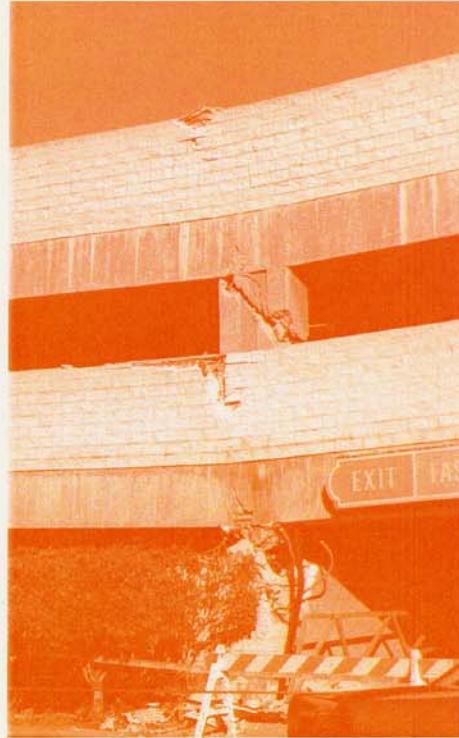


City of Glendale



SAFETY ELEMENT

of the General Plan

Planning Division
August 2003



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James E. Starbird, City Manager
Robert McFall, Assistant City Manager

DIVISION ADMINISTRATION

Elaine Wilkerson, Director of Planning
Hassan Haghani, Planning Administrator
Carmen Lukassian, Office Services Supervisor

SAFETY ELEMENT TEAM

Project Management: Jeff Hamilton, Senior Planner
Kathy Duarte, Planner

Consultant: Tania Gonzalez, Earth Consultants International, Inc.

City Staff

Police Department: Lt. Mark Distaso; Sgt. Sam Hopper

Fire Department: Christopher Gray, Fire Chief; Battalion Chief Mike Haney;
Doug Nickles, Urban Fire Forester; Ronald Gulli, Fire Captain/Emergency
Services Coordinator; Jeffrey Halpert, Fire Protection Engineer; Vasken Demirjian,
Environmental Management Coordinator

Glendale Water and Power: Martin Nixt, Principal Civil Engineer

Public Works: Lucien Le Blanc, City Engineer; Alice I. Stoner, Asst. City
Engineer; Samuel Adarme, Senior Civil Engineer; Chris Chew, Civil Engineer II;
William A'Hearn, GIS Analyst; Jan Bear, Deputy Building Official

RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GLENDALE, CALIFORNIA,
AMENDING THE SAFETY AND OPEN SPACE ELEMENTS OF THE GENERAL PLAN (GENERAL
PLAN AMENDMENT NOS. 2003-01 AND 2003-02)

WHEREAS, the City Council of the City of Glendale has conducted a noticed public hearing pursuant to the provisions of Section 2.68.130 and Chapter 30.16 of the Glendale Municipal Code, and Section 65356 and Chapter 3, Title 7 of the Government Code of the State of California; and

WHEREAS, the City Council has received and accepted proposed General Plan Amendment No. 2003-01, consisting of a replacement of the existing Safety and Seismic Safety Elements with a new Safety Element that combines the features of the earlier elements; and proposed General Plan Amendment No. 2003-02, consisting of minor revisions to the Open Space and Conservation Element to maintain consistency with the new Safety Element; and

WHEREAS, the Council has adopted a resolution certifying that Negative Declaration No. 2003-09 was prepared pursuant to the California Environmental Quality Act; and

WHEREAS, the Planning Commission of the City of Glendale held a noticed public hearing on General Plan Amendment Nos. 2003-01 and 2003-02; and

WHEREAS, the Council has reviewed and considered all materials and exhibits of current record relative to General Plan Amendment Nos. 2003-01 and 2003-02; and

WHEREAS, the Council has found the subject General Plan Amendments to promote and protect the public health, safety, comfort, convenience and general welfare of the community as a whole.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Glendale that General Plan Amendment Nos. 2003-01 and 2003-02 are hereby approved and adopted and the 2003 Safety Element, along with the 2003 revisions to the Open Space and Conservation Element, shall be made a part of the City of Glendale's Comprehensive General Plan.

This resolution shall become effective 30 days after the date of adoption.

Adopted this _____ day of -----, 2003.

Mayor



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CHAPTER 1

INTRODUCTION

1.1 Legal Requirements

The City of Glendale has updated the Safety Element of its General Plan in conformance with State law. As required by Section 65302(g) of the California Government Code, every local government is required to maintain a comprehensive Safety Element that addresses a variety of natural and man-made hazards and that provides goals and policies aimed at reducing the risk associated with these hazards. The Safety and Seismic Safety Elements first became mandatory parts of the General Plan in 1975, when the California Legislature adopted Senate Bill 271 (Chapter 1104). This legislation required cities and counties to adopt General Plan policies relating to, at a minimum, fire safety, flooding and geologic hazards. The City of Glendale responded to this legislation by adopting its first Safety and Seismic Safety Elements in 1976. In 1984, the Legislature adopted Assembly Bill 2038 (Chapter 1009) that expanded the list of mandatory issues that were to be evaluated in the Safety Element, with emphasis on seismic issues, and combined the

previously separate Safety and Seismic Safety Elements into a single document.

1.2 Purpose and Content

The document before you has been prepared to update and replace the original 1976 documents. This new document still focuses on fire, earthquakes, flooding, and other geologic hazards, but it also addresses other safety issues that the City of Glendale considers important. **The ultimate objective of the Safety Element is to improve the safety of the City of Glendale, and in the process make the City more sustainable and prosperous.**

The Safety Element serves the following functions:

- Provides an assessment of the natural and man-made hazards in the City, including, but not limited to, earthquakes, landslides, fire, flood, dam inundation, hazardous materials incidents, terrorism, and vector control. A more in-depth analysis

of each of these hazards is provided in the Technical Background Report.

- Provides a framework by which safety considerations are introduced into the land use planning process and the redevelopment process.
- Strengthens the City's existing municipal codes, and provides guidelines that the City can use during the project review and permitting process to identify and mitigate hazards for new development and redevelopment. Future development and redevelopment should always consider the incorporation of measures aimed at reducing these hazards to acceptable levels.
- Provides policies directed at identifying and reducing hazards in existing development; and
- Strengthens earthquake, flood, fire, and hazardous materials preparedness planning and provides post-disaster reconstruction policies specific to the City of Glendale.

To that end, the Safety Element describes the natural conditions that pose a hazard, but most importantly, it presents goals, policies, and programs that if implemented can substantially reduce the risk these hazards pose to the City of Glendale and its residents. Each of these terms and components of the Element is explained further below:

- **Risk** is defined as the outcome of the interaction between a hazard and the elements of the community, such as population, buildings, and infrastructure that are vulnerable to such an impact. [In simpler terms, **Risk = Hazard x Vulnerability.**]
- **Goals** are statements that describe the City's purpose and direction in reducing its natural hazards. They are the desired condition that the City would like to achieve.
- **Policies** are guidelines that can be implemented to reduce the City's risk and maximize the community's emergency preparedness. These are statements that address specific concerns of long-term planning importance to the community.
- **Programs** are the specific actions that the City has committed to implement over a given number of years to reduce its hazards. They are specific implementation measures selected to maintain or improve public safety, and to

satisfy the objectives of the policies and goals. Where appropriate, the agency or City department responsible for implementation and monitoring of each of these programs is identified.

Whether related to natural or man-made hazards or disaster preparedness, the Safety Element goals are guided by the City's desire and responsibility to:

- Minimize fatalities and injuries;
- Minimize the burden on public and emergency response resources (police, fire, medical, etc.);
- Minimize public and private costs for cleanup, repair and recovery; and
- Minimize long-term impacts caused by displaced households, business disruption, and reduced fiscal resources (with a consequent tax burden).

Specific hazards of concern to Glendale include earthquakes, landslides and mudflows, dam or reservoir failure, wildland and structural fire, storm flooding, contamination of soil and groundwater resources by hazardous materials, terrorism, civil unrest and crime. These hazards can impact the City's residents, workers, and visitors, and could cause the disruption of critical (hospitals, schools, fire stations) and essential (water, gas, sewage, electricity, communications) facilities. Each of these hazards, and others of lesser impact, is described further in the following pages; for a more detailed description of each of these conditions, refer to the accompanying Technical Background Report.

1.3 Limitations

Safety Elements are by scope and definition, provisional. Although the ultimate goal of these documents does not change much over time, the information, tools and techniques available to assess the community's risk to various types of hazards are continuously evolving. Policies and programs are established within a framework that identifies timelines and priorities. As the more critical goals are achieved, emphasis is shifted to new priorities. Most of the data, relationships and processes that affect a community are spatial in nature, and multi-variant. As a result, manipulation of the data and assessment of the risk can be quite complex. Increasingly, Geographic Information Systems (GIS) are being used for this purpose, and Glendale has already embraced the use of GIS-based mapping. The hardware and software



available to manage the City's risk using GIS will only get better with time.

The Safety Element provides a general evaluation of potential hazards on a City-wide basis. The identification and assessment of the hazards described in this document are based on literature and sources available at the time that this Element was prepared. Site-specific studies were not conducted specifically for this study. For effective emergency preparedness and response, communities need to know in advance what are the potentially hazardous conditions specific to their area. A major part of this effort requires mapping of the vulnerable areas in the community. This is covered in the Technical Background Report to the Safety Element. For example, the Technical Report identifies the fault zones that cross the City, areas of potential landslides and unstable slopes, areas susceptible to fire and flooding hazards, and areas where most hazardous materials in the City are being used, stored or generated. However, the hazard maps that serve as the basis for the Technical Background Report are by necessity generalized; the boundaries between hazard zones should not be interpreted as precisely defined. This document and the accompanying illustrations are to be used for general land use planning purposes only, such as in land use decisions. This Element should not be used for site-specific studies, but rather, it should be used to identify areas where detailed site-investigations should be required for new developments or for redevelopments.

Computer simulations that estimate loss of life and damage to buildings and infrastructure (such as HAZUS, the software used for this study) are still in their infancy, but already have proven to be of value in designing and prioritizing appropriate mitigation plans. The results of these models, however, are estimates only, and this should not be forgotten. It is the magnitude, rather than the specific value, of the results that is significant (an earthquake that results in about 4,000 casualties is clearly more severe an event than one that causes about 150 casualties). Once this information is known, appropriate measures can be taken to reduce the hazard and to prepare for and respond to the estimated level of damage. These are the topics covered in this Policy Document.

It is acknowledged that sometimes policies and programs designed to reduce specific hazards may come in conflict with individuals' rights in their properties. Whenever possible, the mitigation measures included herein will be conducted without violating the property owners' rights to modify or improve their investments, along with preserving the aesthetic or natural conditions of the area through minimal modifications. However, when these goals are in conflict, protection of life and property should and will take precedence.

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CHAPTER 2

REGULATORY ENVIRONMENT

There are several Federal and State programs and regulations pertaining to public safety that provide the legal framework to Safety Elements of the General Plan. These programs provide the minimum guidelines and criteria that must be complied with – individual jurisdictions can choose to go beyond the Federal or State requirements and implement more stringent regulations. Some of the specific plans and programs that apply to the City of Glendale are discussed briefly below. This is not intended to be an all-inclusive list. For a more detailed description of the programs described below, refer to the Technical Background Report. For information regarding additional Federal, State and City regulations, refer to the Federal and State Codes of Regulations, and the City of Glendale Municipal Codes (all of these can be found on the world wide web, using various search engines).

2.1 California Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was signed into law in 1972 with its primary purpose being to mitigate the hazard of fault rupture by prohibiting the location of structures for human occupancy across the trace of an active fault. The Act requires the State Geologist to delineate “Earthquake Fault Zones” along faults that are “sufficiently active” and “well defined.” The Act dictates that cities and counties withhold development permits for projects within an Earthquake Fault Zone within their jurisdiction until geologic investigations demonstrate that the projects are not threatened by surface displacements from future faulting. Projects include all land divisions and most structures for human occupancy. State law exempts single-family wood-frame and steel-frame dwellings that are less than three stories and are not part of a development of four units or more. However, local agencies can be more restrictive than the State.

2.2 California Seismic Hazards Mapping Act

The goal of the Seismic Hazards Mapping Act of 1990 is to minimize loss of life and property by identifying and mitigating seismic hazards. The act addresses non-surface fault rupture earthquake hazards, including strong ground shaking, liquefaction and seismically induced landslides. The State agency charged with implementation of the Act is the California Geological Survey (CGS). The CGS prepares and provides local governments with seismic hazard zone maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides, and other ground failures. The seismic hazard zones delineated by the CGS are referred to as “zones of required investigation,” because site-specific geological hazard investigations are required for construction projects located within these areas.

2.3 Real Estate Disclosure Requirements

Pursuant to the Natural Hazards Disclosure Act, since June 1, 1998, sellers of real property and their agents are required to provide prospective buyers with a “Natural Hazard Disclosure Statement” when the property being sold lies within one or more State-mapped hazard areas, such as within an Alquist-Priolo Earthquake Fault Zone or a Seismic Hazard Zone.

2.4 California Environmental Quality Act

The California Environmental Quality Act (CEQA) was passed in 1970 to insure that local governmental agencies consider and review the environmental impacts of development projects within their jurisdictions. CEQA requires that an Environmental Impact Report (EIR) be prepared for projects that may have significant effects on the environment. EIRs are required to identify geologic and seismic hazards, and to recommend potential mitigation measures, giving the local agency the authority to regulate private development projects in the early stages of planning.

2.5 California Building Code

The California Building Code (CBC), which is included in Title 24 of the California Administrative Code, provides “minimum standards to safeguard life or limb, health, property and public welfare by regulating and

controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures.” These documents are historically updated every three years. The most recent version of the CBC is the 2001 edition, based on the 1997 edition of the Uniform Building Code. The City of Glendale has adopted the 2001 CBC edition with local amendments.

