

FIRE PROTECTION PLAN
VESTING TENTATIVE TRACT MAP
NO. 070038

City of Malibu, California

Prepared for:

AZ Winter Mesa, LLC
c/o Big Rock Partners, LLC
315 S. Beverly Drive
Beverly Hills, California 90212
Contact: Robert Gold

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
Contact: Mike Huff, Project Manager

JANUARY 2009

INTENTIONALLY LEFT BLANK

**Fire Protection Plan
VTTM 070038**

TABLE OF CONTENTS

<u>Section</u>	<u>Page No.</u>
EXECUTIVE SUMMARY	1
1.0 INTRODUCTION.....	2
1.1 Fire Protection Plan Summary	2
1.2 Intent	3
1.3 Applicable Codes/Existing Regulations	3
1.4 Project Description	3
1.4.1 Location	3
2.0 SITE CHARACTERISTICS.....	4
2.1 Topography	4
2.2 Climate	11
2.3 Vegetation	11
2.4 Fire History	13
3.0 RISK ANALYSIS METHODOLOGY	14
3.1 Field Assessment	14
4.0 CURRENT FIRE PROTECTION STATUS.....	20
4.1 Existing Water Supply and Fire Flow.....	20
4.2 Existing Fire Access	20
4.3 Existing Fire Protection	20
4.4 Fire Response.....	20
4.5 Estimated Calls and Demand for Service from the Project	21
4.5.1 Estimated Annual Emergency Call Volume	21
4.7.2 Impacts on Fire Response	22
4.8 On-Site Risk Assessment.....	22
5.0 FIRE SAFETY REQUIREMENTS	23
5.1 Fuel Modification Zones.....	23
5.1.1 Zones and Permitted Vegetation.....	23
5.2 Roads.....	27
5.2.1 Access	27
5.2.2 Gates	28
5.2.3 Driveways	29
5.3 Structures	29
5.3.1 Ignition-Resistant Structural Requirements.....	29
5.3.2 Fire Protection Systems	32

**Fire Protection Plan
VTTM 070038**

TABLE OF CONTENTS (CONT.)

	<u>Page No.</u>
6.0 EMERGENCY PLANNING	35
8.0 CONCLUSION	36
9.0 REFERENCES CITED	37

LIST OF FIGURES

Figure 1	Regional Map.....	7
Figure 2	Vicinity Map.....	9

LIST OF TABLES

Table 1	Existing Vegetation Communities	12
Table 2	Fire Station Staffing Levels and Equipment Resources	21
Table 3	Calculated Call Volume (Conceptual Based on 16 Persons).....	22
Table 4	Fire Flow Requirements, by Lot Number	32

Fire Protection Plan

VTTM 070038

LIST OF APPENDICES

- A Site Photographs
- B Site Vegetation Map
- C Fire History Exhibit
- D Vesting Tentative Tract Map
- E County of Los Angeles Fire Department Fuel Modification Plan Guidelines
- F Updated County of Los Angeles Fire Department Plant Lists

**Fire Protection Plan
VTTM 070038**

INTENTIONALLY LEFT BLANK

Fire Protection Plan

VTTM 070038

EXECUTIVE SUMMARY

This Fire Protection Plan (FPP) was prepared for the project located at 24200 Pacific Coast Highway (Vesting Tentative Tract Map No. 070038) in the City of Malibu, California (“Project Site”). This FPP provides measures for fire protection meeting or exceeding those outlined by the County of Los Angeles Fire Department (CLAFD), which provides fire protection services for the City of Malibu (including this project), and the 2007 California Building and Fire Codes. It identifies the fire risk associated with the project’s proposed land uses and outlines requirements for fuel modification, building design and construction, and other pertinent development infrastructure created for fire protection purposes. Tasks completed in the preparation of this FPP include data review, code review, site fire risk analysis, site-specific fire behavior modeling, development land use plan review, and site specific recommendations formulation.

The Project Site encompasses approximately 23.87 acres. Five single family homes are proposed for development on the Project Site, with one additional lot to remain as open space and one lot allocated for a new private street and open space (the “Project”). The Project Site is located in the City of Malibu, south of Pacific Coast Highway, and east of the intersection of Pacific Coast Highway and Malibu Canyon Road. At build-out, the Project will include approximately 19.26 acres allocated for residential lots, a 1.73 acre lot allocated for open space, and a 2.88 acre lot which will include a new private street and undisturbed open space.

The structures in this development will be built using ignition resistant materials, per current building codes and will be complemented by the redundant system of improved infrastructure including water availability, capacity and delivery, fire department access, monitored defensible space, maintained fuel modification and landscaping, and interior sprinklers.

The Project Site is located approximately 0.8 miles from CLAFD Fire Station No. 88, which, under CLAFD’s contract with the City of Malibu, can provide response within required standards. The anticipated population increase associated with the Project would not place a significant impact on the response capabilities of the CLAFD as the project will provide numerous features designed to minimize demand on fire fighting capabilities.

This FPP provides detailed analysis of the proposed Project Site, its potential risk for wildfire, and its impact on the fire department. It also provides requirements, recommendations and measures to reduce the risk and impacts to acceptable levels.

Fire Protection Plan

VTTM 070038

1.0 INTRODUCTION

This FPP has been prepared for the Project Site in the City of Malibu and identifies the wildfire risk associated with the Project's proposed residential land uses. It also specifies requirements for water supply, access, building ignition and fire resistance, fire protection systems, defensible space, and vegetation management, among other pertinent criteria for fire protection. The purpose of this plan is to generate and memorialize the fire safety requirements of the Fire Authority Having Jurisdiction (FAHJ), namely, CLAFD. Requirements and recommendations are based on site-specific characteristics and incorporate input from the CLAFD.

1.1 Fire Protection Plan Summary

Development of five single-family residences is proposed at 24200 Pacific Coast Highway in the City of Malibu. Pacific Coast Highway is an approximately 100-foot-wide, four lane highway that serves as the northern boundary of the Project Site. Currently, the proposed Project Site is vacant, dominated by a routinely disked bluff top that currently supports non-native grassland cover. Construction of homes on these lots will be subject to the requirements in this FPP.

The Project Site is located within what is considered by the City to be a Very High Fire Hazard Severity Zone (VHFHSZ), due to the type of vegetation, fire history, and steep topography of the area. Traditionally, wildland fires that have occurred in the Malibu area have originated along the ridgelines and/or within the lower foothills of the adjacent Santa Monica Mountains and progressed southward toward the ocean. Based on available fire history data, several wildfires have occurred on or within the vicinity of the Project Site and it is expected that wildland fire could be a threat in the future. The most severe wildland fire threat to the proposed Project would be from an offshore, Santa Ana wind-driven wildland fire burning or spotting onto the Project Site from the open space areas to the north.

As detailed in this FPP, the proposed Project's fire protection system includes a redundant layering of protection methods that have been proven to reduce fire risk. The combined fire protection system designed for structures on this site includes site-specific fuel modification zones, ignition-resistant construction, interior sprinklers, and infrastructural improvements only possible with the implementation of the proposed Project Site plans. The system is designed to significantly reduce the fire risk on the Project Site. The Project incorporates the latest building and fire code protection components that have been identified and codified from state-wide post-fire damage assessments.

This FPP will guide the design, construction, and maintenance of project-related improvements in compliance with applicable fire codes. When properly implemented and maintained, the

Fire Protection Plan

VTTM 070038

requirements and recommendations detailed herein are designed to result in fire hazard risk reduction. To that end, preparation of this FPP reflects completion of the following tasks:

- On-site risk assessment
- Fire history analysis
- Fire behavior modeling
- Review of project site plans
- Review and incorporation of City and State Fire Codes

1.2 Intent

The intent of this FPP is to provide fuel modification zone treatment and construction design direction for the Project's consulting architects, builders, CLAFD staff and City of Malibu Planning Officials for minimizing the risk from wildfire at this site. The FPP assesses the overall (on-site and off-site) wildland fire hazards and risks that may threaten life and property associated with the development. In addition, the FPP addresses both short- and long-term fuel modification treatment actions required to minimize any projected fire hazards and risks, and assigns long-term annual maintenance responsibilities for each of the required fuel modification and landscape actions.

1.3 Applicable Codes/Existing Regulations

This FPP demonstrates that the proposed Project Site will be in compliance with Title 32, Fire Code, of the Los Angeles County Code, as amended and in effect on January 1, 2008, adopting the California Fire Code, 2007 Edition (Part 9 of Title 24 of the California Code of Regulations). This code has been adopted by the City and is hereafter referred to as the Fire Code of the City of Malibu. Further, this FPP also complies with Chapter 7A of the 2007 California Building Code (CBC) and Title 14 of the California Code of Regulations, (CCR), also known as the State Responsibility Area (SRA) Fire Safe Regulations, and the CLAFD requirements for fuel modification plans.

1.4 Project Description

1.4.1 Location

This FPP has been prepared for the Project Site, situated in southern coastal Los Angeles County, California (*Figure 1*). The proposed Project address is 24200 Pacific Coast Highway, located in the City of Malibu, California (*Figure 2*). Primary access to the site is located at the

Fire Protection Plan

VTTM 070038

southern terminus of Malibu Canyon Road, on the south side of Pacific Coast Highway. No secondary access currently exists for the Project Site. The Project Site is also situated within an area defined by the CLAFD as Fire Zone 4 and by the City of Malibu as a Very High Fire Hazard Severity Zone (VHFHSZ).

2.0 SITE CHARACTERISTICS

The Project Site consists of a relatively flat bluff with slopes dropping southward toward Malibu Road and then toward the Pacific Ocean. The bluff top portion of the Project Site is routinely disked and currently supports non-native grassland cover. Other vegetative cover is associated with the existing slopes, dominated by chaparral and sage scrub plant communities. Non-native blue gum trees are located in the northern portion of the Project Site, adjacent to Pacific Coast Highway. The Project proposes five residential structures that will be adjacent to non-maintained wildland fuels on the south, west and east. The following sections discuss the overall site characteristics while Project Site photographs are presented in Appendix A.

2.1 Topography

The topography of Malibu and the adjacent Santa Monica Mountains can best be described as being dominated by steep hillsides with deeply incised canyons that trend primarily in a north-south direction, terminating at the Pacific Ocean. The Project Site is directly south of the Santa Monica Mountains and approximately 1/10th of a mile from the Pacific Ocean. The Project Site consists of a relatively flat bluff top with steeper slopes along the southern, western, and eastern boundaries. Further, a north-facing slope that stretches along the northern Project Site boundary drops downward to Pacific Coast Highway, reaching gradients of 53%. Along the eastern boundary, a relatively steep, east-facing slope that angles downward from the Project Site reaches gradients of approximately 50%. South-facing slopes along the southern Project Site boundary reach gradients between 10% and 20 %. Two small north-south trending swales/gullies exist in the south and south-west portions of the Project Site. These narrow gullies are characterized by steep sides that may exhibit ephemeral flows during large storm events (a jurisdictional determination has found that these areas are not waters of the U.S., waters of the state, or streams as defined by the Malibu Local Coastal Program). Slopes in these swales/gullies reach 42%. The bluff top, encompassing the majority of the Project Site, slopes gently southward toward the ocean from approximately 200 feet above mean sea level (AMSL) in the north to approximately 185 feet AMSL in the south before dropping off steeply toward Malibu Road. The Site Plan in Appendix D graphically displays existing Project Site topography.

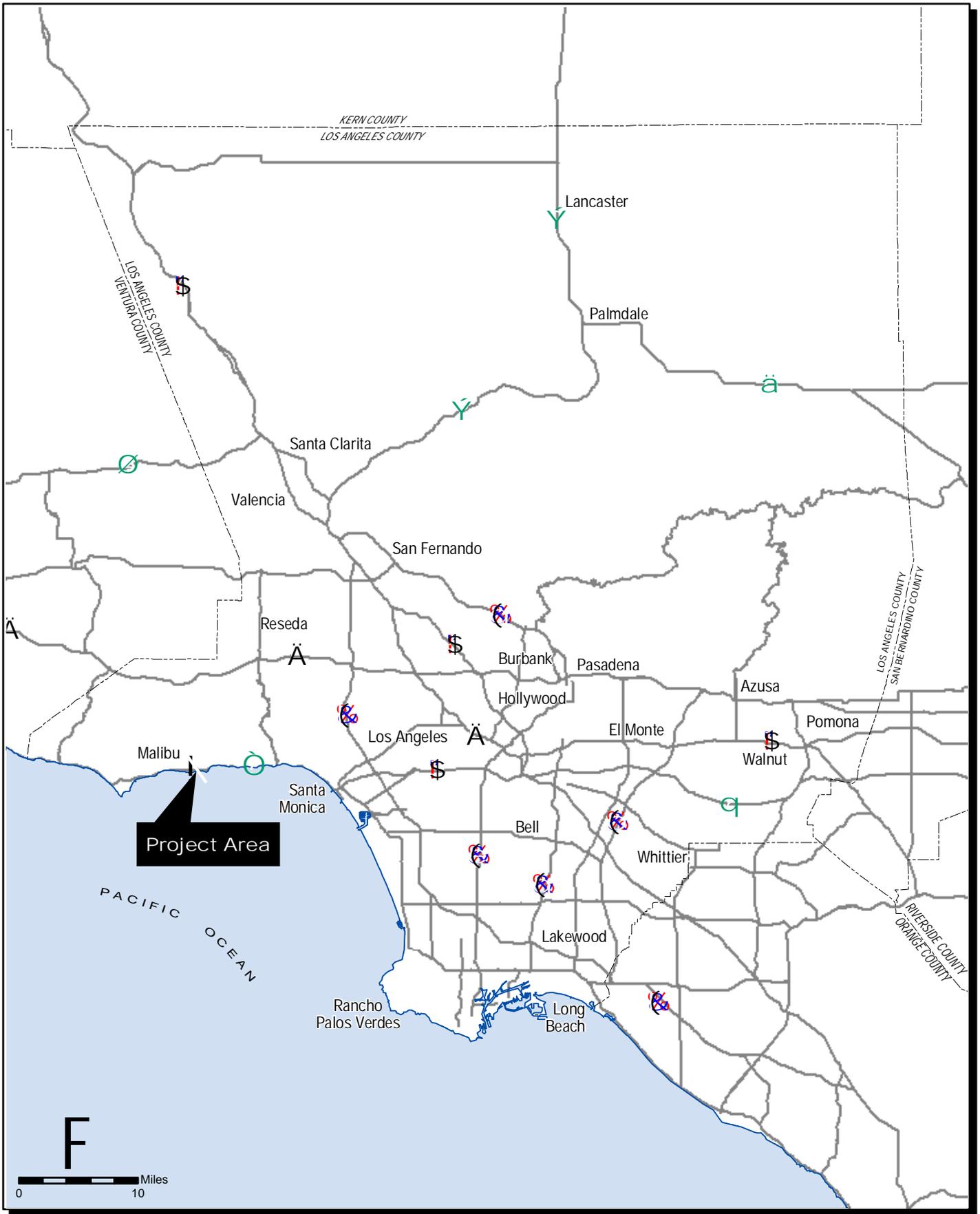
Fire Protection Plan

VTTM 070038

The topographic alignment of the Project Site and regional topographic conditions of the area can have considerable effect on wildland fire behavior and on the ability of fire fighters to suppress those fires. Slope and canyon alignments on site are conducive to channeling, deflecting, concentrating, or dispersing winds, and creating extremely erratic wildfire conditions on the Project Site, especially during off-shore, Santa Ana wind-driven fire events.

Fire Protection Plan
VTTM 070038

INTENTIONALLY LEFT BLANK



Fire Protection Plan
VTTM 070038

INTENTIONALLY LEFT BLANK



**Fire Protection Plan
VTTM 070038**

INTENTIONALLY LEFT BLANK

Fire Protection Plan

VTTM 070038

2.2 Climate

The climate in the vicinity of the Project Site is typified by warm, dry summers and wetter winters. Precipitation in the Malibu area typically occurs between November and March and averages approximately 13 inches per year. The prevailing wind is an onshore flow with fall winds (Santa Ana Winds) from the north and northeast that may gust to 70 miles per hour (mph) or higher and have a humidity of near zero. The climate in the vicinity of the Project Site has a large influence on fire risk as drying vegetation during the summer months becomes fuel available to advancing flames should an ignition be realized.

Localized weather patterns may vary on the Project Site from the adjacent Santa Monica Mountains as humidity levels and plant moisture content near the coast can be higher than inland locations due to the influence of the Pacific Ocean. Fluctuations in wind patterns may also be observed on the Project Site due to the influence of site topography.

2.3 Vegetation

In addition to weather and topography, vegetation (or fuel) plays a major role in affecting fire behavior and shaping the fire hazard potential on the Project Site. Current land cover distribution on the Project Site is characterized by four different vegetation communities (Impact Sciences Inc. 2008), as presented in Table 1 and Appendix B. Dominant vegetative cover on the Project Site is non-native grassland (61.55%), distributed throughout the Project Site on relatively flat areas along most of the bluff top. While this fuel type can burn quickly under strong, dry wind patterns, it does not produce the high heat intensity and high flame lengths associated with chaparral fuel types. Coastal sage chaparral scrub also represents a significant percentage of land cover (32.28%) and is concentrated primarily on the steeper slopes in the southern, western, and eastern portions of the on the Project Site. Fire behavior in this vegetation type produces higher flame lengths than that in grassland, although spread rates are typically slower. The north-facing slope adjacent to Pacific Coast Highway is dominated by mixed sage scrub, with a small area in the western portion of this slope supporting several blue gum trees (*Eucalyptus globulus*).

Post-development vegetation composition on the Project Site is expected to be significantly different than current conditions. Following build-out, irrigated landscape vegetation associated with Fuel Modification Zones (FMZ) A and B is expected to cover much of the Project Site. Native and naturalized vegetation occurring within Fuel Modification Zones C and D is not expected to be irrigated, although overall fuel volumes will be reduced and maintained in order to comply with CLAFD Fuel Modification Zone standards. Such areas are expected to be associated with the steeper slopes along the southern and eastern portions of the Project Site dominated by coastal sage chaparral scrub.

Fire Protection Plan VTTM 070038

**Table 1
Existing Vegetation Communities**

Vegetation Type	Acreage	Percentage Cover
Non-native Grassland (Disked)	14.56	60.99%
Mixed Sage Brush	1.35	5.66%
Coastal Sage Chaparral Scrub	7.75	32.47%
Mature Eucalyptus Trees	0.21	0.88%
Total	23.87	100.00%

Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (leaf size, branching patterns), and overall fuel loading. For example, the native shrub species that compose sage and chaparral communities on the Project Site are a high potential hazard based on such criteria.

Vegetation distribution throughout the Project Site varies by location and topography. Areas where the proposed development is located are primarily non-native grassland, while the adjacent slopes support chaparral and sage scrub cover. The importance of vegetative cover on fire suppression efforts is its role in affecting fire behavior. For example, fire burning in grasslands may have shorter flame lengths than those burning in chaparral scrub; however, fire in grasslands often spreads more rapidly than fire in other vegetation types.

As described, vegetation plays a significant role in fire behavior. A critical factor to consider is the dynamic nature of vegetation communities. Fire presence and absence at varying cycles or regimes affects plant community succession. Succession of plant communities, most notably the gradual conversion of shrublands to grasslands with high frequency fires and grasslands to shrublands with fire exclusion, is highly dependent on the fire regime. Biomass and associated fuel loading will increase over time, assuming that disturbance or fuel reduction efforts are not diligently implemented.

Wildfire disturbances can also have dramatic impacts on plants and plant composition. Heat shock, accumulation of post-fire charred wood, and change in photoperiods due to removal of shrub canopies may all stimulate seed germination. The post-fire response for most species is vegetative reproduction and stimulation of flowering and fruiting. The combustion of aboveground biomass alters seedbeds and temporarily eliminates competition for moisture, nutrients, heat, and light. Species that can rapidly take advantage of the available resources will flourish. It is possible to alter successional pathways for varying plant communities through

Fire Protection Plan VTTM 070038

manual alteration. This concept is a key component in the overall establishment and maintenance of the approved preliminary fuel modification zones on the Project Site.

2.4 Fire History

Fire history is an important component of a site-specific FPP. Fire history information can provide an understanding of fire frequency, fire type, most vulnerable project areas, and significant ignition sources, amongst others. The topography, vegetation, and climatic condition associated with the Malibu area create a unique situation, sometimes referred to as wildfire corridors. These corridors are the result of the alignment of high winds and topography and often result in large, damaging wildfires. The history of wildfires in Malibu is significant, and is graphically portrayed in the map in Appendix C (Fire History Exhibit). This exhibit presents fire history for the general vicinity of the Project Site.

Based on a review of available historical fire perimeter data, portions of the Project Site have burned up to five times during the recorded fire history period (FRAP 2008)¹, including the Malibu Fire in 1935, an un-named fire in 1958, the Wright Fire in 1970, the Calabasas Fire in 1996, and the Canyon Fire in 2007. Other large fires in the vicinity include:

- The 2007 Corral Fire (approximately 4,700 total acres)
- The 1993 Old Topanga Fire (approximately 16,000 total acres)
- The 1985 Piuma Fire (approximately 5,200 total acres)
- The 1982 Dayton Canyon Fire (approximately 43,000 total acres)
- The 1978 Kanan Fire (approximately 25,000 total acres)
- The 1956 Sherwood/Zuma Fire (approximately 35,000 total acres)
- The 1943 Woodland Hills #65 Fire (approximately 15,000 total acres)

Based on fire history data for the vicinity, fire return intervals range between 2 and 11 years, indicating significant wildfire potential for the Project Site.

¹ Based on polygon GIS data for Cal FIRE fires measuring 300 acres and greater in size, and U.S. Forest Service (USFS) fires measuring 10 acres and greater between 1950 and 2007. However, some fires before 1950 and some CAL FIRE fires burning less than 300 acres are also included.

Fire Protection Plan

VTTM 070038

3.0 RISK ANALYSIS METHODOLOGY

3.1 Field Assessment

Dudek conducted a field assessment of the Project Site in order to confirm site plan mapping data and document existing site conditions and potential wildfire risk. While on the Project Site, Dudek assessed topography, vegetation and fuel loading, available setback areas, and general susceptibility of the Project Site to wildfire.

Project Site photographs were collected and fuel conditions were mapped using 100-scale aerial images. Field observations were utilized to augment existing Project Site data in generating the fire behavior models and formulating the recommendations contained in this FPP. Refer to Appendix A for Project Site photographs and brief discussions of existing Project Site conditions.

3.2 Fire Behavior Modeling

Following Project Site evaluation and vegetative fuels data collection efforts, fire behavior modeling was conducted to document the type and intensity of fire that would be expected on the Project Site, given characteristic features including topography, vegetation, and weather. Fire behavior models prepared for this FPP are based on existing site conditions. Fire behavior modeling includes a high level of analysis and information detail to arrive at reasonably accurate representations of how wildfire would move through available fuels on a given site. Fire behavior calculations are based on Project Site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths, intensities, and spread rates, the BehavePlus (v. 3.0.2) fire behavior fuel modeling system was applied using expected low fuel moisture values during peak fire season, variable wind speeds, and 3 representative fuel models observed on the Project Site.

Predicting wildland fire behavior is not an exact science. As such, the movement of a fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting and the weather that is created by the firestorm. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire prevention planning information.

To be used effectively, the basic assumptions and limitations of fire behavior modeling applications must be understood.

- First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is the dead fuels less than

Fire Protection Plan VTTM 070038

0.25 inches in diameter. These are the fine fuels that carry fire. Fuels greater than 1 inch have little effect, while fuels greater than 3 inches have no effect on fire behavior.

- Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within 6 feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
- Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.
- Fourth, fire behavior computer modeling systems were not intended for determining sufficient fuel modification zone/defensible space widths. However, it does provide the average length of the flames, which is a key element for determining defensible space distances for minimizing structure ignition.

Although BehavePlus has some limitations, it can still provide valuable fire behavior predictions, which can be used as a tool in the decision-making process. In order to make reliable estimates of fire behavior, one must understand the relationship of fuels to the fire environment and be able to recognize the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur in a particular landscape. The type and quantity will depend upon soil, climate, geographic features, and fire history. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

The seven fuel characteristics help define the 13 standard fire behavior fuel models (Anderson 1982) and the more recent custom fuel models developed for Southern California (Weise and Regelbrugge 1997). According to the model classifications, fuel models used in BehavePlus have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface-to-volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in modeling efforts. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models:

- **Grasses** – Fuel Models 1 through 3
- **Brush** – Fuel Models 4 through 7, SCAL 14 through 18
- **Timber** – Fuel Models 8 through 10
- **Logging slash** – Fuel Models 11 through 13.

Fire Protection Plan

VTTM 070038

In addition, the aforementioned fuel characteristics were utilized in the recent development of 40 new fire behavior fuel models (Scott and Burgan 2005) developed for use in BehavePlus modeling system. These new models attempt to improve the accuracy of the 13 standard fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the 40 new fuel models:

- **Non-burnable** – Models NB1, NB2, NB3, NB8, NB9
- **Grass** – Models GR1 through GR9
- **Grass shrub** – Models GS1 through GS4
- **Shrub** – Models SH1 through SH9
- **Timber understory** – Models TU1 through TU5
- **Timber litter** – Models TL1 through TL9
- **Slash blowdown** – Models SB1 through SB4.

BehavePlus software was used in the development of this FPP in order to evaluate potential fire behavior for the Project Site. Existing site conditions were evaluated, and local weather data was incorporated into the BehavePlus modeling runs. Table 2 provides a description of the fuel models observed on the Project Site and their corresponding vegetation classifications. These values were used in the modeling analysis for the Project Site. Further, while the 2007 Canyon Fire burned a portion of the Project Site and altered fuel beds, modeling efforts presented herein assume conversion of these shrublands to more mature stand conditions. As such, fuel models representing mature shrubland conditions were used to evaluate worst-case scenarios.

Table 2
Fuel Model Characteristics

Fuel Model	Description	Land Cover Classification
1	Short grass	Non-native grassland
SCAL 18	Coastal sage scrub, California sage and buckwheat dominated	Mixed sage brush
SH5	High Load, Dry Climate Shrub	Coastal sage chaparral scrub

3.2.1 BehavePlus Fuel Model Inputs

Dudek utilized BehavePlus software to evaluate fire behavior potential for the Project Site. Two weather scenarios were evaluated, including a summer, onshore weather condition and a more extreme fall, offshore weather condition.

Fire Protection Plan

VTTM 070038

BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The output variables used in this analysis include flame length (feet), rate of spread (feet/minute), and spotting distance (miles).

The following provides a description of the input variables used in processing the BehavePlus models for the Project Site. In addition, data sources are cited and any assumptions made during the modeling process are described.

Weather

Historical fuel moisture and wind speed data for the region was utilized in determining appropriate fire behavior modeling inputs for the Project Site. Specifically, 50th and 97th percentile values derived from the Leo Carillo Remote Automated Weather Station (RAWS) were determined and utilized in the fire behavior modeling efforts conducted in support of this FPP. RAWS fuel moisture and wind data were processed utilizing the Fire Family Plus software package to determine typical onshore air flow conditions (50th percentile) and atypical offshore/Santa Ana fire weather conditions (97th percentile). The Leo Carillo RAWS is located at Leo Carillo State Beach, approximately 13 miles east of the Project Site, at an elevation of 50 feet AMSL in a similar geographical setting as the Project Site. Data from the Leo Carillo RAWS was evaluated from May 1 through November 30 for each year between 1999 and 2007 (extent of available data record).

Wind speed values derived from RAWS data represent 20-foot wind speeds. As such, a wind adjustment factor of 0.5 was utilized to account for vertical differences in wind speed from the 20-foot recording height to mid-flame height prior to BehavePlus modeling efforts. Standard RAWS setup places the anemometer at 20 feet above ground, while wind affecting surface fire spread is that found at mid-flame height. A conservative wind adjustment factor of 0.5 indicates a fuel bed that is unsheltered from the wind with a fuel bed depth greater than 2.7 feet. It should be noted that mid-flame wind speeds may be only 10% of the wind speeds recorded or predicted at 20 feet.

Topography

Elevation data were derived from digital topographic files prepared for the Project Site. This data source was evaluated in CAD software in order to determine Project Site elevation ranges and slope gradients. Elevation and slope are important components in fire behavior analysis as they affect temperature, humidity, solar radiance, and fire spread rates.

Fire Protection Plan

VTTM 070038

Fuel Model

Vegetation coverage data in the form of a GIS shapefile was used in this analysis to assist in fuel model assignments. Derived from vegetation mapping data for the Project Site (Impact Sciences, Inc. 2008), vegetation types were classified into fuel models. Vegetation mapping data was utilized in field assessment efforts to classify vegetation cover type with an appropriate fuel model. Specifically, three separate fuel models were utilized for the Project Site. Table 2 outlines the fuel model values applied to the different vegetation types found on the Project Site.

