FIRE PROTECTION PLAN
SAFARI HIGHLANDS RANCH

Prepared for:

City of Escondido
Fire Department
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Escondido, California 92026

On behalf of Applicant:

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1 EXECUTIVE SUMMARY

This Fire Protection Plan (FPP) has been prepared for the Safari Highlands Ranch Project (Proposed Project) in northern San Diego County. This FPP evaluates and identifies the potential fire risk associated with the proposed project's land uses and identifies requirements for water supply, fuel modification and defensible space, access, building ignition and fire resistance, fire protection systems, and wildfire emergency pre-planning, among other pertinent fire protection criteria. The project proponent proposes an annexation of the entire project site into the City of Escondido. The purpose of this plan is to generate and memorialize the fire safety requirements of the Escondido Fire Department (EFD) along with project-specific measures based on the site, its intended use, and its fire environment.

This document provides analysis of the site's fire environment and its potential impact on the proposed Project as well as the Project's potential impact on the existing fire protection services provided by EFD. This document will be incorporated as a technical appendix of the Safari Highlands Ranch development Environmental Impact Report. Requirements and recommendations herein are based on site-specific fire environment and proposed project characteristics, and incorporate input from EFD's Prevention Bureau, area fire planning documents, site risk analysis, and standard principles of fire protection planning.

As described in this FPP, the project will meet or exceed all applicable Code requirements. There are up to 14 lots (worst case) where a single story structure would be required or, with application of alternative forms of protection, may build two story structures and meet the intent of the EFD's top of slope structure setback requirements. The recommendations and conditions provided herein are also consistent with the lessons learned from After Fire Action Reports from numerous fires occurring over the last 20 years, including the 2003, 2007 and 2010 San Diego County Fires.

As determined during the analysis of this site and its fire environment, the Proposed Project site, in its current condition, is considered to include characteristics that, under favorable conditions, have the potential to facilitate fire spread. Under extreme conditions, wildfires from the northeast and east could burn towards the site and result in significant ember production. Once the project is built, the on-site fire potential will be lower than its current condition due to conversion of wildland fuels to managed landscapes, improved accessibility to fire personnel, and structures built to the latest ignition resistant codes, though it will result in persons living in a wildland urban interface setting.

The developed portion of this property is proposed for improvements that include construction of 550 single -family residential units, a new fire station, and associated infrastructure and utilities. The entire site has been designed with fire protection as a key objective. The site improvements

are designed to facilitate emergency apparatus and personnel access throughout the site. Driveway and road improvements with fire engine turnarounds provide access to within 150 feet of all sides of every building. Water availability and flow will be consistent with EFD requirements including fire flow and hydrant distribution. Fuel modification zones ranging between 150 and 200 feet wide will be provided, exceeding the required 100 feet and providing additional defensible space for all buildings. These features, along with the ignition resistance of all buildings, interior sprinklers, and pre-planning, training and awareness will assist responding firefighters through prevention, protection and suppression capabilities. As described in this FPP, the project will meet or exceed all applicable Code requirements with the exception of structure setbacks at top of slope for 14 lots. These setbacks have been provided mitigations consistent with the intent of the code or will be available for single story residences.

Early evacuation for any type of wildfire emergency at the Proposed Project is the preferred method of providing for resident safety, consistent with the EFD's current approach for other communities and neighborhoods. As such, Safari Highland Ranch's Homeowner's Association (HOA) will formally adopt, practice, and implement a "Ready, Set, Go!" (International Fire Chiefs Association 2013) approach to site evacuation. The "Ready, Set, Go!" concept is widely known and encouraged by the state of California and most fire agencies. Pre-planning for emergencies, including wildfire emergencies, focuses on being prepared, having a well-defined plan, minimizing potential for errors, maintaining the site's fire protection systems, and implementing a conservative (evacuate as early as possible) approach to evacuation and restricting site activities during periods of fire weather extremes. This FPP includes an emergency evacuation analysis indicating evacuation triggers and contingency plans.

Based on the results of this FPP's analysis and findings, the following FPP implementation measures will be provided by the Safari Highlands Ranch project as part of the proposed development plan. These measures are discussed in more detail throughout this FPP.

1. Preparation of a Construction Fire Prevention Plan detailing the important construction phase restrictions and fire safety requirements that will be implemented to reduce risk of ignitions and pre-plans for responding to an unlikely ignition.
2. Project buildings will be constructed of ignition resistant construction materials based on the latest Building and Fire Codes.
3. Fuel Modification will be provided throughout the perimeter of the site and will be 150 feet wide in areas where that was analyzed appropriate and 200 feet wide everywhere else. Maintenance will occur as needed and the HOA will annually hire a 3rd party, qualified Fuel Modification Zone inspector to provide annual certification that it meets the requirements of this FPP.

4. Access to the site's open space area is provided via access points that are spaced on average every 650 lineal feet with a maximum of 1,300 feet.
5. Fire apparatus access roads will be provided throughout the community and will vary in width and configuration, but will all provide at least the minimum required unobstructed travel lanes, lengths, turnarounds, parking spaces, and clearances. Primary and secondary access will comply with the requirements of the EFD.
6. Firefighting staging areas/temporary refuge areas are available throughout the facility as well as along roadways and site green spaces.
7. Water capacity and delivery provide for a reliable water source for operations and during emergencies requiring extended fire flow.
8. A site-specific evacuation plan has been prepared for the project with input and coordination with EFD.
9. The Community HOA will include an outreach and educational role to coordinate with EFD, oversee landscape committee enforcement of fire safe landscaping, ensure fire safety measures detailed in this FPP have been implemented, educate residents from the Safari Highlands development and prepare community-wide and individual "Ready, Set, Go!" plans. A qualified company will be retained to help the HOA in this capacity, as necessary.

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2 INTRODUCTION

This FPP has been prepared for the Proposed Project. The purpose of the FPP is to evaluate the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those risks to a level consistent with City of Escondido (City) and County of San Diego thresholds. Additionally, this plan generates and memorializes the fire safety requirements of the Fire Authority Having Jurisdiction (FAHJ), which is the Escondido Fire Department (EFD) with support by the San Diego County Fire Authority (SDCFA). Requirements and recommendations are based on site-specific project characteristics and incorporate input from the project applicant and the FAHJ.

As part of the assessment, this plan has considered the property location, topography, combustible vegetation (fuel types), climatic conditions, and fire history. The plan addresses water supply, access, structural ignitability and fire resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management. We have identified fuel reduction treatments and recommend the types and methods of treatment that will protect the Safari Highlands Ranch residents, and infrastructure. The plan recommends measures that the newly formed homeowner's association (Safari Highlands Ranch HOA) will take to reduce the probability of structure ignition throughout the area addressed by the plan.

