BEAR VALLEY PARKWAY
FIRE PROTECTION PLAN
APN Nos. 237-131-01 and -02

Prepared for:

Escondido Fire Department

On behalf of Applicant:

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EXECUTIVE SUMMARY

The Bear Valley Parkway Project is a proposed private residential development located on two parcels encompassing 40.9 acres within the City of Escondido, California. The project is generally located in southeastern Escondido, generally 1.5 miles east of Interstate 15, and south of State Route 78 (SR-78)/San Pasqual Valley Road. More specifically, the Project is located at 661 Bear Valley Parkway. The entrance to the Bear Valley Parkway project site will be located in the northwestern portion of the project site off Bear Valley Parkway and across from Zlatibor Ranch Road. The proposed development will include:

- A total of 55 single-family home lots
- "open space" lots on the southern portion of the residential development
- residential streets, driveways, fire hydrants, and associated infrastructure
- primary ingress/egress off of Bear Valley Parkway with secondary ingress/egress from Private Street "A" onto Bear Valley Parkway for 41 lots in the southern portion of the development
- Fuel Modification Zone designated on lots adjacent to open space

The Bear Valley Parkway property lies within an area statutorily designated a Local Responsibility Area (LRA) "High Fire Hazard Severity Zone (HFHSZ)," by Escondido Fire Department and CAL FIRE. Fire hazard designations are based on topography, vegetation, and weather, amongst other factors, with more hazardous sites including steep terrain, unmaintained fuels/vegetation, and wildland urban interface locations. The nearest open space areas that include very high fire hazard severity designation occur east of the site towards the San Pasqual Valley area. The site is surrounded on three sides by existing, estate-type neighborhoods, a vacant parcel to the east, and a narrow strip of oak riparian forest (preserved open space) to the south. The site is currently undeveloped, disturbed and dominated by past agricultural use as an avocado orchard. One occupied residence is located in the middle of the site. The terrain on, and within the vicinity of the project, is characterized by flat to gently rolling land, with the steepest gradients reaching approximately 16%. The area, like all of San Diego County, is subject to seasonal weather conditions that can heighten the likelihood of fire ignition and spread, however, considering the site's terrain and vegetation, would be expected to result in primarily a low- to moderate-intensity wildfire.

The project site is technically within the jurisdiction of the Escondido Fire Department (EFD) and is situated in the upper section of Service Area District 4. The EFD operates four fire stations that could respond to an incident on the site in under 7 minutes travel time, and one (Station 4) that is within 4.19 minutes of the site. In addition, automatic/mutual aid agreements are in place with neighboring fire agencies to augment response, especially at the fringe area of EFD's jurisdiction.

The project will be constructed to the ignition resistant code requirements of the 2013 California Fire and Building (Chapter 7-A) Codes as amended by the City of Escondido (Chapters 6 and 11 of the Escondido Municipal Code; Ordinance No. 2013-13). Construction shall include enhanced ignition resistant features, automatic interior sprinklers, conforming fire flow and water capacity, roads, supporting infrastructure, and fuel modification areas, as well as additional fire protection features above and beyond the requirements where they are expected to compensate for lots where a 30-foot structure setback for a two-story home cannot be achieved.

1 INTRODUCTION

This Fire Protection Plan (FPP) has been prepared for the proposed Bear Valley Parkway project in the City of Escondido, California. The purpose of the FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those impacts. As part of the assessment, this plan has considered the fire risk presented by the site including: property location and topography, geology (soils and slopes), combustible vegetation (fuel types), climatic conditions, fire history and the proposed land use and configuration. This FPP addresses water supply, access (including secondary/emergency access), structural ignitability and ignition resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management. The plan identifies fuel modification/management zones and recommends the types and methods of treatment that will protect this project and its essential infrastructure. The FPP recommends measures that property owners will take to reduce the probability of structural ignition throughout the project.

This FPP is consistent with the City of Escondido Fire Code (Municipal Code Chapter 11, Article 2; Ordinance No. 2013-13), and Building Code (Municipal Code Chapter 6, Article 3). Further, it is consistent with the California Code of Regulations Titles 14 and 24 and 2013 State Fire and Building Codes. The purpose of this plan is to generate and memorialize the fire safety requirements of the Fire Authority Having Jurisdiction (FAHJ), namely the Escondido Fire Department (EFD). Requirements are based on site-specific characteristics and incorporate input from the project developer (Jack Henthorn and Associates on behalf of Spieth-Wohlford Inc.), project planners, engineers, biologists, architects, and the EFD.

1.1 Project Summary

1.1.1 Location

The Bear Valley Parkway project site consists of approximately 40.9 acres in the City of Escondido, San Diego County, California. It is located in a rural part of southeast Escondido, approximately 1.5 miles east of Interstate 15 (I-15) and south of State Route 78 (SR-78)/San Pasqual Valley Road (Figure 1). More specifically, the project site resides at 661 Bear Valley Parkway near Zlatibor Ranch Road. The site is bordered on the west by Bear Valley Parkway S., on the east by Choya Canyon Road, and on the south by Valley Grove Lane. The Project Area is situated in the U.S. Geological Survey (USGS) 7.5 minute Escondido quadrangle map in section 26, Township 12 South, and Range 2 West.

The project site consists of the following Assessor Parcel Numbers (APNs): 237-131-01-00 (tear drop shape parcel) and 237-131-02-00 (parcel northwest of Bear Valley Parkway).

The property lies within a LRA HFHSZ area as statutorily designated by the EFD in cooperation with CAL FIRE (CAL FIRE 2014).

1.1.2 Project Description

The project consists of a proposed subdivision of 40.9 acres into 55 residential lots, each containing a minimum of 10,000 square feet (Figure 2). In addition to the residential lots, the project proposes two private street lots, seven open space lots and one recreation lot. Private open space will occupy 19.47 acres. The open space lots will include any necessary mitigation areas related to upland or wetland habitat. Two drainage basins are proposed at the entry location and next to the proposed main recreation area.

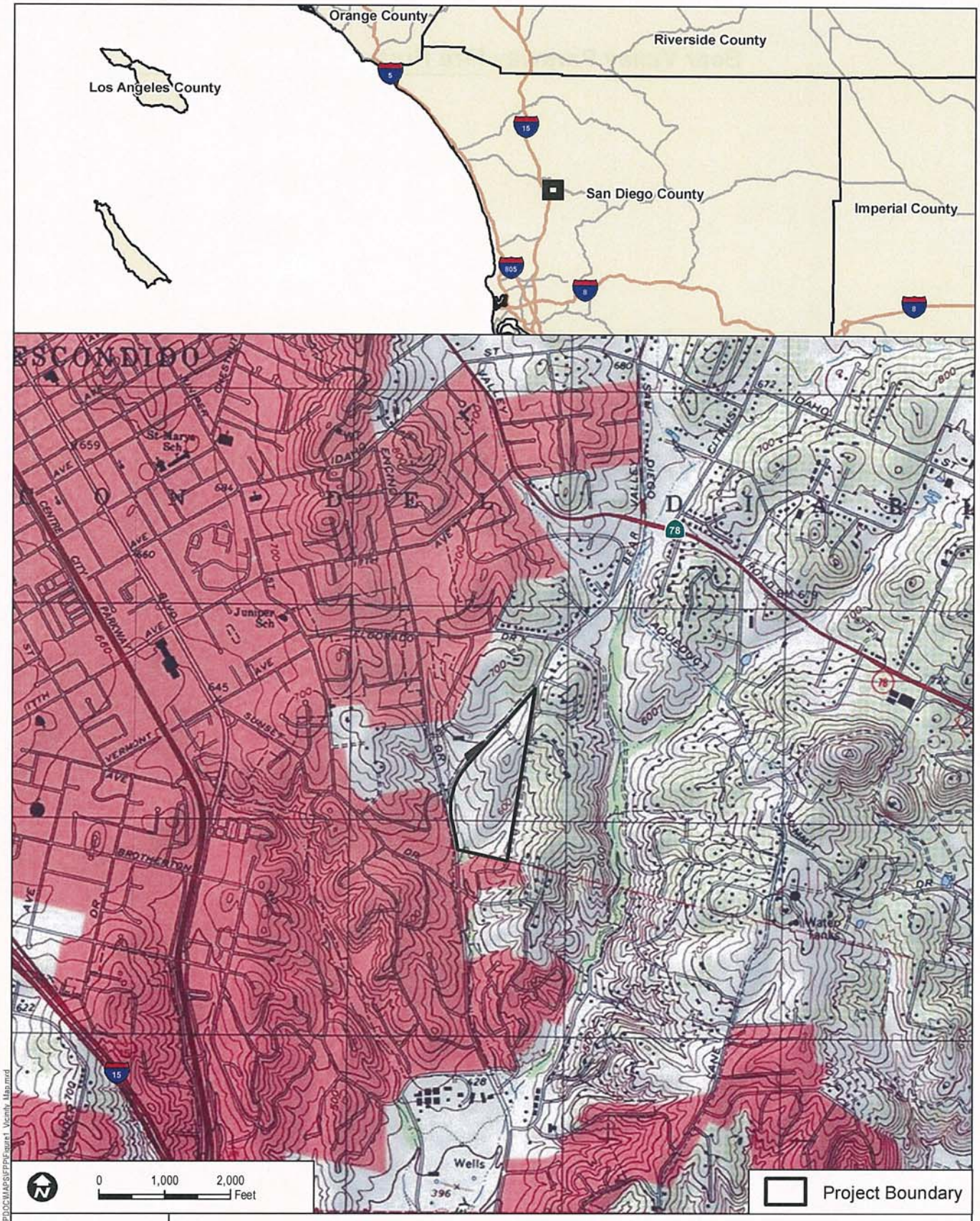
A park will be constructed near the secondary access point. Pedestrian linkages will be via non-curb adjacent private streets where walkways are separated from vehicle traffic by privately maintained parkways. This system will tie into the public Bear Valley Parkway sidewalk system.

The project will take access from Bear Valley Parkway at the intersection of Zlatibor Ranch Road and Bear Valley Parkway. A secondary, gated emergency ingress and egress will be provided south of the primary access and north of the intersection of Bear Valley Parkway and Encino Drive. The project includes frontage right-of-way (ROW) dedication to complete a road widening to from the center line of existing Bear Valley Parkway (51 feet total) ROW. In addition the project will be obligated to construct frontage improvements along Bear Valley Parkway consisting of curb, gutter, side walk, parkway, bike lane and one full travel lane with transitions that will tie into existing improvements. A portion of these frontage improvements are located off-site of the subject property.

1.1.3 Environmental Setting

Dudek conducted a site evaluation on January 20, 2015. The site inspection included:

- Topography evaluation
- Vegetation/fuel assessments
- Existing infrastructure evaluations
- Documentation of the existing condition
- Off-site, adjacent property fuel and topography conditions
- Surrounding land use confirmations
- Necessary fire behavior modeling data collection



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SOURCE: USGS 7.5-Minute Series Escondido Quadrangle.

FIGURE 1
Vicinity Map

Bear Valley Parkway FPP

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SOURCE: Hunsaker 2015; Bing 2015

FIGURE 2

Project Site Plan

Bear Valley Parkway FPP

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1.1.3.1 Topography

The Bear Valley Parkway project site consists of relatively flat to gentle slopes with gradients less than 16%. The slopes throughout the project site previously supported an avocado grove. Much of the site is traversable on dirt roads that provided access to the avocado grove. Elevations on the site range from approximately 590 feet above mean sea level (AMSL) to 680 feet AMSL at the top of the hill. An unnamed intermittent stream channel runs north to south through the western portion of the project site.

