CHAPTER

4 SAFETY ELEMENT

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4 SAFETY ELEMENT

INTRODUCTION

"Providing for a safe and secure community is an important part of the mission of the City of Torrance."
- City of Torrance Strategic Plan, 2008

Providing a safe living environment is one of the most important challenges cities face today. Torrance is located in a region exposed to natural disasters such as earthquakes and landslides, and the increased concern over terrorism we have experienced as a nation have elevated public safety issues in the public consciousness. Residents and businesses look to the City to protect the community from threats to public safety. People recognize that a low crime rate, fire prevention, and reliable emergency response services contribute to the attractiveness of Torrance. While the City has no control over earthquakes or landslides, we can set forth policies that minimize exposure to these hazards. By identifying threats to our safety, we can better guard against disasters and develop effective response plans.

The Safety Element sets forth policies designed to minimize threats from natural and human-caused hazards. By implementing the Safety Element, the City of Torrance can deliver timely emergency service delivery and focus on the expansion of such services throughout the City. Likely increases in traffic congestion, population growth, and ever-changing needs within the community will continue to place demand on resources. This Element can help to establish safety-related priorities for the City.

RELATIONSHIP TO OTHER GENERAL PLAN ELEMENTS

Keeping Torrance safe is a theme addressed throughout the General Plan. The Land Use Element limits the range of land uses allowed in hazardous areas to reduce the number of people and buildings exposed to risk. Objectives and policies in the Circulation and Infrastructure Element aim to make Torrance a safe place to drive, bike, and walk. The Circulation and Infrastructure Element also addresses water supply. The Noise Element establishes policies and priorities to protect residents from noise related to traffic and aircraft operations.

SCOPE AND CONTENT OF THE SAFETY ELEMENT

The Safety Element is one of the required General Plan elements. The City has long emphasized a proactive approach to planning, which involves identifying and avoiding or mitigating hazards present in the environment that may adversely affect property and threaten lives. Government Code Sections 65302(g) and 65302(f) identify several issues to consider in such planning efforts, as does California Health and Safety Code Section 56050.1. In Torrance, issues of concern include:

- Seismic hazards, including seismically induced surface rupture, ground shaking, and ground failure
- Dam/reservoir failure
- Non-seismic ground failure such as slope instability leading to mudslides, landslides, and liquefaction
- Flooding
- Wildland and urban fires
- Presence of hazardous materials and many large-scale industrial uses

Within this Element, safety issues are organized into four broad themes:

Natural Hazards. Addresses seismic hazards such as earthquakes, earthquake-related ground failure, landslides, and flooding.

Human Activity Hazards. Addresses fire hazards, hazardous materials, oil production, and Torrance Municipal Airport (Zamperini Field).

Emergency Response and Public Safety. Emergency response efforts are essential to prevent or minimize potential loss of life or property damage and to

respond effectively to safety hazards, accidents, and natural disasters. The City has emergency plans which establish emergency preparedness and emergency response procedures through the Hazard Mitigation Plan and the Multi-Hazard Functional Plan. Police and fire protection services create a safe community for residents and businesses. Low crime, foresight in the development process, and adequate enforcement lead to a safe environment.

Effective Land Remediation. The remediation and development of high priority contaminated sites will help protect public safety and the environment of Torrance and its residents.

GOAL: The highest level of protection of life and property from natural and human-caused hazards

1. NATURAL HAZARDS

Torrance residents, along with most Southern Californians, have long accepted that we are vulnerable to major and potentially devastating natural disasters. Because of this life-long familiarity with earthquakes, floods, and landslides, we generally feel comfortable about our ability to confront and address these hazards. However, the public consciousness has become attuned to newer, less familiar hazards such as terrorism. The City recognizes its role and responsibility to minimize the effects of natural hazards to the greatest extent possible and to guard against newer threats to community safety.

1.1 SEISMIC AND GEOLOGICAL HAZARDS

Seismic and geological hazards represent the most significant natural hazards in Torrance. Earthquakes and their related effects have the greatest potential to impact a large portion of the population. Other geologic hazards such as landslides and ground subsidence have more localized effects but can still have catastrophic results. The combination of sound planning practices and continued public education will minimize risks to the community and protect the health, safety, and welfare of Torrance residents.

1.1.1 EARTHQUAKES

An earthquake is a manifestation of the constant movement and shifting of the earth's surface. Movement occurs along fractures or faults, which represent the contact point between two or more geologic formations. Earth movement — known as seismic activity — causes pressure to build up along a fault, and the release of pressure results in the groundshaking effects we call an earthquake. The primary results from earthquakes are strong ground shaking and surface fault rupture. Secondary effects include landslides, slope deformation, liquefaction, and ground subsidence.

Ground-shaking effects felt locally depend upon many factors, most notably the intensity of the event, distance to the earthquake epicenter, the depth of the earthquake, and local soils conditions. Seismologists use a logarithmic magnitude scale to describe the intensity of earthquakes. However, what impresses us most when an earthquake occurs are its effects. What kind of damage correlates to, for example, a 5.4 Magnitude earthquake? The Modified Mercalli Scale, presented in Table S-1, was developed to provide a description, in layman terms, of the potential destructive effects of earthquakes associated with the varying magnitudes of the logarithmic Magnitude earthquake scale.

Table S-1
Earthquake Magnitude and Intensity Comparison

Descriptor	Magnitude	Intensity	Description
Not felt	1.0 - 3.0	I	I. Not felt except by a very few under especially favorable conditions. Damage potential: None.
Weak	3.0 - 3.9	II - III	II. Felt only by a few persons at rest, especially on upper floors of high-rise buildings. Delicately suspended objects may swing. Damage potential: None III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing automobiles may rock slightly. Vibrations like passing of a truck. Duration estimated. Damage potential: None
Light Moderate	4.0 - 4.9	IV - V	IV. During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably. Damage potential: None. Perceived shaking: Light. V. Felt by nearly everyone; many awakened. Some dishes, windows and so on broken; cracked plaster in a few places; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop. Damage potential: Very light. Perceived shaking: Moderate.
Strong Very strong	5.0 - 5.9	VI - VII	VI. Felt by all, many frightened and run outdoors. Some heavy furniture moves, few instances of fallen plaster and damaged chimneys. Damage potential: Light. Perceived shaking: Strong. VII. Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving cars. Damage potential: Moderate. Perceived shaking: Very strong.

Table S-1
Earthquake Magnitude and Intensity Comparison

Descriptor	Magnitude	Intensity	Description
Severe	6.0 - 6.9	VIII - IX	VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving cars disturbed. Damage potential: Moderate to heavy. Perceived shaking: Severe.
Violent			IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken. Damage potential: Heavy. Perceived shaking: Violent.
Extreme	7.0 -7.9	X - XII	X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed, slopped over banks. Damage potential: Very heavy. Perceived shaking: Extreme.
	8.0 and higher		XI. Few, if any (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
			XII. Damage total. Waves seen on ground surface. Lines of sight and level are distorted. Objects thrown into the air.

Source: United States Geological Survey (USGS) National Earthquake Information Center, October 2002, and Earth Consultants International, "Seismic Hazards", 2005. Pages 1-7 to 1-8.

Earthquake-triggered geological effects include ground shaking, surface fault rupture, landslides, liquefaction, subsidence, tsunamis and seiches, all of which are discussed below. Earthquakes can also lead to urban fires, reservoir failures, and toxic chemical releases.

GROUND SHAKING

The greatest source of earthquake damage is caused by ground shaking, particularly horizontal ground acceleration. The City is susceptible to ground shaking caused by multiple nearby earthquake fault zones. The 200-mile stretch of the San Andreas fault, which is commonly referred to as "Big Bend", is located approximately 75 miles north of Torrance. This area is highly susceptible to earthquakes because the Pacific and North American tectonic

plates are colliding rather than sliding past each other.[1] The constant collision creates thrust faulting through localized compression. Some of the region's most recent damaging earthquakes have occurred on thrust faults, including the 1971 San Fernando (M_W[2] 6.7), the 1987 Whittier Narrows (M_W 5.9), the 1991 Sierra Madre (M_W 5.8), and the 1994 Northridge (M_W 6.7) earthquakes.

The potential for ground shaking in Torrance depends on the proximity to the affected fault and the intensity of the seismic event along the fault. Since Torrance is close to multiple fault zones, movement along any of the zones has the potential of adversely affecting the City. The highest risks from earthquake fault zones come from the Palos Verdes fault zone, the Puente Hills fault, the Newport-Inglewood fault zone, the Elysian Park fault zone, the Malibu Coast-Santa Monica-Hollywood fault zone, and the Whittier fault zone. Figure S-1 illustrates the spaghetti-like pattern of faults within and surrounding our City and the proposed Fault Hazard Management Zone, discussed later in this section, that encourages the study of the onshore segment of the Palos Verdes fault to conclusively determine whether or not it is an active structure. As shown on Figure S-1, faults identified within the City are located primarily south of Pacific Coast Highway and both within the Torrance Municipal Airport and north of it.

Table S-2 identifies faults thought capable of producing very substantial seismic events by producing horizontal ground accelerations of Modified Mercalli Intensities greater than VII in the Torrance area. The table shows the approximate distance between the fault and various points in Torrance and the maximum magnitude earthquake (M_{max}) each fault is estimated capable of generating.

FAULT RUPTURE

Fault rupture is a ground movement that occurs during an earthquake. Although primary ground rupture usually results in a small percentage of the total damage in an earthquake, structures located close to a rupturing fault may be severely damaged.[3] In 1972, the Alquist-Priolo Fault Zoning Act was enacted with the purpose of mitigating the hazard of fault rupture by prohibiting buildings along all active fault lines. As of 2009, no Aquist-Priolo Earthquake Fault Zones had been designated within the Torrance city limits. However, if the Palos Verdes fault were ever zoned as an active fault, then an Alquist-Priolo Earthquake Fault Zone would include a southern portion of Torrance.

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[1] Earth Consultants International, "Technical Background Report to the Safety Element of the General Plan for the City of Torrance, Los Angeles county, California", 2005. Page 1-49.

[2] M_W: Momentum Magnitude, a measurement that characterizes the relative size of an earthquake and is based on a scale that relates energy release to magnitude.

[3] Earth Consultants International, "Technical Background Report to the Safety Element of the General Plan for the City of Torrance, Los Angeles county, California", 2005. Page 1-42.

