Laguna Beach

Community Wildfire Protection Plan
And Other Natural Disasters

Table of Contents

I. INTRODUCTION

1. LAGUNA BEACH HISTORY

California experiences large, destructive wildland fires almost every year. As demonstrated by the Oct. 27, 1993 firestorm in Laguna Canyon, Laguna Beach is extremely vulnerable to wildfires and major fires. The arson fire was started in the unincorporated area of Laguna Canyon during an extreme Santa Ana wind condition. Fueled with dry, dense fuelbeds, and pushed by hot winds, the fire blew south into Laguna Beach and Emerald Bay, consuming 16,683 acres, destroyed 366 homes (286 in Laguna Beach) and damaged 642 homes (City of Laguna Beach, 1997).

2. COVERED AREA

This CWPP covers the city of Laguna Beach as well as El Morro, Emerald Bay, and Irvine Cove. In addition to fires, this plan expands to other disasters including floods, tsunamis, and earthquakes.

3. CWPP PURPOSE

The CWPP identifies essential infrastructure in the city of Laguna Beach, which are at risk during fires. These identified assets are prioritized by importance and analyzed to create possible solutions, which reduces risk. The possible solutions are then analyzed resulting in plausible actions to reduce ignitability. By identifying these assets, the city can better prepare and protect businesses, landmarks, residential homes, and most importantly, life.

In addition, the Healthy Forests Restoration Act (HFRA) of 2003 encourages communities to engage in forest planning and prioritization. In turn, this legislation allows the US Forest Service (USFS) and the Bureau of Land Management (BLM) to give greater consideration to communities, which have or are in the process of creating a CWPP (California Fire Alliance, 2004). Therefore, the preparation of a CWPP allows the city and other entities to apply for future funding.

II. CITY RECOMMENDATIONS

1. FIRE

The following fire analysis and recommendations are prepared utilizing the *Emergency Management Plan* (1997) and the *Wildland Fire Management Plan* (2005) in conjunction with the Laguna Beach Police Department, Laguna Beach Fire Department, and the Orange County Fire Authority.

Laguna Beach has the three key ingredients that together may contribute to a major wildland fire: **fuel, topography, and weather.**

<u>Fuel</u>

Laguna Beach is surrounded by nearly 15,000 of wildlands around its borders, in addition to numerous, densely vegetated inner canyons and slopes. Undeveloped open space is both a desirable and important component of Laguna's unique character and quality of life. However,

the presence of dense, combustible fuels along steep hillsides also poses certain risks, which must be considered when evaluating the town's fire safety.

Fuel loading includes three classes. **Light fuels** represent flammable grass and annual herbs. There are only a few areas in Laguna Beach, which fit this category, most of which have been altered by man's actions: cattle grazing, fuel breaks, etc. **Medium fuels** include brush and other perennial shrubs less than six feet in height with a crown density of 20 percent or more. This comprises the largest group in Laguna Beach. **Heavy fuels** are the heavier brush species, woodland types and timber types more than six feet in height with a crown density of 20 percent or more. In Laguna Beach, these areas are predominantly located on north facing slopes in the canyons where the moisture content is greater.

Fuels and vegetation become a particularly critical fire risk following years of vegetation build-up. If the vegetation in the adjacent wildland areas is not periodically burned, the resulting fuel loads can create hazardous conditions.

Topography

The topography of Laguna Beach can be best described as dominated by hillsides and canyons with steep slopes and thick vegetation. This terrain can be a prime contributor to fire spread, and a threat for homes built on hillsides.

Weather

The most important factor of fire weather is wind. Like most of Southern California, Laguna Beach is subject to the Santa Ana winds, a seasonal phenomenon caused by very dry, hot air originating from high-pressure systems over California, Utah, and Nevada deserts accompanied by bone-dry humidity. Strong Santa Ana winds can reach 70+ miles and spread a fire, or lead to spotting, where flaming embers are carried up hillside slopes or onto roofs.

There are other important issues influencing fire safety in Laguna Beach, specifically development patterns and access.

Development Patterns

In addition to wildland fires, Laguna Beach is also vulnerable to the possibility of a relatively small structure fire spreading into a major neighborhood conflagration. This is due primary to the town's many densely, packed neighborhoods. These are neighborhoods in which homes are built on small lots with little space between structures. Some of the following neighborhoods have been identified as having critical development patterns with respect to fire are: Arch Beach Heights, Diamond/Crestview, Canyon Acres, Woodland/Milligan, Bluebird Canyon, and the interface areas of South Laguna.

Access

Also, at issue are questions of ingress and egress. Laguna Beach has several neighborhoods with narrow streets and long cul de sacs. Many residents insist on parking on the streets, making for even narrower ingress and egress. Such conditions could pose problems for fire fighting or emergency personnel as well as evacuating citizens.

Fire Fighting Capabilities

The City of Laguna Beach operates four fire stations. An automatic aid agreement provides for Orange County response into fringe areas of the City for fire protection. At least two Orange County Fire brush engines respond on all reported brush fires. The City's fire stations are strategically placed to provide optimum response times to the City. Response time (the time it takes to drive to the scene after leaving the station) averages where calculated between 3 to 5 minutes in all areas studied within the City. The exception is the Club Laguna and El Toro area which is 5 minutes, 43 seconds but a boundary drop agreement improves the response time to just over 3 minutes. Total reflex time (the time from receiving the call to arriving at the scene) is around 7 minutes.

Fire Station Number and Location

Station One— 501 Forest Avenue
Station Two— 285 Agate
Station Three— 2900 Alta Laguna
Station Four— 31646 Second Avenue

Fire Station Staffing and Equipment

Staffing service levels will be confined to on-duty city emergency response personnel and equipment. All frontline engines are Type 1 pumpers. Each engine has emergency medical equipment, defibrillators, and foam pumping capability.

STATION	COMPANY TYPE	STAFF	COMMENTS
One	EMT-D Engine	1 Captain 1 Engineer 1 Firefighter	The unit is equipped with extrication equipment and special rescue tools. This station also houses a Utility Vehicle.
Two	Paramedic Engine	1 Captain 1 Engineer 1 Firefighter	Two of the personnel assigned to this unit are State and County Certified paramedics. This station also houses a Reserve Engine, an OES Engine, and a Utility Vehicle.
Three	EMT-D Engine	1 Captain 1 Engineer 1 Firefighter	This unit also carries additional extrication equipment.
Four	EMT-D Engine	1 Captain 1 Engineer 1 Firefighter	This station also houses a Type III Brush Unit.

In addition to the above, the Fire Department maintains up to 15 Firefighter reserves available by pager.

Emergency Dispatch/Communications

The City of Laguna Beach maintains a police, fire, and marine safety communication center. Calls for emergency assistance are to be received, recorded, and dispatched within one minute. All police, fire, and marine safety vehicles are equipped with radios. Police, fire, and marine safety personnel also have hand-held radios.

Fire Prevention Measures

The City of Laguna Beach has taken steps to reduce the threat of wildland fires and major structures fires. The City has adopted special building requirements in a hazardous fire area (wildland/urban interface zone) that exceeds the Uniform Building Code requirements.

After the 1993 firestorm, a task force was established to determine if changes should be made to the Municipal Code to require homes to be even more fire-resistant in a hazardous fire area. Based on the task force's recommendations, the City Council recommended the use, where possible, of fire-resistive construction to resist fire spread. The Community Development Department has a list of fire-resistive components, which can be used in new construction or in retrofit situations, such as noncombustible roofs, double- and triple-pane glass, and stucco-wrapped horizontal and vertical projections.

The Fire Department City has expanded its fuel modification program to include the entire City urban interface with the use of goats and hand crews. Fuel modification areas include Laguna Canyon, Mystic Hills, Top of the World, Park Avenue/Hidden Valley, Rimrock Canyon, Bluebird Canyon, Diamond/Crestview and Oro Canyon and South Laguna interfaces.

In addition, the Fire Department has continued its Annual Weed Abatement program, in which property owners are notified on a yearly basis to abate weeds and vegetation, which have been determined to be a fire hazard or nuisance.

1.1. Wildland Fire Protection Assessment

The assessment framework will consist of a systematic set of tools that describe the existing levels of wildland fire protection services. Additionally, the framework will assist in identifying high-risk and high-value areas that are potential locations of costly and disastrous wildland fires as well as assist in ranking the areas in terms of priority needs and prescribe what can be done to reduce the future costs and losses. The Wildland Fire Protection assessment system has four (4) components. These are Weather, Assets at Risk, Fuels, and Level of Service.

1.1.1. Weather

Fire behavior is dramatically influenced by weather conditions. Large and costly fires are frequently, though not always, associated with severe weather conditions, typified by high temperatures, low humidity and strong surface winds. The different climates within Laguna Beach experience a different frequency of weather events that lead to severe fire behavior (severe fire weather).

CAL FIRE FRAP data provides a weather assessment that uses a Fire Weather Index (FWI) developed by USDA Forest Service researchers at the Riverside Fire Lab. This index combines

air temperature, relative humidity, and wind speed into a single value. This index can be calculated from hourly weather readings such as those collected in the California Remote Automated Weather Station (RAWS) data collection system. FWI does not include fuel moistures or fuel models. The FWI includes topography only to the extent that the RAWS station weather readings are influenced by local topography.

The following map shows the locations of the RAWS units and the areas of coverage for each station that has is used for this planning effort.

1.1.2. Assets at Risk

As part of the State Fire Plan, CAL FIRE has developed a methodology for analyzing Assets at Risk (AAR). Using their methodology, OCFA has identified the Assets at Risk categories that apply to the county and the following table represents these Assets and the methodology used in ranking them.

Asset at Risk	Public Issue Category	Location and ranking methodology
Fire-flood watersheds	Public safety Public welfare	Watersheds with a history of problems or proper conditions for future problems (South Coastal Plain, field/stakeholder input), ranked based on affected downstream population
Soil erosion	Environment	Ranking of post-fire erosion potential based on weighted combination of fuel characteristics, soil k-factor, slope, and peak rainfall.
Scenic	Public welfare	Four mile viewshed around Scenic Highways and 1/4 mile viewshed around Wild and Scenic Rivers, ranked based on potential impacts to vegetation types (tree versus non-tree types)
Range	Public welfare	Rangelands ranked based on potential replacement feed cost by region/owner/vegetation type
Air quality	Public health Environment Public welfare	Potential damages to health, materials, vegetation, and visibility; ranking based on vegetation type and air basin
Historic buildings	Public welfare	Historic buildings ranked based on fire susceptibility
Recreation	Public welfare	Unique recreation areas or areas with potential damage to facilities, ranked based on fire susceptibility
Structures	Public safety Public welfare	Ranking based on housing density and exposure (potential for structure loss in a large fire event)
Non-game wildlife	Environment Public welfare	Public and NGO land holdings specifically for protection of non-game wildlife habitat, ranked based on fire susceptibility.
Infrastructure	Public safety Public welfare	Infrastructure for delivery of emergency and other critical services (e.g. repeater sites, transmission lines)
Ecosystem Health	Environment	Ranking based on condition class, potential for ecological damage from a severe fire event due to deviation from historical fire return interval

The asset framework and validation process will be refined as stakeholders are identified and are participating in the Fire Plan process. Agencies, such as The Nature Conservancy, have played a vital role in identifying the assets within Laguna Beach.

Knowledge of the types and magnitudes of assets at risk to wildland fire, as well as their locations, is critical to fire protection planning. Given the limits on fire protection resources, they should be allocated, in part, based on the magnitude of the assets being protected. Knowledge of assets at risk is necessary to choose those pre-fire management projects that will

provide the greatest benefit for a given amount of investment. At this stage of development of the *Wildland Fire Management Plan* (2005), OCFA's primary concern is reducing the fire risk and potential loss of the various assets described here in an effort to provide for the safety and protection of life and property while reducing suppression costs.

The AAR analysis used a common unit called the quad 81st. Each quad 81st must be ranked as High, Medium, or Low for each AAR based on potential impacts from a large fire event, if one were to occur. Rankings are developed based on the potential physical fire effects as well as the human valuation of those effects. For example, for the air quality AAR the physical effects of a large fire in timberlands are higher than grasslands due to production of a larger volume of smoke. The valuation of this effect will differ based on the additional factor of how many people are potentially affected within specific air basins.

The potential physical effects of a large fire also include a susceptibility component for assets such as structures, historic buildings, or recreation that involve specific sites within a quad 81st. For example, the ranking procedure for structures involves a valuation component based on the number of housing units within a grid cell as well as a susceptibility component, or exposure. The exposure measure includes site-specific factors near housing such as vegetation clearance, roof type, and accessibility.

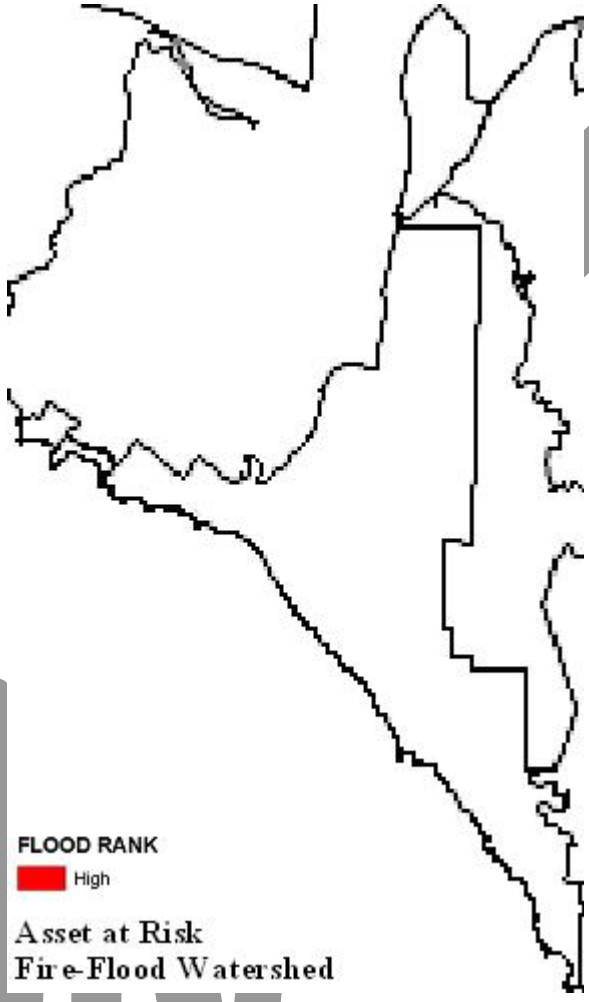
1.1.2.1. Fire-Flood Watersheds

The California Fire Plan describes the potential for certain watersheds to produce fireflood sequences. These watersheds can burn in the dry season and then discharge torrents of debris into downstream-populated plains during severe storms in following wet seasons. Historically, California's South Coastal Plain has suffered the worst effects of the flood-fire sequence because it has the greatest concentration of fire prone, high debris producing watersheds that discharge into populated areas. Impacts include damage to downstream values such as homes, roads, debris basins, and other infrastructure. As an initial statewide approach, watersheds in the general area that has proved to be fireflood prone in the past have been extracted from the statewide 1:24,000 scale CALWATER watershed data. While the initial statewide data are limited to the South Coastal Plain, the fireflood sequence is not limited to these areas alone, and additional watersheds may be identified in other parts of the state through the Unit validation process.

For quad 81st that contain portions of a watershed prone to the fireflood sequence, rankings are assigned based on the potentially affected downstream population from 1990 census data.

RANK	**AFFECTED DOWNSTREAM POPULATION***
High	High: over 2500 per square mile
Medium	Medium: 100-2500 per square mile
Low	Low: less than 100 per square mile
Not ranked	Watershed not fire-flood prone

* Original rankings based on 1990 census. Updates to 2000 census have not been performed since the broad scale at which downstream populations are calculated would probably result in extremely minor changes in the rankings.



1.1.2.2. Soil Erosion

The Post-fire erosion potential is calculated as a combination of,

Slope
Soil k-factor
Fuel characteristics
Peak rainfall

A score for each cell is derived as a weighted summation of these factors. The range of scores was then analyzed to assign the three ranks.

The methodology is designed to provide a reasonable statewide depiction of the spatial variation in post-fire soil erodibility. If the rankings do not adequately represent the local situation, field

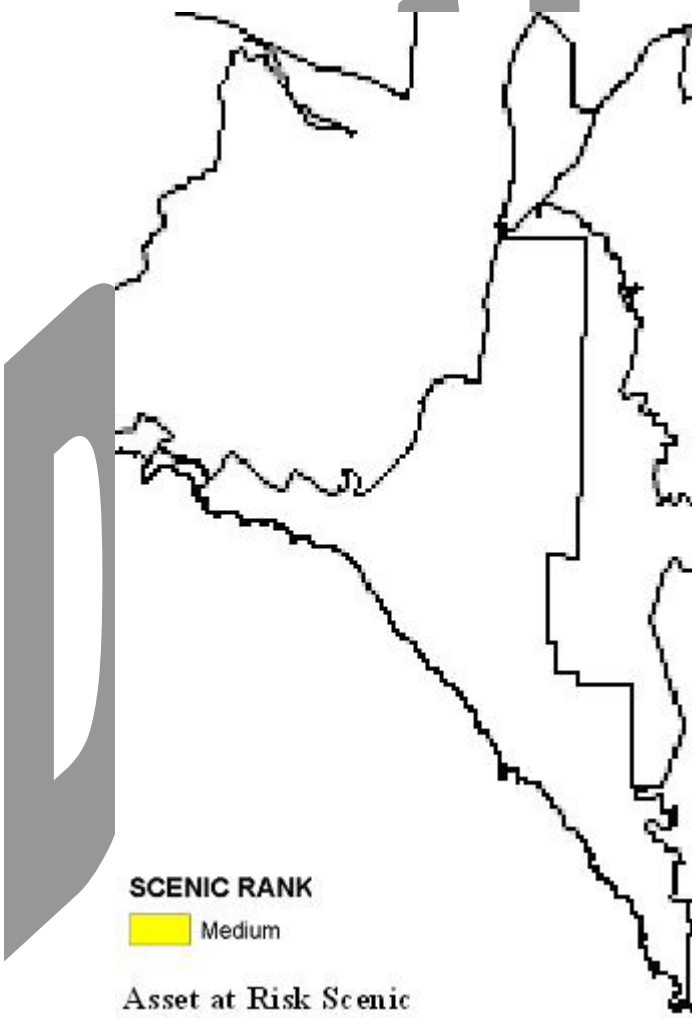
validation is not an option. Options are to locate better data inputs, or have FRAP adjust the methodology to fit local conditions, for example by changing the weighting scheme. Due to these restraints, OCFA accepted the rankings as is and will validate at a later time.

1.1.2.3. Scenic

The scenic asset includes the viewshed around state designated Scenic Highways, Forest Service and BLM Scenic Byways, and designated Wild and Scenic Rivers. Scenic highway designations are monitoring based on the CALTRANS website: http://www.dot.ca.gov/hq/LandArch/scenic_highways.

Based on conversations with the Forest Service, the visibility zone along roads within which scenic values might be impacted by a large fire event is assumed to be a maximum of four miles, but can be less depending on topography. Within this zone, vegetation type will influence the potential degree of impact on scenic values. For herbaceous and shrub types, the impact is probably less severe, and the duration of impact more limited. For tree types (conifer or hardwood), the impact is potentially more severe and longer lasting. For the statewide analysis, each quad 81st is characterized as to whether it is within a scenic area viewshed, and whether the most prevalent vegetation within the cell is a tree or non-tree type. Cells are then ranked according to the following table.

RANK	ROUTE TYPE	VIEWSHED	VEGETATION TYPES
High	State Scenic Highway, Forest Service Scenic Byway, BLM Scenic Byway	Up to four mile viewshed in either direction, subject to topography	Timber, woodland
Medium	State Scenic Highway, Forest Service Scenic Byway, BLM Scenic Byway	Up to four mile viewshed in either direction, subject to topography	Non-tree vegetation
Medium	Designated Wild and Scenic River	1/4 mile viewshed in either direction	Timber, woodland
Low	Designated Wild and Scenic River	1/4 mile viewshed in either direction	Non-tree vegetation
Not ranked	No scenic designation		All

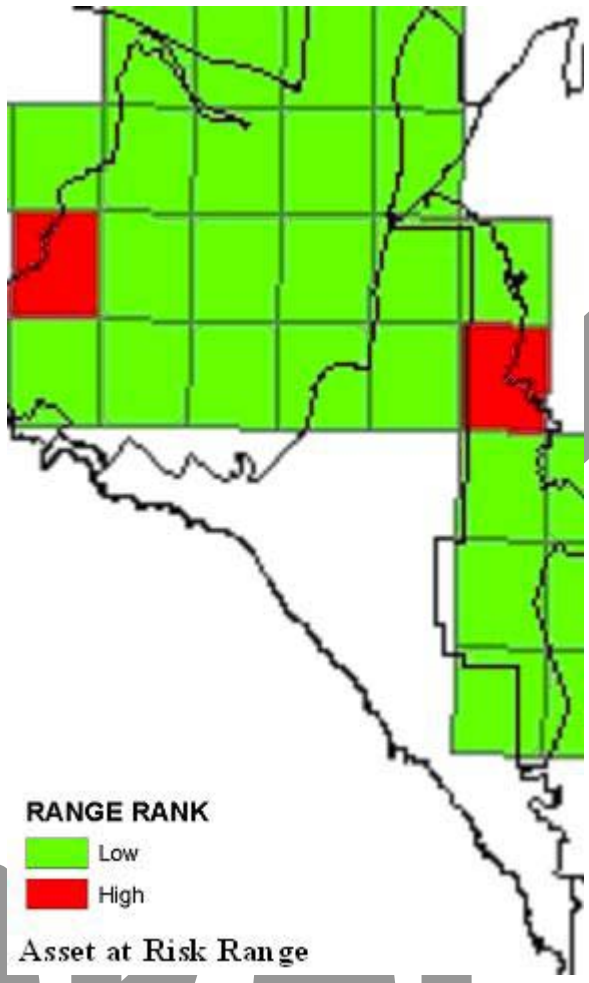


1.1.2.4. Range

The California Fire Plan provides estimates of the cost impact of burning an acre of rangeland for different vegetation types, ownerships, and regions of the state. The impact is based on the replacement cost of oat hay or alfalfa to compensate for lost forage production over a two-year period. While this may not accurately reflect actual losses due to other alternatives such as leasing to compensate for lost forage production, it does provide at least a process for determining the relative rankings of different areas. Using this impact value over all rangelands, many of which are not grazed by livestock, overestimates the actual economic impact. However, in the absence of data for which lands are grazed, it at least provides a relative ranking based on forage production, which has value for wildlife as well as livestock.

For the statewide analysis, each quad 81st is assigned its most prevalent range vegetation type, region, and ownership class. Based on these three designations for the cell, an impact value can be derived, and a ranking assigned based on the following table.

RANK	PER ACRE IMPACT	EXAMPLES
High	Over $35 per acre	North Coast private oak woodland Central Coast private annual grassland
Medium	$17.50 to $35 per acre	East Side private sagebrush Central Sierra private oak woodland
Low	Less than $17.50 per acre	Northern Interior Conifer lands (all owners) Desert (all regions/owners)
Not ranked	$0	Barren, urban, water



Asset at Risk Range

1.1.2.5. Air Quality

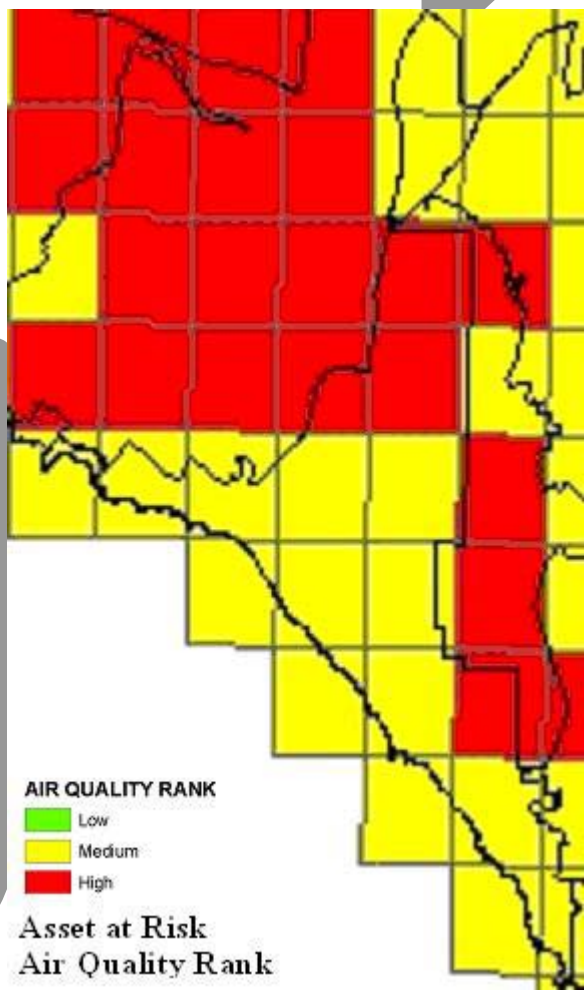
The California Fire Plan draws on past research to provide estimates of the per acre impact of burning an acre of different vegetation types in various air basins. The estimates attempt to capture impacts on health, materials, vegetation, and visibility. Impacts are much higher for timber and brush than for grass and woodland due to higher emission rates, and for more populous air basins. The following table (from California Fire Plan Appendix C) provides these estimates - for a detailed explanation of how the estimates are derived, the reader is referred to the California Fire Plan.

				Including Pollution Right Value	
Air Basin	**Marginal Emission Value ($/ton)**	**Grass and Woodland ($/acre)**	**Timber and Brush ($/acre)**	**Grass and Woodland ($/acre)**	**Timber and Brush ($/acre)**
San Francisco Bay Area	$24,258	$279	$7,641	$295	$8,093
South Central Coast	$6,441	$74	$2,029	$74*	$2,029*
South Coast	$46,458	$534	$14,634	$550	$15,086
San Diego	$24,593	$283	$7,747	$283*	$7,747*
Sacramento Valley	$2,935	$34	$925	$50	$1,377
Southeast Desert	$708	$8	$223	$88*	$223*
San Joaquin Valley	$5,184	$60	$1,633	$60*	$1,633*
North Central Coast	$6,441	$74	$2,029	$74*	$2,029*
North Coast	$1,703	$20	$536	$20*	$536*
Great Basin Valley	$125	$1	$39	$1*	$39*
Northeast Plateau	$395	$5	$124	$5*	$124*
Lake Tahoe	$924	$11	$291	$11*	$291*
Lake County	$908	$10	$286	$10*	$286*
Unweighted Average	$9,313	$107	$2,934	$111	$3,038

* Indicates assumed PM10 pollution right value is zero.
Sources: California Energy Commission 1993, 1995; Air Resources Board 1994.

Each quad 81st is assigned its most prevalent vegetation type and the air basin it is within. Based on the associated impact for the vegetation type and air basin, cells are ranked based on following table.

RANK	AVERAGE PER ACRE IMPACT	EXAMPLES
High	Over $2500 per acre	San Diego air basin brush South Coast air basin brush
Medium	$500 to $2500 per acre	South Coast air basin grassland Mountain Counties air basin timberland (1)
Low	Less than $500 per acre	Northeast Plateau air basin brush North Coast air basin oak woodland



1.1.2.6. Historic Buildings

There is no statewide digital data that contains the location and fire susceptibility of historic buildings. As a result, OCFA relied on data from local Historical Societies to capture locally important historic features that are susceptible to fire.

The following table provides a suggested ranking system based on likely impacts in the event of a large fire event based on historic value and susceptibility, which is a combination of surrounding vegetation, as well as ignition resistance (construction type).