For the purposes of this analysis, BehavePlus fire behavior modeling was conducted for the following locations on the Project Site:

- **Scenario 1:** Non-native grasslands on coastal bluff top, slopes at 15%
- **Scenario 2:** Mixed sage scrub along Pacific Coast Highway, slopes at 50%
- **Scenario 3:** Coastal sage chaparral scrub on slopes in southern portion of Project Site, slopes at 40%

Table 3 summarizes the input variables used in the BehavePlus modeling efforts.

Table 3
BehavePlus Fire Behavior Inputs

Model Variable	50 th Percentile (Onshore Flow)	97 th Percentile (Offshore/Santa Ana conditions)
Fuel model	1, SCAL18, SH5	1, SCAL18, SH5
1 h fuel moisture	9%	4%
10 h fuel moisture	10%	5%
100 h fuel moisture	14%	10%
Live herbaceous moisture	40%	30%
Live woody moisture	100%	60%
20 ft. wind speed (mph)	8 mph	28mph (max. sustained) and 50 mph (max. gust)
Wind direction	Onshore	Offshore
Slope steepness	variable by location, range: 15 to 50%	variable by location, range: 15 to 50%

3.2.2 BehavePlus Model Results

Worst-case wildfire scenarios modeled for the Project Site were associated with the slopes located in the southern portion of the Project Site, represented by coastal sage chaparral scrub vegetation (Fuel Model SH5) had modeling results indicating flame lengths between 12.2 and 41.8 feet, depending on wind speed and fuel moisture condition. Spread rates in these areas

Fire Protection Plan VTTM 070038

ranged from approximately 53 to 637 feet per minute (0.6 and 7.2 mph), and spotting distances reached approximately 2.3 miles under extreme weather scenarios. The results from all BehavePlus fire behavior modeling scenarios are presented in Tables 4.

**Table 4
BehavePlus Fire Behavior Model Results**

Weather Scenario	Flame Length (ft.)	Spread Rate (ft./min.)	Spotting Distance (miles)
Scenario 1: Non-native grasslands on bluff top, slopes at 15%			
On-shore (50 th Percentile)	3.1	52.9	0.1
Santa Ana (97 th Percentile)	8.6	379.6	0.5
Santa Ana (97 th percentile w/ 50mph winds)	8.6	379.6	0.8
Scenario 2: Mixed sage scrub along Pacific Coast Highway, slopes at 50%			
On-shore (50 th Percentile)	15.1	39.6	0.3
Santa Ana (97 th Percentile)	31.5	160.4	1.3
Santa Ana (97 th percentile w/ 50mph winds)	39.4	260.2	2.2
Scenario 3: Coastal sage chaparral scrub on slopes in southern portion of property, slopes at 40%			
On-shore (50 th Percentile)	12.2	52.8	0.3
Santa Ana (97 th Percentile)	30.9	330.9	1.3
Santa Ana (97 th percentile w/ 50mph winds)	41.8	636.6	2.3

Given the climatic, vegetation, and topographic characteristics along with the fire behavior modeling results discussed in this FPP, it is expected that a wildfire may start on, burn onto, or spot onto the Project Site. Under extreme weather conditions, fire can move rapidly through the Project Site's fuels. The most common type of fire anticipated in the vicinity of the Project Site is a fire fanned by offshore Santa Ana winds burning downhill and spotting across Pacific Coast Highway from a location in the adjacent Santa Monica Mountains to the north. Worst-case modeled flame lengths near the proposed Project Site were calculated at 41.8 feet in coastal sage chaparral scrub vegetation types and up to 39.4 feet in mixed sage scrub cover types. Spread rates may exceed 7 mph under extreme weather and slope conditions. As such, it is necessary to provide fuel management areas to reduce the wildfire risk on the Project Site.

It should be noted that the results presented in Table 4 depict values based on inputs to the BehavePlus software. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. Further, this modeling analysis assumes a correlation between the Project Site vegetation and fuel model characteristics. Recent fire activity (2007 Canyon Fire) on the Project Site has altered fuel beds, but modeling efforts presented herein assume conversion of shrublands to more mature stand conditions. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many

Fire Protection Plan

VTTM 070038

factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

4.0 CURRENT FIRE PROTECTION STATUS

4.1 Existing Water Supply and Fire Flow

Water supply for the Project Site is provided by the Los Angeles County Waterworks. There are currently no hydrants or mains on the Project Site. The nearest hydrants are located on Pacific Coast Highway, west of Malibu Canyon Road and at the southern terminus of Malibu Canyon Road, adjacent to the western edge of the Project Site.

4.2 Existing Fire Access

Currently, access to the Project Site is near the intersection of Malibu Canyon Road and Pacific Coast Highway. An existing paved road along the western edge of the Project Site currently provides access for the neighboring Bluffs Park to the west.

4.3 Existing Fire Protection

There are currently no fire protection systems in place for the Project Site, given its vacant condition. Evidence of routine disking of the upper bluff top was observed during field evaluations and served to reduce overall fuel loads.

4.4 Fire Response

The Project Site is located within the City of Malibu, which contracts fire protection and emergency services to the CLAFD. Regionally, the CLAFD provides fire, emergency medical, and rescue services from 170 stations. The Department served over 4 million residents throughout 58 cities and all unincorporated portions of Los Angeles County. The Project Site lies within the jurisdiction of Battalion 5, which consists of 13 stations. The City of Malibu is served directly by five CLAFD fire stations (Stations 67, 69, 70, 71, and 88); however, all stations within the CLAFD are available to service the City if necessary. Additionally, the Ventura County Fire Department (VCFD) and the National Park Service (NPS) are available indirectly to provide fire services to the City if needed. CLAFD Station No. 88, located at 23720 Malibu Road, services the proposed Project area and is located 0.8 miles from the Project Site entrance on Pacific Coast Highway. The response time of arrival is expected to be well within the average 4.8 minute response time for urban areas achieved by the CLAFD, based on 2006 statistics (County of Los Angeles 2008).

Fire Protection Plan VTTM 070038

Table 5 provides the staffing levels at the CLAFD stations serving the Project Site.

**TABLE 5
Fire Station Staffing Levels and Equipment Resources**

CLAFD Station No.	Address	Distance to Project Site	Staffing/Equipment
88	23720 Malibu Road Malibu, CA 90265	0.3 miles	Three-person engine company and a two-person paramedic squad
70	3970 Carbon Canyon Road Malibu, CA 90265	2.9 miles	Four-person engine company and a battalion chief
67	25801 Piuma Road Calabasas, CA 91302	6.2 miles	Three-person engine company
69	401 S. Topanga Canyon Blvd. Topanga, CA 90290	10.8 miles	Four-person assessment engine company and additional paid on-call firefighters on an "as needed" basis
71	28722 W. Pacific Coast Highway Malibu, CA 90265	6.7 miles	Four-person engine company and a two-person paramedic squad

4.5 Estimated Calls and Demand for Service from the Project

4.5.1 Estimated Annual Emergency Call Volume

The following estimated annual emergency call volume at the Project Site is based upon per capita data from CLAFD calls within their jurisdiction, based on 2006 data (County of Los Angeles 2008).

- Total population served by CLAFD: 4,100,000
- Total annual calls: 298,824. Per capita call generation: 0.073
- Total annual fire calls: 10,333. Per capita call generation: 0.003
- Total annual Emergency Medical Services (EMS)/rescue/miscellaneous calls: 288,491. Per capita call generation: 0.070.

Using the assumptions above, the estimated annual emergency call volume for the Project Site was calculated. In order to provide this conceptual estimate, Dudek made assumptions regarding residential populations. The residential population is based on an average of five occupants per residence for this type of community, plus an additional person associated with the proposed manned gatehouse.

Fire Protection Plan VTTM 070038

Based on this information, the total maximum estimated population of the Project Site is 26 persons. This number is a *conservative* estimate that is likely higher than the actual average on-site population. Based on this conservative population estimate, the calculated call volumes by type of call are provided in Table 6.

Table 6
Calculated Call Volume (Conceptual Based on 26 Persons)

Type of call	Per capita call generation factor	Number of estimated annual calls /(per day)
Total Calls	0.073	1.9 / (.005)
Total Fires	0.003	0.1 / (.0002)
Total EMS/Rescue Calls	0.070	1.8 / (.005)

As mentioned, these conceptual estimates are likely somewhat high, as the CLAFLD annual data includes areas within its jurisdiction where call volumes are typically higher due to the type of calls associated with higher density urban populations.

The five residences will increase the call volume at a rate of less than 1% per day. Regardless of the call volume at the first responding station, this level of service demand is not likely to materially raise overall call volume. For perspective, five calls per day are typical in an urban or suburban area. A busy fire station company would be one with 10 or more calls per day.

4.7.2 Impacts on Fire Response

Cumulative impacts from this type of project can cause fire response service decline and must be analyzed for each project. The proposed Project represents a minimal increase in service demand due to the low number of new structures and people living in or using the area. The requirements described in this FPP, including ignition resistive construction, interior sprinklers, and customized fuel modification/vegetation management areas, are designed to aid firefighting personnel and minimize demand on the fire service. The Project is not anticipated to have a material impact on the response capability of CLAFLD responding Fire Stations.

4.8 On-Site Risk Assessment

As experienced as recently as 2007, the Project Site is potentially vulnerable to wildfire, given the climatic, vegetation, topographical, and fire history of the Project Site area. In summary, wind or topography driven wildfire burning under a north or northeastern (Santa Ana) wind pattern downward through the adjacent swales/gullies and slopes to the north of the Project Site could result in an extreme wildland fire and potential hazard to structures proposed for the

Fire Protection Plan

VTTM 070038

Project Site. Further, the potential for spotting (airborne firebrands) from such fires adds to the hazard potential for the Project Site.

5.0 FIRE SAFETY REQUIREMENTS

5.1 Fuel Modification Zones

5.1.1 Zones and Permitted Vegetation

As indicated in preceding sections of this FPP, an important component of a fire protection system is the fuel modification area. Fuel modification areas are designed to gradually reduce fire intensity and flame lengths from advancing fire by placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other on the perimeter of all structures and adjacent open space areas. As outlined in the Fuel Modification Plan Guidelines, the CLAFD designates a variable width fuel modification area based on fuels, topography, fire history, and construction technique. A Fuel Modification Plan will be required for the Project Site by the CLAFD and shall consist of up to five distinct zones, including a Fire Access Road Zone.

Fuel Modification Zones

The following paragraphs describe the vegetation treatment and management specifications required for the Project. In addition, the CLAFD approved plant list, provided in Appendix F, shall be utilized in plant species selection. Each zone shall include permanent field markers to delineate the zones, aiding ongoing maintenance activities that will occur on the Project Site. Management of fuel modification zones occurring on open space lots shall be the responsibility of the Homeowners Association (HOA). Based on the current site plan, it is expected that all fuel modification zones can be accommodated on site.

Zone A: The setback Zone A will encompass all areas of the Project Site extending 20 feet beyond the edge of combustible structures, attached accessory structures, or appendages and projections. Zone A shall be planted and maintained according to CLAFD requirements with approved plants, shrubs, and other vegetation with appropriate spacing. Zone A may also include non-combustible features (e.g. masonry walls, pavement, concrete, pavers, etc).

Specific Requirements – Zone A

- Irrigation by automatic or manual systems shall be provided to landscaping to maintain healthy vegetation with high moisture content.
- Landscaping and vegetation in this zone shall consist primarily of green lawns ground covers, and adequately spaced shrubs and trees. The overall characteristics of the landscape shall provide adequate defensible space in a fire environment.

Fire Protection Plan VTTM 070038

- Plants in this zone shall be highly fire resistant and selected from the updated CLAFLD Desirable Plant List (Appendix F). Other species may be utilized subject to approval.
- Target tree species (including, but not limited to eucalyptus, pine, juniper, cypress, cedar, Canary Island date palm, California fan palm, Mexican fan palm, and bougainvillea) shall not be allowed within 10 feet of combustible structures.
- Vines and climbing plants shall not be allowed on any combustible structure.
- Complete removal of undesirable plant species (chamise, redshank, California sagebrush, buckwheat, sage, pampas grass, cypress, eucalyptus, juniper, and pine) is required.

Zone B: The irrigated Zone B extends from the outermost edge of Zone A up to 100 feet from structures, according to CLAFLD standards.

Specific Requirements – Zone B

- Irrigation by automatic or manual systems shall be provided to landscaping to maintain healthy vegetation with high moisture content.
- Plants in Zone B shall be fire resistant and spaced appropriately. Species selection should be made referencing the updated CLAFLD Plant List included in Appendix F. Other species may be utilized subject to approval.
- Plant spacing in this zone shall be in accordance with CLAFLD standards.
- Complete removal of undesirable plant species (chamise, redshank, California sagebrush, buckwheat, sage, pampas grass, cypress, eucalyptus, juniper, and pine) is required.

Zone C and D: The thinning Zone C and interface thinning Zone D extend from the outermost edge of Zone B up to 300 feet from structures, according to CLAFLD standards.

Specific Requirements – Zone C/D

- Irrigation systems are not required for this zone.
- Removal of the majority of undesirable plant species (chamise, redshank, California sagebrush, buckwheat, sage, pampas grass, cypress, eucalyptus, juniper, and pine) is required.
- Removal of dead/dying vegetation is required.
- Fine fuels (grasses) shall not exceed 3 inches in height.

Fire Protection Plan VTTM 070038

- Landscaping and vegetation in this zone may consist of modified existing native plants, adequately spaced ornamental shrubs and trees, or both. There may also be replacement landscape planting with ornamental or less flammable native species to meet minimum slope coverage requirements of City or County Public Works or Parks & Recreation Landscape or Hillside ordinances. In all cases, the overall characteristics of the landscape shall provide adequate defensible space in a fire environment.
- Fuel loading shall be reduced by pruning/trimming retained shrubs and trees without reducing overall canopy cover or removal of root systems.
- Natural vegetation shall be thinned by reduced amounts as the zone moves away from structures.
- Plants in Zone C and D shall be spaced appropriately. Species selection should be made by referencing the updated CLAFD Plant List included in Appendix F. Other species may be utilized subject to approval.

Fire Access Road Zone: This zone extends 10 feet from the edge of any proposed public or private roadway (excluding driveways) and may be used as access for firefighting apparatus or resources.

Specific Requirements – Fire Access Road Zone

- Clear and remove flammable growth for a minimum of 10 feet on each side of Fire Access Roads (Fire Code Section 317.10).
- Fire access roads, driveways, and turnarounds shall be maintained in accordance with Fire Code. Fire Access Roads shall have unobstructed vertical clearance (Fire Code Section 503.2.1).
- Landscaping and native plants within the 10 foot Fire Access Road Zone shall be appropriately spaced and maintained to provide safe egress in wildland fire environments.
- Proposed trees should be planted outside the 10 foot clearance zone.

Maintenance: All Fuel Modification Zone maintenance will be completed at least annually by May 1 of each year and more often as needed for fire safety, as determined by CLAFD or its representative. Property owner(s) shall be responsible for all vegetation management throughout their property in compliance with the requirements detailed herein. Prior to lot sales, fuel

Fire Protection Plan VTTM 070038

reduction maintenance will be the responsibility of AZ Winter Mesa, LLC. Maintenance shall be regularly performed in all zones which requires:

- Pruning of foliage to reduce fuel load, vertical continuity, and removal of plant litter and dead wood.
- Removal or thinning of undesirable combustible vegetation and replacement of dead or dying landscaping.
- Pruning lower branches of trees and tree-form shrubs to 1/3 of their height (or 6 feet from the lowest hanging branches) to help prevent fire from spreading upward into the crown.
- Ground cover shall be maintained at a height not to exceed 18 inches. Annual grasses and weeds shall be maintained at a height not to exceed 3 inches.
- Accumulated plant litter and dead wood shall be removed. Debris and trimmings produced by thinning and pruning should be removed from the site or chipped and evenly dispersed in the same area to a maximum depth of 5 inches.
- Manual and automatic irrigation systems shall be maintained for operational integrity and programming. Effectiveness should be regularly evaluated to avoid over or under-watering.
- Compliance with the Fire Code is a year-round responsibility. Enforcement will occur following inspection by the Fire Department annually and as needed. Annual inspections are conducted following the natural drying of grasses and fine fuels, between the months of April and June depending on geographic region.
- Brush Clearance enforcement issues on adjacent properties should be directed to the CLAFD's Brush Clearance Unit at (626) 969-2375.
- Questions regarding landscape planting and maintenance with regard to fire safety should be directed to the CLAFD's Fuel Modification Unit at (626) 969-5205.

Consistent with CLAFD requirements, submittal and approval of a Preliminary and Final Fuel Modification Plan will be required prior to the issuance of a building permit. The Preliminary plan package shall include project location, description, tentative map, adjacent land uses, representative site photographs, long-term fuel modification maintenance designation, and any associated environmental documents and will be required prior to final map approval. The Final plan package shall include an Irrigation Plan, a Landscape Plan, Fuel Modification Zone Delineation, and a letter identifying zone management responsibility. Final approval of this plan by CLAFD is required prior to the issuance of a building permit. Prior to the issuance of a certificate of occupancy, CLAFD will inspect and approve the fuel modification zone

Fire Protection Plan VTTM 070038

implementation. A copy of the recorded CC&Rs pertaining to fuel modification maintenance requirements and responsibilities will be provided to CLAFD prior to the issuance of a certificate of occupancy.

Long Term Maintenance Agreements: The builder/developer shall provide new property owner(s) with recorded CC&R's or disclosure statements identifying the responsibilities for maintaining the fuel modification zones within their property. The disclosure shall include the maintenance criteria set forth in the final FMP, and acknowledge responsibility for presenting proposed changes to the CLAFD Fuel Modification Unit. Further, the statement shall acknowledge that CLAFD retains enforcement rights for Fuel Modification Zone condition.

Construction Phase Vegetation Management: Vegetation management requirements shall be implemented at commencement and throughout the construction phase. Vegetation management shall be performed pursuant to CLAFD requirements on all building locations prior to the start of work and prior to any import of combustible construction materials. Adequate fuel breaks shall be created around all grading, site work, and other construction activities in areas where there is flammable vegetation.

In addition to the requirements outlined above, the Project will comply with the following important risk-reducing vegetation management guidelines:

- All new power lines shall be underground for fire safety during high wind conditions or during fires on a right-of-way that can expose aboveground power lines.
- Vegetation management zones cannot extend beyond the private property ownership without written, legal permission of off-site landowners, and shall not extend into biological open space or other sensitive biological areas, or other areas controlled by the City, County and/or resource agencies, without first having written formal permission from all applicable agencies.
- Caution must be used not to cause erosion or ground (including slope) instability or water runoff due to vegetation removal, vegetation management, maintenance, landscaping, or irrigation. No uprooting of treated plants is necessary.

5.2 Roads

5.2.1 Access

Following completion of the Project, access will be limited to an entrance road on the east side of Winter Mesa Drive, immediately south of Pacific Coast Highway. No secondary access is planned for the Project Site. The linear distance from the furthest proposed residence to the

Fire Protection Plan VTTM 070038

access point on Malibu Canyon Road is approximately 1,500 feet. Site access will comply with the requirements of the Fire Code of the City of Malibu (Section 503). In summary:

Road widths and circulation

- All new roads will be constructed to current road standards, including minimum 20-foot road widths unobstructed by parking (Fire Code Section 503.2.1), and shall be improved with all weather paving materials.
- Interior residential streets will be designed to accommodate apparatus expected to respond.
- Parking will be allowed on both sides of the road. Minimum required unobstructed road widths will be maintained.
- Turning radius is determined by the fire code official (Section D103.3, CFC). Developer recommends a minimum 32 foot centerline radius curvature.
- Fire apparatus access roads shall have an unobstructed vertical clearance clear to the sky. A minimum vertical clearance of 13 feet 6 inches may be allowed for protected tree species adjacent to access roads. Any applicable tree-trimming permit from the appropriate agency is required (Fire Code Section 503.2.1).
- Roadside vegetation along all interior circulation roads shall be maintained to the Fire Access Road Zone criteria discussed herein.
- Road grades shall not exceed 15%, unless mitigated to approval by the Fire Chief (maximum 20%).
- Angle of approach/departure shall not exceed 7 degrees (12%), unless mitigated to approval by the Fire Chief.
- Applicant shall provide information showing the new roads, in a format acceptable to the CLAFD, for updating of Fire Department maps.

5.2.2 Gates

Access gates, if any, will comply with CLAFD standards and shall be approved by the fire chief. Public roads shall not be gated. Gates on private roads shall comply with CLAFD standards for electric gates and have an approved means of emergency operation. Gates shall be maintained operational at all times.

Fire Protection Plan

VTTM 070038

Further, it is recommended that the gate(s):

- Include area lighting and that the width of the gated area be 2 feet wider than the road that is gated.
- Include a fire department bypass control.
- Be constructed from noncombustible materials, or to approval of Fire Chief.
- Have provisions for manual operation from both sides, if power fails. Gates shall have the capability of manual activation from the development side, via contact by a person or a vehicle (including a traffic pressure tripping loop).
- Be located 30 feet from any intersecting road.

5.2.3 Driveways

Any new structure on the site shall have a paved driveway meeting the following specifications:

- Grades shall be less than 10%.
- Driveway width shall be greater than 10 feet as measured along the line of the curb or centerline of the driveway and exclusive of side slopes and returns.
- Lighted addresses or identifying placards shall be posted at the entrance to each driveway.
- Driveway gates shall comply with this section.
- All driveways are proposed to occur within fuel modification zones. Adjacent vegetation shall be managed according to individual fuel modification zone specifications.

5.3 Structures

5.3.1 Ignition-Resistant Structural Requirements

This section outlines ignition-resistant construction (for all structures) that will meet the requirements of the Fire Code of the 2007 CFC and CBC (Chapter 7A) as adopted by the City of Malibu. Wind-borne embers and incendiary material present the largest risk from wildland fires for the proposed structures on the Project Site. The following features are designed to reduce ember penetration:

1. Exterior walls of all structures shall be approved noncombustible (stucco, masonry, or approved cement fiber board) or ignition-resistant material (heavy timber) from grade to

Fire Protection Plan VTTM 070038

underside of roof system, per the Building Code. Wood shingle and shake wall covering is prohibited. Any unenclosed under-floor areas shall have the same protection as exterior walls. Wall coverings shall extend from top of foundation to the roof. The underside of any cantilevered or overhanging appendages and floor projections shall maintain the ignition-resistant integrity of exterior walls, or projection shall be enclosed to grade. The Fire Code allows 0.375-inch plywood or 0.75-inch drop siding if there is an underlayment of 0.5-inch fire rated gypsum sheathing tightly butted or taped and mudded (Section 704A.3 CBC).

2. Two-inch nominal solid blocking shall be provided between rafters at all roof overhangs under exterior wall covering (Section 7041.3.1.1).
3. If eaves are installed, eaves and soffits shall meet requirements of the State Fire Marshal 12-7A-3 or shall be protected by ignition resistant materials or noncombustible construction on the underside (Section 704A.2.3 CBC).
4. All roofs shall be a Class “A” listed and fire-rated roof assembly, installed per manufacturer’s instructions, to approval of the CLAFD. Any openings on ends of roof tiles shall be enclosed to prevent intrusion of burning debris. When provided, roof valley flashings shall not be less than 0.019-inch (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of No. 72 American Society for Testing and Materials cap sheet running the full length of the valley (Section 704A.1 CBC).
5. No attic ventilation openings or ventilation louvers shall be permitted in soffits, rakes, eaves, cornices, eave overhangs, or between rafters at eaves, or in other overhanging areas in the WUI area. Attic or foundation ventilation openings or ventilation openings in vertical walls or other similar ventilated openings shall be louvered and covered with corrosion-resistant metal screening or other approved material that offers equivalent protection. Vents are required to have a 1/8-inch mesh and shall not exceed 144 square inches each. Attic and foundation ventilation shall also comply with the requirements of the CBC. It is recommended that Flame and Ember resistant vents with internal baffles are applied to all wildland exposed sides of these residences.
6. Vents shall not be placed on roofs unless they are approved for Class “A” roof assemblies or are otherwise approved by the CLAFD.
7. Vents, such as roof vents, dormer vents, gable vents, foundation vent openings, vent openings in walls, or other similar vent openings, shall be covered with louvers and the required 1/8-inch mesh or are specific flame and ember resistant (i.e., Brandguard Vents).

Fire Protection Plan VTTM 070038

8. Turbine vents are restricted.
9. Glazing, including glass, or other transparent, translucent, or opaque glazing, or leaded glass, shall be one of the following: double pane with one tempered pane or glass block, or have a fire rating of 20 minutes (Section 704A.3.2.2). Plastic or vinyl window frames shall be of an approved type, which will not melt, ignite, or fail. Vinyl frames shall have welded corners and metal reinforcement in the interlock area to maintain integrity.
10. Skylights shall be certified to Architectural Manufacturers Association/Window & Door Manufacturers Association/Canadian Standards Association 101/I.S-2/A440 structural requirements. (Section 2405.5 CBC).
11. Rain gutters and downspouts shall be noncombustible and designed to prevent the accumulation of leaf litter or debris (Section 704A.1.5 CBC).
12. Exterior doors shall be approved noncombustible or 1.25-inch solid-core wood or have a 20-minute fire rating. Windows within doors and glazed doors shall comply with item 11 above (Section 7904A.3.2.3 CBC).
13. Exterior balconies, carports, decks, patio covers, unenclosed roofs and floors, and similar architectural appendages (including gazebos, palapas, and large play structures) and projections shall be of approved noncombustible construction, approved fire-retardant wood, heavy timber (4-by-4-inch minimum with 6-by-6-inch posts; per consultant) or 1 hour fire-resistive construction. When such appendages and projections are attached to exterior fire-resistive walls, they shall be constructed to maintain the fire-resistive integrity of the exterior wall and shall have the same fire rating (Section 704A.4 CBC).
 - i. Any decks or overhangs over slopes shall be enclosed and are subject to the approval of the CLAFD. Decks will be constructed to the same ignition-resistive standards as the primary structure.
 - ii. There shall be no combustible awnings, canopies, or similar combustible overhangs (excluding heavy timber construction).
14. No wood fences shall be allowed.
15. All chimneys and other vents on heating appliances using solid or liquid fuel, including outdoor fireplaces and permanent barbeques and grills, shall have spark arrestors of a type approved by the CLAFD. Spark arrestor openings shall be a maximum 0.5 inch.

Fire Protection Plan VTTM 070038

16. Storage sheds, barns, and outbuildings shall be of approved noncombustible construction (including heavy timber) with noncombustible Class A roofs that do not increase the risk of ignition to the primary structures. Additionally, any of the above-listed detached structures that are 200 square feet or more in size shall be equipped with automatic fire sprinklers. Locations and required FMZs will be subject to approval of CLAFD and the Building Official based on the size of the structure.

5.3.2 Fire Protection Systems

Infrastructure, Structural Fire Protection, and Fire Protection Systems

WUI fire protection requires a systems approach, which includes the components of vegetation management, structural safeguards (both previously addressed), and adequate infrastructure. This section provides recommendations for infrastructure components.

Infrastructure Requirements

The following recommendations are made in order to comply with CFC as adopted by City of Malibu, CBC (Chapter 7A), and nationally-accepted fire protection standards including the 2006 International Wildland-Urban Interface Code, as well as other recommendations to assist in providing reasonable on-site fire protection. The applicable Fire Code sections are listed.

Water supply

The following fire flow requirements are based on proposed building sizes and CLAFD requirements. Table 7 presents specific information, by project lot number.

**Table 7
Fire Flow Requirements, by Lot Number**

Lot Number	Building Size*	Fire Flow**	Duration
1	First floor: 4,732 sf Second floor: 3,587 sf Cabana: 626 sf Garage: 920 sf	1,125 GPM	2 hours
2	First floor: 4,993 sf Second floor: 3,791 sf Gym: 431 sf Garage: 897 sf	1,250 GPM	2 hours
3	First floor: 4,816 sf Second floor: 3,551 sf Cabana: 168 sf Guest House: 659 sf Garage: 635 sf	1,250 GPM	2 hours

Fire Protection Plan VTTM 070038

Lot Number	Building Size*	Fire Flow**	Duration
4	First floor: 5,007 sf Second floor: 3,764 sf Cabana: 298 sf Garage: 959 sf	1,250 GPM	2 hours
5	First floor: 4,667 sf Second floor: 3,697 sf Pool Bath: 135 sf Guest House: 442 sf Garage: 885 sf	1,250 GPM	2 hours

*Each building also includes a 1,000 sf basement, not included in building size totals

**Fire Flows presented include additions for second stories and exposure as well as reductions for full sprinklers and ignition resistant construction.

