

**THE OTAY RANCH RESORT VILLAGE
FIRE PROTECTION PLAN**

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EXECUTIVE SUMMARY

This Fire Protection Plan (FPP) is for the Otay Ranch Resort Village Project in San Diego County, referred to as Village 13 by the Otay Subregional Plan (Otay SRP). This FPP provides measures for fire protection which meet the 2014 San Diego County Consolidated Fire Code , and provides sufficient mitigation for areas that deviate. It also identifies the fire risk associated with the Project's proposed land uses, and identifies requirements for fuel modification, building design and construction and other pertinent development infrastructure criteria for fire protection. The primary focus of this FPP is providing an implementable framework for suitable protection of the planned structures and the people living and utilizing them. Tasks completed in the preparation of this FPP include data review, code review, site fire risk analysis, land use plan review, fire behavior modeling, and site specific recommendations.

Where possible, this FPP incorporates principles of sustainability that are an important component of the Project. Preservation and conservation of resources, including native plant communities, energy and water, along with conservation and maintenance of the site's aesthetics, are important components of the Resort Village and have been duly considered and integrated in this FPP, where appropriate.

The Resort Village is approximately 1,869-acres proposed for the development of a resort and residential community with adjacent, open space preserve. It is located in southern San Diego County near the City of Chula Vista, east of Interstate 805. At build-out, the Resort Village will include approximately 779 developed acres and approximately 1,089 acres of preserved and managed open space. The Resort Village will be built in phases and will include single-family and multiple-use residential, resort uses, retail/commercial, a public safety site, an elementary school site, park and recreation facilities, and related water, sewer, electrical and roadway infrastructure necessary within a planned community. Fire service will be provided by San Diego Rural Fire Protection District (SDRFPD) from a centrally located, on-site station that is capable of responding to the entire project within the County's General Plan 5 minute travel time standard.

The structures in the Project will be built using ignition resistant materials per the most recent County Fire and Building Codes (Chapter 7A) which are the amended California Fire and Building Codes and will be complemented by a system of improved water availability, capacity and delivery; fire department access; monitored defensible space/fuel modification; interior fire sprinkler systems in all structures, monitored interior sprinklers in applicable structures; and other components that will provide properly equipped and maintained structures with a high level of fire ignition resistance.

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The site fire risk analysis resulted in the determination that wildfire has occurred and will likely occur on near the project site again, but with moderate overall intensity and with the ability to provide local fire fighters needed defensible space given implementation of specified measures. Based on sophisticated modeling and analysis of the Project site to assess its unique fire risk and fire behavior, it was determined that the California and San Diego County standard of 100-foot-wide fuel modification zones will be suitable for anticipated fire intensity. This 100-foot wide fuel modification zone, when properly maintained as it will be with this community, has proven effective at minimizing structure ignition in recent fire events in the San Diego region, especially when coupled with ignition resistant construction. The fuel modification zones will be maintained in perpetuity by a funded Community Facilities District or Homeowner's Association (or similarly funded entity), ensuring that the required fuel reduction work occurs annually.

This FPP provides detailed analysis of the Resort Village, its potential risk from wildfire, and its impact on the SDRFPD. Further, it provides requirements, recommendations, and measures to reduce the risk and impacts to acceptable levels.

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1 INTRODUCTION

1.1 Purpose

This Fire Protection Plan (FPP) has been prepared by Dudek, for the Otay Ranch Resort Village (Project), also referred to as “Village 13.” This FPP was initially submitted prior to the County’s implementation of the *Guidelines for Determining Significance for Wildland Fire and Fire Protection*, and meets the intent of those guidelines with a slightly different format. This FPP serves as an implementation plan to guide the preparation of final construction documents that will incorporate the fire protection requirements detailed herein. Recommendations are based on site-specific characteristics and incorporate input from the County Fire Marshal and SDRFPD Fire Chief.

1.2 Scope

This FPP will guide the design, construction, and maintenance of Project related improvements in compliance with applicable codes. When properly implemented on an ongoing basis, the requirements and recommendations detailed herein are designed to result in reduced fire risks to the Project site. To that end, preparation of this FPP reflects completion of the following tasks:

- On-site risk assessment
- Fire Behavior modeling
- FlamMap fuel modeling Exhibits and other GIS analysis
- Fire Response modeling
- Fire history analysis
- Review of various project details/plans
- Review and incorporation of the fire authority having jurisdiction (FAHJ) Fire Codes
- Incorporation of project specific recommendations.

The fire protection features detailed in this FPP will be enforceable by the FAHJ and the County of San Diego. FPP approval will be provided by the SDRFPD Fire Chief and the County Fire Marshal.

1.3 Applicable Codes

This Plan demonstrates compliance with San Diego County Consolidated Fire Code requirements. It also demonstrates compliance with the requirements detailed in Title 24, Part 2 – 2013 California Building Code, Part 2.5 – 2013 California Residential Code, and Part 9 – 2013 California Fire Code for new development in the wildland-urban interface (WUI). It is also

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consistent with applicable County requirements for fire protection plans and vegetation management plans.

Per County Consolidated Fire Code, Section 104.8, Modifications,

Whenever there are practical difficulties involved in carrying out the provisions of this code, the fire code official shall have the authority to grant modifications for individual cases, provided the fire code official shall first find that special individual reasons make the strict letter of this code impracticable and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The applicant's request for a modification shall state the specific sections(s) for which a modification is requested, material facts supporting the contention of the applicant, the details of the modification or mitigating measure proposed and, if applicable, a map showing the proposed location and siting of the modification or mitigation measure. The details of action granting modifications shall be recorded and entered into the files of the department of fire prevention.

This FPP includes modifications to the applicable code where strict application of the code cannot be provided and in such cases, provides information supporting fire authority findings.

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2 PROJECT DESCRIPTION

2.1 Location

The Project site consists of approximately 1,869 acres located in southwestern San Diego County, approximately 0.25 miles east of the City of Chula Vista (Figure 1, and Appendix A). The Project site is bordered by Lower Otay Lake to the south and west. Regional access is provided by Interstate 805 (I-805), approximately 7 miles west of the site and State Route 125 (SR-125) located approximately 2.5 miles west of the Project site. State Route 54 (SR-54) provides regional east-west circulation, approximately 5 miles north of the Project site. Local access is provided by Otay Lakes Road, a collector arterial road that forms the southern boundary of the Project site. The project Assessor Parcel Numbers are 595-090-03, 598-130-021, 598-130-03, 598-140-01, 647-020-08, 647-020-09, 647-020-12, and 647-030-05.

2.2 Site Topography, Vegetation, Climate, and Fire History

2.2.1 Topography

Site topography is characterized by a broad mesa sloping to the south, broken by several steep canyons generally draining from north to south (Figure 2). Portions of the relatively flat mesa extend north into the Jamul Mountains, where the terrain is primarily characterized by steeper slopes. Elevations of developed portions of the project area range from approximately 500 feet above mean sea level at the southern end of the property to approximately 900 feet above mean sea level in the northeastern portion of the Project area. Open space within the Project area includes elevations up to approximately 1,500 feet above mean sea level. The site's average slope is approximately 44%. Slope is important relative to wildfire because steeper slopes typically facilitate more rapid fire spread. In the case of the Project site, the steeper slopes are primarily within the areas designated as permanent open space preserve and will not be developed. The site's steeper slopes ascend from south to north, away from the developed areas of the project in the alignment of the extreme Santa Ana wind events, which influences fire spread as fires tend to spread slower downslope.

2.2.2 Vegetation

The Project site is currently vacant, with historic vegetation consisting of native coastal sage scrub (CSS) and grassland habitats (Figure 2). Some riparian vegetation occurs in Project site drainages. More detailed information regarding the site's plant communities is provided in the *Biological Resources Technical Report for the Otay Ranch – Village 13 Resort Site* (Dudek 2010). On site vegetation is important relative to wildfire as some vegetation, such as CSS and grassland habitats, are highly flammable while other vegetation, such as oak and sycamore riparian, is less flammable due to its higher moisture content, but will burn under certain, more intense fire conditions.

