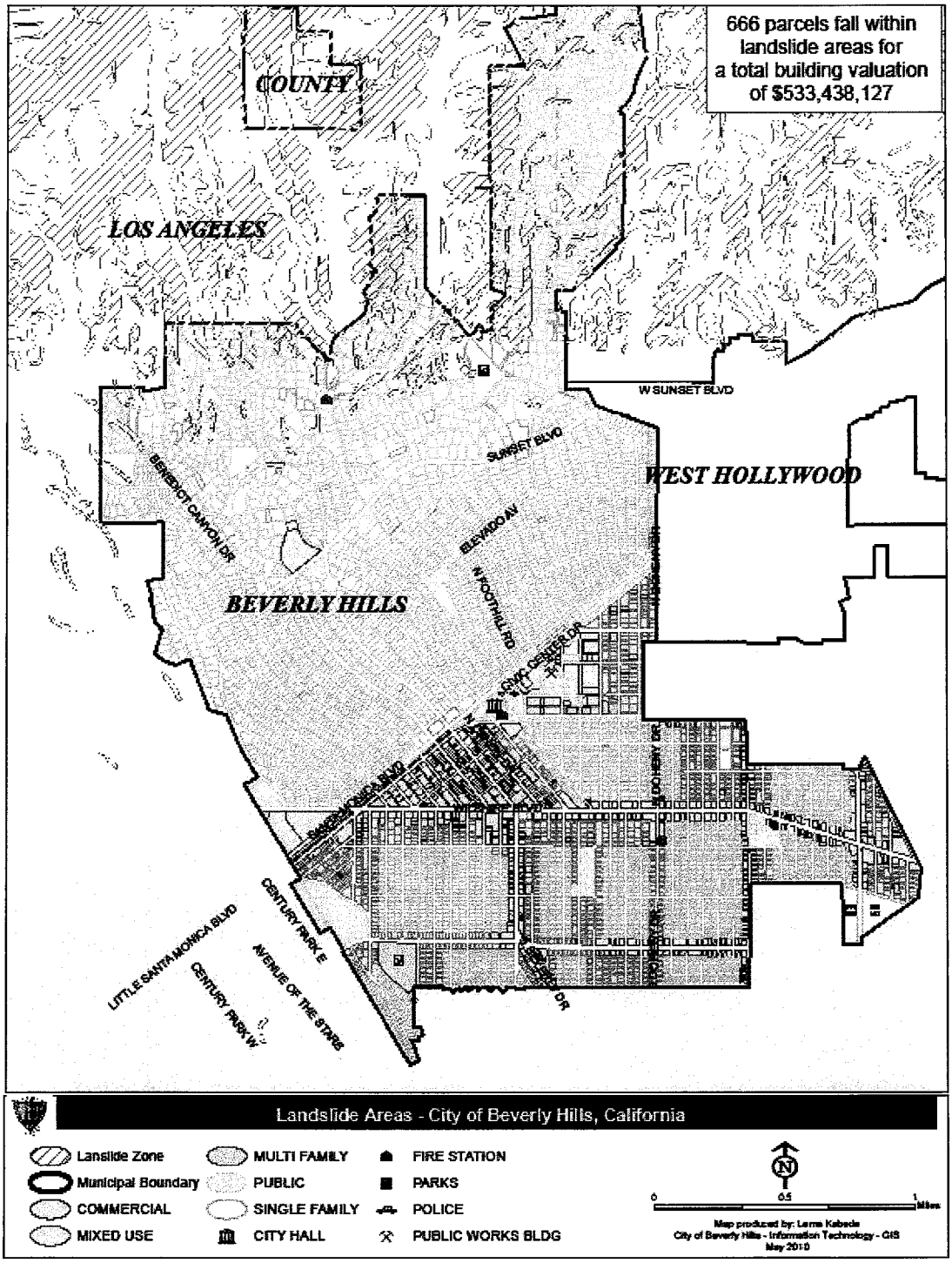
Identifying hazardous locations is an essential step towards implementing more informed mitigation activities. The State of California Department of Conservation produces and maintains seismic hazard and landslide maps which are used by the City to determine seismic and landslide risk prior to the issuance of building permits. Development in the hillside areas must comply with the Beverly Hills Building Codes requirements for slope stability. (http://www.conservation.ca.gov/cgs/geologic_hazards/landslides/Pages/Index.aspx).

RISK ANALYSIS

Vulnerability assessment for landslides will assist in predicting how different types of property and population groups will be affected by a hazard. (Burby, R. (Ed.) Cooperating With Nature (1998) Washington, D.C.: Joseph Henry Press.). Data that includes specific landslide-prone and debris flow locations in the city can be used to assess the population and total value of property at risk from future landslide occurrences.

The City of Beverly Hills Community Development Department uses the ratio of horizontal to vertical slope as an indicator of hill slope stability, using the ratio of 2 horizontal to 1 vertical as the threshold to identify potentially unstable hillside slopes. The Slope Instability Potential Map shows the hillside areas north of Sunset Boulevard that exceed the threshold limit. An estimated 20 % of the land in City of Beverly Hills exceeds this slope threshold and has potentially unstable soil.

Map 14. Slope Instability Potential Map



There are 666 parcels in Beverly Hills located in the potential landslide area. The total value of these properties is estimated approximately $533 million dollars.

While a quantitative vulnerability assessment (an assessment that describes number of

lives or amount of property exposed to the hazard) has not yet been conducted for City of Beverly Hills landslide events, there are many qualitative factors that point to potential vulnerability. Landslides can impact major transportation arteries, blocking residents from essential services and businesses. Past landslide events have caused major property damage or significantly impacted city residents, and continuing to map city landslide and debris flow areas will help in preventing future loss. Factors included in assessing landslide risk include population and property distribution in the hazard area, the frequency of landslide or debris flow occurrences, slope steepness, soil characteristics, and precipitation intensity. This type of analysis could generate estimates of the damages to the city due to a specific landslide or debris flow event.

WHAT IS SUSCEPTIBLE TO LANDSLIDES

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

The City of Beverly Hills Public Works Department, Street Maintenance Division is responsible for the cleanup of landslides that inhibit the flow of traffic or are damaging the roadway. The Public Works Department does its best to communicate with residents impacted by landslides, but can usually only repair the roadway itself, as well as the areas adjacent to the slide where the city has the right of way.

It is not cost effective to mitigate all slides because of limited funds and the fact that some historical slides are likely to become active again even with mitigation measures. The landslide can be alleviated by grading slides, and by installing new drainage systems on the slopes to divert water from the landslides. This type of response activity is often the most cost-effective in the short-term, but is only temporary. Unfortunately, many property owners are unaware of slides and the dangers associated with them.

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, which can have serious impacts on gas lines that are located in vulnerable soils.

Impacts on Development

Although landslides are a natural occurrence, residential development can substantially affect the potential for landslide failures in City of Beverly Hills. Proper planning and geotechnical engineering can be exercised to reduce the threat of safety of people, property, and infrastructure.

EXISTING MITIGATION ACTIVITIES

Landslide mitigation activities include current mitigation programs and activities that are being implemented by local or city organizations.

Landslide Building/Zoning Codes

The City of Beverly Hills Municipal Code (BHMC) Title 9 which adopted the Amendment of California Building Code (CBC) Chapters 18 and 33 addresses development on hillside slopes. These sections outline standards for hillside slope hazard areas on slopes with a ratio of 2 horizontal to 1 vertical or less. Generally, the ordinance requires geotechnical engineering and geologic studies for developments proposed on slopes of 2 horizontal to 1 vertical or less. More detailed surface and subsurface investigations shall be warranted if indicated by geotechnical 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.