- The needed fire flow is based on all structures having approved fire sprinkler systems, including sprinklered basements, with a resulting 50% overall reduction in the Fire Code Fire Flow requirements. ***Fire flow for the five single family detached dwellings is recommended to be a minimum of 1,500 GPM fire flow at 20 PSI.*** Each fire hydrant shall be able to flow at least 1,250 GPM at 20 PSI during a single hydrant flow test. Sixty-PSI static pressure may be required by the Fire Department to serve the internal sprinkler systems in the structures.
- The water system should be designed to assume that four sprinkler heads are flowing at the same time the 1,500 GPM system fire flow is occurring. The 2-hour duration shall be provided at the same time as the maximum peak domestic demand.
- The engineer shall design the water system to supply the needed fire flow to the largest expected size home, including number of stories. Needed fire flow should be provided during periods of peak maximum domestic demand.
- The water supply for fire protection will be provided by Los Angeles County Waterworks and shall be designed and installed to their standards. The water delivery system will be designed to minimize damage and service interruptions as a result of seismic activity. A “Can and Will Serve” letter will be obtained from the water purveyor.
- The water system shall have an adequate number of isolation valves and shall provide two sources of supply to the mains. Two sources of supply to the mains is necessary should one water source fail or be shut off.
- There shall be an approved emergency interconnection provision and emergency interconnection valves provided for emergency use, if this water system adjoins another water system.

Fire Protection Plan

VTTM 070038

- New swimming pools, 5000 gallon (18925 L) or greater capacity, constructed or installed in a Fire Hazard Severity Zone shall have a drain and discharge line connected to a draft hydrant.

Fire Hydrants

- Hydrant type and locations shall be subject to CLAFD approval and shall be located on the normal Fire Apparatus response side of the road.
- As the proposed Project cul-de-sac exceeds 450 feet, a hydrant shall be required mid-block.
- All on-site fire hydrants shall flow a minimum of 1,250 gallons per minute at 20 psi for a duration of two hours. If more than one on-site fire hydrant is required, the on-site fire flow shall be at least 2,500 gallons per minute at 20 psi, flowing from two hydrants simultaneously. Project Site flow may be greater depending upon the size of the structure and the distance from public hydrants.
- Spacing distance between on-site hydrants shall be 300 feet. Design features shall assist in allowing distance modifications.
- All on-site hydrants shall be installed a minimum of 25 feet from a structure or protected by a two-hour firewall.
- All on-site hydrants shall be equipped with a shut-off (gate) valve, which shall be located as follows: a. Minimum distance to the hydrant 10 feet b. Maximum distance from the hydrant 25 feet
- All new on-site hydrants and underground installations are subject to inspection of the following items by a representative of the Department: a. Piping materials and the bracing and support thereof. b. A hydrostatic test of 200 psi for two hours. c. Adequate flushing of the installation. d. Flow test to satisfy required fire flow.
- Hydrants shall be painted with two coats of red primer and one coat of red paint, with the exception of the stem and threads, prior to flow test and acceptance of the system.
- No barricades, walls, fences, landscaping, etc., shall be installed or planted within three feet of a fire hydrant.
- The water system is public and metered by Los Angeles County Waterworks. The water supply and delivery upgrades will:
 - Provide code-compliant fire flow to the Project Site fire hydrant locations
 - Allow for greater operational and emergency water storage should pipeline breaks or shut-downs occur

Fire Protection Plan

VTTM 070038

- Prior to the issuance of building permits, the applicant shall submit to the City plans demonstrating a water system capable of handling the fire flow requirements – existing and proposed buildings.
- Prior to issuance of building permits, the appropriate number of fire hydrants and their specific locations, approved by the CLAFD Fire Chief, will be identified and they will be constructed accordingly.
- Fire service laterals, valves, and meters will be installed on site as required by the CLAFD.
- Reflective blue dot hydrant markers shall be installed in the street to indicate location of the hydrant.
- Crash posts will be provided where needed in on site areas where vehicles could strike fire hydrants, fire department connections, etc.

Fire Sprinklers

- All structures on the Project Site will have approved fire sprinklers that shall also be included in basements. Systems in single family residences should be 13-D, for larger homes, four head calculation systems may be required. Four head calculations refer to the hydraulic calculation/design of the sprinkler system and water supply to a 1 or 2 family dwelling in order to allow four sprinkler heads to properly flow water at the same time if needed for internal property protection. Certain very large homes may require NFPA 13-R systems. Sprinkler coverage shall include the home, garage, enclosed patios and porches. The sprinkler designer will design this system to CLAFD approval.
- All systems should be remotely supervised to an approved monitoring station.

Fire Alarm Systems

- All residential units shall have electric-powered, hard-wired smoke detectors in compliance with CLAFD standards.

6.0 EMERGENCY PLANNING

Evacuation from the Project Site will be the preferred method of safety when adequate warning is provided. When adequate time is available to evacuate the area, the residents will utilize the primary access to Pacific Coast Highway via Malibu Canyon Road and, based on the direction of the approaching wildfire, will egress from the Project Site to a safe area away from open fuel bed areas. In the case of an extreme situation where relocation/evacuation would be too dangerous due to the location of the wildfire, the weather, or other circumstances, residents may be advised

Fire Protection Plan VTTM 070038

to seek temporary refuge from the approaching wildfire in their ignition resistant homes, at the discretion of the CLAFD.

8.0 CONCLUSION

This FPP is submitted in support of proposed residential development of the property at 24200 Pacific Coast Highway (Vesting Tentative Tract Map No. 070038) in the City of Malibu, California, owned by AZ Mesa Winter, LLC. The recommendations in this document meet fire safety, building design elements, fuel management/modification, and landscaping recommendations of the CLAFD. Fire and Building Codes and other local and state regulations in effect at the time of each building permit application supersede these recommendations unless the FPP recommendation is more restrictive.

The recommendations provided in this FPP have been designed specifically for the proposed construction of residences adjacent the WUI zone at the Project Site. The Project Site's fire protection system includes a redundant layering of protection methods that have been shown through post-fire damage assessments throughout California to reduce fire risk. All structures on the Project Site will be constructed to meet or exceed the latest codes, including ignition and ember-resistant exterior walls, roofs, eaves, vents, windows, decks, and other once more vulnerable building features, along with interior sprinklers. Fuel modification zones and all Project Site landscaping will be maintained on an on-going basis and inspected annually, maintaining the plants at very high levels of ignition resistance and removing all dead and dying materials and maintaining appropriate horizontal and vertical spacing. In addition, plants that establish or are introduced to the FMZ that are not on the approved plant list will be removed.

Ultimately, it is the intent of this FPP to guide the construction of residences that are defensible from wildfire and, in turn, do not represent significant threat of ignition source for the adjacent native habitat. It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions and mitigating actions identified in this report are designed to reduce the likelihood that fire will impinge upon the proposed structures. There are no guarantees that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property. Implementation of the required enhanced construction features provided by the applicable codes and the mitigating fuel modification requirements provided in this FPP will reduce the site's vulnerability to wildfire. It will also help accomplish the goal of this FPP to assist firefighters in their efforts to defend these structures and reduce the risk associated with the Project's WUI location.

Fire Protection Plan VTTM 070038

9.0 REFERENCES CITED

- Anderson, Hal E. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. USDA Forest Service Gen. Tech. Report INT-122. Intermountain Forest and Range Experiment Station, Ogden, UT.
- County of Los Angeles 2007-2008 Annual Report
(<http://ceo.lacounty.gov/pdf/Annl%20Rpt%2007-08.pdf>)
- Fire and Resource Assessment Program (FRAP). 2008. California Department of Forestry and Fire Protection. Website Accessed August 21 2008. <http://frap.cdf.ca.gov/>
- Impact Sciences, Inc. 2008. Site Vegetation Maps and GIS data.
- Scott, Joe H.; Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.
- Weise, D.R. and Regelbrugge, J. 1997. Recent chaparral fuel modeling efforts. Prescribed Fire and Effects Research Unit, Riverside Fire Laboratory, Pacific Southwest Research Station. 5p.

Fire Protection Plan
VTTM 070038

INTENTIONALLY LEFT BLANK

APPENDIX A
Site Photographs

INTENTIONALLY LEFT BLANK



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

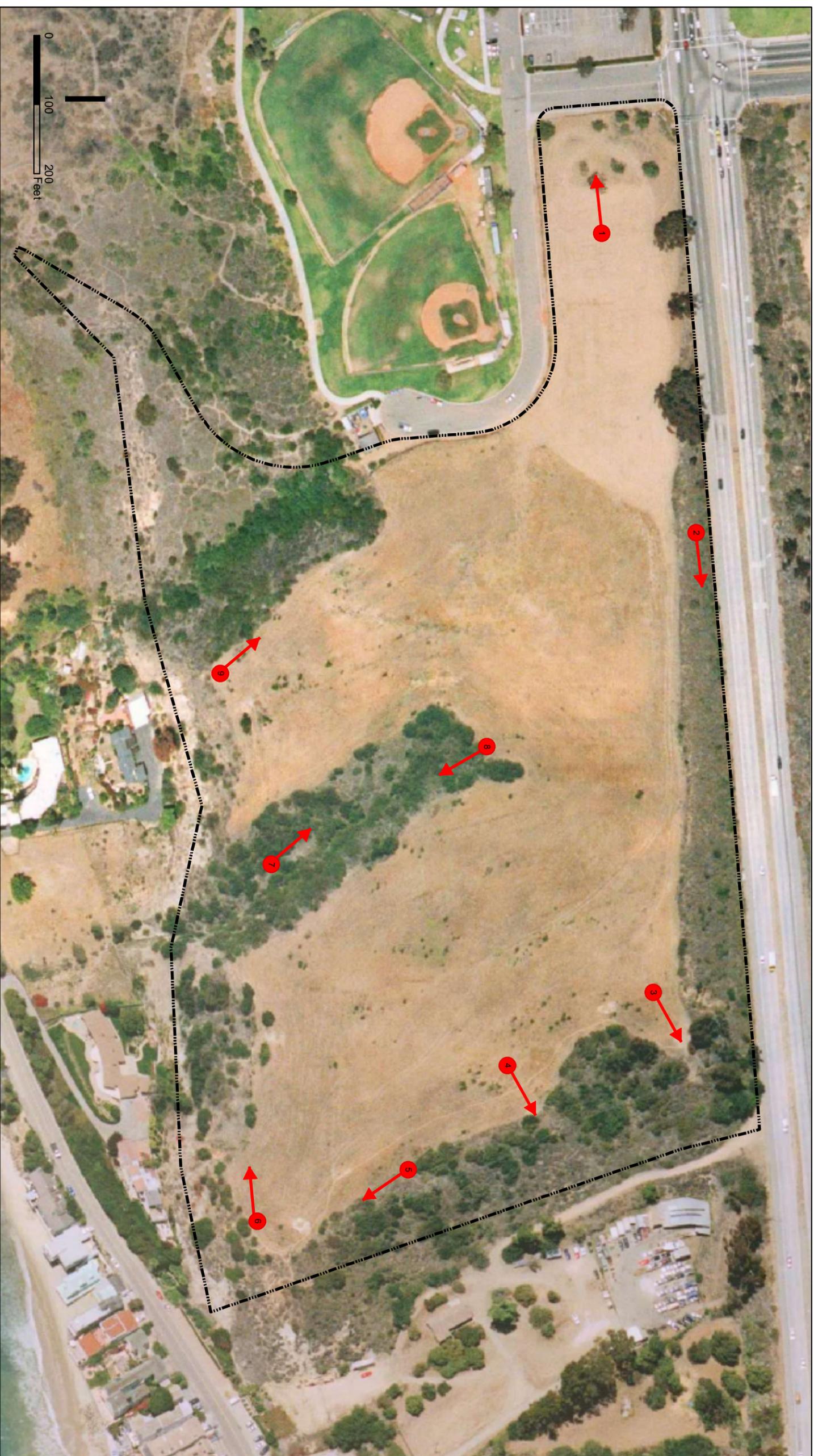


Photo 7



Photo 8

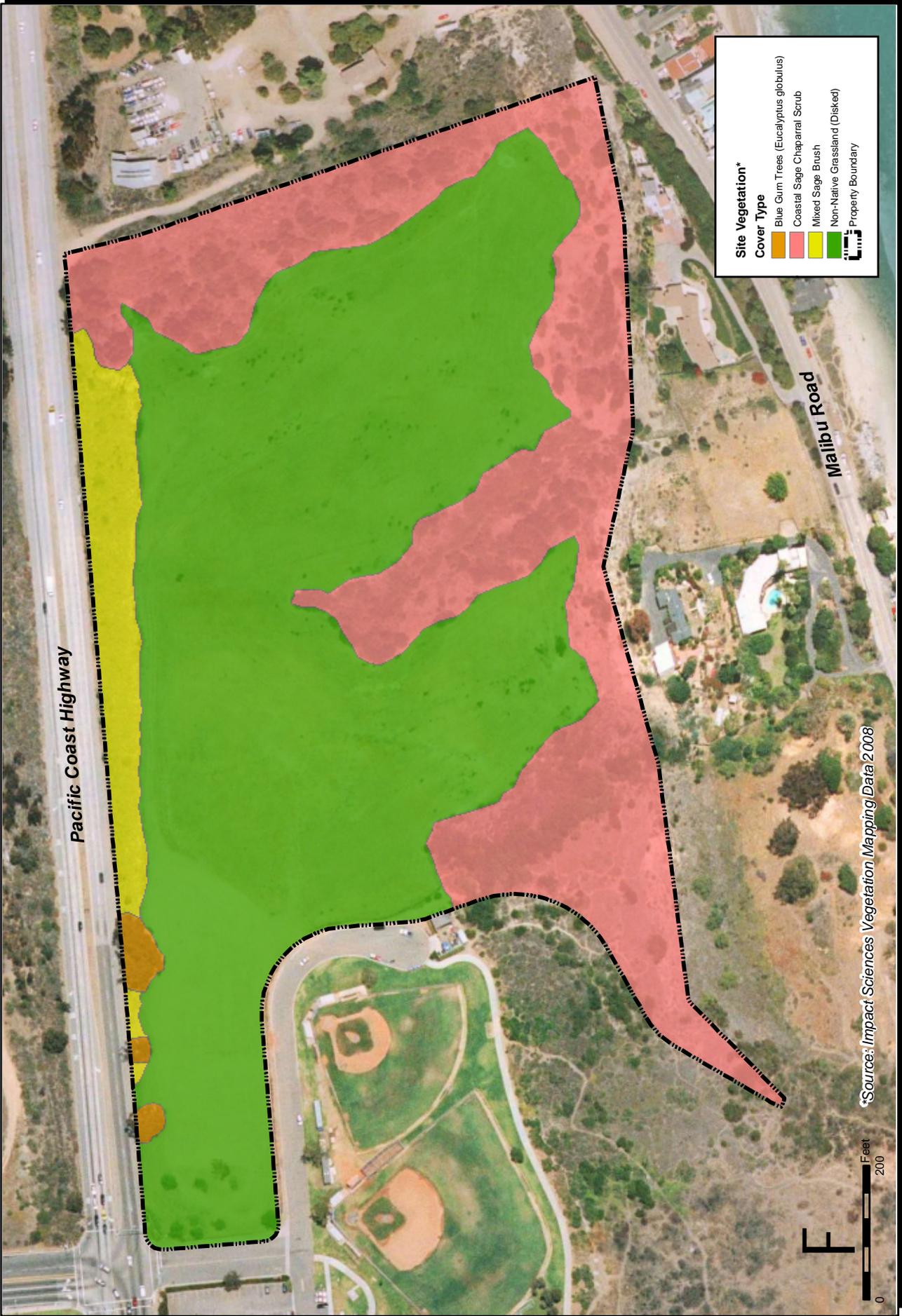


Photo 9

INTENTIONALLY LEFT BLANK

APPENDIX B
Site Vegetation Map

INTENTIONALLY LEFT BLANK

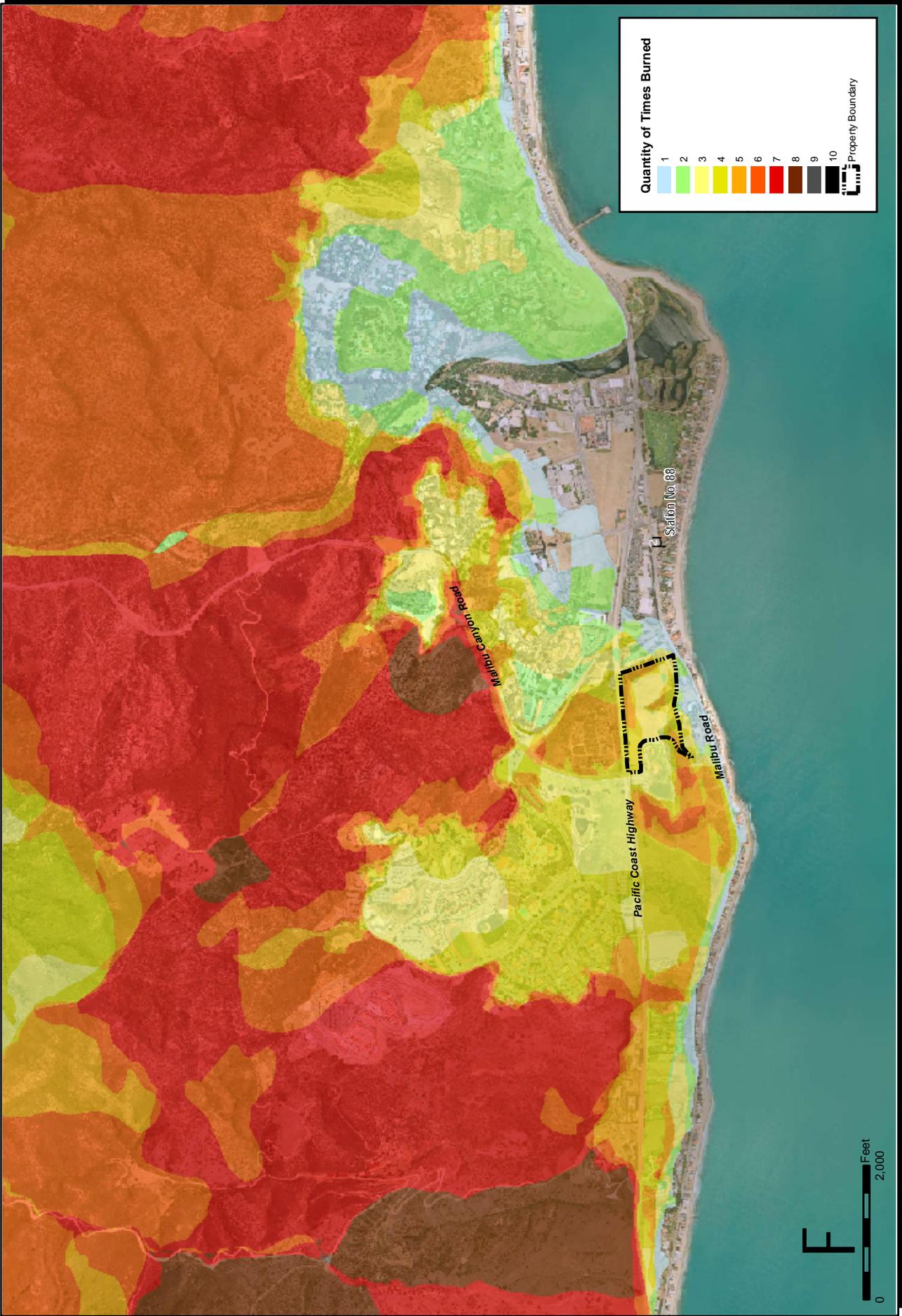


Fire Protection Plan - VTTM 070038
Site Vegetation Map

INTENTIONALLY LEFT BLANK

APPENDIX C
Fire History Exhibit

INTENTIONALLY LEFT BLANK



Fire Protection Plan - VTTM 070038
Fire History Map

INTENTIONALLY LEFT BLANK

APPENDIX D
Project Site Plan

INTENTIONALLY LEFT BLANK

MALIBU ROAD

60251

60250

60252

60253

60254

60255

60256

60257

60258

60259

60260

60261

60262

60263

60264

60265

60266

60267

60268

60269

60270

60271

60272

60273

60274

60275

60276

60277

60278

60279

60280

60281

60282

60283

60284

60285

60286

60287

60288

60289

60290

60291

60292

60293

60294

60295

60296

60297

60298

60299

60300

60301

60302

60303

60304

60305

60306

60307

60308

60309

60310

60311

60312

60313

60314

60315

60316

60317

60318

60319

60320

60321

60322

60323

60324

60325

60326

60327

60328

60329

60330

60331

60332

60333

60334

60335

60336

60337

60338

60339

60340

60341

60342

60343

60344

60345

60346

60347

60348

60349

60350

60351

60352

60353

60354

60355

60356

60357

60358

60359

60360

60361

60362

60363

60364

60365

60366

60367

60368

60369

60370

60371

60372

60373

60374

60375

60376

60377

60378

60379

60380

60381

60382

60383

60384

60385

60386

60387

60388

60389

60390

60391

60392

60393

60394

60395

60396

60397

60398

60399

60400

60401

60402

60403

60404

60405

60406

60407

60408

60409

60410

60411

60412

60413

60414

60415

60416

60417

60418

60419

60420

60421

60422

60423

60424

60425

60426

60427

60428

60429

60430

60431

60432

60433

60434

60435

60436

60437

60438

60439

60440

60441

60442

60443

60444

60445

60446

60447

60448

60449

60450

60451

60452

60453

60454

60455

60456

60457

60458

60459

60460

60461

60462

60463

60464

60465

60466

60467

60468

60469

60470

60471

60472

60473

60474

60475

60476

60477

60478

60479

60480

60481

60482

60483

60484

60485

60486

60487

60488

60489

60490

60491

60492

60493

60494

60495

60496

60497

60498

60499

60500

60501

60502

60503

60504

60505

60506

60507

60508

60509

60510

60511

60512

60513

60514

60515

60516

60517

60518

60519

60520

60521

60522

60523

60524

60525

60526

60527

60528

60529

60530

60531

60532

60533

60534

60535

60536

60537

60538

60539

60540

60541

60542

60543

60544

60545

60546

60547

60548

60549

60550

60551

APPENDIX E

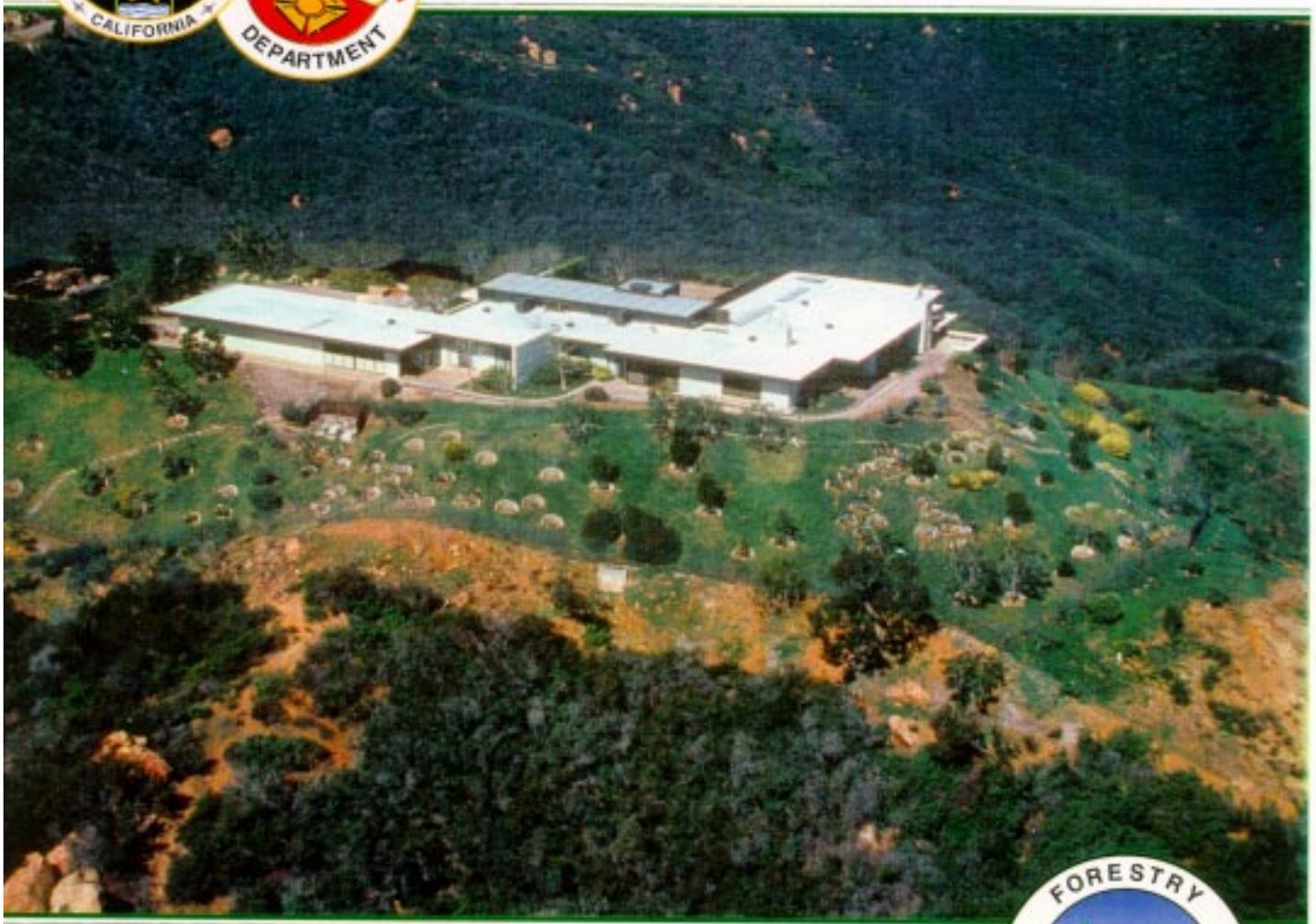
County of Los Angeles Fire Department Fuel Modification Plan Guidelines

INTENTIONALLY LEFT BLANK

Fuel Modification Plan Guidelines



*County of Los Angeles
Fire Department*



Fuel Modification Unit

*Prevention Bureau
Forestry Division*



**FUEL MODIFICATION PLAN
GUIDELINES
FOR PROJECTS LOCATED IN
FIRE ZONE 4 OR
VERY HIGH FIRE HAZARD
SEVERITY ZONES**

ADOPTED

JANUARY 1998

County of Los Angeles Fire Department

Prevention Bureau

Forestry Division

Brush Clearance Section

TABLE OF CONTENTS

Introduction	1
Statute	1
Description and Purpose of Fuel Modification Plan	1
Subdivision Requirements	2
Fuel Modification Zones	3
Zone Delineation: Purpose, Requirements, Maintenance	
Setback Zone (Zone A)	3
Irrigated Zone (Zone B)	5
Thinning Zone (Zone C)	6
Interface Thinning Zone (Zone D)	7
Off-Site Fuel Modification	8
Compliance	8
Exhibits	
Exhibit A Checklist for Preliminary and Final Review	9
Exhibit B Estimated Fuel Modification Distance Chart	12
Exhibit C Sample Fuel Modification Diagrams	13
Appendices	
Appendix I Undesirable Plant List	14
Appendix II Desirable Plant List	15
Appendix III Planting, Spacing, and Maintenance Guidelines	24
Appendix IV Glossary	26
Appendix V Submittal, Routing Procedures	29

Introduction

Following the disastrous Southern California wildfires in 1993, the Board of Supervisors established the Wildfire Safety Panel to analyze and make recommendations on the hazardous conditions that existed for wildfires in the wildland and urban interface/intermix areas of Los Angeles County. The mission identified by the Wildfire Safety Panel at its onset was to enhance life safety concerns in Los Angeles County through the analysis and development of meaningful, cost-effective ways to improve fire safety. One of the recommendations adopted by the Wildfire Safety Panel was for the Fire Department to establish a set of guidelines and landscape criteria for all new construction that would implement ordinances relating to fuel modification planning and help reduce the threat of fires in high hazard areas.