Table S-2
Estimated Horizontal Peak Ground Accelerations and Seismic Intensities in the Torrance Area

Fault Name	Distance to Torrance (mi)	Magnitude of M_{max}*	PGA (g) from M_{max}	MMI from M_{max}
Palos Verdes	0 – 6.6	7.3	1.1 - 0.6	XII-X
Puente Hills Blind Thrust	0.5 – 6.2	7.1	1.3 – 0.6	XII-X
Puente Hills (Coyote Hills segment)	0.5 – 6.2	6.6	1.3 – 0.5	XII - X
Puente Hills (Los Angeles segment)	8.3 – 15	6.6	0.3 – 0.15	IX - VIII
Puente Hills (Santa Fe Springs)	10 - 16	6.5	0.3 – 0.13	IX - VIII
Newport-Inglewood (Onshore)	3 - 10	7.1	0.6 – 0.3	X - IX
Elysian Park Thrust	10 - 19	6.7	0.3 – 0.12	IX - VIII
Santa Monica	15 - 19	6.6	0.15 – 0.11	VIII- VII
Malibu Coast	16 - 20	6.7	0.13 – 0.11	VIII- VII
Hollywood	16 - 20	6.4	0.13 – 0.09	VIII- VII
Upper Elysian Park	12 - 19	6.4	0.18 – 0.12	VIII - VII
Anacapa-Dume	23 - 26	7.5	0.15 – 0.12	VIII - VII
Whittier	18 - 25	6.8	0.12 – 0.08	VII
Raymond	18 – 24	6.5	0.11 – 0.07	VII - VI
Verdugo	21 - 28	6.9	0.11 – 0.08	VII
San Andreas – 1857 Rupture	47 - 54	7.8	0.08 – 0.07	VII - VI

Earth Consultants International, "Technical Background Report to the Safety Element of the General Plan for the City of Torrance, Los Angeles county, California", 2005. Page 1-30.

Abbreviations used in Table S-2:

mi – miles; **M_{max}** – maximum magnitude earthquake; **PGA** – peak ground acceleration as a percentage of **g**, the acceleration of gravity; **MMI** – Modified Mercalli Intensity.

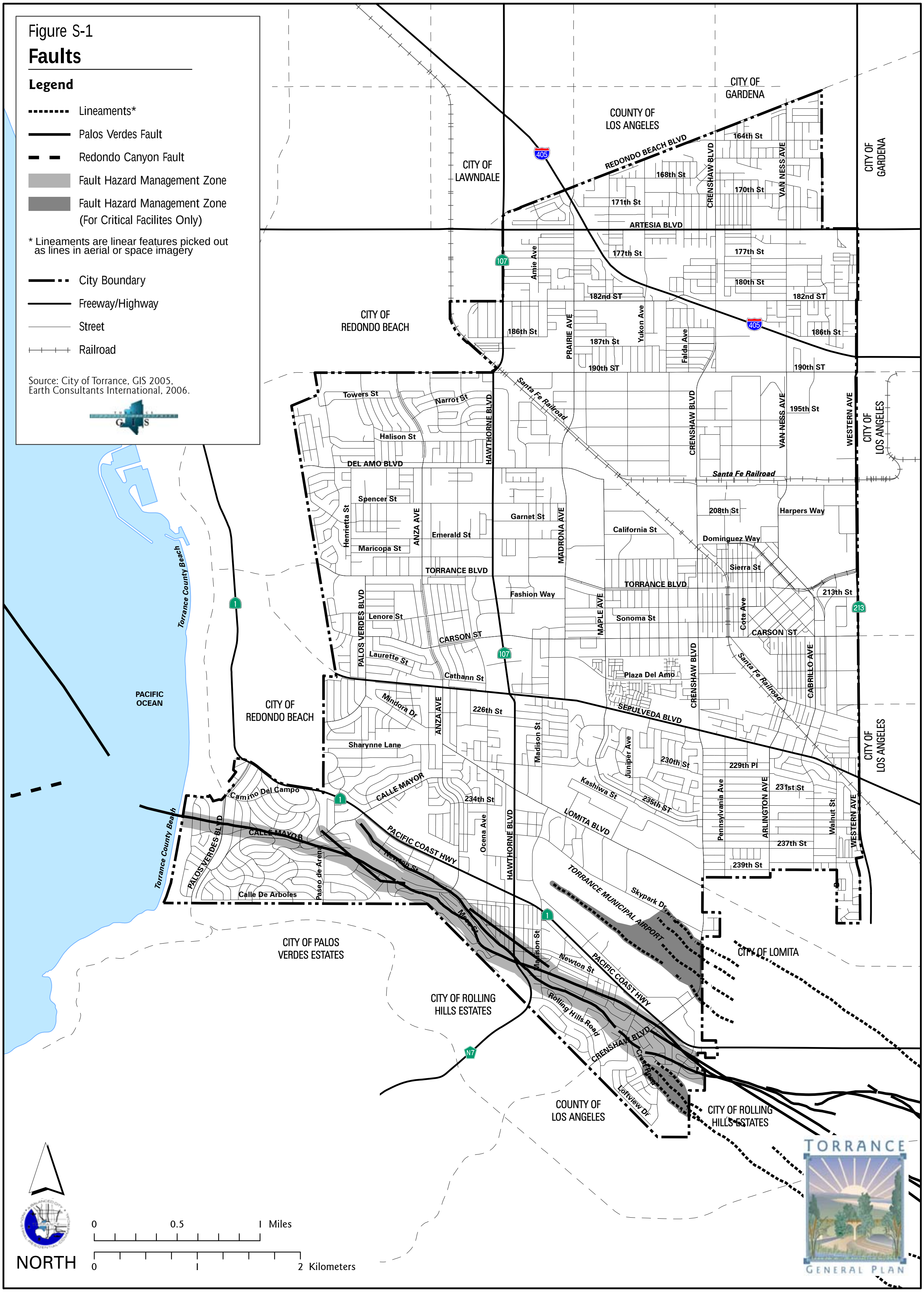


Figure S-1
Faults
Legend
Lineaments*
Palos Verdes Fault
Redondo Canyon Fault
Fault Hazard Management Zone
Fault Hazard Management Zone
(For Critical Facilites Only)
* Lineaments are linear features picked out as lines in aerial or space imagery
City Boundary
Freeway/Highway
Street
Railroad
Source: City of Torrance, GIS 2005, Earth Consultants International, 2006.
CITY OF GARDENA
COUNTY OF LOS ANGELES
CITY OF LAWNDALE
CITY OF REDONDO BEACH
CITY OF LOS ANGELES
PACIFIC OCEAN
CITY OF PALOS VERDES ESTATES
CITY OF ROLLING HILLS ESTATES
CITY OF LOMITA
Torrance County Beach
REDONDO BEACH BLVD
ARTESIA BLVD
DEL AMO BLVD
TORRANCE BLVD
CARSON ST
SEPULVEDA BLVD
PACIFIC COAST HWY
LOMITA BLVD
HAWTHORNE BLVD
CRENSHAW BLVD
WESTERN AVE
Santa Fe Railroad
TORRANCE MUNICIPAL AIRPORT
0 0.5 1 Miles
0 1 2 Kilometers
NORTH
TORRANCE
GENERAL PLAN

MINIMIZING RISKS FROM EARTHQUAKES

To reduce the hazards associated with seismic activity, the City requires that all new development abide by the most recently adopted City and State seismic and geotechnical requirements to protect injury and structural damage due to geologic and seismic hazards.

Historically, the greatest structural damage from earthquakes has been to unreinforced masonry buildings, especially in areas of artificial fill or water-soaked alluvium. The City has a mandatory retrofit seismic ordinance that was adopted in 1987. Torrance was also the first city in California to use a bond instrument as a tool to finance the seismic retrofit of privately owned buildings.[4] Using subsidies, the City of Torrance prioritized the retrofit of older buildings, especially unreinforced masonry buildings that needed to be reinforced and strengthened. The City hoped that through this project, the owners of affected structure would be more willing to pay for retrofit plans if the work were subsidized. In addition, the subsidy conveyed the City's concern regarding the life safety hazard posed by unreinforced masonry buildings and its interest in seeing the issue addressed. As a result of these measures, most of the unreinforced masonry buildings in the City have been brought into compliance with the City's mandatory strengthening requirements.

The most pressing issue related to earthquake safety concerns the area around the Palos Verdes fault. Geologic studies on the Palos Verdes fault suggest that seismic activity on this fault could exceed movement that most engineered structures are not designed to withstand, so buildings that straddle the fault will most certainly be damaged beyond repair if and when the fault breaks the surface. Since it is impractical to reduce the damage potential to acceptable levels by engineering design, the most appropriate mitigation measure is to simply avoid placing structures on or near active fault traces. However, given the extensive urbanization in the area, the opportunity to avoid the fault when siting habitable structures has already been lost. During re-development of these lots, geologic studies should be conducted to locate the fault, with structural setbacks established around the active fault traces. However, implementation of this measure is likely to take decades, as the replacement of fault-impacted prime real estate with greenbelts or other non-habitable uses may be unpopular with property owners.

Because of the complexity of most active fault zones — particularly at the surface where they may become braided, splayed, or segmented — locating and evaluating the active traces of a fault is often not an easy or inexpensive task. Nevertheless, given the significant surface fault rupture hazard in the area, the City will establish a fault hazard management zone around the traces of the Palos Verdes fault that are considered more recently active (Figure S-1). The

[4] Federal Emergency Management Agency (FEMA). Best Practices Case Study: City of Torrance.

intent of the fault hazard management zone is to require that geologic investigations, which may include fault trenching, be performed if conventional structures designed for human occupancy are proposed within the zone.

1.1.2 SEISMIC-RELATED ACTIVITY

The potential for large magnitude earthquakes in our region is a reality we live with daily. In addition to ground shaking, earthquakes present the potential for ground and slope failure. California law requires identification of liquefaction zones, where the stability of foundation soils must be investigated, and landslide zones, where the stability of hillslopes must be evaluated.

Areas with the potential to experience landslides or liquefaction-induced ground displacements are shown in Figure S-2.