The CBC requires geotechnical investigation of the potential soil liquefaction and soil strength loss during earthquakes for development in the liquefaction zones. The geotechnical report shall address potential consequences of any liquefaction and soil strength loss and discuss mitigating measures.

Hillside Development Construction

In 2004, the City has completed the multi-departmental development review process which is in continual improvement at this time. The City continues to takegreat caution to encourage applications of designs and construction technologies for steep slopes to reduce the potential adverse impacts from development Additionally on-going, the addition of the Safety Element amendments on January 12, 2010 to the included policies addressing this mitigation strategy.

Public Outreach of Landslide

The City periodically provides information to educate residents to prevent landside on hillside slopes. In addition, the Planning and Community Development departments thoroughly research and analysis building plans in potential landslide areas.

LANDSLIDE MITIGATION STRATEGIES

The landslide mitigation action items provide direction on specific activities that the city, organizations, and residents in City of Beverly Hills can undertake to reduce risk and prevent loss from landslide events. Each action item is followed by ideas for implementation, which can be used by the steering committee and local decision makers in pursuing strategies for implementation. Section 4 contains the list of Landslide Mitigation Strategies.

SECTION 11

WINDSTORMS

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WHY ARE WINDSTORMS A THREAT TO THE CITY OF BEVERLY HILLS

Severe wind storms pose a significant risk to life and property in the region by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High winds have the potential to cause damage to local homes and businesses. High winds, over prolonged periods of time, can increase the risk of urban wildfire as moisture content decreases in brush on hillsides and at urban interface areas. High winds can displace or interrupt building structural elements, trees, electrical lines and other utility services. The City currently has a tree inventory of 24,852 trees. The City of Beverly Hills is known for its lush landscape; its trees are worth millions of dollars.

CAUSES AND CHARACTERISTICS OF WINDSTORMS IN BEVERLY HILLS

High winds are generally related to thunderstorm activity, strong frontal systems or pressure gradient differences created at an interface of high and low pressure weather fronts. Most significant wind related events in the Southern California area are generally related to an anomaly termed "Santa Ana Winds". A technical description of the Santa Ana Wind condition can be accessed on a National Weather Service internet web site (http://nimbo.wrh.noaa.gov/Sandiego/snawind.html).

While Santa Ana wind conditions are indeed a concern for the general Southern California area, there seems to be a lack of correlation between the effects of these events in the Southern California area and significant effects of the same event in the City of Beverly Hills. Furthermore, the diverse topography within the City of Beverly Hills seems to favor isolated wind events whereas the hillside areas may be windy while, at the same time, the southern area of the City may remain calm. The following chart illustrates Santa Ana wind events featured in news resources during 2008-2010.

Chart 29. Santa Ana Wind News Stories

August 30th, 2008 LA Times	"September can be too hot to think about fall planting -- or to do much of anything but water. Just remember that even if Santa Ana winds kick up the temperatures, the days are short and the sun is low, new plants can still thrive."
January 29th, 2009 OC Register	"Santa Ana winds are gusting across a fairly narrow swath of north-central Orange County, reaching speeds up to 59 mph in Fremont Canyon, above the Anaheim Hills. Nearby areas are getting gusts in the 30s (see below). A high wind advisory is in effect through 2 p.m. Friday, the National Weather Service says."
March 27th, 2010 Ventura County Star	"Gusty but non-damaging Santa Ana winds Saturday will give way to warm temperatures today, but rain and possibly even snow at unusually low elevations could be on tap Wednesday and Thursday, the National Weather Service said."

Comparing National Climatic Data Center (NCDC) records for thunderstorm/high wind events affecting Los Angeles County against available computerized tree maintenance records for City of Beverly Hills street trees (1999 to present), the affects of high wind events that have occurred across Los Angeles County seem to have little historic effect on Beverly Hills street trees. More specifically, the cross reference of NCDC records of fifteen (15) high wind events occurring between 1999 and 2003 against tree maintenance records for whole tree loss to wind during the same period show the loss of one (1) tree

during a 29 November 1999 event and the loss of two (2) trees during a 6 January 2003 event.
Therefore, it appears that wind related tree damage in the City of Beverly Hills does not appear to follow Los Angeles County weather event trends. Wind related tree damage is more likely to occur during events that are isolated specifically to the Beverly Hills area.

There have been five (5) notable wind events in the City from 2004 -2009 (Chart 23). There were a total of 191 wind related incidents with trees, resulting in eight (8) cases of minor to moderate damage to parked vehicles (6) or structures (2). None resulted in significant loss of life or property. The following chart illustrates said incidents. Outside of expected impacts to tree budgets, financial impact has been minimal. In addition, the City has not had any claims for damages regarding these events. Chart 230 illustrates windstorm incidents that caused damage in the City of Beverly Hills between 2004-2009.

Chart 30. Windstorm Incident Records for Beverly Hills

Tree type	Description	Damage	Date
Callestimon citrinus	Limb down	on house-slight	12/22/2006
Erythrina	limb down-alley	fence	12/22/2006
Washingtonia robusta-private tree	private palm down	auto-moderate	12/22/2006
Jacaranda mimosifolia	limb down	auto-moderate	12/22/2006
Syagrus romanzoffiana-private tree	private tree down	garage roof-moderate	12/22/2006
Jacaranda mimosifolia	tree down	auto-slight	12/22/2006
Eucalyptus sideroxylon	limb down	auto-minor	1/5/2007
Fraxinus velutina	limb down	damage to vehicle	4/12/2007

Source: City of Beverly Hills Public Works, Parks and Urban Forest Manager
**** Note: Address locations have been omitted to secure privacy.**

Chart 31 illustrates the five major windstorm events that caused the preceding incidents.

Chart 31. Major Windstorm Events in the City of Beverly Hills

Date	Type	Magnitude	Death	Injuries	Cost of Damage
12/22/2006	High Wind	54 kts.	0	0	$0
12/27/2006	High Wind	52 - 65 kts.	0	0	$0
12/27/2006	High Wind	52 kts.	0	0	$0
4/12/2007	High Wind	75 kts.	0	0	$0
10/27/2009	High Wind	50 - 70 kts.	0	0	$0
source: http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms					

The City's comprehensive street tree care and maintenance mitigation actions decrease any potential damages to property and life as a result of a windstorm hazard. Because of the City's mitigation efforts including alternate pruning schedules, there has been a definite decrease in property damage. In the recent January 2010 storms the City experienced no property damage due to down trees in comparison to the winter storms of 2005. In conclusion, the City's mitigation efforts have proven effective.

WINDSTORM HAZARD IDENTIFICATION

A windstorm event in the City of Beverly Hills can come in the form of short term, topographically influenced, high wind gusts to extended duration Santa Ana wind conditions. Significant wind events in the City of Beverly Hills could pose a significant concern to trees and structural elements of buildings, especially as wind thrown trees and detached structural elements block or disrupt roadways and utility delivery systems. The following chart illustrates the Beaufort Scale which is used to categorize wind-related events.

Chart 32. 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.

Source: http://www.compuweather.com/decoder-charts.html

In terms of City resources, trees come to mind as potential hazards during high wind events. The leafy canopy and structural elements of a tree crown present a drag type barrier to winds. Trees are naturally engineered to minimize wind drag through the re-orientation of leaves and through the independent motion of limbs and branches to minimize the transfer of uniform sway motion forces to the trunk during wind events. The Beaufort Wind Scale (BWS-see Chart 16) specifically notes problems with trees as wind speeds increase. The BWS references the likelihood of whole tree motion as wind speeds exceed thirty two (32) miles per hour (MPH), twig breakage at thirty nine (39) MPH and whole tree windthrow as wind speeds exceed fifty five (55) MPH. The susceptibility of trees to windthrow can be influenced by the general structural condition of the trees, the location of the trees in reference to wind patterns and the level and frequency of pruning maintenance given the trees.