The "Fuel Modification Guidelines" herein are administrative in nature and have been adopted by the County of Los Angeles Fire Department to provide procedural implementation of County Fire Code requirements previously adopted by the Board of Supervisors and already in effect for a Fuel Modification Plan for projects and or structures proposed within the Very High Fire Hazard Severity Zone(s) or Fire Zone 4. The submittal of fuel modification plans that meet the requirements of these guidelines will enable the Fire Department and other agencies to expedite processing and answer applicant's questions. These guidelines require compliance with existing codes and do not modify or change existing Fire Code clearance distances or any other code requirements.

Statute

Per Section 1117.2.1 of the 1996 County Fire Code: "A fuel modification plan, a landscape plan and an irrigation plan shall be submitted with any subdivision of land or prior to any new construction, remodeling, modification or reconstruction of a structure where such remodeling, modification or reconstruction of a structure increases the square footage of the existing structure by 50% or more within any 12-month period and where the structure or subdivision is located within areas designated as a Very High Fire Hazard Severity Zone or Fire Zone 4 in the Los Angeles County Building Code (Section 26.150, Los Angeles County Code Title 26 Building Code)."

Fuel modification plans are required for all projects and/or structures receiving tentative map approval or building permits on or after January 7, 1996. Tentative maps approved prior to January 7, 1996 are exempt from these requirements. In addition, any amendment or revisions to such maps which do not require public review would also be exempt.

Description of Fuel Modification Plan

A fuel modification plan identifies specific zones within a property which are subject to fuel modification. A fuel modification zone is a strip of land where combustible native or ornamental vegetation has been modified and/or partially or totally replaced with drought tolerant, fire resistant plants.

Fuel modification plans will vary in complexity and reflect the fire history of the area, the amount and type of vegetation, the arrangement of the fuels, topography, local weather patterns, and construction, design and placement of structures.

Purpose of Fuel Modification

Fuel modification reduces the radiant and convective heat, and provides fire suppression forces a defensible space in which to take action. Fuel modification zones are strategically placed as a buffer to open space, or areas of natural vegetation and generally would occur surrounding the perimeter of a subdivision, commercial development, or isolated development of a single-family dwelling. Modification of combustible vegetation within a development is handled under the "Clearance of Vegetative Growth" section of the Fire Code as it pertains to structures.

Protected Land - Any project located contiguous to protected lands, as defined in Government Code Section 51184, shall be handled on a case-by-case basis as identified within this code section.

Special Constraints - Information regarding physical, environmental, and legal constraints that may compromise the ability to complete the fuel modification requirements of the project should be addressed in the first stages of design and planning, at the time of preliminary review. Alternative solutions to conflicts may include modifications in the zone widths as a result of set backs, structure orientation, building design and materials selection, utilization of streets, parks, golf courses, natural barriers, existing development or increased irrigation zones.

Subdivision Requirements

Current code requirements for subdivisions including access, fire flow, fire sprinklers, water storage and fire resistive construction techniques will be considered and credited, as appropriate, by the Fire Department in establishing the final fuel modification requirements for a project. Alternative fuel modification proposals may be submitted to the Fire Department for review and approval.

Extreme Fire Hazard - If the Fire Department concludes an extreme fire hazard exists on the property, additional mitigation measures may be required. The Fire Department shall review each project on a case-by-case basis to identify the contributing extreme fire hazard conditions including, but not limited to: wind direction and velocity, fuel load, neighboring land uses, terrain, access for firefighting equipment, adequacy of water supply and delivery systems and construction standards. Generally, the Santa Monica Mountains and the south facing slopes of the San Gabriel Mountains are considered to be Extreme Fire Hazard areas.

Submittal Procedures

Fuel modification plans shall be reviewed and approved by the Forestry Division of the Fire Department for reasonable fire safety. Approval of the final fuel modification plan by the Fire Department is required prior to the issuance of a building permit. Property owners located along the perimeter of tracts must submit plans for additional structures for approval by the Fire Department in addition to the building department to ensure compliance with the underlying fuel modification plan (see Exhibit A for a complete checklist of submittal procedures).

Fuel Modification Zones

The size and type of the fuel modification zone(s) will be determined by the Fire Department upon review of the preliminary plans. Fuel modification distances are designed for typical fire weather scenarios and are not intended to be a blanket requirement for all fuel modification plans. Planting of low-volume, fire retardant, drought tolerant plants may also be required for erosion control (see Exhibit B Estimated Fuel Modification Distance Chart to compute the approximate total fuel modification zone distance for your project).

Per Section 1117.2.3 "Extra Hazard" of the County of Los Angeles 1996 Fire Code, "The governing body finds that in many cases of extra-hazardous situations, a firebreak around structures of only 30 feet (9144mm) is not sufficient and that a firebreak of 50 feet (15240mm) or more may be necessary. If the chief or commissioner finds that because of the location of any building or structure, and because of other conditions, a 30-foot (9144 mm) firebreak around such structure as required by Section 1117.2.2 is not sufficient, he may notify all affected owners of property that they must clear all flammable vegetation and other combustible growth or reduce the amount of fuel content for a distance greater than 30 feet (9144 mm), but not to exceed 200 feet (60960mm)." Fire Code distances are measured on the horizontal or straight out from the structure rather than on the slope.

Zone Delineation

The fuel modification plan shall identify one or more of the following zones: A-Setback Zone; B-Irrigated Zone; C-Thinning Zone; D- Interface Thinning Zone based upon preliminary plan review by the Forestry Division of the Fire Department (see Exhibit C). The actual width of zone(s) will depend on the ability to provide desirable clearance distances.

Zone A - Setback Zone

Purpose

- Provides defensible space for fire suppression forces.
- Offers protection from intense flames and sparks or embers carried by strong winds common to a wildfire by reducing the probability of ignition through increased moisture content of existing vegetation and removal of fine fuels.

General Requirements

- Zone in closest proximity to the structure.
- Minimum of 20 feet beyond the edge of combustible structures, attached accessory structures, or appendages and projections.
- For purposes of the fuel modification plan, all combustible accessory structures, appendages, or projections within 20 feet of the combustible structure will be considered as attached.
- Most vegetation in this zone is limited to ground covers, green lawns, and a limited number of selected ornamental plants.

Special Requirements

- Combustible structures, attached accessory structures, appendages or projections must comply with building code requirements for the Very High Fire Hazard Severity Zone or Fire Zone 4.
- Combustible detached accessory structures such as patio covers, decks, carports, trellises, or similar accessory structures within 20 feet of a combustible structure must comply with building code requirements for the Very High Fire Hazard Severity Zone or Fire Zone 4.
- Irrigation by automatic or manual sprinkler systems to maintain healthy vegetation with high moisture content.
- Irrigation away from native Oak trees and outside the dripline.
- Pruning of foliage to reduce fuel load, vertical continuity, removal of plant litter and dead wood.
- Complete removal of undesirable plant species (see Appendix I), minimal allowance for retention of selective native vegetation.
- Plants in this zone shall be highly fire resistant and selected from the approved planting list for the setback zone and given geographical area (see Appendix II).
- Target trees are not allowed within ten feet of combustible structures. Other tree species may be allowed pursuant to the Fire Code regarding clearance of brush and vegetative growth but are not recommended.
- Special consideration will be given for rare and endangered species, geologic hazards, tree ordinances, or other conflicting restrictions.

Maintenance

- Requires continual removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying fire resistant plantings, maintenance of the operational integrity and programming of the irrigation system.
- Regular trimming to prevent ladder fuels.

Zone B Irrigation Zone

Purpose

- Provide defensible space for fire suppression forces.
- Augment irrigation and planting required by the County Department of Public Works and City Public Works Departments relating to remanufactured slopes and landscape ordinances.

General Requirements

- May have isolated detached accessory structures such as patio covers, decks, carports, trellises, and other similar accessory structures provided they meet building code requirements.
- Some native or existing vegetation may remain if spaced according to planting guidelines (see Appendix III) and maintained free of dead wood, and individual plants are thinned to a percentage as specified during the preliminary review to reduce the fuel load.
- A large percentage of existing vegetation may be removed and replaced with appropriate irrigated fire resistant and drought tolerant plant material.

Specific Requirements

- With the exception of specimen native vegetation approved for retention, irrigated surface fuels shall be maintained at a height not to exceed 18 inches.
- Irrigation shall be designed to supplement native vegetation, and establish and maintain planted natives and ornamentals.
- Any plants selected for planting in this zone shall be selected from the approved plant list for the setback, irrigated, or thinning zone for a given geographical area (see appendix II).
- Planting will be in accordance with planting guidelines and spacing standards established in these guidelines to avoid erosion (see Appendix III).
- 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, or upon further review.
- Removal of undesirable plant species (see Appendix I) as determined during preliminary review.

Maintenance

- Requires continual removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying fire resistant plantings, maintenance of the operational integrity and programming of the irrigation system.
- Regular trimming to prevent ladder fuels.

- Compliance with the Fire Code is a year round responsibility. Enforcement will occur following inspection by the Fire Department annually or as needed. Annual inspections are generally conducted following natural drying of fine fuels. This occurs between the months of April and June.

Zone C Thinning Zone

Purpose

- Designed to slow the rate of spread, reduce flame lengths, and intensities of the fire prior to reaching the irrigated area.
- Designed to eliminate the spread of fire from one plant to another via ladder fuels and eliminate horizontal continuity by properly spacing remaining vegetation and limiting large masses of unbroken vegetation.
- Reduce the fuel load of a wildland area adjacent to a structure, thereby, reducing the radiant and convective heat of wildland fires.

General Requirements

- Predominantly existing vegetation with removal of the majority of undesirable plant species including trees and tree-form shrubs (see Appendix I).
- Reduce fuel loading by reducing the fuel in each remaining shrub or tree without substantial decrease in the canopy cover or removal of soil holding root systems.
- Some replacement planting with ornamental or less flammable native species to meet minimum slope coverage requirements of city or county public works, landscape or hillside ordinances.
- Natural vegetation is thinned by reduced amounts as the zone moves away from the development.

Specific Requirements

- Removal of all dead and dying vegetation, all fine fuels reduced to 3 inches in height.
- 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 Appendix II).
- 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.

Maintenance

- Requires annual removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying fire resistant plantings, maintenance of the operational integrity and programming of the irrigation system.
- Compliance with the Fire Code is a year round responsibility. Enforcement will occur following inspection by the Fire Department annually or as needed. Annual inspections are generally conducted following natural drying of fine fuels. This occurs between the months of April and June.
- Debris and trimmings produced by thinning and pruning shall be removed from the site or chipped and evenly dispersed in the same area to a maximum depth of 5 inches.

Zone D Interface Thinning Zone

Purpose

- Designed to slow the rate of spread, reduce flame lengths, and intensities of the fire prior to reaching the irrigated area.
- Designed to eliminate the spread of fire from one plant to another via ladder fuels and eliminate horizontal continuity by properly spacing remaining vegetation and limiting large masses of unbroken vegetation.
- Reduce the fuel load of a wildland area adjacent to a structure, thereby, reducing the radiant and convective heat of wildland fires.

General Requirements

- Area serving as the initial interface between wildland areas and fuel modification zones.
- Consists of native vegetation individually thinned to reduce foliage mass or fuel loading. This does not necessarily require removing plants, but thinning those that exist.
- Proper thinning and spacing of remaining trees and tree-form native shrubs, reducing fuel load without overly exposing the soil to the threat of erosion.
- Natural vegetation is thinned by reduced amounts as the zone moves away from the development.

Specific Requirements

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

- Any plants selected for planting in this zone shall be chosen from the approved plant list for the setback, irrigated, or thinning zone for a given geographical area (see Appendix II).
- 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.

Maintenance

- Correct maintenance of this zone requires removal of overgrowth and major pruning every three to five years.
- Debris and trimmings produced by thinning and pruning shall be removed from the site or chipped and evenly dispersed in the same area to a maximum depth of 5 inches.
- Compliance with the Fire Code is a year round responsibility. Enforcement will occur following inspection by the Fire Department annually or as needed. Annual inspections are generally conducted following natural drying of fine fuels. This occurs between the months of April and June.

Off-Site Fuel Modification Option

Off-site fuel modification is generally not recommended due to problems inherent with enforcement of regulations on adjacent property and the potential for confusion regarding responsibility for fuel modification areas outside legal ownership. However, if the applicant should voluntarily request and obtain permission from neighboring property owners for fuel modification, it shall be taken into consideration by the Fire Department as part of the project's fuel modification plan.

The intent of these guidelines is to provide for fuel modification within the proposed project's or structure's property boundaries. If the fuel modification zones, consistent with these guidelines, cannot be fully contained on the subject property, on-site alternative means and methods should be sought to provide an equal level of protection from wildland fire. Alternative means and methods may include, but are not limited to, the following: 1) increasing the width of the setback or irrigated zones to reduce thinning zone dimensions, 2) enhancing fire protection construction techniques, 3) structure orientation, and 4) construction of non-combustible fencing material.

Compliance

Construction Phase - Plan review and approval is required for issuance of a building permit(s). Implementation of the fuel modification plan (other than that which will be assigned to the home buyer) is required prior to the issuance of Certificate of Occupancy or building final.

Long-Term Maintenance/Enforcement - The builder/developer is responsible for providing new property owners with recorded CC&R's or disclosure statements identifying the responsibilities for maintaining the fuel modification zone(s) within their property as defined in the approved Fuel Modification Plan. Approved Fuel Modification Plans will be reviewed annually as part of the brush clearance inspection process, by local fire station personnel, brush clearance office personnel, fire prevention or forestry personnel.

EXHIBIT A
**CHECKLIST FOR PRELIMINARY REVIEW TO DETERMINE
REQUIRED FUEL MODIFICATION ZONES**

A preliminary review of your project will determine the site specific requirements necessary to assure reasonable fire safety. All required documents for a preliminary review shall be submitted to the Fuel Modification Unit of the County of Los Angeles Fire Department at the time of tentative map processing. The Preliminary Fuel Modification Plan review will be required prior to final map approval. Approved revisions to the fuel modification plans will be allowed up to the point of issuance of building permit. For information regarding fuel modification plans, please contact the Fuel Modification Unit of the Forestry Division at (909) 620-8287 or (213) 881-2481.

Tentative Map

1. The applicant shall submit three (3) sets of site plans indicating building envelopes to the Fire Department during the tentative map approval process. Additional copies may be submitted for stamp approval as the applicant deems necessary to meet the requirements of other agencies.
2. Indicate on an additional topographic map: project location, legal description, and tentative map.
3. Indicate existing land uses contiguous in all directions up to two hundred (200) feet outside of the project boundaries (i.e., construction, natural vegetation, roads, parks, etc.)
4. Provide photographs and a photo orientation map, of the area which show the type, size, and density of existing vegetation.
5. Indicate who will be responsible for the long-term maintenance of the fuel modification zones (property owner, adjacent property owner, landscape maintenance district, Homeowner's Association, etc.)
6. Submit copies of environmental documents which may disclose conflict with fuel modification plan requirements (i.e., endangered species habitat mitigation, Oak tree preservation, etc.)
7. After review by the Fire Department of all documents provided by the applicant, the Fire Department will meet with the applicant to discuss the recommended fuel modification requirements for the project and finalize the approval of the preliminary fuel modification plan.

NOTE: Documents prepared specifically to meet requirements of other agencies may be submitted, provided the necessary information is included. Approval of a fuel modification plan by the County of Los Angeles Fire Department does not eliminate the requirement or the responsibility of the applicant to obtain appropriate environmental, grading, building, and zoning clearances or permits from the agencies having jurisdiction.

CHECKLIST FOR FINAL FUEL MODIFICATION PLAN

Building Permit

1. Prior to the issuance of a building permit the applicant will submit three (3) sets of blue line plans to the Fire Department showing the final fuel modification requirements. Additional copies may be submitted for stamp approval as the applicant deems necessary to meet the requirements of other agencies. The plan package shall include the following:
 - a. **Irrigation Plan** - The irrigation plan should indicate the areas to be irrigated and the type of irrigation system to be installed.
 - b. **Landscape Plan** - The landscape plan should identify the location and type of all supplemental plantings and location type, and the size of plants remaining on site following modification. The plan should include a complete list of all plants identified by common and scientific name. The landscape plan should also include any specific maintenance intended for the site such as special pruning, mowing, etc.
 - c. **Zone Delineation** - Zone delineation and fuel modification actions planned and completed may be indicated on the landscape plan or a separate plan.
 - d. **Identification of Responsibility** - A letter identifying parties responsible for installation and/or maintenance such as homeowners, homeowner associations, or land management districts.
2. Prior to the issuance of a building permit, the Fire Department must review and approve the final fuel modification plan package submitted by the applicant. Applicants should expect review within 10 working days of the department's receipt of a complete package.

Certificate of Occupancy/Building Final

1. Final approval of fuel modification zone implementation will be obtained following inspection by the fire department. Applicants shall request inspection of the fuel modification requirements by the Fire Department three business days prior to anticipated issuance of a certificate of occupancy or building final. The Fire Department shall respond to an inspection request within three business days.
2. A copy of the recorded CC&R's pertaining to fuel modification maintenance requirements and responsibilities will be provided to the Forestry Division prior to issuance of Certificate of Occupancy.

NOTE: The review and approval process outlined in these guidelines is designed to assist an applicant through the fuel modification process. If questions or conflicts arise, applicants should request assistance from the Fire Department's Brush Clearance Section Manager. If additional clarification is necessary or special circumstances arise, applicants may seek assistance or policy interpretation from the Chief of the Forestry Division.

EXHIBIT B

ESTIMATED FUEL MODIFICATION DISTANCE CHART (EFMD)

STRUCTURE CONSTRUCTION			SCORE
GOOD/CURRENT FIRE ZONE 4 OR VHFHSZ REQUIREMENTS			1
MODERATE			5
POOR			10
FUELS			
PRIMARILY GRASSLAND			5
COASTAL SAGE SCRUB/OAK WOODLAND			10
CHAPARRAL			15
SLOPE*			
	DOWN-SLOPE	UP-SLOPE	
		0 - 20 DEGREES	1
	0 - 20 DEGREES	20 - 40 DEGREES	2
	20 - 40 DEGREES	40 - 60 DEGREES	4
	40 - 60 DEGREES	60 < DEGREES	8
	60 < DEGREES		16
ASPECT**			
NORTH			1
EAST			2
WEST			4
SOUTH			8
FIRE TOPOGRAPHY***			
- DISTANCE FROM SLOPE, CHIMNEYS, SADDLES, CANYONS			
250 - 300			1
200 - 250			2
150 - 200			3
100 - 150			4
50 - 100			5
30 - 50			10
< 30			15
FIRE HISTORY/ POTENTIAL			
- HISTORICAL FIRE PATTERNS/INTENSITY			
LOW			5
MODERATE			10
HIGH			15
TOTAL			

ESTIMATED FUEL MODIFICATION DISTANCE****		EFMD
TOTAL	DISTANCE	
14-24	50'	
25-34	100'	
35-49	150'	
50-69	200'	
70 +	300'	

* SELECT CATEGORY THAT CORRESPONDS TO THE LOCATION OF THE REQUIRED MODIFICATION

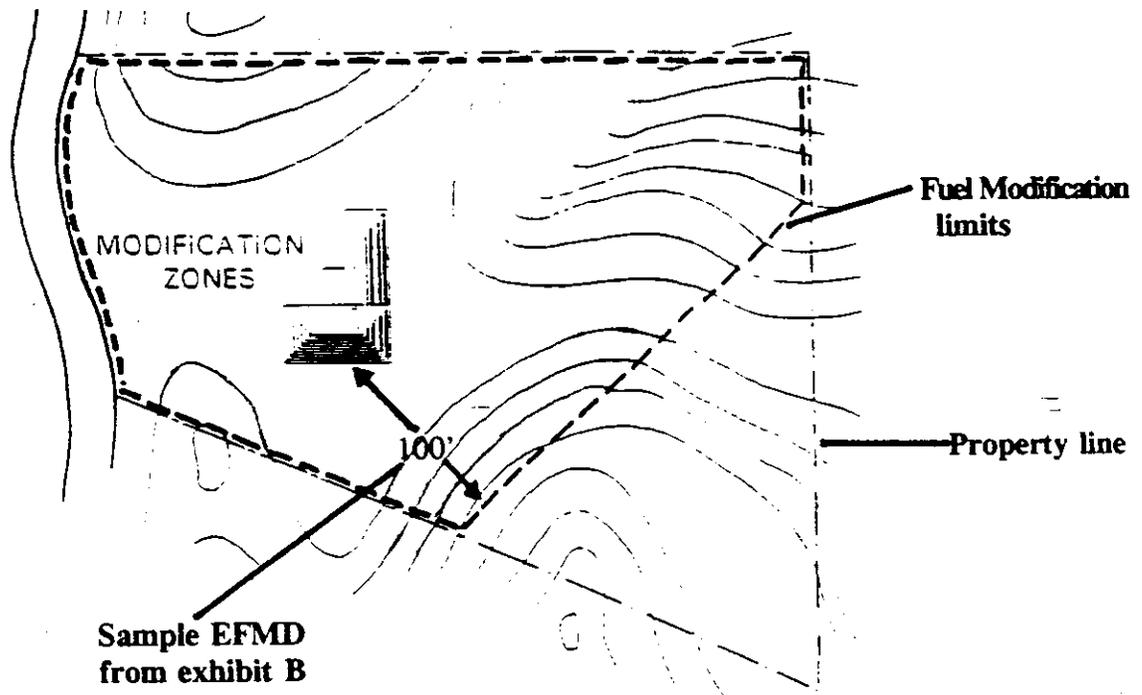
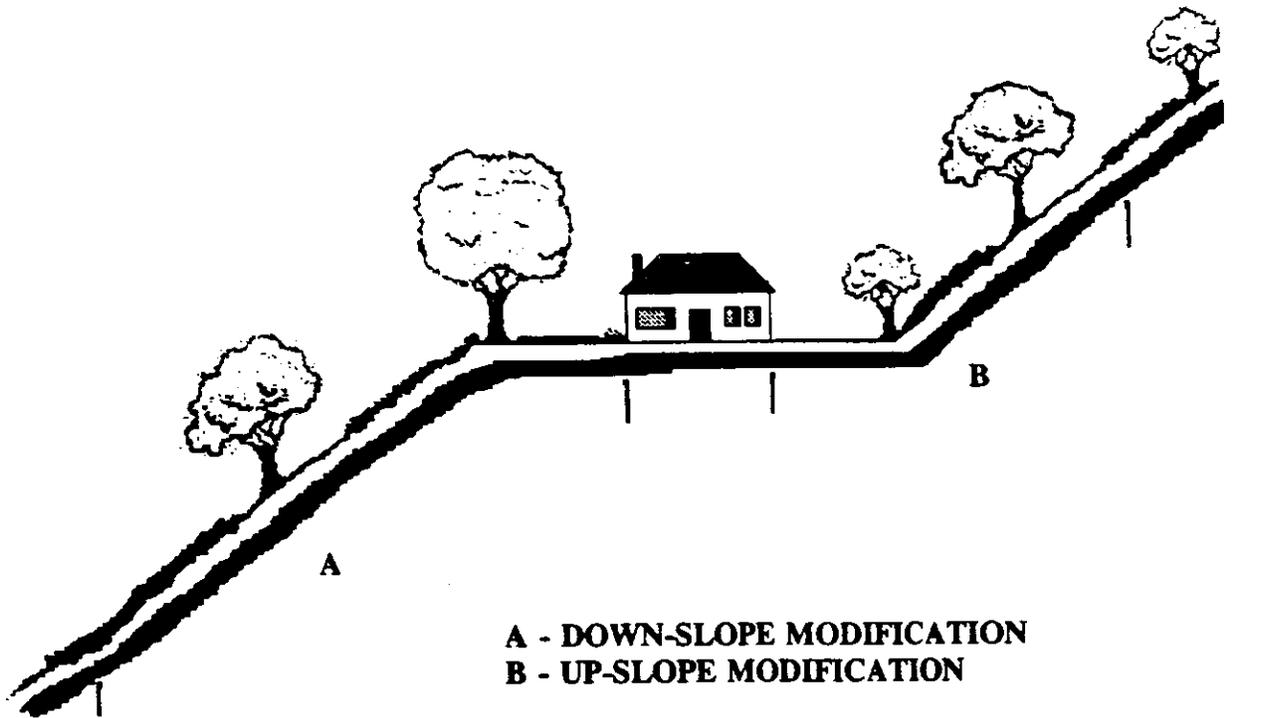
** VALUES ASSIGNED MAY VARY, BASED ON PREVAILING WEATHER PATTERN AND FIRE HISTORY

*** SUBDIVISIONS SHOULD ENTER A VALUE OF (5) FOR THIS CATEGORY

**** MEASUREMENT IN FEET TAKEN ALONG SLOPE (HYPOTENUSE)

EXHIBIT C

SAMPLE FUEL MODIFICATION DIAGRAMS



The actual amount of total fuel modification will be determined on a case by case basis utilizing Exhibit B, Estimated Fuel Modification Distance(EFMD). The necessary zone(s) and their width will be determined during the preliminary review process.

APPENDIX I UNDESIRABLE PLANT LIST

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 should not be planted in fire hazard areas. Should these species already exist within these areas, they should be removed because of the potential threat they pose to any structures. They are referred to as target species since their complete or partial removal is a critical part of hazard reduction. The following is a partial list of plants that should be avoided near structures.

UNDESIRABLE PLANT SPECIES (TARGET SPECIES)

Natives:

Adenostoma fasciculatum - Chamise
Adenostoma sparsifolium - Red shank
Artemisia californica - California Sagebrush
Eriogonum fasciculatum - Common Buckwheat
Salvia spp.- Sage

Ornamentals:

Cortaderia spp. - Pampas Grass
Cupressus spp. - Cypress
Eucalyptus spp. - Eucalyptus*
Juniperus spp. - Juniper
Pinus spp. - Pine

* Except as permitted in the planting list

Others - Other plants may be considered to be undesirable because of their ability to naturalize and become a pest. These types of plants should be avoided, especially in sensitive riparian or coastal areas where they could become established and compete with native vegetation.

Plants should fit the location and situation. Avoid using shallow rooted ground covers on steep slopes. Iceplant, while an effective ground cover on flat surfaces would be undesirable on a steep slope because it's shallow rooted nature may cause it to slide off the slope if the root zone becomes saturated during a rain storm. This would expose the bare soil to erosion.

Care should be taken to avoid erosion problems created or exacerbated by total vegetation removal. In areas where target species comprise the total vegetation, partial removal is recommended, with replacement planting using desirable species as the long range goal.

APPENDIX II DESIRABLE PLANT LIST

Desirable Qualities for Landscape Plants

- Ability to store water in leaves or stems.
- Produces limited dead and fine material.
- Extensive root systems for controlling erosion.
- High levels of salt or other compounds within its tissues that can contribute to fire resistance.
- Ability to withstand drought.
- Prostrate or prone in form.
- Ability to withstand severe pruning.
- Low levels of volatile oils or resins.
- Ability to resprout after a fire.

PLANT LIST LEGEND

<u>Fuel Mod.Zone</u>	<u>Geographical Area</u>	<u>Water Needs</u>	<u>Evergreen/Deciduous</u>
A - Setback	C-Coastal	H-High	E-Evergreen
B - Irrigated	IV-Interior Valley	M-Moderate	D-Deciduous
C - Thinning	D-Deserts	L-Low	E/D-Partly or
D - Interface		VL-Very Low	Summer Deciduous

Comment Code

1	Not for use in coastal areas	13	Tends to be short lived.
2	Should not be used on steep slopes	14	High fire resistance.
3	May be damaged by frost.	15	Dead fronds or leaves need to be removed to maintain fire safety.
4	Should be thinned bi-annually to remove dead or unwanted growth	16	Tolerant of heavy pruning.
5	Good for erosion control.	17	Must be cut back after flowering.
6	Grows best in well drained soils.	18	May require partial shade in desert or valley areas.
7	Produces flowers or fruit that attracts birds and or butterflies.	19	Perennial
8	Adaptability can vary.	20	Tolerates saline soils.
9	Can be used as a lawn substitute.	21	Grows naturally in riparian areas.
10	Showy flowers.	22	Good tree for lawns.
11	Produces edible fruit.	23	Produces habitat or food for wildlife.
12	California native or native cultivar		

The following plant list is provided as a suggested guideline (not exclusive) for fuel modification landscapes within Los Angeles County. Plants not listed (grasses, annuals etc.) may be used if approved with the fuel modification plan.

The desirable planting list is based on comments from numerous professionals and public agencies, Sunset Western Garden Book, Bob Perry's Landscape Plants for Western Regions, and the California Department of Water Resources study entitled, WUCOLS (Water Use Classification of Landscape Species). The plant list is arranged by fuel modification zone, geographical area, and plant type and includes a comment code to assist in plant selection and maintenance requirements.

