

**FIRE PROTECTION PLAN**  
**VESTING TENTATIVE TRACT MAP**  
**NO. 070038**

**City of Malibu, California**

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### 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.

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### 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

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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

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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 1/10<sup>th</sup> 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.

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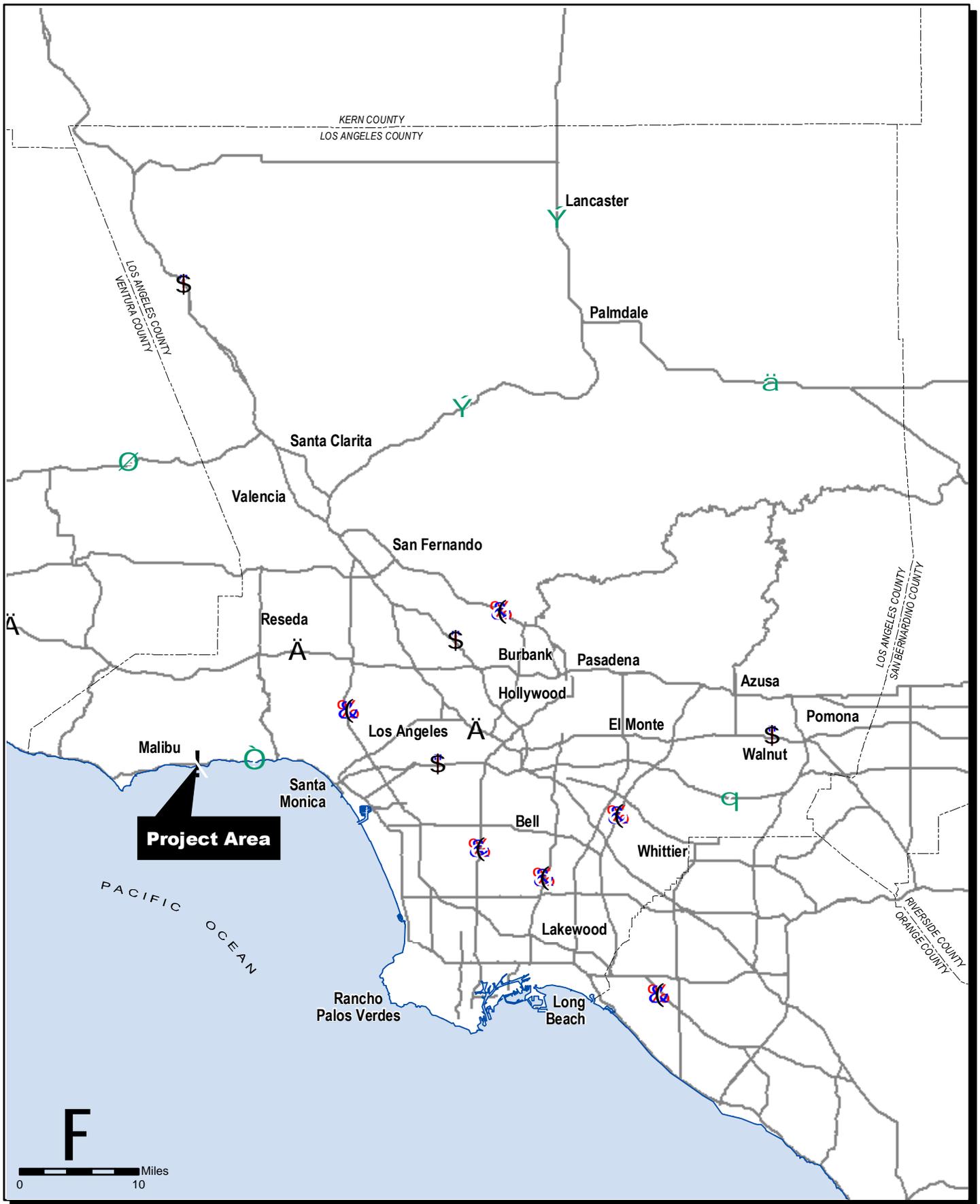
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The topographic alignment of the Project Site and regional topographic conditions of the area can have considerable effect on wildland fire behavior and on the ability of fire fighters to suppress those fires. Slope and canyon alignments on site are 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.

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### 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.

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**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%
<b>Total</b>	<b>23.87</b>	<b>100.00%</b>

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

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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)<sup>1</sup>, 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.

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<sup>1</sup> 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.

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### 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

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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.

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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.

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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.