The following tasks were performed toward completion of this plan:

- Gather site specific climate, terrain, and fuel data;
- Process and analyze the data using the latest Geographical Information System technology;
- Predict fire behavior using scientifically based fire behavior models, comparisons with actual wildfires in similar terrain and fuels, and experienced judgment;
- Analyze and guide design of proposed infrastructure;
- Analyze the existing emergency response capabilities;
- Assess the risk associated with the Proposed Project and site;
- Collect site photographs and map fuel conditions using 200-scale aerial images. Field observations were utilized to augment existing digital site data in generating the fire behavior models and formulating the recommendations presented in this FPP. Appendix A provides representative photographs of existing site conditions.
- Prepare this FPP detailing how fire risk will be mitigated through a system of fuel modification, structural ignition resistance enhancements, fire protection systems, and a conservative evacuation approach.

2.1 Proposed Project Summary

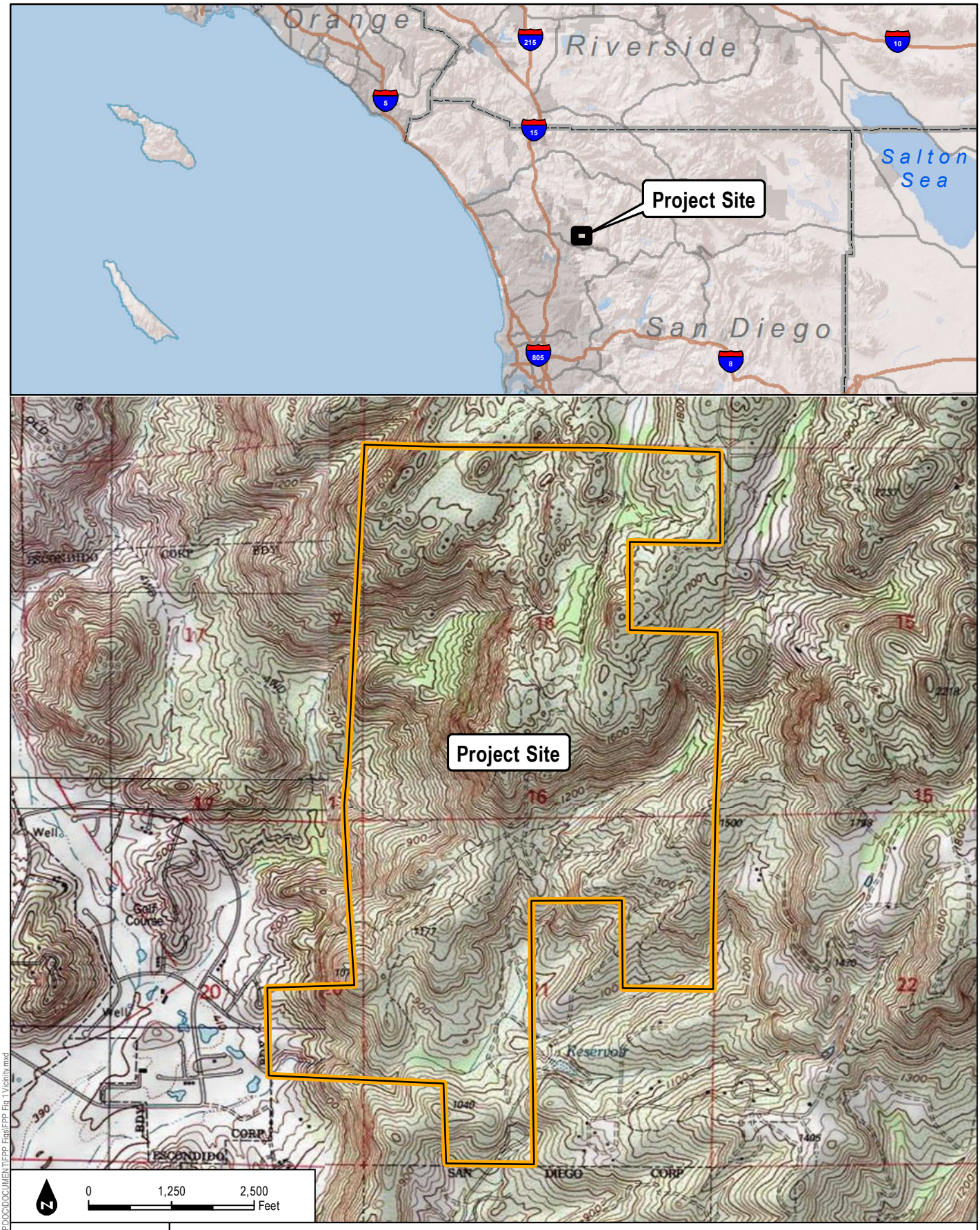
2.1.1 Location

The Proposed Project is located along the southeastern boundary of the City of Escondido within an unincorporated portion of the County of San Diego, California and will be annexed by the City. The Project lies within Township 12 South, Range 1 West in Section 16, eastern portion of Section 20, and northern portion of Section 28 and entirety of Section 21 of the Rodriquez Mountain, Escondido, and San Pasqual, California U.S. Geographical Survey 7.5-minute quadrangle maps, respectively. Specifically, the project site encompasses approximately 1,100 acres of vacant land with its most southerly property boundary approximately 1.5 miles north of State Route 78 (San Pasqual Valley Road) and its westerly property boundary 1.0 mile east of Cloverdale Road (Figure 1).To the west and southwest are the nearest urban developed areas of Rancho San Pasqual, Rancho Vistamonte community, and Eagle Crest Golf Course within the boundary of the City of Escondido. To the south is the San Diego Zoo Safari Park within the boundary of the City of San Diego. To the north and east are the communities of Lake Wohlford and Valley Center as well as large landholdings, including Rancho Guejito and the Cleveland National Forest in the unincorporated areas of the County. Additionally, the project site is within the Escondido General Plan Specific Plan Area (SPA) #4, though it is located outside of the City's Sphere of Influence. The Project proponent proposes an annexation of the entire project into the City of Escondido.

The Proposed Project is located on the following Assessor Parcel Numbers: 240-270-33, 241-060-03, 242-010-02, 242-010-36, 242-010-37, 242-010-38, and portions of 240-120-12, 240-250-03, 240-251-05, 240-251-06, 240-251-07, 241-211-02, and 241-293-01.

2.1.2 Project Description

The Safari Highlands Ranch Project proposes development of a master-planned community composed of 550 single-family residences on 1,098-acre portion of SPA #4. The single-family residential dwelling units occur on lots ranging from approximately 8,000 square feet to over 200,000 square feet clustered into seven neighborhoods. Accompanying infrastructure will consist of an internal road circulation system, water, sewer, and storm water drainage systems, and utilities. Seven phases of development are proposed, corresponding to the seven neighborhoods being built. Public facilities and services and phase development would be coordinated so that services are available and ready to serve the residences as the need arises. Figure 2 depicts the locations of these generalized land uses within the project boundary.