2.6 Unreinforced Masonry Law

The Unreinforced Masonry Law of 1986 requires all cities and counties in Seismic Zone 4 (CBC, 1998) to identify hazardous unreinforced masonry (URM) buildings in their jurisdictions. Owners of such buildings must be notified of the potential earthquake hazard, and mitigation must be performed. The mitigation method, which may include retrofitting or demolition, is left to the local jurisdiction. URM buildings in Glendale have been identified and catalogued in accordance with Chapter 58 of the City Code. As of 2002, of the 703 URM buildings identified in the City, only 2 had not yet been retrofitted or demolished.

2.7 National Flood Insurance Act and Flood Disaster Protection Act

The Federal Emergency Management Agency (FEMA) is mandated by the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 to evaluate flood hazards and provide Flood Insurance Rate Maps (FIRM's) for local and regional planners to promote sound land use and floodplain development. Further, the Flood Disaster Protection Act requires owners of all structures in identified Special Flood Hazard Areas to purchase and maintain flood insurance as a condition of receiving Federal or federally related financial assistance, such as mortgage loans from federally insured lending institutions. The National Flood Insurance Reform Act of 1994 further strengthened the National Flood Insurance Program (NFIP) by providing a grant program for State and community flood mitigation projects. The act also established a system (Community Rating System - CRS) for crediting communities that implement measures to protect the natural and beneficial functions of their floodplains, as well as managing the erosion hazard. The City of Glendale has participated in the NFIP since 1984 (City ID No. – 065030); however, there are no FIRM maps for the City, and Glendale is not currently listed in FEMA's CRS of cities.



2.8 Fire Regulations

Assembly Bill 337 (the Bates Bill, adopted September 29, 1992) was passed as a direct result of the great loss of lives and homes in the Oakland Hills “Tunnel Fire” of 1991. The Bates Bill Process is used to identify Very High Fire Hazard Severity Zones (VHFHSZs). Under **Assembly Bill 3819**, passed in 1994 (AB 3819 – Willie Brown), “Class A” roofing, minimum clearances of 30 feet around structures, and other fire defense improvements are required in VHFHSZs.

Assembly Bill 6 (AB6) requires that fire hazard areas be disclosed in real estate transactions. **Civil Code Section 1103(c)(6)** also requires real estate sellers to inform prospective buyers whether or not a property is located within a wildland area that could contain substantial fire risks and hazards.

Public Resources Code Section 4290 requires minimum statewide fire safety standards pertaining to:

- Road standards for fire equipment access;
- Standards for signs identifying streets, roads, and buildings;
- Minimum private water supply reserves for emergency fire use; and
- Fuel breaks and greenbelts.

Wildland fire areas are also subject to **Public Resources Code Sections 4291 through 4299**, which require property owners in such areas to conduct maintenance in order to reduce the fire danger. The City of Glendale uses the California Fire Code with amendments and several other fire ordinances to further reduce the City’s vulnerability to structural and wildland fires.

2.9 Standardized Emergency Management System Law

The Standardized Emergency Management System (SEMS) is described by the **Petris Bill (SB 1841)**, and is contained in **Chapter 1 of Division 2 of Title 19 of the California Code of Regulations**. It requires all jurisdictions within the State of California to participate in the establishment of a standardized statewide emergency management system. The **California Emergency Services Act, section 8568**, states that “the State Emergency Plan shall be in effect in each political subdivision of the State, and the

governing body of each political subdivision shall take such action as may be necessary to carry out the provision thereof.” The act provides the basic authorities for conducting emergency operations following the proclamations of emergencies by the Governor or appropriate local authority, such as a City Manager. The City of Glendale has a comprehensive Emergency Plan in accordance with SEMS.

2.10 Emergency Planning and Community Right-To-Know Act (EPCRA)

The primary purpose of the Federal Emergency Planning and Community Right-To-Know Act (EPCRA) is to inform communities and citizens of chemical hazards in their areas. Sections 311 and 312 of the EPCRA require businesses to report to state and local agencies the locations and quantities of chemicals stored on-site. Section 313 of the EPCRA requires manufacturers to report the release to the environment of any of more than 600 designated toxic chemicals. These reports help communities prepare to respond to chemical spills and similar emergencies. In the City of Glendale, businesses that use, store or generate any amount of hazardous materials are required to provide the Fire department with an inventory of the hazardous materials that they use. This helps the Fire Department identify the appropriate actions to take in the event of a significant or threatened significant release of a hazardous material.

EPCRA mandates that Toxic Release Inventory (TRI) reports be made public. The TRI is a database that contains information on toxic chemical releases and other waste management activities reported annually by certain industry groups as well as federal facilities. This inventory was established in 1986 under the EPCRA and expanded by the **Pollution Prevention Act of 1990**.

2.11 Hazardous Materials Disclosure Program

As indicated previously, hazardous materials are extensively legislated by the Federal, State and City governments. The City of Glendale requires all businesses that handle any amount of hazardous materials to submit an inventory of the hazardous materials that they manage to the Glendale Fire Department. This exceeds Federal and State requirements.

In 1986, Congress passed the **Superfund Amendments and Reauthorization Act** (SARA). Title III of this legislation requires that each community establish a Local Emergency Planning Committee (LEPC). This committee is responsible for developing an emergency plan that outlines steps to prepare for and respond to chemical emergencies in that community.

Several California statutes require the emergency notification of a hazardous chemical release. These include: Health and Safety Codes §25270.7, §25270.8 and §25507; Vehicle Code §23112.5; Public Utilities Code §7673; Government Codes §51018, §8670.25.5(a); Water Codes §13271 and §13272; and California Labor Code §6409.1(b)10. The Safe Drinking Water and Toxic Enforcement Act of 1986, better known as Proposition 65, and §9030 of the California Labor Code also has specific reporting requirements.

The Environmental Management Center (EMC) is a facility run by the Glendale Fire Department that is tasked with administering a household hazardous waste collection plan for the City of Glendale in accordance with the California Integrated Solid Waste Management Act of 1989 (AB 939). The EMC is located at 780 Flower Street.



CHAPTER 3

GOALS, POLICIES AND PROGRAMS_____

3.1 Seismic and Geologic Hazards

3.1.1 Important Terms and Concepts

A break or fracture between blocks of rock is called a **fault**. Sudden, differential movement on a fault causes an **earthquake**. The strain energy released during an earthquake makes the earth vibrate and shake. Scientists typically use **moment magnitude** to measure the size of an earthquake, which is based on the amount of energy released and is directly proportional to the area of the fault that ruptured. Earthquake damage is typically measured relative to an **intensity** scale. The Modified Mercalli Intensity Scale describes the observable effects that an earthquake has on structures and people.

The State of California considers a fault **active**, and therefore capable of generating earthquakes in the future, if it has moved at least once in the last about 11,000 years. Some faults generate an earthquake every few tens to hundreds of years, while others only break once only in thousands of years. Faults with shorter

recurrence intervals (time between earthquakes) have higher **slip rates**, and are generally considered to pose a greater seismic hazard. In southern California, the San Andreas and San Jacinto faults have the highest recurrence intervals, and are therefore considered to have a higher probability of causing an earthquake in the future. The seismic risk posed by a fault is also dependent on when a fault broke last – a fault with a recurrence interval of five thousand years that has not caused an earthquake in as many years may be near the end of its strain accumulation cycle, and may therefore have a higher probability of rupturing than a fault that just caused an earthquake. If a fault breaks to the ground surface, **primary ground rupture** occurs. This typically results in a relatively small percentage of the total damage in an earthquake, but structures sitting directly on top of the ruptured fault can be damaged extensively.

Earthquake-induced strong ground shaking causes most of the earthquake damage. Damage to structures is usually caused by strong **horizontal ground acceleration**, which is measured as a percentage of **g**, the acceleration of gravity.

The degree of shaking depends on several factors, including earthquake size; location; depth of the focus; orientation and movement of the seismic waves (**source effects**); the type of sediments or rocks that the seismic waves travel through (**path effects**); and the interaction between the structures and the sediments or rocks at a specific site (**site effects**). Strong ground shaking can also trigger the destructive secondary effects of liquefaction and slope failure (landslides). **Liquefaction** occurs in soft, saturated sediments – when the ground shakes, the water that fills the pores increases in pressure, causing the soil to lose strength and behave as a liquid.

Most of the loss of life and injuries that occur during an earthquake are related to the collapse of buildings and structures, or people being struck by falling objects within buildings. Several types of buildings are known to perform poorly in earthquakes, and are therefore considered hazardous. FEMA (1985) defines a hazardous building as “any inadequately earthquake resistant building, located in a seismically active area, that presents a potential for life loss or serious injury when a damaging earthquake occurs.” Some potentially hazardous buildings include unreinforced masonry (URM), soft-stories (tuck-under-parking), tilt-ups, pre-1960 wood frame buildings that are not tied to their foundation or with URM chimneys, and pre-cast concrete buildings.

Slope failure does not need to be triggered by an earthquake. Some of the most significant factors that contribute to slope failure include slope height and steepness, shear strength and orientation of weak layers in the underlying geologic units, and pore water

pressures. Man-made modifications to a slope and stream erosion and down-cutting can also cause a slope to become unstable and fail. Intense precipitation events, or long periods of sustained rainfall, can saturate the soils even on a gentle slope, with the potential for the soils, and the underlying slope, to become unstable. If, in response to gravity, the saturated soils move down slope, they can form **mudflows** or **debris flows**. Mudflows can cause extensive damage to structures in their path. Damaging debris flows also often occur on slopes that were burnt recently because there are few roots holding down the soil and the surface is covered with ash and other debris.

Although not sudden and catastrophic, there are other potential geological hazards that if not recognized and mitigated properly, can cause extensive damage to structures. These hazards are specific to the soils that act as a foundation to buildings and infrastructure, and include **collapsible** and **expansive** soils. Collapsible soils undergo a rearrangement of their grains, and a loss of cementation, resulting in substantial and rapid settlement under relatively low loads. Expansive soils are fine-grained soils with variable amounts of clay minerals that can undergo significant volumetric changes as a result of changes in moisture content. The upward pressures induced by the swelling can have significant harmful effects upon structures and other surface improvements.

Radon gas is a colorless, odorless radioactive gas that forms when naturally occurring radon in the bedrock or soils breaks down. Radon gas can pose a long-term health hazard if it is allowed to collect at high concentrations in structures where people can be exposed to it for long periods of time. There are no immediate symptoms associated with radon gas exposure, but people exposed to elevated concentrations of radon gas over long periods of time can have a higher probability of developing lung cancer. It is estimated that between approximately 7,000 and 30,000 people in the United States die every year due to lung cancer as a result to exposure to radon gas.



3.1.2 Local Conditions

The City of Glendale is located at the boundary between two of southern California's geomorphic provinces, in an area that is being compressed by geological forces associated with movement on the Pacific and North American tectonic plates. Growth of the San Gabriel Mountains in response to earthquakes on the Sierra Madre fault is the most obvious result of this compression. Other



manifestations of this plate boundary include a broad zone of faulting that extends from offshore southern California inland to the Mojave Desert, and the regular occurrence of earthquakes. Movement of these plates is also causing this portion of Los Angeles basin to rotate clockwise. To accommodate this rotation, several of the faults in the area move laterally, typically with one block moving to the left relative to the other (left-lateral strike-slip).

In the Glendale area, the main faults include the Sierra Madre, the Verdugo and the Raymond faults (see Plate P-1). The Sierra Madre fault is a reverse fault that extends across the northern portion of the City, at the base of the San Gabriel Mountains. A portion of the Sierra Madre fault extending through Glendale is zoned under the Alquist-Priolo Earthquake Fault Zoning Act, so geological evaluations to locate the fault are mandated by State law if developments or re-developments amounting to more than 50 percent of the value of the structure are proposed within this zone. The eastern end of the Sierra Madre fault has not been zoned by the State, but it is recommended herein that geologic studies modeled after the Alquist-Priolo requirements be obligatory for this portion of the fault.

The Verdugo fault, which extends across the central portion of the City, is thought to be a left-lateral strike-slip fault, similar to the Raymond fault, which is located immediately south of the City. The trace of the Verdugo fault has been mostly obscured by development, except at two locations, at Brand Park in Glendale and at Palm Park in Burbank. Geologic studies to locate the fault at both of these parks have been inconclusive. Therefore, it is proposed that geological studies to evaluate the potential for surface fault rupture should be required for the Verdugo fault only for certain types of development, such as critical facilities. Similarly, geological investigations of the Sycamore Canyon, Hollywood and York Boulevard faults should also be required. For specific information about these requirements, refer to Section 3.1.3 below.

A worst-case scenario earthquake (maximum magnitude) for Glendale would involve rupture of the Verdugo fault, given that this fault lies directly below extensively developed portions of the City. Both the Sierra Madre and Raymond faults can also cause earthquakes that have the potential to severely impact

the City. Several other faults farther away have the potential to generate earthquakes that would be felt in Glendale, but these do not need to cause any damage in the City, especially if Glendale prepares for the worst-case (Verdugo fault) event. For example, the San Andreas fault has the highest probability of causing an earthquake in southern California in the near future, but this fault is sufficiently far from Glendale that ground shaking expected in Glendale as a result of this earthquake is not expected to be any stronger than shaking as a result of earthquakes on faults closer to the City.

Given that the City of Glendale is almost completely built out, the reduction of earthquake losses depends primarily on the prudent retrofitting of existing structures. Glendale has identified and catalogued all known URM buildings in the City in accordance with Chapter 58 of the City Code, and as of 2002, only 2 URMs had not yet been retrofitted or demolished. This program has reduced significantly the City's seismic vulnerability; however, other potentially hazardous buildings in the City would be identified and retrofitted to reduce even further its vulnerability to strong ground shaking.

Shallow ground water levels (< 50 feet from the ground surface) occur or have occurred historically only in some portions of the City, generally along the Los Angeles River drainage in the southwestern portion of the City, and in the lower reaches of some of the canyons. Shallow ground water has also been reported in the Verdugo Wash area north of the Verdugo fault. Seasonal fluctuations in groundwater levels, and the introduction of residential irrigation requires that site-specific investigations be completed to support these generalizations in areas mapped as potentially susceptible to liquefaction (see Plate P-1). Some areas of the City may also be susceptible to seismically induced settlement. Sites near the base of the San Gabriel and Verdugo Mountains, at the valley margins, may be particularly vulnerable as a result of differential settlement at the bedrock-alluvial contact.