1.1.3.2 Fuels

Vegetative fuels on site are primarily disturbed or developed land, although smaller pockets of southern coast live oak riparian forest and disturbed southern cactus scrub are present (Dudek, 2015). The area proposed for development and within the project grading limits will be converted to roads, structures, and landscaped vegetation following project completion. There are currently no vegetative fuels within proposed fuel modification zones. These areas were disturbed by grove removal resulting in the growth of very few native perennials. Areas outside of proposed development and fuel modification zones can be classified primarily as ornamental landscaping on adjacent properties or vacant parcels that have been maintained per the City's vegetation clearance standards. Appendix A provides photographs of the site in its current, undeveloped condition as well as the off-site land uses. The acreage of each on-site vegetation community or land cover type is provided in Table 1 and illustrated in Figure 3.

Table 1
Vegetation Communities and Land Covers

Habitat Type	Existing Acres
Wetlands/Riparian Areas	
Southern Coast Live Oak Riparian Forest	3.39
Non-native Riparian	0.13
Upland	
Disturbed Southern Cactus Scrub	0.17
Other Land Covers	
Disturbed Habitat	0.55
Developed Land	36.67
Total	**40.90**

1.1.3.3 Fuel Loads

The vegetation described above translates to fuel models used for fire behavior modeling, discussed in Chapter 3 of this FPP. Variations in vegetative cover type and species composition

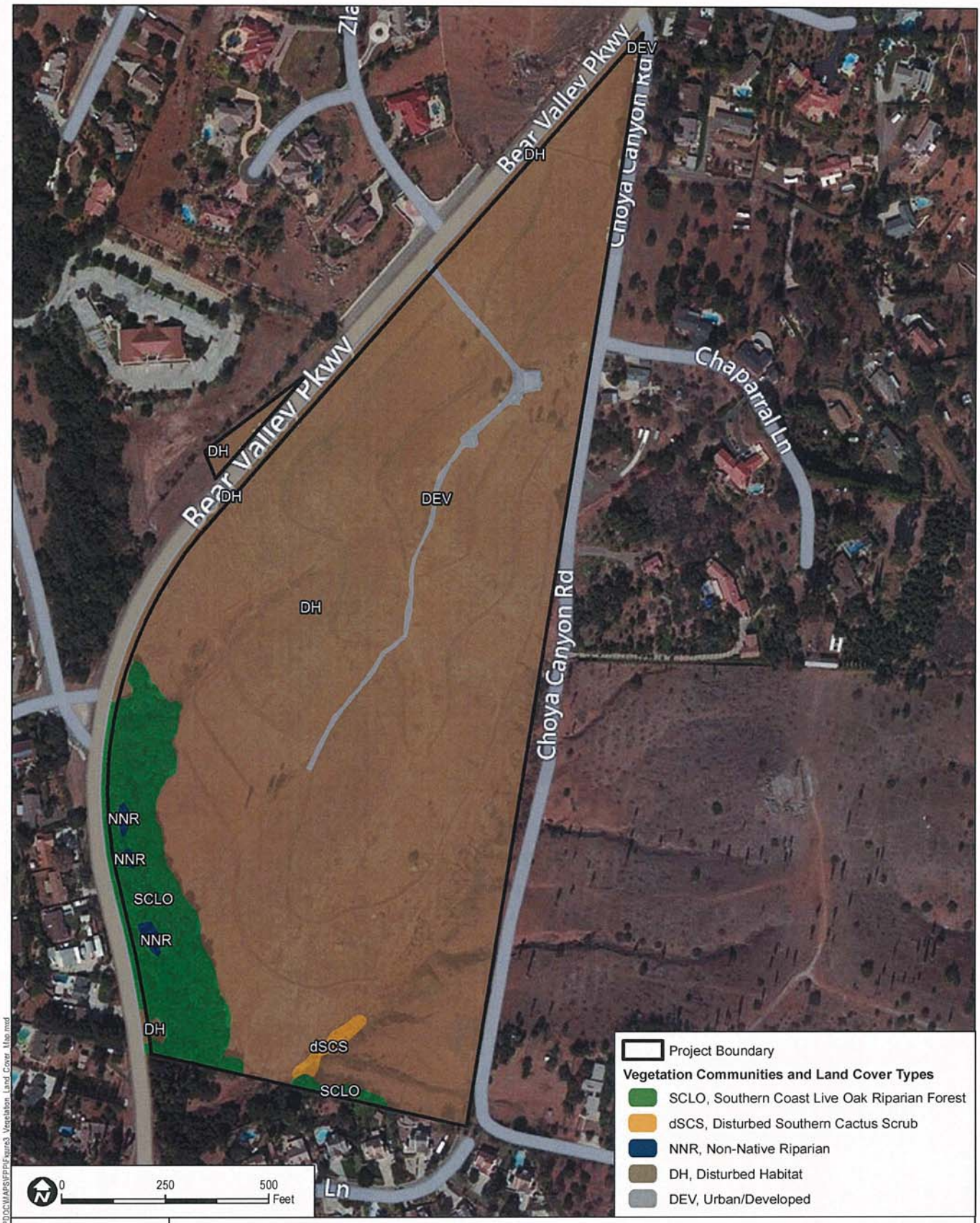
have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (leaf size, branching patterns), and overall fuel loading. For example, the native shrub species that compose the sage scrub plant communities on site are considered to exhibit higher potential hazard based on such criteria.

The importance of vegetative cover on fire suppression efforts is its role in affecting fire behavior. For example, while fires burning in grasslands may exhibit lower flame lengths than those burning in sage scrub fuels, fire spread rates in grasslands are often much more rapid than those in other vegetation types. Fine fuel loading for oak riparian forest areas is estimated at 9.0 tons/acre whereas the disturbed habitats are less than .1 ton/acre.

1.1.3.4 Fire History

Fire history is an important component of a Project FPP. Fire history information can provide an understanding of fire frequency, fire type, most vulnerable project areas, and significant ignition sources, amongst others. Fire frequency, behavior, and ignition sources are important for fire response and planning purposes. One important use for this information is as a tool for pre-planning. It is advantageous to know which areas may have burned recently and, therefore, may provide a tactical defense position, what type of fire burned on the site, and how a fire may spread. According to available data from CAL FIRE's Fire and Resource Assessment Program (CAL FIRE 2014), numerous fires have burned in the vicinity of the project site since the beginning of the historical fire data record (Appendix B). These fires, occurring in 1955, 1967, 1972, 1974, 1980, 1987, 1988, 1993, and 2007 burned within 3 miles of the project site. No fires in the recorded history have burned across the project site. The 2007 Witch Fire, which burned approximately 1.0 mile to the south and east of the project site, was the most recent, and largest wildfire in the vicinity of the project, with a total burned area of over 160,000 acres.

Based on an analysis of this fire history data set, specifically the years in which the fires burned, the average interval between wildfires burning within a 3-mile radius of the project site was calculated to be six years with intervals ranging between 0 (multiple fires in the same year) and 14 years. Based on this analysis, along with the changes in the immediate surrounding area over the last few decades that resulted in conversion of fuels to lower flammability rural-suburban development, the area is not expected to be subject to regular, wide-spread wildfire, but may include smaller fires during typical weather conditions and has the potential for larger wildfires during extreme weather conditions. Based on fire history, wildfire risk for the project site is associated primarily with a Santa Ana wind-driven wildfire burning or spotting onto the site from the east, although a fire approaching from the west during more typical on-shore weather patterns is possible.



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SOURCE: BING 2015

FIGURE 3

Vegetation and Land Cover Map

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Bear Valley Parkway FPP

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1.1.3.5 Climate

North San Diego County and the project area are influenced by the Pacific Ocean and are frequently under the influence of a seasonal, migratory subtropical high pressure cell known as the "Pacific High." Wet winters and dry summers with mild seasonal changes characterize the Southern California climate. This climate pattern is occasionally interrupted by extreme periods of hot weather, winter storms, or dry, easterly Santa Ana winds. The average high temperature for the project area is approximately 70°F, with daily highs in the summer and early fall months (July–October) exceeding 95°F. Precipitation typically occurs between November and March.

The prevailing wind pattern is from the west (on-shore), but the presence of the Pacific Ocean causes a diurnal wind pattern known as the land/sea breeze system. During the day, winds are from the west–southwest (sea) and at night winds are from the northeast (land), averaging 2 miles per hour (mph). During the summer season, the diurnal winds may average slightly higher (approximately 16 mph) than the winds during the winter season due to greater pressure gradient forces. Surface winds can also be influenced locally by topography and slope variations. The highest wind velocities are associated with downslope, canyon, and Santa Ana winds.

Typically the highest fire danger is produced by the high-pressure systems that occur in the Great Basin, which result in the Santa Ana winds of Southern California. Sustained wind speeds recorded during recent major fires in San Diego County exceeded 30 mph and may exceed 50 mph during extreme conditions. The Santa Ana wind conditions are a reversal of the prevailing southwesterly winds that usually occur on a region-wide basis during late summer and early fall. Santa Ana winds are warm winds that flow from the higher desert elevations in the north through the mountain passes and canyons. As they converge through the canyons, their velocities increase. Consequently, peak velocities are highest at the mouths of canyons and dissipate as they spread across valley floors. Santa Ana winds generally coincide with the regional drought period and the period of highest fire danger. The Bear Valley Parkway site is affected by strong winds, such as Santa Anas.

1.1.3.6 Current Land Use

The majority of the Project area was once an avocado orchard. The orchard was removed at some point and is now considered disturbed habitat. There is one residence on site in the central portion of the property that is currently occupied. A power line runs along the western edge of the property from Encino Drive up to Choya Canyon Road and northward. An on-site paved road provides access to the residence with numerous dirt roads traversing the hillside that in the past provided access to the orchard. The remaining portions of the site are undeveloped.

1.1.3.7 Proposed Land Use

The Bear Valley Parkway project proposes to construct a 55-lot, residential development on approximately 40.9 acres with a park near the proposed secondary access point. As indicated in Figure 2, private streets will provide access to the development areas. In addition to the 55 individual single-family residential lots, the project will include lots dedicated to private streets, open space, and maintained fuel modification zones by the project Homeowners Association (HOA). The project, as proposed, will also include:

- Primary access road extending from Bear Valley Parkway into the property
- Emergency ingress/egress route south of the primary access road t and north of the intersection of Bear Valley Parkway and Encino Drive.
- 19.47 acres designated to remain as private open space lands

The proposed improvements described above would be completed according to the City of Escondido Fire and Building code standards in effect at the time of building plan submittal and would include ignition-resistive construction, residential fire sprinkler systems, structure setbacks, required fire flow, and a designated fuel modification area, among other requirements as described further in this FPP.

2 DETERMINATION OF PROJECT EFFECTS

FPPs provide an evaluation of the adverse environmental effects a proposed project may have from wildland fire. The FPP must provide mitigation for identified impacts to ensure that development projects do not unnecessarily expose people or structures to a significant loss, injury or death involving wildland fires. Significance is determined by answering the following guidelines:

Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The wildland fire risk in the vicinity of the Project site has been analyzed and it has been determined that wildfires may occur in wildland areas to the east of the project site as well as potentially in the preserved on-site fuels in the southern portion of the property, but would not be significantly increased in frequency, duration, or size with the construction of the Project. The Project includes fire resistant landscaping, fuel modification areas, and ignition resistant structures. With the project, the site, which is currently dominated by flashy fuels, will be converted to ignition resistant landscapes.

The types of potential ignition sources that currently exist in the area include vehicle and roadway, electrical transmission line, and off-site residential neighborhoods. The project would introduce potential ignition sources, but would include better access throughout the site, managed and maintained landscapes, more eyes and ears on the ground, and generally a reduction in the receptiveness of the area's landscape to ignition. Fires from off-site would not have the same spread potential due to a lack of continuous fuels across this site and would therefore be expected to burn around and/or over the site via spotting.

Preserved riparian vegetation to the southwest of the project is typically well hydrated and the types of plants/trees are more resistive to ignition. However, these fuels can ignite and burn during extreme conditions. Burning vegetation embers may land on Project structures, but are not likely to result in ignition based on ember decay rates and the types of non-combustible and ignition resistant materials that will be used on site. The Project would comply with applicable fire and building codes and would include a layered fire protection system designed to current codes and inclusive of site-specific measures that will result in a Project that is less susceptible to wildfire than surrounding landscapes and that would facilitate fire fighter and medical aid response.