SOURCE: USGS 7.5 Minute Series Topographic Maps

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FIGURE 1
Vicinity Map

Safari Highlands Ranch Fire Protection Plan

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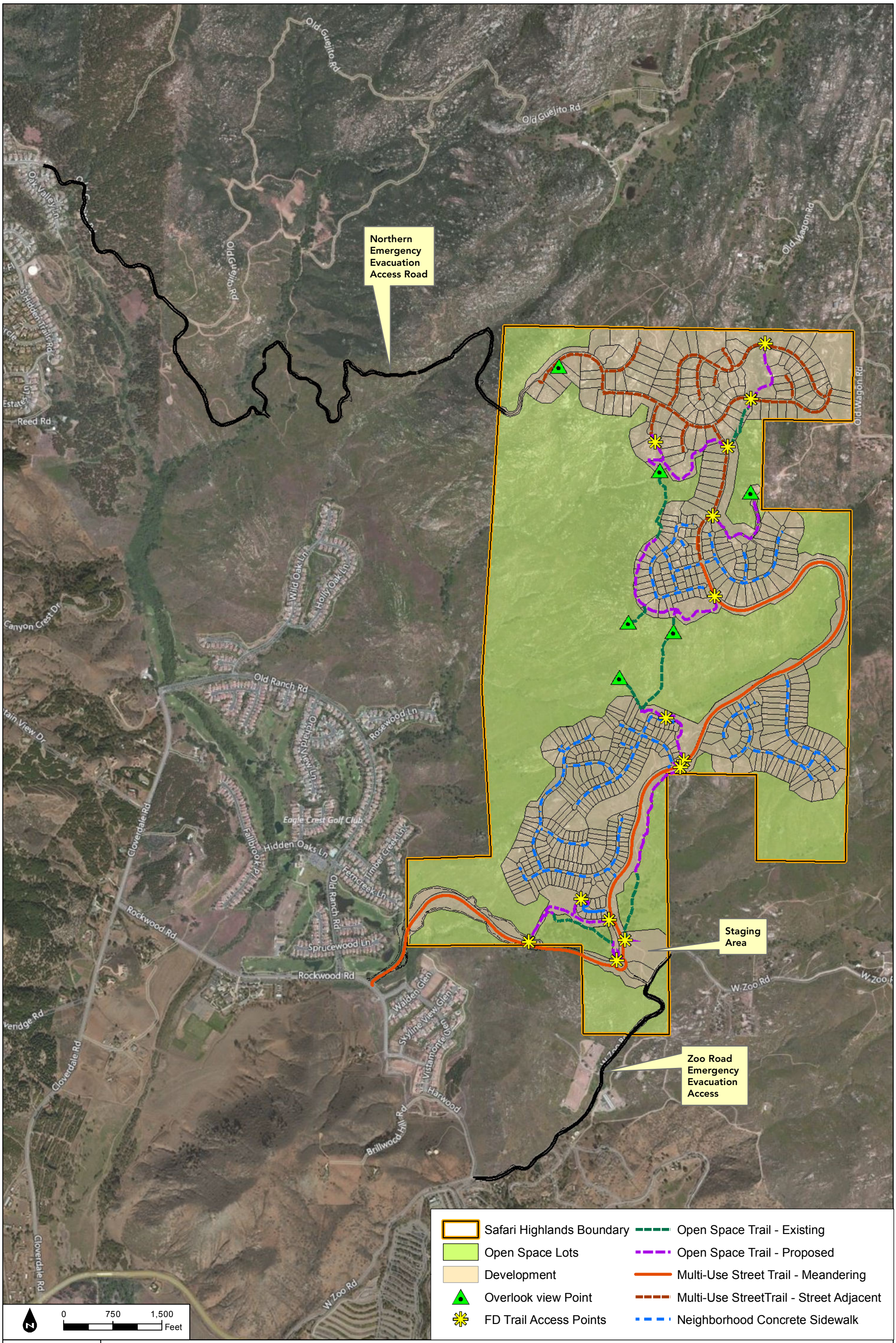

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SOURCE: HUNSAKER 2016

FIGURE 2

Safari Highlands Ranch Site Plan

Safari Highlands Ranch Fire Protection Plan

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2.1.2.1 Village Core

The Village Core would be located off of Safari Highlands Ranch Road in the southernmost portion of the project site. The Village Core would include a new 2.6-acre, three bay fire station site, public trails traversing the site, a 2-acre private recreation facility with swimming pool and clubhouse, and tennis courts.

2.1.2.2 Development Infrastructure

The circulation system will consist of both public and private roads. Safari Highlands Ranch Road, a new primary access road intersecting at Rockwood Road between Old Ranch Road and Vistamonte Avenue, will be the main arterial road throughout the project. It will be public from its starting point at Rockwood Road up to the gated community entry, and private once it extends past the entry gate. Safari Highland Ranch Road will have two 21-foot traffic lanes including bike lanes, a pedestrian path, and shading trees and landscaping. Interior streets will be two lanes, some of which will allow on-street parking. Two emergency access roads will be provided, one to the northwest and another to the south. The northwestern road will be approximately 2.4 miles long and will connect to Stonebridge Road in the Hidden Hills Trails development and will include two minimum 12 foot wide travel lanes along with turnouts and water sources (please refer to the Project's Engineering Grading Plans prepared by Hunsaker 2016). The southern road will be approximately one mile long and will connect to the gated, emergency access Zoo Road, which will be upgraded to meet EFD requirements.

Water utilities will include a connection to the City of Escondido water system, pumps to boost water to an on-site water tank, and an internal water distribution system that will use pumps, reducing stations, and gravity feed. A backup power system to the approval of the EFD to help ensure performance if the local grid is de-energized will be provided. Sewer would be conveyed via new and existing pipelines for processing at the City's primary treatment facility (Hale Avenue Resource Recovery Facility-HARRF). The proposed development also includes on-site sewer lift stations(s) and water storage. The Project will be connecting with the City's reclaimed water system for irrigation use. Stormwater runoff will be controlled on-site through hydro-modification management practices, including the use of biofilters and the use of both retention and detention basins. The Project may also provide a "wet weather" storage site in the northeast.

Other utilities that are currently available to the site and that will be installed are gas, electrical, cable and phone service.

2.1.2.3 Additional On-Site Amenities

In addition to the residential and Village Core sites, there will be recreational pocket parks, trails, a trail head and vista viewpoints present throughout each of the different neighborhoods to compliment the large open space preserve areas.

The project will include an extensive trail system within the 784 acre reserve as well as "linear parks", along roads and multiuse trails through the community. Multiuse trails would include existing dirt trails; paved utility access ways; and new soft-surface trails. The project will include access points to trail systems to facilitate emergency response. Trails will be managed and maintained by the HOA.

The project will preserve approximately 784 acres of land or 69.6% of the site as resource open space preserve. This largely contiguous block of land is located on west-facing slopes of the site, the major drainages, and most of the site's sensitive habitats (Althouse and Meade 2016). The preserve would be managed and maintained in accordance with a Resource Management Plan to be prepared for the Project.