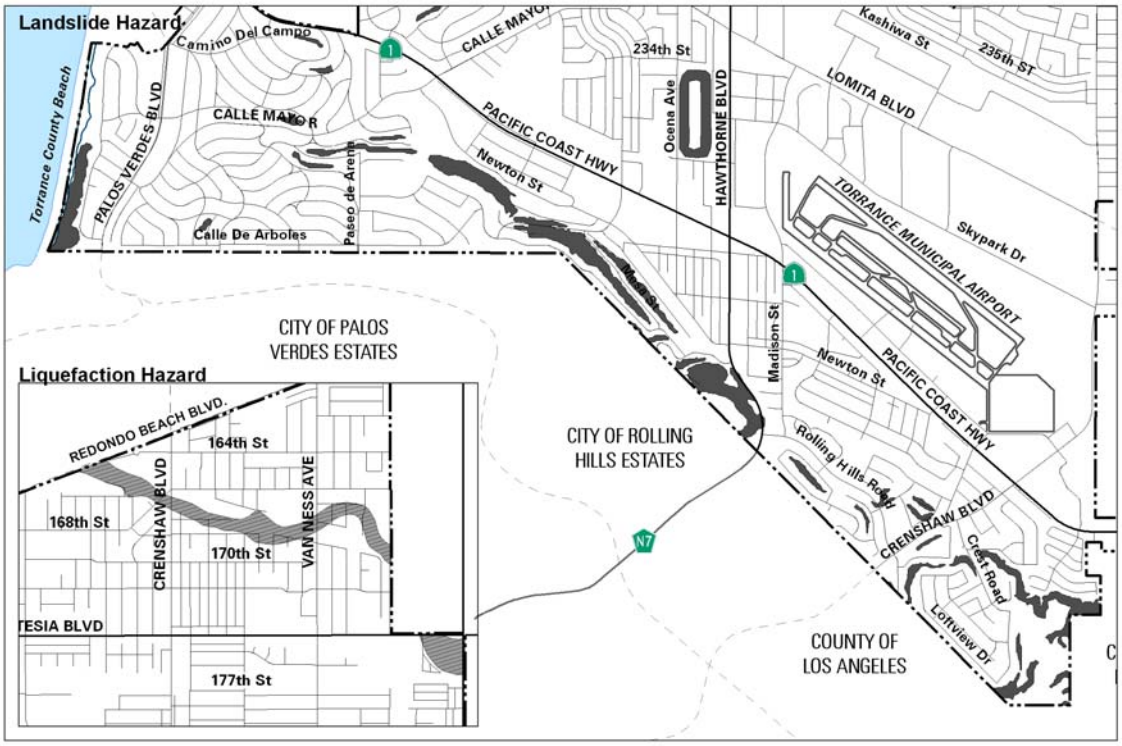


Figure S-2:
Seismic-Related Hazards

Figure S-2 shows areas where previous occurrences of landslide and liquefaction movement, or local topographic, geological, geotechnical, and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693c would be required.

The Seismic Hazards Mapping Act (SHMA, Public Resources Code 2690 et seq.), which was passed by the State in 1990, addresses non-surface fault rupture earthquake hazards such as ground shaking, liquefaction, and landslides. Whereas the Alquist-Priolo Earthquake Fault Zoning Act specifically addresses surface fault ruptures, the Mapping Act deals more with other earthquake hazards, and helps to identify and mitigate these hazards to minimize the loss of life and property. The Act is implemented by the California Geological Survey, whose seismic hazards map for the three quadrangles that cover the City show that liquefaction and earthquake-induced hazards are present in some areas of Torrance. In accordance with the SHMA, all projects within a State-delineated Seismic Hazard Zone for landslides and liquefaction must be evaluated by a certified engineering geologist and/or registered civil engineer. Likewise, project review by the local agency must be performed by geologists and engineers with the same credentials and experience. Seismic Hazard Maps may not show all areas that have the potential for liquefaction and landslides, nor is information shown on the maps sufficient to serve as a substitute for detailed site investigations.

LANDSLIDES

Ground shaking from earthquakes can cause landslides in areas with steep or unstable slopes. Seismically induced landslides can overrun structures, people, or property; sever utility lines; and block roads, thereby hindering rescue operations after an earthquake.

In a landslide, surface rocks and bedrocks can fall onto the roads, buildings, and utility lines below the slope, causing damage to residents and properties. In general, slopes steeper than about 15 degrees are most susceptible. However, failures can occur on flatter slopes if unsupported weak rock units are exposed in the slope face. Figure S-2 identifies the boundaries of areas vulnerable to earthquake-induced landslides and slope instability, particularly steep slope areas south of Pacific Coast Highway.

For suspect slopes, appropriate geotechnical investigation and slope stability analyses should be performed for both static and dynamic (earthquake) conditions. For deeper slides, mitigation typically includes such measures as buttressing slopes or re-grading the slope to a different configuration. Protection from rock falls or surface slides can often be achieved by protective devices such as barriers, retaining structures, catchment areas, or a combination of these. The runout area of the slide at the base of the slope and the potential bouncing of rocks must also be considered. If it is not feasible to mitigate unstable slope conditions, building setbacks should be imposed.

LIQUEFACTION

Liquefaction is a geologic process that causes various types of ground failure. Liquefaction typically occurs in loose, saturated sediments primarily of sandy composition. When liquefaction occurs, the sediments involved have a total or substantial loss of shear strength and behave like a liquid substance. Liquefaction can cause structural distress or failure due to ground settlement, a loss of bearing capacity in the foundation soils, and the buoyant rise of buried structures. In Torrance, the greatest risk of liquefaction occurs along the bluffs overlooking Torrance Beach.

Residential or commercial development is not planned to occur in the liquefiable area along the beach. However, structures and improvements such as roadways, major utility lines, and park improvements could be vulnerable to damage from liquefaction if mitigation measures have not been included in their design. Construction planned for these areas should include appropriate liquefaction mitigation measures.

A considerable part of the City's mapped liquefiable areas — along the channel of Dominguez Creek — are already built upon, mostly with residential and commercial development. A nearby moderate to strong earthquake could cause extensive damage to buildings and infrastructure in these areas. Since retrofitting measures are generally not feasible due to cost, the City will be prepared to respond to damage and disruption in the event of an earthquake. Any new development will require liquefaction susceptibility studies prior to design and construction.

TSUNAMIS

A tsunami is a large sea wave generated by any large-scale disturbance of the ocean floor that occurs in a short period of time, such as an earthquake, volcanic eruption, or coastal landslide, which can cause a sudden displacement of water. Though local earthquakes may cause tsunamis, most past tsunamis in Southern California were associated with distant earthquakes that traveled great distances across the Pacific Ocean basin.

The tsunami hazard for Torrance, which is encompassed in the Southern California region from the Palos Verdes Peninsula south to San Diego, is moderate[5] due to proximity to several active offshore faults.

[5] Earth Consultants International, "Technical Background Report to the Safety Element of the General Plan for the City of Torrance, Los Angeles county, California", 2005. Page 1-49.

To respond to natural disaster such as a tsunami, Torrance's Emergency Services program has established a recovery system for residents, which includes the following action items[6]:

- Replace, reconstruct, remove, and relocate damaged/destroyed infrastructures/buildings
- Establish priorities for emergency repairs to facilities, buildings, and infrastructures
- Economic recovery and community development
- New or amended zoning ordinances, subdivision regulations, building and sanitary codes

In addition, the City has established eight Area Disaster Centers that provide communication to and from Torrance's Emergency Operation Center. The centers are located at major City buildings and library branches, and assist with communication during a disaster.[7] Table S-3 lists the name and location of the centers.

Table S-3
Area Disaster Centers in Torrance

Area Disaster Center	Address
Southeast Torrance Library	23155 South Arlington
Henderson Branch Library	4805 Emerald
North Torrance Library	3604 West Artesia
Walteria Branch Library	3815 West 242nd. Street
El Retiro Branch Library	126 Vista del Parque
Sea-Aire Golf Course	22780 Lupin Drive
Alta Loma Park	26126 Delos Drive
Bartlett Center	1318 Cravens Avenue

City of Torrance website (www.ci.torrance.ca.us)

Madrona Marsh Nature Preserve: One of the last remaining natural wetlands in the highly urbanized Los Angeles basin is included in the Flood Insurance Rate Maps for Torrance as a Special Flood Hazard Zone.

[6] www.torrnet.com City of Torrance – Emergency Services website. Accessed 05/08/06.
[7] Ibid.