Would the project result in inadequate emergency access?

The Project includes fire access throughout the neighborhood and is consistent with the Escondido Fire Code. Fire apparatus access throughout the development will include 36-foot-wide roads. Fire access on the Project site will be improved from its current condition, which provides only limited access on dirt/gravel roads. The on-site roadways include dead ends that are inclusive of cul-de-sacs meeting fire department requirements. In addition, emergency access is provided at a remote location from the primary access, and strategically enables faster egress for residents or ingress for responders from Fire Station 4, which is roughly two miles from this site. Roads will conform with surface, width, turning radius, and vertical clearance Code requirements for emergency access. Therefore, emergency access is considered adequate for this site.

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance service ratios, response times or other performance objectives for fire protection?

The Project is projected to add an estimated fewer than 16 calls per year to the Escondido Fire Department's existing call load. The primary response (first in) would be provided by Station 4, which ran 968 calls in 2014. The addition of 16 calls/year (1.3 calls per month, 0.31 call per week,) to an urban fire station that currently responds to approximately 81 calls per month (19 calls per week, 3 calls per day) is considered less than significant and will not require the construction of additional Fire Station facilities based on that increase alone. For perspective, urban fire stations that respond to five calls per day are considered average and 10 calls per day would be considered a busy station. A portion of the project's parcel tax revenue will be allocated to fire protection, which can be used to maintain current levels of protection without impacting existing citizens.

Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

The project is within the City of Escondido's Water Service Area and sufficient water supplies will be available to serve the project from existing entitlements and resources. The Water Division requires new development within HFHSZ area to meet 2,500 gpm fire flow. The pressures in the development will remain above 20 psi for a minimum 2 hour duration when meeting the fire requirements for the water service area.. The measures described in the responses to these significance questions are provided more detail in the following sections.

3 ANTICIPATED FIRE BEHAVIOR

3.1 Fire Behavior Modeling

Following field data collection efforts and available data analysis, fire behavior modeling was conducted to document the type and intensity of fire that would be expected on or adjacent to the Bear Valley Parkway project site given characteristic site features such as topography, vegetation, and weather. The BehavePlus 5.0.5. fire behavior modeling software package was utilized in evaluating anticipated fire behavior adjacent to proposed fuel modification zones for the entire project site. Results are provided below and a more detailed presentation of the BehavePlus analysis, including fuel moisture and weather input variables, is provided in Appendix C.

3.1.1 BehavePlus Fire Behavior Modeling Effort

Fuel Models are simply tools to help fire experts realistically estimate fire behavior for a vegetation type. Fuel models are selected by their vegetation type; fuel stratum most likely to carry the fire; and depth and compactness of the fuels. Fire behavior modeling was conducted for vegetative types that surround the proposed development. The vegetation types are represented primarily by three fuel models as shown in Table 2. Other fuel models may exist, but not at quantities that significantly influence fire behavior in and around the proposed development. Fuel models were selected from *Standard Fire Behavior Fuel Models: a Comprehensive Set for Use with Rothermel's Surface Fire Spread Model* (Scott and Burgan 2005).

Table 2
Bear Valley Parkway Fire Behavior Model Variables

Scenario	Weather	Fuel Model(s)	Slope	Aspect
1	Peak (Santa Ana)	Ornamental Vegetation (tu1)	14%	Northwest
2	Peak (Santa Ana)	Disturbed, sparse grasslands (gr1)	16%	West
3	Summer (On-shore)	Oak forest riparian/Ornamental vegetation (FM10, tu1)	3-10%	Flat/East

3.1.2 Fuel Model Results

Fire Behavior results derived from the BehavePlus modeling efforts are presented in Table 3 and in Figure 4. Three focused analyses (fire scenarios) were completed, each assuming worst-case fire weather conditions for a fire approaching the project site from the northeast or southwest. The site and adjacent areas were modeled as a Fuel Model *gr1* (Disturbed, sparse grasslands fuelbed), Fuel Model *FM 10* (Coastal live oak riparian forest fuelbed), and Fuel Model *tu1* (Ornamental vegetation fuelbed). This detailed analysis compared fire behavior outside the proposed development with outputs including flame length (feet), rate of spread (mph), and fireline intensity (BTU/ft/s).

Table 3
Oak Creek Community BehavePlus Fire Behavior Model Results

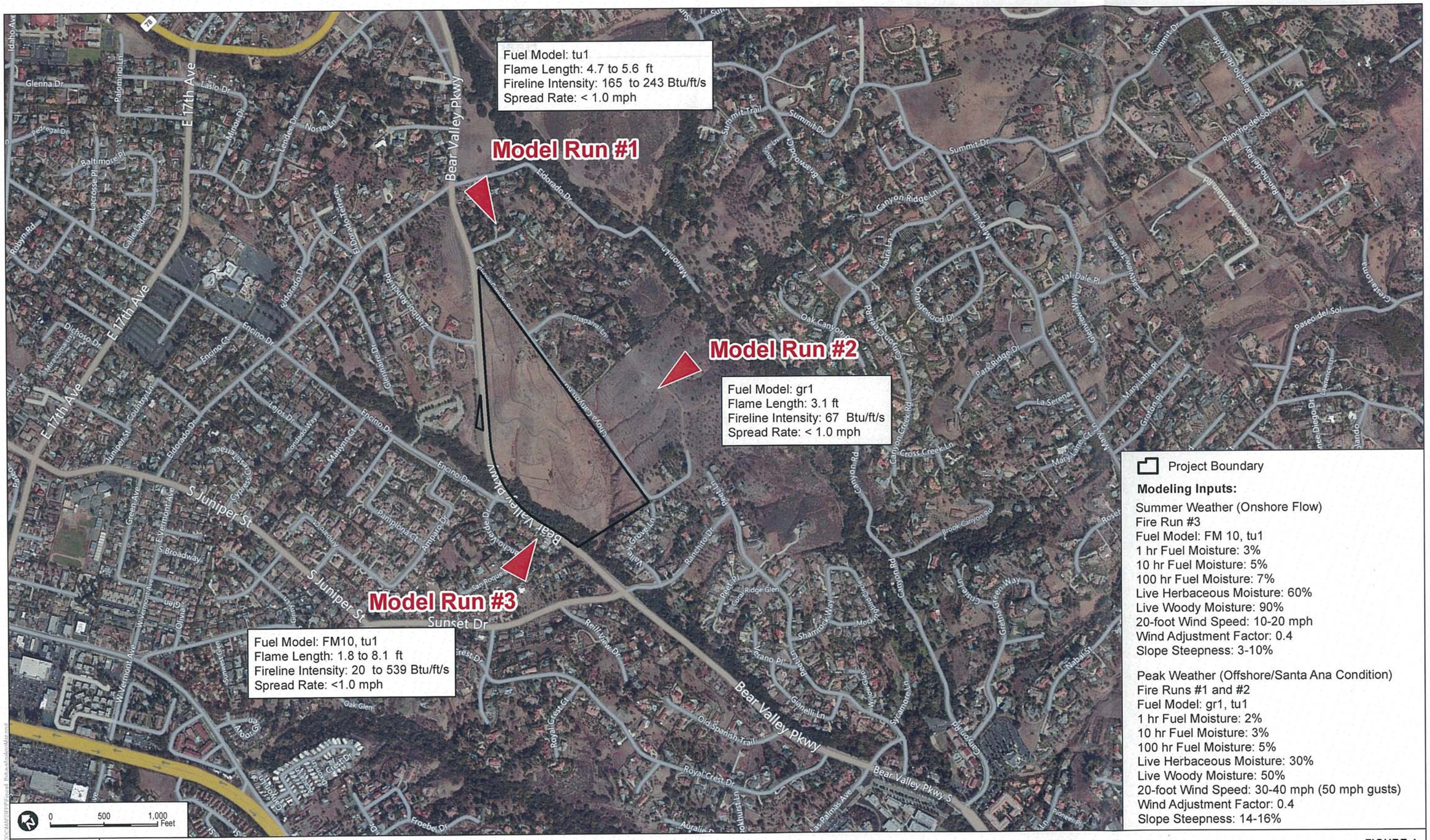
Model Run	Fuel Model(s)	Flame Length (feet)	Fireline Intensity (Btu/ft/s)	Surface Rate of Spread (mph)
1	tu1	4.7 to 5.6	165 to 243	< 1.0
2	gr1	3.1	67	< 1.0
3	FM 10, tu1	1.8 to 8.1	20 to 539	< 1.0

Based on the results of BehavePlus analysis, wildfires with the most fire intensity will occur during on-shore wind patterns and are expected to be of low to moderate severity with flames lengths of 8 feet and slow spread rates (less than 1.0 mph) due to higher fuel moisture content and reduced wind speeds. Even though grass fires can typically ignite or spread quickly, the grass fuelbed is routinely cut in height to reduce their fire potential.

The results presented in Table 3 depict values based on inputs to the BehavePlus software and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

3.2 On-Site Risk Assessment

Given the lack of wildfire on the site, the history of wildfire in the vicinity of the site, as well as the 2007 Witch Fire, that burned within 1.0 mile to the south and east of the Bear Valley Parkway site, combined with the flat terrain, post-project vegetation conversion, climate, potential ignition sources, and anticipated fire behavior, the project is not expected to be vulnerable to recurring wildfire ignition and spread, but may be subject to nearby wildfire that could, under worst case conditions, spread into preserve coast live oak riparian forest areas adjacent to southern portion of Project or from burning embers landing in receptive fuels. Fire is not expected to have readily ignitable fuels in the post-project landscape. Preserved riparian forest corridors on site will be predominantly oak woodland (southern drainage), well hydrated, inclusive of surface water, and generally more difficult to ignite. Should the riparian vegetation ignite, it would be expected to burn in a spotty manner due to the presence of heavy shading, higher humidity under canopy, and hydrated fuels.



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SOURCE: Bing Maps 2015

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Bear Valley Parkway FPP

FIGURE 4

Fire Behave Plus Analysis Map

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4 EMERGENCY RESPONSE AND SERVICE

4.1 Emergency Response

The project is located within the jurisdiction of the EFD Service Area District 4, and consequently, EFD provides initial response. The EFD operates four Fire Stations (Stations 1, 2, 4, and 5) that could respond within 7 minutes to an incident at the Bear Valley Parkway site, although primary response would be from Station 4, with the other stations responding as necessary. Table 4 presents a summary of the location, equipment, staffing levels, maximum travel distance, and travel time for the four EFD stations. Travel distances are derived from Google road data while travel times are calculated applying the nationally recognized Insurance Services Office (ISO) Public Protection Classification Program's Response Time Standard formula (T=0.65 + 1.7 D, where T= time and D = distance). The ISO response travel time formula discounts speed for intersections, vehicle deceleration and acceleration, and does not include turnout time.

Table 4
Escondido Fire Department Responding Stations Summary

Station	Location	Equipment	Staffing	Maximum Travel Distance*	Travel Time**
Station 1	310 Quince Escondido, CA 92029	Paramedic Engine Truck Company Brush Engine Ambulances (2)	27	3.5 mi.	6.7 min.
Station 2	421 North Midway Escondido, CA 92029	Paramedic Engine Brush Engine Ambulance	9	3.2 mi.	6.2 min.
Station 4	3301 Bear Valley Parkway, Escondido, CA 92029	Paramedic Engine Brush Engine	9	2.1 mi.	4.2 min.
Station 5	2319 Felicita Road, Escondido, CA 92029	Paramedic Engine Brush Engine Ambulance (June 2013)	15	3.4 mi.	6.4 min.