Common open space includes approximately 223 acres of irrigated and non-irrigated fuel modification areas. This includes manufactured slopes and non-graded areas such as fuel reduction zones and natural parks.

2.1.2.4 Off-Site Improvements

The proposed project will also undertake off-site improvements that consist of the following:

1. Reconstruction and improvements to Rockwood Road's intersection with the proposed Safari Highlands Ranch Road;
2. Improvements along Rockwood Road between Cloverdale Road and San Pasqual Union School to enhance the school's student pick-up and drop off locations;
3. Intersection of Rockwood Road/Cloverdale Road. Install traffic signal and restripe westbound approach to provide one left-turn and one shared left-turn lane. Restripe southbound Cloverdale Road to provide an additional receiving lane from Rockwood Road left turning movements;
4. Restripe Rockwood Road between Cloverdale and San Pasqual Union School to provide additional westbound lane;
5. Intersection of San Pasqual Valley Road (SR 78)/Citrus Avenue. Install new signal and restripe southbound approach to provide one left hand and one right hand turn lane;

6. Intersection of San Pasqual Valley Road (SR 78)/Cloverdale Road San Pasqual Road. Widen eastbound approach of San Pasqual Valley road to provide dual left-turn lanes. Widen northbound section of Cloverdale Road north of the intersection to provide approximate 650 foot long plus a 150-foot transition lane;
7. Segment of Felicita Road/17th Avenue from Escondido Boulevard to San Pasqual Valley Road (SR 78). Stripe a new eastbound turn pocket at Lendee Drive and extend the two-way left turn lane eastward to the City of Escondido/San Diego County boundary;
8. Two gated emergency access roads: a 2.4 mile road to the northwest connecting to Stonebridge Road in the Hidden Hills Trails development and a one mile road to the south connecting to Zoo Road;
9. Gas, electric, cable, and phone system connections at Rockwood Road to existing infrastructure operated by San Diego Gas and Electric, Times Warner Cable, and AT&T;
10. Improvements to the Eagle Crest Golf Course including replacing the existing temporary clubhouse with a new 4,000 square foot permanent clubhouse with restaurant, reconstruction of hole #14, extension of Safari Highlands Ranch Road and miscellaneous other golf course improvements (all by separate permit).

2.2 Applicable Codes/Existing Regulations

This FPP demonstrates that the Proposed Project will be in compliance with the City of Escondido (City) 2016 Fire Code, City Ordinance 2016.116.1-4, 2016 Consolidated Fire Code, and California Code of Regulations, Title 14 Natural Resources (2016 Cal Fire- SRA Fire Safe Regulations). The project will also be consistent with the 2016 California Building Code (CBC), Chapter 7A, 2016 California Fire Code (CFC), Chapter 49, as adopted by the City. Chapter 7A of the California Building Code focuses primarily on preventing ember penetration into structures, a leading cause of structure loss from wildfires. Thus, it is an important component of the requirements of this FPP given the Project's wildland urban interface (WUI) location, which is within an area statutorily designated by CAL FIRE (2015) as a Very High Fire Hazard Severity Zone (VHFHSZ). Fire hazard designations are based on topography, vegetation, and weather, amongst other factors with more hazardous sites including steep terrain, unmaintained fuels/vegetation, and WUI locations.

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3 PROPOSED PROJECT SITE RISK ANALYSIS

3.1 Field Assessment

Following extensive review of available digital site information, including topography, vegetation types, fire history, and the Proposed Project's site plan, Dudek fire protection planners conducted field assessments of the Proposed Project during April 2014 and again in March 2016, in order to confirm digital data and fill any identified data gaps. Among the field tasks that were completed are:

- Vegetation estimates and mapping refinements
- Fuel load analysis
- Topographic features documentation
- Photograph documentation
- Confirmation/verification of hazard assumptions
- Ingress/egress documentation.

Site photographs (See Appendix A, Representative Photographs) were collected and fuel conditions were mapped using 200-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 Site Characteristics and Fire Environment

The following sections discuss the characteristics within and surrounding the Proposed Project site. The intent of evaluating site conditions is to provide a better understanding of the fire environment, which is not constrained by property boundary delineations.

3.2.1 Topography

The Safari Highlands Ranch project area is part of the inland foothills and valleys of northern San Diego County. Topography is varied and generally includes a series of east-west trending ridgelines with intervening drainages. A portion of the project includes rolling hills, while the majority includes rock outcrops, and steep, rugged terrain that is dissected by drainage courses that drain primarily to the west/southwest (See Figure 1). Elevations at the northern reaches of the property approach 1,820 feet above mean sea level (ASML) while at the southwestern end, adjacent to existing Rancho San Pasqual community, elevations are approximately 420 feet amsl.

3.2.2 Existing Land Use

The project area is largely undisturbed and the dominant vegetation types are Southern Mixed Chaparral and Diegan coastal sage scrub. A number of dirt roads and trails crisscross the project site. Over the years, portions of the property have been used for various unauthorized land uses, including horseback riding, hiking, mountain biking, off-roading, motorcycling, and occasional dumping. Accessible areas on the property have now been fenced to inhibit unauthorized use.

3.2.3 Vegetation

The Safari Highlands Ranch property supports a variety of vegetation types that are common in north-inland San Diego County. Fire history data indicates that the site's vegetation last burned in 2007. Therefore, the vegetation throughout the property is still in early stages of recovery toward a climax species composition. This has resulted in a change in the density and structure of plant species as well as the local fire behavior. A total of 13 vegetation and land cover types were delineated on the project site and proposed off-site improvement areas (Althouse and Meade 2016). The vegetation and land cover mapping included three non-native communities (Agriculture intensive, disturbed areas, and non-native grasslands) and one non-fuel type (developed areas). These vegetation and land cover types were verified by Dudek fire protection planners and assigned a fuel model (which was based on climax condition, not current) for use during site fire behavior modeling. The vegetation and land cover types and their coverage totals as well as corresponding fuel models are summarized in Table 1.