In the case of building structures, the likelihood of structural element detachment may be influenced by local construction code requirements, the location of buildings in reference to wind patterns and in the level of maintenance upkeep provided buildings by owners. Given the location of Beverly Hills in relation to historic Santa Ana wind flows, coupled with the topography of some areas of the City that favor the development of isolated high wind conditions; the effects of windstorms will be a continuing management concern in the City.

Using the analysis provided in the "Windstorm Characteristics in Beverly Hills" section, it can be assumed that windstorms will affect the Los Angeles area with some frequency, possibly annually. While the historic impact of these events on the City of Beverly Hills seems low, these events always stand to pose a threat to life, property, utility delivery systems, infrastructure elements and transportation. In the case that a wind event results in a major utility disruption, it may prove necessary to utilize private and City resources to aid in the care and sheltering of displaced residents. In the case of a severe event, the economic impact of providing these services on a long term basis could prove taxing. Additionally, the cost to restore disrupted or damaged City infrastructure or utility elements could be significant.

RISK ANALYSIS

Historically, windblown debris liability claims in relation to trees are considered "acts of God" from a risk management perspective, unless a known condition existed that lent to an accident. In addition to the rare frequency of this type of problem as seen in Charts 30 and 31, during the years of 2005-2009 the City of Beverly Hills has made no property damage payments as a result of downed trees.

The level of expenditures for all emergency type tree services (i.e. limb failures, clearance of private property tree failures into roadways, etc.) has decreased over the past few years from two (2) percent of the total funding availability to a current level of less than one (1) percent. As the previous analysis showed, few of the responses are directly related to wind events.

In regards to wind related damage to City structures; the City has no record of claim payments related to structural damage during windstorms during the last decade.
In summary, historical data suggests that the vulnerability and risk levels for windstorm related damage and liability in the City of Beverly Hills is low.

WHAT IS SUSCEPTIBLE TO WINDSTORMS

Life and Property

Based on the known wind patterns in the Los Angeles area, windstorms can be expected. As wind speeds increase, the likelihood that trees will be uprooted, building structural elements torn away and utility delivery elements damaged. Detached tree limbs and building elements present a significant hazard to life. As large trees are uprooted, the likelihood that loss of life or significant damage to structures and vehicles will occur increases dramatically.

Utilities and infrastructure

Many times, when power poles and lines fall to the ground, it is because a tree has fallen across the lines. Live power lines on the ground can pose a deadly electrical shock hazard to pedestrians or people trapped in vehicles. Displaced tree limbs or flying structural debris can cause power line arching and subsequent utility delivery disruptions. Windstorms can cause structural damage to buildings and other critical infrastructure, especially as trees are wind thrown. With this damage comes the potential for disruption of communications and technological systems, especially as disruption timeframes become lengthy.

Transportation

Windblown debris, tree limbs and wind thrown trees can damage traffic control apparatus, block roadways, damage vehicles and limit the accessibility of emergency vehicles. Power lines that have been knocked down by falling trees create the potential for fire and electrocution hazards.

Increased Fire Threat

Prolonged winds during the warmer months of the year can decrease foliar moisture levels and increase the ignition potential in drying underbrush. When urban/wildland interface fires occur, Santa Ana wind conditions can drive the flames and increase the spread speed and severity of the fire. This is a concern near homes, especially where brush clearance has been lax.

EXISTING MITIGATION ACTIVITIES

Tree Management

In terms of limiting the potential impact of high wind events on trees, routine trimming to promote air flow through tree crowns and elimination of structurally questionable trees are prudent focuses. The City also takes steps to protect private property trees and plant materials. The City clears the first 15 feet of City pine trees in the Trousdale and the hillside areas in the interests of ladder fuel concerns.

As a Tree City USA program participant, the City of Beverly Hills is recognized for a well rounded urban forestry program. This program includes the scheduled maintenance pruning of trees, the identification and master planned removal and replacement of declining segments of the urban forest and public education programs. Current programs that address limiting decline and potential dangers in the City of Beverly Hills urban forest include the following.

Street Tree Master Plan (STMP) Phase One (1)
The removal and replacement of approximately three thousand (3000) American Elm (Ulmus Americana) and Arizona Ash (Fraxinus velutina) trees, affecting thirty (30) streets in the City was outlined in the STMP Phase One (1) of 1996. In addition to overall decline problems, many of these trees displayed structural abnormalities that could become failure potentials during high wind events. The removal and replacement of approximately two hundred (200) trees each year under this program serves to eliminate structurally deficient trees from the population, thus reducing the overall failure potential of trees in the overall tree population. The program will be approximately ninety (90) percent complete at the end of fiscal year 2009-2010. In addition to the phased removal and replacement program activities, remaining American Elm and Arizona Ash trees are inspected each year during a safety and clearance pruning cycle.

Street Tree Master Plan Phase Two (2)
An ongoing program, Phase Two (2) of the STMP addresses problems with Indian Laurel Fig (Ficus microphylla "Nitida") trees in the City. Ficus trees, for the most part, are fast growing trees with an aggressive root system. As roots from Ficus trees cause conflict with sidewalks and curbs, it becomes necessary to cut roots. When severe root cutting is necessary, tree stability can become an issue. Prior to the development of Phase Two (2) of the STMP, the City attempted to maintain some equilibrium between the crowns of trees that had suffered root cutting and the root system keeping these trees in place through an aggressive and short phased trim cycle. This approach sapped resources from other portions of the urban forest, as approximately thirty (30) percent of the available annual pruning budget was spent pruning Ficus trees that represent approximately six (6) percent of the total City tree resource.

At present, STMP Phase Two (2) projects have decreased the Ficus tree population in the Business Triangle of the City, along Lasky Drive, Durant Drive and Olympic Boulevard. Future STMP Phase Two projects will include the review of Ficus trees on Robertson and La Cienega Boulevards, as well as a portion of Santa Monica Boulevard to the west of Wilshire Boulevard. With the continuation of this program, potentially unstable Ficus trees will be eliminated from the population. Replacement trees will offer the benefits of being more site and size appropriate in addition to being more structurally stable.

Street Tree Master Plan Phase Three (3)
An ongoing program, Phase Three of the STMP addresses disease and loss problems with Canary Island Date palms ranging in age from sixty (60) to over one hundred (100) years old. All of the City's palms are pruned on an annual basis, making palm related

windstorm threats minimal. This phase has an expected timeline of 25-30 years and is currently undergoing funding difficulties.

Ongoing Assessment and Protection of the City Tree Resource
The computerized inventory of the City of Beverly Hills urban forest resource includes a simple data set for individual tree attributes and locations. The ongoing assessment of this inventory identifies increasing attrition rates in segments of the tree population not addressed by a STMP phase. Any notable increase in tree attrition is investigated and analyzed. Individual trees that are potentially dangerous are identified during tree maintenance activities and through reports originating from both City staff and residents.

Community Partnership
The City of Beverly Hills encourages partnership in the care of the City tree resource by providing public education materials to residents and their gardeners in the proper care of City trees, especially when attrition rate trends are noted in a particular segment of the urban forest. This material is mailed with tree trimming notifications and is available for viewing and download on the City web site.

Care of City Parkway Trees
The City takes an aggressive approach towards the protection of parkway trees that may be impacted by construction activities. Construction personnel and property owners are provided with guidelines for the protection of City trees during construction projects. In the event that guidelines are not followed, the City takes whatever action is necessary to see to the protection of trees. When a tree is given proper attention and care, the likelihood that the tree will become diseased or structurally unstable decreases. This material is provided during the project planning process, distributed by inspectors in the field and is available for viewing and download on the City web site.