* Distance measured to most remote structure in development.
** Assumes travel time to the project entrance, an adjusted speed based on the ISO travel time formula, and does not include turnout time

Based on the Bear Valley Parkway site location in relation to existing EFD stations, travel time to the site for the first responding engine from Station 4 to the most remote structure (lot 27) of the Project is roughly 4.2 minutes. Secondary response would arrive within seven minutes from Stations 1, 2 and 5. All response calculations take into account the average speed and the time required for an apparatus to accelerate from a stop to the travel speed. Based on these calculations, emergencies within the project can be responded to according to Escondido's

threshold standard (average maximum initial response to priority Level One or Emergency type calls of no more than 7.5 minutes, a total of 90% of the time).That is, when dispatch (1.0 minute) and turnout time (1.3 minutes) are added to the 4.2 minutes for response from Station 4, the total response time is approximately 6.5 minutes for most of the site. The full-effective firefighting force is estimated to arrive within 8 to 9 minutes. Therefore, the project complies with the City's response time standards.

In addition, the City has a signed automatic aid agreement on first alarm or greater with all surrounding communities. The City is also part of both the San Diego County and State of California Master Mutual Aid Agreements.

4.2 Emergency Service Level

The EFD estimates approximately 13,389 total annual calls (Palmer 2015) and a City population of approximately 148,738 (SANDAG 2014). The per capita call volume is roughly 0.09 for City of Escondido. Based on the proposed development plans, the project's estimated 172 residents (assumes an average of 3.12 occupants per residence for this type of community (SANDAG 2014)) would generate roughly 16 calls per year (1.3 calls per month), most of which are expected to be medical-related calls.

Service level requirements are not expected to be significantly impacted with the increase of 16 calls per year for a station (EFD Station 4) that currently responds to roughly 3 calls per day (968 calls per year, 81 calls per month, 19 calls per week) in its primary service area. For reference, a station that responds to 5 calls per day in an urban setting is considered average and 10 calls per day is considered busy. Therefore, the project is not expected to cause a decline in EFD response times. The requirements described in this FPP are intended to aid firefighting personnel and minimize the demand placed on the existing emergency service system.

4.3 Cumulative Impacts on Fire Response

Cumulative impacts from multiple projects can cause fire response service decline and must be analyzed for each project. The Bear Valley Parkway project and its proposed usage by up to 172 residents represents an increase in potential service demand of approximately 16 calls per year, well within the capacity of the existing Fire Stations that will service the project. However, this total adds to an existing busy service obligation for Station 4 and, when considered cumulatively, the impact is considered potentially significant, but mitigated through increased funding available to the EFD through property taxes and other fees.

5 FIRE SAFETY REQUIREMENTS - INFRASTRUCTURE, BUILDING IGNITION RESISTANCE, AND DEFENSIBLE SPACE

The Escondido Building and Fire Codes (Ordinance No. 2013-13) govern the building, infrastructure, and defensible space requirements detailed in this FPP. The project will meet or exceed applicable codes or will provide alternative materials and/or methods. The following summaries highlight important fire protection features. Prior to bringing combustible materials onto the site, utilities shall be in place, fire hydrants operational, an approved all-weather roadway in place, and interim fuel modification zones established and approved.

While these standards will provide a high level of protection to structures in this development, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

5.1 Fire Access

5.1.1 Roads

The primary project access for the Bear Valley Parkway project will be via proposed private street A, which will be accessed from Bear Valley Parkway just across from Zlatibor Road. Private Street "A" will be a 36 feet wide paved road with parking allowed on both sides, resulting in two 12 foot, unobstructed travel lanes. Interior Project roads, including proposed Private Streets "B", "C", and "D", will also be constructed to minimum 36-foot widths and shall be improved with asphalt paving materials. All residential streets will be designed to accommodate a minimum of a 75,000-lb. fire apparatus load. Any dead-end roads serving new buildings that are longer than 150 feet shall have approved provisions for fire apparatus turnaround.

5.1.2 Entrances

Access gates, will comply with Escondido Fire Code (503.6.1). Gates on private roads will comply with EFD standards for electric gates including an emergency key-operated switch overriding all command functions and opening the gate as described in section 5.1.8. The gates will automatically open from the project interior based on a magnetic or pressure activated device. The secondary/emergency access will be gated on both ends. The gates will be interconnected so that if one is open, both will open. The ingress gate will be set back 30 feet from Bear Valley Parkway while the interior gate is positioned as close to the interior street as possible to eliminate vehicle parking. The gates will be provided back up power (solar).

5.1.3 Dead Ends

All site access roads are provided fire department turnarounds (cul-de-sacs). Roadway cul-de-sacs will comply with the EFD's minimum 36-foot radius (72-foot diameter) cul-de-sac bulb standard. Private residential driveways more than 150 feet in length will have an EFD-approved hammerhead for turning around emergency vehicles. Hammerhead turnarounds are provided for lots 5 and 27. Hammerheads may be required for lots 33, and 49 depending on the positioning of the structures on the lots due to the lot configuration and potential length of the driveway as illustrated in Figure 2.

Secondary/Emergency Access

Per City's Ordinance No. 2013-13 and 2014 County of San Diego Consolidated Fire Code (Section 503.1.3 Dead-end roads), the maximum dead end road length for this development is 800 feet. All lengths are measured from the edge of the roadway surface at the intersection that begins the road (Bear Valley Parkway and Street "A") to the end of the road surface at its farthest point (Street "D" cul-de-sac). Street "A" from the entrance at Bear Valley Parkway to farthest point in the development (Street "D" cul-de-sac) is 2,070 feet. A road length of 800 feet is achievable up to lot #14.

Therefore, the Bear Valley Parkway project includes secondary/emergency access for 40 lots (Lots #15 through 55). For these 40 lots, access from Private Street "A" between lots 42 and 43 would serve as the secondary access road that connects with the public Bear Valley Parkway Road to the west of the Project.

Access from Private Street "A" to Bear Valley Parkway would provide unimpeded access or serve as an emergency egress. This roadway would be 24 feet wide, and marked no parking with HOA enforcement through a contract with a tow company. This road would be available to the project's residents and fire personnel in case of an emergency and supports the imposed loads of responding fire apparatus (up to 75,000 pounds). The road would be gated, but would enable traffic both ways.

5.1.4 Width and Turning Radius

All proposed internal private streets will have a minimum paved width of 36 feet, allowing parking on both sides. Proposed driveways within the project are a minimum 16 feet in width. Turning radius for fire apparatus access roads will be 28 feet as measured on the inside edge of the improved width.

5.1.5 Grade

The maximum grade for new roads and driveways on the Project do not exceed 20%. Although not anticipated, should any sections of road or driveway exceed 15%, they will be provided heavy broom finish or equivalent surfacing to Fire Department approval. Sections exceeding 15% grade will be constructed with Portland Concrete surface and capable of supporting the dynamic weight of a 75,000 pound fire apparatus.

5.1.6 Surface

All fire access and vehicle roadways will be of asphaltic concrete, except as noted for grades exceeding 15%, and designed and maintained to support the imposed loads of fire apparatus (not less than 75,000 pounds) that may respond, including Type I engines, Type III engines, and ladder trucks. Access roads shall be completed and paved prior to issuance of building permits and prior to combustible construction occurring.

5.1.7 Identification

Identification of roads and structures will comply with County and City of Escondido Codes Section 505.1, as follows: All structures shall have a permanently posted address, which shall be legible from the street. If it is not legible from the street, an address shall also be posted at street entrance to driveway and shall be visible from both directions of travel. Numbers shall be 4 inches high with 0.5-inch stroke, and located 6–8 feet above ground level. Numbers will contrast with background.

Streets and roads shall be identified with City approved signs. Temporary signs shall be installed at each street intersection when construction of proposed Private Streets "A" through "D" allows passage by vehicles. Signs shall be of an approved size, weather resistant and be maintained until replaced by permanent signs.

5.1.8 Gates

1. All automatic gates shall be equipped with a Knox, emergency key-operated switch overriding all command functions and opening the gate(s). Automatic gates accessing through the secondary/emergency access roadways shall be equipped with approved emergency traffic control-activating strobe light sensor(s) which will activate the gate from both directions of travel on the approach of emergency apparatus. The automatic gate will have a battery back-up or manual mechanical disconnect in case of a power failure. The gate(s) will include a magnetic or pressure activated switch for automatically opening the gate from the interior of the project for resident egress.

2. Pole gates or other structures or devices which could obstruct fire access roadways or otherwise hinder emergency operations shall be equipped with an approved, Knox padlock.
3. See Section 5.1.2 for details regarding secondary access gates.

5.2 Ignition Resistant Construction and Fire Protection Systems

All new structures within Project will be constructed to EFD standards. Each of the proposed buildings will comply with the enhanced ignition-resistant construction standards of the 2013 CBC (Chapter 7-A). These requirements address roofs, eaves, exterior walls, vents, appendages, windows, and doors and result in hardened structures that have been proven to perform at high levels (resist ignition) during the typically short duration of exposure to burning vegetation from wildfires.

While these standards will provide a high level of protection to structures in this development, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

5.2.1 Fire Protection Systems

5.2.1.1 Water

Water service for the Bear Valley Parkway project will be provided by the City of EscondidoWater Division and will be consistent with EFD requirements (Section 507.2/507.3) for a residential development within a HFHSZ area.. The City's water service area requires new development to meet a 2,500 gpm fire flow which can be supplied from two or more fire hydrants. The pressures in Bear Valley Parkway will remain above 20 psi for a minimum duration of two hours when meeting the fire requirements for the City's water service area and EFD fire flows.

5.2.1.2 Hydrants

Hydrants shall be located along fire access roadways as determined by the EFD Fire Marshal to meet operational needs, at the beginning radius of cul-de-sac streets and every 350 feet . Hydrants will be consistent with EFD Design Standards (507.5.1.1).

5.2.1.3 Fire Sprinklers

All structures will be provided interior fire sprinklers. Automatic internal fire sprinklers shall be in accordance with National Fire Protection Association (NFPA) 13-D (903.1.2) and City of Escondido installation requirements.

5.2.2 Structure Setback Requirements

EFD has adopted setback standards from adjacent slopes (Ordinance 2013-13, Section 4907.1.2.). Structure setback from top of slope is based on structure height. A single story structure (12 feet plate height) requires a minimum 15 feet horizontal setback from top of slope to the farthest projection from the roof. A two- story structure requires a minimum of 30 feet of horizontal setback from top of slope to the farthest projection from a roof. These setbacks are typically calculated using a 30% slope factor. When buildings are set back from slopes, flames spreading up those slopes are deflected vertically and over the structure where cooling occurs, reducing the effects of convective heat on the structure. Except for lots 31 to 41, the majority of the lots do not require a structure setback as previously-defined. Lots 31 to 41, which are adjacent to fuel modification and open space beyond that, include constraints to backyard setbacks. Therefore, without mitigation, the buildable pad for some of these lots could be restricted to single-story structures, depending on final structure footprint and whether 30 feet can be provided for two story structures. As an alternative, allowance for two story structures may be provided with mitigation measures, such as the provided extension of the Zone 1, irrigated zone, placement of a non-combustible, six-foot-tall, heat-deflecting landscape view wall at top of slope to provide additional upward heat deflection for these lots and the wildland exposed sides of these structures will also include code-exceeding dual pane, both panes tempered windows. Additional fire protection features are detailed below in Chapter 6.0.

5.3 Defensible Space and Vegetation Management

5.3.1 Fuel Modification

Fuel modification zones are designed to gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other on the perimeter of the wildland–urban interface (WUI) exposed structures. Because this site will utilize ignition resistant construction techniques and materials, the proposed fuel modification areas are anticipated to provide adequate set back from naturally occurring fuels under typical weather conditions.

5.3.1.1 Escondido Fire Department Fuel Modification Zone Standards

The purpose of this section is to document EFD's standards and make them available for reference. However, we are proposing a site-specific fuel modification zone program with additional measures that are consistent with the intent of the following standards. The Escondido Fire Code (Section 4907.2 — Fuel Modification) requires that fuel modification zones be provided around every building that is designed primarily for human habitation or use and buildings designed specifically to house farm animals. Decks, sheds, gazebos, freestanding open-

sided shade covers and similar accessory structures less than 250 square feet and 30 feet or more from a dwelling, and fences more than 5 feet from a dwelling, are not considered structures for the establishment of a fuel modification zone.