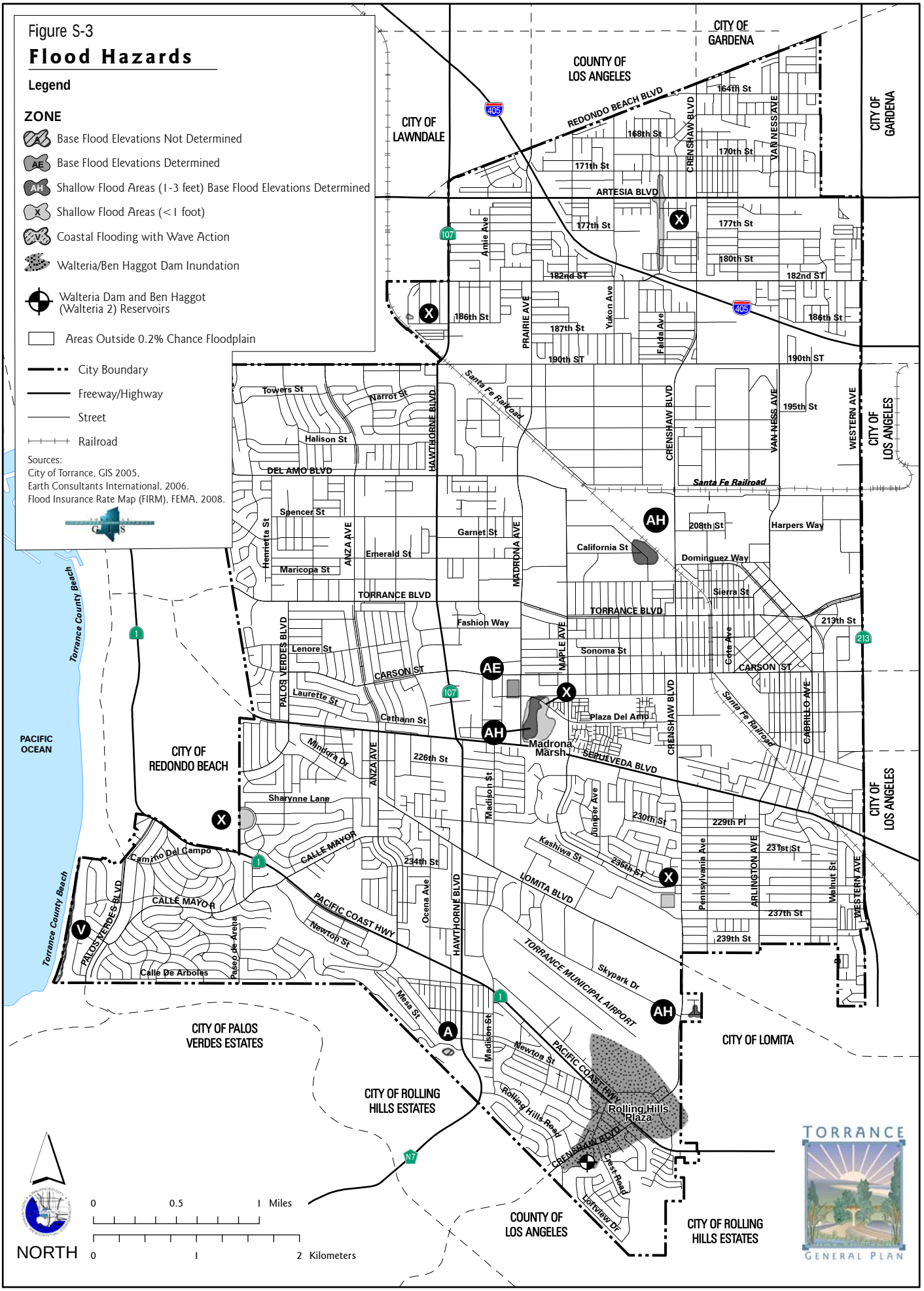


Figure S-3
Flood Hazards
Legend
ZONE
A Base Flood Elevations Not Determined
AE Base Flood Elevations Determined
AH Shallow Flood Areas (1-3 feet) Base Flood Elevations Determined
X Shallow Flood Areas (<1 foot)
VE Coastal Flooding with Wave Action
Walteria/Ben Haggot Dam Inundation
Walteria Dam and Ben Haggot (Walteria 2) Reservoirs
Areas Outside 0.2% Chance Floodplain
City Boundary
Freeway/Highway
Street
Railroad
Sources:
City of Torrance, GIS 2005,
Earth Consultants International, 2006.
Flood Insurance Rate Map (FIRM), FEMA, 2008.
CITY OF GARDENA
COUNTY OF LOS ANGELES
CITY OF LAWNDALE
CITY OF GARDENA
REDONDO BEACH BLVD
164th St
168th St
170th St
171th St
ARTESIA BLVD
177th St
180th St
182nd ST
186th St
187th St
190th ST
195th St
CRENSHAW BLVD
VAN NESS AVE
WESTERN AVE
Amie Ave
PRAIRIE AVE
Yukon Ave
Falda Ave
Santa Fe Railroad
CITY OF LOS ANGELES
Towers St
Narrot St
Halison St
HAWTHORNE BLVD
DEL AMO BLVD
Spencer St
Hemmeta St
ANZA AVE
Emerald St
Maricopa St
Garnet St
MADRONA AVE
208th St
Harpers Way
California St
Dominguez Way
Sierra St
TORRANCE BLVD
Fashion Way
Lenore St
PALOS VERDES BLVD
CARSON ST
Laurette St
Cathann St
MAPLE AVE
Sonoma St
Cota Ave
213th St
CABRILLO AVE
Plaza Del Amo
Madrona Marsh
SEPULVEDA BLVD
Torrance County Beach
PACIFIC OCEAN
CITY OF REDONDO BEACH
Minnora Dr
226th St
Sharynne Lane
Madison St
Juniper Ave
230th St
229th Pl
231st St
Camino Del Campo
CALLE MAYOR
234th St
Kashiwa St
235th ST
LOMITA BLVD
Pennsylvania Ave
ARLINGTON AVE
Walnut St
237th St
239th St
PACIFIC COAST HWY
Newton St
Ocena Ave
Paseo de Arena
Calle De Arboles
Mesa St
TORRANCE MUNICIPAL AIRPORT
Skypark Dr
CITY OF PALOS VERDES ESTATES
CITY OF LOMITA
CITY OF ROLLING HILLS ESTATES
Rolling Hills Plaza
Rolling Hills Road
CRENSHAW BLVD
Crest Road
Hillview Dr
COUNTY OF LOS ANGELES
CITY OF ROLLING HILLS ESTATES
NORTH
0 0.5 1 Miles
0 1 2 Kilometers
TORRANCE
GENERAL PLAN

1.1.3 FLOODING

Floods are natural and recurring events that only become hazardous when humans encroach onto floodplains, modifying the landscape and building structures in the areas meant to convey excess water during floods. Unfortunately, floodplains have been alluring to populations for ages, since they provide level ground and fertile soils suitable for agriculture, as well as access to water and transportation routes. Notwithstanding, these benefits come with a price – flooding is one of the most destructive natural hazards in the world, responsible for more deaths per year than any other geologic hazard.

Torrance and surrounding areas are, like most of Southern California, subject to unpredictable seasonal rainfall. Most years, the scant winter rains are barely sufficient to turn the hills green for a few weeks, but every few years the region is subjected to periods of intense and sustained precipitation that results in flooding.

STORM FLOODING

The City lies at the western edge of the greater floodplain of the Los Angeles and San Gabriel Rivers. Prior to human intervention in historic times, these rivers collected runoff from the surrounding mountains, spreading storm water and sediment loads across the basin. Today, runoff is largely controlled by streets, retention and detention basins, storm drains, and flood control channels.

In coastal Los Angeles County, including the Torrance area, flooding is difficult to predict, and thus plan for, because rainfall varies from year to year. In 1983, for example, flooding occurred at California Street/Hawaii Avenue and along Torrance Boulevard between Van Ness and Western Avenues. The channels in the Torrance area are typical for Southern California. Except for runoff from human activities, such as irrigation and industrial discharges, stream flow is negligible other than during and immediately after rains. In addition to channels, three retention and fourteen detention basins scattered throughout the City collect and store runoff. The basins are cleaned periodically to maintain their storage capacity. As the County upgrades the capacity of its storm drain system, these basins are likely to be abandoned.[8]

To prepare and mitigate hazards from flooding, the City of Torrance participates in the National Flood Insurance Program. Flood Insurance Rate Maps (FIRMs), which are prepared by the Federal Emergency Management Agency (FEMA), maps potential flood zones. Flood hazards related to storm events generally are described in terms of 100- or 500-year flood. A 100-year flood is defined as a major flood event that has a one percent or greater chance of occurring during

[8] Earth Consultants International, Torrance Public Works Department, personal communication, 2005

any one year. Flood hazard planning practices addresses such storms, as well as 500-year events. As implied, the 100- and 500-year floods are the largest flood events that may be expected to occur within 100-year and 500-year periods, respectively. These floods are considered severe but ones which can be reasonably predicted and therefore reasonably mitigated.

According to the FIRMs, and shown on Figure S-3, only a few, small, isolated areas within the City have been mapped as Special Flood Hazard Areas (SFHA), and these result primarily from ponding of water in shallow depressions or sumps, and not from channel flooding. Several of the SFHAs occupy low points that were once natural closed depressions in the El Segundo Sand Hills. For example, the Madrona Marsh Nature Preserve, the largest SFHA in the City, occupies what was once a large, natural depression. Other SFHAs appear to be human-made depressions or sumps. In addition, flooding from coastal processes may pose a hazard to Malaga Cove.[9] While not located in a FEMA delineated flood zone, in 1983 flooding occurred around the intersection of California and Hawaii Avenues and along Torrance Boulevard between Van Ness and Western Avenues.

Although flood hazards in Torrance have been estimated by FEMA to be minor, property owners in potential flood areas can make modifications to their houses to reduce the impact of flooding. FEMA has identified several flood protection measures that can be implemented by property owners to reduce flood damage. These include installing waterproof veneers on the exterior walls of buildings; putting seals on all openings, including doors, to prevent the entry of water; raising electrical components above the anticipated water level improvements; and installing backflow valves that prevent sewage from backing up into the house through the drainpipes. The City will continue to improve and maintain storm drain systems to convey water flows and minimize damage from flood events. The Circulation Element of the General Plan addresses the City's storm drain system and identifies future storm drain improvements.

DAM OR RESERVOIR FAILURE

Dam inundation occurs when structural damage to a dam results in a flood. Dam failure can occur due to an earthquake, erosion, design flaw, or water overflow during storms. There are two enclosed water reservoirs in Torrance.

These reservoirs, referred to as the Walteria and Ben Haggot reservoirs[10], are located in the southern part of the City, on the north flank of the Palos Verdes Hills, and south of the Palos Verdes fault zone. Because of their size, these reservoirs are considered dams and are therefore under the purview of the

[9] Earth Consultants International, "Technical Background Report to the Safety Element of the General Plan for the City of Torrance, Los Angeles county, California", 2005. Page 3-15.

[10] The Ben Haggott reservoir is also referred to in the State database as the 18M Walteria, or Walteria Dam 2.

California Division of Dam Safety. In the event of rupture of the Palos Verdes fault, earth movement could shear the main water lines serving portions of the City, essentially leaving the area without water for some time after the earthquake. Rupture of the water mains could also result in the flooding immediately surrounding and down-gradient of the failed pipes. According to the City's Natural Hazards Mitigation Plan (2004), if these reservoirs fail catastrophically as a result of earthquake-induced damage, they could empty as quickly as 18 minutes. This would allow little time to evacuate the areas immediately down-gradient from the reservoirs, with the potential for loss of life and damage to property.

The inundation pathway for these reservoirs has been mapped, as required by the California Division of Dam Safety, and is shown on Figure S-3. With an estimated maximum discharge of 7,300 cubic feet per second, reservoir failure would impact both residential and commercial areas near Crenshaw Boulevard and Pacific Coast Highway, and would flow onto the southeastern edge of Torrance Airport. To guard against catastrophe, the City will ensure that the design of the Ben Haggott and Walteria reservoirs can withstand ground accelerations from nearby faults.

1.2 NATURAL HAZARDS OBJECTIVES AND POLICIES

The presence of many faults within and near Torrance poses real risk of upset to residents and workers. Continuing investigation of faults will provide important information to help assess the level of risk and evolving approaches to guard against widespread damage. The goals and policies emphasize land use and building requirements for structures in seismic hazard zones, limiting exposure of residents to geologic hazards, particularly in steep slope areas, and protecting residents and businesses from flood hazards.