Table 1
Vegetation and Land Cover Types
on Safari Highlands Ranch Project Site and Off-Site Facilities

Vegetation/Land Cover Type1	Project Site Acreage	100-ft Buffer Acreage	Off-site Facilities Acreage	Total Acreage	Percent Coverage
Non-Native Communities and Land Covers					
Agriculture Intensive	0.0	0.0	2.32	2.32	0.2%
Developed	0.99	2.82	5.67	9.48	0.8%
Disturbed Habitat	11.26	0.13	7.97	19.37	1.6%
Non-native Grassland	6.36	0.0	0.0	6.36	0.5%
Upland Scrub and Chaparral					
Cactus Scrub	0.63	0.0	0.0	0.63	0.0 (<1.0%)
Deer Weed Scrub	73.66	0.0	0.0	73.66	6.0%
Diegan Coastal Sage Scrub	479.65	47.93	12.11	539.69	44.2%
Southern Mixed Chaparral	476.37	36.07	3.47	515.90	42.3%

Table 1
Vegetation and Land Cover Types
on Safari Highlands Ranch Project Site and Off-Site Facilities

Vegetation/Land Cover Type1	Project Site Acreage	100-ft Buffer Acreage	Off-site Facilities Acreage	Total Acreage	Percent Coverage
Woodland					
Oak Woodland	5.01	0.27	0.0	5.28	0.4%
Riparian					
Mulefat Scrub	1.89	0.67	0.22	2.78	0.2%
Oak Riparian Woodland	19.85	1.09	0.25	21.20	1.7%
Other Notable Habitats					
Western Ragweed Meadow	2.79	0.18	0.0	2.97	0.3%
Rock Outcropping/Bushy Spikemoss Mats	20.44	0.75	0.05	21.24	1.7%
Total	**1,098.91**	**89.91**	**32.05**	**1,220.88**	**100.0%**

1 Biological Surveys for the Safari Highlands Ranch Project completed by Althouse and Meade 2016

As presented, the majority of the vegetation on the Project site is associated with the Diegan coastal sage scrub (44.2%) and Southern mixed chaparral (42.3%), while the remainder of the vegetation cover types individually amount to 1% or less of the total project site, except deer weed scrub (6.0%), disturbed habitat (1.6%), oak riparian woodland (1.7%), and rock outcropping/bushy spikemoss mats (1.7%). The project's vegetation and land coverage is illustrated in Figures 3a and 3b and briefly described below.

Changes to site vegetation types will be associated with grading for development pads and roads and installation of fuel modification areas in strategic locations at the perimeter of the developed project area. Site-adjacent vegetation (off-site and adjacent the fuel modification zones) is important relative to wildfire as some vegetation, such as brush and grassland habitats are highly flammable while other vegetation, such as riparian communities or forest understory, are less flammable due to their higher plant moisture content, compact structure, and available shading from overstory tree canopies. The effect vegetation has on fire behavior is substantial and understanding vegetation dynamics is important for developing an effective fuel modification plan.

3.2.3.1 Site Vegetation and Land Cover Type Descriptions

The following descriptions are adapted from the site's Biological Technical Report (Althouse and Meade 2016).

Non-Native Communities and Land Covers

Agriculture Intensive. Agriculture lands supporting active or historical agricultural operation occur at the southwest corner of the property.

Developed. Developed areas support no native vegetation and may be additionally characterized by the presence of man-made structures, such as buildings or roads. The level of soil disturbance is such that only the most ruderal plant species occur. Ornamental vegetation would be associated with developed areas. Developed areas were mapped along the southwest border of the property.

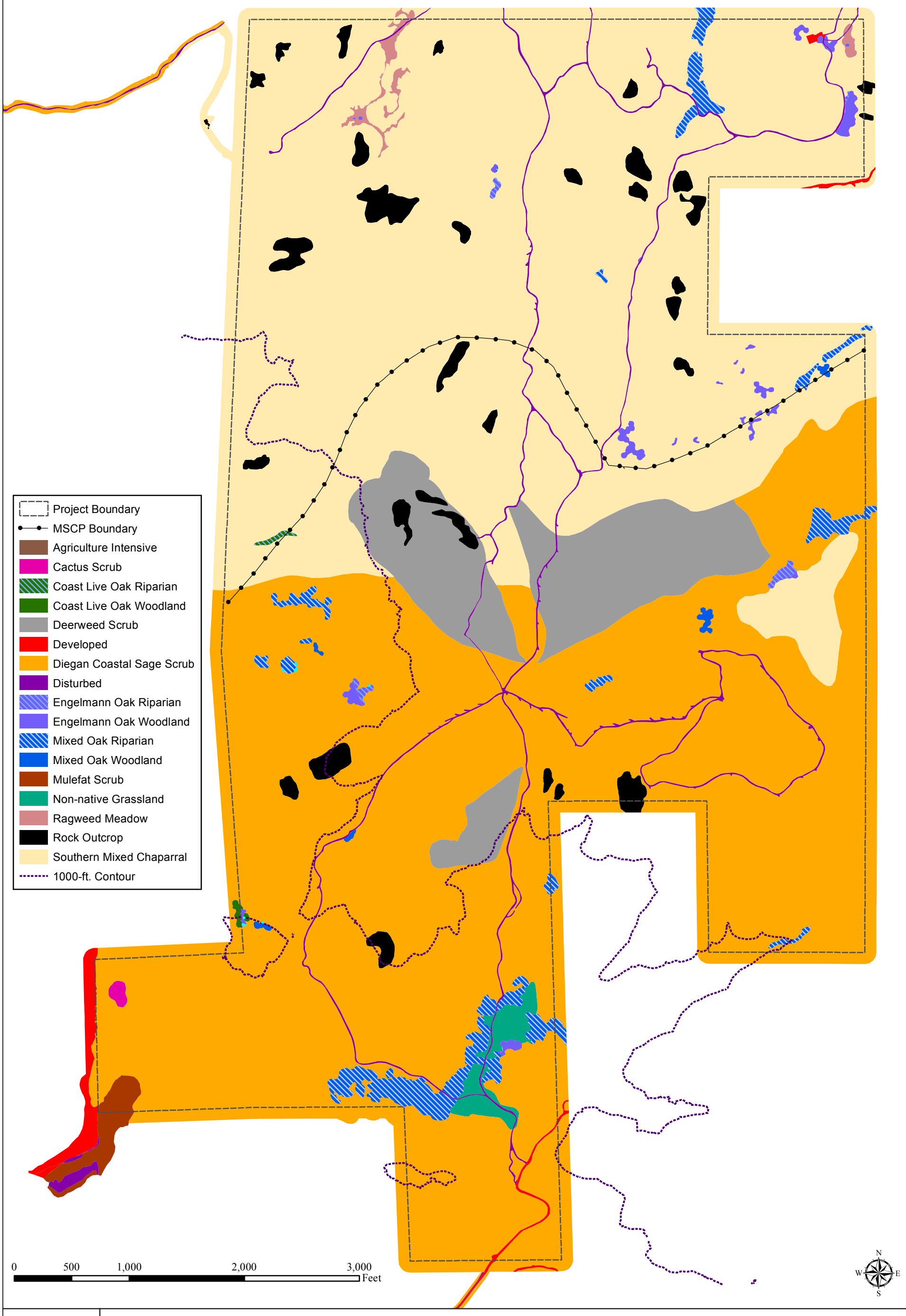
Disturbed Habitat. This type of disturbed area is dominated by non-native broad-leaf herbaceous species such as mustards, fennel (*Foeniculum vulgare*), horseweed (*Conyza canadensis*), thistles, and a sub-dominant percent cover of non-native grasses are often present. This category consists of permanently disturbed land cover consisting of small areas, including dirt roads and trails throughout the property.