Fuel modification zones on Bear Valley Parkway Project shall comply with the following:

Escondido Fire Department's Residential Fuel Modification Zone Standards

1. The area (Zone 1) within 50 feet of a building or structure shall be cleared of vegetation that is not fire resistant and re-planted with fire-resistant plants. In the area between 50–100 feet (Zone 2) from a building (where applicable), all dead and dying vegetation shall be removed. Native vegetation may remain in this area provided that the vegetation is modified so that combustible vegetation does not occupy more than 50% of the square footage of this area. Weeds and annual grasses are to be mowed to a height of 4–6 inches. Any chipping that is done on site should be spread not to exceed 6 inches in height. Trees may remain in both areas provided that the horizontal distance between crowns of adjacent trees and crowns of trees and structures is not less than 10 feet.
2. When a building or structure in a hazardous fire area is setback less than 100 feet from the property line, the person owning or occupying the building or structure shall meet the requirements in subsection (1) above, to the extent possible, in the area between the building or structure and the property line.
3. The building official and the FAHJ may provide lists of prohibited and recommended plants. This FPP includes a proposed list of prohibited plants (Appendix D).
4. The fuel modification zone will be located entirely on the property.
5. When the subject property contains an area designated to protect biological or other sensitive habitat or resource, no building or other structure requiring a fuel modification zone shall be located so as to extend the fuel modification zone into a protected area.

The Bear Valley Parkway project is an infill project surrounded by estate-type residential land uses on three sides. The FMZ widths provided the project vary, depending on the location within the project and the off-site adjacent landscape. For example, most of the off-site areas include rural residential, roadways, or other disturbances that have reduced the fuels and are maintained, thus providing reciprocal FMZ. There is one undeveloped property adjacent the site, but it does not include shrub-dominated wildland, and is mowed annually in compliance with EFD's weed abatement requirements. This area will continually to be a reciprocal FMZ based on EFD's enforcement of its weed abatement standards. All on-site fuels will be converted to urbanized, maintained landscapes except for the riparian/oak corridor on the southern boundary of the site

that is located more than 100 feet from the site's FMZ. Fuel modification areas will occur along roadways, and in the southern portion of the development (Figure 5).

Bear Valley Parkway Fuel Modification Zones

Project Wide: The entire project will include a "Firesafe", maintained and irrigated landscape. Private lots that do not include designated Fuel Modification Zone will not be authorized to include flammable plant species (ground cover, shrubs or trees) that are known to be highly flammable or readily facilitate fire spread. Landscapes will be maintained in a high moisture content, low fuel condition (no accumulation of dead plant material).

Lots 31 to 36 receive extended Zone 1 FMZs on the manufactured slope. These 100+ foot wide FMZs exceed the code requirement by providing low fuel densities and irrigated fuels for the entire distance versus 50 feet of irrigated and 50 feet of thinned area.

Lot 27 receives a 90 foot FMZ with 50 feet of irrigated zone and 40 feet of thinning zone.

Lot 38 receives a 94 foot FMZ with all 94 feet as irrigated zone.

Lot 39 receives an 86 foot FMZ with all 86 feet as irrigated zone.

Remaining lots receive a variation of FMZ including irrigated and thinned FMZ or internal firesafe common area landscaping that is maintained by the HOA.

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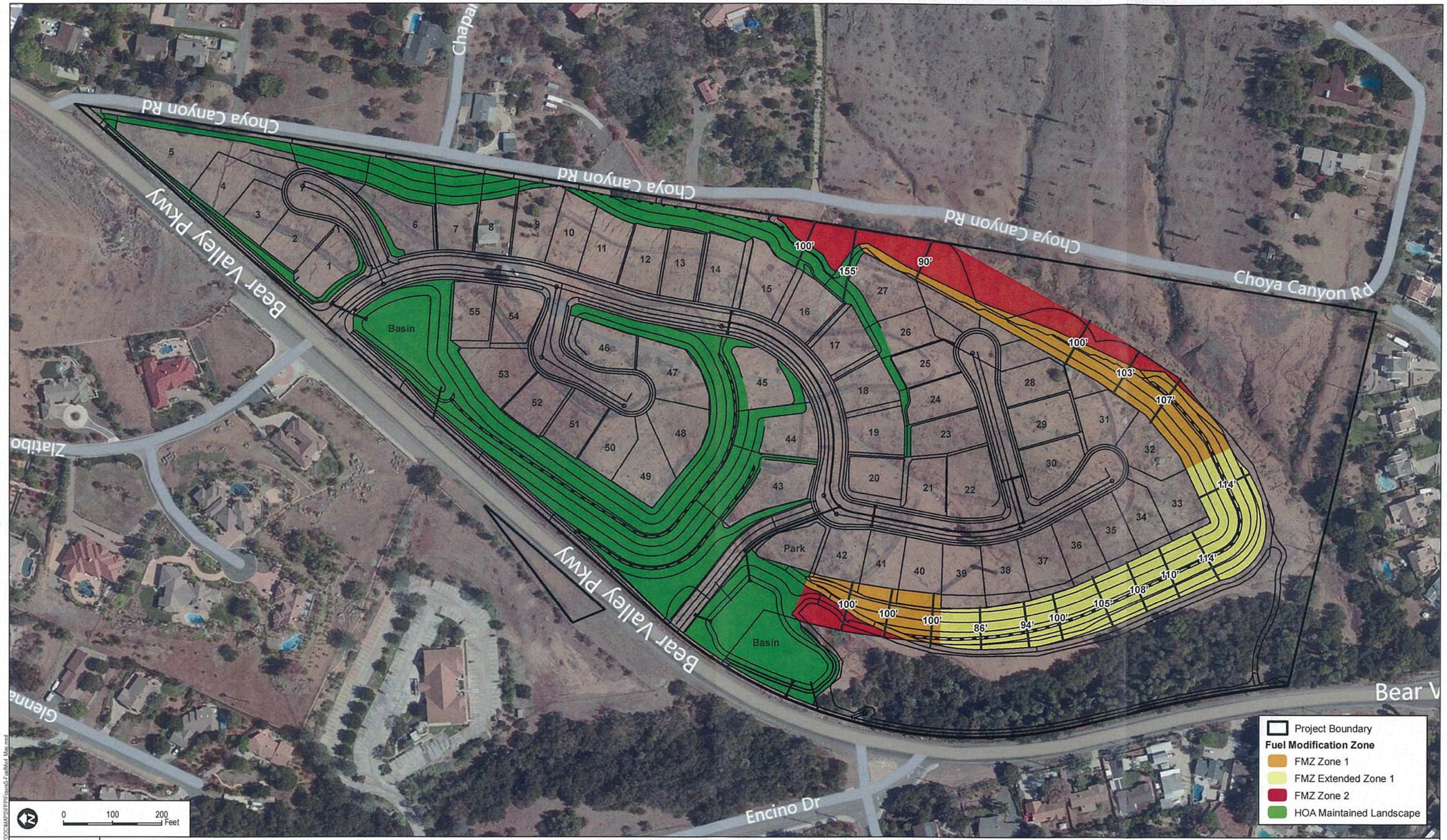

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SOURCE: Bing Maps 2015

Bear Valley Parkway FPP

FIGURE 5

Fuel Modification Map

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Table 5 includes a summary of the proposed Fuel Modification Zones on a lot by lot basis

Table 5
Project Lot by Lot Fuel Modification Zone Summary.

Lot #'s	Fuel Modification Requirements
1 through 26	No designated Fuel Modification Zone due to off-site landscapes that function as FMZ. Firesafe Landscaping on Lots and for HOA-maintained common areas to be provided and off-site weed abatement from adjacent properties provides additional FMZ
27 and 28	Designated 100 foot wide Fuel Modification Zone includes sideyards/backyards of lots 27 and 28 with Zone 1 and 2 requirement. Firesafe Landscaping to be provided throughout lot.
29 and 30	No designated Fuel Modification Zone due to interior project location. Firesafe Landscaping to be provided throughout lot. And off-site weed abatement from adjacent lots provides additional FMZ
28, 31 and 32	Lot 28 includes a standard 100 foot FMZ; Lots 31 and 32 receive 103 and 107 foot FMZs respectively. Both lots will include full irrigated zones with a small thinning zone to the property line.
33 through 37	Code exceeding 100 foot wide Fuel Modification Zone 1 includes backyards of lots . Firesafe Landscaping to be provided throughout lots and HOA-maintained common areas, including detention basin and park.
38 and 39	Slightly reduced FMZs of 94 and 86 feet, respectively, but the entire distance will be irrigated zone (FMZ 1)
43 through 55	No designated Fuel Modification Zone. Firesafe Landscaping to be provided throughout lot and on adjacent HOA-maintained common areas, including the detention basin.

Roadway Fuel Modification Zones

Roadway fuel modification is addressed by the Escondido Fire Code (Section 4907.2.1— Fuel Modification of Combustible Vegetation from Sides of Roadways). The FAHJ may require a property owner to modify combustible vegetation in the area within 20 feet from each side of the driveway or a public or private road adjacent to their property to establish a fuel modification zone. The FAHJ has the right to enter private property to insure the fuel modification zone requirements are met. The Code allows an exception to reduce the width of the fuel modification zone if it will not impair access. On the Bear Valley Parkway site, roadside fuel modification will range from 10–20 feet wide, larger where roads front private lots and front yard landscaping provides the equivalent of fuel modification zone.

Special Fuel Management Issues

Trees may be planted within FMZs as long as they conform to the City's Fire Code (Section 4907.3.3 – Trees). On the Project site, tree planting in the fuel modification zones and along roadways is acceptable, as long as they meet the following restrictions as described below and in the Vegetation Management Section:

- For streetscape plantings, fire resistive trees can be planted 10 feet from edge of curb to center of tree trunk. Care should be given to the type of tree selected, that it will not encroach into the roadway, or produce a closed canopy effect.

- Crowns of trees located within defensible space shall maintain a minimum horizontal clearance of 10 feet for fire resistant trees. Mature trees shall be pruned to remove limbs one-third the height or 6 feet, whichever is less, above the ground surface adjacent to the trees.
- Dead wood and litter shall be regularly removed from trees.
- Ornamental trees shall be limited to groupings of 2–3 trees with canopies for each grouping separated horizontally as described in Table 6 (Table 4907.3 from Escondido Fire Code).

Table 6
Distance Between Tree Canopies by Percent Slope

Percent of Slope	Required Distances Between Edge of Mature Tree Canopies[1]
0–20	10 feet
21–40	20 feet
41+	30 feet

[1] Determined from canopy dimensions as described in Sunset Western Garden Book (Current Edition)

Vegetation Management

The following requirements are provided for designated fuel modification zones. These zones are presented graphically in Figure 5. Each zone would include permanent field markers at the property line to delineate the zones, aiding ongoing maintenance activities that will occur on site. All fuel modification zones shall be maintained by the Homeowners Association.

Per Escondido Fire Code (Section 4907.4.2 — Landscaping Requirements), all plant materials used shall be from the Wildland/Urban Interface Development Standards plant palette. The addition of plant material to the approved list will be at the discretion of the Fire Marshal. Landscape plans shall be in accordance with the following criteria:

1. No non-fire resistive trees (including conifers, pepper trees, eucalyptus, cypress, *Washingtonia* palms and acacia species), shall not be planted on this site. All fire resistive tree species (many species including oak) shall be planted and maintained at a minimum of 10 feet from the tree's drip line to any combustible structure.
2. For streetscape plantings, fire resistive trees can be planted 10 feet from edge of curb to center of tree trunk. Care should be given to the type of tree selected, that it will not encroach into the roadway, or produce a closed canopy effect.
3. Limit planting of large unbroken masses especially trees and large shrubs. Groups should be two to three trees maximum, with mature foliage of any group separated horizontally

by at least 10 feet, if planted on less than 20% slope, and 20 feet, if planted on greater than 20% slope.