GROUNDCOVERS

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Abelia grandiflora</i> 'Prostrata'	Prostrate Glossy Abelia	A,B	M	1 - 2'	3 - 4'	E	C,IV - 3
<i>Achillea tomentosa</i>	Woolly Yarrow	A,B,C	L	6 - 10"	6 - 12"	E	C,IV - 9,19
<i>Aeonium</i> species	NCN	A,B,C	L	Varies	Varies	E	C,IV - 2,3,8,14
<i>Ajuga reptans</i>	Carpet Bugle	A	H	4 - 6"	2 - 4"	E	C,IV - 2,18,19
<i>Aptenia cordifolia</i>	Red Apple Ice Plant	A,B	M,L	- 12"	varies	E	IV,D - 1,2,3,19
<i>Arctostaphylos</i> species	Manzanita	B,C,D	L,VL	Varies	Varies	E	Varies
<i>A. edmundsii</i>	Little Sur Manzanita	B,C,D	L,VL	1 - 2'	4 - 6'	E	C,IV - 4,6,12
<i>A. 'Emerald Carpet'</i>	Emerald Carpet Manzanita	B,C,D	L,VL	1'	4 - 6'	E	C,IV - 4,6,12
<i>Arctotheca calendula</i>	Cape Weed	A,B	M,L	-12"	-18"	E	C,IV,D - 3,7,10,19
<i>Artemisia californica</i> 'cultivars'	Sagebrush - Prostrate Forms	B,C,D	L,VL	varies	varies	E	C,IV,D - 4,6,8,12,23
<i>A. caucasica</i>	Silver Spreader	B,C,D	L,VL	3-6"	2'	E	C,IV,D - 4,6
<i>Asarum caudatum</i>	Wild Ginger	A	M,H	7-10"	2'	D	C,IV - 3,18,19
<i>Atriplex semibaccata</i>	Creeping Saltbrush	B	L,VL	1'	1-5'	E	C,IV,D - 13,20
<i>Baccharis pilularis</i>							
<i>B.p. 'Pigeon Point'</i>	Dwarf Coyote Brush	B,C,D	L,VL	12-24"	-6'	E	C,IV,D - 4,5,12
<i>B.p. 'Twin Peaks'</i>	Dwarf Coyote Brush	B,C,D	L,VL	12-24"	-6'	E	C,IV,D - 4,5,12
<i>Cerastium tomentosum</i>	Snow-in-Summer	A,B	M,L	6-8"	2-3'	E	C,IV,D - 10,19
<i>Chamaemelum nobile</i>	Chamomile	A,B	M	6-8"	-12"	E	C,IV,D - 9,16,19
<i>Cistus salviifolius</i>	Sageleaf Rockrose	B,C	L,VL	1-2'	6'	E	C,IV,D-4,5,6,7,10,16,20
<i>C. 'Sunset'</i>	Rockrose	B,C	L,VL	1-2'	6-8'	E	C,IV,D-4,5,6,7,10,16,20
<i>C. 'Warley rose'</i>	Rockrose	B,C	L,VL	1'	4'	E	C,IV,D-4,5,6,7,10,16,20
<i>Coprosma kirkii</i>	NCN	B	M,L	-2'	6-8'	E	C,IV - 3,4,5,8,18,20
<i>Coreopsis auriculata</i> 'Nana'	NCN	A,B,C	L,VL	5-8"	-2'	E/D	C,IV - 3,8,19
<i>Cotoneaster</i>							
<i>C. adpressus praecox</i>	Cotoneaster	B	M,L	-18"	-6'	D	C,IV,D - 2
<i>C. salicifolius</i> 'Emerald Carpet'	Prostrate Willowleaf Cotoneaster	B	M,L	12-15"	-8'	E	C,IV,D - 4
<i>C.s. 'Repens'</i>	Prostrate Willowleaf Cotoneaster	B	M,L	-6"	-6'	E	C,IV,D - 4
<i>Dalea greggii</i>	Trailing Indigo Bush	B	L,VL	12-18"	5-10'	E	C,IV - 6
<i>Dichondra micrantha</i>	Dichondra	A,B	H,M	-6"	-2'	E	C,IV - 9
<i>Duchesnea indica</i>	Indian Mock Strawberry	A,B	L	-8"	-4'	E	C,IV,D - 11,16,19
<i>Dymondia margaretae</i>	NCN	A,B	M,L	-3"	12-24"	E	C,IV - 3,8
<i>Epilobium californica</i>	California Fuchsia	B,C,D	L,VL	1-2'	3-5'	E/D	C,IV,D-4,5,7,10,12,13,23
<i>Erigeron glaucus</i>	Seaside Daisy	A,B,C,D	M,L	10-12"	-2'	E	C,IV-3,6,8,10,12,18,19,20
<i>E. karvinskianus</i>	Mexican Daisy	A,B,C,D	M,L	10-20"	-3'	E	C,IV-3,6,8,10,18,19,20
<i>Euonymus fortunei</i> 'Colorata'	Purple-Leaf Winter Creeper	B	M	1-2'	-6'	E	IV - 1,5,8,16
<i>Festuca cinerea</i> (ovina'Glauca')	Blue Fescue	A,B	M,L	-12"	-2'	E	C,IV,D - 4
<i>F. rubra</i>	Red Fescue	A,B	M,L	-16"	-30"	E	C,IV,D - 4,9
<i>Fragaria chiloensis</i>	Wild Strawberry	A,B,C,D	L,VL	6-12"	-24"	E	C,IV,D - 4,10,11,12,20
<i>Gazania rigens</i> var <i>leucolaena</i>	Trailing Gazania	A,B	L	6-10"	-24"	E	C,IV,D - 10,19
<i>Glechoma hederacea</i>	Ground Ivy	A	M	3-6"	-18"	E/D	C,IV,D - 8,19
<i>Hedera helix</i> & varieties	English Ivy	A,B	M,L	6-18"	-4'	E	IV,D - 1,4,5,16
<i>Helianthemum nummularium</i>	Sunrose	B	L	6-8"	-3'	E	C,IV,D - 6,10
<i>Herniaria glabra</i>	Green Carpet	A	M	2-3"	-16"	E	C,IV,D - 8
<i>Hypericum calycinum</i>	Aaron's Beard	B	M,L	6-12"	-3'	E	C,IV,D - 4,5,7,16
<i>H. coris</i>	NCN	B	M,L	6-12"	-2'	E	C,IV,D - 4,5,7,16
<i>Iberis sempervirens</i>	Evergreen Candytuft	A,B	M	6-12"	-6-12"	E	C,IV,D - 10,19
<i>Iva hayesiana</i>	Poverty Weed	B,C,D	L,VL	2-3'	4-5'	E	C,IV,D - 4,5,12,16,23
<i>Laurentia fluvialilis</i>	Blue Star Creeper	A	M	2-4"	6-12"	E	C,IV - 8,19
<i>Lonicera japonica</i>	Japanese Honeysuckle	B	M	1-2'	6-10'	E	IV - 1,5,7,10,16
<i>Lysimachia nummularia</i>	Moneywort	A	H,M	2-6"	-2'	E	C,IV - 18,19

GROUNDCOVERS cont'd

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Mahonia aquifolium</i> 'Compacta'	Compact Oregon Grape	A,B	M,L	1-2'	2-3'	E	C,IV - 4,7,12,18,23
<i>M. repens</i>	Creeping Mahonia	A,B	M,L	2-3'	2-3'	E	C,IV - 4,7,12,18,23
<i>Myoporum</i> 'Pacificum'	Pacific Myoporum	B	M,L	2-3'	-30'	E	IV - 1,4,5,16
<i>M. parvifolium</i>	NCN	B	M,L	4-6"	9'	E	IV - 1,4
<i>Nandina domestica</i>							
'Harbour Dwarf'	Dwarf Heavenly Bamboo	A,B	M,L	1 1/2 -2'	2-3'	E	C,IV,D - 15
<i>Oenothera berlandieri</i>	Mexican Evening Primrose	B,C,D	L,VL	10-12"	4'	E	IV,D - 1,4,7,10,17,19
<i>O. stubbei</i>	Baja Evening Primrose	A,B,C,D	L,VL	5"	2'	E	IV,D - 7,19
<i>Ophiopogon japonicus</i>	Mondo Grass	A	M	8-12"	12-24"	E	C,IV - 18
<i>Osteospermum fruticosum</i>	Trailing African Daisy	A,B	M	-18"	-4'	E	IV - 1,10,19
<i>Pelargonium peltatum</i>	Ivy Geranium	A,B	M	-2'	-4'	E	IV - 1,3,7,10,19
<i>P. tomentosum</i>	Peppermint-Scented Geranium	A,B	M	-18"	2-4'	E	IV - 1,3,7,10,19
<i>Phyla nodiflora</i> (<i>Lippia repens</i>)	Lippia	A,B	M,L	2-15"	-3'	E/D	C,IV,D - 9,16,19
<i>Polygonum capitatum</i>	Pink Clover	A,B	M,L	-18"	-2'	E	IV,D - 1,10,19
<i>Potentilla tabernaemontanii</i>	Spring Cinquefoil	A,B	M,L	2-6"	-12"	E	C,IV,D - 9,10,19
<i>Ribes viburnifolium</i>	Catalina Perfume	A,B,C,D	L,VL	-3'	-3'	E	C,IV - 12,18,23
<i>Rosmarinus officinalis</i>							
R.o. 'Huntington Blue'	NCN	B	L	-18"	-4'	E	C,IV,D - 4,5,16
R.o. 'Prostratus'	Prostrate Rosemary	B	L	-24"	-6'	E	C,IV,D - 4,5,16
<i>Salvia sonomensis</i>	Creeping Sage	B,C,D	L	8-12"	3-4'	E	C,IV - 6,12,13,23
<i>Santolina chamaecyparissus</i>	Lavender Cotton	A,B	L	-24"	-3'	E	C,IV,D - 10
<i>S. rosmarinifolius</i> (<i>virens</i>)	Green Lavender Cotton	A,B	L	-24"	-3'	E	C,IV,D - 10
<i>Sedum</i> species	Stonecrops	A,B	L,VL	Varies	Varies	E	C,IV - 2,8,14
<i>Senecio mandraliscae</i>	NCN	A,B	M,L	-18"	-5'	E	C,IV - 3,14,19
<i>S. serpens</i>	Blue Chalkstics	A,B	M,L	-12"	-3'	E	C,IV - 3,14,19
<i>Scaevola</i> 'Mauve Clusters'	NCN	A,B	M,L	4-6"	3-4'	E	C,IV - 6,18,19
<i>Soleirolia soleirolii</i>	Baby's Tears	A	H,M	3-6"	-18"	E	C,IV - 3,18,19
<i>Teucrium chamaedrys</i>							
'Prostratum'	Prostrate Germander	A,B	M,L	4-6"	-3'	E	C,IV,D - 4,16
<i>T. cossonii</i>	NCN	A,B	L	4-6"	-2'	E	C,IV - 6,10
<i>Thymus praecox arcticus</i>	Mother of Thyme	A,B	M,L	2-6"	-18"	E	C,IV,D - 8
<i>T. pseudolanuginosus</i>	Woolly Thyme	A,B	M,L	2-3"	-12"	E	C,IV,D - 8
<i>Trachelospermum</i>							
<i>jasminoides</i>	Star Jasmine	B	M,L	-2'	4-5'	E	C,IV,D - 5,7,10,16
<i>Trifolium fragiferum</i>							
Var. O'connor's	O'Connor's Legume	B	M,L	6-15"	-6'	E	C,IV,D - 5,9,16,19
<i>Verbena hybrida</i>	Garden Verbena	A,B	L,VL	6-12"	1 1/2-3'	E	C,IV,D - 3,7,10,13
<i>V. peruviana</i>	NCN	A,B,C	L,VL	-8"	-2'	E	C,IV,D - 7, 10
<i>V. pulchella gracilior</i>	Moss Verbena	A,B	L,VL	12-15"	2-3'	E	C,IV,D - 8,10,19
<i>V. tenuisecta</i>	Moss Verbena	A,B	L,VL	12-15"	2-3'	E	C,IV,D - 8,10,19
<i>Wedelia trilobata</i>	Wedelia	B	M,L	-12"	4-6'	E	C,IV,D - 3,16, 20
<i>Zoysia tenuifolia</i>	Korean Grass	A	M,L	-6"	-18"	E	C,IV,D - 9

SHRUBS

PERENNIALS/SUCCULENTS

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Acanthus mollis</i>	Bear's Breech	A,D	H,M	-4'	4-6'	E/D	C,IV,D - 3,8,14,16,17,18,19
<i>Achillea filipendulina</i>	Fernleaf Yarrow	B,C	L,VL	4-5'	2'	E	C,IV,D - 10,16,17,19
<i>A. millefolium</i>	Common Yarrow	A,B,C	L,VL	-3'	2'	E	C,IV,D - 10,16,17,19
<i>Aeonium species</i>	NCN	A,B	L	varies	varies	E	C,IV - 3,8,14
<i>Agarathus species</i>	Lily-Of-The-Nile	A,B	M	varies	varies	E/D	C,IV - 3,4,7,10,14,19
<i>Agave species</i>	Agave	V,L,L	L,VL	varies	varies	E	C,IV,D - 3,10,14,17
<i>Aloe species</i>	Aloe	A,B	L,VL	varies	varies	E	C,IV, - 3,7,8,14
<i>Anigozanthos flavidus</i>	Kangaroo Paw	A,B	M,L	3-5'	3'	E	C,IV - 3,6,7,10,19
<i>A. manqlesii</i>	NCN	A,B	M,L	3'	-3'	E	C,IV - 3,6,7,19
<i>Arbutus unedo 'Compacta'</i>	Dwarf Strawberry Tree	B	M,L	6-8'	-8'	E	C,IV,D - 5,7,11,18,23
<i>A.u. 'Elfin King'</i>	NCN	B	M,L	3-5'	-6'	E	C,IV,D - 5,7,11,18,23
<i>A.u. 'Octoberfest'</i>	NCN	B	M,L	6-8'	-8'	E	C,IV,D - 5,7,11,18,23
<i>Arctostaphylos species</i>	Manzanita	B,C,D	L,VL	varies	varies	E	C,IV,D - 4,6,7,10,12
<i>Artemisia 'Powis Castle'</i>	NCN	B,C	L,VL	-3'	6'	E	C,IV - 4,6,12,23
<i>A. stellerana</i>	Beach Worm Wood	B,C	L,VL	-3'	-3'	E	C,IV - 4,6,12,19,23
<i>Aspidistra elatior</i>	Cast-Iron Plant	A,B	M,L	-30"	-3'	E	C,IV - 3,18,19
<i>Baccharis species</i>		B,C,D	L,VL	varies	varies	E	C,IV,D - 4,5,6,12,21,23
<i>Begonia species</i>	Begonia	A,B	H,M	varies	varies	E	C,IV - 3,8,10,14,18
<i>Berberis thunbergii</i>	Japanese Barberry	B	M,L	4-6'	4-6'	D	C,IV,D - 4
<i>B. thunbergii 'cultivars'</i>		A,B	M,L	varies	varies	D	C,IV,D - 4
<i>Bergenia crassifolia</i>	Winter Blooming Bergenia	A,B	M,L	-20"	-20"	E	C,IV - 3,18,19
<i>Buddleia davidii</i>	Butterfly Bush	B	M,L	-10'	-12'	E/D	C,IV,D - 7,10,16,17
<i>Buxus microphylla japonica</i>	Japanese Boxwood	B	M,L	4-6'	4-6'	E	C,IV,D - 16
<i>B.m. koreana</i>	Korean Boxwood	B	M,L	4-6'	4-6'	E	C,IV,D - 16
<i>Caesalpinia gilliesii</i>	Bird of Paradise Bush	B	L,VL	-10'	-10'	E/D	C,IV,D - 7,10
<i>C. mexicana</i>	Mexican Bird of Paradise	B	L,VL	10-12'	-15'	E/D	C,IV,D - 7,10
<i>C. pulcherrima</i>	Red Bird of Paradise	B	L,VL	-10'	-10'	E/D	C,IV,D - 7,10
<i>Calliandra californica</i>	Baja Fairy Duster	B,C,D	L,VL	-3'	4-5'	E/D	C,IV,D - 4,6,7,10
<i>C. eriophylla</i>	Fairy Duster	B,C,D	L,VL	-3'	4-5'	E/D	C,IV,D - 4,6,7,10,12
<i>Callistemon citrinus 'compacta'</i>	Bottlebrush	B	L,VL	-5'	-5'	E	C,IV,D - 5,7,10,20
<i>Calycanthus occidentalis</i>	Spice Bush	B,C,D	M,L	4-12'	-5'	D	C,IV - 12,18
<i>Carissa macrocarpa</i>							
<i>(grandiflora & 'cultivars')</i>	Natal Plum	A,B	M,L	-7'	-7'	E	C,IV - 4,11,16
<i>Cassia artemisioides</i>	Feathery Cassia	B	L,VL	3-6'	-6'	E	C,IV,D - 10,
<i>Ceanothus species</i>	Wild Lilac	B,C,D	L,VL	varies	varies	E/D	C,IV,D - 4,6,7,10,12,23
<i>Cercocarpus betuloides</i>	Mountain Mahogany	B,C,D	L,VL	5-12'	-10'	E	C,IV,D - 4,6,12,23
<i>Choisya ternata</i>	Mexican orange	B	M	6-8'	-8'	E	C,IV - 10,18
<i>Cistus species</i>	Rockrose	B	L,VL	varies	varies	E	C,IV,D - 4,5,6,10,17,20
<i>Clivia miniata</i>	Clivia	A,B	H,M	2'	2'	E	C,IV - 3,10,14,18,19
<i>Colocasia esculenta (caladium)</i>	Elephant's Ear	A,B	H	-6'	-6'	E/D	C,IV - 3,14,18,19
<i>Comarostaphylis diversifolia</i>	Summer Holly	B,C,D	L,VL	6-10' +	6-8' +	E	C,IV,D - 6,7,12,18,23
<i>Convolvulus cneorum</i>	Bush Morning Glory	B	L	2-4'	2-4'	E	C,IV,D - 6,10
<i>Coprosma pumila</i>	NCN	B	M	-3'	8'	E	IV - 1,4,16,20
<i>C. repens</i>	Mirror Plant	B	M	-10'	-6'	E	IV - 1,4,16,20
<i>Cotoneaster species</i>	Cotoneaster	B	M,L	2-18'	3-15'	E/D	C,IV,D - 4,10,16
<i>Cotyledon species</i>	NCN	A,B	L	1-3'	1-3'	E	C,IV - 3,8,14
<i>Crassula species</i>	NCN	A,B	L	1-9'	1-9'	E	C,IV - 3,8,14
<i>Cyrtomium falcatum</i>	Holly Fern	A,B	H,M	2-3'	3-4'	E	C,IV - 15
<i>Dasyliirion longissima</i>	Mexican Grass Tree	B	L,VL	-10'	8'	E	C,IV,D - 15
<i>D. wheeleri</i>	Sotol	B	L,VL	-6'	-6'	E	C,IV,D - 15

SHRUBS cont' PERENNIALS/SUCCULENTS

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Dietes bicolor</i>	Fortnight Lily, African Iris	B	M,L	2-3'	2-3'	E	C,IV,D - 4,10,15,19
<i>D. vegeta</i> (iridioides)	Fortnight Lily	B	M,L	-4'	-4'	E	C,IV,D - 4,10,15,19
<i>Echium fatuosum</i>	Pride of Madeira	B	L,VL	-10'	-10'	E	C,IV - 4,6,7,10,19,20
<i>Elaeagnus pungens</i> & cultivars	Silverberry	B	M,L	6-15'	6-15'	E	C,IV,D - 16
<i>Encelia californica</i>	Coast Sunflower	B,C,D	L,VL	3-5'	3-5'	E/D	C,IV - 5,6,10,4,17
<i>E. farinosa</i>	Brittle Bush	B,C,D	L,VL	3-5	3-5	E/D	C,IV,D - 4,5,6,10,12,17
<i>Erigonum giganteum</i>	St. Catherine's Lace	B,C,D	L,VL	- 8'	- 8'	E	C,IV - 4,6,10,12,19,20
<i>Escallonia species</i>	Escallonia	B	M,L	2-15'	2-10'	E	C,IV - 4,10,16
<i>Euonymus japonica</i> & 'cultivars'	Evergreen Euonymus	B	M	2-10'	-6'	E	C,IV,D - 4,16
<i>Fatsia japonica</i>	Japanese Aralia	A,B	M	5-12'	6-10'	E	C,IV - 18
<i>Fouquieria splendens</i>	Ocotillo	A,B,C,D	VL	8-25'	8-15'	E	IV,D - 6,10,12
<i>Fremontodendron species</i>							
& 'cultivars'	Flannel Bush	B,C,D	L,VL	5-20'	-15'	E	C,IV,D - 4,6,10,12
<i>Gardenia jasminoides</i>	Gardenia	A,B	H	3-6'	3-5'	E	C,IV - 10,18
<i>Garrya species</i>	Silktassel	B,C,D	M,L	4-8'	4-8'	E	C,IV,D - 4,5,7,10,12
<i>Hakea suaveolens</i>	Sweet Hakea	B	L	10-20'	-15'	E	C,IV - 4,8
<i>Hebe species</i> & 'cultivars'	Hebe	B	M	3-6'	3-6'	E	C,IV - 4,5,7,10,16
<i>Hemerocallis hybrids</i>	Daylily	A,B	M,L	1-6'	2-6'	E/D	C,IV,D - 7,10,17,19
<i>Hesperaloe parviflora</i>	NCN	B,C	VL	3-4'	4-6'	E	IV,D - 6,7,19
<i>Hibiscus rosa-sinensis</i>	Chinese Hibiscus	B	M	-15'	-12'	E	C,IV - 3,7,10
<i>Iris species</i>	Bearded Iris	A,B	M	-30"	-2'	E	C,IV,D - 10
<i>I. douglasiana</i>	Douglas Iris	A,B,C	M,L	-2'	-2'	E	C,IV - 10,12,18
<i>Isomeris (Cleome) arborea</i>	Bladderpod	B,C,D	L,VL	3-6'	4-6'	E	C,IV,D - 4,6,10,12,20
<i>Justicia brandegeana</i>	Shrimp Plant	B	M	-3'	-4'	E	C,IV,D - 4,7,10
<i>J. californica</i>	Chuparosa	B,C,D	L,VL	2-5'	-4'	D	IV,D - 4,6,7,10,12
<i>Keckiella cordifolia</i>	Heart-Leaved Penstemon	B,C,D	L,VL	5-6'	8-10'	E/D	C,IV - 4,7,12
<i>Kniphofia uvaria</i>	Red-Hot Poker	A,B	L	2-3'	3-4'	E	C,IV,D - 3,7,10,19
<i>Larrea tridentata</i>	Creosote Bush	B,C,D	VL	4-8'	4-8'	E	IV,D - 6,12,23
<i>Lavandula angustifolia</i>	English Lavender	B	L	3-4'	3-4'	E	C,IV,D - 4,6,7,10,17
<i>L. dentata</i>	French Lavender	B	L	3'	3'	E	C,IV,D - 4,6,7,10,17
<i>L. intermedia</i>	Lavandin	B	L	1-2'	2-3'	E	C,IV,D - 4,6,7,10,17
<i>L. stoechas</i>	Spanish Lavender	B	L	2-3'	3'	E	C,IV,D - 4,6,7,10,17
<i>Leonotis leonurus</i>	Lion's Tail	B	L	3-6'	4-6'	E	C,IV,D - 3,7,10,17
<i>Leucophyllum candidum</i>	Violet Silverleaf	B	L,VL	4-5'	4-5'	E	IV,D - 4,6,7,10
<i>L. frutescens</i>	Texas Ranger	B	L,VL	6-8'	6-8'	E	IV,D - 4,6,7,10
<i>L. laevigatum</i>	Chihuahuan Sage	B	L,VL	3-4'	4-5'	E	IV,D - 4,6,7,10
<i>Limonium perezii</i>	Sea Lavender	A,B	L	-2'	-2'	E	C,IV - 3,10,15,19,20
<i>Liriope muscari</i>	Big Blue Lily Turf	A,B	M	1-2'	2'	E	C,IV - 18
<i>Lobelia laxiflora</i>	Mexican Bush Lobelia	B	L	2-3'	4-6'	E	C,IV,D - 4,7,10
<i>Lupinus species</i>	Lupine	B,C,D	L,VL	varies	varies	E/D	C,IV,D - 4,6,7,10,12,17
<i>Mahonia aquifolium</i>	Oregon Grape	B,C,D	M,L	6-8'	6-8'	E	IV,D - 4,6,11,12,18,23
<i>M. fremontii</i>	Desert Mahonia	B,C,D	L	3-12'	4-8'	E	C,IV,D-4,6,10,11,12,23
<i>M. 'Golden Abundance'</i>	NCN	B,C,D	M,L	5-6'	6'	E	IV,D-4,6,10,11,12,18,23
<i>M. lomariifolia</i>	Venetian Blind Mahonia	B,C	M,L	6-10'	6-10'	E	C,IV,D - 4,6,11,18,23
<i>M. nevinii</i>	Nevin Mahonia	B,C,D	L	3-10'	6-12'	E	C,IV,D-4,6,10,11,12,23
<i>M. pinnata</i>	California Holly Grape	B,C,D	M,L	4-5'	4-6'	E	C,IV-4,6,10,11,12,18,23
<i>Malva sp.</i>	Mallow	B,C	L	varies	varies	E/D	C,IV,D - 6,7,10,13
<i>Mimulus sp. (Diplacus)</i>	Monkey Flower	B,C,D	L	1-4'	1-4'	E	C,IV,D - 4,6,7,10,12
<i>Myrtus communis 'compacta'</i>	Dwarf Myrtle	B	M	5-8'	5-8'	E	C,IV,D - 16
<i>Nandina domestica</i>	Heavenly Bamboo	B	M	6-8'	4-5'	E	C,IV,D - 4,15

SHRUBS cont' PERRENIAL/SUCCULENTS

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
N.d. 'Compacta'	NCN	B	M	4-5'	3-4'	E	C,IV,D - 4,15
Nephrolepis cordifolia	Southern Sword Fern	A,B	M,L	2-3'	3-6'	E	C,IV - 4,15
Nerium oleander	Oleander	B	M,L	8-20'	10-20'	E	C,IV,D - 10,16
N.o. 'Petite Salmon'	NCN	B	M	3-4'	5-7'	E	C,IV - 3,10,16
Opuntia species	Prickly Pear, Cholla etc.	A,B,C,D	L,VL	varies	varies	E	C,IV,D - 8,12,14,23
Pelargonium species	Geranium	A,B	M,L	varies	varies	E	C,IV - 3,10,19
Penstemon species	Beard Tongue	A,B,C,D	L	varies	varies	E/D	C,IV,D - 7,10,12,17,19
Phlomis fruticosa	Jerusalem Sage	B	M,L	3-4'	3-5'	E	C,IV,D - 6,7,10,17,19
Phormium tenax	New Zealand Flax	B	M	5-9'	6'	E	C,IV,D - 4,19
P.t. 'cultivars'	NCN	B	M	varies	varies	E	C,IV,D - 4,19
Photinia fraseri	Common Photinia	B	M,L	10-15'	10-20'	E	C,IV,D - 4,7,10,16
Pittosporum tobira	Tobira	B	M,L	6-15'+	8-15'	E	C,IV,D - 5,16
P.t. 'Variegata'	NCN	B	M	5-8'	6-8'	E	C,IV,D - 5,16
P.t. 'Wheeler's Dwarf'	Dwarf Pittosporum	A,B	M	1-3'	2-4'	E	C,IV,D - 16
Portulacaria afra	Elephant's Food	B	L	5-12'	6-12'	E	C,IV - 3,14
Punica granatum 'Nana'	Dwarf Pomegranate	A,B	L	3'	4'	D	C,IV,D - 7,11,20
Pyracantha species	Firethorn	B	M	varies	varies	E/D	C,IV,D - 4,16
Rhamnus californica	Coffeeberry	B,C,D	M,L	3-15'	4-15'	E/D	C,IV,D - 12,21,23
R. crocea	Redberry	B,C,D	M,L	2-3'	3'	E	IV - 5,12,23
R.c. ilicifolia	Hollyleaf Redberry	B,C,D	M,L	3-15'	3-15'	E	IV - 5,12,23
Rhaphiolepis indica	India Hawthorn	B	M,L	4-8'	4-8'	E	C,IV,D - 4,5,10
R.i. 'cultivars'	NCN	B	M,L	varies	varies	E	C,IV,D - 5,10
Rhus integrifolia	Lemonade Berry	B,C,D	L	3-10'+	6-20'	E	C,IV - 4,5,12,23
R. (Malosma) laurina	Laurel Sumac	B,C,D	L	6-15'+	6-15'	E	C,IV - 4,5,12,23
R. ovata	Sugar Bush	B,C,D	L	3-15'	6-15'	E	C,IV,D - 4,5,12,23
Ribes aureum	Golden Currant	B,C,D	L	3-6'	3-6'	D	C,IV,D - 7,10,12,23
R. malvaceum	Chaparral Currant	B,C,D	L	6-8'	6-8'	D	IV - 7,10,12,23
R. sanguineum & 'cultivars'	Red Flowering Currant	B,C,D	M,L	4-12'	4-8'	D	C,IV,D - 7,10,12,23
R. speciosum	Fuchsia-Flowering Gooseberry	B,C,D	L	3-6'	3-6'	D	C,IV,D - 4,7,10,12,23
R. viburnifolium	Catalina Perfume	B,C,D	L	3'	12'	E	C,IV - 7,10,12,23
Romneya coulteri	Matilija Poppy	B,C	L	-8'	4'	D	C,IV,D - 5,6,10,12,17
Rosa species	Rose	A,B	M	varies	varies	E/D	C,IV,D - 10,16,17
Salvia species	Sage	B,C,D	L	varies	varies	E/D	C,IV,D - 4,7,10,12,17,23
Simmondsia chinensis	Jojoba	B,C,D	L,VL	3-8'+	4-8'	E	C,IV,D - 4,6,11,23
Strelitzia reginae	Bird of Paradise	B	M	5'	4'	E	C,IV - 3,4,10,18
Trichostema lanatum	Woolly Blue Curls	B,C,D	L,VL	3-5'	5'	E	C,IV,D - 6,7,10,12,17
Tulbaghia violacea	Society Garlic	A,B	M	18'	2'	E/D	C,IV,D - 3,10,19
Viburnum species	Viburnum	B	M	varies	varies	E/D	C,IV,D - 3,7,10
Westringia fruticosa	Coast Rosemary	B	M,L	5-7'	6-12'	E	C,IV,D - 4,6,18
Xylosma congestum	Shiny Xylosma	B	M,L	15'+	15'+	E	C,IV,D - 5,16,18
X.c. 'Compacta'	Compact Xylosma	B	M,L	8-12'	8-12'	E	C,IV,D - 5,16,18
Yucca species	Yucca	B,C,D	L,VL	varies	varies	E	C,IV,D - 6,10,12,15