RANK	HISTORIC VALUE	SUSCEPTIBILITY
High	High	High
High	High	Medium
High	Medium	High
Medium	High	Low
Medium	Low	High
Medium	Medium	Medium
Low	Medium	Low
Low	Low	Medium
Low	Low	Low

1.1.2.7. Recreation

The methodology that CAL FIRE creates for the statewide analysis will focus on two main impacts of large fire events on recreation. First, fire can cause severe damage to a unique recreation opportunity that cannot be replaced within a reasonably close geographic area. Secondly, impacts can cause facility or infrastructure damage that requires major public or private outlays to restore the recreation opportunity. For the analysis, the following recreation area designations are assumed to meet one of these two criteria

RECREATION IMPACT	RECREATION AREA DESIGNATION
Potential damage to unique recreation opportunity and/or potential for damages requiring significant outlays to restore the opportunity	County, City, or Regional Park National Recreation Area (NPS) National Seashore (NPS) National Preserve (NPS) National Monument (NPS) National Historic Site (NPS) National Park (NPS) U.S. Forest Service and BLM wilderness areas CA Dept of Fish and Game administered areas CA State Park Santa Monica Mountains Conservancy U.S. Fish & Wildlife Service administered areas

For each quad 81st that contains a recreation area an initial estimate of the susceptibility to fire damage is derived from the fuels rank derived as part of the Fire Plan. Rankings for the recreation asset at risk are assigned based on table below.

RANK	RECREATION DESIGNATION	FUELS RANK (RANKFUEL)
High	Meets above table criteria	Very High
Medium	Meets above table criteria	High
Low	Meets above table criteria	Medium
Not ranked	Does not meet criteria	All

1.1.2.8. Structures

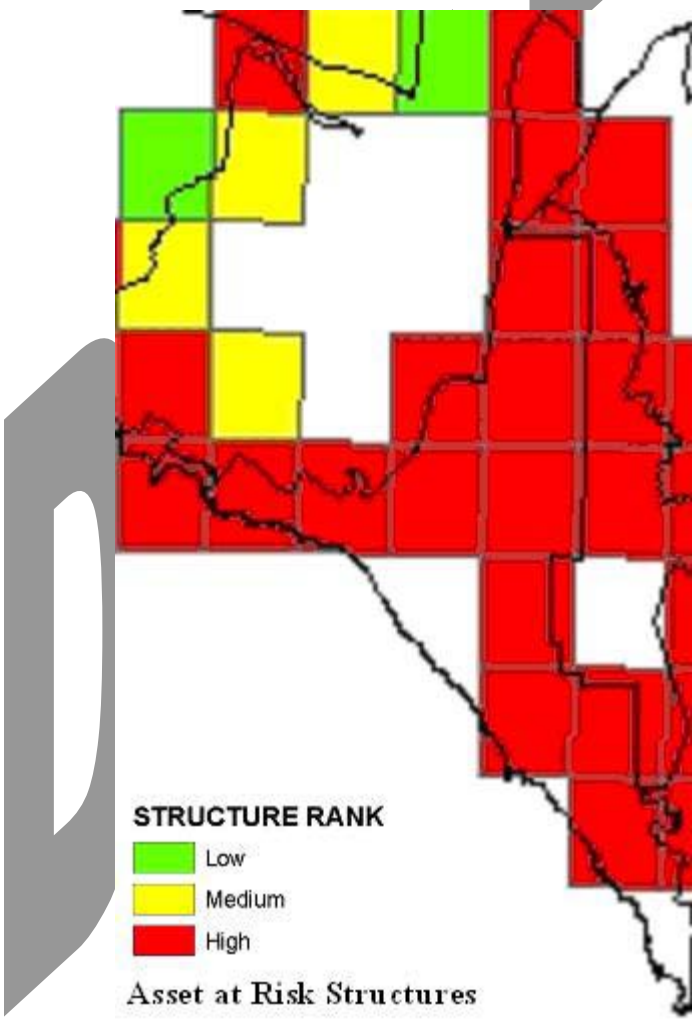
For the statewide analysis, CAL FIRE developed a methodology where the asset ranking is created by combining, 1) the value of housing, as measured by density, with 2) susceptibility to loss (exposure). Exposure is a measure of the likelihood of structures actually being destroyed or damaged, if a large fire event occurs. The following is a suggested list of factors that could contribute to exposure.

Building materials/roof type
Accessibility of fire control equipment to housing locations
Slope conditions affecting housing
Vegetation conditions immediately surrounding housing (fuel type, clearance, etc.)
Presence and timing of past pre-fire projects

Together, density and exposure provide a measure (rank) of overall potential loss of structure values if a large fire event occurs. OCFA adopted the same methodology for the Laguna Beach Fire Plan.

The following table shows the ranking criteria for the structures AAR

	EXPOSURE			
HOUSING DENSITY	**0**	**Low**	**Med**	**High**
Very High	0	M	H	H
High	0	L	M	H
Medium	0	0	L	M
Low	0	0	0	L
Not ranked	0	0	0	0



1.1.2.9. Non-Game Wildlife

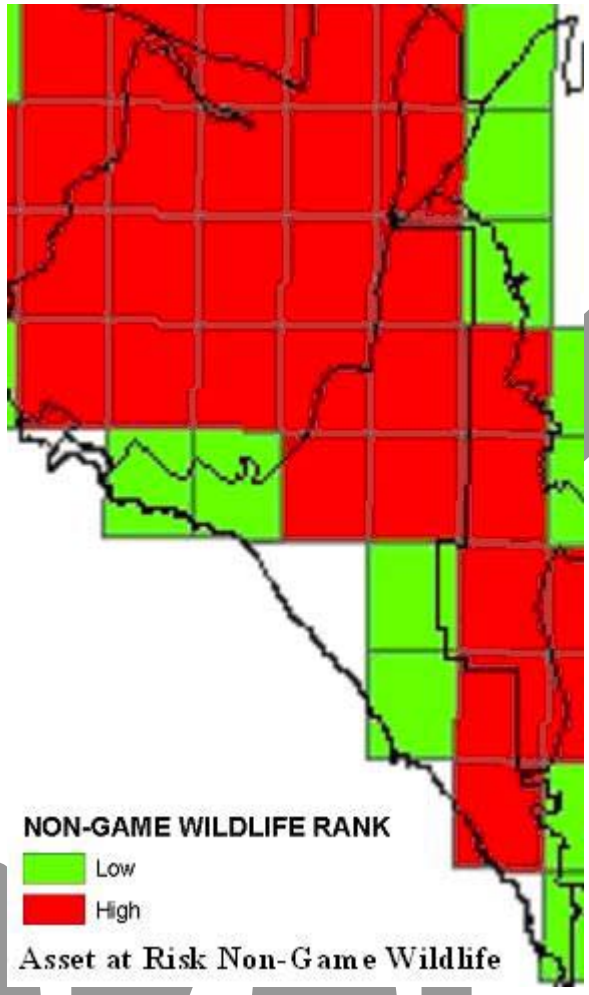
For the statewide analysis, CAL FIRE identified specially designated critical wildlife areas, which include:

CDFG Wildlife Areas and Ecological Reserves
USFWS refuges
NPS preserves
NGO/land trusts (e.g. The Nature Conservancy)

These areas are assigned a rank based on fire susceptibility as reflected by the fuel rank.

RANK	**FEATURE**	**FUELS RANK (RANKFUEL)**
High	Critical designated non-game wildlife area	Very High
High	Critical designated non-game wildlife area	High
Low	Critical designated non-game wildlife area	Moderate
None	None	All

This methodology does not capture important wildlife areas that may have been identified such as T&E locations, spotted owl nest sites, etc. The USFS and BLM have identified many of these areas within their jurisdictions. Additional work is required to obtain, analyze, and rank these additional data sources.



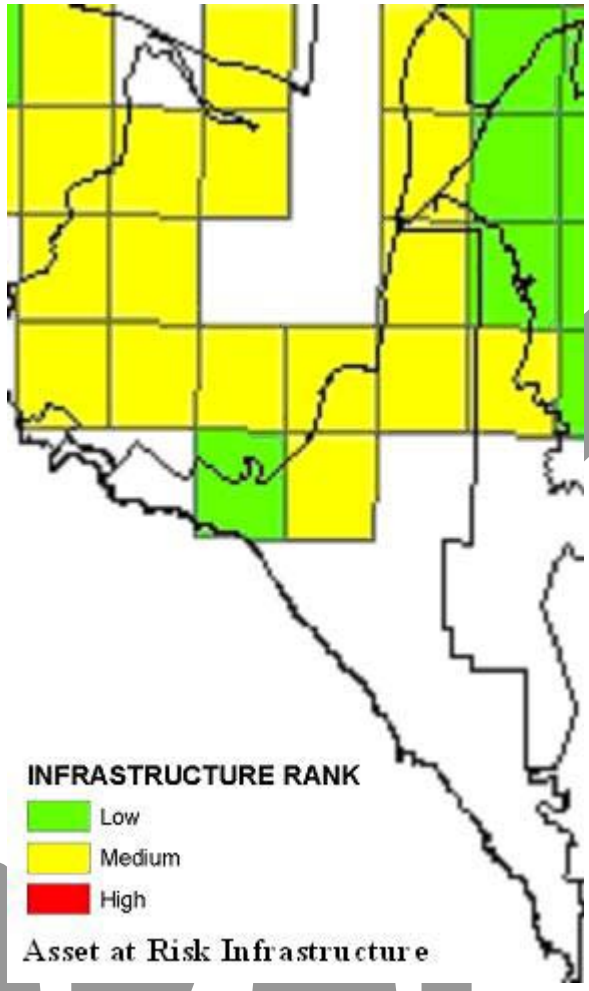
1.1.2.10. Infrastructure

Numerous components of infrastructure contribute to the delivery of emergency services and the economic well being of different regions and localities. This includes power delivery and communications sites susceptible to extended loss of service due to fire. Interruption of these services is a public safety as well as a public welfare issue.

Initial fire plan analysis data will include: a) electrical transmission lines and b) repeater sites.

All quad 81st containing a transmission line are ranked based on the following table.

RANK	FEATURE	FUEL RANK
High	Transmission line	High
Medium	Transmission line	Medium
Low	Transmission line	Low



1.1.2.11. Ecosystem Health

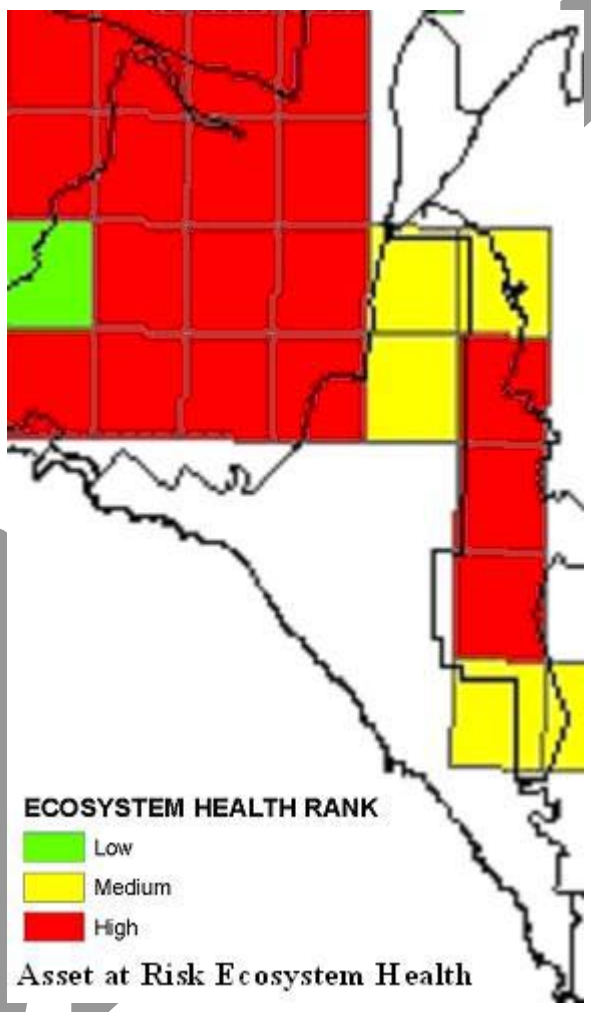
The concept of "condition class" is used to rank cells based on potential ecological damage from a severe fire event. Cells that are assigned condition class 3 typically diverge significantly from the historic fire return interval, resulting in fuel conditions that could promote ecological damage (e.g. mortality within larger tree sizes, soil impacts). Condition class 2 areas have the potential for damage due to moderate divergence from historic return intervals. Condition class 1 refers to areas that are basically within the historic range of fire return interval.

Highest treatment priority will typically be assigned to class 3 areas. Within these areas, project design is critical (e.g. fuel reduction method and timing of treatments) in order to minimize ecological damage.

Class 2 areas are also potential targets for treatment. Fuel reduction projects can prevent these areas from either degrading into condition class 3, or in a worst case being damaged by a severe fire event.

The following table shows the ranking method for ecosystem health, which uses the condition class as a rank.

RANK	CONDITION CLASS
High	3
Medium	2
Low	1
None	Non-fuel



1.1.3. Fuels

Vegetation found within Laguna Beach include annual grasses, woodland, desert brush, riparian, timber, coastal sage scrub and chaparral. Chaparral is a mosaic of vegetation communities whose establishment is essentially determined by fires and micro-site conditions. "Hard" chaparral, for the present purposes, is identified as vegetation dominated by Chamise, scrub oak or shrub forms of canyon live oak or interior live oak. It occupies an elevation position generally between low elevation coastal sage scrub (a form of "soft" chaparral) and higher coniferous areas.

1.1.3.1. Fuel Dynamic Pathways

Fire history plays an important role in modifying fuel model assignments in recently burned areas. FRAP developed a method to reflect changes in surface fuel characteristics resulting from past fires, and to account for fuel changes as burned areas regrow. GIS analysis assigned new surface fuel models based on the time since last burned. This process is called the "Fuel Dynamics Pathways."

Fuel dynamic pathways can be simple (e.g., change anything burned in the last 15 years to model 14) or they can be more complex. Below is an example of more complex "fuel dynamic pathways" for areas within Laguna Beach. This table shows that brush fuel models 4, 5, and 6 regrow differently on north and south slopes. (Note that north and south slopes do not differentiate other fuel models.) After a fire on south slopes, for example, fuel models 4, 5, and 6 stay in a model 1 for the first 3 years. After 3 years of regrowth, brush begins to return, reducing wind speeds and adding to fuel loading, producing a typical fuel model 2. Because north slopes are typically wetter, they often have less severe fire and provide for faster regrowth conditions than south slopes. In the example below, brush models on north slopes return immediately (0 -10 years) to model 5, bypassing the grass model phase experienced on south slopes.

Fuel model pathways after wildfire for Laguna Beach.
Models 4, 5, and 6 (brush types):
South slope:
0-3 years since burn model 1
3-16 years since burn model 2
17-25 years since burn model 5
26-40 years since burn model 6
40+ years since burn model 4
North slope:
0-10 years since burn model 5
11-35 years since burn model 6
35+ years since burn model 4
Model 1 (grass):
no change due to fire

Model 2 (pine grass):
0-10 years since burn model 1
10+ years since burn model 2

Models 8,9,10,11,12,13 (timber and any slash models):
0-2 years since burn model 1
2-10 years since burn model 14 (if replanted); otherwise model 2
11-15 years since burn model 5 (due to brush component and immature trees)
16+ years since burn original model

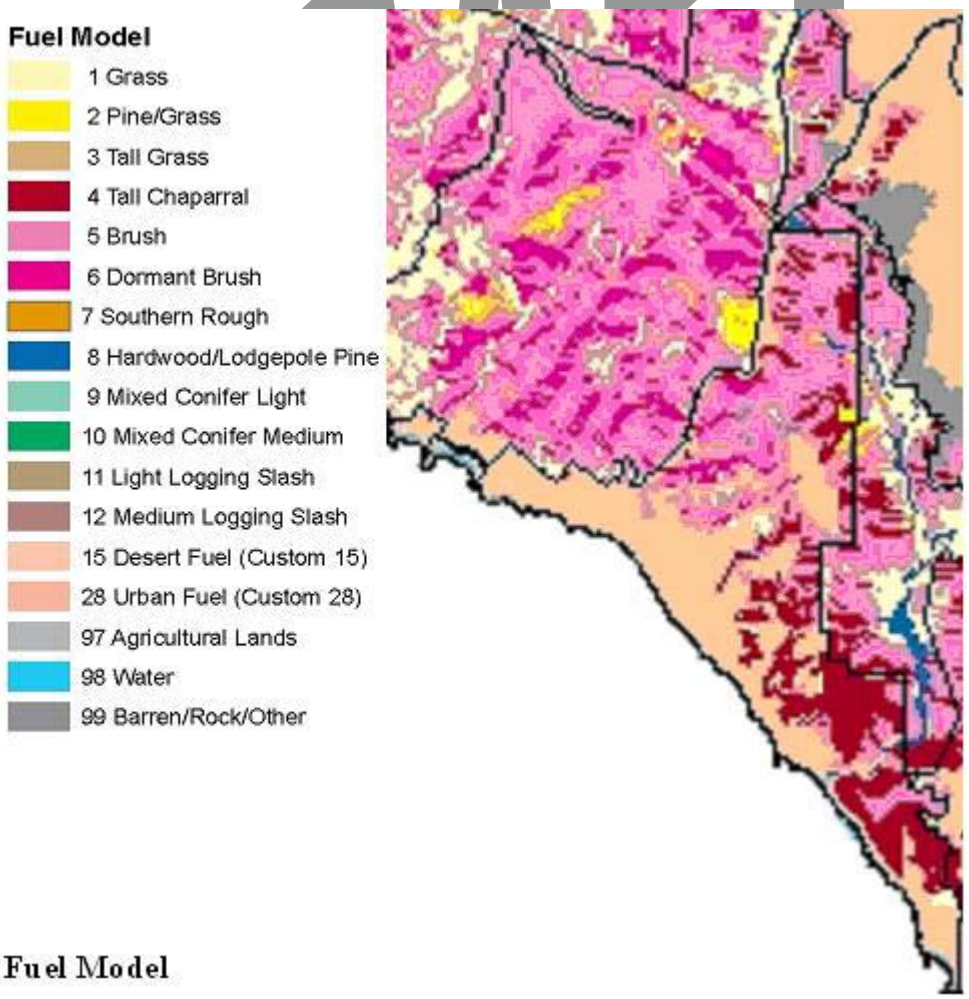
1.1.3.2. Crown and Ladder Fuel Characteristics

The method ascribes additional ladder and crown fuel indices to surface model polygons. If the vegetation data provide sufficient structural detail, the method imputes these additional indices

from those data. If the vegetation data lack structural detail, the method imputes indices based on the fuel model.

The ladder and crown fuel indices convey the relative abundance of these fuels. The indices take values ranging from 0 to 2, with 0 indicating "absent," 1 representing "present but spatially limited" and 2 indicating "widespread." These indices contribute to understanding the probability that torching and crown fire would occur if the stand were subjected to a wildland fire under adverse environmental conditions.

Based on the above methodology a GIS layer produced a fuel hazard ranking by changing the base map to reflect surface fuel characteristics as a result from past fires, and to account for fuel changes as burned areas re-grow. A study will be performed to evaluate post-fire fuel conditions based on comparisons of pre-fire fuel models and the span of time, since the fire occurred. The results will be sent to CAL FIRE's FRAP division to establish future crosswalks. Crosswalk methodology assesses the amount and extent of California's forests and rangelands, analyzes their conditions, and identifies alternative management and policy guidelines. This method updates the base map by overlaying fire perimeters on the fuel types, calculating the span of time since the fire for each burned area, and then changes the fuel model within the burned area according to the crosswalk.



Fuel Model

1.1.3.3. Hazardous Fuels

Assets have a high likelihood of being destroyed in chaparral, grass, and transition fuel types. The annual grasses support fast moving but lower intensity fires. The coastal sage scrub supports fast moving fires with higher intensities. The chaparral fuels sustain very high intensities and spotting problems.

Again, GIS thematic layers have been developed to determine the hazardous fuels throughout Laguna Beach. The first layer development included vegetation coverage from the most recent and detailed vegetation composition as well as structure information. Vegetation data was obtained from the CAL FIRE FRAP and from a variety of other sources and merged together to provide a complete, albeit heterogeneous, coverage map. Additionally, varieties of crosswalk methodologies from previous statewide projects were incorporated to filter the vegetation coverage and translate the data to a Fire Behavior Prediction System (FBPS) fuel model. Orange County Fire Authority supplemented this by a crosswalk of data from the Cleveland National Forest, Orange County vegetation mapping program and the GAP Analysis program of the U.S. Fish and Wildlife Service in defining the County's fuel model coverage. This method produced a fine-grained portrayal of surface fuel types as the second layer.

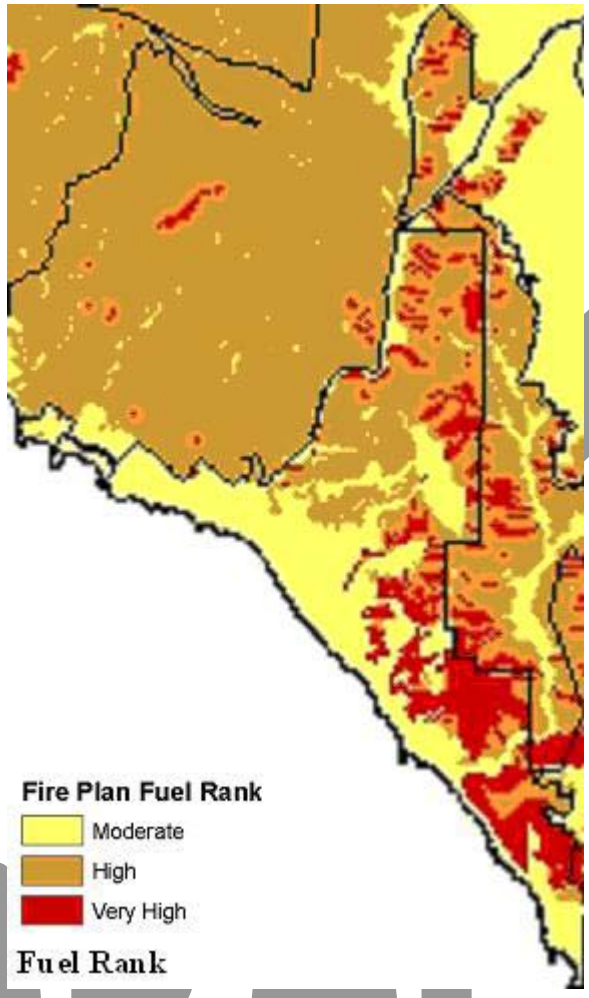
Fuel hazard ranking methodology assigns ranks based on expected fire behavior for unique combinations of topography and vegetative fuels under given severe weather conditions (wind speed, humidity, and temperature). The ranking procedure is best described in a formula:

Fuel Model + Slope = Surface Ranking

Then

Surface Rank + Ladder Index + Crown Index = Hazard Ranking

Throughout California, the Hazard Rank is broken into three (3) categories: Moderate, High, and Very High. Within Laguna Beach, the categories are Moderate to represent urbanized areas, High to represent wildland urban interface and Very High representing the wildland areas.



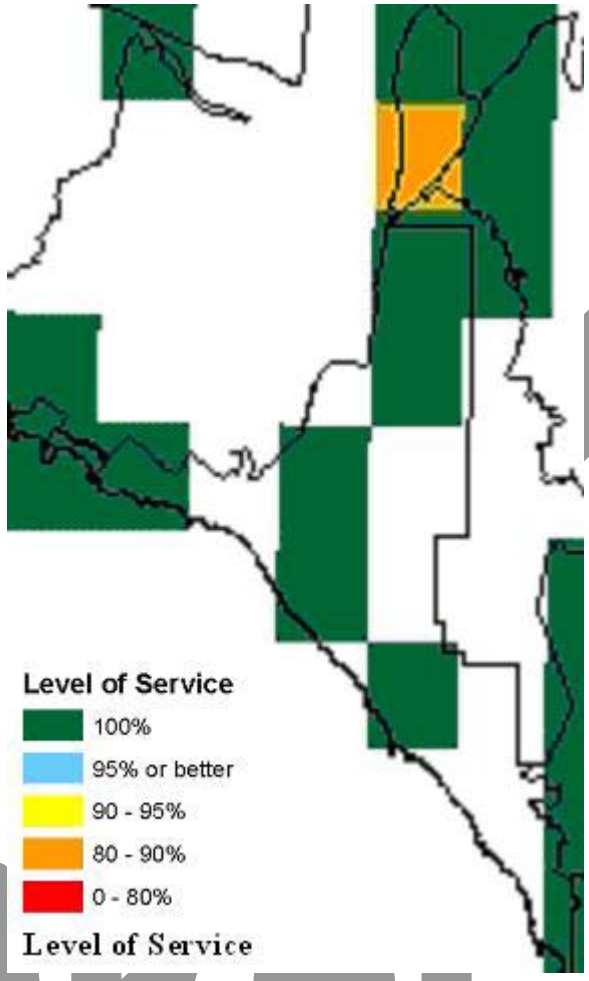
1.1.4. Level of Service

The Level of Service (L.O.S.) rating used in this plan represents the number of incidents where initial attack efforts succeeded. Successful initial attack is defined in terms of the amount of resources needed to suppress the fire within an acceptable size of 100 acres or less, the level of resource commitment, acceptable suppression cost, and minimal damage to assets at risk.

The following maps graphically indicate the Level of Service ranking for the County:

- Initial Attack Fire Workload
- Level of Service

Fire Workload



1.2. W.A.F.L. (Weather, Assets at Risk, Fuels, Level of Service)

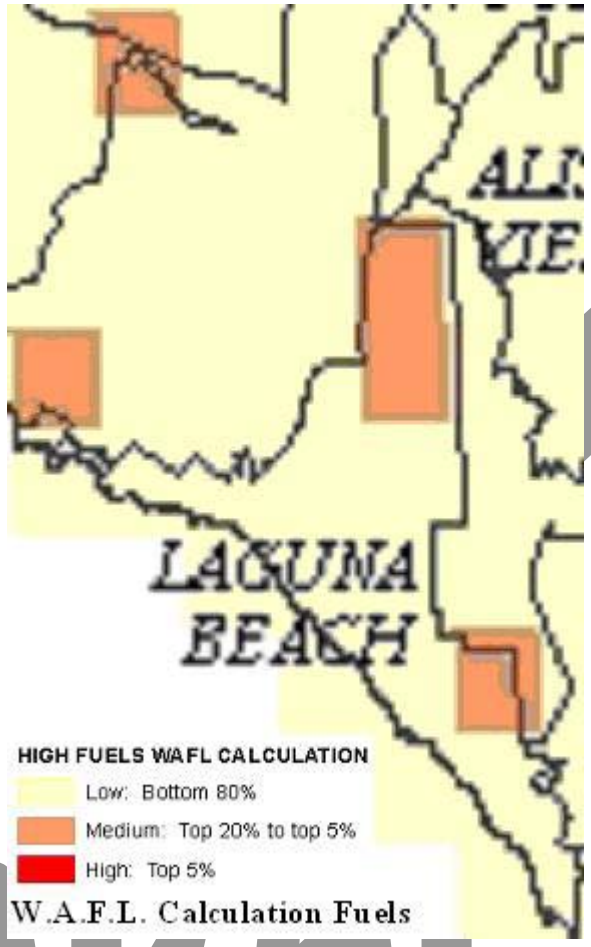
The W.A.F.L. calculator is a Fire Plan tool that will combine weather, assets at risk, fuels, and level of service (LOS). Based on the weighted value entered by the user into the calculator, the four components will result in a High, Medium, and Low ranking. The calculated results will focus the user to high value, high risk areas with severe fire weather and a demonstrated low level of service.