Non-Native Grassland. This habitat is a disturbance-related community found in old fields or openings in the south portion of the property. This association has replaced native grassland and coastal sage scrub at many localities throughout Southern California due to past human activities. Typical non-native grasses on-site include slender wild oat (*Avena fatua*), soft chess (*Bromus hordeaceus*), foxtail brome (*Bromus madritensis*), and rip-gut grass (*Bromus diandrus*). Characteristic forbs include red-stem filaree (*Erodium* spp.), mustard (*Brassica* spp.), and tocalote (*Centauria melitensis*) and Russian thistle (*Salsola tragus*).

Upland Scrub and Chaparral

Cactus Scrub. There is one patch of coast prickly pear cactus (*Opuntia littoralis*) located in southwest portion of the project site.

Deerweed Scrub. Deerweed scrub (*Lotus scoparius*) is a post fire successional vegetation community that is eventually displaced by sage scrub or chaparral. The project site supports this vegetation type, a remnant from the 2007 fire. The deer weed appeared to be dead and did not show any new foliage during the spring season. Bush mallow (*Malocothamnus fasciculatus*) is a common subdominant species present.



SOURCE: ALTHOUSE AND MEADE, INC. 2016

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FIGURE 3A
On-Site Vegetation Map

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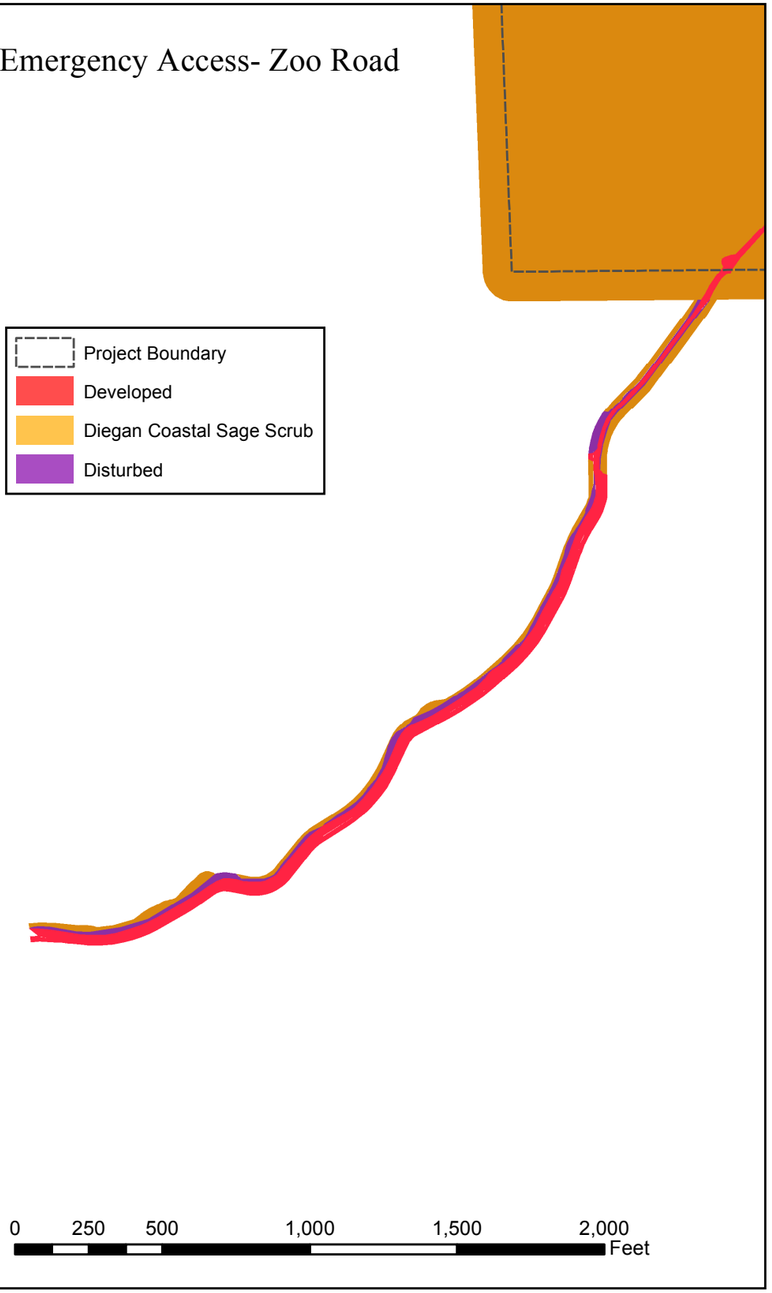
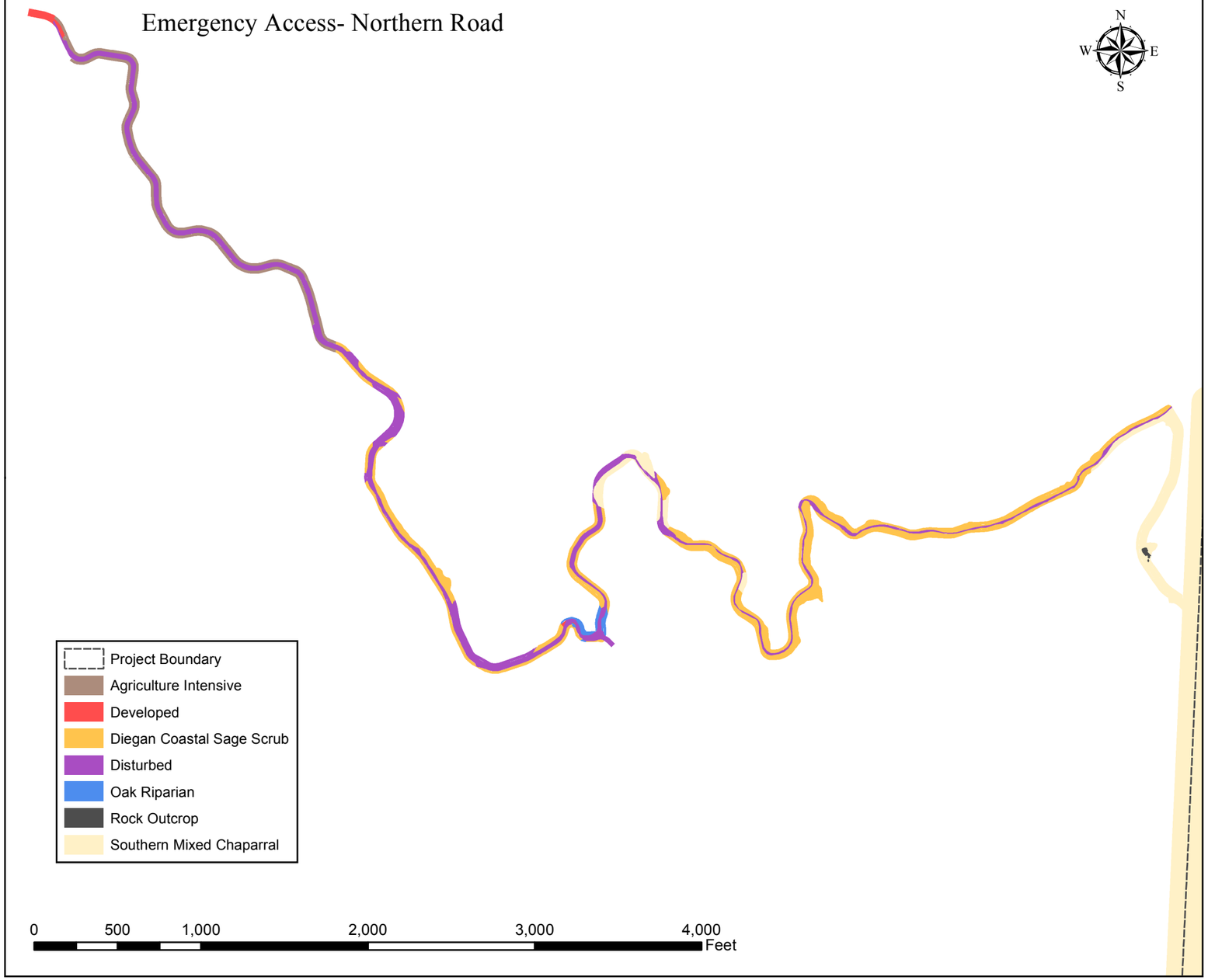
Emergency Access- Zoo Road