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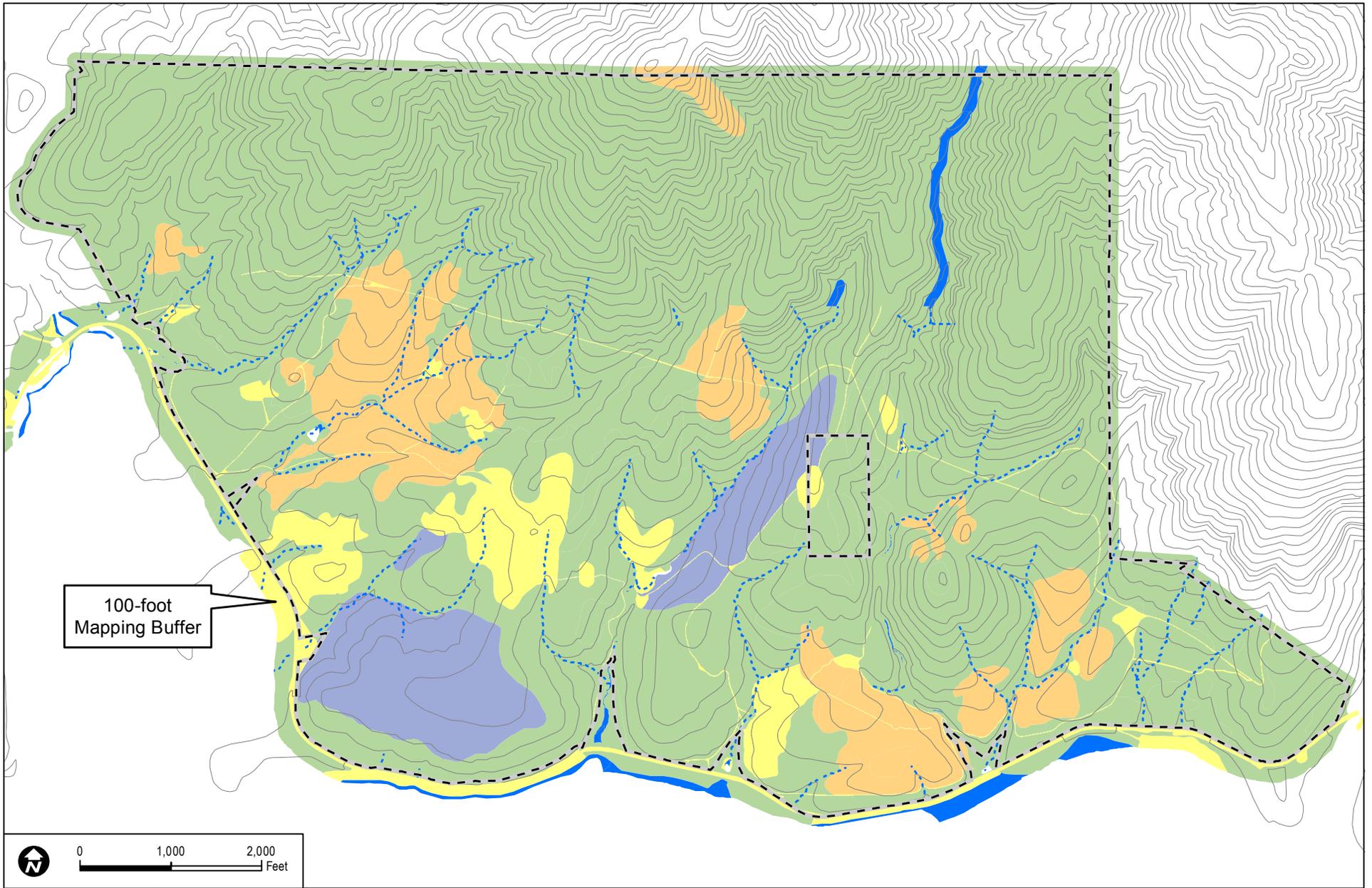
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FIGURE 1
Regional Map

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Source: Dudek 2014; SANGIS 2013

FIGURE 2

Site Topography and Vegetation Map

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2.2.3 Climate

Throughout Southern California and specifically at the Project site, climate has a large influence on the fire risk. The Project Site climate is typical of a Mediterranean area, with warm, dry summers and wetter winters. Precipitation typically occurs between December and March. The prevailing wind is an on-shore flow with fall Santa Ana winds from the northeast that may gust to 50 miles per hour (mph) or higher. Drying vegetation (fuel moisture of less than 5% for 1-hour fuels is possible) during the summer months becomes fuel available to advancing flames should an ignition occur. Extreme conditions, used in fire modeling for this site, include 92°F temperatures in summer and winds of up to 50 mph during the fall. Relative humidity of 12% or less is possible during fire season.

2.2.4 Fire History

Fire history is an important component of a site-specific FPP. Fire history information can provide an understanding of fire frequency, fire type, most vulnerable areas, and significant ignition sources, amongst others. There have been numerous fires recorded by California Department of Forestry and Fire Protection (CAL FIRE) on their Fire and Resource Assessment Program (FRAP) database in the direct vicinity of the Project area, including five fires that have burned on the property (FRAP 2010). The most notable fire occurred on October 26, 2003, and burned nearly 40,000 acres in the Otay Mesa area, including the entire Project area. Much of the property has burned four times, with fewer fire occurrences in the western portion. Appendix B, *Fire History Exhibit*, presents fire history in the Project vicinity and provides a graphical representation of the quantity of times the landscape has burned in the area.

2.3 Land Use

2.3.1 Vicinity Land Use

Existing land uses surrounding the Project site vary from open water to highly urbanized areas (Figure 3). Lower Otay Lake, a water and recreation reservoir owned by the City of San Diego, is located to the west and south of the Project site. The EastLake Vistas residential community, the East Lake Woods residential community and the U.S. Olympic Training Center compose the edge of urban development to the west. Lower Otay Lake, a recreational reservoir and water supply owned by the City of San Diego, is located to the south and west of the Project site. Upper Otay Lake and the Birch Family Estate Parcel, a portion of the Otay Ranch project identified for possible future development as a specialty conference center and low-density residential use, are located to the northwest. An ultra-light gliding and parachuting outfit is located on a private airfield owned by the City of San Diego at the east end of Lower Otay Lake,

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and an inactive quarry is located to the east of the Project site. Open space preserve land is located north of the Project area.

2.3.2 Land Use – General Plan

The San Diego County General Plan identifies the Project Site as a “Semi-Rural” area on the Otay Community Planning Area Regional Category Map. The Otay Community Planning Area Land Use map designates the Project site as a “Specific Plan Area.”

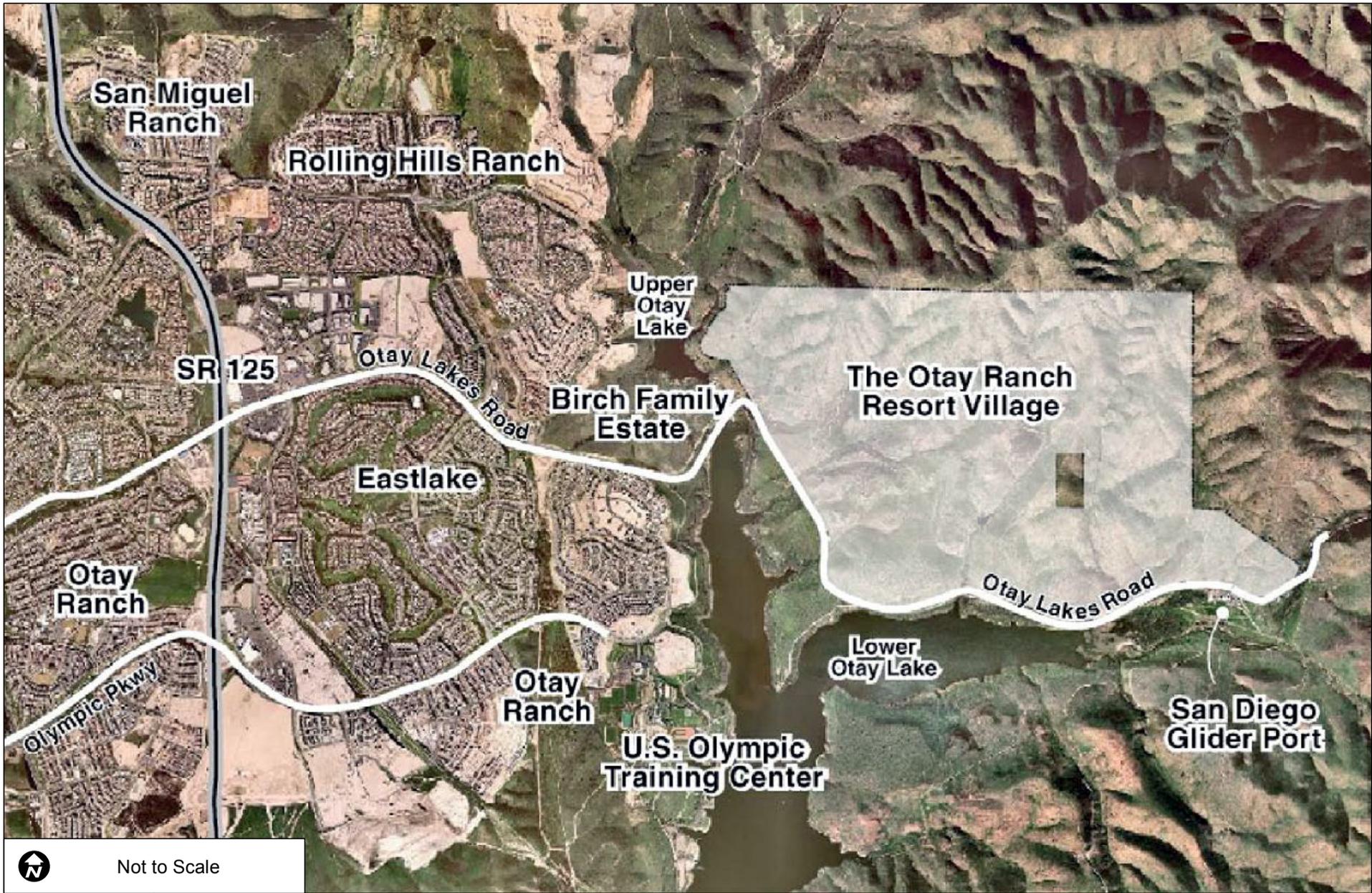
2.3.3 Land Use – Proposed

The Project incorporates a variety of land uses associated with a large, master planned community. With regard to wildfire, an important component is a large open space corridor for the San Diego County Multiple Species Conservation Program (MSCP) South County Segment Preserve that has been delineated in the center of the Project area. The other land uses planned for the Project include, single-family neighborhoods, a multiple-use residential site, a resort complex, an elementary school site, a public safety site, and parks. The Resort Planning Area is located east of the central open space corridor. The Multiple-Use Planning Area, with up to 20,000 square feet of commercial and 57 multi-family homes, is planned adjacent to Otay Lakes Road at the second project entry (Strada Piazza). Lower-density residential neighborhoods are located in the northwest portion of the village. A 100-foot Fuel Modification Zone is provided at the Project perimeter.

Resort

A resort hotel complex with up to 200 rooms will be built in the southeastern portion of the Project site. Buildings may be one to three stories tall with iconic architectural elements, such as a bell tower, up to 75 feet possible. No habitable structures on the Resort site will be over three stories in height. The hotel will be located at the top of a major rock formation. Designers will coordinate with SDRFPD to ensure that the buildings are designed such that typical 24 foot tall firefighter ground ladders will provide effective access.

The resort complex may include up to 20,000 square feet of commercial uses such as restaurants, retail stores, offices and conference facilities, and other recreational facilities, such as tennis and swimming facilities. The commercial portion of the resort complex may provide day-to-day services for permanent residents and visitor-oriented attractions.