4. If shrubs are located underneath a tree's drip line, the lowest branch should be at least three times as high as the understory shrubs or 10 feet, whichever is greater.
5. Existing trees can be pruned 10 feet away from roof, eave, or exterior siding, depending on the tree's physical or flammable characteristics and the building construction features.
6. All tree branches shall be removed within 10 feet of a fireplace chimney or outdoor barbecue.

Other Vegetation Management

Roadway-Adjacent Defensible Space

- Includes an area up to 20 feet on either side of each fire apparatus access road and driveways as well as clear to 13 feet 6 inches above roadway
- Shall be maintained clear of all but fire resistive vegetation
- Maintained by homeowners and homeowner association.

Environmentally Sensitive Areas/Riparian Areas

Once the fuel modification zones are in place, there will not be a need to expand them as they have been planned conservatively larger than necessary. However, if unforeseen circumstances were to arise that removal of non-native species, such as Mexican fan palms, or dead palm fronds for hazard reduction within an area considered environmentally sensitive, it would require approval from the County and the appropriate resource agencies (California Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers) prior to any vegetation management activities occurring within those areas.

Pre-Construction Requirements

- Perimeter fuel modification areas must be implemented and approved by the EFD prior to combustible materials being brought on site.
- Existing flammable vegetation shall be removed on vacant lots prior to commencement of construction.
- Dead fuel, ladder fuel (fuel which can spread fire from ground to trees), and downed fuel shall be removed and trees/shrubs shall be properly limbed, pruned, and spaced per this plan.

Undesirable Plants

Certain plants are considered to be undesirable in the landscape due to characteristics that make them highly flammable. These characteristics can be physical or chemical.

The plants included in the Prohibited Plant List (Appendix D) are unacceptable from a fire safety standpoint, and shall not be planted on the site unless otherwise approved by the EFD.

Vegetation Management Compliance Schedule

All fuel modification area vegetation management shall be completed annually by May 15 of each year and more often as needed for fire safety, as determined by the EFD. The project HOA shall be responsible for all vegetation management throughout the common areas of the project site, including the designated FMZ areas, in compliance with the requirements detailed herein and EFD requirements. The project HOA shall be responsible for ensuring long-term funding and ongoing compliance with all provisions of this FPP, including vegetation planting, fuel modification, vegetation management, and maintenance requirements throughout the private portions of the Bear Valley Parkway site.

6 ADDITIONAL STRUCTURAL PROTECTION MEASURES

As previously mentioned, due to constraints associated with limited building area, the backyards for lots 32 to 41 are limited to 20 feet of setback from top of slope, which would not allow a two-story house. As such, this FPP incorporates additional analysis and measures that will be implemented to compensate for potential fire related threats. These measures are customized for this site based on the analysis results and focus on providing functional equivalency as a City-defined, structure setback.

Extended Zone 1 Fuel Modification Zone

The FMZ adjacent lots 32 to 41 is designed to exceed the code standard of 100 feet that includes a 50 foot wide irrigated zone and a 50 foot wide thinning zone. The FMZ adjacent these lots will include a 100 foot or more irrigated, low fuel zone and no thinning zone. This extension of the irrigated zone results in high moisture plants that are have higher ignition resistance than unirrigated fuels. This will also reduce flame spread and length as well as Btu production, resulting in a lower fire hazard for these lots.

Heat Deflecting Walls

Example heat deflecting wall

The project's slopes and the elevated lots/pads adjacent the extended Zone 1 FMZ areas, provide an opportunity to place heat-deflecting landscape view walls of masonry construction with fire-rated glazing that are six feet in height (roughly lower two feet masonry construction and upper three feet dual pane, one pane tempered glazing or equivalent and meeting Chapter 7A and/or EFD approval). The view walls will be incorporated at top of slope/edge of lot for Lots where appropriate structure setbacks (15 feet for single story or 30 feet for two story) are not achievable. Only Lots 31-34 may be constrained in terms of structure set back. . The landscape walls provide a vertical, non-combustible surface in the line of heat, fumes, and flame travel up the slope. Once these fire byproducts intersect the wall, they are deflected upward or, in the case where lighter fuels are encountered, they are quickly consumed, heat and flame are absorbed or deflected by the wall, and the fuel burns out within a short (30 second–2 minute) time frame (Quarles and Beall 2002). Walls like these have proven to deflect heat and airborne embers and are consistent with NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire – 2008 Edition, Section 5.1.3.3 and A.5.1.3.3 and International Urban Wildland Interface Code (ICC 2012). NFPA 1144, A.5.1.3.3 states: "Noncombustible walls and barriers are effective for deflecting radiant heat and windblown embers from structures."

Exterior Windows

Since the structures will be hardened to wildland urban interface standards, they will be ignition resistant. However, a potentially vulnerable structure component with regard to radiant or convective heat exposure would be the WUI exposed side windows for lots 31 to 41. To address this issue, it is worthwhile to examine the structure ignitability modeling, independent ignition experiments, and case studies that support fuel treatments as low as roughly 34 feet from structures, and compare them with the project. Cohens' (1995) structure ignitability model (SIAM) assesses ignitability of bare wood when exposed to a continuous heat source. The model assumes a worst-case condition of a constant 1700 degrees (F). A constant, maximum heat source is typically not the case during a wildfire due to the movement of a fire, non-uniform vegetation distribution, and the lack of a uniform, constant flame front.

The analysis conducted for this report indicates that the structure setbacks of a minimum of 35 feet from the fuels is consistent with study results for separating the structures from the short-duration heat and flame associated with a fire burning within one of the preserved riparian woodland drainages. The typical duration of large flames from burning vegetation is on the order of 1 minute and up to several minutes for larger fuels at a specific location (Cohen 1995; Butler et al. 2004, Ramsay and Rudolph 2003, Cohen and Quarles 2011)). Tests of various glazing products indicate that single pane, tempered glass failure may occur between 120–185 seconds from exposure (University of California 2011; Manzello et al. 2007) but those tests include direct and constant heating that would not be experienced during a wildfire on this site. Depending on the heat applied and the type of glass used in the various studies, the cracking/failure time varied. However, given the short duration of maximum heat (likely several minutes for the oaks), the loss of heat over distance (25 feet minimum), the dual pane, two pane tempered glazing specified for this project, wildfire heat and flame experienced by the windows from the wildland fire is not expected to be enough (in temperature or duration) to cause failure of both panes. Quarles et al. (2010) provides strong endorsement for tempered glass performance. His research and tests conclude that multi-pane (2–3 panes) with at least one pane tempered is well-suited for wildfire exposures. He indicates that tempered glass is at least four times stronger and much more resistant to thermal exposures than normal annealed glass. The use of code required dual pane, one pane tempered glass provides several benefits, with thermal exposure performance the most important for this study. This FPP requires both panes tempered for the side of the house facing the open space areas to improve the strength of the windows.

Additional Structure and Fire Protection Measures Summary

The following additional measures will be implemented to "mitigate" potential structure fire exposure related to structure setback from top of slope requirements on this project. These measures are customized for this site, its unique topographical and vegetative conditions, and

focus on providing functional equivalency in lieu of the required structure setback. Table 7 provides a summary of the additional measures by lot.

Table 7
Additional Fire Protection Measures by Lot

Lot #'s	Fuel Modification Requirements
1 through 31	No additional fire protection measures beyond Code Requirements.
32 through 41	Where final setback from structure to top of slope is less than 30 feet for 2 story structures, a six foot tall non-combustible view wall will be provided and dual pane, both panes tempered windows will be maintained on wildland exposed side of structure at all times. FMZ areas for all of these lots will be modified to extend the irrigated zones the entire 100 feet.
42 through 55	No additional fire protection measures beyond Code Requirements.

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7 CONCLUSION

This FPP is submitted in support of an application for project entitlement of the Bear Valley Parkway development project. It is submitted in compliance with requirements of the Escondido Fire Department and the Escondido Fire Code. The requirements in this document meet fire safety, building design elements, fuel management/modification, and landscaping recommendations of the EFD. Where the project does not strictly comply with the Code, such as with some lot setbacks and fuel modification zone widths, alternative materials and methods have been proposed that provide functional equivalency as the code intent.

Fire and Building Codes and other local, county, 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 structures adjacent the WUI zone at the Bear Valley Parkway 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 to reduce risk of structural ignition and compensate for fuel modification area reductions.

Modern infrastructure will be provided along with implementation of the latest ignition resistant construction methods and materials. Further, all structures are required to include interior sprinklers consistent with City of Escondido Fire Code. Fuel modification will occur on exposed edges and adjacent biological preserve areas of the project site. The fuel modification zone will be maintained by the Project's HOA and inspected annually by the EFD. Maintenance includes removing all dead and dying materials and maintaining appropriate horizontal and vertical spacing. In addition, plants that establish or are introduced to the fuel modification zone that are not on the approved plant list will be removed.

Ultimately, it is the intent of this FPP to guide, through code and other project specific requirements, the construction of structures 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 would 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 accomplish the goal of this FPP to assist firefighters in their efforts to defend these structures and reduce the risk associated with this project's WUI location. For maximum benefit, the developer, contractors,

engineers, and architects are responsible for proper implementation of the concepts and requirements set forth in this report. Homeowners are responsible to maintain their structures and lots as required by this report, the applicable Fire Code and the EFD.

Although the proposed development and landscape will be significantly improved in terms of ignition resistance, it should not be considered a shelter-in-place community. It is recommended that the homeowners or other occupants who may reside within the Bear Valley Parkway neighborhood adopt a conservative approach to fire safety. This approach must include maintaining the landscape and structural components according to the appropriate standards and embracing a "Ready, Set, Go[1]" stance on evacuation. Accordingly, occupants should evacuate the residence and the area as soon as they receive notice to evacuate, or sooner, if they feel threatened by wildfire or structure fire in a nearby residence. Fire is a dynamic and somewhat unpredictable occurrence and it is important for residents to educate themselves on practices that will improve their home survivability and their personal safety.

[1] International Fire Chiefs Association "Ready, Set, Go" website link: http://wildlandfirersg.org/

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9 LIST OF PREPARERS

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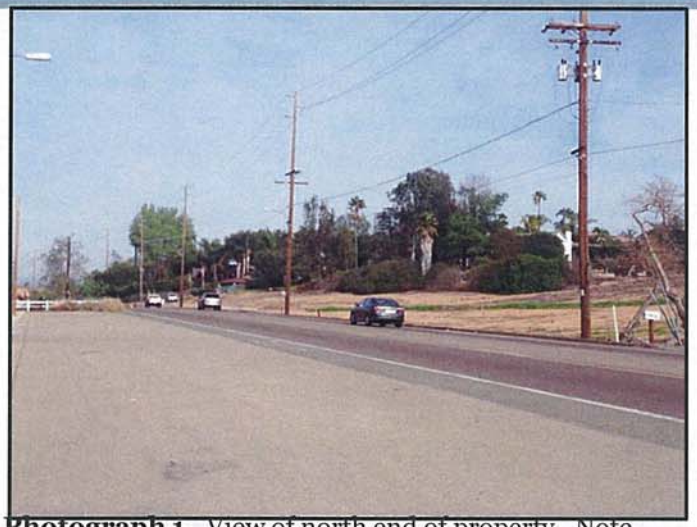
APPENDIX A

Photograph Log

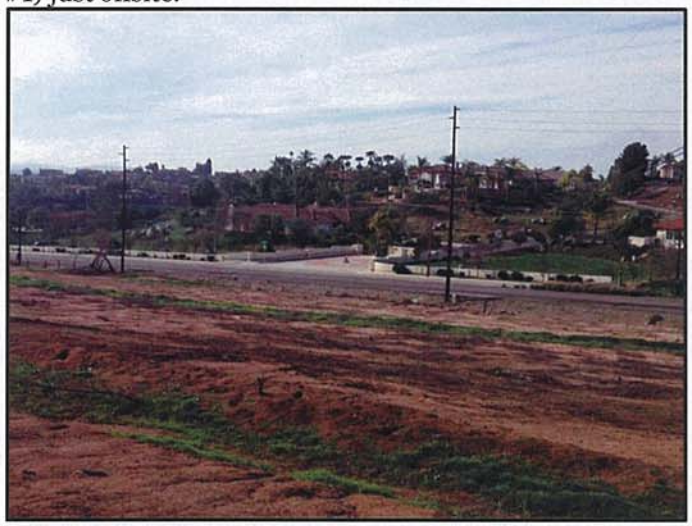
Photograph log

Bear Valley Parkway Project



Photograph 1. View of north end of property. Note power line runs along entire west edge of project site and semi-rural homes and landscaping (modeled in Fire Run #1) just offsite.