The City's hillsides are vulnerable to slope instability due primarily to the fractured, crushed and weathered condition of the bedrock, and the steep terrain (see Plate P-1). Over steepened slopes along the large drainage channels are also locally susceptible to slope instability. The probability of large bedrock landslides occurring is relatively low; therefore the source of potential losses due to slope instability arises primarily from the occurrence

of smaller slope failures in the form of small slides, slumps, soil slips, debris flows and rockfalls. The initiation of such failures is generally tied to a preceding event, such as wildfire, heavy winter storms, seismic activity, or man's activities.

Some of the geologic units in the Glendale area may have fine-grained components that are moderately to highly expansive, typically along faults and fracture zones, where the bedrock has been ground to a fine-grained, plastic material. Fine-grained sediments may also occur along the southern portion of the City, in the distal (farthest from the source) portions of the alluvial fans. These fine-grained units may not be present at the surface but may be exposed during grading for construction.

The Environmental Protection Agency and the U.S. Geological Survey have mapped Los Angeles County, California as having a moderate potential for radon gas. However, the EPA warns that structures with elevated levels of radon gas have been found in areas mapped as having a low or moderate potential for radon gas. Therefore, the EPA recommends that all homes be tested for radon gas regardless of geographic location. If a home tests with elevated levels of radon gas, there are several mitigation measures that can be taken to reduce these concentrations to more acceptable levels, although reducing radon gas levels to less than 2 picoCuries per liter (pCi/L) is difficult.

3.1.3 Goals, Policies and Programs

Goal 1: Reduce the loss of life, injury, private property damage, infrastructure damage, economic losses and social dislocation and other impacts resulting from seismic hazards.

Policy 1-1: The City shall ensure that new buildings are designed to address earthquake hazards and shall promote the improvement of existing structures to enhance their safety in the event of an earthquake.

Program 1-1.1: The City shall adopt and enforce the latest version of Title 24 of the California Code of Regulations (California Building Code) with local amendments, including near-source seismic conditions.

Program 1-1.2: The City shall maintain knowledgeable staff that can identify structural deficiencies in buildings

and offer information to building owners on effective structural reinforcement options.

Program 1-1.3: The City shall encourage owners of potentially hazardous buildings, whether identified by the State or other governmental entity, to implement seismic safety improvements on those buildings.

Program 1-1.4: The City shall cooperate with the Glendale Unified School District and the Glendale Community College District, as requested, to assist their efforts to improve the structural safety of their buildings.

Policy 1-2: The City shall enforce the provisions of the Alquist-Priolo Earthquake Fault Zoning Act and the Seismic Hazards Mapping Act, with additional local provisions.

Program 1-2.1: The City shall require geological studies as part of development proposals in the Fault Hazard Management Zones shown on Plate P-1. The studies shall be conducted by State-certified engineering geologists following the guidelines published by the California Geological Survey (Note 49). The City shall require a State-certified engineering geologist or registered civil engineer, having competence in the field of seismic hazard evaluation and mitigation, to review the study at the applicant's expense. The review shall determine the adequacy of the hazard evaluation and proposed mitigation measures and determine whether the requirements of State law are satisfied, as described in Note 49: Guidelines for Evaluating the Hazard of Surface Fault Rupture by the California Geological Survey, incorporated herein by reference.

Program 1-2.2: The City shall require geological studies as part of development proposals for critical facilities if such facilities are proposed within the Fault Hazard Management Zones of the Verdugo, Mt. Lukens, Hollywood and Sycamore Canyon faults as shown on Plate P-1. The studies shall be conducted in accordance with the California Geological Survey guidelines for surface fault rupture evaluations (Note 49). The City shall require a State-certified engineering geologist having competence in the field of seismic hazard evaluation and mitigation to review the study at the applicant's expense. The review shall determine the adequacy of the hazard evaluation and proposed mitigation measures and determine whether the requirements of State law are satisfied in accordance with



Note 49: Guidelines for Evaluating the Hazard of Surface Fault Rupture, by the California Geological Survey.

Program 1-2.3: The City shall require liquefaction assessment studies as part of development proposals in areas identified by the California Geological Survey as susceptible to liquefaction (see Plate P-1). The studies shall be conducted in accordance with the California Geological Survey's Special Publication 117: Guidelines for Evaluating and Mitigating Seismic Hazards in California, and the Southern California Earthquake Center's (1999) procedures to implement Special Publication 117 – Liquefaction Hazards (both documents incorporated herein by reference). On sites shown to be susceptible to liquefaction, the City shall require the implementation of mitigation measures designed to reduce this hazard to an acceptable level. The City shall require a State-certified engineering geologist or registered civil engineer, having competence in the field of seismic hazard evaluation and mitigation, to review the study at the applicant's expense. The review shall determine the adequacy of the hazard evaluation and proposed mitigation measures and determine whether the requirements of State law are satisfied, as described in Special Publication 117 by the California Geological Survey.

Programs 1-2.4: The City shall require slope stability analyses as part of development proposals in areas identified by the California Geological Survey as susceptible to earthquake-induced landsliding (see Plate P-1). The studies shall be conducted in accordance with the California Geological Survey's Special Publication 117: Guidelines for Evaluating and Mitigating Seismic Hazards in California, and the Southern California Earthquake Center's (2002) guidelines for evaluating and mitigating landslide hazards in California. On sites shown to be susceptible to earthquake-induced slope instability, the City shall require the implementation of mitigation measures designed to reduce this hazard to an acceptable level. The City shall require a State-certified engineering geologist or registered civil engineer, having competence in the field of seismic hazard evaluation and mitigation, to review the study at the applicant's expense. The review shall determine the adequacy of the hazard evaluation and proposed mitigation measures and determine whether the requirements of State law are satisfied, as described in the California Geological Survey's Special Publication 117.

Policy 1-3: The City shall ensure to the fullest extent possible that, in the event of a major earthquake, essential structures and facilities will remain safe and operational. Essential facilities include hospitals, police stations, fire stations, emergency operation centers (as shown on Plate 1-4 of the Technical Background Report), communication centers, generators and substations, reservoirs and "lifeline" infrastructure (as defined in Section 1.8.3 of the Technical Background Report). The vulnerability of some of these critical facilities is summarized in Table 1 (at the end of this document).

Program 1-3.1: The City shall review the seismic vulnerability of essential facilities and "lifelines" in the Alquist-Priolo fault zones and other Fault Hazard Management Zones, and make structural changes to those sections of lifelines that cross fault hazard zones that, based on the vulnerability assessment are not anticipated to perform well during an earthquake. Retrofit of these facilities shall be prioritized.

Program 1-3.2: The City shall replace the piping and fittings in those City-owned water tanks that are not currently fitted with flexible, earthquake-resistant joints.

Program 1-3.3: The City shall conduct, in cooperation with the State Office of Dam Safety, an annual review of the dams and water storage facilities in the City. The City shall follow the State's requests in response to these annual reviews.

Policy 1-4: The City shall ensure that current seismic and geologic knowledge and State-certified professional review are incorporated into the design, planning and construction stages of a project, and that site-specific data are applied to each project.

Program 1-4.1: The City shall develop and make available to the public a list of State-certified engineering geologists and registered civil engineers, having competence in the field of seismic hazard evaluation and mitigation, to review, at the applicant's expense, all geologic and geotechnical reports, including fault studies, for proposed development or redevelopment, and to review grading operations.

Program 1-4.2: The City shall provide the State with updated information on faults, landslide hazards, liquefaction, etc., as such data are generated by project-specific studies. The City shall work with the State to

update the seismic hazards maps produced by the State that are relevant to the City.

Policy 1-5: The City shall ensure that all residents and business owners in the City have access to information regarding seismic and geologic hazards.

Program 1-5.1: The City shall regularly review the technical data on public safety and seismic safety for use in the planning process and undertake revisions or updates to the Safety Element as needed. This includes replacing maps with updated maps obtained from the State of California.

Program 1-5.2: The City shall develop a web-based system to communicate information about seismic and geologic hazards to the public, and describe strategies that people can implement at home and the work place to reduce economic losses and improve personal safety.

Program 1-5.3: The City shall promote earthquake preparedness with publications available in various languages spoken in the community.

Program 1-5.4: The City shall provide its residents with information about the hazards posed by radon gas, with emphasis on published sources and resources available on this subject.

Goal 2: Reduce the loss of life, injury, private property damage, infrastructure damage, economic losses and social dislocation and other impacts resulting from geologic hazards.

Policy 2-1: The City shall avoid development in areas of known slope instability or high landslide risk when possible, and will encourage that developments on sloping ground use design and construction techniques appropriate for those areas.

Program 2-1.1: The City shall require geological and geotechnical investigations in areas of potential seismic or geologic hazards as part of the environmental and development review process. The City will not issue permits for development or redevelopment until assured that all potential geologic hazards have been mitigated.

Program 2-1.2: The City shall require preliminary geological investigations of tract sites by State-registered

geotechnical engineers and certified engineering geologists (in accordance with the California Building Code and the City of Glendale's Grading, Fills and Excavations Code – City Code 15.12).

Program 2-1.3: In those areas of Glendale susceptible to slope instability, the City shall require geotechnical investigations that include engineering analyses of slope stability, provide surface and subsurface drainage specifications, and provide detailed design for fill placement and excavation.

Program 2-1.4: The City shall discourage any grading beyond that which is necessary to create adequate and safe building areas. The City shall conduct regular inspection of grading operations to maximize site safety and compatibility with community character.

Program 2-1.5: The City shall prohibit grading that is inconsistent with the Grading Ordinance. The City shall encourage the use of varied slope ratios on manufactured slopes to reduce the visual impact of grading.

Program 2-1.6: The City shall prohibit reconstruction of structures meant for human habitation that were damaged or destroyed by failed slopes unless the applicant can prove that the remedial measures proposed will improve the unstable slope conditions such that the site is suitable for development.

3.2 Flooding Hazards

3.2.1 Important Terms and Concepts

Rain in southern California is generally a welcomed event – it cleans the air, makes our hills and mountains green, and provides water for drinking and recreation. Intense or prolonged rainfall, however, can cause problems in areas where man has encroached onto the floodplain, modified the landscape and built structures in areas meant to convey excess water during floods. Communities may experience overflowing river channels, flooded streets and basements, mudflows and debris flows at the mouths of canyons, and other similar conditions that can cause extensive damage to property, injuries, and, in some cases, loss of life.

In developed areas, extensive impervious surfaces (such as pavement, buildings, and concrete walkways) cause most precipitation to be collected as runoff. Storm drain



systems are typically designed to safely carry the runoff through the area without ponding or flooding. However, plugged or partially obstructed storm drain inlets can significantly reduce the ability of the storm drain system to collect and convey the water. Regular inspection and maintenance of the storm drain system is required to remove any obstructing debris.

The Federal Emergency Management Agency (FEMA) defines the “base flood” or “100-year flood” as a flood that has a 1-percent or greater chance of being equaled or exceeded during any given year. A base flood has a 26-percent chance of occurring during a 30-year period, generally the length of most home mortgages. However, the recurrence interval represents the long-term average period between floods of a specific magnitude; rare floods could occur at short intervals or even within the same year.

Seismically induced inundation refers to flooding that results when water retention structures (such as dams) fail due to an earthquake. Dams greater than 25 feet in height or reservoirs with more than 50 acre-feet in storage capacity are required to have inundation maps that show the potential flood limits in the event that the dam is breached catastrophically. Inundation maps are prepared for emergency preparedness planning, and in no way reflect the structural integrity or safety of the dam in question.

3.2.2 Local Conditions

The Verdugo Wash is the main stream in the City, separating Glendale into quadrants defined by the southeast to south-flowing stream, and cutting through the rising block of similar bedrock that we now refer

to as the Verdugo Mountains on the west, and the San Rafael Hills on the east. Once it clears the Verdugo Mountains, the Verdugo Wash veers west-southwest and eventually drains into the Los Angeles River near the intersection of the Golden State (5) and Ventura (134) Freeways. Verdugo Wash and several of its tributaries have been confined to man-made channels since the late 1930s. In most years, this system carries little water, with peak discharges typically less than 500 cubic feet per second (cfs). Records indicate however, that about once every decade, the area experiences a severe wet winter, and Verdugo Wash then carries peak flows exceeding 1,000 cfs.

Historical records show that historical peak discharges in the Glendale area have occurred most often between November and March, indicating that future flooding in the City is most likely to occur in the winter months. Storm events can generate debris flows in the upper reaches of the watershed, at and near the base of the San Gabriel Mountains, and at the base of the Verdugo Hills. This is more likely to happen in wet years in areas recently burned by wildfires. Debris flooding has occurred previously in many of the canyons near the Glendale area. For example, the worst storm recorded in the area occurred in 1934, following a wildfire burn in the same area that had occurred two months earlier. As a result of these two events, the storm waters carried large amounts of debris. Roads were choked, bridges were washed out, several people died, and erosion and sedimentation damaged property.

A study of Verdugo Wash conducted in 1978 for the Los Angeles Department of Public Works shows that the channel could accommodate the estimated peak flows everywhere, except in the area immediately north of where Verdugo Wash joins the Los Angeles River. In fact, this area is known to flood regularly during winter storms. Nevertheless, in 1979, the Federal Emergency Management Agency (FEMA) determined that, “for all practical purposes no part of the community would be inundated by the base flood. . .”, and therefore, that the entire community would be classified as Zone C (area of minimal flood hazards where the purchase of flood insurance is not mandatory). In 1984, FEMA again informed the City that no Special Flood Hazard Areas were present within the corporate limits of the City at that time, and thus that the City was placed in Zone D, which has no mandatory flood insurance purchase requirements. As a result, there



Where Death Walked—Altura Street, Looking South

are no flood insurance rate maps for the City of Glendale, and Glendale is not listed in FEMA's Community Rating System.