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FIGURE 3
Surrounding Land Uses

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Residential

Approximately 540 acres (29%) of the Project area are designated single-family residential and will include 1,881 single-family dwelling units. A 14.4-acre multiple-use site, which consists of up to 20,000 square feet of commercial uses and 57 multi-family units, is located along Otay Lakes Road in the western portion of the Resort Village. The gross density of the Project site is approximately 1.04 dwelling units per acre, which is consistent with the Semi-Rural Regional Category designation and the General Plan Land Use designation SR-1.

Public Uses

A 10.0-acre elementary school site and a 10.2-acre public park are located within the village core. Eight other parks, ranging in size between 1.3 and 3.8 acres, are located throughout the residential neighborhoods.

Public Safety Site

The Project also includes a 2.1-acre public safety site centrally located in the Village Core, with access allowing travel north, south, and east. The public safety site will be reserved on the appropriate Final Map, depending on the final fire service configuration. Details related to funding, phasing, specific fire station facility components, equipment and staffing are discussed in Section 5.0 of this FPP.

Otay Ranch Preserve

The largest component of open space in the overall Otay Ranch project is the Otay Ranch Preserve, described in detail in the Otay Ranch Resource Management Plan. Development of the Resort Village Specific Plan area requires conveyance of open space to the Preserve Owner/Manager. The Resort Village Plan includes approximately 1,089 acres of Preserve open space. Native plant communities, primarily CSS, populate the Preserve areas.

Interior Open Space

The 144 acres of private open space within the developed portions of the Otay Ranch Resort Village Specific Plan are comprised of parkways adjacent to Otay Lakes Road, Strada Piazza and other major streets, trails, and manufactured slopes. The open space areas will be planted with irrigated, approved, fire resistive landscape plantings and maintained on an ongoing basis, in perpetuity, as detailed in the vegetation management plan. Where roads cross exposed natural preserve areas, such as between the resort site and the community, roadside fuel modification buffers are provided.

Interior Circulation

Internal circulation comprises about 39.0 acres of the planning area.

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3 FIRE RISK ASSESSMENT

3.1 Field Assessment

A field assessment of the Project area was conducted to document existing site conditions and determine potential actions for addressing the protection of the structures proposed for the site. Assessments of the area's topography, natural vegetation and fuel loading, available setback areas, and general susceptibility to wildfire formed the basis of the site risk assessment.

Site photographs were collected and fuel conditions were mapped using 100-scale aerial images. Field observations were utilized to augment existing site data in generating the fire behavior models and formulating the requirements provided in this FPP.

3.2 Fire Behavior Modeling

Field data collection efforts and fire behavior modeling was verified by Dudek for GIS exhibit preparation and to document the type and intensity of fire that would be expected on the Project site given characteristic site features, such as topography, vegetation, and weather.

Fire behavior modeling includes analysis of site-specific information resulting in modeled representations of how wildfire would move through available fuels on a given site. Fire behavior calculations are based on site-specific fuel characteristics which correlate to fire science research analyzing heat transfer related to specific fire behavior. To objectively predict flame lengths and intensities, the BehavePlus 3.0.1 fire behavior fuel modeling system (Andrews, Bevins, and Seli 2004) was applied using predominant fuel characteristics, slope percentages, and three representative fuel models (Scott and Burgan 2005, Weise and Regelbrugge. 1997) observed on site. Also, FlamMap (Finney 2004), a GIS based fire behavior software application which provides a useful graphical display of the modeling output, was prepared by Dudek for this Project to graphically portray the fire behavior pre- and post- treatment.

Fire behavior modeling specifics are located in Appendix C. This section focuses on results of the modeling process.

3.2.1 Fire Model Output Results

The results from the BehavePlus fire behavior model are presented in Table 1. As presented, wildfire behavior for areas represented by a fuel model SH7 varies based on timing of fire. A worst-case summer fire would result in a fire spreading at a rate of up to 1.1 mph with flame lengths of 21 feet. During a typical fall fire with gusty Santa Ana winds and low fuel moisture, fire is expected to be moderately fast moving at up to 2.3 mph with highest flame length values

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reaching approximately 31 feet. Spotting is projected to occur up to approximately 0.6 mile during a summer fire and over 1 mile during a typical fall fire.

Table 1
BehavePlus Fire Behavior Modeling Results

Fuel Model	BehavePlus Output	Summer Fire	Fall Fire	Extreme Fall Fire
GS2	Surface Rate of Spread	0.7 mph	1.2 mph	—
	Flame Length	8.0 feet	11.0 feet	15.0 feet
	Spot Distance from Wind Driven Surface Fire	0.4 miles	0.6 miles	—
	Ignition Probability	89%	100%	—
SCAL15	Surface Rate of Spread	0.6 mph	1.1 mph	—
	Flame Length	14.0 feet	18.0 feet	20.0 feet
	Spot Distance from Wind Driven Surface Fire	0.6 miles	0.8 miles	—
	Ignition Probability	89%	100%	—
SH7	Surface Rate of Spread	1.1 mph	2.3 mph	—
	Flame Length	21 feet	31 feet	46.0 feet
	Spot Distance from Wind Driven Surface fire	0.6 miles	1.1 miles	2.5 miles
	Ignition Probability	89%	100%	—

To replicate a catastrophic wildfire scenario, 50 mph winds were introduced for the fall/winter model scenario. The resulting extreme weather flame lengths are projected to be 46 feet with maximum spotting distance reaching 2.5 miles. Based on this result, 100-foot vegetation management zones are recommended for exposed portions of the Project perimeter and planting restrictions will be in place for all project landscapes.

Wildfire behavior in chamise (SCAL15) also varies based on timing of fire. A worst-case summer fire would result in a fire spreading at a rate of up to 0.6 mph with flame lengths of up to 14 feet. During a typical fall fire with gusty Santa Ana winds and low fuel moisture, fire is expected to be moderately fast moving at up to 1.1 mph with highest flame length values reaching approximately 18 feet. Under extreme fall conditions, flame lengths were modeled at 20 feet. Spotting distances are projected to be roughly 0.6 mile during a summer fire and 1.1 miles for a fall fire.

These modeling results were used to support analysis and calculation of the size and composition of recommended vegetation management zones. Vegetation management zones, in which flammable vegetation, continuous fuel beds, and ornamental shrubbery are removed, reduce the intensity of approaching fire and help reduce the likelihood of a structural fire spreading into naturally vegetated areas.

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It should be noted that the results presented in Table 1 depict values based on inputs to the BehavePlus software. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. Model results are used as a basis for planning with an understanding that actual fire behavior for a given location will be affected by many factors, including unpredictable weather patterns, small-scale topographic variations, or changing vegetation patterns.

FlamMap Analysis

Dudek utilized FlamMap software to verify and graphically depict fire modeling results for the Project site. Both pre- and post-treatment conditions were evaluated, incorporating both summer weather conditions (20 mph winds from the south-west) and more extreme fall weather conditions (50 mph winds from the north-east). To maintain consistency with BehavePlus fire modeling efforts conducted for the site, the same weather and fuel input variables were incorporated into the FlamMap modeling runs. The only exception occurred in the modeling of post-treatment conditions. In this case, a custom fuel model (Fuel Model 20) was used to represent the anticipated irrigated landscape condition present in the fuel modification areas. Areas within the Project site that existed beyond the limits of fuel modification areas, but within proposed grading limits were modeled using a Fuel Model 2 to depict their developed conditions.

The custom Fuel Model 20 was created by Morais¹ and attempts to mimic the irrigated, exotic landscape commonly found in the wildland-urban interface in southern California. This model utilizes variables from standard models 1 and 7. For this Project, two variations of the model were used in modeling the fuel modification areas. Specifically, fuel bed depth values were altered by zone, leaving all other fuel model variables constant. Depth values were based on recommended fuel modification area requirements (4-inch height for Zone A, 6-inch height for Zone B). Areas modeled as a Fuel Model 2 in the post-treatment analysis were assigned this model value based on Dudek's evaluation of the proposed hydroseed mix to be used in re-vegetating manufactured slopes. The hydroseed mix consists primarily of grass species, with lesser quantities of native shrubs commonly associated with CSS habitat types, resulting in a lower fuel landscape.

Fire Behavior – Existing Condition

Appendix D graphically represents the FlamMap fire behavior modeling outputs. As mentioned, the model inputs derived for the BehavePlus modeling were duplicated by Dudek in the FlamMap application, with nearly identical results. As FlamMap utilizes site-specific digital terrain data (including slope, aspect, and elevation data) slight variations in predicted flame

¹ Morais, M. UCSB Custom Model. http://www.physics.ucsb.edu/~complex/research/hfire/fuels/ucsb_20_desc.html

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length values can be observed based on fluctuations in topography. Such variations are not observable in BehavePlus modeling runs using constant slope variables. As presented, wildfire behavior in each of the fuel types varies based on differing weather condition inputs.

Fire Behavior – Post Fuel Modification Treatment

As expected and illustrated in Appendix E, the anticipated flame length values in untreated, preserve open space areas are higher than those in the fuel modification areas following treatment as directed in this FPP. In fact, significant reductions in flame lengths are anticipated through the use of fuel modification zones. Based on an evaluation of FlamMap modeling outputs, the 46-foot flame lengths predicted during pre-treatment modeling of extreme weather scenarios are significantly reduced to less than 10 feet at the outer edges of the fuel modification areas and to less than 5 feet by the time the inner portions of the fuel modification areas are reached. Similar reductions are observed during less extreme summer weather conditions.

The benefit provided by fuel modification zones is a reduction in the fire intensity and radiant and convective heat to which a structure would otherwise be exposed. This significant reduction in fire intensity does not mitigate the effect of flying embers, which may travel a mile or more during wind driven fires. However, the structures will be built using the latest building and fire codes which have specifically been enacted to reduce the potential for flame and ember penetration, leading causes for structural losses during wildfires.