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### *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 <sup>th</sup> Percentile (Onshore Flow)	97 <sup>th</sup> 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

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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)
<b>Scenario 1: Non-native grasslands on bluff top, slopes at 15%</b>			
On-shore (50 <sup>th</sup> Percentile)	3.1	52.9	0.1
Santa Ana (97 <sup>th</sup> Percentile)	8.6	379.6	0.5
Santa Ana (97 <sup>th</sup> percentile w/ 50mph winds)	8.6	379.6	0.8
<b>Scenario 2: Mixed sage scrub along Pacific Coast Highway, slopes at 50%</b>			
On-shore (50 <sup>th</sup> Percentile)	15.1	39.6	0.3
Santa Ana (97 <sup>th</sup> Percentile)	31.5	160.4	1.3
Santa Ana (97 <sup>th</sup> percentile w/ 50mph winds)	39.4	260.2	2.2
<b>Scenario 3: Coastal sage chaparral scrub on slopes in southern portion of property, slopes at 40%</b>			
On-shore (50 <sup>th</sup> Percentile)	12.2	52.8	0.3
Santa Ana (97 <sup>th</sup> Percentile)	30.9	330.9	1.3
Santa Ana (97 <sup>th</sup> 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*

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*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).

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

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

CLAFLD 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 CLAFLD calls within their jurisdiction, based on 2006 data (County of Los Angeles 2008).

- Total population served by CLAFLD: 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.

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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 CLAFD 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 CLAFD 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

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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.

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- Plants in this zone shall be highly fire resistant and selected from the updated CLAFD 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 CLAFD 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 CLAFD Plant List included in Appendix F. Other species may be utilized subject to approval.
- Plant spacing in this zone shall be in accordance with CLAFD 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 CLAFD 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.

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- 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

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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

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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

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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.

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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

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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).

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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 barbecues and grills, shall have spark arrestors of a type approved by the CLAFD. Spark arrestor openings shall be a maximum 0.5 inch.

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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

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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.

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- 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

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- 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 CLA FD 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 CLA FD.
- 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 CLA FD 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 CLA FD 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

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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.

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### 9.0 REFERENCES CITED

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**APPENDIX A**  
*Site Photographs*

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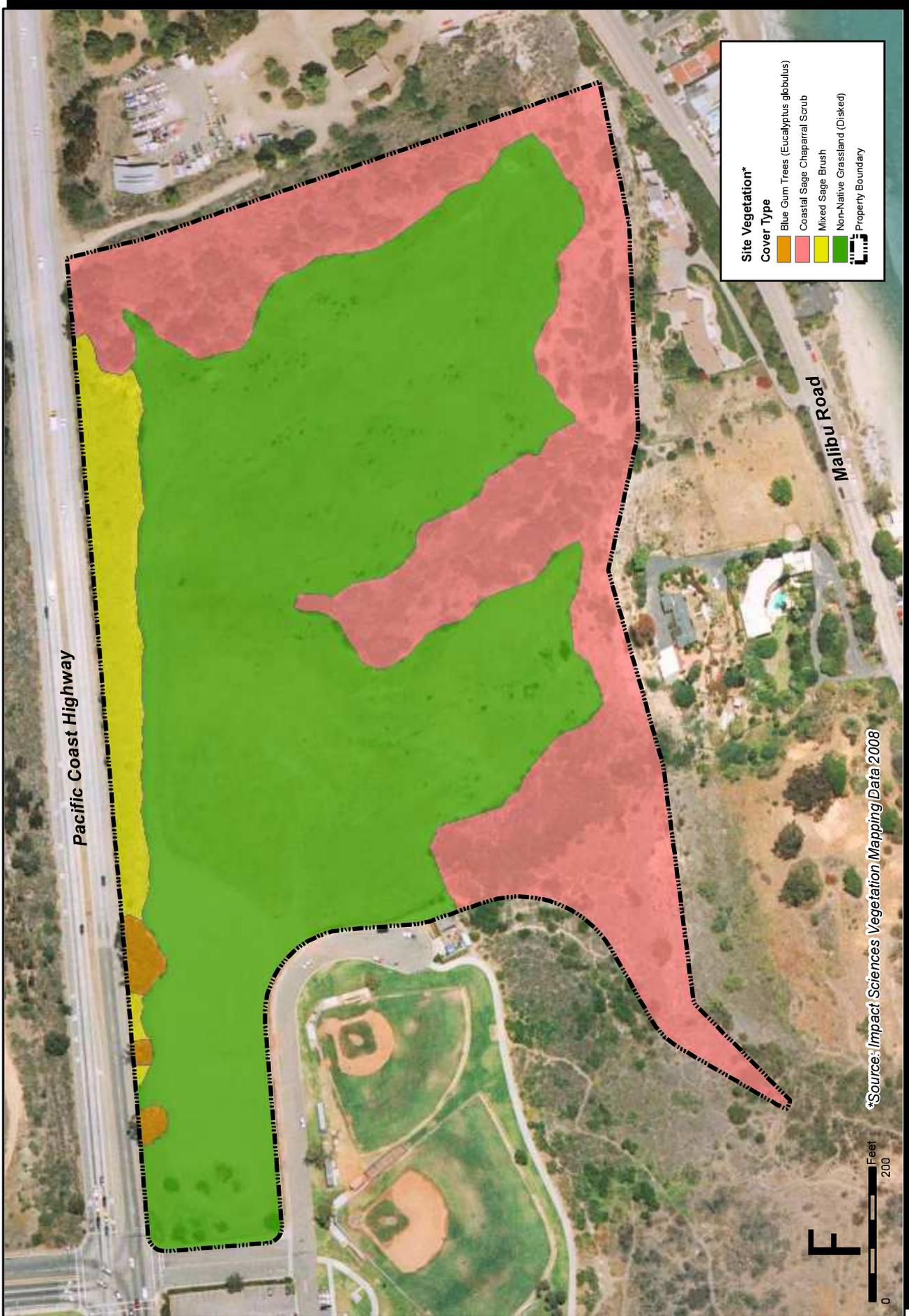
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**APPENDIX B**  
*Site Vegetation Map*