Each of the four W.A.F.L. components can be weighted to increase or decrease its importance. The W.A.F.L. calculator will either add up the scores for each of the four fields or count the number of high scores and then multiply the scores by their weights to arrive at a final score. The user then must determine how to break down the final scores into high, medium, and low rankings. These categories are determined by percentile breakdowns of the final W.A.F.L. scores.

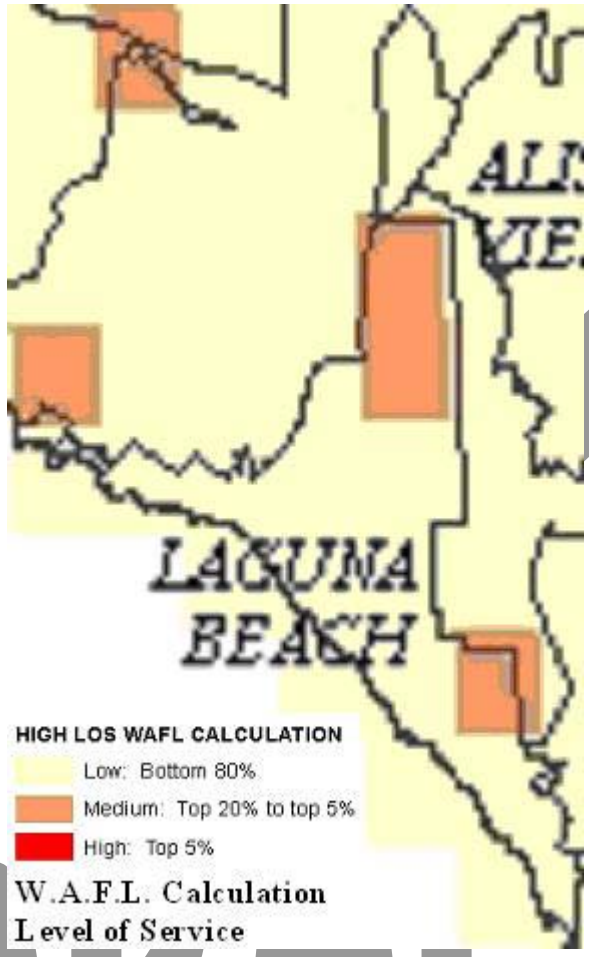
The following maps are examples of the various calculations that can be run using the Fire Plan tools provided by CAL FIRE. To illustrate the dynamic process of the Fire Plan tools W.A.F.L. calculator, the first map displays the results when the four components have been given an equal weighted value. The following four maps display the results when each component is given a separate high weighted value.

Weather component is given a weighted value of 5 (high) and the other 3 components are given a value of 1 (low).

Assets at Risk component is given a weighted value of 5 (high) and the other 3 components are given a value of 1 (low).



Fuels component is given a weighted value of 5 (high) and the other 3 components are given a value of 1 (low).



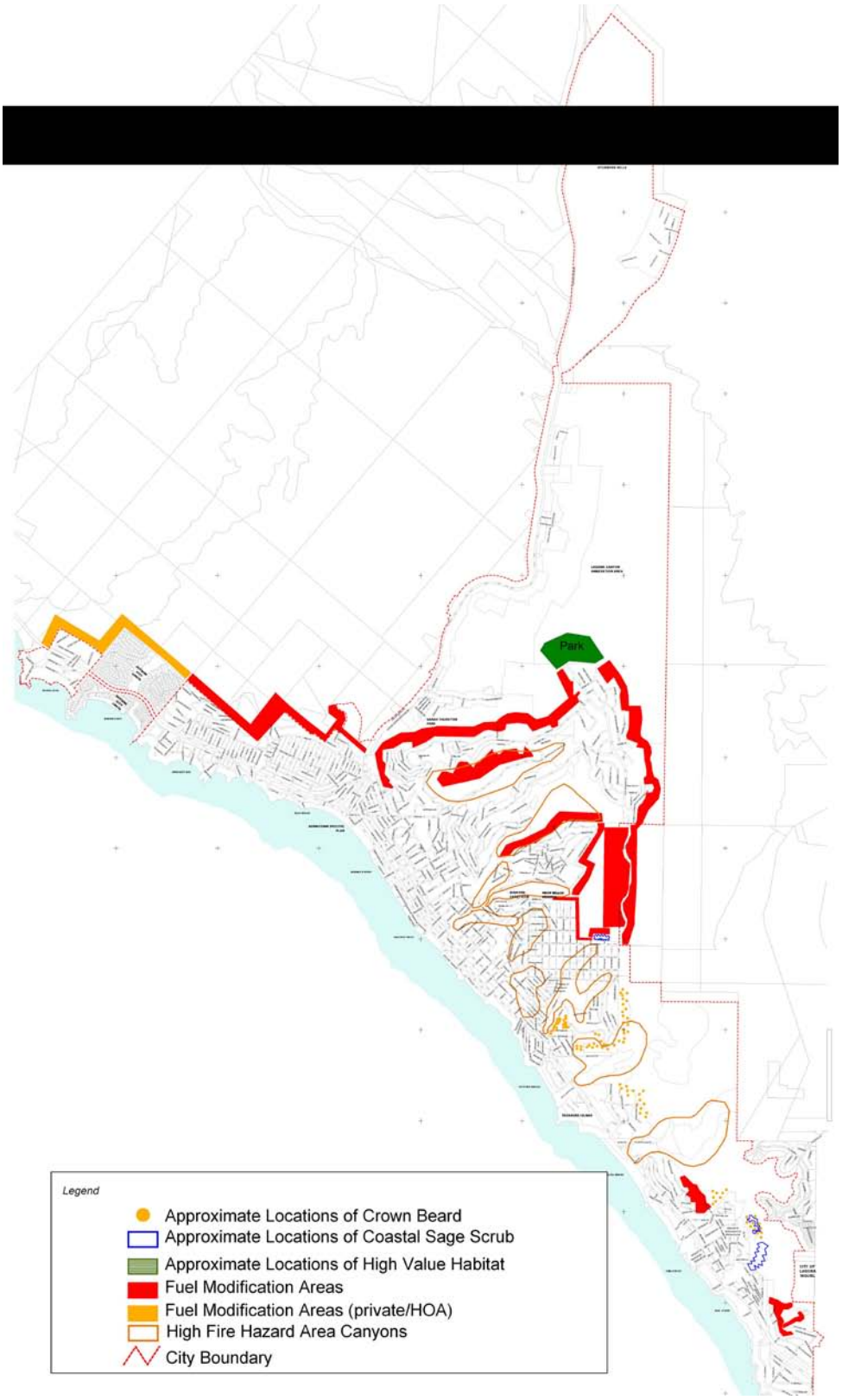
Level of Service component is given a weighted value of 5 (high) and the other 3 components are given a value of 1 (low) (Orange County Fire Authority, 2005).

1.3. Preferred Treatment Methods

The Fire Prevention Division manages the daily fire prevention activities and inspections of the engine companies, the plan review and new construction process, supervises the fire investigators, as well as oversees the vegetation management programs. The vegetation management program is divided into two sub-divisions: fuel modification and weed abatement. The fuel management program consists of approximately 1,500 acres surrounding the exterior of the City, along the open wildland areas, where vegetation is reduced creating fuel breaks to protect residential structures.

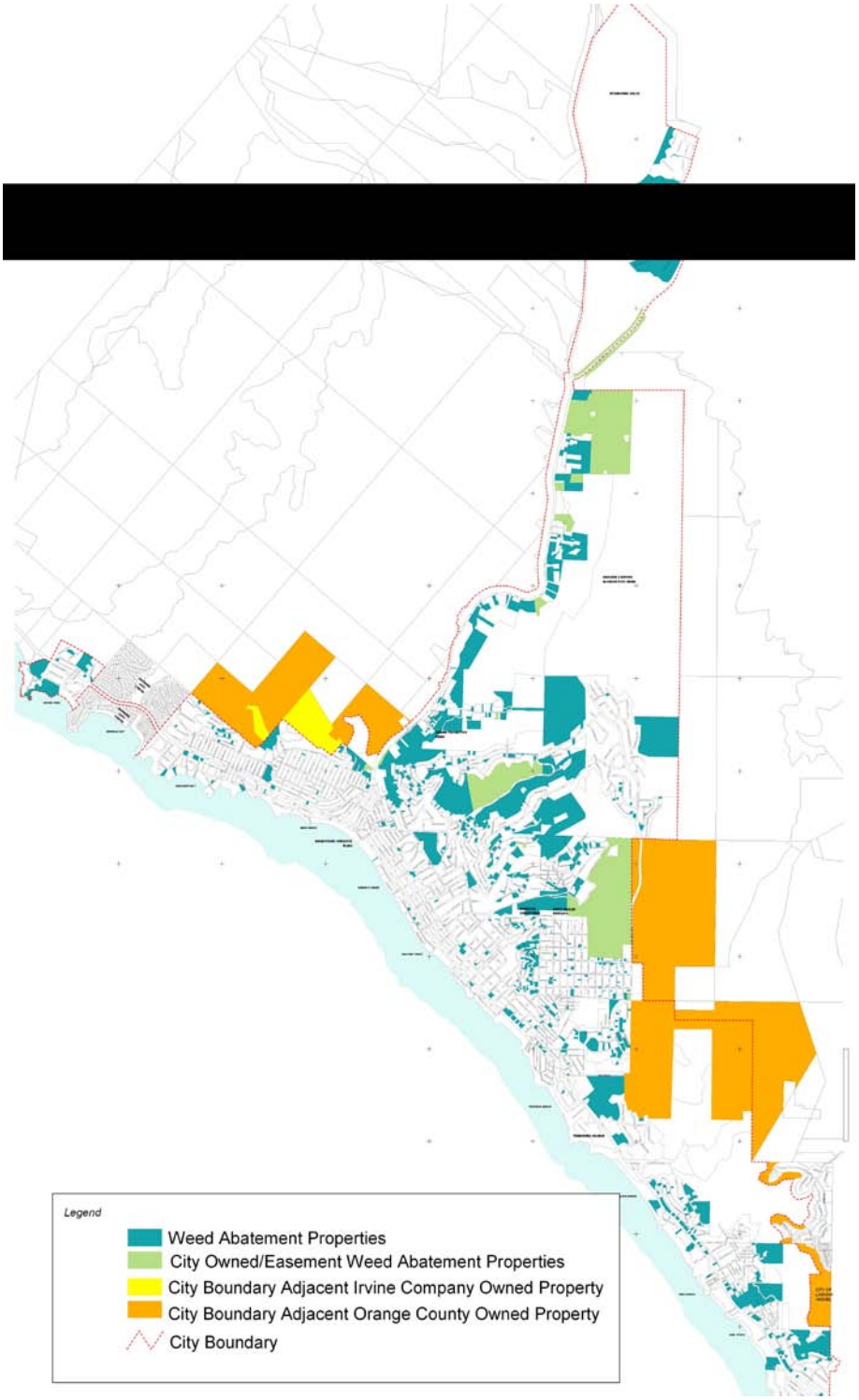
1.3.1. Fuel Modification Areas

The fuel modification program is accomplished and maintained through the use of goats.



1.3.2. Weed Abatement Properties

The weed abatement program reduces fire hazards that result from uncontrolled growth of vegetation on private properties.



For the latest fire analysis and recommendations, please contact the City of Laguna Beach or the Orange County Fire Authority.

2. FLOODS

The following flood analysis is prepared utilizing the *Emergency Management Plan* (1997) in conjunction with the Laguna Beach Police Department.

The City of Laguna Beach is vulnerable to seasonal flooding as a result of substantial winter rainstorm activity and increased upstream urban runoff. A flood can be defined as a temporary rise in stream flow that results in water overtopping its banks and inundating areas adjacent to the stream or channel not normally covered with water.

2.1. History of Floods

Historically, floods causing significant structural damage have occurred in Laguna Canyon in 1937, 1938, 1941, 1966, 1978, and 1983. As recently as March 1995, the central downtown business district was inundated with torrents of runoff. Stores were flooded, the downtown was inundated with mud and debris, the City's Animal Control building was damaged, and a portion of Main Beach Park and boardwalk was washed away. In addition, the abnormally heavy rains were also responsible for saturated and destabilizing hillsides, resulting in landslides.

The Laguna Beach Safety Element has analyzed the flood potential in Laguna Beach as existing in the form of temporary flashfloods resulting from heavy rains and wave run-up during a high tide situation.

Most of the flash flood activity is isolated along the canyons, the floors of which act as runoff channels for the watershed above. This is exacerbated by inland development, which sends its urban runoff into spillways that feed into Laguna Canyon and Aliso Creeks to the Pacific Ocean. Drainage resulting from flash floods is more erosive than inundative in nature. With the exception of Laguna, Bluebird, and Aliso Canyons, most flash flood conditions in Laguna Beach are short-lived due to the limited size of the available watershed.

In general, three separate and distinct types of inundation are known to exist in Laguna Beach. **Flood inundation** hazards are those associated with major atmospheric rainstorm events that result in flooding due to overflow of nearby stream courses or inadequacies in local storm drain facilities. **Facility inundation** hazards are those associated with the potential failure of water holding facilities such as reservoirs built before earthquake and seismic safety standards. The third inundation hazard is **mud and debris flow** that may occur during the rainy season.

Laguna Beach is also vulnerable to flooding because of **wave run-up**. This typically occurs because of large swells produced by storms at sea combining with high tide conditions. Approximately every 10 to 15 years, waves wash up on Pacific Coast Highway between Broadway and Ocean Avenue. Wave run-up is especially damaging to the residences on Victoria and El Morro beaches. The water and debris left by waves typically cause no damage to the commercial area; however, traffic is blocked along Coast Highway. Wave run-up damage occurred in the downtown commercial area in 1929. In 1987, the boardwalk and lifeguard tower on Main Beach Park was damaged by a wave run-up condition that also damaged several oceanfront, condominium residences at Blue Lagoon and Lagunita.

2.2. Storm Drain Facilities

A majority of the City's existing storm drain infrastructures are designed for a 25-year flood. It is, therefore, inadequate for the more generally accepted standard of 100-year flood. The City also has some natural drainage courses. In some cases, these major natural drainage courses drain into improved drainage facilities.

2.2.1. Laguna Canyon Channel

The existing channel from the Pacific Ocean to the GTE Corporation maintenance yard in Laguna Canyon is an improved, concrete-lined facility. North of the GTE yard, the channel becomes unimproved and natural and meanders through private property.

Neither the existing improved channel nor the natural channels are capable of conveying the discharge from a 100-year flood. The City is currently conducting an analysis of alternatives to improve public safety and reduce flooding in Laguna Canyon and the Downtown area. The primary goal of this study is to control floodwaters by storing them in retention, detention and filtering basins, which drain out when the downstream storm drains are no longer overtaxed. (For a detailed breakdown of drainage capacity in Laguna Canyon, see page 41)

2.2.2. Boat Canyon

The Boat Canyon storm drain extends from Hillcrest Drive to the Pacific Ocean. This drain has been designed to carry the 100-year flood frequency, but a high debris factor may cause local flooding at the inlet at the rear of Riddle Field.

2.2.3. Bluebird Canyon

Bluebird Canyon is a graded greenbelt channel through its lower reach and a natural canyon in its upper reach. The storm drain from Glenneyre Street tot eh Pacific Ocean was designed to carry the 100-year frequency floods.

2.2.4. Hidden Valley Canyon

Hidden Valley Canyon has surface runoff that runs down Park Avenue to Wendt Terrace. The Master Plan of Drainage proposes the extension of a pipe to Hidden Valley to resolve this problem.

2.2.5. Aliso Canyon

Aliso Creek is a natural, unlined channel. The creek bed cuts through privately owned property and has a recent history of flooding along the Ben Brown Golf Course.

2.3. Existing Drainage System Capabilities in Laguna Canyon

Location	Estimated Capacity	Ultimate 100-Year Event
Ocean to Forest Avenue	Varies from 700 To 2000	7700
Forest Avenue to Canyon Acres Dr.	Varies 1200 to 2100	7500
Canyon Acres Dr. to 2900 feet Upstream	1920 1840	6900
2900 feet to 4,700 feet upstream of Canyon Acres	1840	6900
4,700 feet upstream from Canyon Acres to GTE	2850*	6700
GTE to El Toro Road	300-400	6100
El Toro Road to San Joaquin Hills Transportation Toll Road	300-400	2390**
*Inlet capacity 1840 cfs **Q25		

Information obtained from a report on Laguna Canyon Drainage System Study by Boyle Engineering, 9/29/94

For the latest flood analysis, please contact the City of Laguna Beach.

3. TSUNAMIS

The tsunami evacuation plan is prepared utilizing the *Emergency Management Plan* (1997) in conjunction with the Laguna Beach Police Department and the Marine Safety Department.

Tsunamis (pronounced soo-nah-mee) are an infrequent, yet serious hazard in the Pacific. A tsunami is a series of traveling ocean waves of great length and long period, generated by disturbances associated with earthquakes in oceanic and coastal regions. As the tsunami crosses the deep ocean, its length from crest to crest may be a hundred miles or more, its height from trough to crest only a few feet. It cannot be felt aboard ships in deep water and cannot be seen from the air. However, in deep water, tsunami waves may reach speeds exceeding 600 miles per hour.

As the tsunami enters the shoaling water of coastlines in its path, the velocity of its waves diminishes and wave height increases. It is in these shallow waters that tsunamis are a threat to life and property, for they can crest to heights more than 10 feet and strike with deviating force.

3.1. Warning System

The tsunami warning system in the United States is a function of the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service. Development of the tsunami warning system was impelled by the disastrous waves generated in Alaska in April 1946, which surprised Hawaii and the West Coast, taking a heavy toll in life and property. The Pacific Tsunami Warning Center was established in Hawaii in 1948. A 1964 Alaskan earthquake

triggered a tsunami which hit Crescent City in Northern California resulted in the Alaska Tsunami Warning Center in Palmer, Alaska. This facility is the nerve center for an elaborate telemetry network of remote seismic stations in Alaska, Washington, Colorado, California, and other location. Tide data from Canada, 'Washington, Oregon and California are available via telephone, teletype and computer readout.

3.2. Watch and Warning

When a large earthquake occurs near the coast in the North Pacific, seismologists at the Alaska Tsunami Warning Center determine its location (epicenter) and magnitude. If the earthquake is considered great enough to generate a tsunami, the Center will issue and immediate Tsunami Warning for the area near the epicenter. This warning is issued through state emergency service offices, Coast Guard, military, FAA, National Weather Service and other agencies. A Tsunami Watch is issued to the rest of Alaska, Canada and West Coast states alerting the public to the possible threat of a tsunami. If a tsunami is detected by tide stations near the epicenter, the warning is expanded to the entire coastline. If no wave is generated, the warning will be cancelled.

3.3. Local Tsunamis

Tsunamis can be categorized as local and Pacific-wide. Typically, a Pacific-wide tsunami is generated by major, vertical, ocean bottom movement in offshore deep trenches. A local tsunami can be a component of the Pacific-wide tsunami in the area of the earthquake or a wave that is confined to the area of generation within a bay or harbor and caused by movement of the bay itself or landslides. The local tsunami may be the most serious threat because of the lack of warning time before reaching shore.

Therefore, it is imperative that those people near shore who feel a strong earthquake should move to higher ground immediately. A strong quake is one that last 30 seconds or longer and causes difficult in standing. The Alaska Tsunami Warning Center will begin issuing its warning to the West Coast in approximately 25 minutes, but that is not quick enough for a local tsunami, so when in doubt, areas should be evacuated.

A tsunami threat to the City of Laguna Beach is considered low to moderate.

3.4. TsunamiReady Guidelines

The TsunamiReady Guidelines are prepared utilizing the *TsunamiReady Recognition Programs* (2004) in conjunction with the Laguna Beach Police Department.

Guidelines for participation in the TsunamiReady Program are given in the following table. Each guideline is fully discussed following the table. Four community categories (based upon population) are used for developing appropriate recognition guidelines.

Guidelines	Population			
	< 2,500	2,500 - 14,999	15,000 - 40,000	> 40,000
Guideline 1: Communications and Coordination				
Established 24-hour Warning Point (WP)	X*	X*	X	X
Established Emergency Operations Center (EOC)	X*	X*	X	X
Guideline 2: Tsunami Warning Reception				
Number of ways for EOC/WP to receive NWS tsunami messages. (If in range, one must be NWR receiver with tone alert; NWR-SAME is preferred)	3	4	4	4
Guideline 3: Local Warning Dissemination				
Number of ways EOC/WP can disseminate warnings to public	1	2	3	4
NWR-SAME receivers in public facilities	X	X	X	X
For county/borough warning points, county/borough communication network that ensures information flow among communities	X	X	X	X
Guideline 4: Community Preparedness				
Number of annual tsunami shelter/area in safe zone	1	2	3	4
Designate/establish tsunami shelter/area in safe zone	X	X	X	X
Designate tsunami evacuation areas and evacuation routes, and install evacuation route signs	X	X	X	X
Provide written, locally specific, tsunami hazard response material to public	X	X	X	X
Schools: Encourage tsunami hazard curriculum, practice evacuations (if in hazard zone), and provide safety material to staff and students.	X	X	X	X
Guideline 5: Administrative				
Formal tsunami hazard operations plan	X	X	X	X
Biennial meeting/discussion between emergency manager and NWS	X	X	X	X
Visit by NWS official to community at least every other year	X	X	X	X

* For cities or towns with less than 15,000 people, a 24-hour warning point and EOC are required; however, another jurisdiction within the county may provide that resource.

3.4.1. Guideline 1: Communications and Coordination Center

A key to effective hazards management is effective communication. This is especially true in tsunami emergencies, since wave arrival times may be measured in just minutes. Such a "short fused" event requires an immediate but careful, systematic and appropriate response. To ensure such a proper response, communities must have established the following:

1. 24-Hour Warning Point. To receive recognition under the TsunamiReady program, an agency needs to have a 24-hour Warning Point (WP) able to receive NWS Tsunami information and provide local reports and advice. Typically, this might be a law enforcement or fire department dispatching point. For cities or towns without a local dispatching point, a county/borough agency could act for them in that capacity. The warning point needs to have:

- 24 hour operations
- Warning reception capability
- Warning communication/dissemination capability
- Ability and authority to activate local warning system(s)

2. Emergency Operations Center. Agencies serving jurisdictions of more than 2,500 people will need an emergency operations center (EOC). It must be staffed during tsunami events to execute the warning point's tsunami warning functions. Summarized below are tsunami-related roles of an EOC:

- Activate based on predetermined guidelines related to NWS tsunami information and/or tsunami events
- Staffed by emergency management director or designee
- Possess warning reception/dissemination capabilities equal to or better than the warning point
- Ability to communicate with adjacent EOCs/Warning Points
- Ability to communicate with local NWS office.

3.4.2. Guideline 2: Tsunami Warning Reception

Warning points and EOCs each need multiple ways to receive NWS Tsunami Warnings. TsunamiReady guidelines to receive NWS warnings in an EOC/WP require a combination of the following, based on population:

- NOAA Weather Radio (NWR): receiver with tone alert. Specific Area Message Encoding (SAME) is preferred. Required for recognition only if within range of transmitter
- NOAA Weather Wire drop: Satellite downlink from NWS.
- Emergency Management Weather Information Network (EMWIN) receiver: Satellite feed and/or VHF radio transmission of NWS products
- Statewide Telecommunications System: Automatic relay of NWS products on statewide emergency management or law enforcement system
- Statewide Warning Fan-out System: State authorized system of passing message throughout warning area
- NOAA Weather Wire via Internet NOAAPort Lite: Provides alarmed warning messages through a dedicated Internet connection
- Direct link to NWS office: For example, amateur or VHF radio
- E-mail from Tsunami Warning Center: Direct e-mail from Warning Center to emergency manager
- Pager Message from Tsunami Warning Center: Page issued from Warning Center directly to EOC/WP
- Radio/TV via Emergency Alert System: Local radio/TV or cable TV

- US Coast Guard Broadcasts: WP/EOC monitoring of USCG marine channels
- National Warning System (NAWAS) drop: FEMA-controlled civil defense hotline

3.4.3. Guideline 3: Warning Dissemination

1. Upon receipt of NWS tsunami warnings or other reliable information suggesting a Tsunami is imminent, local emergency officials should communicate the threat to as much of the population as possible. Receiving TsunamiReady recognition requires having one or more of the following means of ensuring timely warning dissemination to citizens (based on population):

- A community program subsidizing the purchase of NWR.
- Outdoor warning sirens
- Television audio/video overrides
- Phone messaging (dial-down) systems
- Other locally controlled methods, e.g., local broadcast system or emergency vehicle sirens.

2. Once NWS Tsunami Warnings are received, or local information suggests an imminent tsunami threat, the local emergency officials should communicate with as much of the population as possible. To be recognized as TsunamiReady, a community must have NOAA Weather Radio in the following facilities:

Required Locations:
- 24-hour Warning Point
- Emergency Operations Center
- City Hall
- School superintendent office or equivalent

Recommended Locations:
- Courthouses
- Public libraries
- Hospitals
- All schools
- Fairgrounds
- Parks and recreation areas
- Public utilities
- Sports arenas
- Transportation departments
- Nursing Homes/Assisted Living
- Harbors

Receivers with SAME capability are preferred (this is required for recognition only if locations are within range of NWR transmitter). In addition, recognition will be contingent on having one or more of the following means (based on population) of ensuring timely warning dissemination to citizens:

- Cable television audio/video overrides.
- Local Flood warning systems with no single point of failure.
- Other locally controlled methods like a local broadcast system or sirens on emergency vehicles.
- Outdoor warning sirens.

3. Counties/Boroughs Only: A county/borough-wide communications network ensuring the flow of information among all cities and towns within its borders. This would include provision of a warning point for the smaller towns, and fanning out of the message as required by state policy. Critical public access buildings should be defined by each community's tsunami warning plan.

3.4.4. Guideline 4: Awareness

Public education is vital in preparing citizens to respond properly to Tsunami threats. An educated public is more likely to take steps to receive tsunami warnings, recognize potentially threatening Tsunami events, and respond appropriately to those events. Communities seeking recognition in the TsunamiReady program must:

1. Conduct or sponsor Tsunami awareness programs. Possible locations may include schools, hospitals, fairs, workshops, and community meetings (number of presentations per year is based on population).

2. Define Tsunami evacuation areas and evacuation routes, and install evacuation route signs.

3. Designate a Tsunami shelter/area outside the hazard zone.

4. Provide written Tsunami hazard information to the populace, including:
   - Hazard zone maps
   - Evacuation routes
   - Basic tsunami information

These instructions can be distributed through mailings, i.e, utility bills, within phone books, and posted at common meeting points such as libraries and public buildings throughout the community.

5. Local schools must meet the following criteria:
   - Encourage the inclusion of Tsunami information in primary and secondary school curriculums. NWS will help identify curriculum support material.
   - Provide an opportunity biennially for a Tsunami awareness presentation by the local NWS office and/or the local Emergency Manager.
   - Schools within the defined hazard zone must have Tsunami evacuation drills at least biennially.
   - Written safety material should be provided to all staff and students.
   - Have an earthquake plan.

3.4.5. Guideline 5: Administrative

No program can be successful without formal planning and a pro-active administration. To be recognized in the TsunamiReady Program:

1. A Tsunami warning plan must be in place and approved by the local governing body. This plan must address the following:
   - Warning point procedures
   - EOC activation criteria and procedures
   - Warning point and EOC personnel specification
   - Hazard zone map with evacuation routes
   - Procedures for canceling an emergency for those less-than-destructive Tsunamis

- Criteria and procedures for activation of sirens, cable television override, and/or local systems activation in accordance with state Emergency Alert System (EAS) plans, and warning fan-out procedures, if necessary
- Annual exercises.