Result – On-Site Fire Potential

Given the climatic, vegetation, WUI location, and topography characteristics along with the fire history and fire behavior modeling results previously discussed in this FPP, the Project site is considered vulnerable to wildfire starting in, burning onto, or spotting onto the site. This is especially the case due to the large amount of naturally vegetated, unmaintained open space that will be preserved adjacent the site. Under worst-case fall weather conditions, there is potential for fire to move rapidly through the Project site's fuel types. The most common type of fire anticipated in the vicinity of the Project area is a wind-driven brush fire from the north, northeast during the fall with flame lengths reaching nearly 50 feet. The rate of spread would be rapid due to volatile fuels, wind, and low fuel moisture. A typical cause may be related to roadways (tossed cigarette, vehicle accidents, or vehicle fire), or agricultural tractor work, welding, burning, arson or fireworks discharged in the area.

3.3 Existing Fire Department Response Capabilities

The Project is located within the SDRFPD responsibility area. The SDRFPD operates ten staffed Fire Stations and responds to a 720 square-mile area in south and east San Diego County. The fire department is a combination department that uses both paid and volunteer

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firefighters. Initial SDRFPD response to the Project site is currently provided from Fire Station 36 at 14024 Peaceful Valley Road in Jamul, approximately 10 road miles from the project’s eastern most entrance. Station 36 has three full-time firefighters and the following apparatus:

- 2 structural fire engines
- 1 rescue squad truck
- 1 brush fire engine
- 1 light and air unit (County)

Fire Station 36 currently responds to about 1.0 calls per day (2012 statistics).

In addition, City of Chula Vista Fire Station No. 8 is located at the intersection of Otay Lakes Road and Woods Drive, approximately 1.5 miles from the Project site. It houses a staffed engine company and a reserve engine. The closest ladder truck is housed at Chula Vista Fire Station No. 7 on La Media Drive and Santa Venetia, approximately 7 road miles west of the Project site, exceeding the Insurance Services Office 2.5 mile standard. The closest Interface engine (Type II) is located at Chula Vista Fire Station No. 2 at 80 East J Street, approximately 10.7 miles from the Project site. An automatic aid agreement is in place between SDRFPD and City of Chula Vista Fire Department (personal communication with Chula Vista Fire Department Fire Marshal, November 15, 2010). Other fire companies are available as needed per County and State mutual aid response agreements.

3.4 Estimated Calls and Demand for Service from the Project

As indicated in Table 2, using San Diego County fire agencies’ estimate of 82 annual calls per 1,000 population, which is consistent with nearby City of Chula Vista call data (80 annual calls per 1,000 population, as calculated from City provided data), the Project’s estimated 6,957 permanent residents and estimated 400 hotel guests (2 persons per room at 100% occupancy), and 450 on-site staff associated with the school, the resort, and the mixed use sites, would generate approximately 640 calls per year (about 1.8 calls per day), 85% of which (1.5 calls per day) are expected to be medical emergencies and 2.5% fire related calls, based on past call statistics in nearby Chula Vista.

Table 2
Calculated Call Volume Associated with the Otay Ranch Resort Village

Emergency Calls per 1,000 (County Data)	Number of Residents, Guests, and Staff	Avg. No. Calls per Year (7,357/1,000)x82	Avg. No. Calls per Day (589/365)
82	7,807 (estimate)	640	1.8

Total anticipated calls apply San Diego County average call volumes (2012) and are conservative in that they incorporate calls from high call volume land uses as well as lower call volume land uses, like new planned communities.

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3.5 Fire Response Modeling

The San Diego County General Plan Safety Element includes Travel Time Standards from the “Closest Fire Station” (San Diego County General Plan 2011). Travel time does not represent total response time, which is calculated by adding the travel time to the call processing time and to the turnout/reflex time. Generally, the call processing and turnout/reflex time would add between two to three minutes to the travel time. Table S-1 from the County General Plan establishes a service level standard, not a requirement, for fire and first responder emergency medical services that is appropriate to the area where a development is located. Standards are intended to (1) help ensure development occurs in areas with adequate fire protection and/or (2) help improve fire service in areas with inadequate coverage by requiring mitigation for service-level improvements as part of project approval.

**Table S-1
Time Response Standards from the Closest Fire Station***

Travel Time	Regional Category (and/or Land Use Designation)	Rationale for Travel Time Standards**
5 min	<ul style="list-style-type: none"> • Village (VR-2 to VR-30) and limited Semi-Rural Residential Areas (SR-1) • Commercial and Industrial Designations in the Village Regional Category • Development located within a Village Boundary 	In general, this travel time standard applies to the County’s more intensely developed areas, where resident and business expectations for service are the highest.
10 min	<ul style="list-style-type: none"> • Semi-Rural Residential Areas (> SR-1 and SR-2 and SR-4) • Commercial and Industrial Designations in the Semi-Rural Regional Category • Development located within a Rural Village Boundary 	In general, this travel time provides a moderate level of service in areas where lower-density development, longer access routes and longer distances make it difficult to achieve shorter travel times.
20 min	Limited Semi-Rural Residential areas (>SR-4, SR-10) and Rural Lands (RL-20) All Commercial and Industrial Designations in the Rural Lands Regional Category	In general, this travel time is appropriate for very low density residential areas, where full-time fire service is limited and where long access routes make it impossible to achieve shorter travel times.
>20 min	Very-low rural land densities (RL-40 and RL-80)	Application of very-low rural densities mitigates the risk associated with wildfires by drastically reducing the number of people potentially exposed to this hazard. Future subdivisions at these densities are not required to meet a travel time standard. However, independent fire districts should impose additional mitigation requirements on development in these areas.

* The most restrictive standard will apply when the density, regional category and/or village/rural village boundary do not yield a consistent response time standard.

** Travel time standards do not guarantee a specific level of service or response time from fire and emergency services. Level of service is determined by the funding and resources available to the responding entity.

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As noted above, the Project site is currently designated as Semi-Rural by the Otay Community Planning Area Regional Category Map. The gross density is roughly 1.04 dwelling unit per acre, similar to the SR-1 land use designation; however, the actual Land Use designation is Specific Plan Area. Based on these designations, the Project site would be subject to the 5-minute travel time standard post development.

The closest SDRFPD station is beyond the five minute travel time response. In an effort to understand fire department response capabilities from an on-site station, Dudek conducted an analysis of the travel time response coverage from two potential temporary station sites as well as the proposed Otay Ranch Resort Village Public Safety Site. This modeling analysis was conducted using Network Analyst tools within Geographic Information Systems (GIS) software, road data files, and Project development plan data. Response travel speed for this analysis was held constant at 35 mph, consistent with the Insurance Services Office (ISO) Public Protection Classification Program's Response Time Standard. This average speed has been validated for ISO as still being applicable as a predictive tool and considers average terrain, average traffic, weather, and slowing down for intersections. While the Resort Village circulation systems include certain traffic calming tools to improve pedestrian safety, a 35 mph response travel speed is considered appropriate because the Resort Village street sections comply with fire access travel width requirements. Model output files were utilized to analyze the quantity and percentage of individual Project units that could be reached by fire response personnel from each site, assuming travel time and speed constraints. Modeling data and results are presented in Appendices F and G.

Once the network data set parameters were finalized, Dudek ran network models to depict the response coverage from two potential, temporary on-site station sites and the permanent public safety site. The model results in Appendices F and G depict the geographic limits that can be reached within five minutes travel time. As depicted in Appendix F, the entire community falls within the five minute travel time standard from the identified Public Safety Site. As depicted in Appendix G, based on the location of potential temporary sites, one of the sites (Option B) can meet the five minute travel time standard for the entire Project area while the other (Option A) can respond to 96% of the project site, excluding roughly 70 lots and the resort site. Travel to these areas would require no more than an additional minute (estimated). Table 3 presents the results of the emergency response analysis.

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Table 3
Emergency Response Travel Times from Proposed On-site Public Safety Site and Two Potential Temporary Station Sites

5 Minute Travel Time	Quantity of Units Reached within 5-minutes	Percentage of Residential Units Reached (%) within 5-minutes	Quantity of Units Reached within 10-minutes	Percentage of Residential Units Reached (%) within 10-minutes
On-site Public Safety Site	1,938	100	1,938	100
Potential Temporary Station Site – A	1,867	96	1,938	100
Potential Temporary Station Site – B	1,938	100	1,938	100

* The travel time analysis has considered the proposed traffic calming measures proposed for the Project. The types of traffic calming proposed maintain the emergency travel speeds modeled for this analysis.

Response Capability Impact Assessment and Mitigation

The proposed Project includes a significant number of new homes, a school, and commercial structures. Service level requirements could, in the absence of fire facilities and resources improvements, cause a decline in the SDRFPD response times and capabilities. The requirements described in this FPP are intended to aid fire-fighting personnel and minimize the demand placed on the existing emergency service system. However, additional firefighting capabilities and resources will be required to meet the demands created by the Project.

To avoid potential degradation of services, meet the anticipated increased demand in accordance with County emergency travel times in compliance with Fire District requirements, and respond to the on-site risks, including the resort, the Project will be required to provide additional firefighting capabilities. The additional resources required to serve the Project are outlined in Section 5.0 of this FPP including options for temporary fire service, land for a public safety site, fair share funding for a permanent fire station, staffing, and equipment, and the phasing of the development and the firefighting resources necessary to meet the demand for fire and emergency medical services generated by the Project.

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4 FIRE SAFETY REQUIREMENTS

4.1 Fuel Modification Zones

4.1.1 Zones and Permitted Vegetation

As indicated in preceding sections of this FPP, an important component of a fire protection system is the fuel modification area. Fuel modification areas are designed to gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other on the perimeter of the community's WUI exposed structures, as well as around all structures including:

- All residential and commercial occupancies
- School
- Resort
- Open space areas within the community
- Roads

Based on the modeled extreme weather flame lengths for this Project, flame lengths are projected to be approximately 46 feet high. The fire behavior modeling system used to predict these flame lengths was not intended to determine sufficient fuel modification zone widths, but it does provide the average predicted length of the flames, which is a key element for determining "defensible space" distances for providing fire fighters with room to work and minimizing structure ignition. For this Project, the proposed fuel modification zone width is 100 feet, more than twice the modeled flame lengths in each of the fuel types represented on site.