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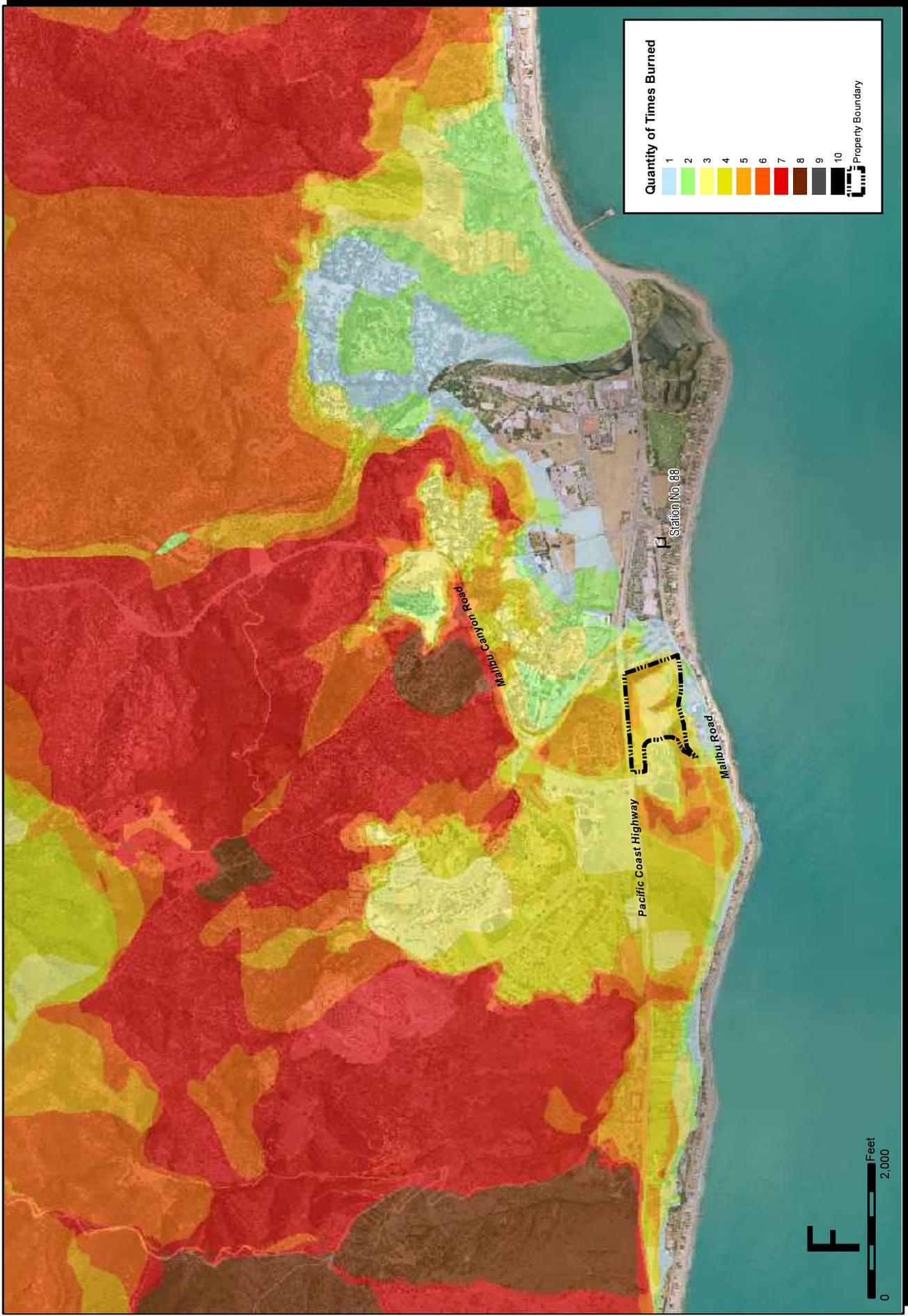
Fire Protection Plan - VTTM 070038  
**Site Vegetation Map**