OBJECTIVE S.1:	To protect the community from hazards related to earthquakes, seismic-related activity, and flooding
Policy S.1.1:	Adopt and strictly enforce the most recent State regulations governing seismic safety and structural design to minimize damage to structures from seismic or geologic hazards.
Policy S.1.2:	Reduce the risk associated with structures which would likely be seriously damaged during a major earthquake, such as those located in high-risk seismic areas and buildings that do not meet current seismic codes.
Policy S.1.3:	Monitor on-going research on regional seismic and seismic-related hazards, and support efforts to identify the location, potential activity, and dangers associated with earthquake faults.

Policy S.1.4:	Require increased levels of structural protection for critical facilities such as hospitals, police and fire facilities, communication and emergency operations centers, and places of community assembly.
Policy S.1.5:	Provide and maintain adequate flood control facilities, and limit development within flood-prone areas.

2. HUMAN ACTIVITY HAZARDS

Securing public safety in Torrance includes providing protection from the hazards we create ourselves. Unlike natural disasters, human-caused hazards can be greatly minimized and prevented through public education, regulating the use of hazardous materials and processes, and coordination with regional safety agencies. In Torrance, human-caused hazards we can easily address include automobile accidents, fires, oil recovery activities, the disposal and handling of hazardous waste material, and operations at Torrance Municipal Airport.

2.1 AUTOMOBILE COLLISIONS

Automobile collisions account for many safety incidents in Torrance. The Torrance Police Department Traffic Division works to reduce the number and severity of traffic collisions. One of the division's goals is to reduce the number of accidents through traffic enforcement, accident investigation, and education. The motor officers, "Driving Under the Influence" (DUI) officers, education officer, parking enforcement officers, and crossing guards within the Traffic Division work to reduce traffic accidents in the City.

2.2 FIRE HAZARD

2.2.1 URBAN FIRES

Residential homes have special fire protection needs, including the requirement to have fire and life safety systems in place, such as automatic fire sprinklers and smoke detectors, in conformance with the City's Building and Fire Codes. The City has a fire sprinkler ordinance for all multi-family residential units. Nearly 70 percent of Torrance's residential stock dates from before 1970, prior to the City's adoption of fire sprinkler ordinances. Therefore, many older housing units do not have sprinklers unless sprinklers have been added as part of alterations or repairs to the structure. Building fires, although only a small percentage of the incidents that the Fire Department responds to on an annual basis, account for a high percentage of the yearly losses in the City (60 percent in 2003 and 85 percent in 2005).

Structural fires are especially an issue in high-density areas, where there is a higher potential for fire to spread from one structure to the next. Furthermore,

the narrow spaces between the structures and the property lines in medium- to high-density areas provide limited room for emergency access. In the older section of downtown Torrance, which is bounded by Dominguez Street to the north, Van Ness Avenue and Border Avenue to the east, Plaza Del Amo to the south, and Crenshaw Boulevard to the west, streets and alleys make it difficult to maneuver and position response vehicles to be most effective in fighting a fire. Structure fires in this older section — where many buildings date from the 1910s to 1930s, were built to older building standards and fire codes, and are made from non-fire resistive construction materials with no internal sprinklers and other fire safety systems in place — present higher risks.

The large industrial and commercial base in Torrance creates the potential for chemical fires to occur, which could impact nearby residential neighborhoods. The City has adopted the 2007 California Fire Code, with City amendments and exceptions to address specific local conditions and needs. These provisions include constructions standards and sprinkler and fire hydrant requirements in new structures and remodels, road widths and configurations designed to accommodate the passage of fire trucks and engines, and requirements for minimum fire flow rates for water mains.

2.2.2 WILDLAND FIRES

In Los Angeles County, wildland fires historically have occurred in the brush-covered hills that frame many communities, including the Palos Verdes Hills, in the southern portion of Torrance, and south of the City, in what is now Rolling Hills, Rolling Hills Estates, and Palos Verdes Estates.[11] Small vegetation fires occasionally still occur on these slopes, but the Fire Department is able to respond quickly and minimize threats to adjacent structures.[12] The California Department of Forestry and Fire Protection maintains Very High Fire Hazard Severity Zones Maps that include the southern portion of the City, adjacent to the Palos Verdes Hills, as a Very High Fire Hazard Severity Zone.

To prevent fires in the City's hillside areas, Section 85.2.20 of the City's Municipal Code allows the Fire Chief to require the removal of brush, flammable vegetation, and combustible growth in an area 30 to 100 feet surrounding buildings and structures in cases of extra-hazardous conditions. In some cases, especially on hillside properties, the Fire Chief may require the fire break to extend up to 200 feet from a structure to mitigate the convective and radiant heat transfer resulting from the slope of the property.

[11] Earth Consultants International, "Technical Background Report to the Safety Element of the General Plan for the City of Torrance, Los Angeles county, California", 2005. Page 4-3.
[12] Earth Consultants International, Fire Department, personal communication, 2005

2.2.3 FIRE PREVENTION

Fire prevention is a key consideration in new and modified developments in Torrance. For all discretionary application and most administrative applications, a description of the project and/or plans is sent to the Fire Prevention plan checker and the Hazardous Material specialist for review and comment. The Fire Department reviews construction drawings when they are submitted into the Building Department for permits. There is also a Fire Prevention representative at all Planning Commission meetings and at the pre-application Plot Plan meetings.

The Municipal Code establishes regulations to facilitate fire suppression activities. For example, Section 85.2.22 establishes a minimum road width in residential developments of not less than 25 feet and wider in cases where parking infringes on road width:

- 25 feet wide when no parking is permitted on either side of the roadway,
- 28 feet wide when parking is permitted on one side of the roadway, and
- 34 feet wide when parking is permitted on both sides of the roadway.

In addition, fire hydrant spacing is required at approximately every 300 feet along public ways in industrial, commercial, high density and multi-unit residential areas and every 500 feet in areas where construction is limited to single family, duplex, and triplex residential. Additional regulations can be found in Division 8, Chapter 5 of the Municipal Code.

2.3 OIL-RELATED ACTIVITIES

Torrance was founded as an oil field boom town. Few operating oil wells remain, as the majority have ceased operation after years of operation. The City recognizes the economic value of productive wells and their associated uses, and local regulations support continued oil production activities. The City also recognizes the public safety hazards associated with oil field operations, such as improperly abandoned wells, unidentified subsurface pipes, contaminated soils, and the risk of explosion. In addition, petroleum contains carcinogens that are considered hazardous by the State of California.

The California Department of Conservation, Division of Oil, Gas, and Geothermal Resources oversees the drilling, operation, maintenance, and plugging and abandonment of oil, natural gas, and geothermal wells. Regulatory programs emphasize the development of oil, natural gas, and geothermal resources in the State through sound engineering practices that protect the environment, prevent pollution, and ensure public safety.

The City will continue to follow the Division of Oil, Gas and Geothermal Resources' established requirements for new construction over or adjacent to

abandoned oil wells. Additionally, the City will continue to enforce Section 81.5.1 of the Building Code, which restricts new development or construction on identified hazard areas, defined as areas that contain material that may be detrimental to public health, welfare, and property. Section 2.3 addresses the hazards associated with methane gas formation in oil field and oil wells.

2.4 HAZARDOUS WASTE

The California Health and Safety Code defines a hazardous material as any material that, due to quantity, concentration, physical, or chemical characteristics, poses a significant potential hazard to public health and safety or to the environment. The manufacturing, use, and transport of hazardous materials are considered potential human activity hazards. Issues associated with the storage, use, and disposal of hazardous materials are highly relevant to Torrance given its varied industrial base.

Commercial and industrial businesses located in Torrance and adjacent communities use hazardous materials, including such businesses as dry cleaners, film processors, auto service providers, landscape contractors, and paint shops. Larger businesses, primarily in industrial areas, can generate, use, and/or store large quantities of hazardous products. Torrance's land use pattern generally separates industry from residential uses, although large-scale industrial activities have the potential to impact broad areas in the event of an accident. Also, commercial freight carriers transporting hazardous substances along major roads or railways present potential hazards. Federal, State, and County agencies enforce regulations for hazardous waste generators and users, and these regulations provide a high degree of protection. Figure S-4 shows the location of hazardous material sites and critical facilities.

2.4.1 HAZARDOUS MATERIALS SITES

Figure S-4 shows the location of these hazardous materials sites in relation to critical facilities such as schools and hospitals. The map includes Superfund sites, Toxic Release Inventory sites, Large Quantity Generator sites, and methane-producing sites (closed landfills and the Torrance oil field). The Torrance Fire Department keeps an updated inventory of Superfund sites, toxic release inventory sites, and large quantity generator sites.

SUPERFUND SITES

The Superfund Act, which is also referred to as the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), is a federal law designed to protect the environment from risks created from previous chemical disposal practices. The Environmental Protection Agency (EPA) designates Superfund sites as neglected or abandoned sites with hazardous waste that could possibly threaten local ecosystems and community