The following fuel modification zone requirements are proposed for this Project. These zones are presented graphically in Appendices H-1 through H-3. In addition, an *Approved Plant List* is provided in Appendix I.

Definition

A 100-foot-wide brush management area from the development's edge, extending outwards towards the Preserve, as required.

General Criteria

- All plant material listed on the Otay Ranch Village 13 "Fire Protection Plan" prohibited plant list (Appendix J) and the County of San Diego's "Undesirable Plant List Plant List" will be prohibited within any brush management zone.

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- No vegetation found on the Prohibited Plant List (Appendix J) shall be planted or remain in any Fuel Modification Zone.
- 50%–70% of the overall brush management areas shall be planted with deep rooting plant material.
- All plant material in irrigated zones shall be maintained in a succulent hydrated condition.
- Debris and trimmings produced by thinning and pruning shall be removed from the site, except for larger woody debris that may be chipped and left on site for weed and erosion control.
- There shall be no hedging of shrubs.
- Shrubs may be planted in clusters not exceeding a total of 400 square feet.
- A distance of no less than the width of the largest shrub's mature spread shall be provided between each shrub cluster.
- Non-shrub avenues devoid of shrubs shall be included to provide a clear access route from toe of slope to top of slope and shall be a minimum width of 6 feet and spaced a distance of 200 linear feet on center.
- Where shrubs or other plants are planted underneath trees, the tree canopy shall be maintained at a height no less than three times the shrub or other plant's mature height to break up any fire laddering effect.

Zone A

Zone A – Definition:

All public and private areas located between a structure's edge and 50 feet outward. These areas may be located on public slopes, private open-space lots, public streets, and/or private yards, as defined in the landscape brush management exhibits.

Zone A – Specific Criteria:

- This irrigated wet zone shall be serviced by a permanent automatic irrigation system.
- No tree limb encroachment within 10 feet of a structure or chimney, including outside barbecues or fireplaces.
- Minimum 10 feet between tree canopies.
- Tree maintenance includes limbing-up (canopy raising) 6 feet or one-third the height of the tree.

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- Additional trees (excluding prohibited or highly flammable species) may be planted as parkway trees on single loaded streets.
- 75% of all groundcover and sprawling vine masses shall be limited to a maximum height of 18 inches.
- 25% of all groundcover and sprawling vine masses may reach a maximum height of 24 inches.
- Ground covers must be of high-leaf moisture content.
- Shrubs shall be less than 2 feet tall, on 5-foot centers.
- Randomly place approved succulent type plant material may exceed the height requirements, provided that they are spaced in groups of no more than three and a minimum of five feet away from described “clear access routes.”
- Vegetation/Landscape Plans shall be in compliance with this FPP.

Zone B

Zone B – Definition:

All public and private areas located between the outside edge of Zone A and 50 feet outward. These areas may be located on public slopes, private open-space lots, public streets, and/or private yards, as defined in the landscape brush management exhibits.

Zone B – Specific Criteria:

- Represents a 50% thinning zone – 50% less fuel than on adjacent unmaintained preserve areas.
- All manufactured slopes within this area shall be serviced by a temporary, aboveground automatic irrigation system which will be turned off once the plantings are established, but will remain in place.
- Trees may be located within this zone, provided that they are planted in clusters of no more than three. A minimum distance of no less than 20 feet shall be maintained between the tree cluster’s mature canopies. The trees will be limbed up to maintain vertical separation from understory shrubs.
- Only those trees on the County of San Diego’s “Suggested Plant List for a Defensible Space” and those approved by the biologist shall be allowed within this zone.
- 75% of all groundcover and sprawling vine masses shall be limited to a maximum height of 36 inches.
- 25% of all groundcover and sprawling vine masses may reach a maximum height of 48 inches.

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- Randomly placed approved succulent type plant material may exceed the height requirements, provided that they are spaced in groups of no more than three and a minimum of five feet away from described “clear access routes.”
- Single specimen native shrubs, exclusive of chamise and sage, may be retained, on 20-foot centers.

4.2 Other Vegetation Management

A. Roadside Fuel Modification Zones (Including Driveways)

- High BTU producing, flammable vegetation including shrubs and trees shall be cleared and are prohibited.
- Tree and shrub canopies shall be spaced such that interruptions of tree crowns occur and horizontal spacing of 20 feet between mature canopies of trees or tree groups is maintained.
- Grass shall be mowed to 4 inches.
- Single tree specimens, fire resistive shrubs, or cultivated ground cover such as green grass, succulents or similar plants used as ground covers may be used, provided they do not form a means of readily transmitting fire.
- All roads in the development will have vegetation clearance of flammable vegetation on each side, as follows:
 1. Fire Access Roads – 30 feet from edge of pavement
 2. New roads/driveways – 30 feet from edge of pavement
 3. Existing roads/driveways – 20 feet from edge of pavement. *EXCEPTION occurs where the preserve is at the edge of an existing road, such as Otay Lakes Road where fuel modification may not be consistent with preserve management directives. However, in an effort to minimize the likelihood of road related activities triggering a Preserve wildfire, an HOA or CFD-funded maintenance district would provide ongoing maintenance for fuel management consistent with Code requirements and habitat management directives.*
- Trees may be placed within the Roadside Vegetation Management Zones. The following criteria must be followed:
 1. Tree spacing to be 20 feet between mature canopies (30 feet if adjacent to a slope steeper than 41%).
 2. Trees must be limbed up one-third the height of mature tree or 6 feet, whichever is greater.

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3. No tree canopies lower than 13 feet 6 inches over roadways.
4. No tree trunks intruding into roadway width.
5. No trees or other plants on the Prohibited Plant List (Appendix J) are permitted.
6. No flammable understory is permitted beneath trees.
7. Any vegetation under trees to be fire resistive and kept to 2 feet in height or below, and no more than one third the height of the lowest limb/branch on the tree.

B. Trail Vegetation Management

- Trails will be limited to existing dirt roads within the Preserve areas. Vegetation Management alongside these roads/trails is not permitted within the MSCP. Trail maintenance shall occur on the trails to remove flashy fuels and maintain the trail in a useable, low fuel condition. The Otay Ranch Preserve Owner Manager or their designee shall maintain trails within Preserve areas.

C. Parks, Open Space, etc.

- Landscaping within parks and open space areas will be in compliance with the guidelines in this plan.
- Flammable vegetation must be removed and is prohibited.
- Grasses must be maintained/mowed to 4 inches.
- Types and spacing of trees, plants, and shrubs, to comply with the criteria in this plan.
- No plants in the Prohibited Plant List (Appendix J) are permitted in this area.
- Down and dead vegetation will be removed as observed.
- Trees to be properly limbed and spaced and from approved, fire resistive plant list.

D. Vacant Parcels and Lots

- Vegetation management will not be required on vacant lots until construction begins. However, perimeter Vegetation Management Zones must be implemented prior to commencement of construction utilizing combustible materials.
- Vacant lots adjacent to active construction areas/lots will be required to implement vegetation management if they are within 30 feet of the active construction area. Perimeter areas of the vacant lot shall be maintained as a Vegetation Management Zone extending 30 feet from roadways and adjacent construction areas.

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- Prior to issuance of a permit for any construction, grading, digging, installation of fences, etc., the 30 feet at the perimeter of the lot is to be maintained as a Vegetation Management Zone.
- In addition to the establishment of a 30-foot-wide vegetation management zone prior to combustible materials being brought on site, existing vegetation on the lot shall be reduced by at least 60% upon commencement of construction.
- Dead fuel, ladder fuel (fuel which can spread fire from ground to trees), and downed fuels shall be removed and trees/shrubs shall be properly limbed, pruned and spaced per this plan.

E. Otay Ranch Preserve Areas

A Community Facilities District (CFD), Homeowners' Association (HOA), Otay Ranch Preserve Owner/Manager or other legal entity approved by the SDRFPD and County Fire Marshal, ("Approved Maintenance Entity") shall obtain permission from the County, and/or the appropriate resource agencies (California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (USFWS), Army Corps of Engineers (ACOE)) prior to conducting Vegetation management activities within the Otay Ranch Preserve areas.

F. Alternative Methods

The builder or private lot owner may submit a site specific risk assessment and detailed Vegetation Management Plan (VMP), to the SDRFPD and the County Fire Marshal proposing alternative methods of fire protection and providing justification for any variance from the recommended vegetation management zones, if there is a practical difficulty, or environmental constraint, in providing the entire size of the necessary vegetation management zone detailed herein. The VMP will need to fully justify any alternative means and methods/mitigation measures proposed for reductions in the fuel modification areas.

G. Private Lots

This FPP provides direction for selecting lower flammability plant material along with planting and maintenance requirements. The 100 feet fuel modification zone, or the entire lot area between the residence and the property line, if less than 100 feet, are required to use low flammability plantings consistent with this FPP. In addition, it is recommended that none of the plant materials listed in the "Prohibited Plant List" (Appendix J) in this plan or otherwise known to be especially flammable be planted on private lots. This FPP or a summary of its key points will be provided to all buyers in a private property owner's guide to living in a fire environment. Deed restrictions will be recorded indicating the fuel modification zones on each private lot, as appropriate. Deed restrictions shall run with the land and be conveyed to any subsequent owner of the private lot. In addition the project Codes, Covenants, and Regulations (CC&Rs) shall include a reference to the FPP to ensure compliance with the FPP.