There are seven dams in the Glendale area that are large enough that the State requires that inundation maps for these facilities be available, plus several other debris basins that are not subject to State regulations because they are too small. All of the larger structures are more than 50 years old and were therefore most likely not designed to withstand the strong ground shaking that the area is thought capable of experiencing given the several nearby seismic sources. Diederich Reservoir and Brand Park Dam are located within the Fault Hazard Management Zone for the Verdugo fault, and possibly just north of the fault trace. East Glorietta Dam is located in an area thought to be susceptible to liquefaction. The Tenth and Western dam is located near, but south of the Verdugo fault. Glenoaks Dam is located in an area where several not active faults have been mapped; however, secondary faulting in response to movement on other faults could occur in the area. In addition to the dams, there are 13 steel water storage tanks in the City. Three of these tanks are located within the fault hazard management zone for the Sierra Madre fault. Most, but not all, of these tanks are fitted with flexible joints that can accommodate some of the lateral and vertical movements associated with an earthquake.

3.2.3 Goals, Policies and Programs

Goal 3: Reduce the loss of life, injury, private property damage, infrastructure damage, economic losses, and social dislocation and other impacts resulting from flooding hazards.

Policy 3-1: The City shall investigate the potential for future flooding in the area and will encourage the adoption of flood-control measures in low-lying areas of alluvial fans, along major channels, and down-gradient of large reservoirs and water tanks.

Program 3-1.1: The City shall participate in the National Flood Insurance Program.

Program 3-1.2: The City shall discourage additions to, or the reconstruction of, critical facilities if such facilities are located in dam or reservoir inundation pathways (shown on Plate P-2) unless it can be demonstrated that

the proposed project and any occupants will be protected from dam or reservoir failure.

Program 3-1.3: The City shall evaluate the potential impacts to the flood control system during the environmental review process for new buildings or building additions. Hydrological studies to assess the impacts shall be required if determined necessary by the City. Potential impacts shall be fully mitigated.

Program 3-1.4: The City shall maintain City-owned storm drain facilities to prevent the accumulation of debris or other obstructions that would hamper the effectiveness of the system during rainy days.

3.3 Fire Hazards

3.3.1 Important Terms and Concepts

Since the 1970s, several different methods to map the wildfire hazard of an area have been developed. Many of these methods rely on a point system that considers the type and amount of vegetation, termed fuel loading, slope gradient, weather, dwelling density, access, level of service provided by the local fire department, and past fire history of an area in determining its fire hazard. Areas with a high fire hazard at the urban-wildland interface have to follow, at a minimum, the model ordinance adopted by the California Fire Marshal, but individual jurisdictions can have more stringent requirements. These requirements include vegetation management practices to create a defensible space around structures (defensible space is a zone of thinned vegetation that helps slow the rate and intensity of a fire and provides space for firefighters to set up to suppress the fire and save the threatened structures), fire-resistive building materials, and minimum access road criteria.

More people than ever now live and play in or at the urban-wildland interface, an area with a high fire hazard, especially if large amounts of combustible vegetation have been allowed to accumulate over time as a result of the fuel management practices common during a large part of the 20th Century. If a wildfire spreads onto the built environment, multiple structural ignitions can develop in a short period of time due to wind transport of brands or cinders. Fires at the urban-wildland interface can be particularly dangerous and complex, posing a severe threat to public and firefighter safety, and causing devastating



losses of both life and property. This has happened at several high-profile fires at the urban-wildland interface in the last 15 years (e.g., the 1990 College Hills Fire, the 1990 Paint fire in Santa Barbara, the 1991 Oakland-Berkeley Tunnel fire, and the 1993 Laguna Beach fire). The worst fire in the City's history was the College Hills fire of June 1990, which burned 100 acres and destroyed 64 homes in the foothills of the San Rafael Hills.

Unlike wildfires at the urban-wildland interface, which appear to be increasing in number and dollar loss, the number of structural fires in the developed portions of cities has decreased over time, in great part due to the use of fire-resistive building materials and internal fire sprinklers, smoke detectors and fire alarms, and the faster response by better trained fire-fighters with better equipment. Nevertheless, earthquakes can generate structural fires that have the potential to severely tax the local fire suppression agencies, especially if the water supply system is impaired due to damage to the water reservoirs and/or water mains.

3.3.2 Local Conditions

The portions of the San Rafael Hills and the Verdugo and San Gabriel Mountains within City limits are mapped as having a high fire hazard due to the steep topography of the area, the presence of flammable vegetation, and limited access (see Plate P-2). In fact, Glendale's Fire Department places nearly two-thirds of the City in the high fire hazard area. The historical record supports this mapping: since the late 1800s, the entire northern two-thirds of the City have burned at least once. The Glendale climate often contributes to the fire

risk. Dried out vegetation from the hot summer months is exposed to Santa Ana wind conditions in the fall. Such winds become extremely erratic when combined with winds generated from burning vegetation and can stress fire-fighting resources and reduce fire-fighting success. In addition, large mountain areas in Glendale contain rough topography which not only facilitates the spread of fire, but also impedes or hinders responding fire-fighting personnel and equipment. Traffic congestion in the urban areas and long travel distances and narrow, winding roads in the hillsides and mountains also can hinder fire department response to the urban-wildland interface areas. These areas have a history of fires, with some areas experiencing a wildland fire at least once a decade. Residents in all of these areas need to recognize that they live in a hazardous area, and that they are responsible for maintaining their properties. This includes, but is not limited to, establishing a fire-resistant landscape consistent with Glendale's 1993 Hillside Management Plan, and building with fire-resistant materials in accordance with Glendale's Building and Safety Code. This is especially critical in some of the older, pre-fire planning developments in the mountainous, high-fire hazard areas where access is limited by narrow roads with no secondary outlet and steep grades, which hamper the Fire Department's response.

To reduce the wildland fire hazard, especially at the urban-wildland interface, the City of Glendale has adopted an aggressive fuel modification ordinance that requires property owners to maintain a defensible space around their properties. The Fire Department conducts annual inspections of residences and lots in the City to ensure compliance with the fuel modification ordinance, and issues notices of violation where appropriate. Glendale should continue to require property owners to conduct maintenance on their properties to reduce the fire danger in accordance with the City's Building and Fire Safety Code.

Several major earthquake-generating faults within the City of Glendale could trigger multiple fires (such as from downed electrical lines or broken gas mains), disrupt life-line services (water supply) and trigger other geologic hazards, such as landslides or rock-falls, which could block roads and hinder disaster response. In addition, freeways, railways, and pipelines within the City of Glendale introduce significant fire and other risks for which the City must respond. Earthquake-induced fires pose a risk in the developed, downtown areas of the City, the result of

downed electric lines, broken gas mains, and tipped-over appliances. Loss estimation models conducted for this study indicate that earthquakes on the Sierra Madre, Verdugo, Raymond and Hollywood faults have the potential to cause significant fire-after-earthquake losses in the City of Glendale. Multiple ignitions over a broad area of the City can tax the local Fire Department, especially if the water reservoirs or water mains are also damaged during the earthquake.

Most development in Glendale occurs in the flatlands, where the predominant housing type is multiple-family units (apartments and condominiums) that have special fire protection needs. To that end, City ordinances require all of mid-rise and high-rise buildings to have fire and life safety systems in place, including automatic fire sprinklers and smoke detectors. The specific construction requirements are contained in the Glendale Building and Safety Code (Volume I, Section 715 which deals with construction requirements in fire hazard areas, and Volume VI, which pertains to fire and life-safety requirements).

The Glendale Fire Department (GFD) is responsible for fire suppression in the City. Nine fire stations are strategically located throughout the City to provide the level of service that has gained the GFD an Insurance Services Office (ISO) rating of 1, the highest rating possible (at this time, only 44 communities in the United States have been awarded an ISO rating of 1). The GFD responds to more than 90 percent of the emergency calls within 6 minutes of receiving the call at dispatch. The City of Glendale has adopted ordinances that exceed the minimum State requirements for fire hazard abatement. These ordinances include the requirement that all new roofs and re-roofs amounting to more than 25 percent of the original roof area to be done in Class A roofing materials. Since 1989, the City has also required internal fire sprinklers in all new residential one- and two-family structures. A twenty year Glendale incident history (1983-2002) shows that the number of incidents reports has nearly doubled during this time period, reflective of the population growth experienced. The number of medical emergencies compared to fire calls has increased over time and represent nearly 80 percent of all Fire Department incident calls. If the number of medical emergency responses continue to increase (which is likely, considering the aging population), and this is found to have an impact on the availability of

fire-fighting personnel and equipment, it may be prudent to add another rescue ambulance and support squad vehicle and increase staffing at the fire station in the area of the City with the highest rate of medical incidents.

In addition to vegetation management to reduce the fire hazard, the City of Glendale has adopted several ordinances that require the use of fire-resistant construction materials that protect structures from fire damage. Most of the City-adopted ordinances have become effective years ahead of the rest of California, setting an example for other communities, and are also more stringent than California Fire Code requirements. These include Class A roof coverings for all new roofs and re-roofs amounting to more than 25 percent of the original roof area, and fire sprinklers in all new one- and two-family structures. The Class A roof-covering ordinance first applied only to structures within the high fire hazard area, but is now enforced Citywide. In 1988, Glendale passed an ordinance requiring automatic fire sprinklers in existing structures four stories or more in height, and since 1989, the City has required internal fire sprinklers in all new residential one- and two-family structures.

The GFD has several proactive programs in place to reduce the fire hazard in the City. It participates in the plan review of nearly all buildings, discretionary approvals, and other development (both public and private). This review ensures that all new projects have fire department “master planning” incorporated in their design. The Fire Department has full time fire investigators that work closely with the Police Department, and it participates in several educational programs. This includes Fire Department personnel assigned full-time to public education, contracting with a private professional acting company to perform fire safety plays scheduled so as to reach every elementary-age school child in the City on an annual basis, and other similar types of educational activities.

In regards to emergency response, the Fire Department requires EMT-D certification of all of its firefighters and has a defibrillator program in excess of EMT certification. The Department has several interdepartmental agreements that ensure cooperation for emergency response (for example, Fire has an agreement with the Glendale Water and Power Department for automatic dispatch upon second alarm). It has automatic aid agreements with the adjacent cities of Burbank, Pasadena, and Los Angeles, and the County of Los Angeles. Also, it is party to an



agreement that authorizes calls for emergency response to be dispatched through the Verdugo Joint Fire Communications Center, which coordinates 33 different stations in the region, which includes stations from Glendale, Burbank, Pasadena, San Marino, South Pasadena, Monrovia, Arcadia, Sierra Madre and San Gabriel. The Fire Department also has an agreement with the Glendale Water and Power Department for automatic dispatch upon second alarm. The City of Glendale activity participates in the Standardized Statewide Emergency Management System (SEMS).

3.3.3 Goals, Policies and Programs

Goal 4 – Reduce the loss of life, injury, private property damage, infrastructure damage, economic losses and social dislocation and other impacts resulting from fire hazards.

Policy 4-1: The City shall ensure to the extent possible that fire services, such as fire equipment, infrastructure, and response times, are adequate for all sections of the City.

Program 4-1.1: The City shall conduct annual fire flow tests, especially in areas of high fire hazard, and shall implement water system improvements for hydrants and fire flow.

Program 4-1.2: The City shall prepare periodic Fire Station location and Resource studies.

Program 4-1.3: The City shall ensure that road standards meet the needs for emergency access.

Programs 4-1.4: The City shall evaluate options for a secondary public access to Glenoaks Canyon.

Program 4-1.5: The City shall improve emergency access for areas currently below standard.

Program 4-1.6: The City shall install traffic signal pre-emption devices for fire response at critical intersections.

Program 4-1.7: The City shall evaluate the impact of traffic calming measures on emergency response times.

Program 4-1.8: The City shall monitor and identify current trends (including population and settlement patterns, incident trends, and changes in the economic, social and/or cultural makeup of the community) that may impact the City's ability to provide adequate emergency services.

Program 4-1.9: The City shall conduct studies to determine whether improvements are needed in the areas of public education and fire prevention.

Policy 4-2: The City shall require that all new development in areas with a high fire hazard incorporate fire resistant landscaping and other fire hazard reduction techniques into the project design in order to reduce the fire hazard.

Program 4-2.1: The City shall encourage residents to plant and maintain drought-resistant, fire-resistant landscape species to reduce the risk of brush fire and soil erosion in areas adjacent to canyons, and develop stringent site design and maintenance standards for areas with high fire hazard or soil erosion potential.

Program 4-2.2: The City shall enforce the Weed Abatement Program in high fire hazard areas.

Program 4-2.3: Fuel management plans shall be required for all new development in areas subject to wildfire.

Program 4-2.4: The City shall enforce the Uniform Fire Code and Municipal Fire Code Amendments for new construction in fire hazard areas, including the use of sprinklers in residential structures.

Program 4-2.5: The City shall consider fire safety issues during revisions to the Zoning Ordinance.

Program 4-2.6: The City shall evaluate the feasibility of requiring development plans to be submitted in electronic format in addition to paper copies in order to facilitate the review and storage of plans.

Program 4-2.7: The City shall develop a program for monitoring and enforcing environmental mitigation measures or conditions of approval applied to projects.

Program 4-2.8: The City shall enforce a Class A Roofing ordinance or better for residential and commercial developments. Residents with existing wood-shingle or unrated roofing materials shall be encouraged to upgrade

to fire resistive building materials, including fire resistive eaves and awnings.

3.4 Hazardous Materials

3.4.1 Important Terms and Concepts

The unhealthful effects of certain chemicals and substances have led to extensive regulation of hazardous materials. The United States Environmental Protection Agency (EPA) defines a hazardous waste as a substance that 1) may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; and 2) that poses a substantial present or potential future hazard to human health or the environment when it is improperly treated, stored, transported, disposed of or otherwise managed. Hazardous waste is also ignitable, corrosive, or reactive (explosive) (U.S. EPA 40 CFR 260.10). A material may also be classified as a hazardous material if it contains defined amounts of toxic chemicals. The EPA has developed a list of specific hazardous wastes that are in the forms of solids, semi-solids, liquids, and gases.