2. Yearly visit/discussion with local NWS Office or Tsunami Warning Center personnel. Due to distance and other logistical constraint in the Alaska and Pacific Regions, this guideline can be met by a visit to the NWS office, phone discussion, or e-mail contacts.

3. NWS officials will commit to visit recognized communities, at least every other year, to tour EOCs/Warning points and meet with key officials.

For the latest TsunamiReady Guidelines, please contact the Department of Commerce, National Oceanic & Atmospheric Administration, National Weather Service. For the latest tsunami preparations, please contact the Laguna Beach Police Department.

4. EARTHQUAKES

The earthquake analysis is prepared utilizing the *Emergency Management Plan* (1997) in conjunction with the Laguna Beach Police Department.

The Laguna Beach area could be affected by several different earthquake faults within its proximity. The city is traversed by two major inactive faults: the Laguna Canyon and Temple Hills Faults. Studies indicate it is unlikely that these faults will experience activity in the near future since there is no record of faulting in historical times or in geologic record of the last 11,000 years.

However, Laguna Beach is situated near three dominant active fault systems: the Newport-Inglewood (three miles west), Whittier-Elsinore (20.5 miles northeast), and the San Jacinto (42.5 miles northeast). A greater distance, but also a potential for affecting Laguna Beach is the San Andrea Fault. However, there is little historical evidence of serious seismic activity emanating from the San Andrea in Southern Orange County.

The Newport-Inglewood Fault, located offshore of Laguna Beach, however, was responsible for a 4.3 earthquake centered near Laguna Beach on Oct. 27, 1969. The Newport-Inglewood Fault was also responsible for the magnitude 6.3 Long Beach Earthquake in 1933.

4.1. Major Seismic Hazards

Given its somewhat general proximity to active earthquake fault systems, the city could be faced with several major seismic hazards:

1. Ground Shaking
2. Ground Failure
3. Tsunamis
4. Seiches

4.1.1. Ground Shaking

The most widespread effect of earthquakes is "ground shaking." This is usually, but not always, the greatest cause of damage. Knowledge of earthquake-resistant design and construction has increased greatly in recent years, though much remains to be learned. The Modified Mercalli Intensity Scale describes damage associated with ground shaking.

4.1.2. Ground Failure

"Ground failure" is exhibited in the form of landslides, subsidence, liquefaction, and other surface and near-surface ground movements. The low-lying areas adjacent to Laguna Canyon and the central downtown business district would be most prone to liquefaction due, due primarily to its thick, soft water-saturated alluvial soils, and the presence of a high water table.

Here, the sediments lack the density and cementation of bedrock regions and the shaking is likely to be more intense. The effect of such liquefaction would be the tendency for objects having a specific gravity greater than water to become unstable and/or sink. Some road surfaces may become impassable. Earthquake-driven landslides are also possible, given the presence of local ancient landslide formations.

The effects of "ground displacement" (surface rupture) along a fault can be damaging, with as much as 30 feet of ground offset either vertically, horizontally, or both. Fortunately, the Newport-Inglewood Fault has not historically exhibited such faulting patterns at surface levels.

4.1.3. Tsunamis

A "tsunami" is a sea wave generated by a sub-marine earthquake, a major landslide, or volcanic eruption. It is a long, powerful, low sea wave, which as it meets land, may become a high, damaging force when affected by bottom topography. For Laguna Beach, the risk to the public safety from tsunamis has been evaluated and found to be extremely remote.

4.1.4. Seiches

A "seiche" is the sloshing of an enclosed body of water caused by seismic activity or land sliding. Due to the small surface area of the bodies of water within Laguna Beach, seiches do not represent a potential hazard to the public safety.

A secondary effect of a major earthquake could include Fire. Typically, earthquake-related fires occur as a result of broken gas line. Water mains and lines may also break due to ground movement. The combination of fires and a water shortage can seriously complicate the response to an earthquake.

4.2. Building Standards

Building and construction standards are an important factor when considering the odds for withstanding a major earthquake. Structures built prior to modern earthquake standards have a greater likelihood for damage in a major earthquake.

Laguna Beach has many homes built in the 1920s and 1930s, prior to the Long Beach earthquake and statewide seismic design standards. Many homes are wood frame, single-story residential structures, which are the most stable during an earthquake. However, some of these homes may

have been built before builders routinely bolted the structures to their foundations. The city has a voluntary program for homeowners to assist them in retrofitting their homes.

Unreinforced masonry construction was also prevalent for commercial structures in Laguna Beach during the 1920s. However, because of more stringent state and local seismic standards, nearly all commercial unreinforced masonry structures in Laguna Beach have been completely retrofitted in the last five years. The remainder must be completed by 1997.

It should be stressed that while new design standards may improve stability of structures, they do not make the structures absolutely earthquake proof. Depending on its proximity to the epicenter and the magnitude and prevalent soil conditions, no structure is entirely safe from earthquake damage.

4.3. Damage to Vital Public Services, Systems and Facilities

4.3.1. Major Hospitals

Laguna Beach has one major hospital (South Coast Medical Center) with a total 210 beds. Time would be vital to keep SCMC functioning. SCMC has its own disaster plan and operates under a Hospital Incident Command System.

4.3.2. Freeways and Roads

A major quake of a magnitude 7 or greater on the Newport-Inglewood Fault could cause Pacific Coast Highway to be blocked by severe pavement breakage or liquefaction failures. Bridges over PCH at Aliso Creek and Emerald Bay could suffer extensive damage. Likewise, the San Joaquin Hills Transportation Corridor overpasses at Laguna Canyon Road and El Toro Road could suffer damage. This could make entrance and exit into Laguna Beach difficult. It could also be expected that a major earthquake could trigger landslides, which could temporarily close local streets.

4.3.3. Utilities

4.3.3.1. Telephone Systems

Telephone systems will be adversely affected due to overload resulting from post-earthquake calls from both within and outside the area. In addition, the system itself could be lost or temporarily disrupted.

4.3.3.2. Water, Supply and Waste Disposal

The major aqueducts supplying water to our region—the Colorado, California, and Los Angeles aqueducts—are expected to sustain damage causing temporary interruptions in outside water supply. The numerous major reservoirs in the Southern California regions will provide ample storage to meet demands during the time required for repairs. However, damage to water transmission lines, local storage reservoirs and pumping plans, as well as local distribution systems, will affect water availability and pressure. The absence of electrical power for extended periods will, in some areas, preclude water deliveries where pumping is necessary, even thought he conveyance facilities may be intact. Some areas could be dependent on tanker trucks to

provide basic water needs. Citizens are encouraged to maintain their own temporary water supply for drinking and sanitation purposes.

Sewage collection systems will sustain widespread damage, particularly in the low-lying areas. The City employs an emergency telemetry system to alert Public Works in a loss of power to its pump stations. The City also has a mobile generator that can provide power to a failed pump station in the even electricity is lost or disrupted.

4.3.3.3. Electric Power

Damage to power plants and their ancillary facilities in affected areas could result in the loss or temporary disruption of electrical service. Immediate concerns will focus on repairs necessary to restore power to areas of greatest need. Major restoration problems include repairs necessary to route power through the major substations, restoration of damaged and collapsed transmission line towers, reactivation of equipment at local substations and replacement of fallen poles, burned transformers, etc.

It is reasonable to assume that during some portion of the first 72-hour period following the earthquake, virtually all areas would experience some temporary loss of power. All critical facilities will require back-up generating equipment and emergency fuel supplies.

4.3.3.4. Natural Gas Service

Damage to natural gas facilities will consist primarily of 1) some isolated breaks in the major transmission lines and 2) innumerable breaks in mains and individual service connections within the distribution systems, particularly in the areas of intense ground shaking and/or ground failure. These leaks in the distribution system could affect portions resulting in a loss of service for extended periods.

4.4. Emergency Response Actions

All City departments are assigned specific functions as described in the Functional Responsibility Matrix. Each department will respond to, manage, and request mutual aid resource/personnel to respond to their assigned responsibilities.

Attachment 1
Modified Mercalli Intensity Scale

The first scale to reflect earthquake was developed by deRossi of Italy, and Forel of Switzerland, in the 1880s. This scale, with values from I to X, was useful for about two decades. A need for a more refined scale increased with the advancement of the science of seismology, and in 1902, the Italian seismologist, Mercalli, devised a new scale with a range from I to XII. The Mercalli Scale was modified in 1931 by American seismologists Harry O. Wood and Frank Neuman to take into account modern structural features:

I	(2)	Not felt except by a very few under especially favorable circumstances.
II	(2)	Felt by only a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.

III	(3)	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Vibration like passing truck. Duration estimated.
IV	(4)	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motorcars rock noticeably.
V	(4)	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken. A few instances of cracked plaster; unstable objects overturned. Pendulum clocks may stop.
VI	(5)	Felt by all. Many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
VII	(5-6)	Everybody runs outdoors. Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motorcars.
VIII	(6)	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great with poorly built structures. Heavy furniture overturned. Sand and mud ejected in small amounts. Charge in well water. Persons driving motorcars disturbed.
IX	(7)	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.
X	(7-8+)	Some well-built structures destroyed; most masonry and frame structures destroyed with foundation; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Water splashed (slopped) over the banks.
XI	(8+)	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and landslips in soft ground. Rails bent greatly.
XII	(8+)	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seem on ground surface. Lines of sight are distorted. Objects are thrown upward into the air.

ATTACHMENT 2 **MAJOR EARTHQUAKES IN THE USA 20TH CENTURY**

YEAR	AREA	MAGNITUDE	LIVES LOST	PROPERTY DAMAGE
1906	San Francisco	8.3	700-800	400 Million
1933	Long Beach	6.3	115	50 Million
1940	El Centro	7.1	9	6 Million
1952	Tehachapi	7.7	12	50 Million
1954	Eureka	6.6	1	2 Million
1957	San Francisco	5.3	0	1 Million
1964	Alaska	9.2	139	11.5 Million
1969	Santa Rosa	5.6	0	11 Million
1971	San Fernando/Sylmar	6.4	58	500 Million
1983	Coalinga	6.4	0	31 Million
1987	Whittier	5.9	8	358 Million
1989	San Francisco/Loma Prieta	7.1	63	6 Billion
1990	Upland	5.5	0	10.4 Million
1991	Sierra Madre	5.8	1	33.5 Million
1992	Landers/Big Bear	7.6/6.7	1	91.1 Million
1994	Northridge	6.8	57	13+ Billion

For the latest earthquake analysis, please contact the City of Laguna Beach.

5. EVACUATION PLAN

Other disaster plans are discussed in the *Emergency Management Plan* (1997), but not included in this report. Further information can be found at the Laguna Beach Police Department for Hazardous Material Spills, Marine Oil Spills, Aircraft Accidents, Nuclear Accidents (SONGS), and State of Nuclear Wars. However, the following evacuation plan is applicable to various types of disasters, not just the ones discussed in this report.

The following evacuation plan is prepared utilizing the *Evacuation Plan* (2006) in conjunction with the Laguna Beach Police Department.

5.1. Plan

5.1.1. Purpose

This plan provides guidance for the conduct of evacuation, dispersal, or relocation operations during natural disasters, technological incidents, and nuclear defense emergencies. It also describes the organizations responsibilities for conducting evacuation operations. The Police Department has primary responsibility for an evacuation supported by Marine Safety. Volunteers may also supplement the work force, if applicable.

5.1.2. Objectives

The overall objectives of all evacuation operations are the following:

- Expedite movement of persons from hazardous areas
- Control evacuation traffic
- Coordinate transportation for those without vehicles and for those with special needs
- Provide perimeter control for the affected scene and evacuated areas
- Determine the safety of evacuation routes in a post-earthquake or devastated environment
- Accomplish objectives of the *Action Plan*

5.1.3. Situation and Assumptions

Laguna Beach may be impacted by a major emergency incident that impacts large areas of the City. If residents are displaced as a result of a large-scale incident, it is the City's responsibility to relocate persons from impacted areas to safe locations.

In large-scale incidents, the *Emergency Operation Center* (EOC) will be activated for the coordination of emergency evacuation and relief efforts. When the EOC is activated, the *Law Enforcement Unit* will also be activated. If an evacuation of any area within the City is necessary, the Police Department will be the lead agency and will be responsible for the implementation and execution of the evacuation plan. Fire Department, Municipal Services, and Marine Safety will assist police.

5.1.4. General Information

Evacuation plans will be prepared, on an ad hoc basis, by the Police Department in conjunction with EOC staff and the *Plan Section*. In general, those persons closest to the hazard, or those most at risk, will be warned and evacuated first.

5.2. Organization and Assignment of Responsibilities

The *Law Enforcement Branch* is organized under the *Operations Section* of the EOC. The Laguna Beach Police Department personnel assigned to the EOC are responsible for coordinating evacuation within the City, as well as drafting and issuing evacuation orders.

5.2.1. Police Department EOC Personnel

The Police Department is the lead agency for evacuations and has the overall responsibility of evacuation operations within the City. Either field personnel or EOC personnel will determine the necessity for evacuation. Police Operations Center (POC) who will direct the actual operation will manage tactical operations. Police personnel will carry out the evacuation and ensure the safety of the evacuation route with support from other departments if necessary. Once areas have been evacuated, the Police Department has the exclusive responsibility for protecting private and public property in all areas that were evacuated. Police personnel in the field will control entry. The Police Department will make special arrangements for prisoners within the Laguna Beach Jail.

5.2.2. Marine Safety

Marine Safety will assist with the evacuation of all areas at the direction of the Police Operations Center. Primary responsibility will be for the evacuation of the beach areas. Marine Safety will also evacuate and perform rescues in flooded areas.

5.2.3. Fire Department

Fire Department will assist with the evacuation of non-ambulatory, handicapped and elderly individuals, and patients at hospitals and convalescent hospital at the direction of the Police.

5.2.4. Municipal Services

Municipal Services will assist with closures of highways at the direction of the Police

5.2.5. Policies and Procedures

- Identify area and population to be evacuated
- Establish evacuation routes
- Request transportation assistance from EOC *Logistics*
- Control access to hazard area

When the decision to evacuate has been made, the public will be alerted and given the order to evacuate by door-to-door contact. Whenever possible, Police, Marine, Fire and Municipal Services units will circulate through the area and issue warnings and evacuation orders via a loudspeaker system.

The evacuation order will contain the following elements, at a minimum:

- Why evacuation is being ordered
- Evacuation routes
- What to do if vehicle breaks down
- Assembly points for those without transportation
- Location of shelters

Provision must be made to evacuate persons with mobility impairments. The Fire Department will plan, organize, and coordinate evacuation of non-ambulatory persons.

5.3. Alert and Notification

5.3.1. Purpose

This plan addresses the policies and procedures for alerting and warning the public and disaster service workers of imminent, extraordinary danger. Depending upon the nature of the threat and the population group at risk, warning can originate at any level of government. Success in saving lives and property is dependent upon timely dissemination of warning and emergency information to persons in threatened areas. This plan includes information on warning systems to be utilized for notification of persons of potential danger.

5.3.2. Objectives

- To alert the general public to the threat of imminent, extraordinary danger by timely dissemination of information
- To alert City employees, the public and volunteers of any potential danger
- To prevent loss of life and property
- To accomplish the objectives of the *Action Plan*

The Laguna Beach Police Department shall have the primary responsibility for alerting the general public in an emergency disaster situation. They will be supported by the *Fire Branch* and the *Marine Safety Branch*. Other City employees and volunteers may be utilized to assist in this function.

5.3.3. Concept of Operations

- Gather information regarding the extent of the emergency or disaster from every known source
- Alert and mobilize all on-duty and off-duty personnel
- Activate any and all alerting systems needed to notify the public and disaster service workers of imminent, extraordinary danger

5.3.4. Alerting Systems

The following alerting systems are available in Laguna Beach:

- Emergency Alert System (EAS/EBS)
- Television/cable television
- Police unit public address system
- Fire and Marine Safety apparatus loud speakers
- Door-to-door canvassing

The LOCAL WARNING POINT for the City of Laguna Beach is the Police Department via the California Police Telecommunications System (CLETS). The RESPONSIBLE PARTY for local warnings is the Police Watch Commander.

5.4. Care & Shelter

5.4.1. Purpose

The Care & Shelter Unit Plan describes the organizational and operational policies and procedures required to meet the sheltering and feeding needs of Laguna Beach residents and visitors who are displaced as the result of a major disaster. It cites authorities and specifies the public and private organizations responsible for providing mass care services. An emergency action checklist for the Health & Welfare Branch is included in the annex of the *Emergency Management Plan* (1997).

5.4.2. Objectives

The overall objectives of the *Logistics Section/Care & Shelter Unit* operations are:

- Provide food, shelter or temporary housing, first aid, child care and other basic necessities of life for emergency workers
- Provide food, shelter or temporary housing, first aid and other basic necessities of life on a mass care basis until other resources are available to persons unable to provide for themselves as a result of a disaster and be prepared to designate areas for control of pets
- Coordinate activation, operation, and support of shelters with the American Red Cross.
- Work with the Police Department in providing lodging and feeding of displaced prisoners who are dislocated from the city jail
- Accomplish the objectives of the *Action Plan*.

5.4.3. Shelter Opening Procedure

SCENARIO 1 - RED CROSS IS AVAILABLE TO MANAGE THE SHELTER

1. Determine the most appropriate shelter site based upon the nature of the disaster with clearances from the *Operations Sections and Plans Section/Damage Assessment Unit* building inspectors.
2. Contact American Red Cross at 714-481-5300 or (800) 540-2000 and request that a shelter be activated. Provide them the following information:
   - Nature of disaster
   - Location/school recommended for use as the shelter
   - Approximately how many people to be sheltered
   - Decide who will contact the School District
3. Request an ARC representative to respond to the City EOC
4. Notify the *Deputy EOC Director, Public Information Officer,* and *Operations Section* of the location and approximate time of shelter activation
5. City provided support as needed
   - Evacuation to shelters--*Operations Section/Police Branch*
   - Transportation—*Supply Unit*
   - Logistical needs such as food, bedding, first aid supplies-*Supplies Unit/Staffing- Care & Shelter Unit*
   - Communications-*Communications Unit*

SCENARIO 2 - RED CROSS IS <u>NOT</u> AVAILABLE TO MANAGE THE SHELTER

1. Determine the most appropriate shelter site based upon the nature of the disaster with clearances from the *Operations Section*
2. Contact American Red Cross and request that a shelter activation. If they are not available to provide shelter management, continue with #3 below
3. Contact the Laguna Beach School District and give them the following information:
   - Nature of disaster
   - Location/school recommended for use as the shelter
   - Approximately how many people to be sheltered
   - Request the School District send a contact person with access to facility and capability to make school operational; i.e., facility accessibility, keys to unlock doors, keys and tools to turn on electricity
4. Make contact with City Employee Shelter Manager per Organization and Assignment of Responsibility Chart
   - By telephone - for phone numbers, see the Department Phone List kept in the *Care and Shelter Unit* desk
   - If telephones are inoperable, City Shelter Managers are to report to the City EOC
5. Provide the Shelter Manager with the following information:
   - Nature of disaster
   - Location/school recommended for use as the shelter
   - Approximately how many people to be sheltered
   - Contact person name and title. Meet contact person in front of the school Administrative Office
6. Notify the *Deputy EOC Director, Public Information Officer,* and *Operations Section* of the location and approximate time of shelter activation
7. Provide support for the shelter

   Staffing - See the City of Laguna Beach Community Services Department "Key Personnel Emergency Home Phone List" in the *Care & Shelter Unit* EOC desk
   - Contact Marine safety and request they provide first aid in the shelters
   - Consult American Red Cross
   - Contact Salvation Army, Church groups, etc.
   - Contact County Social Services Agency

   Supplies
   - Contact American red Cross
   - Contact *Supplies Unit* for City-owned resources
   - Contact *Finance Section/Purchasing Unit* for resources not owned by the City
   - Attempt to get any items donated to the City that could be used in shelters and ongoing to assist victims. Work with American Red Cross in managing the donated goods.

   Communications
   - Establish communications between shelters and the EOC using facility phones, pay phones, cellular phones or public safety radios assigned to the public safety personnel stationed at shelters.

Special needs population

- If resources and time are available, accommodations for the special needs and institutionalized populations will be made. Specialized facilities will be arranged, if possible. The *Care & Shelter Unit* will, at the time of the incident, either activate appropriate City facilities or refer to the yellow pages for local hotels outside the impacted area.

Security

- If the Shelter Manager determines a need for security personnel in the shelter, they should contact the *Care & Shelter Unit, which* will arrange for security.
- A security request should be made by the *Care & Shelter Unit Leader* to the *Operations Section*/*Police Branch* for a patrol officer to be located in the shelter; an alternate may include a Marine Safety Officer

First Aid

- The American Red Cross (ARC) usually provides nurses for shelters.
- If ARC is unable to meet the first aid needs in a shelter, the City will contact the Marine Safety Division. Thirty Marine Officers are trained as Emergency Medical Technicians (EMT)

5.4.4. Public Shelter Locations and Phone Numbers

A list of public shelters is kept on file in the Emergency Services Office (EOC) and is included in the City's EOC Activation. A list of all City Shelter Managers and their phone numbers will be created and kept at the *Care & Shelter* EOC desk.

5.4.5. Registration and Inquiry

During peacetime responses and recovery operations, the ARC is responsible for conducting registration and inquiry operations. The ARC has trained Disaster Welfare Inquiry system to recruit volunteer workers to handle mass inquiries. During most disasters, a Registration and Inquiry Center is established in the ARC Chapter office nearest the incident.

Registration and Information Coordinators in Reception and Care Centers are responsible for registration of shelter inhabitants. The ARC should establish communications between the Center and shelters, hospitals, coroner offices and morgues. Registration lists and location changes are sent to the Center daily, if practicable. Although every effort is made to locate all victims, it is probable that some persons, whose homes may have been damaged, will relocate without registering. In light of this, *Care & Shelter* should request that the *Public Information Officer* issue bulletins requesting those who relocate to notify relatives of their whereabouts, as well as to register at a Center.

5.4.6. Lodging Operations

- In widespread disasters, all suitable buildings, other than those being used for other emergency functions, may be used for lodging.
- Schools are the preferred facility for lodging, as they are public facilities and can accommodate a large number of persons. Churches are also appropriate, as they are often large and frequently have feeding facilities on the premises.
- Following an earthquake where buildings may be damaged or the threat of damage by aftershocks exists, outside parks and school fields may be set up as temporary shelters.

- Arrangements should be made in advance with owners or managers of all potential mass care facilities, parks, and schoolyards. Arrangements have been made between the local school district and the American Red Cross
- In large-scale disasters, commercial lodging facilities, such as motels and hotels, may be reserved for the infirmed who require special facilities.
- Only minimal health care will be available in mass care facilities.

5.4.7. Feeding Operations

- Mass feeding operations will be the joint responsibility of the City of Laguna Beach, the American Red Cross, and other agencies.
- Both workers and victims must be fed.
- During peacetime operations, arrangements will be made, when possible, for mobile feeding and refreshment services, as well as food delivery to persons in field locations.
- Ordinarily, a central facility will be established for mass feeding.
- Arrangements will be made with restaurants to augment mass feeding operations, if necessary.

Note: Given the City's limited resources, it is probable the City would turn to Mutual Aid for extended mass care sheltering and feeding operations.

Potential Shelter Facilities

El Moro Elementary School	8681 North Coast Highway
Top Of The World Elementary School	21601 Tree Top Lane
Thurston Middle School	2100 Park Avenue
Laguna Beach High School	625 Park Avenue
Veteran's Legion Hall	450 Legion Street
City Hall Recreation Room	505 Forest Avenue
Frederick Lang Park Community Center	21540 Wesley Drive

5.5. Evacuation Travel

5.5.1. Purpose

This plan describes the organizational and operational policies and procedures required to obtain logistical supplies, material resources, transportation, and facilities necessary to support emergency response and recovery activities.

5.5.2. Objectives

The overall objectives of the *Logistics Unit* during an emergency will be to accomplish the following:

- Oversee the distribution of food and other essential supplies
- Secure supplies for mass care facilities, staging areas and medical facilities
- Request the American Red Cross manage donated items
- Work closely with the American red Cross to manage donated supplies and services from individuals and the public sector

- Work closely with the *Finance Section Purchasing* Unit in purchasing any items you are unable to secure
- Coordinate resources with all City departments
- Arrange transportation resources and drivers
- Arrange special transportation resources and trained personnel for non-ambulatory individuals
- Arrange mutual aid resources for items that cannot be obtained locally

5.5.3. Transportation

- The transportation of supplies, equipment, materials, and all logistical needs will be coordinated by the *Supply Unit*
- The transportation and movement of people will be coordinated by the *Supply Unit*

5.5.4. Transportation Assistance

- Some of the population will not have access to automobiles. Additionally people with disabilities or infirmities may require special transportation. Once the number of those requiring transportation assistance has been determined by the Police Branch, they will advise the Logistics Section/Supply Unit who will locate and request needed vehicles and operators.
- Transportation for essential workers will be coordinated and provided by each City department utilizing City vehicles and operators to the extent possible.
- Vehicles with mechanical problems will be abandoned until such time as circumstances permit qualified repair personnel to safely return to the location to repair on site or tow the affected vehicle.
- Other potential problem areas along evacuation routes including weight restrictions, narrow bridges, and road sections susceptible to secondary effects of an incident. Police officers will patrol the evacuation routes ensuring public safety of the routes following a devastating event. Both public and private vehicles will be used to transport people. Orange County Transit Authority (OCTA) and the Laguna Beach Unified School District will be notified if buses are needed. Transportation vehicles are coordinated through the Logistics Section by the Supply Unit.

5.5.5. Primary Evacuation Routes

- North Coast Highway
- South Coast Highway
- Laguna Canyon Road

5.5.6. Alternate Evacuation Routes

- Any other roadway leading away from the beach

5.5.7. Staging Area

- Determine need for a *Transportation Unit* staging area(s). Determine location of staging area(s)
- Request personnel through the *Personnel Unit* to staff the staging area
    - Staging Area Manager

    - Support personnel
- Establish communications from the EOC to the *Transportation Unit* staging area.
- Request the *Staging Area Manager* to do the following:
    - Establish a layout of the staging area (draw a map of the area)
    - Consider using traffic cones to mark areas
    - Maintain security at the site
    - Maintain a list of fuel supply locations
    - Provide transportation of equipment/supplies to incident sites
    - Communicate all necessary information to the EOC

5.5.8. Possible Staging Areas in the City

1. Act V City Yard in Laguna Canyon
2. City Yard Employees' Parking Lot at City Hall
3. Main Beach
4. Aliso Pier Parking Area
5. All Laguna Beach Unified School District playgrounds and athletic fields
6. All City and private parking facilities
7. All City parks

5.5.9. List of City Facilities

Name	Address
Laguna Beach City Hall	505 Forest Avenue
Fire Station #1	501 Forest Avenue
Fire Station #2	285 Agate
Fire Station #3	2900 Alta Laguna Blvd
Fire Station #4	31646 Second Avenue, South Laguna
Frederick Lang Park & Community Center	21540 Wesley Drive
Veteran's Legion Hall	450 Legion
Laguna Club for Kids—Bluebird Park	1470 Temple Terrace
City Nursery	Olive Street
Laguna Beach Animal Shelter	20612 Laguna Canyon Road

5.6. Public Information and Education

5.6.1. Purpose

This plan describes the organizational and operational policies and procedures for providing emergency information to the public and news media. The City *Public Information Officer* (PIO) will lead the *Public Information Unit* to meet the informational needs of the incident. Fire and Police department personnel will support the *PIO Unit* staffing. The primary purpose of the *PIO Unit* is to provide the public with alerting and warning information, which can save lives and property. The type of news media contacted will depend upon the nature and threat of the emergency and the population groups at risk. The secondary purpose is to provide timely and accurate information to the news media about the emergency incident.