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4.2.1 Maintenance

Vegetation management shall be completed annually by May 1 of each year and more often as needed for fire safety, as determined by the SDRFPD. Homeowners and private lot owners shall be responsible for all vegetation management on their lots, in compliance with this FPP which is consistent with Fire District requirements. The “Approved Maintenance Entity” shall be responsible for and shall have the authority to ensure long term funding, ongoing compliance with all provisions of this FPP, including vegetation planting, fuel modification, vegetation management, and maintenance requirements on all private lots, multifamily residences, resort, school (Fire District may inspect schools and enforce fuel modification requirements), parks, common areas, roadsides (including Otay Lakes Road), and open space under their control (if not considered biological open space). Any water quality basins, flood control basins, channels, and waterways should be kept clear of flammable vegetation, subject to paragraph E above. The Approved Maintenance Entity shall obtain an inspection and report from a SDRFPD–authorized Wildland Fire Safety Inspector, in May of each year, certifying that vegetation management activities throughout the Project Site have been performed pursuant to this FPP. This report will be funded by the Approved Maintenance Entity and submitted to SDRFPD and/or the County Fire Marshal for approval.

In addition to the requirements outlined above, the project will comply with the following important risk reducing guidelines:

- All new power lines shall be underground.
- Vegetation Management Zones cannot extend beyond the private lot or development without written, legal, permission of off-site landowners, and shall not extend into biological open space or other sensitive biological areas, or other areas controlled by the County and/or resource agencies without first having written formal permission from all applicable agencies.
- Erosion or ground (including slope) instability resulting from vegetation removal and maintenance is possible, especially on slopes. Where possible, removed plants’ roots will be left in the ground for soil stability purposes. Annual maintenance of root crown sprouts may be necessary.

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4.3 Road Requirements

4.3.1 Access

Access Roads

Site access, including road widths and connectivity, will comply with the requirements of the Consolidated County Fire Code (Section 96.1.503). The County Fire Marshal and SDRFPD have reviewed requests for project specific deviations from the Fire Code standards and provided input which is reflected in the Tentative Map street sections.

- A concurrent request for Modification to Road Standards application has been submitted to the Department of Public Works. Eight modifications are proposed and formal approval of these modifications will be addressed as part of the approval of the Tentative map.
- Roads will be constructed to minimum 24-foot unobstructed widths and shall be improved with aggregate cement or asphalt paving materials. There shall be at least two points of primary access from Otay Lakes Road to the Project Site for emergency response and evacuation. All interior residential streets will be designed to accommodate a minimum of a 75,000-lb. fire truck based on actual weight of the required aerial ladder/Quint (quintuple combination pumper).
- Fire access road for each phase shall meet all project approved fire code requirements and/or mitigated exceptions for maximum allowable dead-end distance, paving, and fuel management prior to combustibles being brought to the site.
- On-site fire lane road at commercial buildings, resort, and school (road closest to the building) will be 26 feet wide, per code or as approved by County Fire Marshal.
- Parking will be assumed to be 8 feet in width, but may be reduced on certain residential streets. Where parking lane widths are reduced below 8 feet, parking will be restricted, per the DPW Road Modification, by posting of signs stating “No Parking; Fire Lane” to preserve the 24-foot unobstructed width for emergency response. Street sections are to be reviewed and approved by the County DPW and the County Fire Marshal.
- Roads with a median or center divider will have 14 feet unobstructed width on both sides of the center median or divider. Emergency fire truck access points will be provided through the center divider at 1,000-foot intervals, where road segment length allows.

Secondary Access

- Three entrances from Otay Lakes Road to the Project site are provided, two of which are remote from each other, satisfying the need for secondary access.

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- Any dead end roads longer than 150 feet shall have approved provisions for fire apparatus turnaround.
- Emergency access is provided off of Strada Piazza to the end of the cul-de-sac for Piazza Cascina street, as well as from Piazza Sorano connecting to Otay Lakes Road. The roads are 24 feet wide, all-weather surface, constructed to DPW standards. These emergency access routes will include automatic (pressure activated) gate for evacuation purposes, and consistent with the County Consolidated Fire Code, will be equipped with automatic strobe sensors and KNOX key switches for automatic override by first responders.
- Fire apparatus turnarounds to include turning radius of a minimum 28 feet, measured to inside edge of improved width, (CCFC 96.1.503.2.4).
- The longest dead-end road (cul-de-sac) allowed by the County Consolidated Fire Code and CCR Title 14 is 800 feet for this community. No dead-end cul-de-sac lengths will exceed 800 feet.
- Cul-de-sac bulbs are required on dead-end roads in residential areas where roadways serve more than two residences.
- Roadways and/or driveways will provide fire department access to within 150 feet of all portions of the exterior walls of the first floor of each structure.
- Roadway design features (e.g., speed bumps, humps, speed control dips, planters, fountains) that could interfere with emergency apparatus response speeds and required unobstructed access road widths will not be installed or allowed to remain on roadways (SDRFPD and County Consolidated Fire Code). Traffic Calming features (i.e., raised intersections, intersection neck downs, roundabouts and parallel bay parking with landscape pop-outs) may be allowed, subject to approval by the SDRFPD and County Department of Public Works.
- Vertical clearance of vegetation along roadways will be maintained at 13 feet, 6 inches. Vertical clearance in the commercial/resort areas to be clear to the sky to allow aerial ladder truck operation.
- Angle of driveway/roadway approach/departure will not exceed 7° (12%) per Fire District.
- Road grades will not exceed 15%, unless approved by the Fire Chief (maximum 20% with mitigations).
- Developer will provide information illustrating the new roads, in a format acceptable to the Fire District, for updating of Fire District maps (County Fire Code, Section 96.1.505.5).
- Any roads that have traffic lights shall have Fire District–approved traffic preemption devices (Opticom) compatible with devices on the Fire Apparatus, per Fire District.

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4.3.2 Gates

Access gates will comply with County Fire Code and SDRFPD, Section 96.1.503.6. Public roads shall not be gated. Any gates on any private roads or on private driveways may be permitted but must comply with Fire District standards for electric gates.

- Access gates are to be equipped with a KNOX key switch, which overrides all command functions and opens the gate. Gates serving more than 4 parcels shall be equipped with sensors for detecting emergency vehicle “opticom” strobe lights from any direction of approach. Strobe detection and key switches will be provided on the interior and exterior of gates.
- Switches may be dual keyed for Fire District and Law Enforcement access.
- Gate activation devices will be equipped with a battery backup or manual mechanical disconnect in case of power failure.
- Further, gates will be:
 - Wider than the roadway
 - Inclusive of area lighting
 - Constructed from non-combustible materials
 - Inclusive of provisions for manual operation from both sides, if power fails. Gates will have the capability of manual activation from the development side, via contact by a person or a vehicle (including a vehicle detection loop)
 - Located 30 feet from any intersecting road
 - Operable by activation with fire truck radio.

4.3.3 Driveways

Any structure that is 150 feet or more from a common road in the development shall have a paved driveway meeting the following specifications:

- Grades less than 20% with surfacing and sub-base consistent with the County of San Diego Parking Design Manual
- Approved fire apparatus turnaround with radius no less than 36 feet
- Driveways serving two houses or fewer will be 16 feet wide unobstructed with a fire apparatus turnaround. Driveways serving more than two houses will be 24 feet wide unobstructed

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- Lighted house addresses shall be posted at the entrance to each driveway if house numbers are not visible from the street
- Driveway gates to comply with this section.

Identification of roads and structures will comply with SDRFPD and CFC, Section 96.1.505), as follows:

- All structures to be identified by street address numbers at the structure. Numbers to be 4 inches in height, 0.5-inch stroke, and located 6 to 8 feet above grade. Addresses on other than residential buildings to be 6 inches high with 0.5-inch stroke. Numbers will contrast with background and be lighted.
- Multiple structures located off common driveways will include posting addresses on structures, on the entrance to individual driveways, and at the entrance to the common driveway for faster emergency response.
- Structures 100 feet or more from a roadway will include numbers at the entrance to the driveway.
- Proposed roads within the development will be named, with the proper signage installed at intersections to satisfaction of the Fire District and the Department of Public Works (County of San Diego Standard DS-13).
- Streets will have street names posted on non-combustible street signposts. Letters/numbers will be 4 inches high, reflective, on a 6-inch-high backing. Signage will be 7 feet above grade. There will be street signs at the entrances to the development, all intersections, and elsewhere as needed subject to approval of the Fire Chief.
- Access roads to private lots to be completed and paved prior to issuance of building permits and prior to the occurrence of combustible construction.

4.4 Structure Requirements

4.4.1 Ignition-Resistance

This section outlines ignition-resistant construction (for all structures) that will meet the requirements of the 2014 Consolidated County Fire Code and the County Building Code (SD County Code of Regulatory Ordinance; Title 9, Division 2), Chapter 701--A. The following construction practices respond to the requirements of these codes and are consistent with the 2013 California Fire and Building Codes (Chapter 7A). Code updates are likely to occur before the project is fully constructed. As such, building plans must meet the “then-current” County Building Code in effect at the time of building plan submittal.

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While these standards will provide a high level of protection to structures in this development, and should reduce the potential for ordering evacuations in a wildfire, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

1. Exterior walls of all structures and garages to be constructed with approved non-combustible (stucco, masonry, or approved cement fiber board) or ignition-resistant material from grade to underside of roof system. Wood shingle and shake wall covering is prohibited. Any unenclosed under-floor areas will have the same protection as exterior walls. Per County Building Code, Chapter 7-A: Exterior wall coverings to extend from top of foundation to the underside of roof sheathing, and terminate at 2-inch nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure). The underside of any cantilevered or overhanging appendages and floor projections will maintain the ignition-resistant integrity of exterior walls, or projection will be enclosed to grade.
2. Eaves and soffits will meet the requirements of SFM 12-7A-3 or be protected by ignition-resistant materials or non-combustible construction on the exposed underside, per County Building Code, Chapter 7-A.
3. There shall be no use of paper-faced insulation or combustible installation in attics or other ventilated areas per County Building Code.
4. There shall be no use of plastic, vinyl, or light woods on the exterior.
5. All roofs shall be a Class “A” listed and fire-rated roof assembly, installed per manufacturer’s instructions, to approval of the Fire District and the PDS. Roofs shall be made tight with no gaps or openings on ends or in valleys, or elsewhere between roof covering and decking, in order to prevent intrusion of flame and embers. Any openings on ends of roof tiles shall be enclosed to prevent intrusion of burning debris. When provided, roof valley flashings shall not be less than 0.019 inch (No. 26 gage galvanized sheet) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of 72 pound ASTM 3909 cap sheet running the full length of the valley (County Building Code, Chapter 7-A).
6. No vents in soffits, cornices, rakes, eaves, eave overhangs or between rafters at eaves or in other overhang areas. Gable end and dormer vents to be at least 10 feet from property line or provided alternative design resistant to ember penetration. Vents in allowed locations to be protected with wire mesh having no openings greater than 0.125 inch. Vent openings shall not exceed 144 square inches. Vents shall be designed to resist the intrusion of any burning embers or debris (County Building Code, Chapter 7-A).