The State of California defines hazardous materials as substances that are toxic, ignitable or flammable, reactive, and corrosive. The State also defines an extremely hazardous material as a substance that shows high acute or chronic toxicity, carcinogenicity (causes cancer), bioaccumulative properties (accumulates in the body's tissues), persistence in the environment, or is water reactive.

Hazardous materials are extensively regulated by Federal, State and City laws, and new regulations are constantly being developed as we learn more about the impact these substances have on human health and the environment. It is not the intent of the Safety Element to discuss or even list all of the regulations currently in effect to reduce the impacts of hazardous materials, as these will change or will be added to with time. The three main sources of information on hazardous materials management as they pertain to the City of Glendale are: 1) the Environmental Protection Agency (EPA), 2) the California Department of Health Services (DHS), and 3) the City of Glendale Fire Department.

The Clean Air Act requires the EPA to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. To that



end, the EPA requires that the levels of five major air pollutants be measured on a daily basis. These Air Quality Indexes are reported daily in the local news media serving metropolitan areas with populations exceeding 200,000. Air Quality Indexes are reported using a numerical value between 0 and 500 that corresponds to a health descriptor like “good” or “unhealthful.” The local agency responsible for monitoring and enforcing air quality is the South Coast Air Quality Management District.

The EPA's National Primary Drinking Water Standard protects drinking water quality by limiting the levels of specific contaminants that are known to occur or have the potential to occur in water and can adversely affect public health. The EPA and the California Department of Health Services (DHS) set the Maximum Contaminant Levels (MCLs) for specific contaminants in ground water. These contaminants include organic and inorganic chemicals (minerals), substances that are known to cause cancer (carcinogens), radionuclides (such as uranium and radon), and microbial contaminants. Water purveyors are required to test their water for these contaminants on a fixed schedule, and report their results to the DHS.

Leaking underground storage tanks (UST's) have been recognized since the early 1980s as the primary cause of groundwater contamination by gasoline compounds and solvents. In California, regulations aimed at protecting against UST leaks have been in place since 1983.



California's program is more stringent than the Federal program, requiring that all tanks be double walled, and prohibiting gasoline delivery to non-compliant tanks. The State Water Resources Control Board (SWRCB) has been designated the lead regulatory agency in the development of UST regulations and policy. The SWRCB maintains an inventory of leaking underground storage tanks in a statewide database.

3.4.2 Local Conditions

There are five large-quantity and more than 250 small-quantity generators of hazardous materials in the City. The distribution of these sites in the City is shown on Plate 5-1 of the Technical Background Report. There are also eight facilities listed in the Toxics Release Inventory that are known to have released hazardous materials of concern into the air – the EPA monitors these facilities closely to reduce the potential of future emissions at concentrations above the acceptable limits. Given these numbers, it is impressive that the actual number of unauthorized releases of hazardous materials into the environment is fairly small, as documented in the Federal and State databases reviewed. Of 55 underground storage tank leaks, only one is known to have impacted a potable groundwater source. The rest have either impacted soil only, or non-potable sources of water.

Some of the significant hazardous sites are located within or adjacent to a liquefaction susceptible area, or in an unstable slope area, and two of the sites are located within or adjacent to a dam inundation area. None of the significant hazardous sites identified in the City are located in or adjacent to a high fire hazard area. Given that all of Glendale is susceptible to high to very high ground motions as a result of an earthquake on either the Verdugo, Sierra Madre or Raymond fault, all hazardous materials sites should provide for, at a minimum, secondary containment of hazardous substances, including segregation of reactive chemicals, in accordance with the most recent California Fire Code and City of Glendale Fire Code amendments.

Some hazardous materials sites are located within 1/2-mile of schools. Significant Hazardous Materials sites should be required to prepare Risk Management Plans (RMPs) that identify the procedures by which the surrounding critical facilities will be evacuated, should it become necessary during an accidental release of haz-

ardous materials. Alternatively, the schools in the immediate vicinity of the significant hazardous materials sites should consider implementing, as part of their School Safety Plans mandated by Senate Bill 187 (the Safe School Act of 1997), procedures for evacuation should a chemical spill occur in the area.

The City of Glendale's Environmental Management Center (EMC) is charged with the responsibility of conducting compliance inspections for facilities in the City that handle hazardous material, generate or treat a hazardous waste and/or operate an underground storage tank. All new installations of underground storage tanks require an inspection, along with the removal, of the old tanks. The EMC coordinates hazardous material planning and appropriate response efforts with city departments, as well as local, and State agencies. The Office of Emergency Services for Glendale is tasked with coordinating the City's disaster operations. The goal of these agencies is to improve public and private sector readiness, and to mitigate local impacts resulting from natural or technological emergencies. Both agencies are branches of the Glendale Fire Department that deals with the planning for and response to the natural and technological disasters in the City of Glendale. The EMC is also tasked with administering a household hazardous waste collection plan for the City of Glendale in accordance with the California Integrated Solid Waste Management Act of 1989 (AB 939). The EMC is located at 780 Flower Street.

3.4.3 Goals, Policies and Programs

Goal 5: Reduce threats to the public health and safety, and to the environment, from hazardous materials.

Policy 5-1: The City shall strive to reduce the potential for residents, workers, and visitors to Glendale to being exposed to hazardous materials and wastes.

Program 5-1.1: The City shall enforce the seven Unified Program elements including the disclosure laws that require all users, producers, and transporters of hazardous materials and wastes to clearly identify the materials that they store, use or transport, and to notify the appropriate City, County, State and Federal agencies in the event of a violation.

Program 5-1.2: The City shall identify City roadways along which hazardous materials are routinely transported. If critical facilities, such as schools, hospitals, child care centers or other facilities with special evacuation needs are located along these routes, the City shall notify the operators of these facilities that they are near such routes. The City shall work with the operators of these facilities to assist them with the preparation of evacuation plans.

Program 5-1.3: The City shall evaluate the potential impacts related to hazardous materials during the environmental review process for new buildings or businesses where the production, use, storage, transport or disposal of hazardous materials is proposed. Potential impacts shall be fully mitigated.

Policy 5-1.4: The City shall maintain the capability of responding to hazardous materials incidents in the City and along the sections of freeways that extend across the City. This includes maintaining cooperation agreements with adjacent jurisdictions and continuing to coordinate with regional providers of emergency services.

Policy 5-1.5: The City shall encourage residents and businesses to reduce or eliminate the use of hazardous materials. This includes encouraging residents to buy toxic substances in only the amount needed to do the job, or better yet, to use safer non-toxic alternate products that do not pose a threat to the environment.

Program 5-1.6: The City shall support the operation of recycling centers that take hazardous substances, such as paint, paint thinner, used waste oil, etc.

Program 5-1.7: The City shall review the future direction of the City's Certified Unified Program Agency (provided by the City's Fire Department) to determine the best use of the agency's resources (including but not limited to review of existing and proposed facilities, monitoring trends in the use of types and quantities of hazardous materials, enforcing cleanup and mitigation measures, and public education efforts).

Program 5-1.8: The City shall coordinate hazardous materials regulation with other agencies. The Los Angeles County Hazardous Waste Management Plan is

incorporated herein by reference and shall be used by the City as a guide to hazardous waste management efforts.

3.5 Terrorism, Civil Disturbance and Crime

3.5.1 Important Terms and Concepts

Terrorism is defined as the "use of force or threats to demoralize, intimidate, and subjugate, especially as a political weapon or policy." Terrorists often use or threaten to use nuclear, biological or chemical substances to cause as much damage as possible in an area or to a group of people. These are referred to as Weapons of Mass Destruction, or WMDs.

Few terrorist incidents have actually occurred on American soil, but since the 9/11/01 incidents in New York and Washington, D.C., concern regarding terrorist acts in the United States has increased. Since the early 1990s, the Federal and State governments have established programs and protocol aimed at planning for and dealing with terrorist acts. The State of California has prepared and published as an addendum to the State Emergency Plan a document entitled California Terrorism Response Plan. This document identifies and describes how the State and local governments are to plan for and respond to terrorism incidents. The tasks and responsibilities of emergency management are based on two terms: Crisis Management and Consequence Management. Crisis Management refers to the response to people committing an act of terrorism. Consequence Management refers to the response to the potential or actual effects of terrorism. According to the California Terrorism Response Plan (2001), local government has primary responsibility for responding to an incident for the purpose of protecting public health and safety (Consequence Management). All response to terrorism incidents needs to be conducted in accordance with the State's Standardized Emergency Management System (SEMS). The Federal government is responsible for the law enforcement aspects of a terrorism incident that relate to identifying, apprehending and neutralizing the terrorists and their weapons (Crisis Management). These tasks are handled by the Federal Bureau of Investigation (FBI), with assistance from other agencies as necessary. Consequence management support at the federal level is provided by the Federal Emergency Management Agency (FEMA).



Civil disturbances typically develop in response to an unpopular policy or act issued or made by the group in power, either the policy makers, or those that enforce these procedures, such as the police. Civil disturbances can also develop in response to perceived or real racial or social inequality, and deep-seated political or religious differences. Civil disturbances can include minor infractions, such as disturbing the peace or assembling illegally, to major offenses such as looting, robbery and possession of stolen property, assault, arson, brandishing of weapons, and even murder. These incidents are generally handled at the local level, with assistance from adjacent jurisdictions as needed. In the event of a large-scale mass demonstration, rioting or other violent acts, the National Guard may mobilize to aid the local law-enforcement agencies.

3.5.2 Local Conditions

The risk of terrorist attacks occurring in Glendale is considered low but not impossible since California can be considered an attractive terrorist target, and therefore, by association, Glendale can be considered at risk. The Police Department maintains a confidential list of assets in the City that are considered potential terrorist and/or civil disturbance targets, and is vigilant about any unusual or suspicious activities in and around these areas.

The Fire and Police Departments are responsible for responding to terrorist attacks and civil disturbances. The Police Department has several programs specifically designed to deal with crowd control issues, and more recently terrorist activities. Several other regional and State organizations and programs are responsible for planning for and responding to civil unrest and terrorist

activities. The City of Glendale is one of the few communities in the area to receive specialized training and equipment to respond to terrorism, including incidents involving WMDs. Glendale has incorporated terrorism scenarios into the City's Emergency Response Plan and into training exercises.

The City of Glendale has one of the lowest crime rates for cities with populations exceeding 100,000. The Police Department indicates that property crimes in Glendale far outnumber crimes against persons. The data also show that as in other commerce centers, white-collar crimes, such as fraud and identity theft, have increased in the last few years in Glendale. Like many diverse communities, Glendale experiences a presence of culturally based organized crime. Changes in the frequency, pattern, or type of crime are addressed by the Police Department. For example, the street-gang situation in Glendale is addressed on a daily basis, primarily by the Gang Unit. The Police Department utilizes a variety of programs and affirmative policing, forming partnerships with community groups, businesses, schools and other government agencies, to fight crime. The community as a whole has a zero tolerance for criminal activity.

3.5.3 Goals, Policies and Programs

Goal 6: Increase the City's capability to effectively respond to acts of terrorism or civil disturbance, and to reduce criminal activity.

Policy 6-1: The City shall develop and implement programs intended to save lives, prevent injury and reduce property damage during and following a terrorist attack or civil unrest incident.

Program 6-1.1: The City shall regularly review and update as necessary the confidential list of potential terrorist targets in the City.

Program 6-1.2: The City shall study ways to minimize collateral damage in the areas surrounding the confidential list of potential targets.

Program 6-1.3: The City shall study potential access problems along major routes such as Brand Boulevard, San Fernando Road and Verdugo Boulevard in the event of an attack or civil unrest, and shall provide

recommendations to manage traffic through these areas in the event of a disaster.

Program 6-1.4: The City shall identify potential, strategically located staging sites near high-risk assets from which emergency response personnel, including mutual aid forces, can be deployed quickly and efficiently.

Program 6-1.5: The City shall continue to conduct disaster response exercises that utilize credible crime, terrorism and natural disaster scenarios.

Program 6-1.6: The City shall continue to prepare and implement measures to protect essential City facilities and infrastructure from criminal or terrorist attack, including cyber attack.

Program 6-1.7: The City shall regularly review the Police Department's level of training and contingency plans to ensure that the Department is responsive to any changes in the City's profile (such as changes in demographics or types of businesses) that may increase the risk of terrorist attacks.

Program 6-1.8: The City shall annually review plans to respond to a large-scale criminal event, such as a terrorist incident. Such plans shall consider topics such as identification of potential targets, risk reduction strategies, minimization of collateral damage and coordination with other agencies.

Policy 6-2: The City shall undertake programs aimed specifically at reducing crime.

Program 6-2.1: The City shall continue to monitor and regularly study crime statistics to look for trends or shifts in population, economics or social conditions that would engender increased crime.

Program 6-2.2: The City shall continue to educate the public about crime watch, neighborhood watch and other similar programs.

3.6 Dangerous Animals and Plants

3.6.1 Important Terms and Concepts

Wild animal – human interaction appears to be increasing in California, in part as a result of man's increased encroachment onto the progressively smaller "islands"

of undeveloped terrain left in the region. This also means that animal density in these undeveloped areas has increased, with the resultant increased competition for food resources. Most often, this interaction consists of casual sightings of animals from a distance, but some animals have actually adapted to their urban surroundings and become accustomed to eating pet food, trash, and even pets. Some animals are carriers of disease.

There are several plants that can be poisonous if touched or eaten. While this is not a major health concern, sensitive individuals, especially infants, need to be protected from the potential harmful effects. There are innumerable lists of poisonous plants available in books and on the web. It is difficult to address all potential dangerous plants, but some of the more common ones are listed in the accompanying Technical Background Report.

3.6.2 Local Conditions

Coyotes are common in the Glendale area. Studies of these coyotes show that they have adapted well to the urban environment partly because people are used to leaving food out for them. The San Gabriel Mountains are habitat for mountain lions and black bears. These animals tend to avoid humans, although bears are also opportunistic and have learned to look for food in dumpsters and other areas frequented by people. Actions that people can take if they encounter a mountain lion or black bear are similar: make yourself look as big as possible; shout; throw rocks or sticks you can reach without bending over; take aggressive action.