TREES

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT FT	SPREAD FT	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Acacia farnesiana</i>	Sweet Acacia	B	L	15-20'	15-20'	D	IV,D - 10
<i>A. greggii</i>	Catclaw Acacia	B,C,D	L,VL	15-25'	15-25'	E	IV,D - 10,12,21,23
<i>A. saligna</i>	Willow Acacia	B	L	15-35'	12-25'	E	C,IV,D - 10
<i>A. smallii</i>	NCN	B,C,D	L,VL	15-20'	15-20'	D	C,IV,D - 10,21,23
<i>A. stenophylla</i>	Shoestring Acacia	B	M,L	20-45'	10-20'	E	C,IV,D - 10,22
<i>Acer macrophyllum</i>	Bigleaf Maple	B,C,D	M	30-95'	30-95'	D	C,IV - 12,21,23
<i>A. negundo</i>	Box Elder	B	M,L	-60'	-50'	D	IV,D - 12,23
<i>A. palmatum</i>	Japanese Maple	B	M	-20'+	-20'	D	C,IV - 6
<i>A. saccharinum</i>	Silver Maple	B	M	40-100'	40-100'	D	C,IV,D - 22
<i>Aesculus californica</i>	California Buckeye	B,C,D	M,L	20+	30'	D	C,IV,D - 6,7,10,12,23
<i>Agonis flexuosa</i>	Peppermint Tree	B	M,L	25-35'	25-35'	E	C,IV - 3,22
<i>Albizia julibrissin</i>	Silk Tree	B	M	-40'	40'+	D	C,IV,D - 7,10,22
<i>Alnus cordata</i>	Italian Alder	B	M	40'	25'	D	C,IV,D - 22
<i>A. rhombifolia</i>	White Alder	B	H,M	50-90'	40'	D	IV - 12,21,23
<i>Arbutus 'Marina'</i>	NCN	B	M,L	-40'	-40'	E	C,IV,D - 5,7,10,11,23
<i>A. unedo</i>	Strawberry Tree	B	M,L	12-35'	20-35'	E	C,IV,D - 5,7,10,11,23
<i>Archontophoenix cunninghamiana</i>	King Palm	B	M	50'	10-15'	E	C,IV - 3,10,15
<i>Bauhinia variegata</i>	Purple Orchid Tree	B	M	20-35'	35'	E/D	C,IV - 4,10
<i>Betula pendula</i>	European White Birch	B	M	30-40'	30'	D	C,IV,D - 6,22
<i>Brachychiton acerifolius</i>	Flame Tree	B	L	60'	45-50'	D	C,IV,D - 10,22
<i>B. populneus</i>	Kurrajong Bottle Tree	B	L	30-50'	30'	E	C,IV,D - 10,22
<i>Brahea armata</i>	Blue Hesper Palm	B	L,VL	40'	10'	E	C,IV,D - 6,10,15
<i>B. edulis</i>	Guadalupe Palm	B	L,VL	30'	10'	E	C,IV,D - 6,15
<i>Callistemon citrinus</i>	Lemon Bottlebrush	B	M,L	-25'	-15'	E	C,IV,D - 4,7,10
<i>C. viminalis</i>	Weeping Bottlebrush	B	M,L	20-30'	-15'	E	C,IV - 4,7,10
<i>Calodendrum capense</i>	Cape Chestnut	B	M	30'	25-40'	D	C,IV - 7,10
<i>Carya illinoensis</i>	Pecan	B	M,L	70'	70'	D	C,IV,D - 6,11
<i>Cercidium floridum</i>	Blue Palo Verde	B,C,D	L,VL	30'	30'	D	IV,D - 6,10,12,21,23
<i>C. microphyllum</i>	Littleleaf Palo Verde	B,C,D	L,VL	25'	25'	D	IV,D - 6,7,10,12,21,23
<i>Cercis occidentalis</i>	Western Redbud	B,C,D	M,L	20'	20'	D	C,IV,D - 7,10,12,23
<i>Chamaerops humilis</i>	Mediterranean Fan Palm	B	M	20'	20'	E	C,IV,D - 15
<i>Chilopsis linearis</i>	Desert Willow	B,C,D	L	-35'	-35'	D	IV,D - 6,7,10,12,23
<i>Chionanthus retusus</i>	Chinese Fringe Tree	B	M	20'	20'	D	C,IV - 10
<i>Chitalpa tashkentensis</i>	Chitalpa	B	M,L	20-30'	20-30'	D	C,IV,D - 7,10
<i>Chorisia speciosa</i>	Floss Silk Tree	B	M	30-60'	30-40'	D	C,IV,D - 10,22
<i>Cinnamomum camphora</i>	Camphor Tree	B	M,L	50'+	60'+	E	C,IV,D - 22
<i>Cocculus laurifolius</i>	Laurel Leaf Snail Seed	B	M	25'	30'+	E	C,IV,D - 4
<i>Cordyline australis</i>	Giant Dracaena	B	M	30'	15'	E	C,IV,D - 15
<i>Cupaniopsis anacardioides</i>	Carrot Wood	B	M	40'	40'	E	C,IV,D - 20
<i>Dracaena drago</i>	Dragon Tree	B	M,L	20'	20'	E	C,IV - 3,10,14,15
<i>Eriobotrya deflexa</i>	Bronze Loquat	B	M,L	20'	20'	E	C,IV,D - 10
<i>Erythrina species</i>	Coral Tree	B	M,L	Varies	Varies	D	C,IV,D - 3,7,8
<i>Eucalyptus citriodora</i>	Lemon-scented Gum	B	M,L	75-100'	-40'	E	IV,D - 1,7,22
<i>E. maculata</i>	Spotted Gum	B	M,L	60-80'	-40'	E	IV,D - 1,7,22
<i>E. nicholii</i>	Willow Peppermint	B	M,L	-40'	-30'	E	IV,D - 1,7,22
<i>E. sideroxylon</i>	Red Ironbark	B	M,L	35-80'	-35'	E	IV,D - 1,7,10
<i>E. torquata</i>	Coral Gum	B	M,L	-25'	-20'	E	IV,D - 1,6,7,10,20
<i>Feijoa sellowiana</i>	Pineapple Guava	B	M,L	18-25'	-25'	E	C,IV,D - 3,7,8,10,11,16
<i>Ficus species</i>	Fig	B	M,L	Varies	Varies	E,D	C,IV,D - 3,8

TREES cont'd

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT FT	SPREAD FT	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Fraxinus augustifolia</i>	Raywood Ash	B	M	25+35'	30'	D	C,IV,D - 22
<i>F. dipetala</i>	Foothill Ash	B,C,D	L,VL	18-20'	20-30'	D	C,IV,D - 12,21,22,23
<i>F. latifolia</i>	Oregon Ash	B	M	40-80'	40-60'	D	C,IV,D - 12,22,23
<i>F. velutina</i>	Arizona Ash	B,C	M,L	20-50'	30-50'	D	C,IV,D - 22,23
<i>F.v. coriacea</i>	Montebello Ash	B,C,D	M,L	20-40'	20-40'	D	C,IV,D - 12,22,23
<i>Geijera parviflora</i>	Australian Willow	B	M,L	25-30'	20-30'	E	C,IV,D - 6
<i>Ginkgo biloba</i>	Maidenhair Tree	B	M,L	35-80'	30-60'	D	C,IV,D - 6,22
<i>Gleditsia triacanthos</i>	Honey Locust	B	M,L	35-70'	-30'	D	IV,D - 6,22
<i>Heteromeles arbutifolia</i>	Toyon	B,C,D	L,VL	15-30'	15-30'	E	C,IV,D - 5,7,10,12,23
<i>Hymenosporum flavum</i>	Sweetshade Tree	B	M,L	20-40'	15-20'	E	IV - 10
<i>Jacaranda mimosifolia</i>	Jacaranda	B	M,L	25-40'	-30'	D	C,IV,D - 10,22
<i>Juglans californica</i>	Southern California Black Walnut	B,C,D	L	20-35'	30-45'	D	C,IV, - 5,6,12,23
<i>Koelreuteria bipinnata</i>	Chinese Flame Tree	B	M	20-40'	-45'	D	C,IV,D - 6,22
<i>K. paniculata</i>	Golden Rain Tree	B	M,L	20-35'	-40'	D	IV,D - 20,22
<i>Lagerstroemia indica</i>	Crape Myrtle	B	M,L	-30	-20	D	IV,D - 10,22
<i>Liquidambar formosana</i>	Chinese Sweet Gum	B	M	40-60'	25'	D	C,IV,D - 7
<i>L. styraciflua</i>	American Sweet Gum	B	M	60'	-25'	D	C,IV,D - 7
<i>Liriodendron tulipifera</i>	Tulip Tree	B	M	60-80'	40'	D	C,IV,D - 22
<i>Lithocarpus densiflorus</i>	Tanbark Oak	B,C,D	L	-60'	-40'	E	C,IV - 6,12,23
<i>Magnolia species</i>	Magnolia	B	M	Varies	Varies	E,D	C,IV,D - 6,8,10,22
<i>Maytenus boaria</i>	Mayten Tree	B	M,L	30-50'	30'	E	IV - 6,22
<i>Metasequoia glyptostroboides</i>	Dawn Redwood	B	H,M	-80'	-40'	D	C,IV - 22
<i>Metrosideros excelsus</i>	New Zealand Christmas Tree	B	L,VL	-30'	-30'	E	C,IV - 5,6,7,10
<i>Morus alba</i>	White Mulberry	B	M,L	20-60'	30-50'	D	IV,D - 11,16
<i>Olea europea</i>	Olive	B	L,VI	-35'	20-30'	E	C,IV,D - 11,16,20
<i>Parkinsonia aculeata</i>	Jerusalem Thorn	B	L,VL	15-30'	15-30'	D	C,IV,D - 3,6,7,10,22,
<i>Pistacia chinensis</i>	Chinese Pistache	B	M,L	-60'	-50'	D	C,IV,D - 22
<i>Pittosporum phillyraeoides</i>	Willow Pittosporum	B	L	15-25'	10-15'	E	C,IV,D - 10
<i>P. rhombifolium</i>	Queensland Pittosporum	B	M	15-35'	-25'	E	C,IV,D - 22
<i>P. undulatum</i>	Victorian Box	B	M	-25'	-25'	E	C,IV - 22
<i>Platanus acerifolia</i>	London Plane Tree	B	L	40-80'	30-40'	D	C,IV,D - 22
<i>P. racemosa</i>	California Sycamore	B,C,D	L	50-100'	50-100'	D	C,IV,D - 12,21,22,23
<i>Podocarpus gracilior</i>	Fern Pine	B	M	-60'	-60'	E	C,IV,D - 16,22
<i>P. macrophyllus</i>	Yew Pine	B	M	-50'	-45'	E	C,IV,D - 16,22
<i>Populus fremontii</i>	Fremont Cottonwood	B,C,D	M	40-60'	40-60'	D	C,IV,V - 12,21,22,23
<i>Prosopis glandulosa</i>	Honey Mesquite	B	L,VL	25-30'	25-30'	D	C,IV,D - 5,7,22,23
<i>P. g. var. 'torreyana'</i>	Mesquite	B	L,VL	40-50'	40-50'	D	C,IV,D - 5,7,12,22,23
<i>Prunus species & 'cultivars'</i>	Cherry	B	varies	varies	varies	E,D	C,IV,D - 7,8,10,11,16
<i>P. ilicifolia</i>	Hollyleaf Cherry	B,C,D	L,VL	15-30'	15-30'	E	C,IV,D - 7,11,12,16,23
<i>P. lyonii</i>	Catalina Cherry	B,C,D	L,VL	20-45'	30'+	E	C,IV,D - 7,11,12,16,23
<i>Punica granatum</i>	Pomegranate	B	L	12-18'	-20'	D	C,IV,D - 7,11,20
<i>Quercus agrifolia</i>	Coast Live Oak	B,C,D	L,VL	30-70'	70'+	E	C,IV,D - 6,12,23
<i>Q. chrysolepis</i>	Canyon Live Oak	B,C,D	M,L	30-60'	20-60'	E	C,IV - 6,12,36
<i>Q. douglasii</i>	Blue Oak	B,C,D	M	50'	>50	D	C,IV,D - 6,12,23
<i>Q. engelmannii</i>	Engelmann Oak	B,C,D	I	60'	>60'	E	IV,D - 6,12,23
<i>Q. ilex</i>	Holly Oak	B	M	40-70'	40-70'	E	C,IV,D - 6,23
<i>Q. kelloggii</i>	California Black Oak	B,C,D	M	30-80'	-60'	D	IV - 6,12,23
<i>Q. lobata</i>	Valley Oak	B,C,D	L,VL	70'+	70'+	D	C,IV - 6,12,23
<i>Q. palustris</i>	Pin Oak	B	H,M	50-80'	5-70'	D	C,IV,D - 6,22,23
<i>Q. rubra</i>	Red Oak	B	H,M	-90'	90'	D	C,IV - 6,23

TREES cont'd

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT FT	SPREAD FT	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Q. suber</i>	Cork Oak	B	M	70-100'	-100'	E	C,IV,D - 6,23
<i>Q. virginiana</i>	Southern Live Oak	B	M,H	60'	100'	E/D	C,IV,D - 22
<i>Q. wislizenii</i>	Interior Live Oak	B,C,D	M,L	30-75'	75'+	E	IV,D - 6,12,23
<i>Rhus lancea</i>	African Sumac	B	L	20-30'	20-30'	E	C,IV,D - 20,22
<i>Robinia ambigua</i>	Locust	B	M,L	30-50'	-30'	D	IV,D - 1,7,10,22
<i>R. pseudoacacia</i>	Black Locust	B	L	-75'	30-40'	D	IV,D - 1,5,7,10,20,22
<i>Sapium sebiferum</i>	Chinese Tallow Tree	B	M	-35'	-35'	D	IV,D - 22
<i>Schefflera actinophylla</i>	Queensland Umbrella Tree	A,B	H,M	20'+	20'+	E	C - 3,8,18
<i>S. pueckleri</i>	Tupidanthus	A,B	H,M	20'+	20'+	E	C - 3,8,18
<i>Syagrus romanzoffianum</i>	Queen Palm	B	M	50'	-20'	E	C,IV - 15
<i>Tabebuia chrysotricha</i>	Golden Trumpet Tree	B	M	25-30'	-30'	E	C,IV - 6,10,22
<i>T. impetiginosa</i>	Pink Trumpet Tree	B	M	35'	-30'	E	C,IV - 6,10,22
<i>Taxodium mucronatum</i>	Montezuma Cypress	B	H-L	75'	35'	E/D	IV - 22
<i>Tipuana tipu</i>	Tipu Tree	B	M	-50'	-50'	D	C,IV - 10,22
<i>Trachycarpus fortunei</i>	Windmill Palm	B	M	-30'	-6'	E	C,IV,D - 15
<i>Tristania conferta</i>	Brisbane Box	B	L,VL	30-60'	-40'	E	C,IV - 22
<i>Umbellularia californica</i>	California Bay	B,C,D	L,VL	30-75'	30-75'	E	C,IV,D - 5,12,23
<i>Zelkova serrata</i>	Sawleaf Zelkova	B	M	60'	60'	D	IV,D - 22
<i>Ziziphus jujuba</i>	Chinese Jujube	B	M,L	20-30'	20-30'	D	C,IV,D - 11,20,22

APPENDIX III PLANTING, SPACING, AND MAINTENANCE GUIDELINES

Information:

- Utilize slope distances for all measurements.
- Maintenance includes irrigation and annual removal of weeds, dead materials, and other undesirable flammable vegetation required to keep the fuel modified area in a fire safe condition as required by the approved fuel modification plan.
- During early stages of revegetation, plants are small and may be planted in increased densities to establish erosion control measures; however, as these plants mature and increase in size they must be thinned to meet fuel modification standards.
- The term "fire resistant" may be misleading. All plants will burn if there is enough heat and other conditions are right. Vegetative fire resistance may be enhanced through consistent irrigation.

General Requirements:

- Select plant material which will produce a coverage of permanent planting effectively controlling erosion.
- Consider utilizing deep-rooted plant material needing limited watering.
- Limit use of plants which are known to be especially flammable throughout your property.
- Limit use of plants which develop large volumes of foliage and branches.
- Limit use of plants which develop deciduous or shaggy bark.
- Limit use of plants which develop dry or dead undergrowth.
- **Recommended** minimum spacing is 30 feet between canopies for trees, and 15 feet or three times the diameter of the individual crowns for large shrubs. Limited grouping or alternative spacing may be approved.

Specific Requirements:

- Plants and trees must be individually planted, spaced and maintained in such a manner that they do not form a means of transmitting fire from native growth to the structure.
- Select plant species from the approved plant list for each zone and geographical area. Other species will be reviewed on a case by case basis. Except for dwarf varieties or mature trees small in stature, trees are generally not **recommended** within Zone A for reasons which go beyond fire issues and are therefore not included in the planting guide. Tree canopies may extend into Zone A when planted outside the zone.

- Limit massing of vegetation adjacent to structures; especially under eaves, overhangs, decks, etc.
- Provisions for continuous maintenance must be documented on the fuel modification plan and CCR's, i.e., by homeowner associations, property owners, or other entities.
- Conduct yearly maintenance to reduce fuel volumes, eliminate weeds, remove dead vegetation, etc. prior to annually brush inspections.
- Irrigation shall be designed to supplement native vegetation and establish planted natives and ornamentals.
- Irrigation shall be directed away from native oaks and be placed outside the dripline.

APPENDIX IV

GLOSSARY

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 a 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: 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 RESISTANT: Any plant will burn with enough heat and proper conditions. Resistance is often used as a comparative term relating to the ability of a plant to resist ignition.

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

FIRE ZONE 4: Any geographic area designated pursuant to Section 6402 and Chapter 26.150 of Title 26, County Building Code to contain the type and condition of vegetation, topography, weather, and structure density to increase the possibility of conflagration fires.

FUELBREAK: 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 area, 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.

LITTER: The uppermost layer of loose debris composed of freshly fallen or slightly decomposed organic materials 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.

SUBDIVISION: A parcel of land that is subdivided to create multiple individual lots for residential purposes in accordance with The State of California Subdivision Map Act.

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

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 meets or intermingles.

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 to contain the type and condition of vegetation, topography, weather, and structure density to increase the possibility of conflagration fires.

APPENDIX V

SUBMITTAL AND ROUTING PROCEDURES

SUBDIVISION AND ACCESS UNIT:

1. Applicants submitting proposed tract or parcel maps for projects located in the Very High Fire Hazard Severity Zone (VHFHSZ) or Fire Zone 4, will be referred to the Fuel Modification Unit for approval of their Preliminary Fuel Modification Plan. Notification will be given to the applicant by use of Form #266, "Conditions of Approval for Subdivisions - Incorporated," or by use of Form #267, "Conditions of Approval for Subdivisions - Unincorporated" during Subdivision Committee meetings. A representative from the Fuel Modification Unit will attend the subdivision meetings.
 - a. Fuel Modification Plan Guidelines are available from the Fire Prevention Office, Forestry Division Office, Regional Planning One-Stop, Fuel Modification Unit, Area Prevention Office, Building and Safety, and Contract Cities.
 - b. Fuel Modification Plans may be submitted by mail or in person to the Fuel Modification Unit.
2. The Subdivision and Access Unit will notify the Fuel Modification Unit in writing, using Form #266 or Form #267 regarding the impending tract/parcel map.
3. The Fuel Modification Unit will return a copy of the Preliminary Fuel Modification Plan Approval Letter to the applicant and the Subdivision and Access Unit before final map clearance is approved.

FIRE PREVENTION ENGINEERING:

1. Applicants submitting proposed building plans for projects located in the Very High Fire Hazard Severity Zone (VHFHSZ) or Fire Zone 4, will be referred to the Fuel Modification Unit for approval of their Preliminary and/or Final Fuel Modification Plan. Notification will be given to the applicant in the form of the "Very High Fire Hazard Severity Zone/Fire Zone 4" plan check sheet, during the initial review.
 - a. Fuel Modification Plan Guidelines are available from the Fire Prevention Office, Forestry Division Office, Regional Planning One-Stop, Fuel Modification Unit, Area Prevention Office, Building and Safety, and Contract Cities.

- b. Fuel Modification Plans may be submitted by mail or in person to the Fuel Modification Unit.
-
- 2. The following verbatim note will be required to be blueprinted on the final building plans, prior to obtaining approval. "This property is located within an area designated by the Fire Department as Very High Fire Hazard Severity Zone (VHFHSZ) or Fire Zone 4. A Final Fuel Modification Plan shall be submitted and approved, prior to building permit approval. Implementation of the approved Final Fuel Modification Plan and final inspection will be required prior to approval of occupancy." Submit three sets of plans to the Fuel Modification Unit.
 - 3. Fire Prevention, Engineering will notify the Fuel Modification Unit in writing, using the Very High Fire Hazard Severity Zone (VHFHSZ) or Fire Zone 4 Building Requirement Checklist regarding the impending building permit request.
 - 4. The Fuel Modification Unit will return a copy of the Final Fuel Modification Plan Approval Letter to the applicant and the Fire Prevention, Engineering Unit, before building permit clearance is approved.
 - 5. The Fuel Modification Unit will return a copy of the Final Inspection and Receipt of CCR's approval letter to the applicant and the Fire Prevention Unit before final occupancy is approved.

APPENDIX F

Updated County of Los Angeles Fire Department Plant Lists

|

INTENTIONALLY LEFT BLANK

APPENDIX I UNDESIRABLE PLANT LIST

TARGET PLANT 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 would 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 as species containing these volatile substances.

Plants with these characteristics should not be planted in fire hazard areas. Should these species already exist within these areas, they should be removed because of the potential threat they pose to structures. They are referred to as target species since their complete or partial removal is a critical part of hazard reduction. The following is a partial list of plants that should be avoided near structures.

UNDESIRABLE PLANT SPECIES (TARGET SPECIES)

Natives:

Adenostoma fasciculatum - Chamise
Adenostoma sparsifolium - Red shank
Artemisia californica - California Sagebrush
Eriogonum fasciculatum - Common Buckwheat
Salvia sp. – Sage

Ornamentals:

Cortadera sp.- Pampas Grass
Cupressus sp. - Cypress
Eucalyptus sp. - Eucalyptus*
Jasminum humile – Italian Jasmine
Juniperus sp. – Juniper*
Pinus sp. – Pine
Plumbago auriculata – Cape Plumbago
Tecoma capensis – Cape Honeysuckle

* Except as permitted in the planting list

INVASIVE PLANT SPECIES - Other plants may be considered to be undesirable due to their ability to naturalize in wildland areas and become pests, because they are invasive in the landscape, or because they are an aggressive spreading or climbing species that out compete other plants. These types of plants should be avoided, especially in sensitive riparian or coastal areas where they may become established and compete with native vegetation. The following is a list of commonly used plant species that should not be planted due to their invasive nature. Applicants may be required to remove these plants where they occur. For a more complete list, visit the California Invasive Plant Council website at www.cal-ipc.org.

UNDESIRABLE PLANT SPECIES (INVASIVE SPECIES)

Arctotheca calendula – Capeweed
Atriplex semibaccata – Australian Saltbush
Carpobrotus chilensis – Sea Fig, Ice Plant
Carpobrotus edulis – Hottentot Fig
Cortadera sp. – Pampas Grass
Cytisus sp. – Broom
Elaeagnus angustifolia – Russian Olive
Ficus carica – Edible Fig
Eucalyptus globulus – Blue Gum
Hedera canariensis – Algerian Ivy
Hedera helix – English Ivy
Myoporum laetum - Myoporum
Pennisetum setaceum – Fountain Grass – including all cultivars and varieties
Phoenix canariensis – Canary Island Date Palm
Plumbago auriculata – Cape Plumbago
Robinia pseudoacacia – Black Locust
Schinus molle – California Pepper Tree
Schinus teribinthifolius – Brazilian Pepper Tree
Tecoma capensis – Cape Honeysuckle
Vinca major – Periwinkle
Washingtonia robusta – Mexican Fan Palm

Plants should fit the location and situation. Large trees should not be planted under or near utility lines. Low branching and wide trees should not be planted near roads or driveways where they could interfere with emergency vehicles. Typically, trees should be planted no closer than a distance of one half of their expected mature width away from roads or driveways. Avoid using shallow rooted ground covers on steep slopes. Acceptable forms of Ice Plant, while an effective ground cover on flat surfaces, would be undesirable on a steep slope because its shallow rooted nature may cause it to slide off the slope if the root zone becomes saturated during a rain storm. This would expose the bare soil to erosion.

Care should be taken to avoid erosion problems created or enhanced by total vegetation removal. In areas where target species comprise the total vegetation, partial removal is recommended with replacement planting using desirable species as the long range goal.

APPENDIX II DESIRABLE PLANT LIST

Desirable Qualities for Landscape Plants

1. Ability to store water in leaves or stems.
2. Produces limited dead and fine material.
3. Extensive root systems for controlling erosion.
4. High levels of salt or other compounds within its tissues that can contribute to fire resistance.
5. Ability to withstand drought.
6. Prostrate or prone in form.
7. Ability to withstand severe pruning.
8. Low levels of volatile oils or resins.
9. Ability to resprout after a fire.

PLANT LIST LEGEND

<u>Geographical Area</u>	<u>Water Needs</u>	<u>Evergreen/Deciduous</u>
C-Coastal	H-High.....	E-Evergreen
IV-Interior Valley.....	M-Moderate....	D-Deciduous
D-Deserts	L-Low	E/D-Partly or
	.....	VL -Very Low Summer Deciduous

ZONE: A number on the list denotes the minimum distance allowed from any structure.
 Example: A,B-15 would indicate the plant should be planted no closer than 15 feet. Trees should typically be planted no closer than one half their expected mature spread away from roads or driveways.

A - Setback Zone – to 20 feet from structure.

B – Irrigated Zone – from Zone A up to 100 feet from structure.

C – Thinning Zone – thinned native vegetation up to 200 feet from structure.