Emergency Access- Northern Road



SOURCE: ALTHOUSE AND MEADE, INC. 2016

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FIGURE 3B
Off-Site Vegetation Map

Safari Highlands Ranch Fire Protection Plan

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Diegan Coastal Sage Scrub. Coastal sage scrub is comprised of low, soft-woody subshrubs to about 3 feet high, many of which are facultative drought-deciduous. This association is typically found on dry sites, such as steep, south-facing slopes or clay-rich soils that are slow to release stored water. Dominant shrubs on-site include California sagebrush (*Artemisia californica*), flat-top buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), white sage (*Salvia apiana*), and our Lord's candle (*Yucca whipplei*). Other, less frequent, constituents of this community include spiny redberry (*Rhamnus crocea*), deerweed, broom baccharis (*Baccharis sarothroides*), monkey flower (*Mimulus aurantiacus*), and yellow bush- penstemon (*Keckiella antirrhinoides*). Sage scrub is the dominant vegetation in the southern half of the project site.

Southern Mixed Chaparral. Southern mixed chaparral tends to occur on steeper, more mesic north-facing slopes than chamise chaparral. This vegetation community type is characterized by relatively high species diversity. Typical species on-site include chamise (*Adenostoma fasciculatum*), mountain mahogany (*Cerocarpas minutiflora*), hoary-leaf ceanothus (*Ceanothus crassifolius*), chaparral whitehorn (*Ceanothus leucodermis*), scrub oak (*Quercus berberidifolia*), Ramona lilac (*Ceanothus tomentosus*). The understory component is generally better-developed in this association than in chamise chaparral. This is the dominant vegetation in the northern half of the project site.

Woodland

Oak Woodland. Oak woodlands located away from the drainage channels on-site are classified as an upland habitat. The majority of the oaks in this category are coast live oaks (*Quercus agrifolia*), but Englemann oaks (*Quercus englemannii)* also are present on-site, but often in sparser densities to be mapped as oak woodland. They were mapped as individual trees located within the sage scrub and chaparral matrix.

Riparian

Mulefat Scrub. Mulefat scrub is a riparian scrub dominated by mulefat (*Baccharis salicifolia)*. Mulefat-dominated scrub occurs along intermittent streams with a fairly coarse substrate and moderately deep water table. Understory vegetation is usually composed of nonnative, weedy species or is lacking altogether, as is the case in the stand of mulefat in the southwest corner of the site.

Oak Riparian Woodland. On the Safari Highlands Ranch site oak riparian woodland is limited to mostly coast live oak trees clustered along the ephemeral drainages. The larger oak grove in the southern portion of the site supports sub-dominant cover of California sycamore (*Platanus californicus*), black willow (*Salix gooddingi*), arroyo willow (*S. lasiolepis*), toyon (*Heteromeles arbutifolia*), and a sparse understory of poison oak (*Toxicodendron diversilobum*), Douglas mugwort (*Artemisia douglasiana*), and western ragweed.

Other Notable Habitats

Western Ragweed Meadow. Western ragweed (*Ambrosia psilostachya*) is the co-dominant herbaceous species in the meadow habitat occurring in shallow drainage swales on the project site. Blue-eyed-grass (*Sisyrhinchium bellum*), redstem filaree (*Erodium cicutarium*), Mexican rush (*Juncus mexicanus*), and deer grass (*Muhlenbergia rigens*), are either co-dominant or subdominant species with ragweed in these meadows.

Rock Outcropping/Bushy Spikemoss Mats. Throughout the site there are rock outcroppings some of which support extensive mats of brushy spikemoss (*Selaginella biglovii*).

3.2.4 Vegetation Dynamics

The vegetation characteristics described above and presented in Table 1 are used to model fire behavior, discussed in Section 5.2 of this FPP. Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (bark thickness, leaf size, branching patterns), and overall fuel loading. For example, the native shrub species that compose the chaparral communities on site are considered to be less likely to ignite, but would exhibit higher potential hazard (higher intensity heat and flame length) than grass dominated plant communities (fast moving, but lower intensity) if ignition occurred. The corresponding fuel models for each of these vegetation types are designed to capture these differences. Additionally, vegetative cover influences fire suppression efforts through its effect on fire behavior. For example, while fires burning in grasslands may exhibit lower flame lengths and heat outputs than those burning in native shrub habitats, fire spread rates in grasslands are often more rapid.

As described, vegetation plays a significant role in fire behavior, and is an important component to the fire behavior models discussed in this report. A critical factor to consider is the dynamic nature of vegetation communities. Fire presence and absence at varying cycles or regimes disrupts plant succession, setting plant communities to an earlier state where less fuel is present for a period of time as the plant community begins its succession again. In summary, high frequency fires tend to convert shrublands to grasslands or maintain grasslands, while fire exclusion tends to convert grasslands to shrublands, over time. In general, biomass and associated fuel loading will increase over time, assuming that disturbance (fire, grazing) or fuel reduction efforts are not diligently implemented. It is possible to alter successional pathways for varying plant communities through manual alteration. This concept is a key component in the overall establishment and maintenance of the proposed fuel modification zones on site. The fuel modification zones on this site will consist of irrigated and maintained landscapes as well as thinned native fuel zones that will be subject to regular "disturbance" in the form of

maintenance and will not be allowed to accumulate excessive biomass over time, which results in reduced fire ignition, spread rates, and intensity.