Protecting Parkway Trees during Construction
Program successes and challenges:
The level of expenditures for all emergency type tree services (i.e. limb failures, clearance of private property tree failures into roadways, etc.) has decreased over the past few years from two (2) percent of the total funding availability to a current level of less than one (1) percent. As the previous analysis showed, few of the responses are directly related to wind events.

The continued improvement in community partnership related to the care of City parkway trees is expected to have a significant impact in limiting avoidable decline and attrition in the street tree population. As private property tree maintenance improves, especially in the hillside areas of the City, the occurrence of wind and rain related tree failures into public roadways is expected to decline.

Public Awareness Campaign
The City periodically distributes information via mail to all residents and community members regarding mitigation and safety practices to prevent the loss of life and property in case of a windstorm hazard event.

EXISTING MITIGATION ACTIVITIES – Interagency Efforts
Tree Pruning and Fire Code Sections
As stated, one of the most common problems associated with windstorms is power outage. High winds commonly occur during winter storms, and can cause trees to bend, sag, or fail (tree limbs or entire trees), coming into contact with nearby distribution power lines. Fallen trees can cause short-circuiting and conductor overloading. Wind-induced damage to the power system causes power outages to customers, incurs cost to make repairs, and in some cases can lead to ignitions that start wild land fires.

One of the strongest and most widespread existing mitigation strategies pertains to tree clearance. Currently, California State Law requires utility companies to maintain specific clearances (depending on the type of voltage running through the line) between electric power lines and all vegetation.
Enforcement of the following California Public Resource Code Sections provides guidance on tree pruning regulations:

4293: Power Line Clearance Required
4292: Power Line Hazard Reduction
4291: Reduction of Fire Hazards around Buildings
4171: Public Nuisances

The following pertain to tree pruning regulations and are taken from the California Code of Regulations:

Title 14: Minimum Clearance Provisions
Sections 1250-1258
General Industry Safety Orders
Title 8: Group 3: Articles 12, 13, 36, 37, 38
California Penal Code Section 385

Finally, the following California Public Utilities Commission section has additional guidance:

California Public Utilities Commission
General Order 95: Rule 35
Homeowner Liability:
Failure to allow a utility company to comply with the law can result in liability to the homeowner for damages or injuries resulting from a vegetation hazard. Many insurance companies do not cover these types of damages if the policy owner has refused to allow the hazard to be eliminated.

The power companies, in compliance with the above regulations, collect data about tree failures and their impact on power lines. This mitigation strategy assists the power company in preventing future tree failure. From the collection of this data, the power

company can advise residents as to the most appropriate vegetative planting and pruning procedures.

Equipment Testing
In the case of a windstorm event, the City has purchased backup power generators for use during a power failure for Critical City Facilities. Equipment is tested on a regular basis by the Department of Public Works and appropriate records kept.

WINDSTORM MITIGATION STRATEGIES
The windstorm mitigation action items provide direction on specific activities that organizations and residents in City of Beverly Hills can undertake to reduce risk and prevent loss from windstorm events. Each action item is followed by ideas for implementation, which can be used by the Hazard Mitigation Planning Committee and local decision makers in pursuing strategies for implementation.
(See Section 4 for list of Windstorm Mitigation Strategies)

APPENDIX A

PLAN RESOURCE DIRECTORY

EARTHQUAKE

Local and Regional Resources

Los Angeles County Public Works Department
900 S. Freemont Ave.
Alhambra, CA 91803
626-458-5100
http://ladpw.org

Southern California Earthquake Center (SCEC)
3651 Trousdale Parkway
Los Angeles, CA. 90089
213-740-5843
www.scec.org

State Resources

California Department of Transportation (CalTrans)
120 S. Spring Street
Los Angeles, CA. 90012
213-897-3656
http://www.dot.ca.gov/

California Resources Agency
1416 Ninth Street
Sacramento, CA. 95814
916-653-5656
http://resources.ca.gov/

California Division of Mines and Geology (DMG)
801 K Street
Sacramento, CA. 95814
916-4451825
www.consrv.ca.gov/cgs/index.htm

California Department of Conservation: Southern California Regional Office
655 S. Hope Street
Los Angeles, CA 90017
Ph: 213-239-0878
www.consrv.ca.gov

Governor's Office of Emergency Services (OES)
P.O. Box 419047
Rancho Cordova, CA 95741-9047
Ph: 916 845- 8911
www.oes.ca.gov

Federal and National Resources

Building Seismic Safety Council (BSSC)
1090 Vermont Ave., NW
Washington, DC 20005
Ph: 202-289-7800]
www.bssconline.org

Federal Emergency Management Agency, Region IX
1111 Broadway
Oakland, CA 94607
Ph: 510-627-7100
www.fema.gov

Federal Emergency Management Agency, Mitigation Division
500 C Street, S.W.
Washington, D.C. 20472
Ph: 202-566-1600
www.fema.gov/fima/planhowto.shtm

United States Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
Ph: 650-853-8300
http://www.usgs.gov/

Western States Seismic Policy Council (WSSPC)
125 California Avenue
Palo Alto, CA 94306
Ph: 650-330-1101
www.wsspc.org/home.html

Institute for Business & Home Safety
4775 E. Fowler Avenue
Tampa, FL 33617
Ph: 813-286-3400
http://www.ibhs.org/

Publications

"Land Use Planning for Earthquake Hazard Mitigation: Handbook for Planners"
Wolfe, Myer R. et. al., (1986) University of Colorado, Institute of Behavioral Science, **National Science Foundation.**
This handbook provides techniques that planners and others can utilize to help mitigate for seismic hazards; It provides information on the effects of earthquakes, sources on risk assessment and effects of earthquakes on the built environment. The handbook also gives examples on application and implementation of planning techniques to be used by local communities.

Contact: Natural Hazards Research and Applications Information Center
Address: University of Colorado, 482 UCB,
Boulder, CO 80309-0482
Phone: (303) 492-6818
Fax: (303) 492-2151
Website: http://www,colorado.edu/UCB/Research/IBS/hazards

"Public Assistance Debris Management Guide", FEMA (July 2000).
The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing. and controlling large-scale debris clearance, removal, and disposal operations, Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The "Public Assistance Debris Management Guide" is available in hard copy or on the FEMA website.

FIRE

Local and Regional Resources

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 California 94244-2460
(916)653-5123
http://www.fire.ca.gov/php/index.php

Office of the State Fire Marshal (OSFM)
1131 "S" Street
Sacramento, CA 95814
PO Box 944246
Sacramento, CA 94244-2460
Tel. (916) 445-8200
Fax. (916) 445-8509

Federal Resources and Programs

The following are a list of federal resources available to the City of Beverly Hills:
Federal Emergency Management Agency (FEMA) Programs:

Fire Suppression Assistance Grants
Hazard Mitigation Grant Program
National Wildland/Urban Interface Fire Protection Program
Federal Wildland Fire Policy, Wildland/Urban Interface Protection
http://www.fs.fed.us/land/wdfire7c.htm

National Fire Protection Association (NFPA)
Public Fire Protection Division
1 Battery March Park.
P.O. Box 9101
Quincy, MA 02269-9101
Phone: (617) 770-3000

National Interagency Fire Center (NIFC)
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
(FEMA)
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

Additional Resources

Firewise
1 Battery March Park.
P.O. Box 9101
Quincy, MA 02269-9101
Phone: (617) 770-3000
http://www.firewise.org/

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

TERRORISM

Local and Regional Resources

Beverly Hills Police Department
464 N. Rexford Dr.
Beverly Hills, CA 90210
(310) 550-4951

Los Angeles Sheriff's Department
4700 Ramona Blvd.
Monterey Park, CA 91754
(323) 526-5541

State Resources

Office of Emergency Services
www.oes.ca.gov

Federal and National Resources

Department of Homeland Security
www.dhs.gov

The National Disaster Communication Response Team
www.ndcrt.org/alphabetical.html