Comment Code

- | | | | | |
|----|---|----|-------|---------------------------------------|
| 1 | Not for use in coastal areas. ... | 13 | ..... | Tends to be short lived. |
| 2 | Should not be used on steep slopes..... | 14 | ..... | High fire resistance. |
| 3 | May be damaged by frost. | 15 | ..... | Dead fronds or leaves need to be |
| 4 | Should be thinned bi-annually to ..... |  | ..... | removed to maintain fire safety. |
| | remove dead or unwanted growth..... | 16 | ..... | Tolerant of heavy pruning. |
| 5 | Good for erosion control. | 17 | ..... | Must be cut back after flowering. |
| 6 | Grows best in well drained soils. | 18 | ..... | May require partial shade in desert |
| 7 | Produces flowers or fruit that. .... |  | ..... | or valley areas. |
| | attracts birds and or butterflies. | 19 | ..... | Perennial |
| 8 | Adaptability can vary. | 20 | ..... | Tolerates saline soils. |
| 9 | Can be used as a lawn substitute..... | 21 | ..... | Grows naturally in riparian areas. |
| 10 | Showy flowers. | 22 | ..... | Good tree for lawns. |
| 11 | Produces edible fruit... .. | 23 | ..... | Produces habitat or food for wildlife |
| 12 | Native or native cultivar. | X | ..... | May be invasive in some areas |

The following plant list is provided as a suggested guideline, not exclusive, for Fuel Modification landscaping within Los Angeles County. Plants not listed (grasses, annuals etc.) may be used if approved with the Fuel Modification plan.

The desirable planting list is based on comments from numerous professionals and public agencies, Sunset Western Garden Book, Bob Perry's Landscape Plants for Western Regions, and the California Department of Water Resources study entitled, WUCOLS (Water Use Classification of Landscape Species). The plant list is arranged by plant type and includes categories for the acceptable Fuel Modification Zone, water needs, size, and appropriate geographical area for planting. A comment code is included to assist in plant selection and maintenance requirements.

GROUNDCOVERS - REVISED 8/16/2007

Groundcovers in Zone A, especially woody species, should typically maintained at a height of 6 inches or less.

Groundcovers in Zone B and within 50 of the structure, should be maintained at a height of 12 inches or less.

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Abelia grandiflora</i> 'Prostrata'	Prostrate Glossy Abelia	A,B	M	1 - 2'	3 - 4'	E	C,IV - 3
<i>Acacia redolens</i> 'desert carpet'	Desert Carpet Acacia	B-30	L	2'	10-15'	E	C,IV,D-3,5,6,10
<i>A. r.</i> 'Low Boy'	Low Boy Acacia	B-30	L	3'	10-15'	E	C,IV,D-3,5,6,10
<i>Achillea tomentosa</i>	Woolly Yarrow	A,B	L	6 - 10"	6 - 12"	E	C,IV - 7,9,19
<i>Aeonium</i> species	NCN	A,B	L	varies	varies	E	C,IV-2,3,8,14
<i>Ajuga reptans</i>	Carpet Bugle	A,B	H	4 - 6"	2 - 4"	E	C,IV - 2,18,19
<i>Aptenia cordifolia</i>	Red Apple Ice Plant	A,B	M,L	- 12"	varies	E	IV,D - 1,2,3,19
<i>Arctostaphylos edmundsii</i>	Little Sur Manzanita	B-30	L,VL	1 - 2'+	4 - 6'	E	C,IV - 4,6,12
<i>A.</i> 'Emerald Carpet'	Emerald Carpet Manzanita	B	L,VL	1'	4 - 6'	E	C,IV - 4,6,12
<i>A. hookeri</i> 'Monterey Carpet'	Monterey Manzanita	B	L	1-2'	8-12'	E	C,IV-6,7,12,23
<i>A.</i> 'Pacific Mist'	NCN	B	L	1-2'	8-10'	E	C,IV-6,7,12,23
<i>A. uva-ursi</i>	Bearberry	B	L	6-12"+	10-15'	E	C,IV-5,6,7,12,23
<i>Artemisia californica</i> 'cultivars'	Sagebrush - Prostrate Forms	B-30	L,VL	varies	varies	E	C,IV,D - 4,6,8,12,23
<i>A. caucasica</i>	Silver Spreader	A,B	L,VL	3-6"	2'	E	C,IV,D-4,6,12
<i>Asarum caudatum</i>	Wild Ginger	A	M,H	7-10"	2'	D	C,IV-3,18,19
<i>Baccharis pilularis</i> 'Pigeon Point'	Dwarf Coyote Brush	B	L,VL	12-24"	-6'	E	C,IV,D-4,5,12
<i>B.p.</i> 'Twin Peaks'	Dwarf Coyote Brush	B	L,VL	12-24"	-6'	E	C,IV,D-4,5,12
<i>Ceanothus gloriosus</i>	Point Reyes Ceanothus	B	L	1-2'	12-16'	E	C-6,7,10,12
<i>Cerastium tomentosum</i>	Snow-In-Summer	A,B	M,L	6-8"	2-3'	E	C,IV,D-10,14,19
<i>Chamaemelum nobile</i>	Chamomile	A,B	M	6-8"	-12"	E	C,IV,D-9,16,19
<i>Cistus salviifolius</i>	Sageleaf Rockrose	B	L,VL	1-2'	6'	E	C,IV,D-4,5,6,7,10,16,20
<i>C.</i> 'Sunset'	Rockrose	B	L,VL	1-2'	6-8'	E	C,IV,D-4,5,6,7,10,16,20
<i>C.</i> 'Warley rose'	Rockrose	B	L,VL	1'	4'	E	C,IV,D-4,5,6,7,10,16,20
<i>Coprosma kirkii</i>	NCN	B	M,L	-2'	6-8'	E	C,IV-3,4,5,8,18,20
<i>Coreopsis auriculata</i> 'Nana'	NCN	A,B	L,VL	5-8"	-2'	E/D	C,IV-3,8,19
<i>Cotoneaster adpressus praecox</i>	Cotoneaster	B	M,L	-18"	-6'	D	C,IV,D-2
<i>C. salicifolius</i> 'Emerald Carpet'	Prostrate Willowleaf Contoneaster	B	M,L	12-15"	-8'	E	C,IV,D-4
<i>Dalea greggii</i>	Trailing Indigo Bush	B	L,VL	12-18"	5-10'	E	IV,D - 6
<i>Delosperma alba</i>	White Training Ice Plant	A,B	L	-12"	2'	E	C,IV-10
<i>Dichondra micrantha</i>	Dichondra	A,B	H,M	-6"	-2'	E	C,IV-9,14,18
<i>Drosanthemum floribundum</i>	Rosea Ice Plant	A,B	L	-12"	1'-2'	E	C,IV-3,5,10
<i>Duchesnea indica</i>	Indian Mock Strawberry	A,B	L	-8"	-4'	E	C,IV,D-11,16,19
<i>Dymondia margaretae</i>	NCN	A,B	M,L	-3"	12-24"	E	C,IV-3,8
<i>Erigeron glaucus</i>	Seaside Daisy	A,B	M,L	10-12"	-2'	E	C,IV-3,6,8,10,12,18,19,20
<i>E. karvinskianus</i>	Santa Barbara Daisy	A,B	M,L	10-20"	-3'	E	C,IV-3,6,8,10,12,18,19,20
<i>Euonymus fortunei</i> 'Colorata'	Purple-Leaf Winter Creeper	B	M	1-2'	-6'	E	IV-1,5,8,16
<i>Festuca cinerea</i> (ovina'Glauca')	Blue Fescue	A,B	M,L	-12"	-2'	E	C,IV,D-4
<i>F. rubra</i>	Red Fescue	A,B	M,L	-16"	-30"	E	C,IV,D-4,9
<i>Fragaria chiloensis</i>	Wild Strawberry	A,B	L,VL	6-12"	-24"	E	C,IV,D-4,10,11,12,14,20
<i>Gazania</i> Hybrids	Trailing Gazania	A,B	M,L	6-10"	-24"	E	C,IV,D-10,19
<i>Geranium incanum</i>	Cranesbill	A,B	M,L	-12"	2'	E	C,IV-4,10,19,X
<i>Glechoma hederacea</i>	Ground Ivy	A,B	M	3-6"	-18"	E/D	C,IV,D-8,19
<i>Helianthemum nummularium</i>	Sunrose	A,B	M	6-8"	-3'	E	C,IV,D - 6,10
<i>Herniaria glabra</i>	Green Carpet	A,B	M	2-3"	16"	E	C,IV,D-6,8,9,19
<i>Hypericum calycinum</i>	Aaron's Beard	B	M,L	6-12"	-3'	E	C,IV,D-4,5,7,16
<i>H. coris</i>	St. Johnswort	B	M,L	6-12"	-2'	E	C,IV,D-4,5,7,16
<i>Iberis sempervirens</i>	Evergreen Candytuft	A,B	M	6-12"	-6-12"	E	C,IV,D-10,19
<i>Iva hayesiana</i>	Poverty Weed	B-30	L,VL	2-3'	4-5'	E	C,IV,D-4,5,12,16,23
<i>Juniperus conferta</i> & cultivars	Shore Juniper	B	L	1'	6-8'	E	C,IV,D-5,8,20
<i>J. horizontalis</i> & cultivars		B	L	1'	6-8'	E	C,IV,D-5,8,20

GROUNDCOVERS cont'd

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Laurentia fluviatilis</i>	Blue Star Creeper	A	M	2-4"	6-12"	E	C,IV-8,19
<i>Lonicera japonica</i>	Japanese Honeysuckle	B	M	1-2'	6-10'	E	IV-1,5,7,10,16
<i>Lysimachia nummularia</i>	Moneywort	A	H,M	2-6"	-2'	E	C,IV -18,19
<i>Liriope muscari</i>	Big Blue Lily Turf	A,B	M	18"	2-3'	E	C,IV,D-14,18
<i>L. spicata</i>	Creeping Lily Turf	A,B	M	12"	3'	E	C,IV,D-14,18
<i>Mahonia aquifolium 'Compacta'</i>	Compact Oregon Grape	A,B	M,L	1-2'	2-3'	E	C,IV-4,7,12,18,23
<i>M. repens</i>	Creeping Mahonia	A,B	M,L	2-3'	2-3'	E	C,IV-4,7,12,18,23
<i>Myoporum 'Pacificum'</i>	Pacific Myoporum	A,B	M,L	2-3'	-30'	E	IV-1,4,5,16
<i>M. parvifolium</i>	NCN	A,B	M,L	-6"	9'	E	C,IV-3,5,
<i>M. p. 'Putah Creek'</i>	NCN	A,B	M,L	1'	8'	E	C,IV-3,5,
<i>Nandina domestica 'Harbour Dwarf'</i>	Dwarf Heavenly Bamboo	A,B	M,L	1 1/2 -2'	2-3'	E	C,IV,D-15
<i>Oenothera berlandieri</i>	Mexican Evening Primrose	B	L,VL	10-12"	4'	E	IV,D-1,4,7,10,17,19
<i>O. stubbei</i>	Baja Evening Primrose	A,B	L,VL	5"	2'	E	IV,D-7,12,19
<i>Ophiopogon japonicus</i>	Mondo Grass	A,B	M	8-12"	12-24"	E	C,IV-14,18
<i>Osteospermum fruticosum</i>	Trailing African Daisy	A,B	M	-18"	-4'	E	IV-1,10,19
<i>Pelargonium peltatum</i>	Ivy Geranium	A,B	M	-2'	-4'	E	IV - 1,3,7,10,19
<i>P. tomentosum</i>	Silver Spreader	A,B	M	-18"	2-4'	E	IV-1,3,7,10,19
<i>Persicaria capitata</i>	Pink Clover	A,B	M,L	-18"	3'	E	IV,D -1,10,19,X
<i>Phyla nodiflora (Lippia repens)</i>	Lippia	A,B	M,L	2-15"	-3'	E/D	C,IV,D-9,16,19
<i>Potentilla tabernaemontanii</i>	Spring Cinquefoil	A,B	M,L	2-6"	-12"	E	C,IV,D-9,10,19
<i>Ribes viburnifolium</i>	Catalina Perfume	A,B	L,VL	-3'	-3'	E	C,IV - 12,18,23
<i>Rosmarinus officinalis</i>							
<i>R.o. 'Huntington Blue'</i>	NCN	B	L	-18"	-4'	E	C,IV,D - 4,5,16
<i>R.o. 'Prostratus'</i>	Prostrate Rosemary	B-30	L	-24"	-6'	E	C,IV,D - 4,5,16
<i>Scaevola 'Mauve Clusters'</i>	NCN	A,B	M,L	4-6"	3-4'	E	C,IV - 6,18,19
<i>Salvia sonomensis</i>	Creeping Sage	B	L	8-12"	3-4'	E	C,IV-6,12,13,23
<i>Sedum species</i>	Stonecrops	A,B	L,VL	varies	varies	E	C,IV - 2,8,14
<i>Senecio mandraliscae</i>	Chalksticks	A,B	M,L	-18"	-5'	E	C,IV - 3,14,19
<i>S. serpens</i>	Blue Chalksticks	A,B	M,L	-12"	-3'	E	C,IV-3,14,19
<i>Soleirolia soleirolii</i>	Baby's Tears	A	H,M	3-6"	-18"	E	C,IV - 3,14,18,19
<i>Teucrium cossonii majoricum</i>	NCN	A,B	L	8"	-2'	E	C,IV - 6,10
<i>T. X lucidrys 'Prostratum'</i>	Prostrate Germander	A,B	M,L	4-6"	-3'	E	C,IV,D - 4,16
<i>Thymus praecox arcticus</i>	Mother of Thyme	A,B	M,L	2-6"	-18"	E	C,IV,D - 8
<i>T. pseudolanuginosus</i>	Woolly Thyme	A,B	M,L	2-3"	-12"	E	C,IV,D - 8
<i>Trachelospermum jasminoides</i>	Star Jasmine	A,B	M,L	-2'	4-5'	E	C,IV,D - 5,7,10,16
<i>Trifolium fragiferum</i>	White Clover	A,B	M,L	6-15"	-6'	E	C,IV,D-5,9,16,19
<i>Verbena X hybrida</i>	Garden Verbena	A,B	L,VL	6-12"	1 1/2-3'	E	C,IV,D - 3,7,10,13
<i>V. peruviana</i>	NCN	A,B	L,VL	-8"	-2'	E	C,IV,D - 7, 10
<i>V. pulchella gracilior</i>	Moss Verbena	A,B	L,VL	12-15"	2-3'	E	C,IV,D-8,10,19
<i>Vinca minor</i>	Dwarf Periwinkle	A,B	M,L	12"	3'	E	IV,D - 1,5,16,18, X
<i>Wedelia trilobata</i>	Wedelia	B	M,L	1-2'	4-6'	E	C,IV- 3,16, 20
<i>Zoysia tenuifolia</i>	Korean Grass	A	M,L	-6"	-18"	E	C,IV,D - 9

SHRUBS - REVISED 8/16/2007

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Abelia grandiflora</i>	Glossy Abelia	A,B-5	M	8'	8'	E	C,IV,D - 4, 10
<i>A. g. 'Prostrata'</i>	Prostrate Glossy Abelia	A,B-5	M	2'	4'	E/D	C,IV,D - 10
<i>Abutilon hybridum</i>	Flowering Maple, Chinese Lantern	A,B-10	M	10'	10'	E	C,IV - 4
<i>Acanthus mollis</i>	Bear's Breech	A,B	H,M	-4'	4-6'	E/D	C,IV,D - 3,8,14,16,17,18,19
<i>Achillea filipendulina</i>	Fernleaf Yarrow	A,B	L,VL	4-5'	2'	E	C,IV,D - 10,16,17,19
<i>A. millefolium</i>	Common Yarrow	A,B	L,VL	-3'	2'	E	C,IV,D - 10,16,17,19
<i>Aeonium species</i>	NCN	A,B	L	varies	varies	E	C,IV - 3,8,14
<i>Agapanthus species</i>	Lily-Of-The-Nile	A,B	M	varies	varies	E/D	C,IV - 3,4,7,10,14,19
<i>Agave species</i>	Agave	A,B	L,VL	varies	varies	E	C,IV,D - 3,10,14,17
<i>Alocasia macrorrhiza</i>	Elephant's Ear	A,B	H	5'	8'	E/D	C,IV - 3,14,18,19
<i>Aloe species</i>	Aloe	A,B	L,VL	varies	varies	E	C,IV, - 3,7,8,14,15
<i>Alyogyne huegelii</i>	Blue Hibiscus	A,B-5	M,L	5-8'	6'	E	C,IV - 3,4,10
<i>Anigozanthos flavidus</i>	Kangaroo Paw	A,B	M,L	3-5'	3'	E	C,IV - 3,6,7,10,19
<i>A. manqlesii</i>	NCN	A,B	M,L	3'	-3'	E	C,IV - 3,6,7,19
<i>Arbutus unedo 'Compacta'</i>	Dwarf Strawberry Tree	A,B-5	M,L	6-8'	-8'	E	C,IV,D-5,7,11,18,23
<i>A.u. 'Elfin King'</i>	Elfin King	A,B-5	M,L	3-5'	-6'	E	C,IV,D - 5,7,11,18,23
<i>A.u. 'Octoberfest'</i>	NCN	A,B-5	M,L	6-8'	-8'	E	C,IV,D-5,7,11,18,23
<i>Arctostaphylos species</i>	Manzanita	B	L,VL	varies	varies	E	C,IV,D - 4,6,7,10,12
<i>Artemisia 'Powis Castle'</i>	NCN	B	L,VL	-3'	6'	E	C,IV - 4,6,12,23
<i>A. stellerana</i>	Beach Worm Wood	B	L,VL	-3'	-3'	E	C,IV - 4,6,12,19,23
<i>Aspidistra elatior</i>	Cast-Iron Plant	A,B	M,L	-30"	-3'	E	C,IV -3,18
<i>Aucuba japonica</i>	Japanese Aucuba, Gold Dust Plant	A,B-5	M,L	6-15'	6-15'	E	C,IV,D - 18
<i>Baccharis species</i>	Various	B	L,VL	varies	varies	E	C,IV,D-4,5,6,12,21,23
<i>Begonia species</i>	Begonia	A,B	H,M	varies	varies	E	C,IV - 3,8,10,14,18
<i>Berberis thunbergii</i>	Japanese Barberry	B	M,L	4-6'	4-6'	D	C,IV,D - 4
<i>B. thunbergii 'cultivars'</i>		A,B	M,L	varies	varies	D	C,IV,D - 4
<i>Bergenia crassifolia</i>	Winter Blooming Bergenia	A,B	M,L	-20"	-20"	E	C,IV - 3,18,19
<i>Bougainvillea sp.</i>	Bougainvillea	B	L	varies	varies	E/D	C,IV - 3,4,10
<i>Buddleja davidii</i>	Butterfly Bush	B	M,L	-10'	-12'	E/D	C,IV,D - 7,10,16,17,X
<i>Buxus microphylla japonica</i>	Japanese Boxwood	A,B-5	M,L	4-6'	4-6'	E	C,IV,D -16
<i>B.m. koreana</i>	Korean Boxwood	A,B-5	M,L	4-6'	4-6'	E	C,IV,D -16
<i>Caesalpinia gilliesii</i>	Bird of Paradise Bush	A,B	L,VL	-10'	-10'	E/D	C,IV,D - 7,10
<i>C. mexicana</i>	Mexican Bird of Paradise	A,B	L,VL	10-12'	-15'	E/D	C,IV,D - 7,10
<i>C. pulcherrima</i>	Red Bird of Paradise	A,B	L,VL	-10'	-10'	E/D	C,IV,D - 7,10
<i>Calliandra californica</i>	Baja Fairy Duster	B	L,VL	-3'	4-5'	E/D	C,IV,D -4,6,7,10,12
<i>C. eriophylla</i>	Fary Duster	B	L,VL	-3'	4-5'	E/D	C,IV,D -4,6,7,10,12
<i>Callistemon citrinus'compacta'</i>	Bottlebrush	B	L,VL	8'	8'	E	C,IV,D-5,7,10,20
<i>C. viminalis "Little John"</i>	NCN	A,B-10	L	5'	8	E	C,IV,D-5,7,10,20
<i>Calycanthus occidentalis</i>	Spice Bush	B	M,L	4-12'	-5'	D	C,IV-12,18
<i>Carissa macrocarpa (grandiflora)</i>	Natal Plum	A,B-10	M,L	7+	7+	E	C,IV - 4,11,16
<i>C. m. 'cultivars'</i>	Natal Plum	A,B-5	M,L	varies	varies	E	C,IV - 4,11,16
<i>Carpenteria californica</i>	Bush Anemone	A,B-10	L,VL	6-8'	6-8'	E	C,IV - 6,7,10,12
<i>Cassia artemisioides</i>	Feathery Cassia	B	L,VL	3-6'	-6'	E	C,IV,D - 10,
<i>Ceanothus species</i>	Wild Lilac	B-30	L,VL	varies	varies	E/D	C,IV,D - 4,6,7,10,12,23
<i>Cercocarpus betuloides</i>	Mountain Mahogany	B-30	L,VL	5-12'	-10'	E	C,IV,D - 4,6,12,23
<i>Choisya ternata</i>	Mexican orange	B	M	6-8'	-8'	E	C,IV - 10,18
<i>Cistus species</i>	Rockrose	A,B-10	L,VL	varies	varies	E	C,IV,D - 4,5,6,10,17,20
<i>Clivia miniata</i>	Clivia	A,B	H,M	2'	2'	E	C,IV - 3,10,14,18,19
<i>Colocasia esculenta (caladium)</i>	Taro, Elephant's Ear	A,B	H	-6'	-6'	E/D	C,IV - 3,14,18,19
<i>Comarostaphylis diversifolia</i>	Summer Holly	B	L,VL	6-10'+	6-8'+	E	C,IV,D-6,7,12,18,23
<i>Convolvulus cneorum</i>	Bush Morning Glory	B	L	2-4'	2-4'	E	C,IV,D-6,10
<i>Coprosma pumila</i>	NCN	B	M	-3'	8'	E	IV - 1,4,16,20

SHRUBS cont'd

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>C. repens</i>	Mirror Plant	B	M	-10'	-6'	E	IV - 1,4,16,20
Cotoneaster species & cultivars	Cotoneaster	B	M,L	varies	varies	E/D	C,IV,D - 4,10,16,X
Cotyledon species	NCN	A,B	L	1-3'	1-3'	E	C,IV - 3,8,14
Crassula species	NCN	A,B	L	1-9'	1-9'	E	C,IV - 3,8,14
<i>Cuphea hyssopifolia</i>	False Heather	A,B	M	2'	3'	E	V,IV - 3,7,10,
<i>Cycas revoluta</i>	Sago Palm	A,B	M	8'	10'	E	C,IV,D - 3,8,15,18
<i>Cyrtomium falcatum</i>	Holly Fern	A,B	H,M	2-3'	3-4'	E	C,IV - 15
<i>D. wheeleri</i>	Sotol	B	L,VL	-6'	-6'	E	C,IV,D-15
<i>Dasyilirion quadrangulatum(longissima)</i>	Mexican Grass Tree	B	L,VL	-10'	8'	E	C,IV,D-15
<i>D. wheeleri</i>	Sotol	B	L,VL	-6'	-6'	E	C,IV,D-15
<i>Dendromecon harfordii</i>	Island Bush Poppy	B	L,VL	8-20'	10-20'	E	C,IV - 5,10,12,23
<i>Dietes bicolor</i>	Fortnight Lily, African Iris	A,B	M,L	2-3'	2-3'	E	C,IV,D - 4,10,15,19
<i>Dietes iridioides</i>	Fortnight Lily, African Iris	A,B	M,L	3'	3'	E	C,IV,D - 4,10,15,19
<i>Dodonea viscosa</i>	Hopseed Bush	A,B-10	M,L	12-18'	10+	E	C,IV,D - 3,4
<i>D. v. 'Purpurea'</i>	Purple Hopseed Bush	A,B-10	M,L	12-18'	10+	E	C,IV,D - 3,4
<i>Echium candicans (fastuosum)</i>	Pride of Madeira	B	L,VL	-10'	-10'	E	C,IV - 4,6,7,10,19,20,X
<i>Elaeagnus pungens & cultivars</i>	Silverberry	B	M,L	6-15'	6-15'	E	C,IV,D - 16
<i>Encelia californica</i>	Coast Sunflower	A,B-10	L,VL	3-5'	3-5'	E/D	C,IV-5,6,10,4,17
<i>E. farinosa</i>	Brittle Bush	B	L,VL	3-5	3-5	E/D	C,IV,D - 4,5,6,10,12,17
<i>Erigonum giganteum</i>	St. Catherine's Lace	B	L,VL	- 8'	- 8'	E	C,IV - 4,6,10,12,19,20
<i>Escallonia species</i>	Escallonia	A,B-5	M,L	2-15'	2-10'	E	C,IV - 4,10,16
<i>Euonymus japonica & cultivars</i>	Evergreen Euonymus	A,B	M	2-10'	-6'	E	C,IV,D - 4,16
<i>Euphorbia species</i>	Varies	A,B	M,L,VL	varies	varies	E/D	C,IV- 1(varies),3,6,8,10,14,18
<i>Euryops pectinatus</i>	NCN	A,B	M,L	6'	6'	E	C,IV,D - 3,4,6,7,10
<i>Fatsia japonica</i>	Japanese Aralia	A,B	M	5-12'	6-10'	E	C,IV - 15,18
<i>Fouquieria splendens</i>	Ocotillo	A,B	VL	8-25'	8-15'	E	IV,D - 6,10,12
<i>Fremontodendron species</i>							
& cultivars	Flannel Bush	B	L,VL	5-20'	-15'	E	C,IV,D - 4,6,10,12
<i>Gardenia jasminoides</i>	Gardenia	A,B	H	3-6'	3-5'	E	C,IV - 10,18
<i>Garrya elliptica</i>	Coast Silktassel	B	M,L	4-8'	4-8'	E	C,IV,D - 4,5,7,10,12
<i>Grevillea species</i>	Grevillea	B	L,VL	varies	varies	E	C,IV,D - 3,4,5,7,8,10
<i>Grewia occidentalis</i>	Lavender Starflower	A,B-10	M	6-10'	6-10'	E	C,IV,D - 4
<i>Hakea suaveolens</i>	Sweet Hakea	B	L	10-20'	-15'	E	C,IV - 4,8
<i>Hebe species & cultivars</i>	Hebe	A,B-10	M	3-6'	3-6'	E	C,IV - 4,5,7,10,16
<i>Helictotrichon sempervirens</i>	Blue Oat Grass	A,B-15	M	2-3'	2-3'	E/D	C,IV,D - 15,19
<i>Hemerocallis hybrids</i>	Daylily	A,B	M,L	1-6'	2-6'	E/D	C,IV,D - 7,10,17,19
<i>Hesperaloe parviflora</i>	Red Yucca	A,B	VL	3-4'	4-6'	E	IV,D - 6,7,15,19
<i>Heuchera Species</i>	Coral Bells	A,B	M,L	6"-2'	2'	E/D	C,IV,D - 6,7,8,10,12,15,18,19
<i>Hibiscus rosa - sinensis</i>	Chinese Hibiscus	A,B-5	M	-15'	-12'	E	C,IV - 3,4,7,10,18
<i>Ilex species</i>	Holly	B	M	varies	varies	E	C,IV,D - 7,16,X
<i>Iris species</i>	Bearded Iris	A,B	M	-30"	-2'	E	C,IV,D - 10,19,X
<i>I.douglasiana</i>	Douglas Iris	A,B	M,L	-2'	-2'	E	C,IV - 10,12,18,19
<i>Juniperus species</i>	Juniper	B	M,L,VL	varies	varies	E	C,IV,D - 4, 7, 23
<i>Justicia brandegeana</i>	Shrimp Plant	A,B	M	-3'	-4'	E	C,IV,D - 4,7,10
<i>J. californica</i>	Chuparosa	B	L,VL	2-5'	-4'	D	IV,D - 4,6,7,10,12
<i>Keckiella cordifolia</i>	Heart-Leaved Penstemon	B	L,VL	5-6'	8-10'	E/D	C,IV-4,7,12
<i>Kniphofia uvaria</i>	Red-Hot Poker	A,B	L	2-3'	3-4'	E	C,IV,D-3,7,10,19,X
<i>Lantana Camara & hybrids</i>	Lantana	A,B-10	M	varies	varies	E	C,IV,D - 4,7,10
<i>Larrea tridentata</i>	Creosote Bush	B	VL	4-8'	4-8'	E	IV,D-6,12,23
<i>Lavandula angustifolia</i>	English Lavender	A,B-10	L	3-4'	3-4'	E	C,IV,D-4,6,7,10,17
<i>L. dentata</i>	French Lavender	A,B-10	L	3'	3'	E	C,IV,D-4,6,7,10,17
<i>L. intermedia</i>	Lavandin	A,B	L	1-2'	2-3'	E	C,V,D-4,6,7,10,17