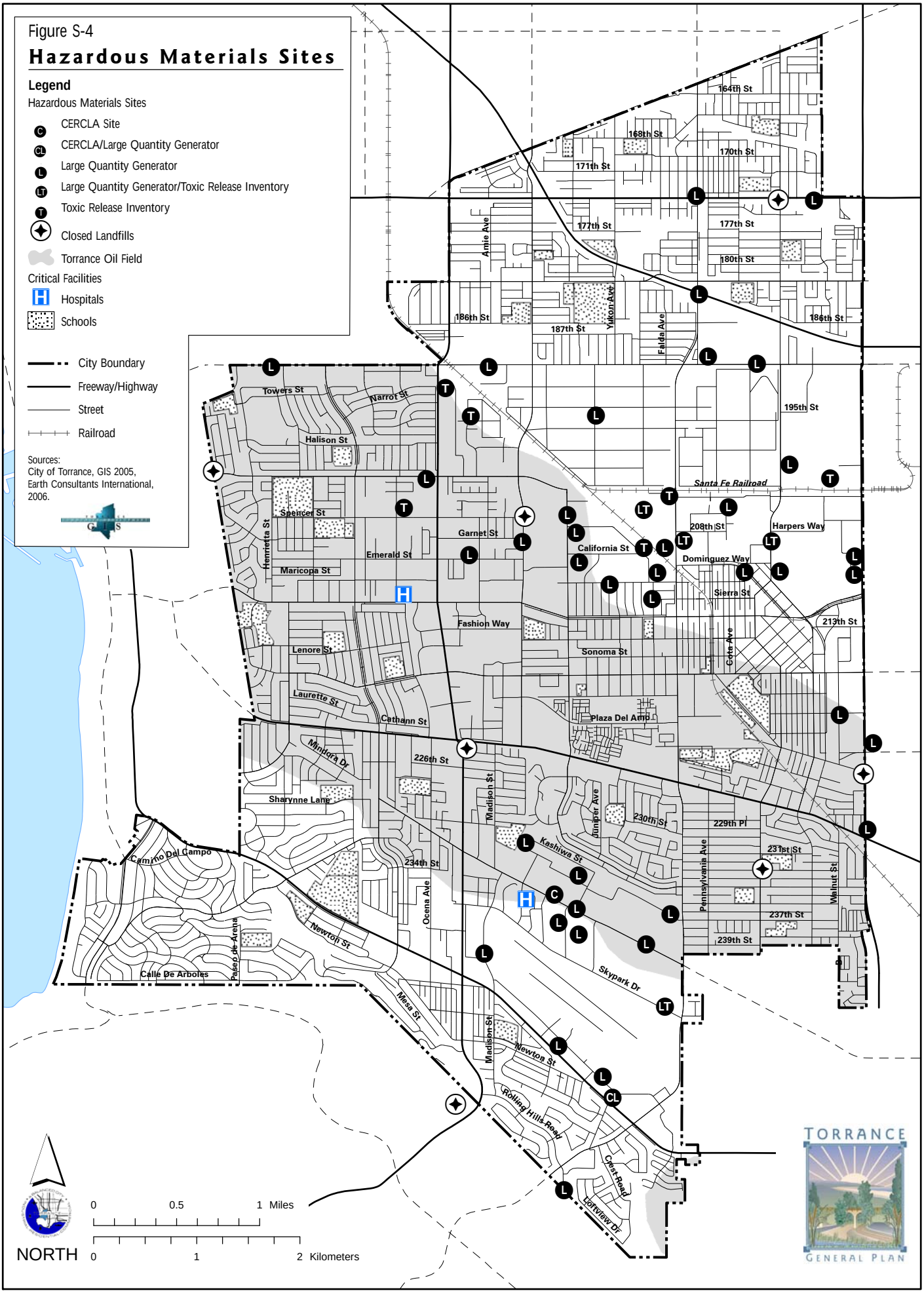


Figure S-4
Hazardous Materials Sites
Legend
Hazardous Materials Sites
CERCLA Site
CERCLA/Large Quantity Generator
Large Quantity Generator
Large Quantity Generator/Toxic Release Inventory
Toxic Release Inventory
Closed Landfills
Torrance Oil Field
Critical Facilities
Hospitals
Schools
City Boundary
Freeway/Highway
Street
Railroad
Sources:
City of Torrance, GIS 2005,
Earth Consultants International,
2006.
Towers St
Narrot St
Halison St
Spencer St
Hemmetta St
Garnet St
Emerald St
Maricopa St
Lenore St
Laurette St
Cathann St
Manitora Dr
Sharynne Lane
Camino Del Campo
Calle De Arboles
Paseo de Arena
Newton St
Mesa St
Ocena Ave
Madison St
226th St
234th St
Kashiwa St
Juniper Ave
230th St
229th Pl
231st St
Pennsylvania Ave
Walnut St
237th St
239th St
Skypark Dr
Rolling Hills Road
Crest Road
Hollerview Dr
Fashion Way
Sonoma St
Plaza Del Amo
Cota Ave
213th St
Sierra St
Dominguez Way
208th St
Harpers Way
California St
195th St
Santa Fe Railroad
186th St
187th St
Yukon Ave
Falda Ave
177th St
180th St
171th St
168th St
170th St
164th St
Annie Ave
0
0.5
1 Miles
0
1
2 Kilometers
NORTH
TORRANCE
GENERAL PLAN

members. The EPA assigns "archive" status to sites where no immediate or long-term risks to human health are posed. In 2005, the EPA listed two CERCLA/Superfund sites in Torrance.

TOXIC RELEASE INVENTORY SITES

The EPA also monitors a list of sites known to release toxic chemicals into the air. In 2005, the EPA registered 19 facilities in the City on the Toxic Release Inventory (TRI) list. Subsequently two of the sites were converted to residential uses and are no longer considered TRI sites.

LARGE QUANTITY GENERATOR SITES

Many types of businesses can be producers of hazardous waste. Small businesses like dry cleaners, auto repair shops, medical facilities or hospitals, photo processing centers, and metal-plating shops are typical generators of small quantities of hazardous waste. Larger businesses are sometimes generators of large quantities of hazardous waste. These include chemical manufacturers, large electroplating facilities, and petroleum refineries. The EPA defines a large-quantity generator as a facility that produces over 1,000 kilograms (2,200 pounds or about 275 gallons) of hazardous waste per month. Large-quantity generators are fully regulated under the Resource Conservation and Recovery Act (RCRA) which amended, in 1976, the Solid Waste Disposal Act to establish a regulatory structure for the management of solid and hazardous wastes.

METHANE GAS

Methane and other natural gases can form at great depth, where they are most often associated with petroleum deposits. Oil and gas seeps are common occurrences in many parts of California, including in and around Torrance. The Torrance Oil Field underlies a large portion of Torrance, extending between the city's east and west borders, and from about Lomita Boulevard on the south to approximately the BNSF railroad right-of-way on the north. Under certain conditions, the gas can become trapped under an impermeable layer. As the gas accumulates under the impermeable layer, it can build up to high concentrations and pressures. Human-made structures, such as pavement or building foundations, can also prevent gas from venting to the atmosphere. Methane can accumulate in the upper reaches of poorly ventilated building components, such as basements, crawlspaces, and attics, sometimes with catastrophic results such as explosions.

TORRANCE FIRE DEPARTMENT HAZARDOUS MATERIALS DIVISION

The Los Angeles County Fire Department's Health Hazardous Materials Division is the Certified Unified Program Agency for Torrance. The Torrance Fire Department serves a participating agency and is responsible for implementing Chapter 6.95 (hazardous materials disclosure and the California Accidental Release Program) and Chapter 6.7 (underground storage tanks) of the California

Health and Safety Code. The County enforces the hazardous waste regulation in the City.

The Torrance Fire Department maintains a Hazardous Materials Response Team consisting of State Certified Hazardous Materials Specialists. Members of the Hazardous Materials Team have specialized training for dealing with emergency responses for hazardous materials. The Torrance Fire Department also requires every business in the City that handles a certain amount of hazardous materials complete the following forms: Business Owner/Operator Identification, Emergency Response Business Plan, Hazardous Material Inventory Form, and the Emergency Response Business Plan Certification Checklist. These forms help the City to monitor hazardous materials to help reduce adverse impacts hazardous waste can have on the community and the environment.

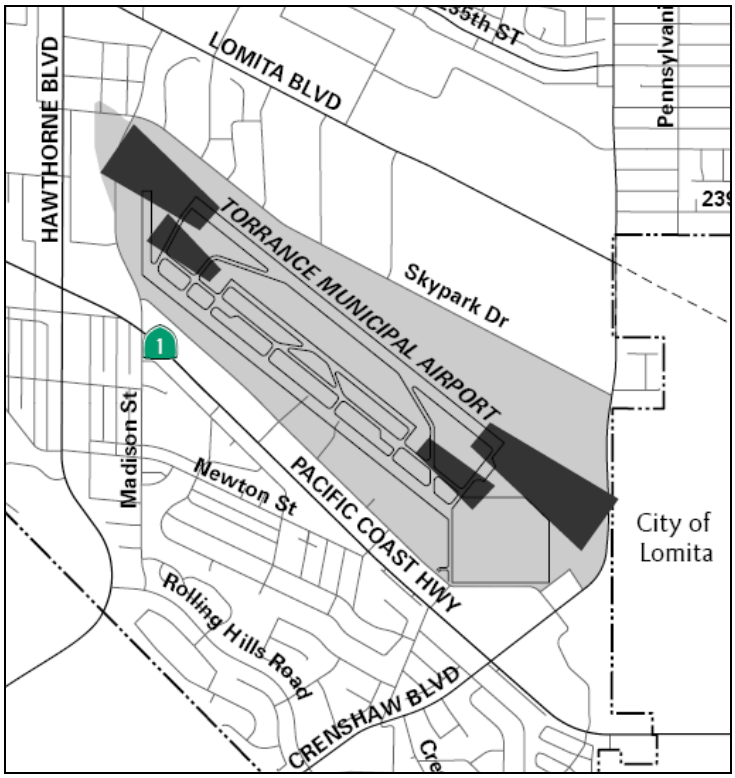
2.5 TORRANCE MUNICIPAL AIRPORT (ZAMPERINI FIELD)

Torrance Municipal Airport is a general aviation facility that encompasses 500 acres, 140 acres of which are leased for non-aeronautical purposes. Torrance Airport can handle planes with a maximum per wheel weight of 20,000 pounds. However, the majority of airplanes are light, single-, sometimes twin-engine models, used mainly for recreational purposes, limited in size and seating capacity (usually two to eight), carrying less than 200 gallons of fuel on average, and with a typical gross weight not exceeding 12,500 pounds.

Between 1988 and 2004, 26 general aviation accidents occurred at or near the airport. Of these, two were fatal accidents. The potential impact of an airplane crash at Torrance Municipal Airport is limited due to the speed, weight, and fuel load restrictions of small airplanes and helicopters.

The Torrance Fire Department maintains vehicles that are equipped with automatic gate openers that allow them direct access to the airfield.

Consistent with State aviation regulations, a Runway Protection Zone (RPZ) has been established at each end of each active runway. The size of the RPZ is determined by the type of landing approach used for that runway. The Federal Aviation Administration (FAA) mandates the airport operator to restrict uses of RPZ land under its control to those compatible with airport operations. The Runway Protection Zone for Torrance Municipal Airport is shown on Figure S-5.



Runway Protection Zone
Airport Influence Zone
Source: Los Angeles County Airport Land Use Plan, 1991

Figure S-5:
Torrance Airport Runway Protection Zone

Airport Operations Vehicle: The airport operations vehicle is equipped with fire extinguishers, tool-boxes, and other materials needed to respond to minor accidents.