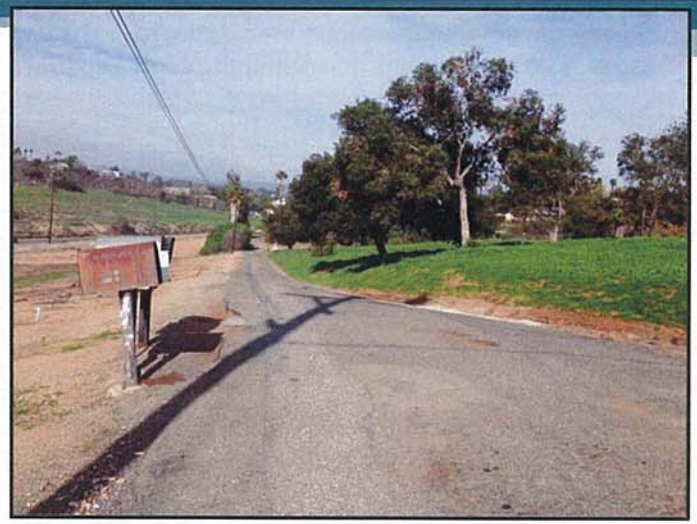
Photograph 2. Another view of north end of property. The project site, which was previously an avocado orchard, is now disturbed.



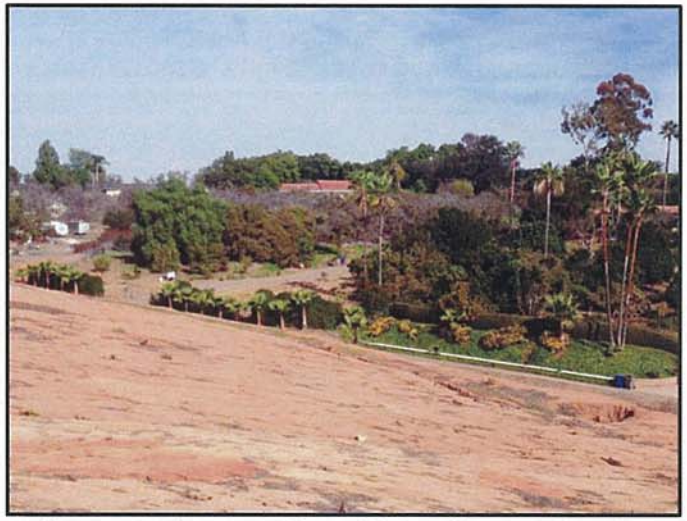
Photograph 3. Photograph shows residential neighborhood to north of Project along Zlatibor Ranch Road.

Photograph 4. View looking south along eastern boundary of property from Bear Valley Parkway and Choya Canyon Road.

Photograph 5. One residence in the middle of the site is currently occupied.



Photograph 6. View looking north along Choya Canyon Road. Eastern border of the project site is located on left-hand side of road.

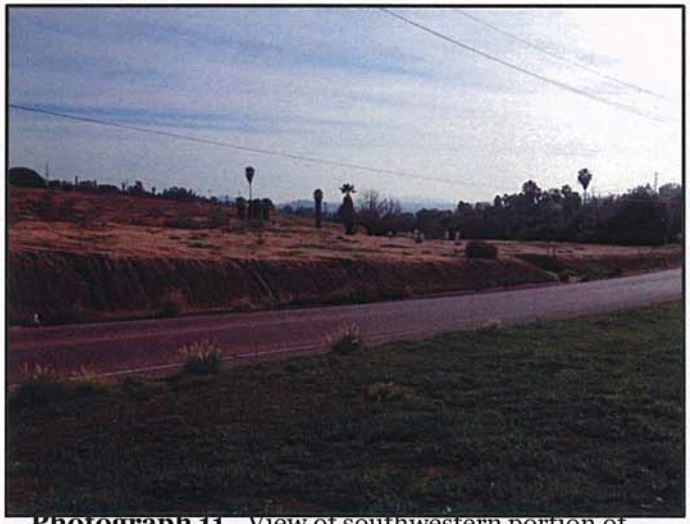


Photograph 7. Residential lots (offsite) with well-maintained landscapes occur along northeast edge of property. This fuelbed was modeled in Fire Run #1.

Photograph 8. Adjacent vacant land that has been regularly mowed resides along the southeast side of the property, just east of Choya Canyon Road. This fuelbed was modeled in Fire Run #2

Photograph 9. Ephemeral streambeds are located along southeast corner of property and are adjacent to residential development off Valley Grove Lane.

Photograph 10. Southern coast live oak riparian forest is found along southwestern portion of property and outside the fuel modification area for the proposed development.



Photograph 11. View of southwestern portion of property. Note oak riparian forest on right-hand side of photograph . Bear Valley Parkway is in the foreground.

Photograph 12. Photograph shows north section of oak riparian forest from intersection of Encino Drive and Bear Valley Parkway.

Photograph 13. Another view of oak riparian forest looking south . Note pockets of Mexican fan palms in the riparian corridor.

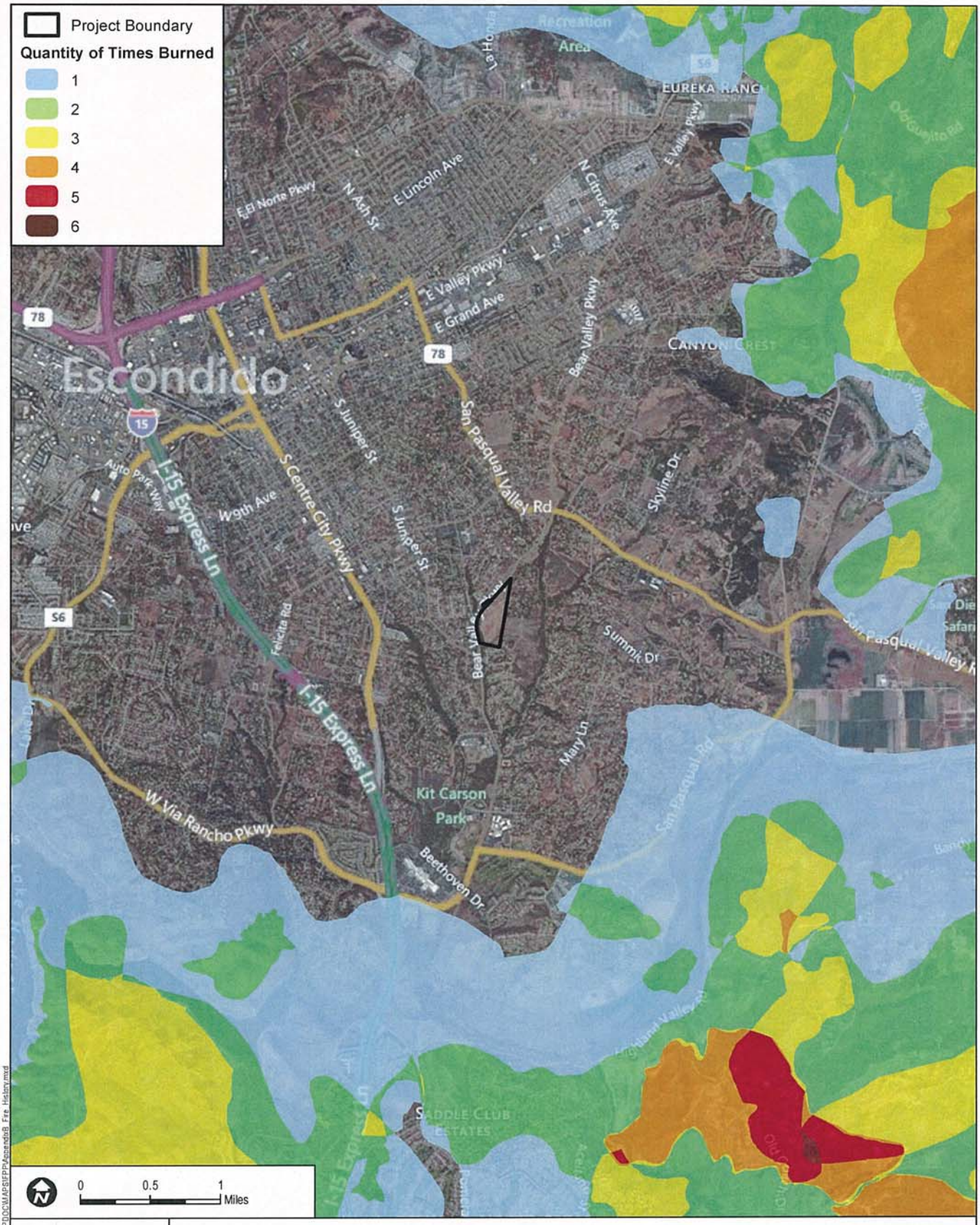
Photograph 14. A more urban development is located west of the site and Bear Valley Parkway . Ornamental landscaping was modeled in Fire Run #3.

Photograph 15. Close up view of oak riparian canopy and understory fuelbeds that were modeled for Fire Run #3.

Photograph 16. Another view of oak riparian forest with invasive palms. Fuel types were included for Fire Run #3.

APPENDIX B

Fire History



DUDEK

SOURCE: BING 2014, CDF 2013

Appendix B
Fire History

7833

Bear Valley Parkway FPP

Path: Z:\Projects\7833011\MAPDOC\MAP\FPP\AppendixB_Fire_History.mxd

APPENDIX C

BehavePlus Fire Behavior Analysis

APPENDIX C
BehavePlus Fire Behavior Analysis

BEHAVEPLUS FIRE BEHAVIOR MODELING

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 site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths, spread rates, and fireline intensities, the BehavePlus 5.0.5 fire behavior modeling system was applied using predominant fuel characteristics, slope percentages, and extreme weather variables for the 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. 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 BehavePlus 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 dead fuels less than one-quarter inch in diameter. These are the fine fuels that carry fire. Fuels greater than one inch have little effect while fuels greater than three inches have no effect on fire behavior.
- Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within six 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, the BehavePlus fire behavior computer modeling system was not intended for determining sufficient fuel modification zone 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 on a site. The type and quantity will depend upon the soil, climate, geographic features, and the fire history of the site. 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 BehavePlus. 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

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 efforts. These new models attempt to improve the accuracy of the standard 13 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 new 40 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 FIRE BEHAVIOR MODELING INPUTS

Vegetation/Fuels

To support the fire behavior modeling efforts conducted for this Fire Protection Plan (FPP), fuel models were identified for three key locations in order to represent multiple wildfire scenarios on or adjacent to the project site. While vegetation types other than the selected three are located on site, the selected areas represent the most likely wildfire threat for the proposed project. Table 1 summarizes fuel model assignments by modeling scenario.