Federal Bureau of Investigation
www.fbi.gov

FLOOD

County Resources

Los Angeles County Public Works Department
900 S. Fremont Ave.
Alhambra, CA 91803
Ph: 626-458-5100

Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90607
Ph: 562-699-7411 x2301

State Resources

Governor's Office of Emergency Services (OES)
P.O. Box 419047Rancho Cordova, CA 95741
Ph: 916 845- 8911
Fax: 916 845- 8910

California Resources Agency
1416 Ninth Street, Suite 1311

Sacramento, CA 95814
Ph: 916-653-5656

California Department of Water Resources (DWR)
1416 9th Street
Sacramento, CA 95814
Ph: 916-653-6192

California Department of Conservation: Southern California Regional Office
655 S. Hope Street, #700
Los Angeles, CA 90017-2321
Ph: 213-239-0878
Fax: 213-239-0984

Federal Resources and Programs

Federal Emergency Management Agency (FEMA)
Federal Emergency Management Agency, Region IX1111
Broadway, Suite 1200 Oakland, CA 94607
Ph: 510-627-7100
Fax: 510-627-7112

Federal Emergency Management Agency, Mitigation Division
500 C Street, S.W.
Washington, D.C. 20472
Ph: 202-566-1600

FEMA's List of Flood Related Websites

This site contains a long list of flood related Internet sites from "American Heritage Rivers" to "The Weather Channel" and is a good starting point for flood information on the Internet.
Contact: Federal Emergency Management Agency, Phone: (800) 480-2520
Website: http://www.fema.gov/nfip/related.htm

National Flood Insurance Program (NFIP)
In Southern California many cities lie within flood zones as defined in FEMA Flood Maps. The City of Beverly Hills is (or is not) a community within a designated flood zone. Flood insurance is available to citizens in communities that adopt and implement NFIP building standards. The standards are applied to development that occurs within a delineated floodplain, a drainage hazard area, and properties' within 250 feet of a floodplain boundary. These areas are depicted on federal Flood Insurance Rate Maps available through the county.

National Floodplain Insurance Program (NFIP)
500 C Street, S.W.

Washington, D.C. 20472
Ph: 202-566-1600

The Floodplain Management Association
The Floodplain Management website was established by the Floodplain Management Association (FMA) to serve the entire floodplain management community. It includes full-text articles, a calendar of upcoming events, a list of positions available, an index of publications available free or at nominal cost, a list of associations, a list of firms and consultants in floodplain management, an index of newsletters dealing with flood issues (with hypertext links if available), a section on the basics of floodplain management, a list of frequently asked questions (Fans) about the Website, and a catalog of Web links.

P.O. Box 50891
Sparks, NV 89435-0891
Ph: 775-626-6389
Fax: 775-626-6389

The Association of State Floodplain Managers
The Association of State Floodplain Managers is an organization of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning, and recovery. ASFPM fosters communication among those responsible for flood hazard activities, provides technical advice to governments and other entities about proposed actions or policies that will affect flood hazards, and encourages flood hazard research, education, and training. The ASFPM Web site includes information on how to become a member, the organization's constitution and bylaws, directories of officers and committees, a publications list, information on upcoming conferences, a history of the association, and other useful information and Internet links.

Contact: The Association of State Floodplain Managers
Address: 2809 Fish Hatchery Road, Madison, WI 53713 Phone: (608) 274-0123
Website: http://www.floods.org

National Weather Service
The National Weather Service provides flood watches, warnings, and informational statements for rivers in the City of Beverly Hills. National Weather Service
520 North Eleven Street
Oxnard, CA 93030
Ph: 805-988- 6615

Office of Hydrology, National Weather Service
The National Weather Service s Office of Hydrology (OH) and its Hydrological Information Center offer information on floods and other aquatic disasters, This site offers current and historical data including an archive of past flood summaries, information on current hydrologic conditions, water supply outlooks, an Automated

Local Flood Warning Systems Handbook, Natural Disaster Survey Reports, and other scientific publications on hydrology and flooding.

1325 East West Highway, SSMC2
Silver Spring, MD 20910
Ph: 301-713-1658
Fax: 301-713-0963

National Resources Conservation Service (NRCS), US Department of Agriculture
NRCS provides a suite of federal programs designed to assist state and local governments and landowners in mitigating the impacts of flood events. The Watershed Surveys and Planning Program and the Small Watershed Program provide technical and financial assistance to help participants solve natural resource and related economic problems on a watershed basis. The Wetlands Reserve Program and the Flood Risk Reduction Program provide financial incentives to landowners to put aside land that is either a wetland resource, or that experiences frequent flooding. The Emergency Watershed Protection Program (EWP) provides technical and financial assistance to clear debris from clogged waterways, restore vegetation, and stabilizing riverbanks. The measures taken under EWP must be environmentally and economically sound and generally benefit more than one property.

14th and Independence Ave., SW, Room 5105-A
Washington, DC 20250
Ph: 202-720-7246
Fax: 202-720-7690

USGS Water Resources
This web page offers current US water news; extensive current (including real-time) and historical water data; numerous fact sheets and other publications; various technical resources; descriptions of ongoing water survey programs; local water information; and connections to other sources of water information.

6000 J Street Placer Hall
Sacramento, CA 95819-6129
Ph: 916-278-3000
Fax: 916-278-3070

Bureau of Reclamation
The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. The Bureau provides leadership and technical expertise in water resources development and in the efficient use of water through initiatives including conservation, reuse, and research. It protects the public and the environment through the adequate maintenance and appropriate operation of Reclamation's facilities and manages Reclamation's facilities to fulfill water user contracts and protect and/or enhance conditions for fish, wildlife, land, and cultural resources.

Mid Pacific Regional Office
Federal Office Building
2800 Cottage Way
Sacramento CA 95825-1898
Ph: 916- 978-5000
Fax 916- 978-5599
http://www.usbr.gov/

Army Corps of Engineers
The Corps of Engineers administers a permit program to ensure that the nation's waterways are used in the public interest. Any person, firm, or agency planning to work in waters of the United States must first obtain a permit from the Army Corps of Engineers. The Corps is responsible for the protection and development of the nation's water resources, including navigation, flood
control, energy production through hydropower management, water supply storage and recreation.

US Army Corps of Engineers
P.O. Box 532711
Los Angeles CA 90053- 2325
Ph: 213-452- 3921

Other Natural Resources

American Public Works Association
2345 Grand Boulevard, Suite 500
Kansas City, MO 64108-2641
Ph: 816-472-6100
Fax: 816-472-1610

Publications

NFIP Community Rating System Coordinator's Manual
Indianapolis, IN.
This informative brochure explains how the Community Rating System works and what the benefits are to communities. It explains in detail the CRS point system, and what activities communities can pursue to earn points. These points then add up to the "rating" for the community, and flood insurance premium discounts are calculated based upon that "rating " The brochure also provides a table on the percent discount realized for each rating (1-10). Instructions on how to apply to be a CRS community are also included.