Although air crash incidents at the airport have been infrequent, the City will continue to minimize risks by following the FAA's land use restrictions to areas surrounding airports and flight paths. Per FAA standards, the airport will maintain RPZ for each end of the airport's active runways. The City will ensure that all land use decisions close to the airport are consistent with standards contained within the Airport Comprehensive Land Use Plan. Further details about operations at the airport are included in the Circulation and Infrastructure Element.

2.6 HUMAN ACTIVITY HAZARDS GOALS AND POLICIES

The City is committed to maintaining a safe environment by minimizing fire and oil production hazards and ensuring that hazardous waste is handled and stored properly. For airport operations, the City will prioritize emergency readiness and protection of surrounding land uses.

OBJECTIVE S.2:	To minimize the risks associated with urban fires and wildland fires
Policy S.2.1:	Continue to enforce building fire codes and ordinances.
Policy S.2.2:	Continue to enforce the City's fire prevention and suppression requirements for water supply, water flows, fire equipment access, and vegetation clearance in new and modified developments.
Policy S.2.3:	Continue to research and adopt best practices pertaining to fire management and fire hazards.
Policy S.2.4:	Continue to involve the Fire Department in the development review process to ensure that fire safety is addressed in new and modified developments.

OBJECTIVE S.3:	To protect the community from hazards associated with the production, transmission, and processing of petroleum products
Policy S.3.1:	Take appropriate measures to protect citizens from the hazards of oil and gas recovery, production, and transmission.
Policy S.3.2:	Require that oil well abandonment and construction near abandoned oil wells comply with the most current local, State, and federal abandonment standards.
Policy S.3.3:	Require all secondary recovery projects to comply with all applicable regulations regarding health, safety, and aesthetics as a condition of approval.
Policy S.3.4:	Maintain comprehensive regulations in the Municipal Code that address all aspects of oil and gas recovery, production, and transmission activities.
Policy S.3.5:	Ensure the compatibility of land uses near new and future oil recovery activities.

OBJECTIVE S.4:	To reduce the risk associated with the use, storage, transport, or disposal of hazardous waste
Policy S.4.1:	Adopt and strictly enforce the most current regulations governing hazardous waste management.
Policy S.4.2:	Minimize exposure of critical facilities and residences to hazardous materials.
Policy S.4.3:	Avoid locating new residential development adjacent to or near potentially hazardous industrial activities.

OBJECTIVE S.5:	To minimize the risk of potential hazards related to operations at Torrance Municipal Airport
Policy S.5.1:	Ensure that land use decisions within the airport influence area are consistent with the standards contained within the Torrance Airport Comprehensive Land Use Plan.
Policy S.5.2:	Require that airport personnel and emergency responders are trained in all applicable operational and safety procedures related to aviation hazards.
Policy S.5.3:	Ensure that the airport has the appropriate equipment and technology to address any emergency situations that may arise.
Policy S.5.4:	Prioritize airport preparation and response to potential security and terrorism threats.

3. EMERGENCY RESPONSE AND PUBLIC SAFETY

The best approach to dealing with public safety threats involves two key strategies: 1) plan to prevent them and 2) develop responses that minimize the extent of upset when a disaster occurs. The City of Torrance has consistently provided its residents, businesses, and visitors with superior emergency services. This commitment will continue by reducing hazards and responding quickly and efficiently to emergencies. With a combination of reliable emergency services, use of the best available technologies, and community involvement, Torrance will continue to be one of the safest cities in the region.

To recoup the cost of providing safety services to new developments the City adopted a Development Impact Fee (DIF) program. The dwelling unit fee implemented by the DIF is applied to pay a portion of the costs identified for public facilities used for transportation services, the undergrounding of utilities, sewer and storm drain facilities. In 2007, the DIF was amended to include police and fire services.

3.1 EMERGENCY SERVICES

3.1.1 POLICE DEPARTMENT

The mission of the Torrance Police Department is to preserve public safety and quality of life, to respond effectively to the changing needs of the community, and to promote mutual respect between the community and the Police Department.[13]

Torrance Police Department Patrol Vehicle: Patrol is the largest bureau within the Police Department. Patrol Officers are the first responders to the 85,000 annual community's calls for service. The City is divided into 6 beats, with each beat patrolled by at least one unit.

[13] www.torrnet.com City of Torrance – Police Department. Accessed 6/22/06.

The Police Department includes specialized divisions that allow for focused prevention and response:

- The Patrol Bureau provides specialized unit services including a Crime Scene Investigation unit, a Gang Detail unit, the Special Weapons and Tactics (S.W.A.T.) unit[14], and a Canine Detail unit.
- The Special Operations Bureau consists the Detective Division, Vice and Narcotic Division including a Crime Impact Team that works undercover, as well as a Narcotics Team, and Intelligence Section along with the Traffic and Special Events Division consists of Commercial Enforcement, Parking Enforcement, and the Police Motor Squad.
- The Communications Division manages the City's Public Safety Dispatch Center.
- Community Affairs Division provides information to the Community related to crime prevention and emergency preparedness.
- Emergency Services Division is responsible for the City's emergency plan, City employee emergency disaster training, management of the City's Emergency Operation Center, management and training of the City's Disaster Service Volunteers, and providing emergency preparedness training to the community.

To further the effectiveness of its public safety efforts, the Torrance Police Department has established Focus Based Policing — a method of policing that enhances a connection with the community and responsibilities of community members as well. The Police Department also administers two Police Community Centers that provide a variety of non-emergency police services to the community and provide a line of communication to City residents. Establishment of a Community Affairs Division will be evaluated as a way to further community involvement and focus-based policing.

In addition to community connections, keeping abreast of the latest technology is a priority for the Police Department. Technology used for crime scene investigations, crime analysis, mass notification, and improved communications can improve crime prevention and emergency response.

3.1.2 FIRE SERVICE

The Torrance Fire Department is guided by its mission of dedication to protect the community and provide for life safety, environmental protection, and property conservation through education, hazard reduction, and emergency response. The Department's core value is commitment to the highest standards of professionalism and integrity that are the tradition of the fire service. The Torrance Fire Department has six fire stations and a Fire Prevention and Hazardous Administration office. The Fire Department provides safety, environmental protection, and property conservation through the provision of

[14] www.torrnet.com City of Torrance – Police Department. Accessed 6/22/06.

the following emergency response programs: Emergency Medical Services, Direction and Control, Fire Suppression, Hazardous Material Emergency, Hazardous Materials Administration, Public Education, Specialized Emergency Response Services, Technical Rescue Services, Fire Prevention, and Specialized Emergency Response Services.

Torrance Fire Department Fire Engine

- **Fire Station 1 (Headquarters)**, 1701 Crenshaw Boulevard.
  Station 1 houses two engine companies, one ladder truck company, one paramedic rescue unit, a Hazardous Materials Response Unit and the shift commander (Battalion Chief). The Fire Department's administrative offices are also located here.
- **Fire Station 2**, 25135 Robinson Way
  Station 2 houses one engine company and a paramedic assessment unit.
- **Fire Station 3**, 3535 W. 182nd Street
  Station 3 houses one engine company and one paramedic rescue unit.
- **Fire Station 4**, 5205 Calle Mayor
  Station 4 houses one engine company and one paramedic rescue unit.
- **Fire Station 5**, 3940 Del Amo Boulevard
  Station 5 houses one engine company and one paramedic rescue unit. Some personnel are cross-trained to respond as members of the Fire Department's Air and Lighting unit.
- **Fire Station 6**, 21401 Del Amo Circle
  Station 6 houses one engine company, one ladder truck company, and one paramedic rescue unit. Engine company personnel from Station 6 are also cross trained to respond as part of the Fire Department's Hazardous Materials Response Team and Technical Rescue System Services.
- **City Hall**, 3031 Torrance Boulevard
  The Fire Department's Fire Prevention and Hazardous Materials Administration offices are located within the City Hall complex.

The Torrance Fire Department responds to over 12,000 incidents a year. Approximately 70 percent of the responses are medical and rescue emergency

calls. Fires represent less than three percent of all calls, and structure fires represent less than 0.5 percent. This is due to the use of modern fire and building codes, effective fire prevention inspection work by the Fire Department, and effective public education. Fires, when they do occur in newer occupancies, are kept small by fire sprinkler systems and the efforts of the Fire Department.

In addition to fire suppression services, the Fire Department responds to all medical emergencies in the City with an Advanced Life Support (ALS) paramedic rescue squad, and all life-threatening medical emergencies receive Basic Life Support (BLS) unit response in addition to the ALS. The BLS units are equipped with life-saving medical equipment and staffed with Emergency Medical Technicians. The Fire Department relies on traffic signal actuation devices at critical intersections to deal with traffic congestion and improve the driving time response.

As an indication of the superior fire services available to Torrance residents and businesses, the Insurance Services Office (ISO), which provides rating and statistical information for the insurance industry in the United States, has given Torrance the highest rating possible (Class I).

One of the most critical issues for fire response is the availability of water in an emergency, particularly for widespread structural fires after earthquakes. Although a seven-day emergency storage supply is recommended, especially in areas likely to be impacted by fires after earthquakes, as of 2006 the water storage reservoirs in Torrance provide only one and one-half days of emergency storage supply.

3.1.3 MUTUAL AID AGREEMENTS

While the Torrance Police Department is tasked with preserving the safety and quality of life of the community and the Torrance Fire Department is tasked with the responsibility of fire prevention and fire suppression, both departments team with other public safety agencies to work together during emergencies. These teaming arrangements are handled through automatic and mutual aid agreements, which obligate the public safety departments to help each other under pre-defined circumstances. Torrance is part of the California Fire and Rescue Master Mutual Aid System under Los Angeles County Operation Region 1 area, and more specifically, part of, and coordinator for, the South Bay area (also referred to as Area G). As a result of being part of the same operational area group, all of these jurisdictions have mutual aid agreements that allow them to obtain additional emergency resources, as needed, from non-affected members in the group. As coordinator for Area G, the City is charged with communicating and coordinating mutual aid requests from Region 1 to all South Bay cities. Torrance also coordinates mutual aid requests from other south bay cities in Area G to assist each neighboring agency as needed.