5.6.2. Objectives

- Provide accurate and timely emergency information to the general public
- Provide media releases
- Establish a media center
- Coordinate press conferences
- Coordinate staff to respond to public inquiries
- Accomplish objectives as stated in the EOC *Action Plan*

5.6.3. Policies and Procedures

Policies and procedures the *PIO* should follow include, but are not limited to:

- Prepare, in advance, emergency public information materials addressing survival tips for all hazards, including nuclear attack
- Clear press releases with the *Director* and the *Deputy EOC Director* prior to releasing information to the news media for the public
- Request response organizations coordinate activities with the *PIO* Office
- Prepare materials describing the health risks, the appropriate self-help of first aid stations, and other appropriate survival measures for the current emergency
- Prepare emergency public information materials for the visually impaired and non-English speaking groups
- Prepare instructions for people who must evacuate from a high-risk area
- Elements that should be addressed include: definition of the population at risk; evacuation routes; suggestions on the types and quantities of clothing, food, medical items, etc. evacuees should take with them; locations of reception areas/shelters; and safe travel routes.
- Prepare instructions identifying centrally located staging areas and pickup points for evacuees without private automobiles or other means of transportation.
- Prepare instructions for evacuees to reception centers for shelter, lodging, and feeding facility assignments
- Utilize TTY or other available devices to communicate with the hearing impaired
- Refer inquiries on the status of evacuees to the American Red Cross Representative. The Disaster Welfare Inquiry services usually require up to 48 hours to establish and is the responsibility of the ARC. The EOC cannot handle the operation of locating individuals. This will be handled by the ARC who will access shelter registration information
- Prepare emergency public information materials relative to support services available and damaged/restricted areas
- Establish and implement a rumor control procedure through the phone coordinator
- Coordinate with State, Federal, and private sector agencies to obtain technical information relative to health risks, weather, etc.
- Continue providing information to the news media and the public on available services for a long time after the EOC is closed.

5.7. Public Safety

5.7.1. Purpose

The Law Enforcement plan addresses the policies and procedures, which will guide the Laguna Beach Law Enforcement operations in its four functional areas, including the following:

- Alert and Warning (Supported by Fire, Marine Safety and Public Information)
- Evacuation (Supported by Fire, Marine Safety and Public Works)
- Coroner
- Animal Services

Law Enforcement has a secondary responsibility for the following functions/plans:

- Management (Police Chief is Third Alternate for *Director of Emergency Services*)
- Public Information (Police Community Liaison supports PIO Operations)
- Fire, Rescue and HazMat (Police support searching operations)
- Communications (Police are part of *Communications Unit*)

5.7.2. Objectives

- Mobilize, deploy and organize Laguna Beach Police Branch resources from law enforcement, traffic control and perimeter control operations
- Complete a comprehensive damage assessment survey of the area utilizing aerial and ground observation
- Assist the *Plans Section* in completing their missions by reporting damage assessment information gathered by field units
- Authenticate unconfirmed reports by deploying police officers to the scene
- Provide security in the *Emergency Operation Center* (EOC), mass care facilities, multipurpose staging areas, Casualty Collection Points (COP), disaster Medical Aid Centers (MAC) supply storage areas, critical facilities, evacuated areas, and registration areas.
- Provide security for public and private property
- Provide notification to families about the status of injured or missing relatives when appropriate
- Protect and house prisoners in custody; if necessary, relocate and/or release prisoners
- Alert and warn the general public of imminent disasters
- Plan and supervise evacuation operations
- Control access to incident scene and evacuated areas
- Conduct Coroner operations in the event that County authorities are unable to meet the needs of the City
- Once County authorities have assumed the primary responsibility for Coroner operations, assist, to the extent possible
- Manage the animal services operation in the absence of the County authorities
- Accomplish objectives of the EOC *Action Plan*
- Direct and control traffic
- Set priorities based on the *Action Plan*

5.7.3. Situation and Assumptions

Laguna Beach may be impacted by emergency incidents serious enough to impact large areas of the City. If residents are displaced as a result of a large-scale incident, it is the City's responsibility to provide aid and assistance. Due to the City Police Department's relatively small staff and limited resources, it is not likely but probable that individual police personnel will be performing a myriad of duties an emergency, which would otherwise be spread out in a larger department.

5.8. Evacuation of Medical and Public Facilities

Priority will be given to warning places having immediate proximity to a disaster event, or have large numbers of people who will require sufficient time to prepare, such as schools, hospitals or nursing homes. In the event of a major disaster, which posed a threat to these Special Locations, the Police Watch Commander will dispatch a police unit to personally notify those at risk. Door-to-door warnings may also be necessary for alerting the hearing-impaired and non-English speaking groups.

Hospitals			
Name	Address/Contact Person	Phone #	Population
South Coast Medical Center	31872 South Coast Highway	499-1311	210 beds, avg. patient occupancy 67, 100 staff

Recreational Facilities			
Name	Address/Contact Person	Phone #	Population
Boy's and Girl's Club of Laguna Beach	1085 Laguna Canyon Road Kim Maxwell	494-2535	avg. 100-175 children; 8-10 staff; 10-20 parents
Laguna Club for Kids	1470 Temple Terrace Derek St. John/Stacey Nau	494-7630	avg. 75-86 children; 6-8 staff

Pre Schools/Day Care			
Name	Address/Contact Person	Phone #	Population
Anneliese's Pre School	20062 Laguna Canyon Rd. Terri Herkimer	497-8310	170 students 20 staff
Anneliese's Pre School	21542 Wesley Drive Annette Thomas	499-5527	105 students 11 staff
Anneliese's Pre School	758 Manzanita Liesa Schimmelpfennig	494-5527	100 students 11 staff
Kid Care Brookie's Mom	741 Marlin Drive Sheila Jacobs	499-1178	12 students 3 staff
Kid's Castle Day Care	960 Catalina Street Deanna Stewart	497-8620	6-8 children 3 staff
Heidi Knoff Day Care	31866 8th Ave. Heidi Knoff	499-4058	12 students 2 staff
Laguna Club for Kids	1470 Temple Terrace Derek St. John/Stacey Nau	494-7630	avg. 75-86 children; 6-8 staff
Laguna Beach head Start	8681 North Coast Hwy. Terry Barman	497-6508	17 students 8 staff
Laguna Presbyterian Pre School	415 Forest Avenue Pat Drew	494-0504	110 students 13 staff
Montessori School of Laguna Beach	340 St. Ann's Drive Suzy Willhoit	494-2411	50 students 9 staff
Niguel Parent Participation Pre School	1085 Laguna Canyon Road Cindra Vargas	497-3895	20 students 5 staff

Private Schools			
Name	Address/Contact Person	Phone #	Population
St. Catherine's School	3090 South Coast Highway Principal Pat Prerost	494-7339	300 students 20 staff
Art Institute of Southern California	2222 Laguna Canyon Road Him Godek	497-3309	105 students 11 staff

Public Schools			
Name	Address/Contact Person	Phone #	Population
El Morro Elementary Principal Linda Purrington	8681 North Coast Highway	497-7780	531 students 52 staff
Top of the World Elementary Principal Sharon Malawian	21601 Tree Top Lane	497-7790	650 students 52 staff
Thurston Middle School Principal Ron LaMotte	2100 Park Avenue	497-7785	575 students 45 staff
Laguna Beach High School Principal Barbara Callard	625 Park Avenue	497-7750	775 students 78 staff

For the latest information on the evacuation plan, please contact the City of Laguna Beach.

III. PUBLIC RESOURCES

1. UTILITIES

The following utilities section is prepared with the help of the *Evacuation Plan* (2006) in conjunction with the Laguna Beach Police Department

In all cases involving major disaster situations, which disrupt or threaten to disrupt alated services, the utility companies will be contacted by the Operations Sections/Public Works Branch Chief or their alternate as the City's liaison to determine the utility's status, location of damaged facilities and anticipated time of restoration of service.

1.1. Aliso Water Management Agency

The City of Laguna Beach operates AMWA's waste pump stations. The South Coast Water District operates AMWA's waste treatment plant. When the City EOC is activated, the *Operations Section/Public Work Branch Chief or designated alternate* will contact the LBCWD to assess damage and coordinate restoration of services.

1.2. South Coast Water District

The South Coast Water District provides water and sewage service for South Laguna. The Water District has its own disaster plan with Standard Operational Procedures. When the City EOC is activated, the *Operations Section/Public Works Branch Chief or designated alternate* will contact the SCWD to access damage and coordinate restoration of services.

1.3. San Diego Gas & Electric

When the City EOC is activated, the Operations Section/Public Works Branch coordinates SDG&E.

1.4. Southern California Edison Company

When the City EOC is activated, the Operations Sections/Public Works Branch coordinates the Edison Company.

1.5. Southern California Gas Company

When the City EOC is activated, the Operations Sections/Public Works Branch coordinates the Gas Company.

1.6. GTE

24-hour phone number is 611. When the City EOC is activated, GTE will be coordinated by the *Operations Section/Public Works Branch*. GTE has its own disaster plan, and in the event of a loss of service have identified Police, Fire, hospitals, and schools for priority service restoration.

1.7. Cox Cable

When the City EOC is activated, the Operations Section/Public Works Branch will coordinate the Cable Company.

For the latest information on utilities, please contact the City of Laguna Beach or the associated utility company listed above.

2. FIRE SAFE COUNCIL

The California Fire Safe Council's mission is to preserve and enhance California's manmade and natural resources by providing leadership and support that mobilizes all Californians to protect their homes, communities, and environment from wildfires (Fire Safe Council, 1993).

The Council unites its diverse membership to speak with one voice about fire safety through distribution of fire prevention education materials to industry leaders and their constituents, evaluation of legislation pertaining to fire safety, and empowerment of grassroots organizations to spearhead fire safety programs (Fire Safe Council, 1993).

To help protect the local region from future disaster, the Greater Laguna Coast Fire Safe Council was organized. Through a Federal Bureau of Land Management grant, this council seeks to develop activities that will keep residents informed about fire dangers and to promote fire mitigation measures (Greater Laguna Coast Fire Safe Council, 2002).

The Laguna Coast Council is one of over one hundred such community-centered Fire Safe Councils across California focusing on fire prevention through community awareness. This strategy is most effective with the participation of everyone affected (Greater Laguna Coast Fire Safe Council, 2002).

3. LAGUNA BEACH UNIFIED SCHOOL DISTRICT

The following school district information is prepared utilizing the *Evacuation Plan* (2006) and *Disaster Preparedness Plan* (2003) in conjunction with the Laguna Beach Police Department and Laguna Beach Unified School District.

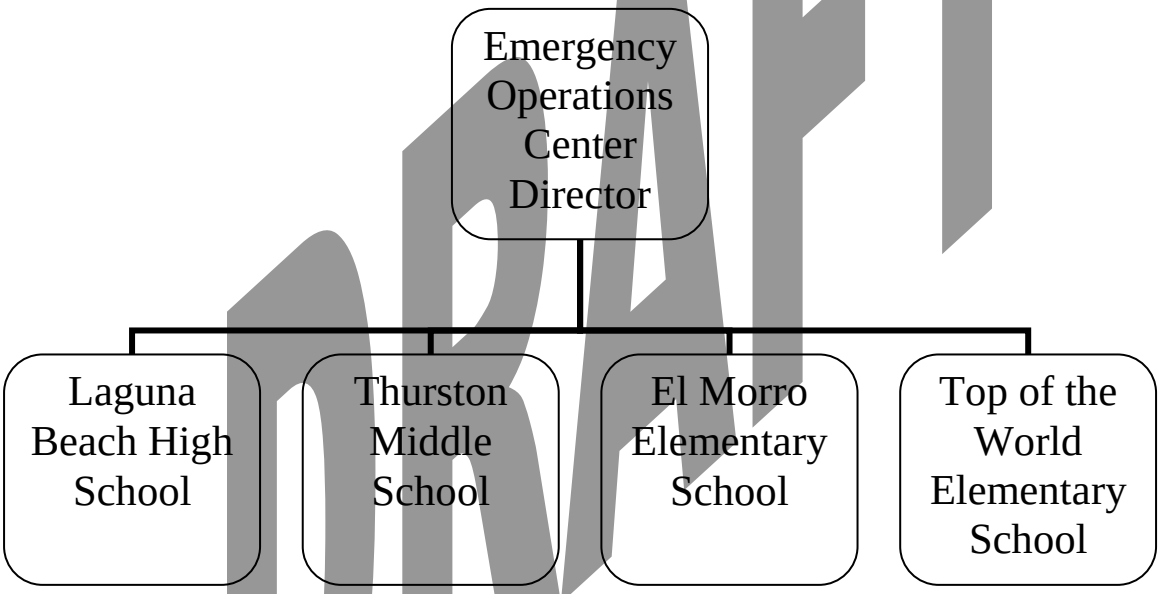
Senate Bill 2786 requires that all schools in California must have disaster plans and a system for care for students for up to 72 hours.

The LBUSD has grades K-12; is responsible for **2,515 students,** and has two elementary schools, one middle school and one high school, all of which are located within Laguna Beach. Schools include:

- Laguna Beach High School, 625 Park Avenue, 497-7750
- Thurston Middle School, 2100 Park Avenue, 497-7785
- El Morro Elementary School, 8681 North Coast Highway, 497-7780
- Top of the World Elementary School, 21601 Tree Top Lane, 487-7790

The LBUSD offices are located at 550 Blumont. The LBUSD and each school site have a disaster plan, which addresses both building and wildland fires, bomb threats or actual detonation, natural disasters, man-made disasters and attacks or disturbances by individuals or groups. The disaster plan also addresses large-scale student evacuations and requires teachers to maintain their students' home phone numbers and parents' work phone numbers.

The Emergency Operations Center (EOC) Director, who is the Superintendent or her designees, will have the authority for overall coordination efforts of all district personnel and resources. Each school principal will direct emergency operations at his or her school site.



Private Schools

There is one private school in Laguna Beach.

Pre-Schools

There are nine pre-school/day-care facilities in Laguna Beach.

For the latest school district information, please contact the Laguna Beach Unified School District.

4. SOUTH COAST MEDICAL CENTER

The following medical center information is prepared utilizing the *Safety Policy and Procedure Manual* (2006) in conjunction with the South Coast Medical Center.

SCMC is a full paramedic receiving hospital located at 31872 South Coast Highway. It has 210 beds. It has its own disaster plan (California title 22, Sections 72551 and 25553 require hospitals to have disaster plans) and is trained in Hospital Incident Command Systems.

SCOPE AND INTENT

South Coast Medical Center (SCMC) works to maintain a safe and secure environment. It is the policy and commitment of SCMC to provide direction to employees as to appropriate disaster response and maintain an emergency preparedness plan which describes the hospital's responsibilities and action plan in the event of a disaster in concert with the mission, services, laws and regulations as covered in the Safety Program. To this end, SCMC will provide information about emergency preparedness via the comprehensive Emergency Preparedness Plan, which includes county emergency medical services, internal, and external disaster implementation flow sheets, Reddinet communications, department manager and employee responsibilities, Hospital Emergency Incident Command system and job responsibilities. This Emergency Preparedness Plan is established and maintained as an important part of the overall Safety Management Program.

THE PLAN DESCRIPTION

The Emergency Preparedness Plan defines the disaster management activities for SCMC and includes all locations at which SCMC does business. The focus of the Emergency Preparedness Sub-Committee is to update, review and revise the plan for continuous improvement. The sub-committee reports quarterly to the Safety Committee.

This is a comprehensive written program, which provides details on how components of the program are implemented on a day-to-day basis. The program also provides organization for a systematic, documented process of continuous performance improvement. This plan and the program are reviewed and revised as necessary at minimum every three (3) years and endorsed by the facility's senior management and the Safety Committee.

STATEMENT OF NEED

As a community hospital, South Coast Medical Center requires an effective response to disasters or emergencies, internal or external. As a result, it has established and maintains a compliant program to respond to disasters, internal or external. Elements selected for inclusion in the program are determined by regulatory requirements and the collective judgments of the Emergency Preparedness Sub-Committee. This is accomplished through a needs assessment process as follows:

- Ongoing review of current governmental and other agency regulations.
- The safety surveillance process.
- Recommendations from surveys and the Safety Committee.

OBJECTIVES

Through needs assessments, objectives are established annually and documented in the annual Emergency Preparedness Summary and Assessment of Effectiveness report. These are reviewed and updated annually and may include, but are not limited to the following:

- Continue to increase staff knowledge and the skills necessary for their role in responding and acting in a disaster situation through education, communication, and departmental Process Improvement (PI) programs.
- Expand the process for monitoring, inspecting, correcting and measuring the effectiveness of Emergency Preparedness activities.
- Monitor and strive for continuous improvement in the expected level of staff participation in emergency preparedness activities.
- Monitor and strive for continuous improvement in the process of reviewing and critiquing emergency preparedness drills/events.
- Monitor and strive for continuous improvement in Emergency Preparedness record keeping.

PERFORMANCE STANDARDS

Through needs assessments, performance standards are established annually and documented in the annual Emergency Preparedness Summary and Assessment of Effectiveness report.

METHODS OF EVALUATION FOR THIS PLAN

The Plan and its components will be evaluated annually by the Emergency Preparedness Sub-committee in conjunction with the Safety Officer, and reported to the Safety Committee.

- **SCOPE** - The sub-committee will assess the effectiveness and appropriateness of the overall plan criteria and requirements and revise the scope, as necessary.
- **OBJECTIVES** - The sub-committee will assess the effectiveness of the objectives identified in the Emergency Preparedness Program Assessment and Performance Improvement Report through performance and outcomes.
- **PERFORMANCE** - The sub-committee will assess the status and outcomes of performance standards selected for focused attention and improvement. Performance will be measured through surveys, educational assessments, focus studies, observation, demonstrations, and surveillance.
- **EFFECTIVENESS** - The sub-committee will assess the status and outcomes of the Plan criteria, objectives, and identified performance standards. Effectiveness of the Plan will be measured through surveys, educational assessments, focus studies, observation, demonstrations, and surveillance which are compiled, analyzed and reported to the Safety Committee in the Emergency Preparedness Program Assessment and Performance Improvement Report.

PLAN ELEMENTS

1. Authority
   a. The Safety Committee will have the overall responsibility for directing, coordinating, and maintaining the Emergency Preparedness Plan. This Plan will be reviewed annually by the Safety Committee.
   b. The Safety Committee will appoint an Emergency Preparedness Subcommittee with authority for developing and monitoring the Plan. The subcommittee will be responsible for ongoing evaluation of the plan for compliance and effectiveness. The Safety Committee will appoint a chairman of the subcommittee who will ensure that quarterly activity reports are submitted to the Safety Committee. The Safety Committee, in turn, will incorporate the Emergency Preparedness Report into its report to the Performance

Assessment and Improvement system for ultimate reporting to the Hospital's Administration and Board of Directors.

c. The Vice President of Provider Contracting is designated as the chairperson of the Emergency Preparedness Sub-Committee. The Vice President is responsible for coordinating the activities of others in the organization with responsibilities in the emergency preparedness disciplines. The Vice President is also responsible for ensuring regulatory compliance, and in conjunction with the Safety Officer.
d. The Emergency Preparedness Sub-Committee is multidisciplinary and is representative of the departments responsible for the health and safety of patients, staff, and visitors. Representation is from administration, clinical, and support services. The committee is authorized to periodically perform internal and external disaster drills in the facilities, to discuss emergency preparedness issues and propose resolutions, and to make recommendations to department heads when corrections are necessary through the Safety Committee.

2. Responsibilities
   a. The Subcommittee will be responsible for the following:
      i. Reviewing the Emergency Preparedness Plan on an on-going basis to assure it is up to date. Develop a mechanism to assure that Emergency Preparedness plan is sent to each individual department and maintained in Safety Manual.
      ii. Planning and implementing 2 disaster drills (internal and external) annually.
      iii. Assuring that all disaster kits are appropriately labeled and updated annually.
      iv. Assuring that written emergency preparedness policies and procedures exist.
      v. Assuring that emergency preparedness training is provided to all employees and that appropriate documentation is maintained.
      vi. Implementation and effectiveness of the emergency Preparedness Plan reporting to the Safety Committee.
      vii. Serve as a resource for training of directors and employees.
   b. Emergency Preparedness Subcommittee Chairperson shall be responsible for:
      i. Managing regulatory and safety compliance of/for the Plan.
      ii. Facilitate the subcommittee and its activities.
      iii. Assuring Emergency Preparedness education is conducted.
      iv. Maintaining all required documentation of committee activities as appropriate.
      v. Coordinating and updating the Emergency Preparedness Plan annually.
3. Emergency Preparedness Training/Education
   a. General
      i. South Coast Medical Center will provide employees with general and specific training on emergency preparedness through Hospital Wide New Employee Orientation and annual review update. Department Directors will ensure that employees are provided with the following information:
         a) The location of Emergency Preparedness plan information.
         b) Disaster telephone tree lists updated bi-annually.
      ii. General training and specialized training on emergency preparedness will be documented, and maintained in an education file for future review.

For the latest SCMC information, please contact the South Coast Medical Center.

5. VISITORS AND NON-RESIDENTS

During the 2005 landslide, Laguna Beach Visitors & Conference Bureau hosted some of the media in town and provided access for them to their outlets. They worked as a contact point for displaced residents in need of housing and coordinated with local hotels in placing some of those needing assistance. The Visitors Bureau keeps a week's worth of water and supplies on hand in case of emergency for staff including additional cell phones for personnel to assist in a natural disaster (Bijlani, 2007).

Each Hotel has its own emergency plan in place to handle an occurrence or event such as a natural disaster.

IV. COMMUNITY RESPONSIBILITIES

1. FIRE

The following guidelines are prepared utilizing the *Landscape/Fuel Modification Guidelines and Maintenance Program* (2005) in conjunction with the Laguna Beach Fire Department.

1.1. Purpose

The purpose of these guidelines is to provide information on how landscape and fuel modification zones are to be integrated, designed, installed, and maintained in order to meet safety requirements. The many variables involved with landscape and fuel modification make specific, uniform regulations impractical. Laguna Beach Fire Department (LBFD) will not require supporting data if these guidelines are followed to the satisfaction of LBFD. Compliance with these guidelines does not guarantee that homeowner's insurance may be secured. Furthermore, compliance with these guidelines may not prevent the loss of life and or real and personal property due to fire.

1.1.2. Scope

Landscape is considered to be any hardscape or softscape improvement not defined as a structure. A fuel modification zone is a strip of land where combustible vegetation has been removed and/or modified and partially or totally replaced with more adequately spaced, drought-tolerant, fire-resistant plants in order to provide a reasonable level of protection to structures from wildland. Development contiguous to or within 300' of an undeveloped vegetated area (urban wildland interface) requires modification of natural vegetation at the urban interface and an integrated landscape plan.

Properties required to follow these guidelines are identified in the City's GIS with a "FM" designation. All proposed new structures designated with an FM shall be required to follow the Landscape/Fuel Modification Guidelines. All existing structures with an FM designation, which propose an addition alteration or repairs having a valuation of 50% or more of the valuation of the building prior to the additions, alterations, or repairs, shall be required to follow the Landscape/Fuel Modification Guidelines. An integrated landscape and fuel modification plan varies in complexity and is dependent upon the type, quantity, and spacing of vegetation, as well as topography, degree/type of exposure, local weather conditions, and the construction, design, and placement of structures. A typical landscape/fuel modification installation consists of a 20-foot setback zone (Zone A), a minimum 50-foot zone typically irrigated (Zone B), with an

additional 125-foot minimum of vegetation thinning zones (Zones C and D). The minimum width of a fuel modification area is 195 feet and in some cases the width increases due to type of terrain and/or type and mass of vegetation. The necessity of implementing a landscape/fuel modification plan does not release the owner from the responsibility to mitigate the impact of such modifications (e.g., erosion control, endangered species, etc.).

1.1.3. Submittal Requirements

1.1.3.1. Landscape/Fuel Modification Plans

Landscape/fuel modification plans show the area and location of all hardscape/softscape improvements and fuel modification necessary to achieve the minimum acceptable level of risk to structures from combustible vegetation. Submit two sets of plans prepared by a licensed landscape architect or other design professional with equivalent credentials to the City of Laguna Beach Community Development Department for review.

The following shall be included on the fuel modification plan (also refer to Attachment 1):

A. Identify the design of the proposed development, showing all property lines, contour lines, and the proposed location of all new and existing structures including all hardscape/softscape improvements and the fuel modification area.

B. Delineation of each zone (setback, irrigated, and thinning) with a general description of each zone's dimensions and character; i.e., 50-foot - 70-foot Zone B, with existing vegetation removed, irrigated, and planted with adequately spaced plant material that is more drought-tolerant and fire-resistant (See Attachment 2).

C. Location and detail of permanent zone markers (See Attachment 4).

D. Identify the removal of undesirable plant species in accordance with the LBFD Fire Prone Plant Species List (See Attachment 7).

E. Plant palette to be installed in accordance with approved guidelines. Include a plant matrix for all trees, tree-form shrubs, shrubs, and shrub-like plants in irrigated zones showing the maximum height and width of mature plants and proposed spacing. NOTE: Care should be taken to select plants that provide limited habitant to rats and other rodents that may detract from the health and safety of residents. Contact Orange County Vector Control for further information.

F. Photographs of the area, which show the type of vegetation that currently exists, including height and density, and the topography of the site.

G. Description of the methods to be used for vegetation removal, i.e., mechanical or manual.

H. Location of emergency and maintenance access easements within every 500 lineal feet of the fuel modification area. Access easements shall have a minimum 10-foot width; alternatively, 5-foot wide easements provided every 250 feet may be acceptable. Gates, if installed within

the easement, shall be a minimum of 36 inches wide. The easements shall be maintained free of vegetation or any structures greater than 5 inches in height.

I. General description of what exists 300 feet beyond the development property lines in all directions; i.e., reserve lands, structures, natural vegetation, roads, parks, etc. (Note: LBFD may require additional information on a project-specific basis).

J. Identify any proposed off-site fuel modification areas and provide appropriate legal agreements with adjacent property owners.

K. Irrigation plans and specifications, as requested.

L. All applicable maintenance requirements and assignment of responsibility (See Section 6).

M. Tract or project conditions, CC&R, and/or deed restrictions relative to fuel modifications (See Attachment 5).

N. The integrated landscape/fuel modification plan shall be reviewed by LBFD and approved by the Design Review Board (DRB) prior to issuance of the building permit.

O. For large developments, fuel modification zones (especially zones B, C, and D) should be located within common lettered lots owned and maintained by associations representing common ownership; e.g., homeowners' associations. The integrity and longevity of the fuel modification zones shall be maintained with sufficient tract/project conditions and CC&Rs to specifically identify the restrictions within the fuel modification areas. Likewise, when fuel modification zones are located on private property, deed restrictions are required to specifically identify the restrictions on any portion of the property subject to fuel modification. (See Sections 6 and 8 and Attachments 2 and 5).

1.1.3.2. LBFD Plant Palette Information

The plant palette must be submitted containing both the botanical and common names of all plant materials that are to be used. In the irrigated zone areas (which commonly serve as a screening buffer between development and open space/park land), plants must be fire resistant and drought-tolerant. Plant materials used outside of the irrigated zones must be fire resistant and drought tolerant. There is no such thing as a plant that will not burn. The term fire resistant may be misleading. All plants will burn given sufficient heat and low moisture content. Vegetative fire resistance may be enhanced through adequate irrigation or precipitation.