Table 1
BehavePlus Fine Dead Fuel Moisture Calculation

Scenario	Vegetation Type	Fuel Model
1	Ornamental vegetation	tu1
2	Disturbed, sparse non-native grasses	gr1
3	Ornamental vegetation/Oak riparian forest	FM 10, tu1

Weather

Fire behavior modeling conducted in support of this FPP utilized the guidelines and standards presented by the County of San Diego, Department of Planning and Land Use[1]. These guidelines identify acceptable fire weather inputs for extreme fire conditions during summer months and Santa Ana fire weather patterns. The County analyzed and processed fire weather from Remote Automated Weather Stations (RAWS) between April 15 to December 31 in order to represent the general limits of the fire season. Data provided by the County's analysis included temperature, relative humidity, and sustained wind speed and is categorized by weather zone, including Maritime, Coastal, Transitional, Interior, and Desert.

To evaluate potential fire behavior for the project site, Dudek utilized the BehavePlus (v. 5.0.5) fire behavior modeling software package to determine fuel moisture values and expected fire behavior for the site. The temperature, relative humidity, and wind speed data for the Transitional[2] weather zone were utilized for this FPP based on the project location. Reference fuel moistures were calculated in BehavePlus and were based on site-specific topographic data inputs. Fire behavior for the site was calculated in three different locations using worst-case fuels and topography (steepest slopes). One of the modeling scenarios analyzed potential fire behavior along the western edge (Scenario 3) during summer fire weather conditions. The other two modeling scenarios (Scenarios 1 and 2) analyzed potential fire behavior along the eastern and

[1] County of San Diego Report Format and Content Requirements – Wildland Fire and Fire Protection (August 31, 2010). On-line at http://www.sdcounty.ca.gov/dplu/docs/Fire-Report-Format.pdf

[2] http://mappingsandiego.com/viewMap.html

northeastern edge of the development during Peak weather conditions. Table 2 summarizes the fuel moisture calculations utilized for this FPP.

Table 2
BehavePlus Fine Dead Fuel Moisture Calculation

Variable	Summer Weather	Peak Weather
Dry Bulb Temperature	90 -109 deg. F	90 -109 deg. F
Relative Humidity	10 - 14 %	5 - 9 %
Reference Fuel Moisture	2 %	1 %
Month	Feb Mar Apr Aug Sept Oct	Feb Mar Apr Aug Sept Oct
Time of Day	12:00 - 13:59	12:00 - 13:59
Elevation Difference	Level (within 1,000 ft.)	Level (within 1,000 ft.)
Slope	3-10%	14-16%
Aspect	Southwest/East	West
Fuel Shading	Exposed (< and > 50% shading)	Exposed (< 50% shading)
Fuel Moisture Correction	1 %	1 %
Fine Dead Fuel Moisture	3 %	2 %

Topography

The topography of the site is discussed in greater detail in the FPP. Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or down hill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. Slope values for this site were measured from site topographic maps and are presented in units of percent.

The modeling locations were adjacent to proposed development areas on the site with slope measurements ranging from relatively flat to 16%. Scenarios to the east and northeast were selected based on the strong likelihood of fire approaching from the both directions during a Santa Ana wind-driven fire event. The scenario on the west was selected to evaluate fire behavior potential during a summer fire occurring during typical on-shore wind flow patterns. The fire behavior modeling input variables for the project site are presented in Table 3. Locations for each modeling run are presented graphically in Figure 4 of the FPP.

Table 3
BehavePlus Fire Behavior Modeling Inputs

Variable	Summer Weather (Onshore Flow)	Peak Weather (offshore/Santa Ana Condition)
Scenario	3	1 and 2
Fuel Model	FM 10, tu1	gr1, tu1
1h Moisture	3%	2%

Table 3
BehavePlus Fire Behavior Modeling Inputs

Variable	Summer Weather (Onshore Flow)	Peak Weather (offshore/Santa Ana Condition)
10h Moisture	5%	3%
100h Moisture	7%	5%
Live Herbaceous Moisture	60%	30%
Live Woody Moisture	90%	50%
20-foot Wind Speed (upslope/downslope)	10-20 mph	30-40(50 mph gusts)
Wind Adjustment Factor	0.4	0.4
Slope Steepness	3-10%	14-16%

BEHAVEPLUS FIRE BEHAVIOR MODELING RESULTS

Three fire behavior variables were selected as outputs from the BehavePlus analysis conducted for the project site, and include flame length (feet), rate of spread (mph), and fireline intensity (BTU/feet/second). The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2004). It is a somewhat subjective and non-scientific measure of fire behavior, but is extremely important to fireline personnel in evaluating fireline intensity and is worth considering as an important fire variable (Rothermel 1983). Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in initial attack and fire suppression efforts. The information in Table 4 presents an interpretation of these fire behavior variables as related to fire suppression efforts. The results of fire behavior modeling efforts are presented in Table 5, as well as in Table 3 of the FPP. Additionally, identification of modeling run locations is presented graphically in Figure 4 of the FPP.

Table 4
Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 to 8 feet	100-500 BTU/ft/s	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 to 11 feet	500-1000 BTU/ft/s	Fires may present serious control problems -- torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.

Table 4
Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

Source: BehavePlus 5.0.5 fire behavior modeling program (Andrews, Bevins, and Seli 2004)

Table 5
BehavePlus Fire Behavior Modeling Results

Model Run	Fuel Model(s)	Flame Length (feet)	Fireline Intensity (Btu/ft/s)	Surface Rate of Spread (mph)
1	tu1	4.7 to 5.6	165 to 243	< 1.0
2	gr1	3.1	67	< 1.0
3	FM 10, tu1	1.8 to 8.1	20 to 539	< 1.0

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APPENDIX D

Prohibited Plant List

APPENDIX D
Prohibited Plant List

Botanical Name	Common Name
Trees	
Abies species	Fir
Acacia species (numerous)	Acacia
Agonis juniperina	Juniper Myrtle
Araucaria species *(A. heterophylla, A. araucana, A. bidwillii)*	Araucaria (Norfolk Island Pine, Monkey Puzzle Tree, Bunya Bunya)
Callistemon species *(C. citrinus, C. rosea, C. viminalis)*	Bottlebrush (Lemon, Rose, Weeiping)
Calocedrus decurrens	Incense Cedar
Casuarina cunninghamiana	River She-Oak
Cedrus species *(C. atlantica, C. deodara)*	Cedar (Atlas, Deodar)
Chamaecyparis species (numerous)	False Cypress
Cinnamomum camphora	Camphor
Cryptomeria japonica	Japanese Cryptomeria
Cupressocyparis leylandii	Leyland Cypress
Cupressus species *(C. fobesii, C. glabra, C. sempervirens,)*	Cypress (Tecate, Arizona, Italian, others)
Eucalyptus species (numerous)	Eucalyptus
Juniperus species (numerous)	Juniper
Larix species *(L. decidua, L. occidentalis, L. kaempferi)*	Larch (European, Japanese, Western)
Leptospermum species *(L. laevigatum, L. petersonii)*	Tea Tree (Austrailian, Tea)
Lithocarpus densiflorus	Tan Oak
Melaleuca species *(M. linariifolia, M. nesophylla, M. quinqenervia)*	Melaleuca (Flaxleaf, Pink, Cajeput Tree)
Olea europea	Olive
Picea (numerous)	Spruce
Palm species (numerous)	Palm
Pinus species *(P. brutia, P. canariensis, P. eldarica, P. halopensis, P. pinea, P. radiate,* numerous others)	Pine (Calabrian, Canary Island, Mondell, Aleppo, Italian Stone, Monterey)
Platycladus orientalis	Oriental arborvitae
Podocarpus species *(P. gracilior, P. macrophyllus, P. latifolius)*	Fern Pine (Fern, Yew, Podocarpus)
Pseudotsuga menziesii	Douglas Fir
Schinus species *(S. molle, S. terebenthifolius)*	Pepper (California and Brazilian)
Tamarix species *(T. Africana, T. apylla, T. chinensis, T. parviflora)*	Tamarix (Tamarisk, Athel Tree, Salt Cedar, Tamarisk)
Taxodium species *(T. ascendens, T. distichum, T. mucronatum)*	Cypress (Pond, Bald, Monarch, Montezuma)
Taxus species *(T. baccata, T. brevifolia, T. cuspidata)*	Yew (English, Western, Japanese)
Thuja species *(T. occidentalis, T. plicata)*	Arborvitae/Red Cedar
Tsuga species *(T. heterophylla, T. mertensiana)*	Hemlock (Western, Mountain)
Groundcovers, Shrubs & Vines	
Acacia species	Acacia
Adenostoma fasciculatum	Chamise
Adenostoma sparsifolium	Red Shanks

APPENDIX D (Continued)

Botanical Name	Common Name
Agropyron repens	Quackgrass
Anthemis cotula	Mayweed
Arbutus menziesii	Madrone
Arctostaphylos species	Manzanita
Arundo donax	Giant Reed
Artemesia species *(A. abrotanium, A. absinthium, A. californica, A. caucasia, A. dracunulus, A. tridentate, A. pynocephala)*	Sagebrush (Southernwood, Wormwood, California, Silver, True tarrangon, Big, Sandhill)
Atriplex species (numerous)	Saltbush
Auena fatua	Wild Oat
Baccharis pilularis	Coyote Bush
Bambusa species	Bamboo
Bougainvillea species	Bougainvillea
Brassica species *(B. campestris, B. nigra, B. rapa)*	Mustard (Field, Black, Yellow)
Bromus rubens	Foxtail, Red brome
Cardera draba	Noary Cress
Carpobrotus species	Ice Plant, Hottentot Fig
Castanopsis chrysophylla	Giant Chinkapin
Cirsium vulgare	Wild Artichoke
Conyza bonariensis	Horseweed
Coprosma pumila	Prostrate Coprosma
Cortaderia selloana	Pampas Grass
Cytisus scoparius	Scotch Broom
Dodonea viscose	Hopseed Bush
Eriodyctyon californicum	Yerba Santa
Eriogonum species *(E. fasciculatum)*	Buckwheat (California)
Fremontodendron species	Flannel Bush
Hedera species *(H. canariensis, H. helix)*	Ivy (Algerian, English)
Heterotheca grandiflora	Telegraph Plant
Hordeum leporinum	Wild barley
Juniperus species	Juniper
Lactuca serriola	Prickly Lettuce
Larix species (numerous)	Larch
Larrea tridentata	Creosote bush
Lolium multiflorum	Ryegrass
Lonicera japonica	Japanese Honeysuckle
Mahonia species	Mahonia
Mimulus aurantiacus	Sticky Monkeyflower
Miscanthus species	Eulalie Grass
Muehlenbergia species	Deer Grass
Nicotania species *(N. bigelevil, N. glauca)*	Tobacco (Indian, Tree)
Pennisetum setaceum	Fountain Grass
Perronskia Atriplicifloria	Russian Sage

Botanical Name	Common Name
Phoradendrom species	Mistletoe
Pickeringia montana	Chaparral Pea
Rhus species *(R. diversiloba, R. laurina, R. lentii)*	Sumac (Poison oak, Laurel, Pink Flowering)
Ricinus communis	Castor Bean
Rosmarinus species	Rosemary
Salvia species (numerous)	Sage
Sacsola austails	Russian Thistle
Solanium Xantii	Purple Nightshade (toxic)
Sylibum marianum	Milk Thistle
Thuja species	Arborvitae
Urtica urens	Burning Nettle
Vinca major	Periwinkle
Rhus Lentii	Pink Flowering Sumac

Notes:

1 For the purpose of using this list as a guide in selecting plant material, it is stipulated that all plant material will burn under various conditions.

2 The absence of a particular plant, shrub, groundcover, or tree, from this list does not necessarily mean it is fire resistive.

3 All vegetation used in Vegetation Management Zones and elsewhere in this development shall be subject to approval of the Fire Marshal.

4 Additional plants that are considered undesirable due to their invasiveness nature are detailed on the California Invasive Plant Council's Web site at www.cal-ipc.org/ip/inventory/index.php.

5 Landscape architects may submit proposals for use of certain vegetation on a project specific basis. They shall also submit justifications as to the fire resistivity of the proposed vegetation.

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