Deer and smaller animals like raccoons, ground squirrels, rabbits, bats and rats can carry diseases that can be transmitted to domestic animals and people, either through direct contact, or through the bites of fleas and ticks. Some of these conditions include rabies (through direct contact, such as a bite, from the infected animal), and plague (carried by infected fleas that live on squirrels, rats, rabbits, and even domestic animals). Mice and other rodents can also carry the virus that causes hantavirus pulmonary syndrome, a flu-like condition that can cause pulmonary distress in some individuals. Mosquitoes are also the carriers of viruses that can cause encephalitis or meningitis, such as West Nile encephalitis. People affected by all of these conditions have been reported in California in the last few years, although these are generally isolated cases. The Centers for Disease Prevention and Control keep track of outbreaks or incidents of these diseases throughout the United States,



and provide detailed information about each of these conditions at their web page.

Other potentially dangerous animals in the area include rattlesnakes, bees and wasps, and black widow spiders. Los Angeles County, including Glendale, is on the watch list for Africanized Honey Bee (AHB) infestation, although it is not considered a serious threat at this time. Several Salmonella incidences linked to reptiles, such as iguanas and turtles, have been reported in Los Angeles County.

The City of Glendale contracts with the Pasadena Humane Society (PHS) for animal control. The Glendale Police Department administers the contract. PHS provides to citizens, at nominal fees, humane traps that can be used to trap small animals. The PHS also deals with feral cats and stray dogs. The Arcadia District Office of the County of Los Angeles Agricultural Commissioner / Weights and Measures Department and the Greater Los Angeles County Vector Control District provide vector control services for Glendale (a vector is an organism that serves as carrier from one host to another of disease-producing bacteria, fungi, worms, or viruses).

3.6.3 Goals, Policies and Programs

Goal 7: Reduce the risks to the public related to wild animals and poisonous or dangerous plants.

Policy 7-1: The City shall provide information to the public about the risks associated with wild animals and dangerous or poisonous plants.

Program 7-1.1: The City shall make information available to the public (for example, with pamphlets or using the City's web site) summarizing the ways to avoid dangerous wild animals and actions that can be taken in the event of an encounter with such animals.

Program 7-1.2: The City shall make information available to the public, such as pamphlets or information on the City's web site, summarizing the ways to avoid dangerous plants and first-aid measures that can be taken in the event of exposure to or ingestion of such plants.

Policy 7-2: The City shall assist the public in their efforts to reduce interactions with wild animals and dangerous or poisonous plants.

Program 7-2.1: The City, at the discretion of the Director of Public Works, shall provide residents with trash receptacles that are difficult for animals to knock over or open.

Program 7-2.2: The City shall work with the Park Rangers to monitor sightings of mountain lions and black bears in and adjacent to City limits, and shall post this information at the entrance to trailheads in the areas where sightings have been made in the past year.

Program 7-2.3: The City shall encourage residents that wish to compost in their properties to use enclosed composting bins.

Program 7-2.4: The City shall encourage residents to have their pets vaccinated for rabies and provide information about the benefits of flea control as a method for preventing the spread of dangerous diseases.

Program 7-2.5: The City shall monitor for unusual numbers of dead rodents or birds and notify appropriate County agencies if such an event occurs.

Program 7-2.6: The City shall monitor for coyote sightings and work with appropriate agencies to eliminate or relocate aggressive coyotes as necessary.

3.7 Disaster Preparedness, Recovery and Emergency Response

3.7.1 Important Terms and Concepts

Planning issues pertaining to emergency response, disaster preparedness, and disaster recovery require an assessment of the hazards, identification of functions and resources to handle short-term response, and development of recovery procedures. Earthquakes pose the greatest challenge because they occur with little or no warning, and can set into motion a number of linked events. In the immediate aftermath of a major earthquake, numerous decisions need to be made. These decisions include the orderly evacuation and sheltering of displaced individuals and families, the search for and rescue of victims, and the suspension and resumption of critical services such as



utilities and transportation routes. Effective emergency response hinges on an accurate assessment of the disaster to identify those areas that need the most assistance, and reliance on pre-determined strategies that allow emergency personnel to make the best possible decisions given the circumstances.

Evacuation routes and bomb shelters are a legacy of the 1950s and 1960s when communities prepared for the evacuation of their entire population if necessary as a result of a nuclear war. In the last two decades, however, there has been a shift toward sustainability, with communities emphasizing the need to be self-sufficient after an emergency. There are, nevertheless, certain types of disasters that require the mobilization (evacuation) of a segment of the population from a hazardous or potentially hazardous area to a safer area. This would be the case, for example in the event of a wildfire threatening residences at the urban-wildland interface, the inundation of the area directly down gradient from a breached dam, or the area downwind from a facility that releases a toxic chemical into the air. All of these events require the immediate evacuation of high occupancy and dependent facilities (immobile populations) to safer areas that may or may not be near to the impacted area. Evacuated individuals may be able to come back home or to their place of business within 24 to 48 hours of the disaster. In the event of an earthquake, displaced individuals or households generally prefer to take shelter in a facility or park as close to home as possible. Evacuation need not be immediate following the earthquake, but the length of time that displaced people may need to remain in emergency shelters can be expected to last several days, until they

can return home or find more permanent locations with relatives, friends or elsewhere.

Disaster response routes are roads that can best move emergency services and supplies to where they are needed the most immediately following a major disaster. Therefore, disaster routes should be kept clear of non-essential traffic and debris following an earthquake or another disaster. The public needs to stay off disaster response routes until allowed to do so by the local police.

3.7.2 Local Conditions

The data suggest that the City of Glendale is at risk of experiencing a near-source earthquake given its proximity to three active seismic sources. The City has already taken several actions that have reduced its vulnerability to earthquake-induced strong ground shaking, but additional work can be done. The City's Emergency Plan establishes the responsibilities of the City's emergency response personnel and the framework by which the City will respond to and receive emergency mutual aid from other local governments and County, State and Federal agencies. The Emergency Plan is updated annually and City personnel train with it annually in exercises ranging from tabletop discussions to full-scale exercises involving dozens of personnel in the field supported by the activation of the City's Emergency Operations Center.

It is important to remember that during large-scale disasters, such as an earthquake, several emergencies may have to be addressed simultaneously, and that emergency resources from neighboring communities and jurisdictions may not be available for some time after the disaster. In fact, other neighboring cities may fare worse than Glendale to the same disaster, and Glendale may have to respond to incidents not only within its corporate boundaries, but may be called on to assist other nearby communities. Self-sufficiency, both by City Divisions and the residents, is an important component of a community's preparedness.

Plate P-3 shows the evacuation routes through the City of Glendale shown on the County of Los Angeles Safety Element (Leighton, 1990). These evacuation routes are, together with the proposed City disaster response routes, the main thoroughfares through the City to be used by emergency response services during an emergency. If the situation warrants the evacuation of an area, these roadways serve as evacuation routes. Otherwise, all of these roads should be considered disaster response routes. There are



significant differences in these concepts that need to be understood by everybody. Evacuation routes are used to relocate residents and visitors from a hazardous or potentially hazardous area to a safer area. Given that evacuation activities are controlled by particular situations, selection of the most appropriate evacuation route for a particular disaster generally requires some improvisation. Nevertheless, identifying the routes through the City that provide for the most direct access in an out of a given area helps to speed the process during an actual emergency. Road blockage of the evacuation and disaster routes should be prevented at all times

Disaster routes serve as thoroughfares primarily for the movement of emergency response vehicles and access to critical facilities. These are typically wide roads or major arterial routes that allow for cross-town traffic. Notice that all fire stations in the City are located along or immediately adjacent to one of these disaster response routes. Immediate emergency clearance (for example of debris associated with an earthquake) and road/bridge repairs for short-term emergency operations are emphasized along disaster routes. When these roadways are being used for disaster response, the general public needs to stay off these roads until told otherwise by the Police Department or the appropriate City agency managing the disaster response operations. Specific actions warranted along these disaster response and evacuation routes include the following:

- Mitigation measures that prevent earthquake-induced slope failures from blocking these roads should be implemented. This is especially significant for Glenoaks Boulevard, since it provides the only source of access in and out for this area of Glendale, and to a lesser degree for East Chevy Chase Drive, both in the San Rafael Hills.
- Improvement of those disaster response routes with inadequate widths to support the mobilization of fire engines and other emergency response vehicles.
- Mitigation and/or setback of structures or buildings that could potentially block the public right-of-way along these routes. This includes cornices, parapets, or other overhangs that if collapsed, would impact traffic on these roads.

- Development of specific plans for traffic control contingencies during major disasters, considering both evacuation and disaster response options.

The disaster routes identified divide the City into sections. Potential shelter locations have been identified within each of these sections. These shelter locations are shown on Plate P-3 and on Table 2. Residents and visitors in need of shelter following a disaster are encouraged to report first to the shelter closest to them. If that shelter is full, closed, or otherwise unavailable, then residents would be referred to the next closest open shelter. These facilities are to serve as staging and communication areas for emergency response personnel, and City officials and relief organizations managing the emergency recovery efforts. Residents should be aware of the disaster routes and emergency shelters in their neighborhood, and the actions to take in the event of a disaster, including how to be self-sufficient for at least 72 hours after a disaster. Equipment caches with supplies can be maintained at several of the shelter locations identified in Table 2 so that they are immediately available during an emergency.

3.7.3 Goals, Policies and Programs

Goal 8: Maintain a high level of emergency preparedness.

Policy 8-1: The City shall prepare for emergency response and recovery from natural and urban disasters, especially earthquake hazards.

Program 8-1.1: The City shall update disaster preparedness and recovery plans as necessary. Such plans shall be prepared in accordance with regional, State and Federal regulations and guidelines.

Program 8-1.2: The City shall maintain and update the City's emergency response organization consisting of representatives from all City departments, local quasi-governmental agencies, private businesses, citizens, and other community partners involved in critical and/or community-wide services.

Program 8-1.3: The City shall maintain mutual aid agreements with other agencies and develop partnerships with other emergency relief organizations.

Program 8-1.4: The City shall establish traffic control contingency plans for disaster routes.

Program 8-1.5: The City shall make information available to the public (for example, with pamphlets or using the City's web site) about steps they can take to increase their level of disaster preparedness such as the need for storing supplies to increase self-reliance in the aftermath of a disaster.

Program 8-1.6: The City shall promote the development of evacuation plans in high-rise buildings, immobile population centers, businesses that use hazardous substances, and in other critical facilities. The evacuation procedures should be designed to be carried out without aid from the City's emergency response resources.

Program 8-1.7: The City shall compile and maintain information about facilities with special risks, hazards and needs that may require specialized response.

Program 8-1.8: The City shall participate in emergency preparedness exercises.

Program 8-1.9: The City shall inventory equipment available, including battery-powered and mobile generators, cranes, bulldozers, concrete saws, large ladders, personal protective gear (including respirators, gloves, and protective clothing), medical equipment and supplies, tents and other facilities that can be used for temporary shelter and as makeshift emergency medical centers.



EXHIBITS

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Table 1: Hazard Assessment of Critical Facilities and Schools in Glendale
(based on their location relative to hazards described in the Technical Background Report only--
Site Specific Studies Recommended)

ID	Critical Facilities	Strong Shaking ¹	Surface Rupture	Liquefaction	Landsliding	Slope Instability	Wildfire Susceptibility	Flooding	Dam Inundation	Hazardous Listings
1	Emergency Operations Center									
2	Glendale Police Station									
3	LA County Sheriff Station									
	Fire Stations									
4	Fire Station 21									
5	Fire Station 22									
6	Fire Station 23									
7	Fire Station 24									
8	Fire Station 25									
9	Fire Station 26									
10	Fire Station 27									
11	Fire Station 28									
12	Fire Station 29									
	Hospitals									
13	Verdugo Hills Hospital									
14	Adventist Medical Center									
15	Glendale Memorial Hospital									
	Schools									
16	Glendale Community College									
17	Montrose Campus of Glendale College									
18	R.D. White Elementary									
19	John Marshall Elementary									
20	John Muir Elementary									
21	Horace Mann Elementary									
22	Thomas Edison Elementary									
23	Columbus Elementary									
24	Mark Keppel Elementary									
25	Thomas Jefferson Elementary									
26	Balboa Elementary									
27	Hoover High School									
28	Eleanor Toll Middle School									
29	Benjamin Franklin Elementary									
30	Allan F. Daily High School									

Table 1: Hazard Assessment of Critical Facilities and Schools in Glendale
(contd.)

ID	Critical Facilities	Strong Shaking ¹	Surface Rupture	Liquefaction	Landsliding	Slope Instability	Wildfire Susceptibility	Flooding	Dam Inundation	Hazardous Listings
31	Theodore Roosevelt Middle School									
32	Glendale High School	H								
33	Woodrow Wilson Middle School									
34	Glenoaks Elementary									
35	Verdugo Woodlands Elementary									
36	John Fremont Elementary									
37	Lincoln Elementary									
38	Dunsmore Elementary	H								
39	Clark Magnet High School	H								
40	Cerritos Elementary									
41	Valley View Elementary									
42	Glendale Career College									
43	La Crescenta Elementary									
44	Monte Vista Elementary									
45	Mountain Avenue Elementary									
46	Rosemont Avenue Middle School									
47	Crescenta Valley High School									

High Risk to Critical Facility--facility is located in, or within ½ mile, of a census tract containing 31 or more hazardous waste listings.

Moderate Risk to Critical Facility--facility is located in, or within ½ mile, of a census tract containing 11 to 30 hazardous waste listings.

1. The entire Glendale area can experience strong seismic shaking as a result of an earthquake on the Sierra Madre, Verdugo, Raymon or Hollywood faults. Based on the HAZUS analyses, Glendale High School is anticipated to experience at least moderate damage as a result of any of the four earthquake scenarios mentioned above. The schools in the northern portion of the district, near the Sierra Madre fault, are also anticipated to suffer at least moderate damage as a result of the maximum magnitude earthquake on the Sierra Madre fault. The schools that, according to the HAZUS analyses, are more likely to perform poorly during a near-source earthquake are identified with an “H”.