Note: All plants in Zones A-D shall be selected from the LBFD list and specified for appropriate fuel modification zones.

The plant materials approved by LBFD and various resource agencies responsible for environmental protection are provided in Attachment 8. Specific planting criteria are included for various plant materials. If alternate plant materials are proposed, the landscape architect shall provide a photograph, as well as data on the fire resistive characteristics and proposed uses (zones, number, spacing, etc.) and LBFD will make a case-by-case determination as to

acceptability of the proposed material. The proposed plant must be spaced based on size and characteristics. If the plant materials are proposed to be planted within 300 feet of reserve lands (except plants on the interior of the tract), concurrence from the applicable following agencies would be required: US Fish and Wildlife Service, California Department of Parks and Recreation, The Nature Conservancy, the Department of Fish and Game, Orange County Public Facilities and Resource Department, and the Orange County Vector Control District. If the proposed plants have received previous resource agency approval, no concurrence letter will be required.

1.1.3.3. Zone A – Setback Irrigated Zone

The purpose of the setback zone is to provide a defensible space for fire suppression forces and to protect structures from radiant and convective heat. **No combustible construction shall be allowed within the 20-foot setback zone (Zone A). In no case shall Zone A be less than 20-foot minimum. This measurement shall be made horizontally from the point of the structure closest to Zone A.** This zone is located between Zone B and the structure and in all directions (360°) surrounding the structure to include the front, side and rear yards. The specific requirements are as follows.

A. Automatic irrigation systems to maintain healthy vegetation with high moisture content.

B. Irrigation maintained outside the drip line of native oak trees.

C. Pruning of foliage to reduce fuel load, vertical continuity, and removal of plant litter and dead wood.

D. Complete removal of fire prone plant species (see Attachment 7), minimal allowance for retention of selected native vegetation.

E. Plants in this zone shall be fire resistant and selected from the Fuel Modification Zone Plant List for the setback zone and given geographical area (see Attachment 8).

F. Trees and tree form shrub species are not allowed within 10 feet of combustible structures (measured from the edge of a full growth crown).

G. Trees and tree form shrub species are not allowed to extend beyond the property line (measured from the edge of a full growth crown).

H. Tree and tree form shrub species are not allowed within 10 feet of adjacent tree species as measured from the edge of a full growth crown (see Attachment 6).

I. Special consideration should be given for rare and endangered species, geologic hazards, tree ordinances, or other conflicting restrictions.

J. Maintenance including ongoing removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying fire resistant plantings, maintenance of the operations integrity and programming of the irrigation system, regular trimming to prevent ladder fuels.

K. A minimum of 36” of horizontal clearance and unlimited vertical clearance around the exterior of the structure (360°) shall be provided for Firefighter access. Firefighter access shall be made without the need for special tools (ladders) or ability and have permanent improvements installed when ascending or descending from street level (e.g., stairs).

L. No combustible construction shall be allowed in Zone A.

M. No permanent or portable barbeques/grills, fire pits, fireplaces, or other flame generating device shall be permitted within 30’ of non-fire resistive plants/vegetation.

N. No vines shall be permitted on combustible structures (e.g., Type V non-rated structure).

1.1.3.4. Zone B – Irrigated Zone

This portion of landscape/fuel modification should be irrigated and planted with drought – tolerant, deep-rooted, moisture retentive plants. The plans must delineate that portion of the fuel modification area that will be permanently irrigated. Plant material selection, irrigation system design, and the landscape maintenance management plan shall sensitively address water conservation practices and include methods of erosion control to protect against slope failure. All irrigation shall be kept a minimum of 20 feet from the drip line of any existing native Quercus (oak) species. This irrigated zone is 50 feet to 75 feet in width. Zone B shall be cleared of all undesirable plant species, irrigated, and planted with plants from the approved LBFD Plant List. Exceptions to save desirable species may be submitted for approval by the Fire Chief on a site-specific basis. As in Zone A, combustible construction (i.e. gazebos, trellis’s, shade covers etc.) is not allowed in Zone B. The specific requirements are as follows.

A. Groundcover shall be maintained at a height not to exceed 18 inches.

B. In order to maintain proper coverage, native grasses should be allowed to go to seed. Native grasses shall be cut after annual seeding. Cut heights shall not exceed 8 inches.

C. Irrigation shall be designed to supplement native vegetation, and establish and maintain planted natives and ornamentals.

D. Any plants selected for planting in this zone shall be selected from the approved plant list for irrigated zones for a given geographical area (See Attachment 8).

E. Planting will be in accordance with planting guidelines and spacing standards established in this guideline (See Attachments 6 and 8).

F. In Zones B, C, and D, sensitive and/or protected plant species shall be identified on the landscape/fuel modification plans and dealt with per the City’s Open Space/Conservation Plan.

G. Tree and tree-form shrub pruning and spacing will be in conformance with Attachment 6. Tree form shrubs are defined as shrubs that naturally exceed 4 feet in height.

H. Tree-form shrubs and other shrubs shall be spaced such that they do not create an excessive fuel mass and can be maintained in accordance with specified spacing as indicated on the plan.

I. Special consideration should be given for rare and endangered species, geological hazards, tree submitted for project approval, upon further review.

J. Removal of undesirable plant species (see Attachment 7).

1.1.3.5. Zone C & D – Thinning Zones (Non-Irrigated)

Zone C is 50 to 75 feet in width and requires 50% thinning and removal of all dead and dying vegetation and undesirable species. Zone D is 75 to 130 feet in width and requires 30% thinning with removal of all dead and dying vegetation and undesirable species. Thinning zones are utilized to reduce the fuel load of a wildland area adjacent to urban developments, thereby reducing the radiant and convective heat of wildland fires. Thinning zones are located adjacent to the irrigated zone and can extend 125 feet or more into wildland areas. All dead and dying vegetation shall also be removed from the thinning zones. Additionally, undesirable plant species shall be removed from the thinning zones due to their susceptibility to wildland fire. As in Zones A and B, combustible construction (i.e. gazebos, trellis's, shade covers etc.) is not allowed in Zones C and D. The specific requirements are as follows.

A. Removal of all dead and dying vegetation, all fine fuels reduced to a maximum of 8-12 inches in height.

B. In order to maintain proper coverage, native grasses shall be allowed to go to seed. Native grasses shall be cut after annual seeding. Cut heights shall not exceed 8 inches.

C. Any plants selected for planting in this zone will be chosen from the approved plant list for the setback, irrigated, or thinning zone for a given geographical area (See Attachment 8).

D. Special consideration will be given for rare and endangered species, geologic hazards, tree ordinances, or other conflicting restrictions as identified in the environmental documents submitted for project approval review.

E. Reduce fuel loading by reducing the fuel in each remaining shrub or tree without substantial decrease in the canopy cover or removal of tree holding root systems.

F. In Zones B, C, and D, sensitive and/or protected plant species shall be identified on the fuel modification plans and tagged in the field for further disposition.

G. Tree and tree-form shrub pruning and spacing will be in conformance with Attachment 6. (See Attachment 6.) Tree form shrubs are defined as shrubs that do not naturally exceed four feet in height.

H. Tree-form shrubs less than 4' in height and other shrubs shall be spaced such that they do not create an excessive fuel mass and can be maintained in accordance with specified spacing as indicated on the plan.

I. Maintain sufficient cover to prevent erosion without requiring planting.

1.1.3.6. Off-Site Fuel Modification Requirements

Due to the variable and sometimes considerable amount of land necessary for fuel modification, development proposals often include a request to have the required fuel modification zones extend onto adjacent properties. However, off site fuel modification is not recommended due to problems inherent with enforcement of regulations on adjacent property and the potential for confusion regarding responsibility for fuel modification on areas outside of legal ownership. Proper on-site fuel modification design should determine where development can safely be located and should be an integral part of the development proposal.

Should off-site fuel modification be deemed a necessity, appropriate legally recorded instruments must be established that clearly state the responsibilities and rights of the parties involved relative to the establishment and maintenance of the fuel modification area. Appropriate recorded documents must include a recorded agreement between all parties and a grant of easement for the establishment and maintenance of the fuel modification area. It should be understood that the allowance of off-site fuel modification by an adjacent property owner may affect the rights and/or use of the off-site property. All agreements for any off-site fuel modifications shall be integrated into fuel modification plans with a letter from adjoining property owner giving rights to maintain fuels.

The City of Laguna Beach may grant fuel modification easements on city property-to-property owners in need of such agreements to complete the requirements of their fuel modification plan. City financed/maintained fuel modification programs (i.e. goat grazing, hand crews) may be utilized as a component of a fuel modification plan. The City of Laguna Beach shall not guarantee the continuation of current or future City sponsored fuel modification programs. Property owners shall remain responsible for maintaining their fuel modification plan regardless of the status of the City financed/maintained fuel modification programs.

1.1.3.7. Non-Compliant Properties

If the requirements of these guidelines cannot be met for any reason, documentation supporting the reason(s) shall be required at plan submittal. Alternate materials and methods may be considered in lieu of a complete landscape/fuel modification plan at the discretion of the Fire Chief and DRB. A Fire Protection Plan (CFC 8601) shall be submitted by a recognized fire protection engineer or individual with similar qualifications (subject to the Fire Chief's approval) when alternate materials and methods are proposed to meet the requirements of this guideline.

1.1.3.8. Fuel Modification Plan Revisions

Revisions to previously approved fuel modification plans shall follow procedures as established by the agency having jurisdiction. Note: Revisions to plans will not be reviewed without a copy of the original stamped LBFD approved plan for reference.

1.1.3.9. Fuel Modification Implementation & Required Inspections

This following information shall be placed on precise fuel modification plans, verbatim:

A. **After Permit Issuance and Before Foundation Inspection:** A Rough Fuel Modification Inspection shall be conducted. The developer/builder shall implement those portions of the approved landscape/fuel modification plan determined to be necessary by LBFD prior to the introduction of any combustible materials into the area (removal of undesirable species may meet this requirement). This generally involves removal and thinning of plant materials indicated on the approved plan. An inspection and/or release letter to the building department is required.

B. **Prior to Issuance of Utility Release:** The landscape and fuel modification zones adjacent to structures must be installed, irrigated, and inspected. This includes physical installation of features identified in the approved landscape/fuel modification plan (including, but not limited to, hardscape, softscape, plant establishment, thinning, irrigation, zone markers, access easements, etc). An LBFD Fire Inspector or designee will provide written approval to the Building Division after completion after this final inspection. The CC&R language for maintenance must also be provided and approved by LBFD.

C. **Prior to Home Owner Association (HOA) Acceptance (if applicable):** This activity must include an LBFD Fire Inspector and the following representatives:
   - Landscape design professional
   - Installing landscape contractor
   - HOA management representative
   - HOA landscape maintenance contractor

   The fuel modification shall be maintained as originally installed and approved. A copy of the approved plans must be provided to the HOA representatives at this time. Landscape professionals must convey ongoing maintenance requirements to HOA representatives.

D. **Annual Inspection and Maintenance:** The property owner is responsible for all maintenance of the fuel modification. All areas must be maintained in accordance with approved fuel modification plans. This generally includes a minimum of two growth reduction maintenance activities throughout the fuel modification areas each year (spring and fall). Other activities include maintenance of irrigation systems, replacement of dead or dying vegetation with approved materials, removal of dead plant material, and removal of undesirable species. The LBFD conducts regular inspections of established fuel modification areas. Ongoing maintenance shall be conducted regardless of the date of these inspections. Disclosure of all landscape/fuel modification requirements shall be the responsibility of the property owner and or their agent upon transfer of ownership.

1.1.3.10. Fees

- No additional fees are charged for plan reviews and site inspections.

- No fees are currently charged for maintenance inspections of existing fuel modification areas. However, non-compliance fees are applied if identified deficiencies are not corrected within required time frames.

1.1.3.11. Glossary

CHARACTERISTICS OF FIRE-RESISTIVE VEGETATION – Growth with little or no accumulation of dead vegetation (either on ground or upright); non-resinous plants; low volume of total vegetation (e.g. grass vs. forest or shrub covered land); high live fuel moisture; drought tolerant; stands without ladder fuels (small limbs/braches between ground and canopy); low maintenance (slow-growing, require little care when maintained); plants with woody stems and branches that require prolonged heating to ignite.

CONDUCTION – Direct transfer of heat by objects touching each other.

CONVECTION HEAT – Transfer of heat by atmospheric currents, and is most critical under windy conditions and in steep terrain.

CROWN – Upper part of tree or other woody plant carrying the main branch system and foliage.

CANOPY – More or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees or other woody growth.

DEFENSIBLE SPACE – An area around the perimeter of structures or developments in the wildland, which are key points of defense/attack against encroaching wildfires or escaping structure fires.

DESIRABLE PLANT LIST – List of plants exhibiting characteristics of low fuel volume, fire resistance, and drought tolerance which make them desirable for planting in areas of high fire danger.

DRIPLINE – Ground area at the outside edge of the canopy.

DROUGHT TOLERANCE – The ability of a plant or tree to survive on little water.

FINE FUELS – Fuels such as grass, leaves, and draped pine needles which, when dry, ignite readily and are consumed rapidly (also called flash fuels).

FIRE BREAK – Removal of growth, usually in strips, around housing developments to prevent a fire from spreading to the structures from open land or vice versa.

FIRE PROTECTION PLAN – A Fire Protection Plan (FPP) shall include mitigation measures consistent with the unique problems resulting from the location, topography, geology, flammable vegetation, and climate of proposed site. The FPP shall address water supply, access, building

ignition and fire resistance, fire protection systems and equipment, defensible space and vegetation management.

FIRE RESISTANT – All plants will burn under extreme fire weather conditions such as drought. However, plants burn at different intensities and rate of consumption. Fire-resistive plants burn at a relatively low intensity, slow rates of spread and with short flame lengths.

FIRE RETARDANCE – Relative comparison of plant species related to differences in fuel volume, inherent flammability characteristics, and ease of fire spread.

FUEL BREAK – A wide strip or block of land on which the native or pre-existing vegetation has been permanently modified so that fires burning into it can be more readily extinguished.

FUEL LOAD – The weight of fuels in a given areas, usually expressed in tons per acre.

FUEL MODIFICATION ZONE – A strip of land where combustible native or ornamental vegetation has been modified and partially or totally replaced with drought tolerant, fire retardant, plants.

FUEL MOISTURE CONTENT – The amount of water in a fuel, expressed as a percentage of the oven dry weight of that fuel.

FUEL VOLUME – The amount of fuel in a plant in a given area of measurement. Generally an open-spaced plant will be low in volume.

HORIZONTAL CONTINUITY – The extent or horizontal distribution of fuels at various levels or planes.

LADDER FUELS – Fuels which provide vertical continuity between strata. Fire is able to carry from surface fuels by convection into the crowns with relative ease.

LANDSCAPE – Any improvement made to the property not classified as a structure.

LITTER – The uppermost layer of loose debris composed of freshly fallen or slightly decomposed organic material such as dead sticks, branches, twigs, leaves, or needles.

LONG TERM – In perpetuity of the fuel modification plan requirement.

PROBABILITY OF IGNITION – A rating of the probability that a firebrand (glowing or flaming) will cause a fire, providing it lands on receptive fuels. It is calculated from air temperature, fuel shading, and fuel moisture.

RADIANT HEAT – Transfer of heat by electromagnetic waves and can, therefore, travel against the wind. For example, it can preheat the opposite side of a burning slope in a steep canyon or a neighboring home to the ignition point.

RESERVE LANDS – As defined by the Central Coastal and Southern Natural Communities Conservation Plan.

SUBDIVISION – A parcel of land that is subdivided to create multiple individual lots in accordance with the State of California Subdivision Map Act.

SPECIAL FIRE PROTECTION AREA – See Very High Fire Hazard Severity Zone

STRUCTURE – That which is built or constructed, an edifice or building of any kind or any piece of work artificially built up or composed of parts joined together in some manner.

TARGET SPECIES – Undesirable species that are generally removed as part of the fuel modification plan (see undesirable species).

TREE FORM SHRUB – Those shrub species exceeding 4' in height.

UNDESIRABLE SPECIES – Those species of plants with inherent characteristics which make them highly flammable. These characteristics can be either physical or chemical. Physical properties include large amounts of dead material retained within the plant, rough or peeling bark, and the production of large amounts of litter. Chemical properties include the presence of volatile substances such as oils, resins, wax, and pitch. These plants are sometimes referred to as target species.

URBAN INTERFACE – That line, area, or zone where structures and other human development meet or intermingle.

VERTICAL CONTINUITY – The proximity of fuels to each other that governs the fire's capability to sustain itself. Vertical continuity applies to the relationship of aerial fuels to surface fuels or fuels low to the ground.

VERY HIGH FIRE HAZARD SEVERITY ZONE – Any geographic area designated pursuant to Government Code Section 51178 and/or local ordinance to contain the type and condition of vegetation, topography, weather, and structure density due to increased possibility of conflagration fires. See 2001 UFC Section 1101.1, Appendix II-A.

1.1.4. Attachments

1.1.4.1. Attachment 1: Landscape/Fuel Modification Plan Submittal Checklist

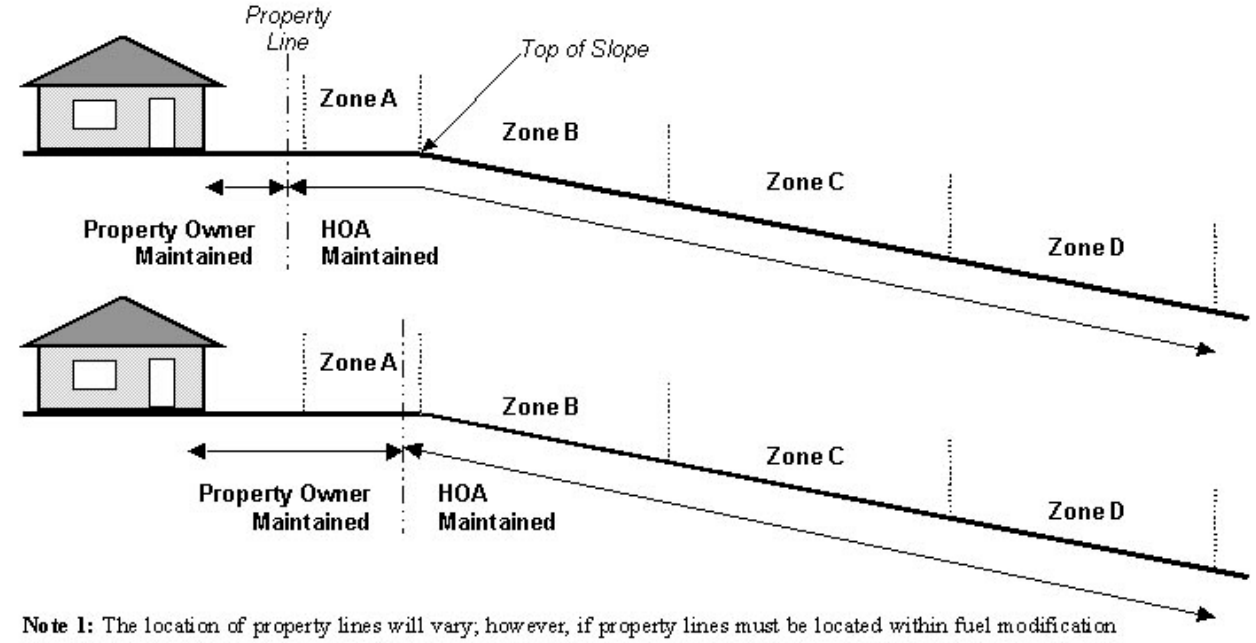
SUBMITTAL AND APPROVAL

	PRECISE PLANS
☐ ***Prior to issuance of building permit***	X
☐ Minimum plan size 18" x 24". Maximum plan size 24" x 36". Scale to be 1/8" = 1'0".	X
☐ Number of plans sets to the Zoning Department.	3 sets

PLAN REQUIREMENTS

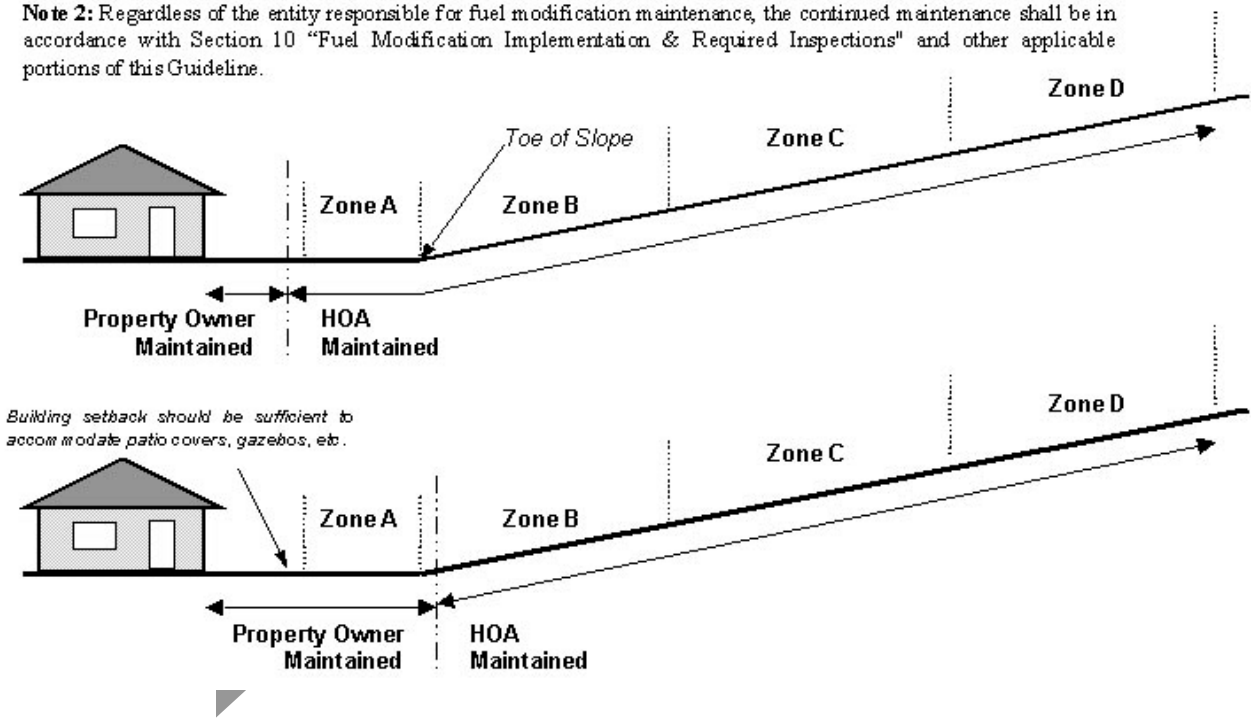
☐ Delineation of each fuel modification zone – line indicating limit of combustible construction (start of Zone A).	
☐ Scale Dimensions.	
☐ Site Characterization.	
☐ Photographs of area with emphasis on existing vegetation and topography.	
☐ Indication of permanent zone marker locations and detail.	
☐ Delineation of impacted existing vegetation.	
☐ Description of vegetation removal methodology.	
☐ Firefighter access routes around structure.	
☐ Plant palette & specifications, including a plant legend (botanical & common names) for existing and proposed plants. A matrix of typical spacing requirements as well as the following information: planting lines, topography, wind direction, neighboring lot lines.	
☐ Designation of irrigated area.	
☐ Irrigation plans and specifications (engineer scale) shall be provided upon request.	
☐ Removal of undesirable species (Attachment 7).	
☐ Property lines.	
☐ Contour lines.	
☐ Location of all new and existing improvements to include landscape (hardscape and softscape).	
☐ Maintenance access easements (if required).	
☐ Generally describe characteristics, existing improvements, land uses, wetland and riparian areas & vegetation for 300 feet beyond property lines in all directions.	
☐ Statement, on the plans, of ultimate maintenance responsibility requirement.	
☐ On title sheet, indicate tract/project conditions, CC&Rs, and/or deed restrictions relative to fuel modification areas.	
☐ Location of all proposed offsite fuel modification areas with easements.	

1.1.4.2. Attachment 2: Fuel Modification Configuration Options



Note 1: The location of property lines will vary; however, if property lines must be located within fuel modification areas, appropriate documentation (e.g., Maintenance easements and/or deed restrictions) shall be established to: 1) restrict certain activities and uses on those portions of any private property within the fuel modification area, and 2) identify those responsible for the establishment and continued maintenance of the fuel modification area located on private property.

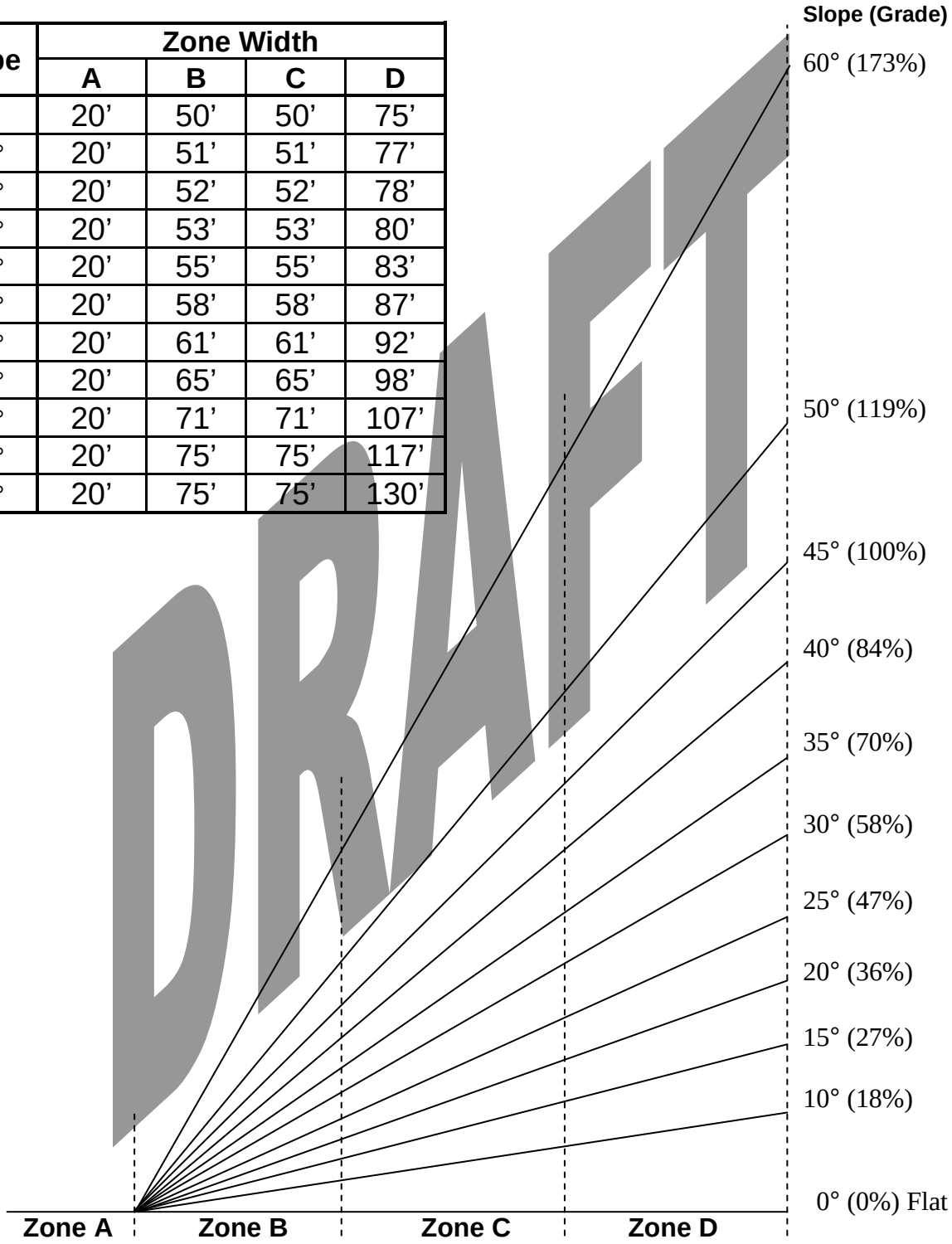
Note 2: Regardless of the entity responsible for fuel modification maintenance, the continued maintenance shall be in accordance with Section 10 "Fuel Modification Implementation & Required Inspections" and other applicable portions of this Guideline.