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7. Vents shall not be placed on roofs unless they are approved for Class “A” roof assemblies (and contain an approved baffle system (such as Brandguard vents) to stop intrusion of burning material) or are otherwise approved.
8. Turbine vents are prohibited.
9. Exterior glazing in windows (and sliding glass doors, garage doors, or decorative or leaded glass in doors) to be dual pane with one tempered pane, or glass block or have a 20-minute fire rating. Glazing to comply with CBC Chapter 7-A.
10. Any vinyl frames to have welded corners and metal reinforcement in the interlock area to maintain integrity of the frame certified to ANSI/AAMA/NWDA 101/I.S 2 97 requirements.
11. Skylights to be tempered glass (County Building Code, Chapter 7-A).
12. Rain gutters and downspouts to be non-combustible. They shall be designed to prevent the accumulation of leaf litter or debris, which can ignite roof edges (County Building Code, Chapter 7-A).
13. Doors to conform to SFM standard 12-7A-1, or shall be of approved noncombustible construction or shall be solid core wood having stiles and rails not less than 13/8 inches thick or have a 20-minute fire rating. Doors to comply with County Building Code, Chapter 7-A. Garage doors to be solid core 1.75-inch-thick wood or metal, to comply with code.
14. Decks and their surfaces, stair treads, landings, risers, porches, balconies to comply with language in County Building Code, Chapter 7-A and be ignition-resistant construction, heavy timber, exterior approved fire retardant wood, or approved non-combustible materials.
15. Decks or overhangs projecting over vegetated slopes are not permitted. Decks to be designed to resist failing due to the weight of a firefighter during fire conditions. There will be no plastic or vinyl decking or railings. The ends of decks to be enclosed with the same type of material as the remainder of the deck.
16. There shall be no combustible awnings, canopies, or similar combustible overhangs.
17. All private lots at the perimeter of the Project Site and those abutting the open space are required to have 6-foot solid masonry walls or other solid non-combustible wall (other than plastic or vinyl or other material that can melt) at the perimeter of the lot. An approved, listed, fire-rated glazing assembly using glazing such as “Firelite Plus” by Technical Glass Products Co., 1.800.426.0279, or equivalent, may be installed to provide for views. Final determination as to actual type of listed glazing assembly to use is up to

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the glazing contractor, architect, and general contractor, and is subject to approval of County Fire Marshal and Building Official.

18. No wood fences to be allowed within 5 feet of structures on any lots. The first 5 feet from a structure will be non-combustible or meet the same fire resistive standards as walls. The exception is that a wood gate may be used adjacent to a structure, if there is a 5-foot length of non-combustible or fire-resistive fencing between the gate and the remainder of the fence where it abuts the structure.
19. All chimneys and other vents on heating appliances using solid or liquid fuel, including outdoor fireplaces and permanent barbecues and grills, to have spark arrestors that comply with the County Fire Code. The code requires that openings be maximum 0.5 inch. Arrestors shall be visible from the ground
20. All structures shall meet the setback established in Otay Ranch Resort Village Specific Plan.
21. Any liquid propane gas LPG tanks (except small barbecue and outdoor heater tanks), firewood, hay storage, storage sheds, barns, and other combustibles shall be located at least 30 feet from structures, and, within the fuel modification zone, 30 feet from flammable vegetation. There shall be no flammable vegetation under or within 30 feet of LPG tanks, or tanks shall be enclosed in an approved ignition-resistant enclosure with 10 feet clearance of flammable vegetation around it. In no case shall a tank be closer than 10 feet from the structure (consultant recommendation). County Fire Code requires 10 feet of clearance of native vegetation, weeds, and brush from under and around LPG tanks.
22. Storage sheds, barns, and outbuildings to be constructed of approved non-combustible materials, including non-combustible Class A roofs and shall be subject to the same restrictions as the main structure on lot.
23. Additionally, any of the above-listed structures (i.e., outbuildings, storage sheds, barns, separate unattached garages) that are 500 square feet or more in size shall be equipped with automatic fire sprinklers. Locations, and required fuel modification zones, will be subject to approval of County Fire Marshal and the Building Official based on size of the structure. Such structures should be a minimum of 30 feet from primary structure (consultant recommendation).

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4.4.2 Fire Protection System Requirements

Infrastructure, Structural Fire Protection, and Fire Protection Systems

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

Infrastructure Recommendations

The following conceptual recommendations are made in order to comply with the SDRFPD requirements, County of San Diego PDS requirements, the California Fire Code, the County Consolidated Fire Code and nationally accepted fire protection standards, as well as additional requirements to assist in providing reasonable on-site fire protection.

Water service will be provided by the Otay Water District. Water supply requirements include the following requirements from SDRFPD Fire Code, Section 96.1.507.2, and County Consolidated Fire Code, Section 96.1.507.2:

Fire Hydrants

- Hydrants are subject to SDRFPD approval. Hydrants to be located on the normal Fire Apparatus response side of the road at each intersection and at 350-foot spacing as required by the SDRFPD (except as noted below). Where applicable, hydrants to be located at the entrance to cul-de-sac bulb (not in the bulb itself). Hydrants to be provided on each side of any divided road or highway. In areas where buildings are not directly accessed from main roadways, the hydrants on such roadways may be 1,000 feet apart.
- Hydrants to be placed at entrances to driveways, even if this results in slightly exceeding the 350 feet by up to 50 feet.
- Per the SDRFPD Code, hydrants shall be provided every 300 feet in resort area, multifamily dwellings, and at the school.
- The water system for fire protection to be an approved water supply with hydrants and mains. Fire flow in the mains for residential occupancies to be at least 2,500 gallons per minute (gpm) in fire mains with a 20-psi residual at periods of maximum peak domestic demand. Fire flow for the multifamily, resort, and commercial occupancies to be a minimum of 2,500 gpm in fire mains and to County Consolidated Fire Code. No credit for sprinklers is available in wildfire prone areas. Duration of flow is 2 hours or more if required by the County Consolidated Fire Code based on the required flow. The amount of stored water for fire protection to be for the required duration (minimum 2 hours) at

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the worst-case fire flow at times of maximum peak domestic and commercial demand (including agriculture). Any private water systems to comply with National Fire Protection Association (NFPA) 22 and 24. In addition, fire protection water systems to comply with American Water Works Association Standard M-31; “Distribution Requirements for Fire Protection.”

- Hydrants to have one 2.5-inch outlet and one 4-inch outlet and be of bronze construction per the District Fire Code. Hydrants at resort, commercial buildings, and school to have two 4-inch outlets and one 2.5-inch outlet. Fire protection engineer to make determination whether dry barrels are necessary due to freeze potential.
- Hydrants to have a 3×3 concrete pad at base (gravel if dry barrel hydrant) for weed control.
- Reflective blue dot hydrant markers to be installed in the street to indicate location of the hydrant. Red dot markers are required for all sprinkler systems other than those in detached single-family dwellings.
- The lateral shut-off valve will be located in the street 10–25 feet in front of hydrant.
- Crash posts will be provided where needed on site areas where vehicles could strike fire hydrants, fire department connections, etc.

Fire Sprinklers

All structures, of any occupancy type, are required by the Fire District to have internal fire sprinklers. (Exception may be granted by Fire District for detached accessory structures under 500 square feet). One- and two-family residences may have NFPA 13-D systems. Residential structures 7,000 square feet and larger may be required to have a 4-head calculation. Enclosed patios porches, workshops, barns, storage structures, separate unattached garages, RV structures, and auxiliary use rooms over 500 square feet also to have sprinkler protection.

Other occupancies, such as the resort hotel, 3 or more stories in height, or 20 or more guests, shall have a sprinkler system in compliance with Uniform Building Code Standard 9-1 or NFPA 13, per the District Fire Code Section 96.1.903.2. Actual system design is subject to final building design and the occupancy types in the structure. All other occupancies in this development shall have fire sprinklers in compliance with the Fire District requirements and NFPA 13. All systems other than single-family detached dwelling systems to be remotely supervised to an approved 24/7 alarm company. A pressure of more than the minimum 20 PSI will most likely be needed to supply fire sprinklers in certain structures, and for certain in the resort building. This must be determined in the water system design phase.

4.4.3 Additional Requirements and Recommendations Based on Occupancy Type

This section includes conceptual occupancy-specific recommendations based on the type of occupancy.