Table 2: Potential Shelters In and Near the City of Glendale
(for the location of the shelter closest to you, refer to Plate P-3)

Parks and Facilities	Address	Buildings	Building Capacity	Phone Number
Adult Recreation Center	210 E. Colorado Street	Yes	75	548-3775
Brand Park Studios	1601 W. Mountain Street	Yes	40	548-3782
Civic Auditorium	1401 N. Verdugo Road	Yes	600	548-2147
Clark Community Center	4747 New York Avenue L.C.	Yes	150	548-4068
Crescenta Valley County Park	3901 Dunsmore Avenue L.C.	Yes	40	No Phone
Fremont Park	600 W. Hahn Avenue	No		No Phone
Glendale Armory	220 E. Colorado Street	Yes	250	No Phone
Glenoaks Park	2531 E. Glenoaks Blvd.	Yes	40	No Phone
Griffith Manor Park	1551 Flower Street	Yes	25	No Phone
Maple Park	820 E. Maple Street	Yes	130	548-3785
Pacific Park	501 S. Pacific Avenue	No		No Phone
Scholl Canyon Ballfields	3200 E. Glenoaks Blvd.	No		No Phone
Scholl Canyon Park	2849 E. Glenoaks Blvd.	No		No Phone
Sparr Heights Senior Center	1613 Glencoe Way	Yes	40	548-2187
Verdugo Park	1621 Cañada Blvd.	No		No Phone
Schools and Colleges	Address	Buildings	Building Capacity	Phone Number
Glendale Community College	1500 N. Verdugo Road	Yes		240-1000
Montrose Campus of Glendale College				
R.D. White Elementary	744 E. Doran Street	Yes		241-2164
John Marshall Elementary	1201 E. Broadway	Yes		242-6834
Thomas Edison Elementary	440 W. Lomita Avenue	Yes		241-1807
Balboa Elementary	1844 Bel Aire Drive	Yes		241-1801
Hoover High School	651 Glenwood Road	Yes		242-6801
Allan F. Daily High School	220 N. Kenwood	Yes		247-4805
Crescenta Valley High School	4400 Ramsdell Avenue	Yes		249-5871

Table 3: Program Implementation Schedule

No.	Program	Responsible Division	Potential Funding	Priority	Time Frame (years)
	Seismic Hazards				
1-1.1	Adopt Building Code	Public Works/Building & Safety	N/A	High	On-going
1-1.2	Hire and train staff knowledgeable on the Building Codes	Public Works/Building & Safety	N/A	High	On-going
1-1.3	Encourage seismic improvements	Public Works/Building & Safety	N/A	High	On-going
1-1.4	Cooperate with G.U.S.D. to improve the structural safety of their buildings	Public Works/Building & Safety	N/A	High	On-going
1-2.1	Require geological studies for projects in identified hazards zones	Public Works/Engineering Planning	N/A	High	On-going
1-2.2	Require geological studies for critical facilities projects in the hazards zones of the Verdugo, Lukens, Hollywood and Sycamore Canyon faults	Public Works/Engineering Planning	N/A	High	On-going
1-2.3	Require liquefaction assessment studies	Public Works/Engineering Planning	N/A	High	On-going
1-2.4	Require slope stability analyses	Public Works/Engineering Planning	N/A	High	On-going
1-3.1	Review seismic vulnerability of essential facilities	Public Works/Building & Safety	N/A	Moderate	3 years
1-3.2	Replace piping and fittings in City-owned water tanks	Glendale Water & Power	GWP Budget	High	1 year
1-3.3	Annual review of dams and water storage facilities	Glendale Water & Power	GWP Budget	High	On-going
1-4.1	Develop and make available to public a list of State certified geologists	Public Works/Engineering	PW Budget	Moderate	1 year
1-4.2	Provide State with updated information on seismic hazards	Public Works/Building & Safety	PW Budget	High	On-going
1-5.1	Update Safety Element as needed	Planning	General Fund	Moderate	As Needed
1-5.2	Develop web-based information for public regarding seismic hazards and safety strategies	Public Works/Building & Safety	PW Budget	Moderate	1 year

**Table 3: Program Implementation Schedule**

No.	Program	Responsible Division	Potential Funding	Priority	Time Frame (years)
1-5.3	Promote earthquake preparedness through publications in various languages	Public Works/Building & Safety	PW Budget	Moderate	1 year
1-5.4	Provide information about radon gas hazards	Public Works/Building & Safety	PW Budget	Low	3 years
	Geologic Hazards				
2-1.1	Require geological and geotechnical investigations in areas of potential hazard	Public Works/Engineering Planning	N/A	High	On-going
2-1.2	Require preliminary geological investigations of tract sites	Public Works/Engineering Planning	N/A	High	On-going
2-1.3	Require geotechnical investigation in areas susceptible to slope instability	Public Works/Engineering Planning	N/A	High	On-going
2-1.4	Discourage unnecessary grading. Inspect grading operations to ensure safety.	Public Works/Engineering Planning	N/A	High	On-going
2-1.5	Prohibit grading that is inconsistent with the Grading Ordinance	Public Works/Engineering Planning	N/A	High	On-going
2-1.6	Prohibit reconstruction of structures meant for human habitation that were destroyed by failed slopes	Public Works/Building & Safety	N/A	High	On-going
	Flooding Hazards				
3-1.1	Participate in National Flood Insurance Program	Public Works/Engineering	N/A	Moderate	On-going
3-1.2	Discourage reconstruction of critical facilities if located in inundation pathways	Public Works/Engineering	N/A	High	On-going
3-1.3	Fully mitigate potential impacts to flood control system by new development	Public Works/Engineering	N/A	High	On-going
3-1.4	Maintain City-owned storm drain facilities	Public Works/Engineering	PW Budget	High	On-going
	Fire Hazards				
4-1.1	Conduct annual fire flow tests	Fire	N/A	Moderate	On-going

Table 3: Program Implementation Schedule

No.	Program	Responsible Division	Potential Funding	Priority	Time Frame (years)
4-1.2	Prepare periodic Fire Station location and Resource studies	Fire	N/A	Moderate	As needed
4-1.3	Road standards shall meet needs for emergency access	Fire/Planning/Engineering	N/A	Moderate	On-going
4-1.4	Evaluate secondary public access for Glenoaks Canyon	Public Works/Engineering Fire	N/A	Low	5 years
4-1.5	Improve emergency access for areas below standards	Fire	N/A	Moderate	As needed
4-1.6	Install signal preemption devices at critical intersections	Fire/Transportation	Unknown	Moderate	Under study
4-1.7	Evaluate impact of traffic calming devices on emergency response times	Fire/Transportation	N/A	Moderate	On-going
4-1.8	Monitor and identify current trends that may impact emergency services	Fire	N/A	Moderate	As needed
4-1.9	Determine if improvements are needed in public education and fire prevention	Fire	N/A	Low	On-going
4-2.1	Encourage fire-resistant landscaping	Fire/Planning	N/A	Moderate	On-going
4-2.2	Enforce Weed Abatement Program in high fire hazard areas	Fire	Currently Budgeted	High	On-going
4-2.3	Require fuel management plans for new development	Fire	N/A	Moderate	As needed
4-2.4	Enforce the Uniform Fire Code and Municipal Fire Code Amendments	Fire	Currently Budgeted	High	On-going
4-2.5	Consider fire safety issues when making revisions to the Zoning Ordinance	Planning/Fire	N/A	Moderate	As needed
4-2.6	Evaluate feasibility of requiring development plan submittal in electronic format	Public Works/Building & Safety/Engineering	N/A	Low	2 years

**Table 3: Program Implementation Schedule**

No.	Program	Responsible Division	Potential Funding	Priority	Time Frame (years)
4-2.7	Develop program to monitor and enforce mitigation measures and conditions of approval applied to projects	Planning	N/A	Moderate	1 year
4-2.8	Enforce Class A roofing and encourage upgrading existing wood roofs	Public Works/Building & Safety	N/A	High	On-going
Hazardous Materials					
5-1.1	Enforce the 7 Unified Program elements related to hazardous materials	Fire/Hazardous Materials	Permit Fees	High	On-going
5-1.2	Identify roadways used to transport hazardous materials and critical facilities near such routes	Fire/Hazardous Materials	Area Plan	High	2 years
5-1.3	Evaluate hazardous materials during environmental review process for new buildings	Planning/Fire/Hazardous Materials	Plan check/permit fees	High	On-going
5-1.4	Maintain ability to respond to hazardous materials incidents in the city	Fire/Hazardous Materials	General Fund/EMC/EOC	High	On-going
5-1.5	Encourage public to eliminate or reduce use of hazardous materials	Fire/Hazardous Materials	Disposal fee/State grants	High	On-going
5-1.6	Continue to support recycling centers	Fire/Hazardous Materials	Disposal fee/State grants	Moderate	On-going
5-1.7	Review direction of City's Certified Unified Program Agency	Fire/Hazardous Materials	EMC Budget	Moderate	On-going
5-1.8	Coordinate hazardous materials regulation with other agencies	Fire/Hazardous Materials	N/A	Moderate	On-going
Terrorism, Civil Disturbance and Crime					
6-1.1	Review and update confidential list of potential targets in the City	Police/SPE Working Group	N/A	High	On-going
6-1.2	Study ways to minimize collateral damage to potential targets	Police/SPE Working Group	N/A	High	On-going

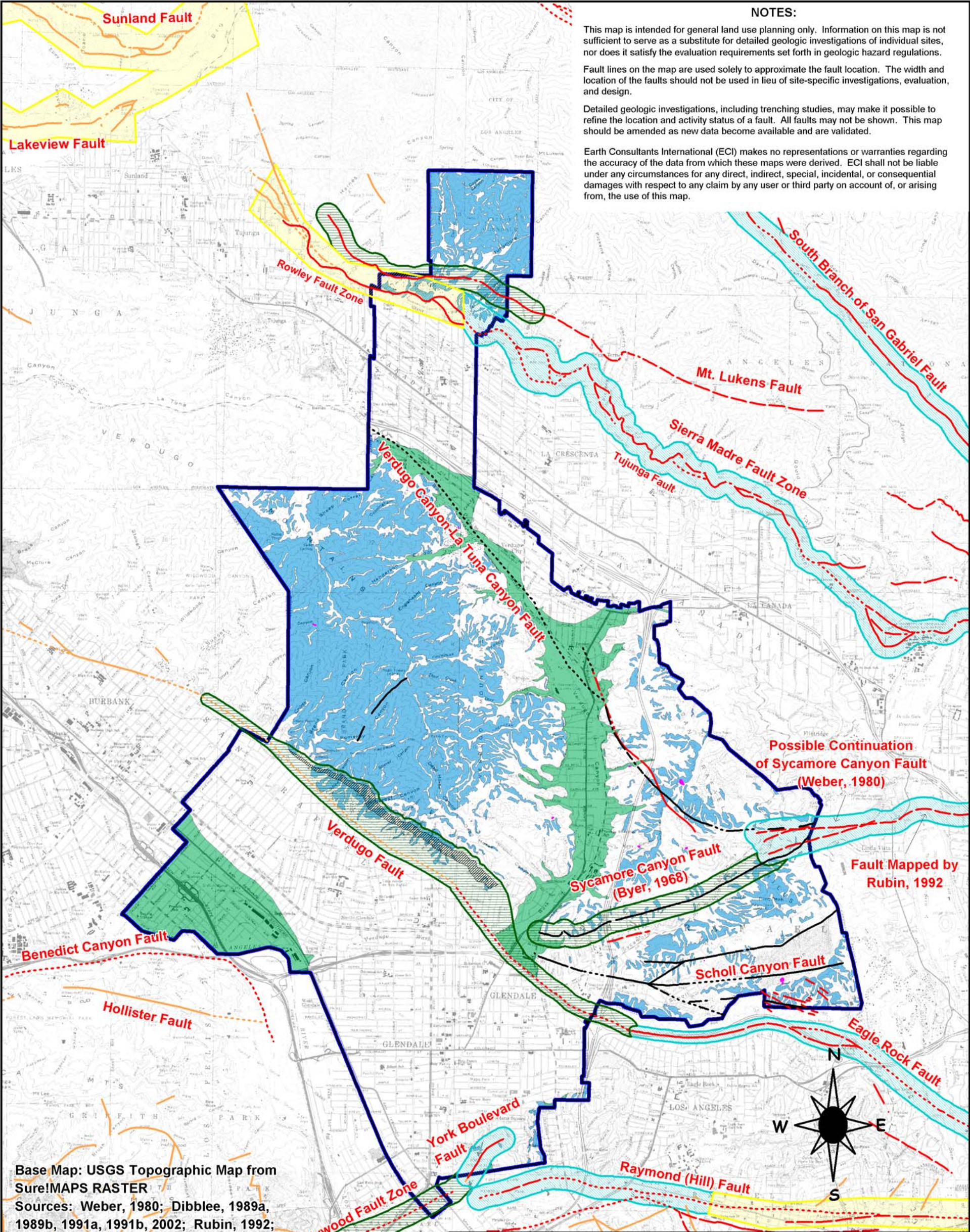
Table 3: Program Implementation Schedule

No.	Program	Responsible Division	Potential Funding	Priority	Time Frame (years)
6-1.3	Study access problems of major routes in the event of an attack or civil unrest	Police/SPE Working Group	N/A	High	2 years
6-1.4	Identify staging sites near high risk assets	Fire	N/A	Moderate	1 year
6-1.5	Conduct disaster response exercises	Fire	N/A	High	On-going
6-1.6	Protect essential City facilities from attack	Police/GWP/ Fire	N/A	High	On-going
6-1.7	Review Police training and plans for dealing with terrorist attacks	Police	Grants	High	On-going
6-1.8	Annually review plans to respond to a large-scale incident, such as a terrorist incident	Police/SPE Working Group	N/A	High	On-going
6-2.1	Monitor crime statistics to look for trends	Police	N/A	High	On-going
6-2.2	Educate the public about neighborhood watch and similar programs	Police	COPS Grants	Moderate	On-going
Animal & Plant Hazards					
7-1.1	Make information available to the public in regards to hazardous animals	Parks and Recreation	Grants	High	On-going
7-1.2	Make information available to the public in regards to dangerous plants	Parks and Recreation	Grants	High	On-going
7-2.1	Provide residents with animal-proof trash receptacles	Public Works/Maintenance Services	Parks/PW Grants	Low	5 years
7-2.2	Work with Forest Rangers to monitor wild animal sightings and publicize information	Parks and Recreation/City PIO	N/A	Low	On-going
7-2.3	Encourage residents to use enclosed composting bins	Parks and Recreation/PW Integrated Waste Mgmt.	PW Integrated Waste Mgmt. Grants	Low	On-going
7-2.4	Encourage residents to have pets vaccinated and publicize the benefits of flea control	City Clerk	N/A	Low	On-going