3.2 EMERGENCY PREPAREDNESS

Torrance sets emergency preparedness as one of its top priorities, recognizing that proper planning at all levels in the community — from response agencies to businesses and residents — will minimize the adverse effects of natural and human-caused disasters. The Emergency Services Division within the Police Department is responsible to ensure City employees receive up to date emergency disaster training. Through a coordinated effort by the Emergency Services Division, Community Affairs Division and the Disaster Service Volunteers, the City provides the community emergency preparedness information and outreach.

3.2.1 EMERGENCY PLANS

The City of Torrance adopted and approved a Natural Hazard Mitigation Plan in 2004, and the State of California and FEMA approved the plan in 2005. The plan promotes policy to help reduce the risk against natural hazards such as earthquakes, landslides, and floods. The plan encourages raising public awareness, documenting resources for risk reduction and loss-prevention, and incorporating safer and more sustainable building practices.[15]

The City has an emergency plan which establishes emergency preparedness and emergency response procedures for both peacetime and wartime disasters. The plan is termed a "Multi-Hazard Functional Plan," prepared in accordance with the State Office of Emergency Services guidelines for multi-hazard functional planning. This plan, establishes the emergency organization, assigns tasks, specifies policies and general procedures, and provides for coordination of planning efforts of the various emergency staff utilizing the Standardized Emergency Management System (SEMS) and National Incident Management System (NIMS). The plan establishes that the City of Torrance is primarily responsible for emergency actions and will commit all available resources to save lives, minimize injury to persons, and minimize damage to the environment and to property. The Police Department, through the Emergency Services Division, is responsible to ensure the City's emergency plan is current and follows both State and federal mandates.

The Torrance Fire Department is required to prepare and follow an area plan for emergency responses to hazardous materials releases. In 2006, the Torrance Fire Department rewrote its area plan to bring it up to date. The area plan has been submitted to the Governor's Office of Emergency Services as required under the Health and Safety Code.

[15] City of Torrance Natural Hazard Mitigation Plan, pg. 3.

3.2.2 EMERGENCY OPERATIONS

In the event of a major emergency or disaster, the City centralizes emergency management at its Emergency Operation Center, or EOC. Centralizing the location of authority and information facilitates a coordinated response by emergency services personnel. The number and level of staffing at the EOC depends on the specific emergency.[16] To maintain lines of communication open during emergencies, Torrance has established eight Area Disaster Centers (ADC) to serve as points for communication to and from the City's Emergency Operation Center in the event no electronic devices are operating because of a natural disaster or emergency. When an emergency event occurs, City staff and Torrance Amateur Radio Association radio operators respond to these ADCs:

- Southeast Torrance Library
- Henderson Branch Library
- North Torrance Library
- Walteria Branch Library
- El Retiro Branch Library
- Sea-Aire Golf Course
- Alta Loma Park
- Bartlett Center

The City has several warning systems in place to notify residents in the event of a major emergency. A specific response plan has been developed in the event of an accident at the Exxon/Mobil Refinery. A barrier system along Crenshaw Boulevard automatically restricts traffic movement, and nearby residents receive evacuation information as needed.

The systems local to Torrance include:

- Community Warning Siren: Alerts public in close proximity to Exxon/Mobil Refinery of a chemical release and the need to shelter in place
- Crenshaw Barrier System: Restricts traffic on Crenshaw Boulevard by the Exxon/Mobil Refinery
- CityWatch: The City's emergency telephone notification system that alerts residents in the event of an emergency
- Radio Alert Network: City-activated radio system within certain public and private facilities, including some private homes, to warn of an emergency
- Phone Bank: The City has designed and implemented a phone bank which relieves calls going to the Police and Fire dispatch centers and provides necessary information to the community if they call. The phone numbers are made available on the local cable television station, the City website, and via press releases in the event of an emergency.

[16] www.ci.torrance.net, City of Torrance – Emergency Services. Accessed 7/10/06

- Cable Television: CitiCABLE Channel 3 will broadcast emergency alerts in the case of an emergency.
- City's Radio Station: CitiSOUNDS AM 1620 will broadcast emergency alerts in the case of an emergency.
- Torrance Website: The City's website (www.torranceca.gov) provides emergency alerts in the case of an emergency.

National and international safety issues and the expected occurrence of natural disasters such as earthquakes necessitate an effective emergency response. To that end, the City will focus on enhancement of the City's EOC to provide the most up-to-date emergency response services to the Torrance community. Technology and capital upgrades will be prioritized as funding becomes available. Funding sources outside the City will also be used to augment the City's emergency response resources.

3.2.3 EMERGENCY RESPONSE VOLUNTEERS

In the case of an emergency, community volunteers will enhance emergency response activities by the City. The City's Emergency Services Division through the Police Department oversees the Disaster Service Volunteer Programs to provide for continual disaster readiness. Community Emergency Response Team (CERT) Program educates community members about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills. The Torrance Amateur Radio Association provides emergency communications during a major communications outage. Utilizing a seven-band ham station coupled with licensed amateur radio operators stationed throughout the community, the association ensures vital information is shared among first responders. The Animal Disaster Team provides medical treatment and shelter for animals impacted by disasters.

City Disaster Drill: The City of Torrance participated in a county-wide disaster drill to both train, and to measure the City's ability to respond to a large-scale disaster.

Source: Torrance Fire Department CERT Training Website, 2006

3.3 COMMUNITY SAFETY

3.3.1 CRIME AND TERRORISM

In the aftermath of the terrorist attacks on September 11, 2001, the City of Torrance's emergency preparedness and response services expanded to address terrorism issues that confront the nation and local communities. Since the events of 9/11, a considerable amount of information has been generated on potential vulnerabilities, protective measures, and anti-terrorism/security technologies. The Police and Fire Departments recognize the need not only to learn from the lessons from 9/11, but also to collectively address the terrorism planning and policy issues that most affect Torrance residents.

The City credits a strong relationship with federal law enforcement, vertical sharing of information, close coordination and communication, with its success in securing the City.[17] The City's approach to terrorism focuses on prevention, but awareness, knowledge, and skills will be enhanced in order to avert crime and terrorism events before they occur.[18] To further the City's efforts in identifying and preventing crime and terrorism threats, the goals, policies, and implementation programs in this Element also apply to terrorism readiness and response.

3.3.2 CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED)

Torrance values the effect of crime prevention and strives to find creative ways to make residents and businesses safe. Crime Prevention through Environmental Design (CPTED) refers to defensible space planning that uses design techniques, building orientation, and features of the built environment to deter criminal activity and positively influence human behavior and the perception of safety.

The concepts of CPTED offer non-invasive and permanent measures to prevent crime in the City of Torrance. CPTED include the following five concepts:

- Territoriality: Clearly identifying the boundary of a property or an area through walls and fences can discourage intrusion.
- Natural Surveillance: Arranging populated functions or rooms to face the street allows easy surveillance by building occupants.

[17] *Hearing on Radicalization, Information Sharing and Community Outreach: Protecting the Homeland from Homegrown Terror.* Testimony of John J. Neu, Chief of Police. U.S. Congress House Committee on Homeland Security Subcommittee on Intelligence, Information Sharing, and Risk Assessment.

[18] *Ibid.*

- Access Control: Circulation and access can be controlled through designating paths and placing bollards or fences to limit access.
- Activity Support: Supporting activities on the street attract people and encourage natural surveillance.
- Maintenance: Maintenance of sidewalks, street trees, lighting, and private property discourages negative behavior such as littering and vandalism.

Crime prevention also requires public participation. The Police Department administers a Neighborhood Watch Program that relies on Torrance residents as its most effective tools of crime prevention. The program provides training to volunteers who maintain neighborhood safety by being watchful and reporting suspicious behavior.

The success of CPTED depends on maintenance of all these programs. Maintaining streets, lighting, and landscaping facilitate natural surveillance and access control. Maintaining private and public properties requires participation by property owners and the Public Works Department. Continuation and monitoring of these programs will enhance safety in Torrance neighborhoods.

3.4 EMERGENCY RESPONSE AND PUBLIC SAFETY OBJECTIVES AND POLICIES

The City of Torrance will strive for a high level of community safety through reliable emergency services, a high level of preparedness, and innovative tools to prevent crime.

OBJECTIVE S.6:	To provide a high level of fire, police, and emergency medical services
Policy S.6.1:	Monitor the development of technology, and prioritize the acquisition and use of the latest technology to enhance emergency services.
Policy S.6.2:	Maintain an adequate number of fire stations, facilities, and services sufficient to meet high fire protection standards.
Policy S.6.3:	Adopt reasonable safety standards for areas in the City susceptible to hillside wildfires covering such elements as adequacy of nearby water supplies, land use patterns, routes or throughways for fire equipment, clarity of addresses and street signs, and maintenance of vegetation fuel.
Policy S.6.4:	Provide for a maximum six-minute Fire Department response time.
Policy S.6.5:	Maintain sufficient and adequate police stations and substations, facilities, services, and staffing to meet high public safety standards.
Policy S.6.6:	Support community participation in crime prevention through Police Department public outreach programs.

OBJECTIVE S.7:	To reduce the impacts related to natural and human activity hazards through a high level of emergency preparedness
Policy S.7.1:	Promote public awareness of emergency procedures for residents, the business community, City staff, and public officials.
Policy S.7.2:	Require essential service providers (water, sewage, electrical power, communication, transportation, natural gas, and liquid fuel systems) and transportation agencies to periodically evaluate the vulnerability of their systems in the event of a disaster.
Policy S.7.3:	Review and consistently update the City's disaster contingency plans. Require that plans for critical facilities and service providers cover the adequate provision of emergency supplies and power supplies to provide essential services.
Policy S.7.4:	Continue to work with other jurisdictions to maintain mutual aid agreements.
Policy S.7.5:	Provide an adequate supply of water and water pressure to meet emergency needs.
Policy S.7.6:	Improve the City's water storage capacity and distribution network to ensure provision of supplies during emergencies.
Policy S.7.7:	Continue to prepare and implement measures to protect critical facilities from criminal or terrorist attacks.
Policy S.7.8:	Encourage the use of Crime Prevention through Environmental Design (CPTED) principles to enhance the safety of proposed and existing developments from crime.
Policy S.7.9:	Integrate prevention and response plans for tsunamis in the City's disaster contingency plans.
Policy S.7.10:	Develop disaster exercises to prepare for both natural and human activity hazards.
Policy S.7.11:	Maintain an Emergency Operations Center that will provide the highest level of emergency response and preparedness facilities.

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