SHRUBS cont'd

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
L. stoechas	Spanish Lavender	A,B-10	L	2-3'	3'	E	C,IV,D-4,6,7,10,17
Lavatera assurgentiflora	California Tree Mallow	B	L,VL	8-12'	8-12'	E	C,IV- 4,5,6,7,12,16,20
L. Maritima	Tree Mallow	A,B-10	M,L	8-12'	8-12'	E	C,IV- 4,7,8,10,18
Leonotis leonurus	Lion's Tail	A,B-10	L	3-6'	4-6'	E	C,IV,D-3,7,10,17
Leucophyllum candidum	Violet Silverleaf	A,B-10	L,VL	4-5'	4-5'	E	IV,D-4,6,7,10
L. frutescens	Texas Ranger	A,B-10	L,VL	6-8'	6-8'	E	IV,D-4,6,7,10
L. laevigatum	Chihuahuan Sage	A,B-5	L,VL	3-4'	4-5'	E	IV,D-4,6,7,10
Ligustrum japonicum	Wax-leaf Privet	A,B-10	M,L	10-12'	10	E	C,IV,D-7,10,15,X
Limonium perezii	Sea Lavender	A,B	L	-2'	-2'	E	C,IV - 3,10,15,19,20,X
Lobelia laxiflora	Mexican Bush Lobelia	A,B-5	M,L	2-3'	4-6'	E	C,IV,D-4,7,10,19,X
Lupinus species	Lupine	B	L,VL	varies	varies	E/D	C,IV,D-4,6,7,10,12,17
Mahonia aquifolium	Oregon Grape	A,B-10	M,L	6-8'	6-8'	E	IV,D-4,6,11,12,18,23
M. fremontii	Desert Mahonia	B	L	3-12'	4-8'	E	C,IV,D-4,6,10,11,12,23
M. 'Golden Abundance'	NCN	A,B-5	M,L	5-6'	6'	E	IV,D-4,6,10,11,12,18,23
M. lomariifolia	Venetian Blind Mahonia	A,B	M,L	6-10'	6-10'	E	C,IV,D-4,6,7,11,15,18,23
M. nevinii	Nevin Mahonia	B-30	L	3-10'	6-12'	E	C,IV,D-4,6,10,11,12,23
M. pinnata	California Holly Grape	B	M,L	4-5'	4-6'	E	C,IV-4,6,7,10,11,12,18,23
Malosma - See Rhus							
Malva species	Mallow	A,B	L	varies	varies	E/D	C,IV,D-6,7,10,13
Melaleuca nesophila	Pink Melaleuca	A,B-10	L,VL	10-20'	10-20	E	C,IV - 4,5,7,10,16
Mimulus species (Diplacus)	Monkey Flower	B	L	1-4'	1-4'	E	C,IV,D-4,6,7,10,12
Muhlenbergia rigins	Deer Grass	A,B-10	L,VL	4'	4'	D	C,IV,D- 12,15,17,19
Myrica californica	Pacific Wax Myrtle	B	M,L	10-15'+	10-15'+	E	C,IV - 4,5,7,12,20,23
Myrsine africana	African Boxwood	A,B-5	M	3-8'	3-8'	E	C,IV,D - 16,18
Myrtus communis 'compacta'	Dwarf Myrtle	A,B-10	M	5-8'	5-8'	E	C,IV,D-16
Nandina domestica	Heavenly Bamboo	A,B	M	6-8'	4-5'	E	C,IV,D-4,15
N.d. 'Compacta'	NCN	A,B	M	4-5'	3-4'	E	C,IV,D-4,15
Nephrolepis cordifolia	Southern Sword Fern	A,B	M,L	2-3'	3-6'	E	C,IV-4,15
Nerium oleander	Oleander	B	M,L	8-20'	10-20'	E	C,IV,D-10,16,X
N.o. 'Petite Salmon'	NCN	A,B-10	M	3-4'	5-7'	E	C,IV-3,10,16
Opuntia species	Prickly Pear, Cholla etc.	A,B	L,VL	varies	varies	E	C,IV,D-8,12,14,23
Pelargonium species	Geranium	A,B	M,L	varies	varies	E	C,IV-3,10,19
Penstemon species	Beard Tongue	A,B	L	varies	varies	E/D	C,IV,D-7,10,12,17,19
Phlomis fruticosa	Jerusalem Sage	A,B	M,L	3-4'	3-5'	E	C,IV,D-6,7,10,17,19
Phoenix roebelenii	Pygmy Date Palm	A,B	M,L	6-10'	6-10'	E	C,IV - 3,15,18
Phormium tenax	New Zealand Flax	A,B	M	5-9'	6'	E	C,IV,D-4,15,19
P.t 'cultivars'	NCN	A,B	M	varies	varies	E	C,IV,D-4,15,19
Photinia fraseri	Photinia	B	M,L	10-15'	10-20'	E	C,IV,D-4,7,10,16
Pittosporum tobira	Tobira	A,B-10	M,L	6-15'+	8-15'	E	C,IV,D-5,16
P.t.'Variegata'	NCN	A,B-5	M	5-8'	6-8'	E	C,IV,D-5,16
P.t.'Wheeler's Dwarf'	Dwarf Pittosporum	A,B	M	1-3'	2-4'	E	C,IV,D-16
Portulacaria afra	Elephant's Food	A,B	L	5-12'	6-12'	E	C,IV-3,14
Punica granatum 'Nana'	Dwarf Pomegranate	A,B	L	3'	4'	D	C,IV,D-7,11,20
Pyracantha species	Firethorn	B	M	varies	varies	E/D	C,IV,D-4,16,X
Rhamnus californica	Coffeeberry	B	M,L	3-15'	4-15'	E/D	C,IV,D-12,21,23
R. crocea	Redberry	B	M,L	2-3'	3'	E	IV-5,12,23
R.c. ilicifolia	Hollyleaf Redberry	B	M,L	3-15'	3-15'	E	IV-5,12,23
Rhaphiolepis indica	India Hawthorn	A,B-5	M,L	4-8'	4-8'	E	C,IV,D-4,5,10
R.i 'cultivars'	NCN	A,B	M,L	varies	varies	E	C,IV,D-5,10
Rhus integrifolia	Lemonade Berry	B-40	L	3-10'+	6-20'	E	C,IV-4,5,12,23
R.(Molosma) laurina	Laurel Sumac	B-40	L	6-15'+	6-15'	E	C,IV-4,5,12,23
R. ovata	Sugar Bush	B-30	L	3-15'	6-15'	E	C,IV,D-4,5,12,23

SHRUBS cont'd

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT	SPREAD	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Ribes aureum</i>	Golden Currant	A,B	L	3-6'	3-6'	D	C,IV,D-7,10,12,23
<i>R. malvaceum</i>	Chaparral Currant	A,B	L	6-8'	6-8"	D	IV-7,10,12,23
<i>R. sanguineum</i> & cultivars	Red Flowering Currant	A,B	M,L	4-12'	4-8'	D	C,IV,D-7,10,12,23
<i>R. speciosum</i>	Fuchsia-Flowering Gooseberry	A,B	L	3-6'	3-6'	D	C,IV,D-4,7,10,12,23
<i>R. viburnifolium</i>	Catalina Perfume	A,B	L	3'	12'	E	C,IV-7,10,12,23
<i>Romneya coulteri</i>	Matilija Poppy	B	L	-8'	4'	D	C,IV,D-5,6,10,12,17
<i>Rosa</i> species	Rose	A,B	M	varies	varies	E/D	C,IV,D-10,16,17
<i>Rosmarinus officinalis</i> & cultivars	Rosemary	B	M,L	varies	varies	E	C,IV,D- 4, 5, 7
<i>Salvia</i> species - native varieties	Sage	B	L,VL	varies	varies	E/D	C,IV,D-4,7,10,12,17,23
<i>Salvia</i> species - ornamental varieties	Sage	A,B	M,L	varies	varies	E/D	C,IV,D-4,7,10,17,23
<i>S. greggii</i>	Autumn Sage	A,B	M,L	3-4'	3-4'	E	C,IV,D - 4,7,10
<i>S. leucantha</i>	Mexican Bush Sage	A,B	L,VL	3-4'	4-6'	E	C,IV- 7, 10,17
<i>Santolina chamaecyparissus</i>	Lavender Cotton	A,B	L	-24"	-3'	E	C,IV,D - 10
<i>S. rosmarinifolius</i> (virens)	Green Lavender Cotton	A,B	L	-24"	-3'	E	C,IV,D - 10
<i>Simmondsia chinensis</i>	Jojoba	B	L,VL	3-8'+	4-8'	E	C,IV,D-4,6,11,23
<i>Strelitzia nicolai</i>	Giant Bird of Paradise	A,B	M	-30'	-20'	E	C,IV-3,4,10,15,18
<i>S. reginea</i>	Bird of Paradise	A,B	M	5'	4'	E	C,IV-3,4,10,15,18
<i>Tibouchina urvilleana</i>	Princess Flower	A,B-10	M	5-18'	5-10'	E	C,IV -3,4, 6,10
<i>Trichostema lanatum</i>	Wooly Blue Curls	B	L,VL	3-5'	5'	E	C,IV,D-6,7,10,12,17
<i>Tulbaghia violacea</i>	Society Garlic	A,B	M	18'	2'	E/D	C,IV,D-3,10,19
<i>Viburnum</i> species	Viburnum	A,B-10	M	varies	varies	E/D	C,IV,D-3,7,10
<i>Westringia fruticosa</i>	Coast Rosemary	A,B-10	M,L	5-7'	6-12'	E	C,IV,D-4,6,18
<i>Xylosma congestum</i>	Shiny Xylosma	A,B-10	M,L	15'+	15'+	E	C,IV,D-5,16,18
X.c. 'Compacta'	Compact Xylosma	A,B-5	M,L	8-12'	8-12'	E	C,IV,D-5,16,18
<i>Yucca</i> species	Yucca	B	L,VL	varies	varies	E	C,IV,D - 6,10,15
<i>Zantedeschia aethiopica</i>	Calla Lilly	A,B	H,M	2-4'	3'	E/D	C,IV,D - 3,10,14,18,X
<i>Zauschneria californica</i>	California Fuchsia	B	L,VL	1-3'	3-5'	E/D	C,IVD-4,5,7,10,12,13,23

TREES - REVISED 8/16/2007

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT FT	SPREAD FT	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>Acacia farnesiana</i>	Sweet Acacia	A,B-15	L	15-20'	15-20'	D	IV,D-10
<i>A. greggii</i>	Catclaw Acacia	A,B-15	L,VL	15-25'	15-25'	E	IV,D-10,12,21,23
<i>A. salicina</i>	Willow Acacia	A,B-15	L	15-35'	12-25'	E	C,IV,D-10,X
<i>A. smallii</i>	NCN	A,B-15	L,VL	15-20'	15-20'	D	C,IV,D-10,12,21,23
<i>A. stenophylla</i>	Shoestring Acacia	A,B-15	M,L	20-45'	10-20'	E	C,IV,D-10,22,X
<i>Acer macrophyllum</i>	Bigleaf Maple	B	M	30-95'	30-95'	D	C,IV-12,21,23
<i>A. negundo</i>	Box Elder	B	M,L	-60'	-50'	D	C,IV,D-12,23
<i>A. palmatum</i>	Japanese Maple	A,B	M	-20'+	-20'	D	C,IV-6
<i>A. saccharinum</i>	Silver Maple	B-30	M	40-100'	40-100'	D	C,IV,D-22
<i>Aesculus californica</i>	California Buckeye	B	M,L	20+	30'	D	C,IV,D-6,7,10,12,23
<i>Agonis flexuosa</i>	Peppermint Tree	B	M,L	25-35'	25-35'	E	C,IV-3,22
<i>Albizia julibrissin</i>	Silk Tree	B	M	-40'	40'+	D	C,IV,D-7,10,22,X
<i>Alnus cordata</i>	Italian Alder	A,B-15	M	40'	25'	D	C,IV,D-22
<i>A. rhombifolia</i>	White Alder	B	H,M	50-90'	40'	D	IV-12,21,23
<i>Arbutus 'Marina'</i>	NCN	A,B-15	M,L	-40'	-40'	E	C,IV,D-5,7,10,11,23
<i>A. unedo</i>	Strawberry Tree	A,B-10	M,L	12-35'	20-35'	E	C,IV,D-5,7,10,11,23
<i>Archontophoenix cunninghamiana</i>	King Palm	A,B	M	50'	10-15'	E	C,IV-3,10,15
<i>Bauhinia variegata</i>	Purple Orchid Tree	B	M	20-35'	35'	E/D	C,IV-4,10
<i>Betula pendula</i>	European White Birch	A,B-10	M	30-40'	30'	D	C,IV,D-6,22
<i>Brachychiton acerifolius</i>	Flame Tree	B	L	60'	45-50'	D	C,IV,D-10,22
<i>B. populneus</i>	Kurrajong Bottle Tree	A,B-10	L	30-50'	30'	E	C,IV,D-10,22
<i>Brahea armata</i>	Blue Hesper Palm	A,B	L,VL	40'	10'	E	C,IV,D-6,10,15
<i>B. edulis</i>	Guadalupe Palm	A,B	L,VL	30'	10'	E	C,IV,D-6,15
<i>Butia capitata</i>	Pindo Palm	A,B-10	M,L	10-20'	10-15'	E	C,IV,D-10,11,15
<i>Callistemon citrinus</i>	Lemon Bottlebrush	B	M,L	-25'	-15'	E	C,IV,D-4,7,10
<i>C. viminalis</i>	Weeping Bottlebrush	A,B-10	M,L	20-30'	-15'	E	C,IV-4,7,10
<i>Calocedrus decurrens</i>	Incense Cedar	B	L,VL	75+	30+	E	IV,D-6,12
<i>Calodendrum capense</i>	Cape Chestnut	B	M	30'	25-40'	D	C,IV-7,10
<i>Carya illinoensis</i>	Pecan	B	M,L	70'	70'	D	C,IV,D-6,11
<i>Cedrus deodara</i>	Deodar Cedar	B-30	M,L	60-80'	40+	E	C,IV,D-6
<i>Ceratonia siliqua</i>	Carob	B-30	M,L	30-40'	40+	E	C,IV,D-6
<i>Cercidium floridum</i>	Blue Palo Verde	A,B	L,VL	30'	30'	D	IV,D-6,10,12,21,23
<i>C. microphyllum</i>	Littleleaf Palo Verde	A,B	L,VL	25'	25'	D	IV,D-6,7,10,12,21,23
<i>Cercis occidentalis</i>	Western Redbud	A,B-10	M,L	20'	20'	D	C,IV,D-7,10,12,23
<i>Chamaerops humilis</i>	Mediterranean Fan Palm	A,B	M	20'	20'	E	C,IV,D-15
<i>Chilopsis linearis</i>	Desert Willow	A,B-15	L	-35'	-35'	D	IV,D-6,7,10,12,23
<i>Chionanthus retusus</i>	Chinese Fringe Tree	A,B	M	20'	20'	D	C,IV-10
<i>Chitalpa tashkentensis</i>	Chitalpa	A,B	M,L	20-30'	20-30'	D	C,IV,D-7,10,12
<i>Chorisia speciosa</i>	Floss Silk Tree	B	M	30-60'	30-40'	D	C,IV,D-10,22
<i>Cinnamomum camphora</i>	Camphor Tree	B-30	M,L	50'+	60'+	E	C,IV,D-22
<i>Citrus species</i>	Citrus	A,B	M	varies	varies	E	C,IV,D-3,6,10,11
<i>Cocculus laurifolius</i>	Laurel Leaf Snail Seed	B	M	25'	30'+	E	C,IV,D-4
<i>Cordyline australis</i>	Giant Dracaena	A,B	M	30'	15'	E	C,IV,D-15,X
<i>Cupaniopsis anacardioides</i>	Carrot Wood	A,B-10	M	40'	40'	E	C,IV,D-20
<i>Cupressus macrocarpa</i>	Monterey Cypress	B-30	M	40'+	40'	E	C-6,12,23,X
<i>Cyathea cooperi</i>	Australian Tree Fern	A,B	M	20'	12'	E	C,IV-3,15,18
<i>Dicksonia antarctica</i>	Tazmanian Tree Fern	A,B	M	15'	12'	E	C,IV-15,18
<i>Dracaena draco</i>	Dragon Tree	A,B	M,L	20'	20'	E	C,IV-3,10,14,15
<i>Eriobotrya deflexa</i>	Bronze Loquat	A,B-10	M,L	20'	20'	E	C,IV,D-10
<i>Erythrina species</i>	Coral Tree	B	M,L	varies	varies	D	C,IV,D-3,7,8
<i>Eucalyptus citriodora</i>	Lemon-scented Gum	B	M,L	75-100'	-40'	E	C,IV,D-1,7,22
<i>E. maculata</i>	Spotted Gum	B	M,L	60-80'	-40'	E	C,IV,D-1,7,22

TREES cont'd

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT FT	SPREAD FT	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>E. nicholii</i>	Willow Peppermint	B	M,L	-40'	-30'	E	C,IV,D-1,7,22
<i>E. sideroxylon</i>	Red Ironbark	B	M,L	35-80'	-35'	E	C,IV,D-1,7,10
<i>E. torquata</i>	Coral Gum	A,B-15	M,L	-25'	-20'	E	C,IV,D-1,6,7,10,20
<i>Feijoa sellowiana</i>	Pineapple Guava	A,B	M,L	18-25'	-25'	E	C,IV,D-3,7,8,10,11,16
<i>Ficus species</i>	Fig	B	M,L	varies	varies	E,D	C,IV,D-3,*
<i>Fraxinus augustifolia</i>	Raywood Ash	B	M	25+35'	30'	D	C,IV,D-22
<i>F. dipetala</i>	Foothill Ash	B	L,VL	18-20'	20-30'	D	C,IV,D-12,21,22,23
<i>F. latifolia</i>	Oregon Ash	B	M	40-80'	40-60'	D	C,IV,D-12,22,23
<i>F. velutina</i>	Arizona Ash	B	M,L	20-50'	30-50'	D	C,IV,D-22,23
<i>F.v. Coriacea</i>	Montebello Ash	B	M,L	20-40'	20-40'	D	C,IV,D-12,22,23
<i>Geijera parviflora</i>	Australian Willow	A,B-15	M,L	25-30'	20-30'	E	C,IV,D-6
<i>Ginkgo biloba</i>	Maidenhair Tree	A,B-15	M,L	35-80'	30-60'	D	C,IV,D-6,22
<i>Gleditsia triacanthos</i>	Honey Locust	A,B-15	M,L	35-70'	-30'	D	C,IV,D-6,22,X
<i>Grevillea robusta</i>	Silk Oak	B	M	60'+	30'+	E	C,IV,D-3,7,10
<i>Heteromeles arbutifolia</i>	Toyon	A,B-15	L,VL	15-30'	15-30'	E	C,IV,D-5,7,10,12,23
<i>Hymenosporum flavum</i>	Sweetshade Tree	A,B	M,L	20-40'	15-20'	E	C,IV-10
<i>Jacaranda mimosifolia</i>	Jacaranda	B	M,L	25-40'	-30'	D	C,IV,D-10,22
<i>Juglans californica</i>	Southern California Black Walnut	B	L	20-35'	30-45'	D	C,IV,-5,6,12,23
<i>Koelreuteria bipinnata</i>	Chinese Flame Tree	B	M	20-40'	-45'	D	C,IV,D-6,22
<i>K. paniculata</i>	Golden Rain Tree	B	M,L	20-35'	-40'	D	C,IV,D-20,22
<i>Lagersiroemia indica</i>	Crape Myrtle	A,B	M,L	-30	-20	D	IV,D-10,22
<i>Laurus nobilis</i>	Sweet Bay	B	M	20-40'	20-40	E	C,IV-3,16
<i>Leptospermum laevigatum</i>	Australian Tea Tree	A,B-15	L,VL	10-30	10-30'	E	C,IV-5,10,16
<i>Liquidambar formosana</i>	Chinese Sweet Gum	A,B	M	40-60'	25'	D	C,IV,D-7
<i>L. styraciflua</i>	American Sweet Gum	A,B	M	60'	-25'	D	C,IV,D-7
<i>Liriodendron tulipifera</i>	Tulip Tree	B	M	60-80'	40'	D	C,IV,D-22
<i>Lithocarpus densiflorus</i>	Tanbark Oak	B	L	-60'	-40'	E	C,IV-6,12,23
<i>Lyonothamnus floribundus</i>	Catalina Ironwood	A,B-15	M	20-35	15'	E	C,IV-6,10,12,15,23
<i>Magnolia grandiflora</i>	Southern Magnolia	B	M	60-80'	40-60'	E	C,IV,D-10,22
<i>M. X soulangeana</i>	Saucer Magnolia	A,B	M	15-25'	25'+	D	C,IV,D-10
<i>Maytenus boaria</i>	Mayten Tree	A,B	M,L	30-50'	30'	E	C,IV-6,22,X
<i>Melaleuca quinquenervia</i>	Cajeput Tree	A,B-15	M,L	20-40'	15-25'	E	C,IV,D-10
<i>Metasequoia glyptostroboides</i>	Dawn Redwood	A,B-15	H,M	-80'	-40'	D	C,IV-22
<i>Metrosideros excelsus</i>	New Zealand Christmas Tree	A,B	L,VL	-30'	-30'	E	C,IV-5,6,7,10
<i>Morus alba</i>	White Mulberry	B	M,L	20-60'	30-50'	D	C,IV,D-11,16
<i>Olea europea</i>	Olive	A,B-10	L,VI	-35'	20-30'	E	C,IV,D-11,16,20,X
<i>Parkinsonia aculeata</i>	Jerusalem Thorn	A,B-10	L,VL	15-30'	15-30'	D	C,IV,D-3,6,7,10,22,X
<i>Phoenix dactylifera</i>	Date Palm	B	M,L	80'	30'	E	C,IV,D-7,11,15,X
<i>Pinus species</i>	Pine	B-30	L,VL	varies	varies	E	C,IV,D-15,23
<i>Pistacia chinensis</i>	Chinese Pistache	B	M,L	-60'	-50'	D	C,IV,D-22,X
<i>Pittosporum phillyraeoides</i>	Willow Pittosporum	A,B	L	15-25'	10-15'	E	C,IV,D-10
<i>P. rhombifolium</i>	Queensland Pittosporum	A,B	M	15-35'	-25'	E	C,IV,D-22
<i>P. undulatum</i>	Victorian Box	A,B-15	M	-25'	-25'	E	C,IV-22,X
<i>Platanus acerifolia</i>	London Plane Tree	A,B-15	L	40-80'	30-40'	D	C,IV,D-22
<i>P. racemosa</i>	California Sycamore	B	L	50-100'	50-100'	D	C,IV,D-12,21,22,23
<i>Podocarpus gracilior</i>	Fern Pine	B	M	-60'	-60'	E	C,IV,D-16,22
<i>P. macrophyllus</i>	Yew Pine	B	M	-50'	-45'	E	C,IV,D-16,22
<i>Populus fremontii</i>	Fremont Cottonwood	B	M	40-60'	40-60'	D	C,IV,V-12,21,22,23
<i>Prosopis chilensis</i>	Chilean Mesquite	B	L	30-50'	30-50'	E/D	C,IV,D-10,23
<i>P. glandulosa</i>	Honey Mesquite	A,B-15	L,VL	25-30'	25-30'	D	C,IV,D-5,7,21,22,23
<i>Prunus cerasifera 'Atropurpurea'</i>	Purple-leaf Plum	A,B-10	M,L	25'	25'	D	C,IV,D-10,11,22
<i>P. ilicifolia</i>	Hollyleaf Cherry	A,B-15	L,VL	15-30'	15-30'	E	C,IV,D-7,11,12,16,23

TREES cont'd

BOTANICAL NAME	COMMON NAME	ZONE	WATER NEEDS	HEIGHT FT	SPREAD FT	E/D	GEOGRAPHICAL AREA-COMMENTS
<i>P. lyonii</i>	Catalina Cherry	A,B-15	L,VL	20-45'	30'+	E	C,IV,D-7,11,12,16,23
<i>Punica granatum</i>	Pomegranate	A,B-10	L	12-18'	-20'	D	C,IV,D-7,11,20
<i>Pyrus calleryana</i> & cultivars	Ornamental Pear	A,B-15	M	varies	varies	D	C,IV,D-10
<i>P. Kawakamii</i>	Evergreen Pear	A,B-10	M	15-30'	15-30'	E,D	C,IV,D-10
<i>Quercus agrifolia</i>	Coast Live Oak	B-30	L,VL	30-70'	70'+	E	C,IV,D-6,12,23
<i>Q. chrysolepis</i>	Canyon Live Oak	B-30	M,L	30-60'	20-60'	E	C,IV-6,12,36
<i>Q. douglasii</i>	Blue Oak	B-30	M	50'	50+	D	C,IV,D-6,12,23
<i>Q. engelmannii</i>	Engelmann Oak	B-30	I	60'	60+	E	IV,D-6,12,33,23
<i>Q. ilex</i>	Holly Oak	B-30	M	40-70'	40-70'	E	C,IV,D-6,23
<i>Q. kelloggii</i>	California Black Oak	B	M	30-80'	-60'	D	IV-6,12,23
<i>Q. lobata</i>	Valley Oak	B-30	L,VL	70'+	70'+	D	C,IV-6,12,23
<i>Q. palustris</i>	Pin Oak	B-30	M	50-80'	5-70'	D	C,IV,D-6,22,23
<i>Q. rubra</i>	Red Oak	B-30	M	60-75'	50'	D	C,IV,D-6,23
<i>Q. suber</i>	Cork Oak	B-30	M	70-100'	-100'	E	C,IV,D-6,23
<i>Q. virginiana</i>	Southern Live Oak	B-30	M,L	60'	100'	E/D	C,IV,D-22
<i>Q. wislizenii</i>	Interior Live Oak	B	M,L	30-75'	75'+	E	IV,D-6,12,23
<i>Rhus lancea</i>	African Sumac	A,B-15	L	20-30'	20-30'	E	C,IV,D-20,22
<i>Robinia ambigua</i>	Locust	B	M,L	30-50'	-30'	D	IV,D-1,7,10,22
<i>R. pseudoacacia</i>	Black Locust	B	L	-75'	30-40'	D	IV,D-1,5,7,10,20,22,X
<i>Sapium sebiferum</i>	Chinese Tallow Tree	B	M	-35'	-35'	D	IV,D-22,X
<i>Schefflera actinophylla</i>	Queensland Umbrella Tree	A,B	H,M	20'+	20'+	E	C-3,8,18
<i>S. pueckleri</i>	Tupidanthus	A,B	H,M	20'+	20'+	E	C-3,8,18
<i>Sophora japonica</i>	Japanese Pagoda Tree	B	M	30-50'	30-50'	D	C,IV,D-22
<i>Stenocarpus sinuatus</i>	Firewheel Tree	A,B-10	M	30'	15'+	E	C,IV-6,10,22
<i>Syagrus romanzoffianum</i>	Queen Palm	A,B	M	50'	-20'	E	C,IV-15
<i>Tabebuia chrysotricha</i>	Golden Trumpet Tree	B	M	25-30'	-30'	E	C,IV-6,10,22
<i>T. impetiginosa</i>	Pink Trumpet Tree	B	M	35'	-30'	E	C,IV-6,10,22
<i>Taxodium mucronatum</i>	Montezuma Cypress	B	H-L	75'	35'	E/D	C,IV-22
<i>Tipuana tipu</i>	Tipu Tree	B	M	-50'	-50'	D	C,IV-10,22
<i>Trachycarpus fortunei</i>	Windmill Palm	A,B	M	-30'	-6'	E	C,IV,D-15
<i>Tristania conferta</i>	Brisbane Box	A,B-15	L,VL	30-60'	-40'	E	C,IV-22
<i>Ulmus parvifolia</i>	Chinese Elm	B-30	M,L	40-60'	50-70'	E/D	C,IV,D-22,X
<i>Umbellularia californica</i>	California Bay	B	L,VL	30-75'	30-75'	E	C,IV,D-5,12,23
<i>Washingtonia filifera</i>	California Fan Palm	B-30	M-VL	60'	20'	E	C,IV,D-3,7,10,12,15,21,X
<i>Zelkova serrata</i>	Sawleaf Zelkova	B	M	60'	60'	D	C,IV,D-22
<i>Ziziphus jujuba</i>	Chinese Jujube	A,B-15	M,L	20-30'	20-30'	D	C,IV,D-11,20,22

INTENTIONALLY LEFT BLANK