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# **APPENDIX C**

## *Fire History Exhibit*

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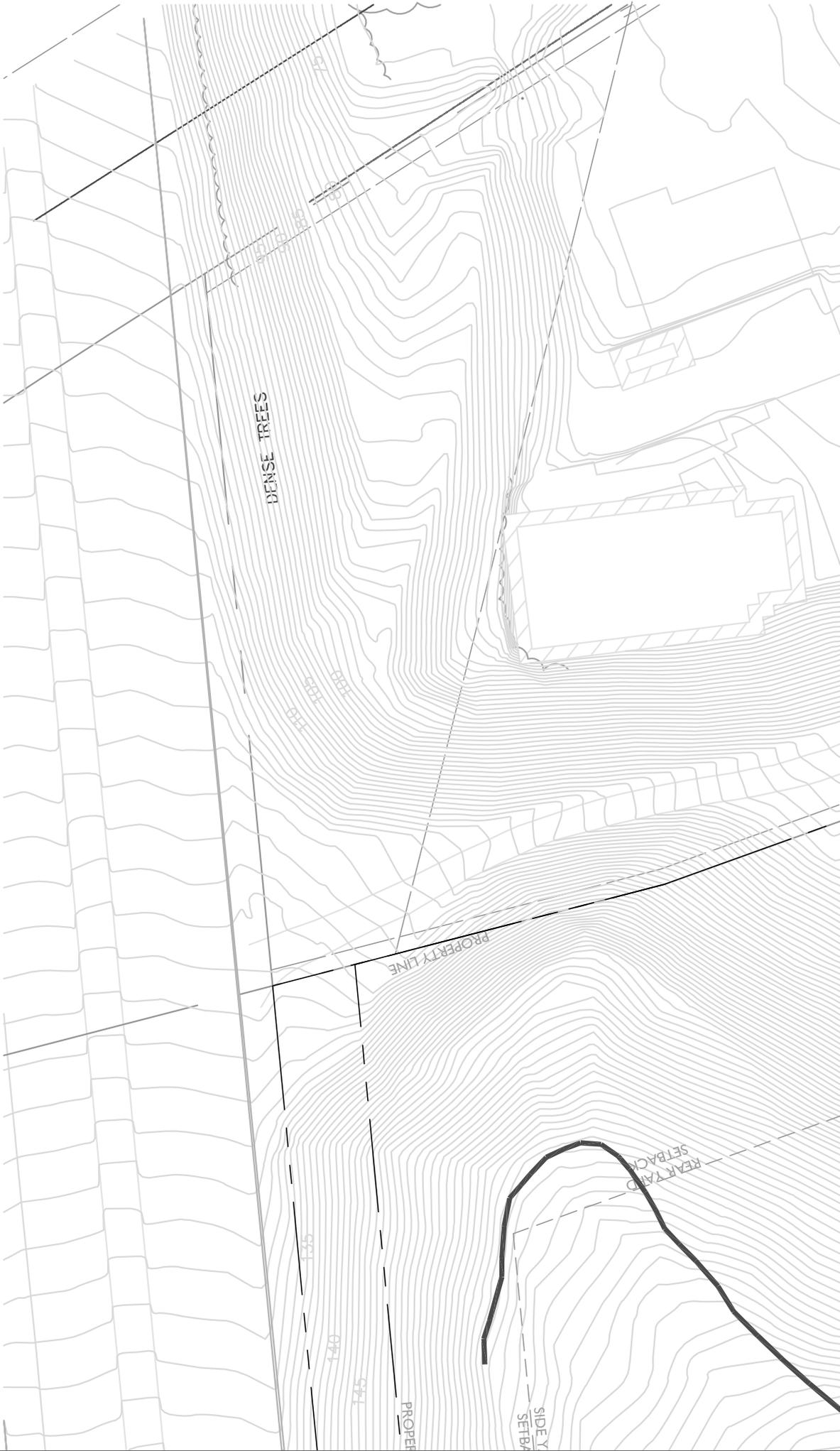


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# **APPENDIX D**

## *Project Site Plan*

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LANDRY DESIGN GROUP



12.02.08