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Additional Resort Complex/ Hotel/ Commercial Building Requirements and Recommendations

- On-site fire lane roadways will be 26 feet unobstructed by parking to within 150 feet of all portions of the exterior wall. Roadways will be clear to the sky with no overhead obstructions. Turning radius and actual location and configuration of on-site roads will be subject to Fire District approval when detailed plans are submitted and will be located to facilitate proper and safe operation of Fire District ground and aerial ladders.
- The primary travel road to the resort shall have at least 1 ingress lane and 2 egress lanes. The road will have 30 feet of vegetation management zone on the Preserve side of the road and 20 feet of vegetation management on the development side of the road with irrigated, low flammability vegetation and sparse planting.
- The Resort will be designed in coordination with SDRFPD/SDCFA to ensure that acceptable firefighter access is accommodated via typical fire engine ground ladders.
- Any overhang over an entrance where vehicles may drive or park will include a fire sprinkler system to protect against a fire in vehicles, including buses.
- Red dot markers are required in road at location of Fire Department sprinkler connections.
- Fire sprinkler system and valves will be remotely supervised by an alarm monitoring company that is U.L. listed for fire, or accepted by SDRFPD. The riser and valves will be located on exterior or in a 1-hour rated room directly accessible from exterior.
- Sprinkler fire department connection to be located about 4 to 10 feet in from curb of main access road in front of main building, 40 feet or more from building. A fire hydrant shall be located within 50 feet of the connection.
- Provide a wet standpipe system in any building over 2 stories from grade accessible to a fire engine, and in any large public assembly room (conference center, auditorium, etc.). A wet standpipe system shall be installed elsewhere where required by County Fire Code.
- Provide two points of fire truck access to applicable structures. Actual location of roads will be subject to Fire District approval at time of detailed plans for the resort/hotel.
- Provide approved 4-foot-wide firefighter foot and gurney access to pool and recreation areas from the closest parking location for an emergency vehicle.
- Unless an approved fire truck turnaround is provided, on-site, dead-end roads over 150 feet in length are prohibited.
- Provide firefighter access doors every 100 feet around perimeter of building high occupancy buildings.
- Provide adequate enclosed, fire-rated stairways to all floors for firefighter access and evacuation; one to terminate at the roof. Stairways will be in smoke proof rated enclosures.

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- Provide a Fire District–approved method of smoke removal from the building.
- Provide 6-foot-wide firefighter access paths around perimeters of buildings.
- Place fire hydrants every 300 feet on the on-site Resort road and on access road fronting the property.
- Provide hydrants, post-indicator valves, and Fire Department sprinkler connections with adequate vehicle crash protection.
- Provide the appropriate fire-extinguishing systems in restaurants where required for cooking operations.
- Elevators and controls are subject to Fire District approval.
- Any building qualifying as a high-rise building, if any, will comply with all high-rise fire protection requirements.
- Provide supervised smoke detection.
- Provide manual fire alarms.
- Provide an emergency announcement system, if applicable, to final design of buildings.
- Locate graphic alarm annunciator on exterior at front door and other significant access points if required by SDRFPD.
- Provide firefighter control room an exterior accessible location for use in monitoring all fire alarms and reviewing building maps and communicating during a fire or other emergency (subject to final design and size of resort).
- Provide required fire extinguishers.
- Any other commercial occupancy will comply with Fire District and Fire and Building Code requirements for the particular occupancy.
- Any outside storage to comply with Fire Code and Fire District requirements.
- Individual buildings will not exceed 40,000 square feet without having approved, fire-rated, firewalls partitioning every 40,000 square feet (or less if required by the specific building) or other equivalent fire protection such as a smoke detection system in addition to the sprinklers.
- Occupancy design and layout will comply with the County Building and Fire Codes.
- All final plans will be subject to approval of the Fire District.

School

- Building Plans will be subject to approval of the State Architect. Access, water supply and hydrant plans are subject to SDRFPD approval.

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5 FIRE AND EMERGENCY SERVICES

The following summary provides information pertaining to fire and emergency service response configuration for the Resort Village. Final fire and emergency services may include implementation of an optional configuration, as discussed below.

The Otay Subregional Plan (Otay SRP) includes Fire Protection and Emergency Services Facilities Goals, Objectives, Policies and Implementation Measures to ensure the timely provision of local fire protection and emergency service facilities. The following objectives establish response time/travel time thresholds for fire and emergency services within the County of San Diego:

- Provide sufficient fire and emergency services facilities to respond to calls within Otay Ranch single-family communities with residential lots of less than 2 acres, or more intensive uses such as multifamily residential, including industrial development and all commercial development except neighborhood commercial, in a 5-minute travel time.

Project Fire and Emergency Response Configuration

The Otay Ranch Resort Village Specific Plan is within the County of San Diego. The San Diego County General Plan includes travel time standards of 5-minutes, 10-minutes, 20-minutes and over 20-minutes, depending on the Land Use and Regional Category designations. The Project site is designated Semi-Rural on the Otay Community Planning Area Map, which falls under both the 5-minute and 10-minute response standard. Table S-1 of the County General Plan Safety Element describes in situations where the density, regional category and/or village/rural village boundary do not yield a consistent response time standard the more restrictive standard shall apply; thus, the proposed fire and emergency response configuration is based on what would be required to achieve the 5-minute travel time standard.

To ensure the entire Project site could be served within a 5-minute travel time, the public safety site was centrally located. Not only does this provide for better response coverage, but the location across from the neighborhood park and elementary school ensure the public safety site will be a civic presence and located near two potential call generating uses. However, due to this central location, it would not be practical to construct a fire station on the public safety site in the early phases of development.

Because the Resort Village will be built in phases, and based on the response analysis conducted in support of this FPP, the initial phases of this project can be provided emergency response from a temporary on-site facility. The temporary service option would continue until such time as a permanent fire station can be funded and constructed on-site, with timing estimated below.

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Timing of construction of a permanent on-site fire station within the Resort Village will be finalized and documented in a “Fire Services Agreement” between the project Applicant(s) and the SDRFPD. The permanent fire station shall be constructed on the Public Safety site identified in the Resort Village Specific Plan and Tentative Map.

The type and size of permanent on-site fire station will be based on the projected call volume associated with this project and the anticipated apparatus and staffing. The proposed apparatus for this station is one Type I engine and one Type III wildland engine, capable of providing structure and wildfire response. Staffing at Project build-out shall consist of a minimum of 4 firefighters. Based on a sampling of fire station sizes throughout southern California, and comparing new station design templates, a Fire Station between 6,000 and 6,500 square feet with two apparatus bays (dual stacked) may be sufficient for the project. However, if SDRFPD determines that the facility should be expanded to serve other areas within the SDRFPD, the Resort Village may contribute its fair share of the cost to construct and equip the facility. In addition, if the cost of providing fire services on-site exceeds available revenue, the Resort Village may contribute its fair share of maintenance and ongoing operation costs of the station.

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6 COMMUNITY PROTECTION AND EVACUATION PLAN

A Community Protection and Evacuation Plan (CPEP) will be prepared for the Otay Ranch Resort Village Community prior to occupancy. The CPEP will utilize existing information from San Diego County Office of Emergency Services (OES) and a standard template, as described on the County OES Web site (<http://www.sdcounty.ca.gov/oes/>). Fire and law enforcement authorities shall participate in preparation of the CPEP. The CPEP provides site specific procedures for various emergency situations, including wildfire, and once complete, will be made available to Otay Ranch residents, and resort and commercial tenants. The CPEP will be reviewed by residents at least annually through organized meetings and educational outreach by the HOA, Community Services District, or other means.

The CPEP will form the backbone of hazard relocation/evacuation planning for the Otay Ranch Resort Village. Wildfire emergencies will be one component of the CPEP. Among the important concepts that will be included in the CPEP are hazard identification, a description of the area's environment, mitigation strategies, law enforcement, fire agencies and contact information, homeowner education materials, preparedness checklist, route planning, and specific procedures for early relocation and resort site emergency refuge.

This FPP provides considerable information that can be integrated into the CPEP. Climate, vegetation, topography, wildfire hazards, fire agencies, and other descriptive information in this FPP can be utilized in the CPEP. Additionally, this FPP outlines important relocation considerations that will be integrated into the CPEP, as described in the following sections.

6.1 Wildfire Education

Resort Village residents and occupants of commercial and resort facilities will be provided ongoing education regarding wildfire, the CPEP, and this FPP's requirements. This educational information will support the fire safety and relocation features/plans designed for this community. Informational handouts, community Web-site page, mailers, fire safe council participation, inspections, seasonal reminders, and resort check-in handouts are some methods that will be used to disseminate wildfire and relocation awareness information. The Fire Authority Having Jurisdiction will review and approve all wildfire educational material/programs before printing and distribution.

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7 SUMMARY

This Plan complies with the requirements of the County Consolidated Fire Code and the California Fire and Building Codes.

When properly implemented on an ongoing basis, the fire protection strategies proposed in this FPP should significantly reduce the potential vegetation fire threat and should greatly assist the fire authority in controlling and/or extinguishing a vegetation fire at this Project Site. The installation of fire sprinklers have been proven effective in mitigating significant interior structure fires. Interior sprinklers may also protect a structure if a wildland fire enters the structure through a window or door. They will not protect against a fire in the attic unless attic sprinklers are installed as part of the system design. However, special precautions regarding vent openings have been specified to minimize the likelihood of an attic fire.

This is a conceptual plan, which provides enough detail for County Fire Marshal and local Fire Protection District approval. Detailed plans, such as improvement plans, building permits, etc., demonstrating compliance with the concepts in this plan and with Fire Code requirements shall be submitted to the fire authority at the time they are developed.

Fire is a dynamic and somewhat unpredictable occurrence and as such, this plan does not guarantee that a fire will not occur or will not result in injury, loss of life or loss of property. There are no warranties, expressed or implied, regarding the suitability or effectiveness of the recommendations and requirements in this plan, under all circumstances.

The developers, contractors, engineers, and architects are responsible for proper implementation of the concepts and requirements set forth in this Plan. Homeowners and property managers are responsible to maintain their structures and lots as required by this Plan, the Fire District, and as required by the Fire Code. Alternative methods of compliance with this Plan can be submitted to the fire authority and County Fire Marshal for consideration.

It will be extremely important for all homeowners, property managers, and occupants to comply with the recommendations and requirements described and required by this FPP on their property. The responsibility to maintain the fuel modification and fire protection features required for this project lies with the homeowners and business owners. The HOA or similar entity will be responsible for ongoing education and maintenance of the common areas, while the fire authority will have the authority to enforce the vegetation management requirements detailed in this Plan. Such requirements shall be made a part of deed encumbrances and CC&Rs for each lot, as appropriate.

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