Contact: NFIP Community Rating System
Phone: (800) 480-2520 or (317) 848-2898
Website: http://www.fema.gov/nfip/crs

Floodplain Management: A Local Floodplain Administrator's Guide to the NFIP.
This document discusses floodplain processes and terminology. It contains floodplain management and mitigation strategies, as well as information on the NFIP, CRS, Community Assistance Visits, and floodplain development standards.
Contact: National Flood Insurance Program
Phone: (800) 480-2520
Website: http://www.fema,gov/nfip/

Flood Hazard Mitigation Planning: A Community Guide, (June 1997).Massachusetts Department of Environmental Management.
This informative guide offers a 10-step process for successful flood hazard mitigation. Steps include: map hazards, determine potential damage areas, take an inventory of facilities in the flood zone, determine what is or is not being done about flooding, identify gaps in protection, brainstorm alternatives and actions, determine feasible actions, coordinate with others, prioritize actions, develop strategies for implementation, and adopt and monitor the plan.
Contact: Massachusetts Flood Hazard Management Program Phone: (617) 626-1250
Website: http://www.magnetstate.ma.us/dem/programs/mitigate

Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials, (February 1987), FEMA-116.
This guidebook offers a table on actions that communities can take to reduce flood losses. It also offers a table with sources for floodplain mapping assistance for the various types of flooding hazards, there is information on various types of flood hazards with regard to existing mitigation efforts and options for action (policy and programs, mapping, regulatory, non-regulatory). Types of flooding which are covered include alluvial fan, areas behind levees, areas below unsafe reservoirs, coastal flooding, flash floods, fluctuating lake level floods, ground failure triggered by earthquakes, ice jam flooding, and mudslides.

Contact: Federal Emergency Management Agency
Phone: (800) 480-2520
Website: http://www.fema,gov

LANDSLIDE

County Resource

Los Angeles County Department of Public Works
900 S. Freemont Ave.
Alhambra, CA 91803
626-458-5100
http://ladpw.org

State Resources

- Department of Conservation Headquarters
- California Geological Survey Headquarters/Office of the State Geologist
- California Division of Forestry
- Department of Water Resources
- Governor's Office of Emergency Services
- California Department of Transportation (Cal Trans)

Federal Resources

- Federal Emergency Management Agency (FEMA)
- Natural Resource Conservation Service (NRCS)
- US Geological Survey, National Landslide Information Center

Publications

Olshansky, Robert B., Planning for Hillside Development (1996) American Planning Association.
This document describes the history, purpose, and functions of hillside development and regulation and the role of planning, and provides excerpts from hillside plans, ordinances, and guidelines from communities throughout the US.

Olshansky, Robert B. & Rogers, J. David, Unstable Ground: Landslide Policy in the United States (1987) Ecology Law Quarterly.
This is about the history and policy of landslide mitigation in the US.
Public Assistance Debris Management Guide (July 2000) Federal Emergency Management Agency.

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and city emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The Guide is available in hard copy or on the FEMA website.

USGS Landslide Program Brochure. National Landslide Information Center (NLIC), United States Geologic Survey.
The brochure provides good, general information in simple terminology on the importance of landslide studies and a list of databases, outreach, and exhibits maintained by the NLLC. The brochure also includes information on the types and causes of landslides, rock falls, and earth flows.

WINDSTORMS

State Resources

California Division of Forestry & Fire Protection
1416 9th Street
PO Box 944246
Sacramento California 94244-2460
916-653-5123
http://www.fire.ca.gov/php/index.php

Federal Resources and Programs

National Weather Service
Los Angeles/Oxnard Weather Forecast Office
520 North Elevar Street
Oxnard, CA 93030
Forecast and weather info: 805-988-6610
Administrative issues: 805-988-6615
E- mail: Webmaster.LOX@noaa.gov
http://weather.noaa.gov/

Additional Resources

City of Beverly Hills: Property Owner's Guide to Protecting Street Trees:
http://www.beverlyhills.org/presence/connect/CoBH/Homepage/For+Residents/City+Services/Trees/RESRP- COPY-Protecting_Trees_English

City of Beverly Hills: Protecting City Parkway Trees During Private Property Construction:
http://www.beverlyhills.org/presence/resources/file/eb00030cb234c06/treesprotection.pdf

International Society of Arboriculture
P.O. Box 3129
Champaign, IL 61826-3129
Phone: 217.355.9411
Fax: 217.355.9516
Web: www.isa-arbor.com
E- mail: isa@isa-arbor.com

Publications

Windstorms: Protect Your Family and Property from the Hazards of Violent Windstorms:
http://emd.wa.gov/5-prep/trng/pubed/Windstrm.pdf

Preparing Your Home for Severe Windstorms:
http://www.chubb.com/personal/html/helpful_tips_home_windstorm.html

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

FEMA

March 4, 2011

Pamela Mottice-Muller
Director of Emergency Management
City of Beverly Hills
455 N Rexford Drive
Beverly Hills, CA 90210

Dear Ms. Mottice-Muller:

We have completed our final review of the *City of Beverly Hills Hazard Mitigation Action Plan*, officially adopted by the City of Beverly Hills, California, on August 30, 2010, and found the plan to be in conformance with Title 44 Code of Federal Regulations (CFR) Part 201.6 *Local Mitigation Plans.* The City of Beverly Hills can be commended for the identification and implementation of mitigation actions as well as the clear direction this Plan gives for long term planning to reduce the impacts of future disasters.

The approval of this plan ensures the City of Beverly Hills continued eligibility for project grants under FEMA's hazard mitigation assistance programs, including Hazard Mitigation Grant Program, Pre-Disaster Mitigation, Flood Mitigation Assistance and Severe Repetitive Loss grant programs. All requests for funding, however, will be evaluated individually according to the specific eligibility, and other requirements of the particular program under which applications are submitted. Approved mitigation plans are eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Additional information regarding the CRS can be found at *www.fema.gov/business/nfip/crs.shtm* or through your local floodplain manager.

FEMA's approval of the *City of Beverly Hills Hazard Mitigation Action Plan* is for a period of five years, effective starting the date of this letter. Prior to March 4, 2016, the City of Beverly Hills is required to review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding. The enclosed crosswalk provides additional recommendations to incorporate into the plan when the City of Beverly Hills undertakes it's identified plan maintenance process.

If you have any questions regarding the planning or review processes, please contact Juliette Hayes, Community Planner at (510) 627-7211, or by email at juliette.hayes@dhs.gov.

Sincerely,

Sally Ziolkowski, Director
Mitigation Division

Enclosure

cc: Ken Worman, California Emergency Management Agency, Mitigation Planning

APPENDIX C
Natural Hazard Risk Analysis Rating Form
This form was used in 2004 to assess risk of each hazard in Beverly Hills.

DMA 2000 Hazard Mitigation Plan
Natural Hazard Risk Analysis Rating Form
City of Beverly Hills 2004

INSTRUCTIONS FOR HAZARD MITIGATION RATING FORM

Give each hazard priority risk category listed as a rating from 0 to 3; 0 = no risk, 3 meaning a high risk.

0 = No hazard risk in accordance with the definitions for hazard prioritization on page 3 through 5 of this form.

1 = Low Risk in accordance with the hazard prioritization definitions on pages 3 through 5 of this form.

2 = Moderate Risk in accordance with the hazard definitions on pages 3 through 5 of this form.

3 = High Risk in accordance with the hazard risk definitions on pages 3 though 5 of this form.

Total the numbers horizontally for each hazard category. The highest possible score for a hazard is 24; the lowest potential score is 0.

After the completion of the matrix, the committee will assign the numerical values for the four categories of risk: 1-highest priority risks, 2-moderate priority risks, 3-low risk priority risks and 0-no risk rating values for prioritization.