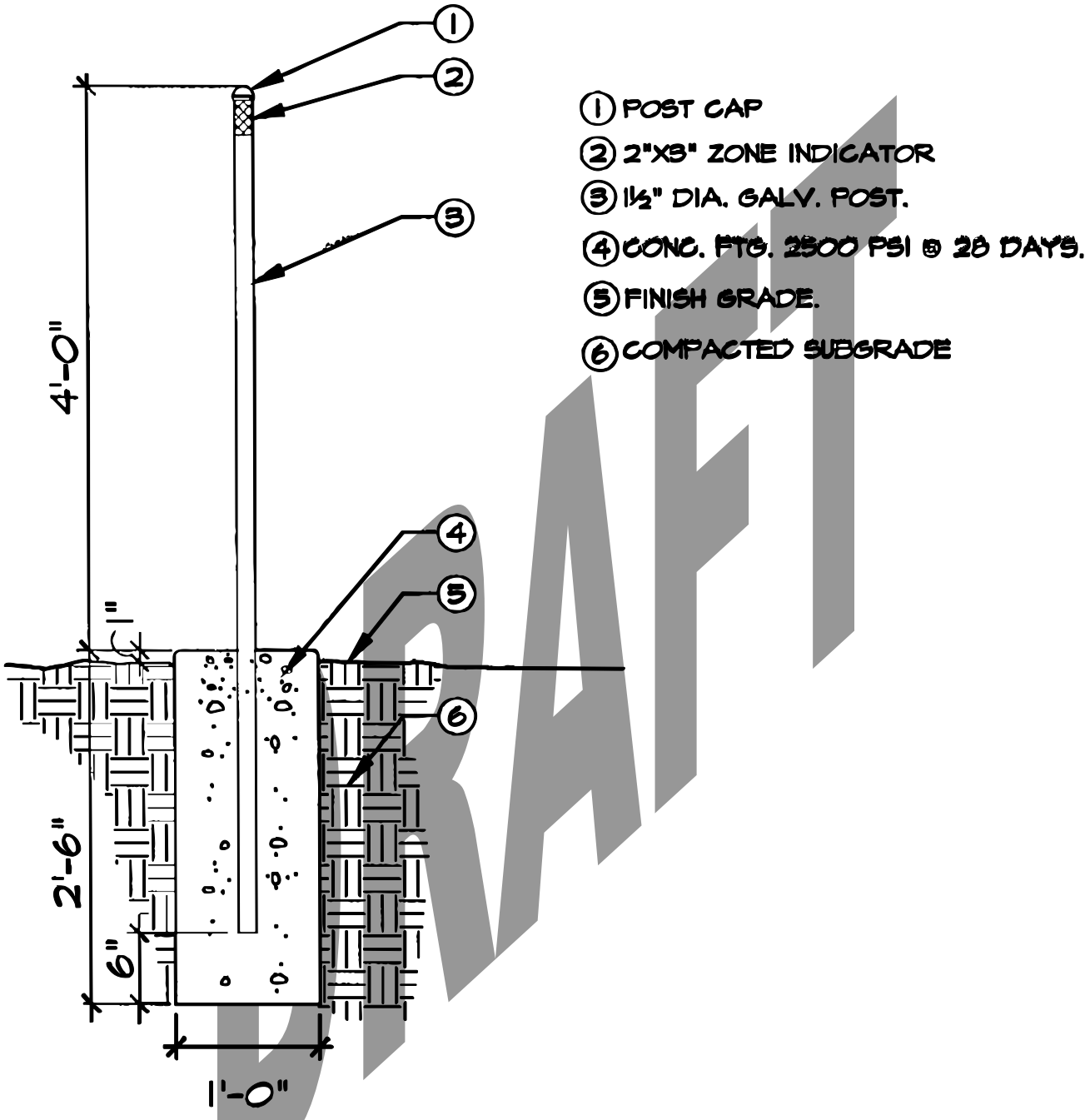
1.1.4.3. Attachment 3: Incline Measurement for Selected Slopes

(Measured Horizontal to Surface)

Slope	Zone Width			
	A	B	C	D
0°	20’	50’	50’	75’
10°	20’	51’	51’	77’
15°	20’	52’	52’	78’
20°	20’	53’	53’	80’
25°	20’	55’	55’	83’
30°	20’	58’	58’	87’
35°	20’	61’	61’	92’
40°	20’	65’	65’	98’
45°	20’	71’	71’	107’
50°	20’	75’	75’	117’
60°	20’	75’	75’	130’



1.1.4.4. Attachment 4: Zone Marker Details



Zone markers shall identify each zone with min. 2" contrasting lettering (e.g. Zone A) and placed every 50 lineal feet along each zone. A minimum of two markers per zone shall be required. Zone markers shall be maintained and serviceable at all times

1.1.4.5. Attachment 5: Sample CC&R Maintenance Language

It is recommended that the following language be included in the CC&Rs recorded for a common interest development.

The duty of the homeowners' association to perform "Fire Prevention Maintenance" (as defined below) for all Fuel Modification Zones and manufactured interior slopes within the development shall be included as an express obligation in the recorded CC&Rs for the development. Similarly, each Owner whose Lot (or Condominium) is subject to Fuel Modification Zone restrictions (e.g., non-combustible structure setback, etc.) shall be obligated to comply with such restrictions.

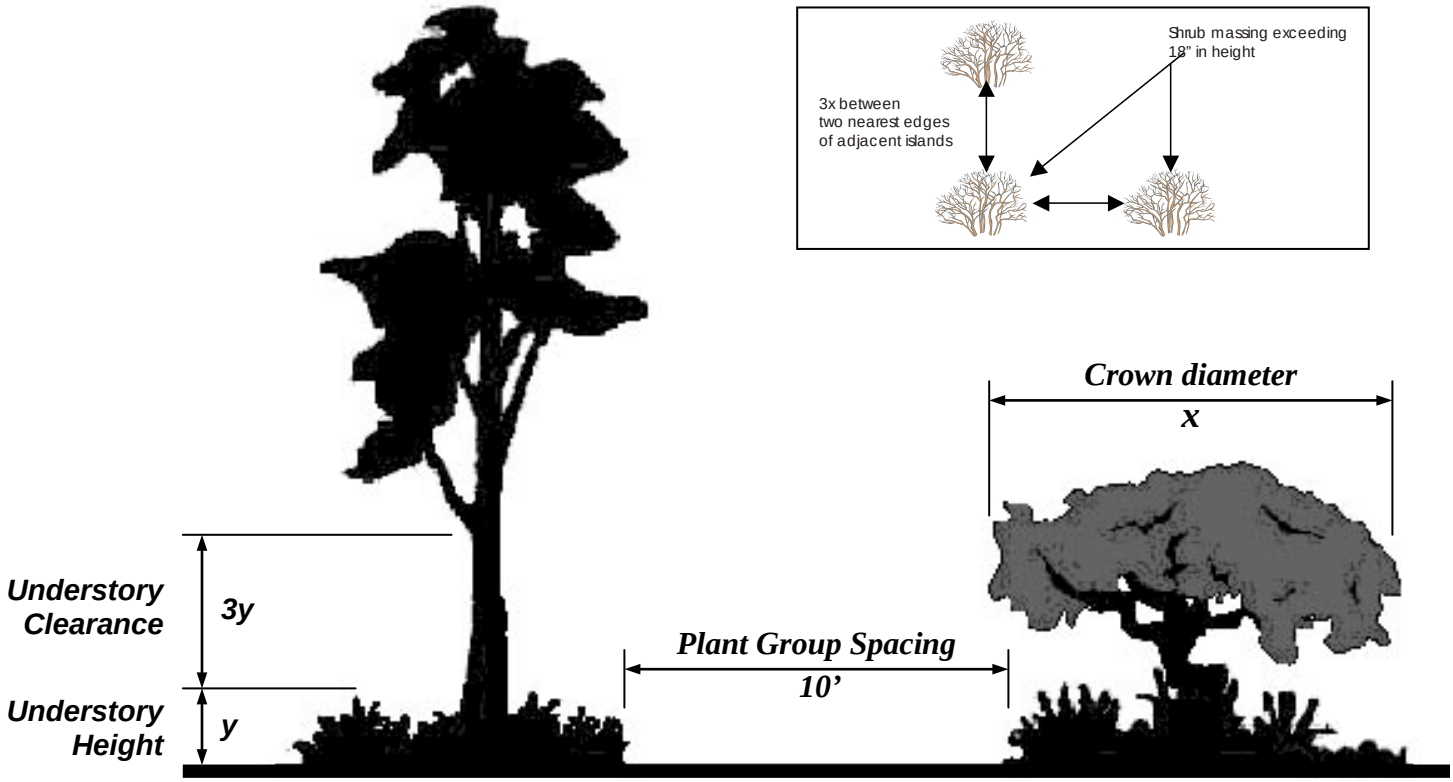
1. LBFD will be designated as a third party beneficiary of a homeowners' association's duty to perform "Fire Prevention Maintenance" (as defined below) for all portions of the Association Property (or Common Area) that constitute Fuel Modification Zones and designated interior/manufactured slopes to be maintained by the homeowners' association, and of any Owner's duty to comply with any Fuel Modification Zone restrictions applicable to his Lot (or Condominium). Additionally, LBFD shall have the right, but not the obligation, to enforce the homeowners' association's duty to perform such Fire Prevention Maintenance, and to enforce compliance by any Owner with any Fuel Modification Zone restrictions applicable to his Lot (or Condominium). In furtherance of such right, LBFD shall be entitled to recover its costs of suit, including its actual attorneys' fees, if it prevails in an enforcement action against a homeowners' association and/or an individual Owner. (A sample third party beneficiary provision to be incorporated into the CC&Rs is attached hereto as Addendum "1").
2. As used herein, "Fire Prevention Maintenance" shall mean the following:
   (i) All portions of the Association Property (or Common Area) that constitute Fuel Modification Zones or designated interior/manufactured slopes shall be regularly maintained by the homeowners association on a year round basis in accordance with the Fuel Modification Plan on file with the property manager for the development.
   (ii) The irrigation system for Fuel Modification Zones or designated interior/manufactured slopes shall be kept in good condition and proper working order at all times. The irrigation system shall not be turned off except for necessary repairs and maintenance.

ADDENDUM "1"

Enforcement by the City of Laguna Beach. The City of Laguna Beach (City) is hereby designated as an intended third party beneficiary of the Association's duties to perform Fire Prevention Maintenance for all portions of the Association Property (or Common Areas) consisting of Fuel Modification Zones or designated interior/manufactured slopes in accordance with the Fuel Modification Plan, and of each Owner's duty to comply with any Fuel Modification Zone or designated interior/manufactured slopes restrictions applicable to his Lot (or Condominium) as set forth in the Fuel Modification Plan. In furtherance thereof, the City shall have the right, but not the obligation, to enforce the performance by the Association of its duties and any other fire prevention requirements~~,~~ which were imposed by the City or other Public Agency as a condition of approval for the Development (e.g., prohibition of parking in fire lanes, maintenance of the blue reflective markers indicating the location of fire hydrants, etc.) and shall also have the right, but not the obligation, to enforce compliance by any Owner with any Fuel Modification Zone or designated interior/manufactured slopes restrictions

applicable to his Lot (or Condominium) as set forth in the Fuel Modification Plan. If, in its sole discretion, the City shall deem it necessary to take legal action against the Association or any Owner to enforce such duties or other requirements, and prevails in such action, the City shall be entitled to recover the full costs of said action, including its actual attorneys' fees, and to impose a lien against the Association Property, or an Owner's Lot (or Condominium), as the case may be, until said costs are paid in full.

1.1.4.6. Attachment 6: Tree and Tree Form Shrub Pruning and Spacing for New Plantings and Thinning Zones



NOT TO SCALE

1. Vertical Continuity. New and existing trees and tree-form shrubs (naturally reaching 4' and taller), which are being retained with the approval of the Laguna Beach Fire Department, shall be pruned to provide clearance of three times the height of the understory plant material or 10 feet, whichever is greater (see figure above). New trees and tree-form shrubs may comply with the lesser if sufficient height is not available to achieve 10 feet. Dead and excessively twiggy growth shall be removed.
2. Plant Group Spacing.
   a. Trees and tree-form shrubs shall be single specimens or in a maximum grouping of three plants. Groupings shall be separated by a distance of 10' (see figure above). Other limited grouping arrangements and spacing may be acceptable if approved by LBFD.

b. Trees shall be single specimens or in a maximum grouping of three plants. Groupings shall be separated by a distance of 10 feet (see figure above). Other limited grouping arrangements and spacing may be acceptable if approved by LBFD.
c. Plant specimens listed in the LBFD "Approved Plant Palette-Qualification Statements for Select Plant Species" shall comply with plant groupings and spacing requirements specified in those restrictions (see pages 31 and 32).

1.1.4.7. Attachment 7: Undesirable Plants and Species (Target Species)

Certain plants are considered to be undesirable in the landscape due to characteristics that make them highly flammable. These characteristics can be either physical or chemical. Physical properties that would contribute to high flammability include large amounts of dead material retained within the plant, rough or peeling bark, and the production of copious amounts of litter. Chemical properties include the presence of volatile substances such as oils, resins, wax, and pitch. Certain native plants are notorious for containing these volatile substances.

Plants with these characteristics shall not be planted in any of the fuel modification zones. Should these species already exist within these areas, they may be required to be removed because of the potential threat they pose to any structures. They are referred to as target species since their complete removal is a critical part of hazard reduction. These fire-prone plant species are (but not limited to):

FIRE PRONE PLANT SPECIES (MANDATORY REMOVAL)

Botanical Name	Common Name
Cynara Cardunculus	Artichoke Thistle
Ricinus Communis	Castor Bean Plant
Cirsium Vulgare	Wild Artichoke
Brassica Nigra	Black Mustard
Silybum Marianum	Milk Thistle
Sacsola Austails	Russian Thistle/Tumblewood
Nicotiana Bigelevil	Indian Tobacco
Nicotiana Glauca	Tree Tobacco
Lactuca Serriola	Prickly Lettuce
Conyza Canadensis	Horseweed
Heterothaca Grandiflora	Telegraph Plant
Anthemix Cotula	Mayweed
Urtica Urens	Burning Nettle
Cardaria Draba	Noary Cress, Perennial Peppergrass
Brassica Rapa	Wild Turnip, Yellow Mustard, Field Mustard
Adenostoma Fasciculatum	Chamise
Adenostoma Sparsifolium	Red Shanks
Cortaderia Selloana	Pampas Grass
Artemisia Californica	California Sagebrush
Eriogonum Fasciculatum	Common Buckwheat
Salvia Mellifera	Black Sage

Ornamental:

Corraders	Pampas Grass
Cupressus sp	Cypress
Eucalyptus sp	Eucalyptus
Juniperus sp	Juniper
Pinus sp	Pine

1.1.4.8. Attachment 8: Fuel Modification Zone Plant List

(Note: Legend can be found on page 31)

	Code	Botanical Name	Common Name	Plant Form
1.	W	Abelia x grandiflora	Glossy Abelia	Shrub
2.	n	Acacia redolens desert carpet	Desert Carpet	Shrub
3.	o	Acer macrophyllum	Big Leaf Maple	Tree
4.	X	Achillea millefolium	Common Yarrow	Low Shrub
5.	W	Achillea tomentosa	Woolly Yarrow	Low Shrub
6.	X	Aeonium decorum	Aeonium	Ground cover
7.	X	Aeonium simsii	no common name	Ground cover
8.	W	Agave attenuata	Century Plant	Succulent
9.	W	Agave shawii	Shaw's Century Plant	Succulent
10.	N	Agave victoriae-reginae	no common name	Ground Cover
11.	X	Ajuga reptans	Carpet Bugle	Ground Cover
12.	W	Alnus cordata	Italian Alder	Tree
13.	o	Alnus rhombifolia	White Alder	Tree
14.	N	Aloe arborescens	Tree Aloe	Shrub
15.	N	Aloe aristata	no common name	Ground Cover
16.	N	Aloe brevifoli	no common name	Ground Cover
17.	W	Aloe Vera	Medicinal Aloe	Succulent
18.	W	Alogyne huegeii	Blue Hibiscus	Shrub
19.	o	Ambrosia chammissonis	Beach Bur-Sage	Perennial

20.	o	Amorpha fruticosa	Western False Indigobush	Shrub
21.	W	Anigozanthus flavidus	Kangaroo Paw	Perennial/accent
22.	o	Antirrhinum nuttalianum ssp.	no common name	Subshrub
23.	X	Aptenia cordifolia x ‘Red Apple’	Red Apple Aptenia	Ground cover
24.	W	Arbutus unedo	Strawberry Tree	Tree
25.	W	Arctostaphylos ‘Pacific Mist’	Pacific Mist Manzanita	Ground Cover
26.	W	Arctostaphylos edmundsii	Little Sur Manzanita	Ground Cover
27.	o	Arctostaphylos glandulosa ssp.	Eastwood Manzanita	Shrub
28.	W	Arctostaphylos hookeri ‘Monterey Carpet’	Monterey Carpet Manzanita	Low Shrub
29.	N	Arctostaphylos pungens	no common name	Shrub
30.	N	Arctostaphylos refugioensis	Refugio Manzanita	Shrub
31.	W	Arctostaphylos uva-ursi	Bearberry	Ground Cover
32.	W	Arctostaphylos x ‘Greensphere’	Greensphere Manzanita	Shrub
33.	N	Artemisia caucasica	Caucasian Artesmisia	Ground Cover
34.	X	Artemisia pycnocephala	Beach Sagewort	Perennial
35.	X	Atriplex canescens	Four-Wing Saltbush	Shrub
36.	X	Atriplex lentiformis ssp. breweri	Brewer Saltbush	Shrub
37.	o	Baccharis emoyi	Emory Baccharis	Shrub
38.	W o	Bacharis pilularis ssp. Consanguinea	Chaparral Bloom	Shrub
39.	X	Baccharis pilularis var. pilularis ‘Twin Peaks #2’	Twin Peaks	Ground Cover
40.	o	Baccharis salicifolia	Mulefat	Shrub
41.	N	Baileya Multiradiata	Desert Marigold	Ground Cover
42.	W	Beaucarnea recurvata	Bottle Palm	Shrub/Small Tree
43.	N n	Bougainvillea spectabilis	Bougainvillea	Shrub
44.	N n	Brahea armata	Mexican Blue Palm/Blue Hesper Palm	Palm
45.	N n	Brahea brandegeei	San Jose Hesper Palm	Palm
46.	N n	Brahea edulis	Guadalupe Palm	Palm

47.	o	Brickellia californica	no common name	Subshrub
48.	W o	Bromus carinatus	California Brome	Grass
49.	o	Camissonia cheiranthifiloa	Beach Evening Primrose	Perennial Shrub
50.	N	Carissa macrocarpa	Green Carpet Natal Plum	Ground Cover/Shrub
51.	X	Carpobrotus chilensis	Sea Fig Ice Plant	Ground Cover
52.	W	Ceanothus gloriosus 'Point Reyes'	Point Reyes Ceanothus	Shrub
53.	W	Ceanothus griseus 'Louis Edmunds'	Louis Edmunds Ceanothus	Shrub
54.	W	Ceanothus griseus horizontalis	Yankee Point	Ground Cover
55.	W	Ceanothus griseus var. horizontalis	Carmel Creeper Ceanothus	Shrub
56.	W	Ceanothus griseus var. horizontalis 'Yankee Point'	Yankee Point Ceanothus	Shrub
57.	o	Ceanothus megarcarpus	Big Pod Ceanothus	Shrub
58.	W	Ceanothus prostratus	Squaw Carpet Ceanothus	Shrub
59.	o	Ceanothus spinosus	Green Bark Ceanothus	Shrub
60.	W	Ceanothus verrucosus	Wart-Stem Ceanothus	Shrub
61.	W	Cerastium tomentosum	Snow-in-Summer	Ground cover/Shrub
62.	W	Ceratonia siliqua	Carob	Tree
63.	W	Cercis occidentalis	Western Redbud	Shrub/Tree
64.	X	Chrysanthemum leucanthemum	Oxeye Daisy	Ground Cover
65.	W	Cistus Crispus	no common name	Ground Cover
66.	W	Cistus hybridus	White Rockrose	Shrub
67.	W	Cistus incanus	no common name	Shrub
68.	W	Cistus incanus ssp. Corsicus	no common name	Shrub
69.	W	Cistus salviifolius	Sageleaf Rockrose	Shrub
70.	W	Cistus x purpureus	Orchid Rockrose	Shrub
71.	W	Citrus species	Citrus	Tree
72.	o	Clarkia bottae	Showy Fairwell to Spring	Annual
73.	o	Cneoridium dumosum	Bushrue	Shrub

74.	o	Collinsia heterophyllia	Chinese Houses	Annual
75.	W o	Comarostaphylis diversifolia	Summer Holly	Shrub
76.	N	Convolvulus cneorum	Bush Morning Glory	Shrub
77.	W	Coprosma kirkii	Creeping Coprosma	Ground Cover/Shrub
78.	W	Coprosma pumila	Prostrate Coprosma	Low shrub
79.	o	Coreopsis californica	Califiornia Coreopsis	Annual
80.	W	Coreopsis lanceolata	Coreopsis	Ground Cover
81.	N	Corea pulchella	Australian Fuscia	Ground Cover
82.	W	Cotoneaster buxifolius	no common name	Shrub
83.	W	Cotoneaster congestus ‘Likiang’	Likiang Cotoneaster	Ground Cover/Vine
84.	W	Cotoneaster aprneyi	no common name	Shrub
85.	X	Crassula lactea	no common name	Ground Cover
86.	X	Crassula multicava	no common name	Ground Cover
87.	X	Crassula ovata	Jade Tree	Shrub
88.	X	Crassula tetragona	no common name	Ground Cover
89.	W o	Croton californicus	California Croton	Ground Cover
90.	X	Delosperma ‘alba’	White trailing Ice Plant	Ground Cover
91.	o	Dendromecon rigida	Bush Poppy	Shrub
92.	o	Dichelostemma capitatum	Blue Dicks	Herb
93.	N	Distinctis buccinatoria	Blood-Red Trumpet Vine	Vine/Climbing vine
94.	N	Dodonaea viscosa	Hopseed Bush	Shrub
95.	X	Drosanthemum floribundum	Rosea Ice Plant	Ground Cover
96.	X	Drosanthemum hispidum	no common name	Ground Cover
97.	X	Drosanthemum speciosus	Dewflower	Ground Cover
98.	o	Dudleya lanceolata	Lance-leaved Dudleya	Succulent
99.	o	Dudleya pulverulenta	Chalk Dudleya	Succulent
100.	W	Elaeagnus pungens	Silverberry	Shrub

101.	o	Encelia californica	California Encelia	Small Shrub
102.	o *	Epilobium canum [Zauschneria californica]	Hoary California Fuschia	Shrub
103.	o	Eriastrum Sapphirinum	Mojave Woolly Star	Annual
104.	N	Eriobotrya japonica	Loquat	Tree
105.	o	Eriodictycon crassifolium	Thick Leaf Yerba Santa	Shrub
106.	o	Eriodictycon trichocalyx	Yerba Santa	Shrub
107.	W o	Eriophyllum confertiflorum	no common name	Shrub
108.	W	Erythrina species	Coral Tree	Tree
109.	N	Escallonia species	Several varieties	Shrub
110.	W o	Eschscholzia californica	California Poppy	Flower
111.	X	Eschscholzia mexicana	Mexican Poppy	Herb
112.	N	Euonymus fortunei	Winter Creeper Euonymus	Ground Cover
113.	N	Feijoa sellowiana	Pineapple Guava	Shrub/Tree
114.	N	Fragaria chiloensis	Wild Strawberry/Sand Strawberry	Ground Cover
115.	o	Frankenia salina	Alkali Heath	Ground Cover
116.	W	Fremontondendron californicum	California Flannelbush	Shrub
117.	X	Gaillardia x grandiflora	Blanketflower	Ground Cover
118.	W	Galvezia speciosa	Bush Snapdragon	Shrub
119.	W	Garrya ellipta	Silktassel	Shrub
120.	X	Gazania hybrids	South African Daisy	Ground Cover
121.	X	Gazania rigens leucolaena	Training Gazania	Ground Cover
122.	o	Gillia capitata	Globe Gilia	Perrenial
123.	W	Gilia leptantha	Showy Gilia	Perrenial
124.	W	Gilia tricolor	Bird’s Eyes	Perrenial
125.	W	Ginkgo biloba	Maidenhair Tree	Tree
126.	o	Gnaphalium Californicum	California Everlasting	Annual
127.	W	Grewia occidentalis	Starflower	Shrub

128.	o	Grindelia stricta	Gum Plant	Ground Cover
129.	N n	Hakea suaveolens	Sweet Hakea	Shrub
130.	W	Hardenbergia comptoniana	Lilac Vine	Shrub
131.	N	Heliathemum muutabile	Sunrose	Ground Cover/Shrub
132.	o	Helianthemum scoparium	Rush Rose	Shrub
133.	o	Heliotropium curassavicum	Salt Heliotrope	Ground Cover
134.	X	Helix Canariensis	English Ivy	Ground Cover
135.	W	Hesperaloe parviflora	Red Yucca	Perennial
136.	o n	Heteromeles arbutifolia	Toyon	Shrub
137.	X	Hypericum calycimum	Aaron's Beard	Shrub
138.	N	Iberis sempervirens	Edging Candytuft	Ground Cover
139.	N	Iberis umbellatum	Globe Candytuft	Ground Cover
140.	o	Isocoma menziesii	Coastal Goldenbush	Small Shrub
141.	o	Isomeris arborea	Bladderpod	Shrub
142.	W	Iva hayesiana	Poverty Weed	Ground Cover
143.	N	Juglans californica	California Black Walnut	Tree
144.	o	Juncus acutus	Spiny Rush	Perrenial
145.	o	Keckiella antirrhinoides	Yellow Bush Penstemon	Subshrub
146.	o	Keckiella cordifolia	Heart Leaved Penstemon	Subshrub
147.	o	Keckiella ternata	Blue Stemmed Bush Penstemon	Subshrub
148.	W	Kniphofia uvaria	Red Hot Poker	Perennial
149.	W	Lagerstroemia indica	Crape Myrtle	Tree
150.	W	Lagunaria patersonii	Primrose Tree	Tree
151.	X	Lamprathus aurantiacus	Bush Ice Plant	Ground Cover
152.	X	Lampranthus filicaulis	Redondo Creeper	Ground Cover
153.	X	Lampranthus spectabilis	Trailing Ice Plant	Ground Cover
154.	W	Lantana camara cultivars	Yellow Sage	Shrub