**Table 3: Program Implementation Schedule**

No.	Program	Responsible Division	Potential Funding	Priority	Time Frame (years)
7-2.5	Look for and report unusual numbers of dead rodents or birds	Parks and Recreation	N/A	High	On-going
7-2.6	Monitor coyote population and relocate aggressive coyotes	Parks and Recreation	Parks	Moderate	On-going
	Emergency Preparedness				
8-1.1	Update preparedness and recovery plans	Fire/EOC	N/A	High	On-going
8-1.2	Maintain and update participants in the City's emergency response organization	Fire/EOC	N/A	High	On-going
8-1.3	Maintain mutual aid agreements with other agencies	Fire	N/A	High	On-going
8-1.4	Establish traffic control plans for disaster routes	Police	N/A	Moderate	2 years
8-1.5	Publicize information about disaster preparedness	Fire/EOC	N/A	Low	1 year
8-1.6	Promote development of evacuation plans in high-rise buildings, immobile population centers, businesses that use hazardous substances and in other critical facilities.	Fire	N/A	Moderate	3 years
8-1.7	Compile and maintain information about facilities that may require specialized response.	Fire/Police/GWP/Public Works	N/A	Moderate	On-going
8-1.8	Continue to participate in emergency preparedness exercises	All City Divisions	N/A	Moderate	On-going
8-1.9	Inventory equipment needed for emergency preparedness	Fire/EOC/Police/Public Works/GWP/Finance-- Logistics	N/A	High	1 year

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NOTES:

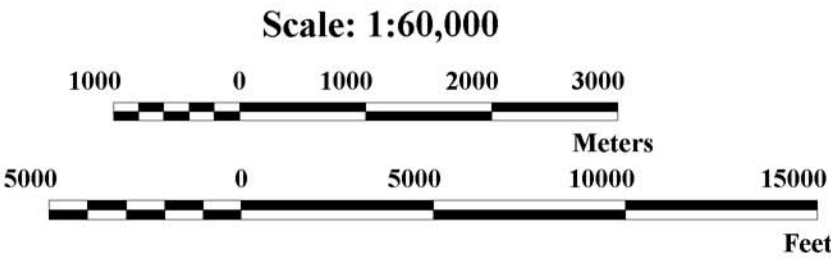
This map is intended for general land use planning only. Information on this map is not sufficient to serve as a substitute for detailed geologic investigations of individual sites, nor does it satisfy the evaluation requirements set forth in geologic hazard regulations.

Fault lines on the map are used solely to approximate the fault location. The width and location of the faults should not be used in lieu of site-specific investigations, evaluation, and design.

Detailed geologic investigations, including trenching studies, may make it possible to refine the location and activity status of a fault. All faults may not be shown. This map should be amended as new data become available and are validated.

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Base Map: USGS Topographic Map from Sure!MAPS RASTER
Sources: Weber, 1980; Dibblee, 1989a, 1989b, 1991a, 1991b, 2002; Rubin, 1992; Yerkes, 1997; Yerkes and Graham, 1997; Byer, 1968.



- Explanation**
- Fault; solid where location known, dashed where approximate, dotted where inferred.
 - Faults Mapped by Dibblee, Weber, and Rubin
 - Faults Mapped by Yerkes, and Yerkes and Graham
 - Faults Mapped by Byer
 - Verdugo Fault Zone Mapped by Byer
 - Mapped Landslide
 - Alquist-Priolo Earthquake Fault Zone
 - Fault Hazard Management Zone
 - Fault Hazard Management Zone for Critical Facilities Only
 - Seismic Hazard Zones**
 - Liquefaction Hazard Zone
 - Landslide Hazard Zone

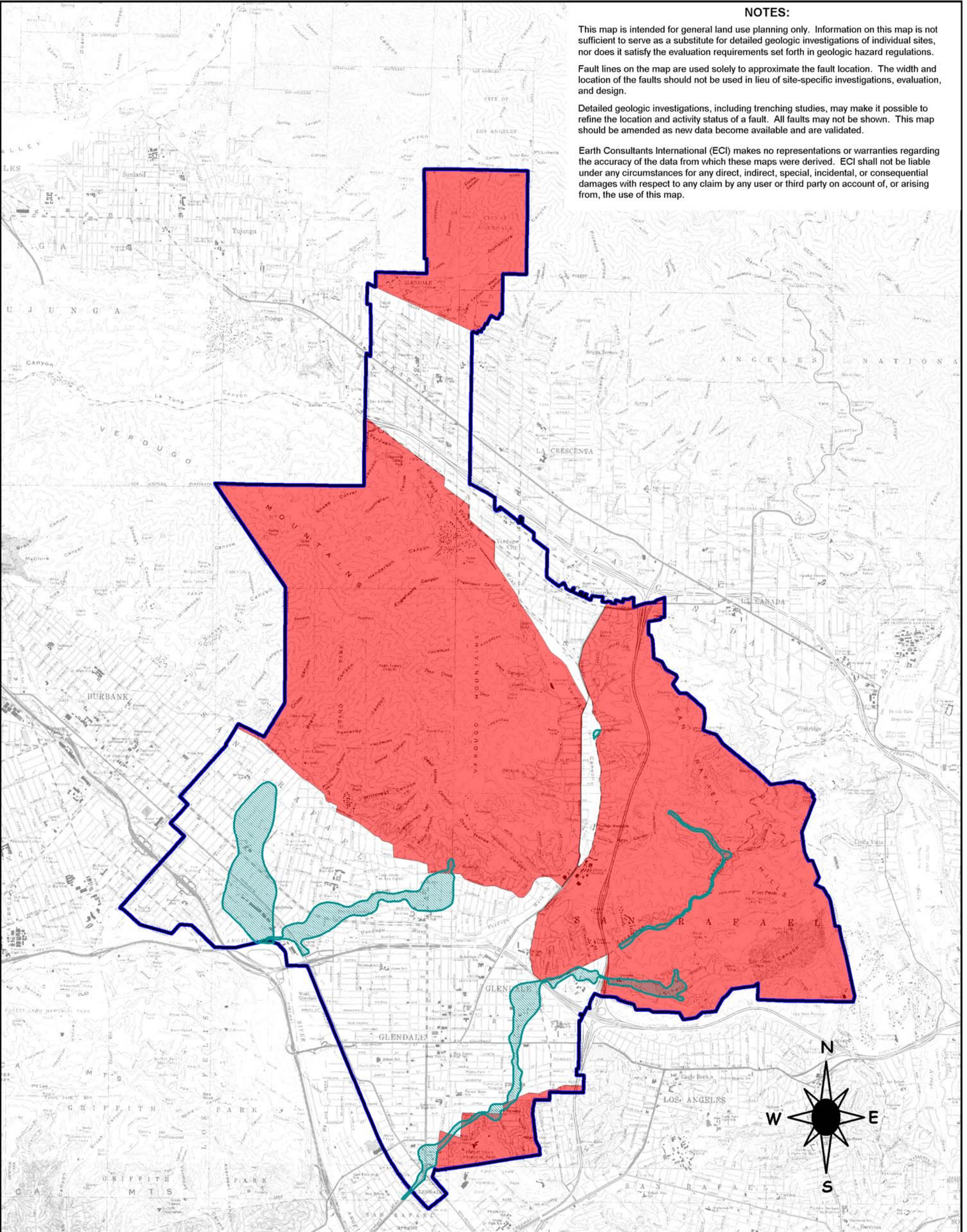


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Project Number: 2103
Date: July, 2003

Summary of Hazards Map (I)

Glendale, California

Plate
P-1



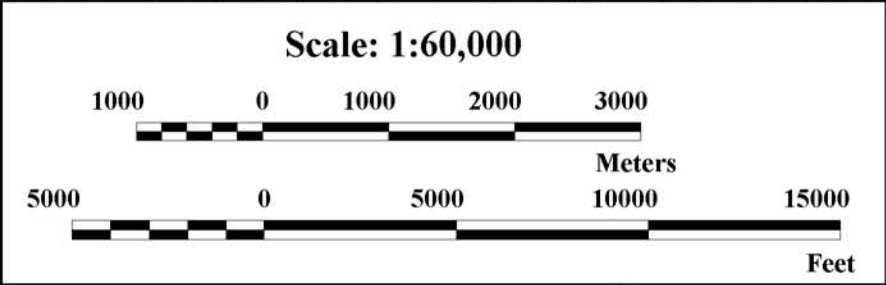
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Explanation

Dam Inundation Zone

Fire Hazard Zones

Glendale City Boundary

Base Map: USGS Topographic Map from Sure!MAPS RASTER
Source: City of Glendale Fire Department; California Governor's Office of Emergency Services (OES).

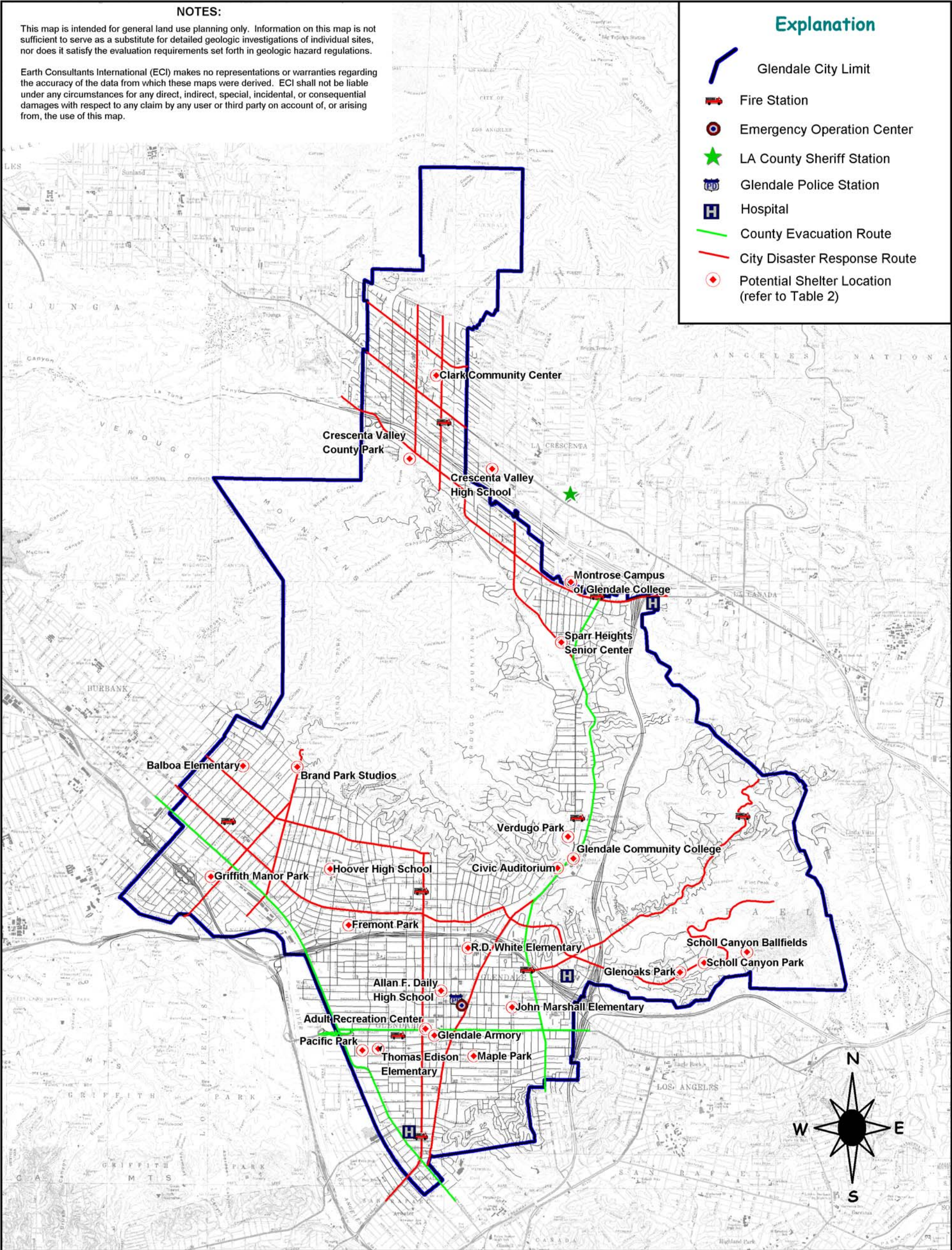
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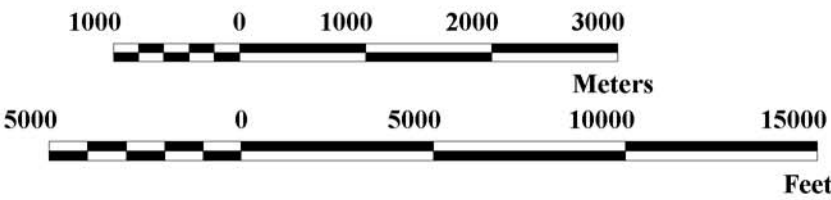
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Explanation

- Glendale City Limit
- Fire Station
- Emergency Operation Center
- LA County Sheriff Station
- Glendale Police Station
- Hospital
- County Evacuation Route
- City Disaster Response Route
- Potential Shelter Location (refer to Table 2)



Scale: 1:60,000



Base Map: USGS Topographic Map from Sure!RASTER MAPS
Source: City of Glendale Planning Emergency Plan (1996); City of Glendale Circulation Element of the General Plan (1998); Los Angeles County Element (Leighton, 1990).



Project Number: 2103
Date: July, 2003

Emergency Response Map
Glendale, California

Plate
P-3