Examples: A score of 17 to 24 could be considered high-priority risk
9 to 16 could be considered moderate-priority risk
0 to 8 could be considered low-priority risk

Hazard	Magnitude	Duration	Distribution	Area Affected	Frequency	Probability	Degree of Vulnerability	Community Priority	Value
Earthquake									
Fire: Wildland/Urban									
Flood									
Landslide/Mudslides									
Windstorms									
Terrorism									

DMA 2000 Hazard Mitigation Plan
Natural Hazard Risk Analysis Rating Form
City of Beverly Hills 2004

DEFINITIONS FOR HAZARD PRIORITIZATION

Magnitude

Physical and economic greatness (impact) of the event

Factors to consider

- Size of event
- Threat to life
- Threat to Property
    1. Individual
    2. Public sector
    3. Business and manufacturing
    4. Tourism

Duration

The length of time the disaster and the effects of the disaster last

Factors to consider

- Length of physical duration during emergency phase
- Length of threat to life and property
- Length of physical duration during recovery phase
- Length of effects on individual citizen and community recovery
- Length of effects on economic recovery, tax base, business and manufacturing recovery, tourism, threat to tax base and threat to employment

Distribution

The depth of the effects among all sectors of the community and State

Factors to consider:

- How wide spread across the state and community are the effects of the disaster
- Are all sectors of the community affected equally or disproportionately

Area Affected

How large an area is physically threatened and potentially impaired or by a disaster risk

Factors to consider:

- Geographic area affected by primary event
- Geographic, physical, economic areas affected by primary risk and the potential secondary effects.

Frequency

The historic and predicted rate of recurrence of a risk caused event (generally expressed in years such as the 100 year flood)

Factors to consider:

- Historic events and recurrences of events in a measured time frame
- Scientifically based predictions of an occurrence of an event in a given period of time.

Degree of Vulnerability

How susceptible is the population, community infrastructure and state resources to the effects of the risk.

Factors to Consider:

- History of the impact of similar events
- Mitigation steps taken to lessen impact
- Community and State preparedness to respond to and recover from the event

Community Priorities

The importance placed on a particular risk by the citizens and their elected officials:

- Willingness to prepare for and respond to a particular risk
- More widespread concerns over a particular risk then other risks
- Cultural significance of the threat and associated a risks
- Opportunity to mitigate for one risk before others due to resource availability
- Distribution of resources

APPENDIX D

Public Involvement Events and Meetings for 2010- 2015 Update

For previous planning and public meetings, please refer to the City of Beverly Hills Hazard Mitigation Plan 2004-2009.

Recreation and Parks Commission Meeting
07/27/2010
Description: Commission meeting where plan was presented to Commissioners and their and public input was requested on the renewal of the Hazard Mitigation Plan
Attendees: Recreation and Parks commissioners, Ken Pflazgraf – Recreations and Parks, Recreation and Parks staff, general public.
Location: Beverly Hills City Hall.

Planning Commission Meeting
07/08/2010
Description: Commission meeting where plan was presented to Commissioners and their and public input was requested on the renewal of the Hazard Mitigation Plan
Attendees: Planning commissioners, David Reyes – Planning Department, Planning staff, general public.
Location: Beverly Hills City Hall.

Public Works Commission Meeting
07/08/2010
Description: Commission meeting where plan was presented to Commissioners and their and public input was requested on the renewal of the Hazard Mitigation Plan
Attendees: Public Works commissioners, Shana Epstein – Public Works, Public Works staff, general public.
Location: Beverly Hills City Hall.

Health and Safety Commission Meeting
06/28/2010
Description: Commission meeting where plan was presented to Commissioners and their and public input was requested on the renewal of the Hazard Mitigation Plan.
Attendees: Health and Safety commissioners, Pamela Mottice-Muller - Director of Emergency Management, Viviana Franco – Consultant, general public.
Location: Beverly Hills City Hall.

Hazard Mitigation Steering Committee Meeting
06/16/2010
Description: Meeting to discuss progress of HMP and review and approve Mitigation Strategies.
Attendees: Jeff Kolin - City Manager, Mahdi Aluzri - Assistant City Manager, David Lightner – Deputy City Manager , David Snowden - Chief of Police, Tim Scranton – Fire Chief, David Gustavson - Director of Public Works, Transportation and Engineering, Cheryl Friedling – Deputy City Manager , David Schirmer - Director of Information Technology, Scott G. Miller - Chief Financial Officer, Byron Pope – City Clerk , Steve Miller - Director of Community

Services, Larry Weiner - City Attorney, Susan Healy Keene - Director of Community Development, Sandra Curtis - Director Human Resources , Pamela Mottice-Muller - Director of Emergency Management
Location – Beverly Hills City Hall

Hazard Mitigation Update Meeting
05/20/2010
Description: Mitigation Strategies Development and community engagement strategies.
Attendees: City of Beverly Hills HMP Task Force, Pamela Mottice-Muller - Director Emergency Management, Viviana Franco – Consultant, Jesse Deanda – Building and Safety, Ken Pfalzgraf - Parks and Recreation, Chief Greg Barton – Fire Department, Officer Tad Nelson, CCIA - – Police Department, Peter Noonan - Community Development, Lema Kebede - Information Technology, Nicole McClinton – Information Technology,Larry Sakurai - Community Development.
Location: City Hall

Hazard Mitigation Update Meeting
04/04/2010
Description: HMP Planning Meeting. Items discussed: Timeline, Public input process and community engagement.
Attendees: Pamela Mottice-Muller - Director Emergency Management, Viviana Franco – Consultant
Location: via phone conference

Multi Jurisdictional Planning Meeting: Area A
03/31/2010
Description: Multi-Jurisdiction Hazard Implementation AREA A Meeting discuss update of hazard mitigation plans.
Attendees: Paul Weinberg – City of Santa Monica, Director of Emergency Services, Shirley Berry- City of West Hollywood Public Safety, Christine Parra – Culver City Emergency Manager, Pamela Mottice-Muller - Director of Emergency Management
Location : City Hall

Hazard Mitigation Steering Committee Kick Off Meeting
03/17/2010
Description: Meeting to discuss renewal of HMP.
Attendees: Jeff Kolin - City Manager, Mahdi Aluzri - Assistant City Manager, David Lightner – Deputy City Manager , David Snowden - Chief of Police, Tim Scranton – Fire Chief, David Gustavson - Director of Public Works, Transportation and Engineering, Cheryl Friedling – Deputy City Manager , David Schirmer - Director of Information Technology, Scott G. Miller - Chief Financial Officer, Byron Pope – City Clerk , Steve Miller - Director of Community Services, Larry Weiner - City Attorney, Susan Healy Keene - Director of Community Development, Sandra Curtis - Director Human Resources , Pamela Mottice-Muller - Director of Emergency Management
Location – City Hall

HMP Task Force Meeting
02/22/2010
Description: Provided overview of Hazards Mitigation Project; asked for community input on process and development. Task force analyze HMP 2004 and provided feedback for renewal strategies.
Attendees: City of Beverly Hills HMP Task Force, Pamela Mottice-Muller - Director Emergency Management, Viviana Franco – Consultant, Jesse Deanda – Building and Safety, Ken Pfalzgraf – Parks and Recreation, Shana Epstein – Public Works, Chief Greg Barton – Fire Department, Sgt. Lincoln Hoshino – Police Department, Peter Noonan – Community Development, Lema Kebede – Information Technology, Nicole McClinton – Information Technology, Larry Sakurai - Community Development.
Location: Room A of City Hall, 455 N. Rexford Dr., Beverly Hills, CA 90210

Hazard Mitigation Renewal Meeting
12/11/2009
Description: Discussion of HMP plan process, implementation, update on status of 2004 mitigation strategies and how to approach new 2010 mitigation strategies. Community engagement planning.
Attendees: Pamela Mottice-Muller - Director Emergency Management, Megan Roach – Policy Analyst, Viviana Franco – Consultant
Location: City Hall

Public Involvement Events

Neighborhood Watch
Neighborhood Watch meetings were conducted which covered the importance of Neighborhood Watch and how Neighborhood Watch relates to the elements of "Citizen Corp.", as well as, emergency preparedness, and a terrorism overview. Every year in the spring, the Neighborhood Watch covers topics of emergency management. A video presentation was also disseminated city wide over the City's Cable Channel. The topic for 2009 presentation was "Emergency/Disaster Preparedness and Mitigation." In 2010, the topic was "Personal Safety and the Internet."