155.	W	Lantana montevidensis	Trailing Lantana	Shrub
156.	o	Lasthenia californica	Dwarf Goldfields	Annual
157.	W	Lavandula dentata	French Lavender	Shrub
158.	W	Leptospermum laevigatum	Australian Tea Tree	Shrub
159.	W	Leucophyllum frutescens	Texas Ranger	Shrub
160.	o	Leymus condensatus	Giant Wild Rye	Large Grass
161.	N	Ligustrum japonicum	Texas privet	Shrub
162.	X	Limonium pectinatum	no common name	Ground Cover
163.	X	Limonium perezii	Sea Lavender	Shrub
164.	W n	Liquidambar styraciflua	American Sweet Gum	Tree
165.	W	Liriodendron tulipfera	Tulip Tree	Tree
166.	X	Lonicera japonica ‘Halliana’	Hall’s Japanese Honeysuckle	Vining Shrub
167.	o	Lonicera subspicata	Wild Honeysuckle	Vining Shrub
168.	X	Lotus corniculatus	Bird’s Foot Trefoil	Ground Cover
169.	o	Lotus hermannii	Northern Woolly Lotus	Perennial
170.	o	Lotus scoparius	Deerweed	Shrub
171.	W	Lupinus arizonicus	Desert Lupine	Annual
172.	W	Lupinus benthamii	Spider Lupine	Annual
173.	o	Lupinus bicolor	Sky Lupine	Flowering annual
174.	o	Lupinus sparsiflorus	Loosely Flowered Annual Lupine/Coulter’s Lupine	Annual
175.	W	Lyonothamnus floribundus ssp. Asplenifolius	Fernleaf Ironwood	Tree
176.	W	Macadamia integrifolia	Macadamia Nut	Tree
177.	W	Mahonia aquifolium ‘Golden Abundance’	Golden Abundance Oregon Grape	Shrub
178.	W	Mahonia nevenii	Nevin Mahonia	Shrub
179.	o	Malacothamnus Fasciculatus	Chapparal Mallow	Shrub
180.	X	Malephora luteola	Training Ice Plant	Ground Cover
181.	W	Maytenus boaria	Mayten Tree	Tree

182.	W	Melaleuca nesophila	Pink Melaleuca	Shrub
183.	N	Metrosideros excelsus	New Zealand Christmas Tree	Tree
184.	o *	Mimulus species	Monkeyflower	Flower
185.	o	Mirabilis californica	Wishbone Bush	Perrenial
186.	N	Myoporum debile	no common name	Shrub
187.	W	Myoporum insulare	Boobyalla	Shrub
188.	W	Myoporum parvilfolium	no common name	Ground Cover
189.	W	Myoporum ‘Pacificum’	no common name	Ground Cover
190.	o	Nassella (stipa) lepidra	Foothill Needlegrass	Ground Cover
191.	o	Nassella (stipa) pulchra	Purple Needlegrass	Ground Cover
192.	o	Nemophilia menziesii	Baby Blue Eyes	Annual
193.	X	Nerium Oleander	Oleander	Shrub
194.	o	Nolina cismontana	Chapparal Nolina	Shrub
195.	N	Nolina species	Mexican Grasstree	Shrub
196.	W	Oenothera belandieri	Mexican Evening Primrose	Ground Cover
197.	N	Oenothera hookeri	California Evening Primrose	Flower
198.	W	Oenothera speciosa	Show Evening Primrose	Perrenial
199.	X	Ophiopogon japonicus	Mondo Grass	Ground Cover
200.	o *	Opuntia littoralis	Prickly Pear	Cactus
201.	o *	Opuntia oricola	Oracle Cactus	Cactus
202.	o *	Opuntia prolifera	Coast Cholla	Cactus
203.	W	Osmanthus fragrans	Sweet Olive	Shrub
204.	X	Osteospermum fruticosum	Training African Daisy	Ground Cover
205.	X	Parkinsonia aculeata	Mexican Palo Verde	Tree
206.	W	Pelargonium peltatum	Ivy Geranium	Ground Cover
207.	X	Penstemon species	Beard Tongue	Shrub
208.	W	Photinia fraseria	no common name	Shrub

209.	W	Pistacia chinesis	Chinese Pistache	Tree
210.	X	Pittosporum undulatum	Victorian Box	Tree
211.	o	Plantago erecta	California Plantain	Annual
212.	**	Plantago insularis	Woolly Plantain	Annual
213.	X	Plantago sempervirens	Evergreen Plantain	Ground Cover
214.	W	Plantanus racemosa	California Sycamore	Tree
215.	W	Plumbago auritulata	Plumbago Cape	Shrub
216.	o	Popolus fremontii	Western Cottonwood	Tree
217.	X	Portulacaria Afra	Elephant's Food	Shrub
218.	o	Potentilla glandulosa	Sticky Cinquefoil	Subshrub
219.	X	Potentilla tabernaemontanii	Spring Cinquefoil	Ground Cover
220.	X	Prunus caroliniana	Carolina Cherry Laurel	Shrub/Tree
221.	o	Prunus ilicifolia ssp. Ilicifolia	Holly Leafed Cherry	Shrub
222.	X	Prunus lyonii	Catalina Cherry	Shrub/Tree
223.	N	Punica granatum	Pomegranate	Shrub/Tree
224.	W	Puya species	Puya	Succulent/Shrub
225.	W	Pyracantha species	Firethorn	Shrub
226.	o	Quercus agrifolia	Coast Live Oak	Tree
227.	o n *	Quercus berberdifolia	California Scrub Oak	Shrub
228.	o n *	Quercus dumosa	Coastal Scrub Oak	Shrub
229.	X	Quercus engelmannii	Engelmann Oak	Tree
230.	X	Quercus suber	Cork Oak	Tree
231.	X	Rhamnus alaternus	Italian Buckthorn	Shrub
232.	o	Rhamnus californica	California Coffee Berry	Shrub
233.	o	Rhamnus crocea	Redberry	Shrub
234.	o	Rhamnus crocea ssp. Ilicifolia	Hollyleaf Redberry	Shrub
235.	N	Rhaphiolepis species	Indian Hawthorne	Shrub

236.	o	Rhus integrifolia	Lemonade Berry	Shrub
237.	N	Rhus lancea	African Sumac	Tree
238.	o n	Rhus ovata	Sugarbush	Shrub
239.	o	Ribes aureum	Golden Currant	Shrub
240.	o	Ribes indecorum	White Flowering Currant	Shrub
241.	o	Ribes speciosum	Fuschia Flowering Goosebberry	Shrub
242.	W	Ribes viburnifolium	Evergreen currant	Shrub
243.	o *	Romneya coulteri	Matilija Poppy	Shrub
244.	X	Romneya coulteri 'White Cloud'	White Cloud Matilija Poppy	Shrub
245.	W n	Rosmarinus officinalis	Rosemary	Shrub
246.	W n	Salvia greggii	Autums Sage	Shrub
247.	W n	Salvia sonomensis	Creeping Sage	Ground Cover
248.	o	Sambucus mexicana	Mexican Elderberry	Tree
249.	W	Santolina chamaecyparissus	Lavender Cotton	Ground Cover
250.	W	Santolina virens	Green Lavender Cotton	Shrub
251.	o	Satureja chandleri	San Miguel Savory	Perennial
252.	o	Scirpis scutus	Hard Stem Bulrush	Perennial
253.	o	Scirpus californicus	California Bulrush	Perennial
254.	X	Sedum acre	Goldmoss Sedum	Ground Cover
255.	X	Sedum album	Green Stonecrop	Ground Cover
256.	X	Sedum confusum	no common name	Ground Cover
257.	X	Sedum lineare	no common name	Ground Cover
258.	X	Sedum x rubrotinctum	Pork and Beans	Ground Cover
259.	X	Senecio serpens	no common name	Ground Cover
260.	o	Sisyrinchium bellum	Blue Eyed Grass	Ground Cover
261.	o	Solanum douglasii	Douglas Nightshade	Shrub
262.	o	Solanum xantii	Purple nightshade	Perennial

263.	W	Stenicarpus sinuatus	Firewheel Tree	Tree
264.	W	Strelitzia nicolai	Giant Bird of Paradise	Perennial
265.	W	Strelitzia reginae	Bird of Paradise	Perennial
266.	o	Symphoricarpos mollis	Creeping Snowberry	Shrub
267.	W	Tecoma stans (Stenolobium stans)	Yellow Bells	Shrub/Small Tree
268.	X	Tecomaria capensis	Cape Honeysuckle	Ground Cover
269.	N	Teucarium chamedrys	Germander	Ground Cover
270.	N	Thymus serpyllum	Lemon Thyme	Ground Cover
271.	N	Trachelospermum jasminoides	Star Jasmine	Shrub
272.	o	Trichosstems lanatum	Woolly Blue Curls	Shrub
273.	X	Trifolium hirtum ‘Hyron’	Hyron Rose Clover	Ground Cover
274.	X	Trifolium fragerum ‘O’Connor’s’	O’Connor’s Legume	Ground Cover
275.	o	Umbellularia californica	California Laurel	Tree
276.	o	Verbena lasiostachys	Western Vervain	Perennial
277.	N	Verbena peruviana	no common name	Ground Cover
278.	X	Verbena species	Verbena	Ground Cover
279.	X	Vinca Minor	Dwarf Periwinkle	Ground Cover
280.	o	Vitis girdiana	Desert Wild Grape	Vine
281.	X	Vulpia myuros ‘Zorro’	Zorro Annual Fescue	Grass
282.	W	Westringia fruticosa	no common name	Shrub
283.	W	Xannithorrhoea species	Grass Tree	Perennial accent/shrub
284.	W	Xylosma congestum	Shiny Xylosma	Shrub
285.	X	Yucca Species	Yucca	Shrub
286.	o	Yucca whipplei	Yucca	Shrub

Legend:

X = Plant species prohibited in wet and dry fuel modification zones adjacent to reserve lands. Acceptable on all other fuel modification locations and zones.

W = Plant species appropriate for use in wet fuel modification zones adjacent to reserve lands. Acceptable in all other wet and irrigated dry (manufactured slopes) fuel modification locations and zones.

o **=** Plant species native to Orange County. Acceptable in all fuel modification wet and dry zones in all locations.

N = Plant species acceptable on a limited basis (maximum 30% of the area at the time of planting) in wet fuel modification zones adjacent to reserve lands. Acceptable on all other fuel modification zones.

***** = If locally collected.

****** = Not native but can be used in all zones.

n = Plant species acceptable on a limited use basis. Refer to qualification requirements following plant palette.

Approved Plant Palette – Qualification statements for Select Plant Species

2. Acacia redolens desert carpet: May be used in the upper ½ of the "B" fuel modification zone. The plants may be planted at 8-foot on center, maximum spacing in meandering zones not to exceed a mature width of 24 feet or a mature height of 24 inches.

43. Bougainvillea spectabilis (procumbent varieties): Procumbent to mounding varieties may be used in the mid "B" fuel modification zone. The plants may be planted in clusters at 6-foot on center spacing not to exceed eight plants per cluster. Mature spacing between individual plants or clusters shall be 30-foot minimum.

44. Brahea armata: Additional information may be required as directed by LBFD.

45. Brahea brandegeel: Additional information may be required as directed by LBFD.

46. Brahea edulis: May be used in upper and mid "B" fuel modification zone. The plants shall be used as single specimens with mature spacing between palms of 20-foot minimum.

129. **Hakea Suaveolens:** May be used in the mid "B" fuel modification zone. The plants shall be used as single specimens with mature spacing between plants of 30-foot minimum.

136. Heteromeles arbutifolia: May be used in the mid to lower "B" fuel modification zone. The plants may be planted in clusters of up to 3 plants per cluster. Mature spacing between individual plants or clusters shall be 30-foot minimum.

164. Liquidambar styraciflua: May be used in the mid "B" fuel modification zone. The plant shall be used as single specimens with mature spacing between trees and 30-foot minimum.

227. Quercus berberdifolia: Additional information may be required as directed by LBFD.

228. Quercus dumosa: May be used in the mid to lower "B" fuel modification zone. The plants may be planted in clusters of up to 3 plants per cluster. Mature spacing between individual plants or clusters shall be 30-foot minimum.

238. Rhus ovata: May be used in the mid to lower "B" fuel modification zone of inland areas only. The plants may be planted in clusters of up to 3 plants per cluster. Mature spacing between individual plants or clusters shall be 30-foot minimum.

245. Rosmarinus officinalis: Additional information may be required as directed by LBFD.

246. Salvia greggii: Additional information may be required as directed by LBFD.

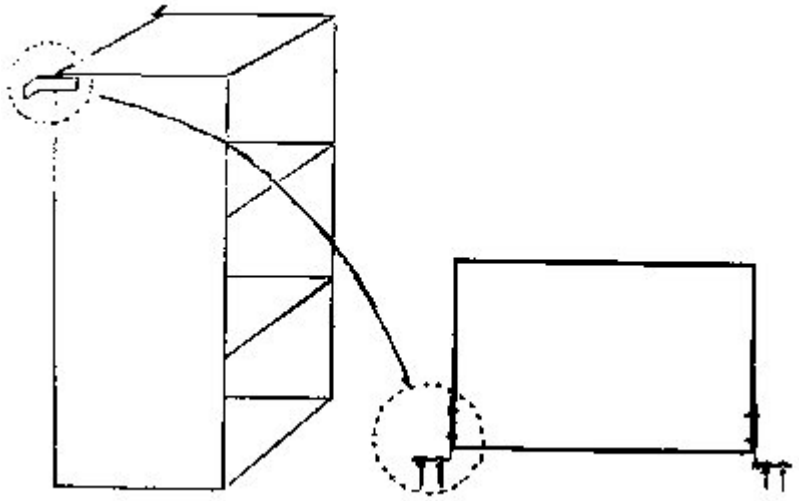
247. Salvia sonomensis: May be used in the mid to upper "B" fuel modification zone. The plants may be planted in clusters of up to 3 plants per cluster. Mature spacing between individual plants or clusters shall be 15-foot minimum.

For the latest fuel modification information, please contact the Laguna Beach Fire Department.

2. EARTHQUAKE PREPAREDNESS

The responsibility for earthquake preparedness does not end with the city. Individuals and communities should also take measures to prepare for earthquakes and other natural disasters. *Earthquake Preparedness* (1996a) lists the following tips on how to secure furniture.

1. Secure Overhead Objects
2. Ceiling lights and fans should be additionally supported with a cable bolted to the ceiling joist. The cable should have enough slack to allow it to sway.
3. Framed pictures, especially glass-covered, should be hung from closed hooks so that they can't bounce off. Only soft art such as tapestries should be placed over beds and sofas.
4. Anchor Your Furniture: Secure the tops of all, top-heavy furniture such as bookcases and file cabinets to the wall. Be sure to anchor to the stud, not just to the plasterboard. Flexible fasteners such as nylon straps allow tall objects to sway without falling over, reducing the strain on the studs.

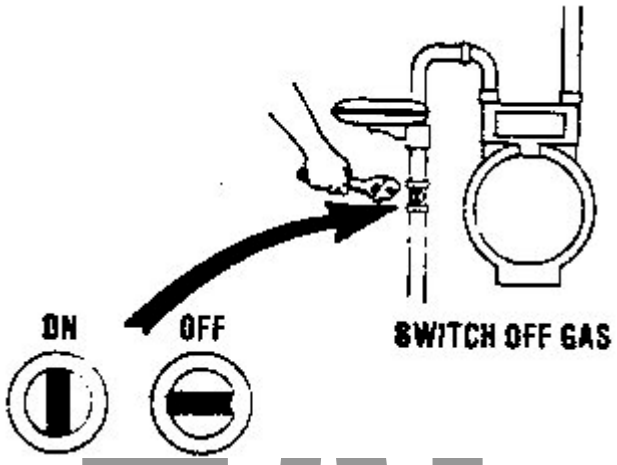


3. UTILITY SHUT OFF

Turning off valves can prevent further damage and destruction due to a major disaster. *Utility Shut Off* (1996b) lists the following tips on how to turn off gas, water, and electricity.

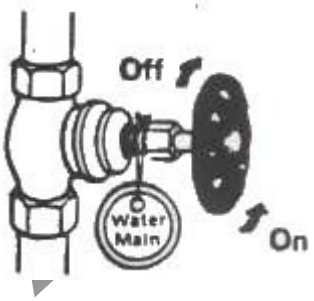
3.1. Gas

Shut off gas only if you suspect a gas leak or can smell escaping gas. The main shut-off valve is located next to your meter on the inlet pipe. Use a wrench and give it a quarter turn in either direction so that it runs crosswise on the pipe. The line is not closed.



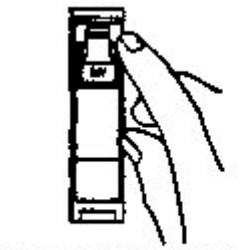
3.2. Water

After the quake make a visual inspection for leaks in your plumbing system. If leaks are discovered, shut off the water at the house valve. If the house valve does not work, shut off the water at the meter (located in a concrete box in the sidewalk).

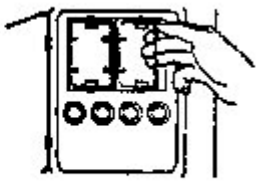


3.3. Electricity

Know the location of your main service switch handle - to cut off main power supply-and your branch circuit panel.



CIRCUIT BREAKER



PULL-OUT
CARTRIDGE FUSES

V. COMMUNICATION

The following communication plan is prepared utilizing the *Emergency Management Plan* (1997) in conjunction with the Laguna Beach Police Department.

The Communications Unit is responsible for the City's emergency communications operations. This unit is the primary responsibility of the Police Department.

1. COMMUNICATION FACILITIES

The City of Laguna Beach communications system operates from the Police/Fire Dispatch Center on the lower level of City Hall at 505 Forest Avenue. The Dispatch Center relays radio signals from a 175-watt transmitter/receiver base located at Moorhead Station in North Laguna. The Moorhead Station also serves the Laguna County Water District, Orange County Transit and local paramedic and Pager services. A second transmitter/receiver is located on Catalina Island.

The City also utilizes satellite receivers located at Fire Station 4 in South Laguna and at the City's Animal Shelter facility in Laguna Canyon.

Both the City Hall Dispatch Center and Moorhead Station are equipped with emergency backup generator systems in the event of loss of electricity. The system is not entirely disaster-proof, however. In the case of the 1993 Firestorm, the City briefly lost its entire communications system when the fire burned transmission lines leading from the Moorhead transmitter to its main communication antenna. In a situation where Moorhead communications are lost, the City would request a Mobile Communications Command Post facility from the Orange County Coordinated Communication Systems until repairs could be made.

The Police Department is responsible for maintaining communications facilities, and for taking preventatives measures to protect communication equipment, such as installation of special lightning-proof equipment.

2. EMERGENCY 9-1-1 SERVICE

All 9-1-1 calls are answered by the Police/Fire Dispatcher and directed to the appropriate responder (Police and/or Fire and/or Marine Safety and/or municipal Services). In the event that service of the 9-1-1 system is temporarily disrupted or lost, all 9-1-1 calls are automatically rerouted to the Orange County Communications sub-station located at the San Clemente Fire Department and directed back to Laguna Beach Police/Fire Dispatchers via telephone. The public could also contact the Laguna Beach Police directly by dialing 497-0701.

3. INTERDEPARTMENTAL FIELD COMMUNICATIONS

Utilizing an updated 800MHz radio system, The City's Police, Fire, Marine Safety, and Public Works Departments can communicate directly with each other while in the field. The dispatch center can still relay radio communications between these departments as needed.

4. COUNTYWIDE COMMUNICATIONS

In addition to its local communication system, both the Police/Fire Dispatcher and the field personnel are also linked with a broad network of emergency personnel through the Orange County Coordinated Communications System. Through this system, Laguna Beach units may communicate with various county jurisdictions, including the OC Sheriffs, OC Fire Authority, OC Lifeguards, OC Harbor Patrol, and various county agencies in addition to jurisdictions outside of Orange County.

5. "CONTROL ONE" AND "OCC"

The County of Orange operates a 24-hour, 7-day-a-week Coordinated Communications Center accessible to all local jurisdiction. The Center is known by two call signs: "CONTROL ONE" and "OCC." The "OCC" radio call sign is used within the Paramedic Coordinated Communications System. The CONTROL ONE call sign is used for all other radio and telephone systems. Located atop Loma Ridge, CONTROL ONE is the central contact point for major emergency and disaster situations and Mutual Aid requests. Control One can be utilized to request immediate outside resources or simply to relay information to outside jurisdictions.

Control One also operates six Mobile Communications Command Posts, which can be transported to disaster sites to reestablish communications until pre-existing communications are restored.

6. EMERGENCY ALERT SYSTEM (EAS)

The Emergency Alert System is a network of public broadcast stations and interconnecting facilities, which have been authorized by the Federal Communications Commission (FCC) to operate in a controlled manner. The system is voluntary in structure and designed to provide the public with information about a situation or instructions on how to react to a situation that may pose a threat or actual danger to people or their property.

7. RADIO AMATEUR CIVIL EMERGENCY SYSTEM (RACES)

The Laguna Beach Police Department maintains a list of locally licensed amateur radio operators, each with their own communications equipment that responds to the City in emergencies and provides auxiliary communications. Such a system of augmenting telephone services with amateur radio networks can not only provide important alternatives in the event a disaster situation partially damages or overwhelms regular telephone systems, but also expand the City's communication capabilities.

For the latest information on communication, please contact the City of Laguna Beach.

VI. ACTION PLAN

1. PROJECT RECOMMENDATIONS

1.1. El Toro Road

The park area adjacent to El Toro Road suffers from a lower Level of Service rating than the rest of Laguna Beach. According to the Level of Service Map (1.1.4.), this area is successful in 80-90% of its initial attacks, compared to 100% by the rest of the city. Furthermore, this ranking of 80-90% is the second most severe ranking on a five-point scale. In addition, El Toro Road experiences a high fire plan fuel ranking with patches of very high areas (1.1.3.3.). The city should consider increasing resources to this area because El Toro Road in combination with Laguna Canyon Road provides a main access route to the city. By shoring up this path, the City of Laguna Beach can further protect this evacuation route as well as better contain wildfires attempting to enter the main city limits.

1.2. Laguna Canyon

Laguna Canyon suffers from a high fire plan fuel ranking with patches of very high areas (1.1.3.3.). In addition, the W.A.F.L. calculations show this area as a medium risk, top 5-20%, when focusing on high value, high risk areas with severe fire weather and low level of service. More significantly, Laguna Canyon resulted in a medium ranking in all four calculations when the variables (weather, assets at risk, fuels, and level of service) were individually given higher values (1.2.). Furthermore, the city currently does not operate fuel modification projects in Laguna Canyon (1.3.1.). Laguna Beach should consider increasing resources to this area because Laguna Canyon is adjacent to Laguna Canyon Road, which provides a main access route to the city. By shoring up this zone, the City of Laguna Beach can further protect this evacuation route as well as better contain wildfires attempting to enter the main city limits.

1.3. Irvine Cove/Emerald Bay

The W.A.F.L. calculations show Irvine Cove and Emerald Bay as medium risks, top 5-20%, when focusing on high value, high risk areas with severe fire weather and low level of service. More significantly, like Laguna Canyon, these communities resulted in medium rankings in all four calculations when the variables (weather, assets at risk, fuels, and level of service) were individually given higher values (1.2.). The city should consider working with Orange County to increase resources to this area because the Irvine Cove/Emerald Bay area surrounds North Pacific Coast Highway, which provides a main access route to the city. By shoring up this zone, the City of Laguna Beach can further protect this evacuation route as well as better contain wildfires attempting to enter the main city limits.

1.4. Aliso Creek Inn and Golf Course

The Aliso Creek Inn and Golf Course suffer from a very high fire plan fuel ranking (1.1.3.3.). In addition, the W.A.F.L. calculations show this area as a medium risk, top 5-20%, when focusing on high value, high risk areas with severe fire weather and low level of service. More significantly, the Golf Course area resulted in a medium ranking in all four calculations when the variables (weather, assets at risk, fuels, and level of service) were individually given higher values (1.2.). Furthermore, the city identifies the Golf Course as a High Fire Hazard Canyon Area, yet currently does not operate fuel modification projects in this area (1.3.1.). Laguna

Beach should consider increasing resources to the Golf Course area because an uncontrollable wildfire could spread and block South Pacific Coast Highway, which provides a main access route to the city. By shoring up this zone, the City of Laguna Beach can further protect this evacuation route as well as better contain wildfires attempting to enter the main city limits.

2. COMMUNICATION IMPROVEMENT

The City of Laguna Beach possesses plans and procedures to ensure excellent horizontal communication amongst Police, Fire, and other government agencies (VI.). However, the city's ability to communicate vertically down to its constituents is not as strong.

During the 1993 fire, many parents rushed to El Morro Elementary School to rescue their children from the impending wildfire. However, the influx of automobiles caused traffic jams resulting in many parents unable to reach their children. Had the School District's Disaster and Evacuation Plan been effectively communicated down to the parents, they would have known the schools have plans to protect their children. In fact, "when the school administrators saw the very first column of smoke rising above the hills behind El Morro school, six miles away, they made an instant, brilliant decision to call the bus company in Santa Ana to have the busses leave immediately for an emergency evacuation of the kids to Laguna Beach High School" (Turnbull, 2001).

Laguna Beach has made great strides in informing residents of disaster plans through Neighborhood Watch meetings, the Task Force, and other community-run organizations. However, the 1993 fire demonstrated breaks in the vertical communication to residents. Laguna Beach should consider increasing resources specifically to strengthen the community's awareness of disaster plans.

VII. REFERENCES

Bijlani, Judith A. (2007). Emergency Plans for Guests. Email interviewed on February 12, 2007.

California Department of Transportation. (1999). Officially Designated State Scenic Highways and Historic Parkways. Retrieved on January 10, 2007 from http://www.dot.ca.gov/hq/LandArch/scenic_highways.

California Fire Alliance. (2004). Preparing a Community Wildfire Protection Plan. Retrieved July 17, 2006 from http://www.stateforesters.org/pubs/cwpphandbook.pdf.

City of Laguna Beach. (1996a). Earthquake Preparedness. Retrieved on December 10, 2006 from http://www.lagunabeachcity.net/community/disaster/earthquake.htm.

City of Laguna Beach. (1996b). Utility Shut Off. Retrieved on December 10, 2006 from http://www.lagunabeachcity.net/community/disaster/shutoff.htm.

City of Laguna Beach. (1997). Emergency Management Plan. Laguna Beach, CA. Updated July, 2006.

City of Laguna Beach. (2006). Evacuation Plan. Laguna Beach, CA.

City of Laguna Beach Fire Department. (2005). Landscape/Fuel Modification Guidelines and Maintenance Program. Laguna Beach, CA.

Department of Commerce, National Oceanic & Atmospheric Administration, National Weather Service (DOC, NOAA, NWS). (2004). TsunamiReady Recognition Programs. Retrieved February 10, 2007 from http://www.weather.gov/directives/sym/pd01018002curr.pdf.

Fire Safe Council. (1993). About the Fire Safe Council. Retrieved on November 3, 2006 from: http://www.firesafecouncil.org/about/index.cfm.

Greater Laguna Coast Fire Safe Council. (2002). Welcome to the Greater Laguna Coast Fire Safe Council Website. Retrieved on September 15, 2006 from http://www.lagunacoastfiresafecouncil.org/default.htm.

Laguna Beach Unified School District. (2003). Disaster Preparedness Plan. Laguna Beach, CA.

Orange County Fire Authority. (2005). Wildland Fire Management Plan. Orange County, CA.

South Coast Medical Center. (2006). Safety Policy and Procedure Manual. Laguna Beach, CA.

Turnbull, Steve. (2001). The Great Laguna Fire of 1993. Retrieved on September 8, 2006 from http://www.light-headed.com/asite/laguna/laguna_history/laguna_beach_fire.php.