General Plan – Safety Element Public Meetings
Through 2009, the City updated its general plan which included, as part of a Mitigation Strategy offered in the 2004 HMP, the creation of the Safety Element of the plan. Through this process the City offered various public meetings to garner public input on hazard planning.

Health and Safety Expo
The City holds a Safety every year Held every year in October
Health and Safety Expo, changed in 2009

Beverly Hills Cable
In the month of July 2010, the local cable channel *Beverly Hills Television Channel 10* aired a notice to the public to provide public input and comments on the Hazard Mitigation Plan renewal via the various commission meetings and the website.

Website

The public was provided an opportunity to provide input and comments on the plan via the City's Office of Emergency Management webpage. The plan was made public via a link and people were asked to provide comments to the Director of Emergency Management. The following is the link to the Draft Plan:
http://beverlyhills.org/services/emergency/default.asp

APPENDIX E. CEQA Exemption and City Council Resolution

Notice of Exemption

Form D

To: Office of Planning and Research
P.O. Box 3044, Room 212
Sacramento, CA 95812-3044

County Clerk
County of Los Angeles
12400 Imperial Highway
Norwalk, CA 90650

From: (Public Agency) City of Beverly Hills
455 N. Rexford Drive
Beverly Hills, CA 90210
(Address)

Project Title: City of Beverly Hills Hazard Action Mitigation Plan 2010 - 2015

Project Location - Specific:
City of Beverly Hills, California

Project Location - City: Beverly Hills Project Location - County: Los Angeles

Description of Nature, Purpose and Beneficiaries of Project:
The project is the preparation and adoption of a hazards action plan. The plan includes information, resources and implementation strategies to assist the city in the preparation and response to hazards. The plan includes mitigations to assist the City in reducing risk and preventing loss from future hazard events such as earthquakes, flooding, terrorism, fires and windstorms.

Name of Public Agency Approving Project: City of Beverly Hills City Council

Name of Person or Agency Carrying Out Project: City of Beverly Hills

Exempt Status: (check one)
- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☒ Categorical Exemption. State type and section number: 15306, Information Collection (Class 6)
- ☐ Statutory Exemptions. State code number:

Reasons why project is exempt:
The project is a policy document that contains data about the city, identification of possible hazard risks and an assessment on what the city and its citizenry could do to minimize risks and how to prepare for potential hazards. The plan includes an implementation program to assist city departments to prepare for hazards. Neither the data contained in the document nor the recommended implementation strategies could result in a serious or major disturbance to an environmental resource, consistent with the Class 6 exemption criterion.

Lead Agency Contact Person: Pamela Mottice-Muller Area Code/Telephone/Extension: 310 285-1025

If filed by applicant:
1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: Pamela Mottice-Muller Date: 8/30/10 Title: Director Office of Emergency Management

☒ Signed by Lead Agency
☐ Signed by Applicant

Date received for filing at OPR: _____

Revised 2005

28

Resolution

RESOLUTION NO. 10-R-12766

RESOLUTION OF THE COUNCIL OF THE CITY OF BEVERLY HILLS APPROVING THE "HAZARD MITIGATION ACTION PLAN, 2010-2015"

Whereas, the federal Disaster Mitigation Act of 2000 ("Mitigation Act") (P.L. 106-390; 44 C.F.R. Part 201) requires that local governments develop and submit local hazard mitigation plans to the Federal Emergency Management Agency ("FEMA") as a condition of receiving FEMA Hazard Mitigation Grant program funds after November 2004;

Whereas the City of Beverly Hills (the "City") approved their plan, entitled the "Hazard Mitigation Action Plan, 2005-2010," on October 19th, 2004;

Whereas Sections 201.3(d)(2) & 201.6(d)(3) of Title 44 of the Code of Federal Regulations requires that the City to review and update the "Hazard Mitigation Action Plan, 2005-2010" to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit said plan to FEMA for approval within five (5) years from FEMA's approval of the "Hazard Mitigation Action Plan, 2005-2010" in order to continue to be eligible for FEMA Hazard Mitigation Grant program funds;

Whereas FEMA approved "Hazard Mitigation Action Plan, 2005-2010" on December 17, 2004;

Whereas the provisions of the "Hazard Mitigation Action Plan, 2005-2010"also require that the City renew said plan every five (5) years;

Whereas, the City's Office of Emergency Management, in conjunction with the Steering Committee comprised of members of various City departments, and in compliance with 44

1250790 1

C.F.R. §§ 201.3(d)(2) & 201.6(d)(3) and the "Hazard Mitigation Action Plan, 2005-2010," has reviewed and updated the "Hazard Mitigation Action Plan, 2005-2010";

Whereas, said update is entitled the "Hazard Mitigation Action Plan, 2010-2015";

Whereas, the "Hazard Mitigation Action Plan, 2010-2015" has been environmentally reviewed pursuant to the California Environmental Quality Act (CEQA), CEQA Guidelines (California Code of Regulations, Title 14, Sections 15000 *et seq.*) (hereafter the "Guidelines"), and the City's environmental guidelines, and a Class 6 Categorical Exemption has been issued in accordance with the requirements of Section 15306 of the Guidelines; and

Whereas, the public has been provided an opportunity to comment on the "Hazard Mitigation Action Plan, 2010-2015" during its drafting and prior to its approval by the City Council.

Now, therefore the City Council of Beverly Hills hereby resolves as follows:

Section 1. The City Council hereby adopts the "Hazard Mitigation Action Plan, 2010-2015," which was presented to the City Council on August 17, 2010 at a regular duly noticed City Council meeting.

Section 2. The City Clerk is hereby directed to transmit a copy of this resolution to the City's Office of Emergency Management for inclusion into the Hazard Mitigation Action Plan, 2010-2015.

Section 3. The City Clerk shall certify to the adoption of this resolution and shall cause this resolution and his certification to be entered into the Book of Resolutions of the Council of this City.

ADOPTED: August 17,2010

JIMMY DELSHAD
Mayor of the City of
Beverly Hills, California

ATTEST:

(SEAL)

BYRON POPE
City Clerk

APPROVED AS TO FORM:

LAURENCE S. WIENER
City Attorney

APPROVED AS TO CONTENT:

MAHDI ALUZRI
Deputy City Manager

PAMELA MOTTICE-MUELER
Director of Office of Emergency
Management

APPENDIX F. Acknowledgements

The Hazards Mitigation Plan 2010-2015 has been a very comprehensive project that required the efforts, intellect and patience of numerous staff within the City of Beverly Hills. The scholarly research involved to update hazard sections and compose sound mitigation strategies was a tremendous accomplishment and is greatly appreciated not only by city staff but by city residents as a whole. The Hazards Mitigation Plan is vital in reducing the possibility of the loss of life and property during and after an situation hazard event. This would not have been possible without the following individuals:

Honorable Council Members:
Barry Brucker
Nancy Krasne
Mayor Jimmy Delshad
William W. Brien, MD
John A. Mirisch

Health and Safety Commissioners
Public Works Commissioners
Recreation and Parks Commissioners
Planning Commissioners

Adolfo Castano, Graphic Services
Captain Greg Barton, Fire Department
Cathy Cassells, Graphic Services
David Reyes, Community Development
Genevieve Row, Recreation and Parks
Jeff Kolin, City Manager
Jesse DeAnda, Community Development
Kathy Ryan, City Manager's Office
Ken Pfalzgraf, Recreation and Parks
Larry Sakurai, Community Development
Lema Kebede, Information Technology
Mahdi Aluzri, Assistant City Manager
Nicole McClinton, Information Technology
Officer Lincoln Hoshino, Police Department
Officer Tad Nelson, Police Department
Pamela Mottice-Muller, Emergency Management
Peter Noonan, Community Development
Shana Epstein, Public Works
Viviana Franco, Consultant