Conditions adjacent the project's footprint (outside the fuel modification zones), where the wildfire threat will exist post-development, are classified as medium to heavy fuel loads due to the dominance of chaparral fuels on the hillsides surrounding the site.

3.2.5 Climate

North San Diego County and the project area are influenced by the Pacific Ocean and are frequently under the influence of a seasonal, migratory subtropical high pressure cell known as the "Pacific High" (WRCC 2014a). Wet winters and dry summers with mild seasonal changes characterize the Southern California climate. This climate pattern is occasionally interrupted by extreme periods of hot weather, winter storms, or dry, easterly Santa Ana winds (WRCC 2014a). The average high temperature for the project area is approximately 70°F, with average highs in the summer and early fall months (July–October) reaching 95°F. Precipitation typically occurs between December through April with annual rainfall ranging from 3.5 to 13.3 inches (CY 2012 to 2014) with lower annual accumulation (3.5 to 5.2 inches) in 2015 due to the current drought (WRCC 2014b, DWR 2016). The prevailing wind pattern is from the west (on-shore), but the presence of the Pacific Ocean causes a diurnal wind pattern known as the land/sea breeze system. During the day, winds are from the west–southwest (sea) and at night winds are from the northeast (land), averaging 2 miles per hour (mph). During the summer season, the diurnal winds may average slightly higher (approximately 16 mph) than the winds during the winter season due to greater pressure gradient forces. Surface winds can also be influenced locally by topography and slope variations. The highest wind velocities are associated with downslope, canyon, and Santa Ana winds.

The project area's climate has a large influence on the fire risk as drying vegetation during the summer months becomes fuel available to advancing flames should an ignition be realized. Typically the highest fire danger is produced by the high-pressure systems that occur in the Great Basin, which result in the Santa Ana winds of Southern California. Sustained wind speeds recorded during recent major fires in San Diego County exceeded 30 mph and may exceed 50 mph during extreme conditions. The Santa Ana wind conditions are a reversal of the prevailing southwesterly winds that usually occur on a region-wide basis during late summer and early fall. Santa Ana winds are warm and dry winds that flow from the higher desert elevations in the north through the mountain passes and canyons. As they converge through the canyons, their velocities increase. Consequently, peak velocities are highest at the mouths of canyons and dissipate as they spread across valley floors. Santa Ana winds generally coincide with the regional drought period and the period of highest fire danger. The Proposed Project site is affected by Santa Ana winds from the north and east of the site. The slopes are generally in alignment with the extreme Santa Ana wind events, which can influence fire spread by creating upslope wind-driven fires.

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4 DETERMINATION OF PROJECT EFFECTS

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

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

The wildland fire risk in the vicinity of the Project site has been analyzed and it has been determined that wildfires may occur in wildland areas adjacent the Project site as well as potentially in any preserved on-site fuels, but would not be significantly increased in frequency, duration, or size with the construction of the Project. In fact, the existing site, pre-development, includes numerous potential fire issues including unmaintained vegetation. The Project would include conversion of fuels to maintained urban development with designated landscaping and fuel modification areas. As such, a condensed portion of the site will be largely converted from readily ignited fuels to ignition resistant structures and landscape, including up to 200 feet wide fuel modification zones on the perimeter of the Project.

The types of potential ignition sources that currently exist in the area include vehicle and roadway, electrical transmission line, and machinery associated with agricultural operations and off-site residential neighborhoods. The project would introduce potential ignition sources, but would also include conversion of ignitable fuels to lower flammability landscape and include better access throughout the site, managed and maintained landscapes, higher local presence for fire detection and reporting, and generally a reduction in the receptiveness of the area's landscape to ignition. Fires from off site would not have continuous fuels across this site and would, therefore, be expected to burn around and/or over the site via spotting, with an overall effect of slowing fire spread across the property. Burning vegetation embers may land on Project structures, but are not likely to result in ignition based on ember decay rates and the types of non-combustible and ignition resistant materials that will be used on site.

The Project would comply with applicable fire and building codes and would include a layered fire protection system designed to current codes and inclusive of site-specific measures that will result in a Project that is less susceptible to wildfire than surrounding landscapes and that would facilitate fire fighter and medical aid response.

Would the project result in inadequate emergency access?

The Project includes fire access throughout each neighborhood and is consistent with the EFD and San Diego County General Plan in terms of meeting a 5 minute response travel time from the on-site fire station. Fire apparatus access throughout the development will include roads that meet the code requirements for width, grade, clearance, turnouts, dead-end length and turnarounds. Fire access on the Project site will be improved from its current condition, which provides only limited access on rugged dirt/gravel roads. Therefore, the Project's access is considered consistent with code requirements.

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

The Project is projected to add a conservatively estimated 172 calls per year to the EFD's existing call load. The actual number of calls will likely be lower based on several factors, but is assessed using the EFD's per capita volume. Due to the project's location, a new fire station will be needed at the site in order to meet response time goals. The primary response (first in) would be provided by the on-site Fire Station. The fire station will improve emergency response for fire and medical emergencies in the area, benefitting existing residents. The applicant is currently discussing options for funding the fire station, including the possibility of a partnership with the City of San Diego, CalFire, and other creative ways in order to avoid burdening the City of Escondido.

Additional resources would be available from EFD Stations 2 and 4, which are not considered busy fire stations, having 1,034 and 2,676 engine company calls during 2015, or roughly 2.8 and 7.3 calls per day, respectively. The addition of 172 calls/year (0.5 calls/day) to both stations is considered substantial, but the capacity for stations 2 or 4 to respond to the additional calls is available, as analyzed in Section 6.3 of this FPP. The anticipated 3.3 or 7.8 calls per day will be below what would be considered a busy station. For perspective, urban fire stations that respond to five calls per day are considered average and 10 calls per day would be considered a busy station while a suburban/rural station that responds to roughly 6 calls per day can be considered busy (Hunt 2013). For comparison, Vista Fire Protection District and San Marcos Fire Department both respond to an average of 5 calls per day per station[1].

[1] Dudek 2014. Analysis of Deer Springs Fire Protection District neighboring fire agency call volumes. Average call volumes are calculated by dividing the total number of annual calls by the number of fire stations serving those calls

The project will provide a two acre fire station site and build a fire station meeting the EFD's and cooperating fire agency specifications. A conceptual fire station plan is provided in Figure 5. Ongoing operations and maintenance costs will be based on a fair-share formula into which the Safari Highlands Ranch project will pay via property tax allotments. A portion of the project's parcel tax revenue and ongoing annual assessments will be allocated to fire protection, which can be used to improve upon current levels of fire and medical response in the area, which will have positive impacts for the area's existing residents. The final funding amount will be determined by the applicant and EFD and included in a Fire Service Agreement to be completed prior to map recordation.

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

The project will include a connection to the City of Escondido's water system and sufficient water supplies will be available to serve the project from existing entitlements and resources, including a new water storage tank to be built on the site. The Water Division requires new development within VHFHSZ area to meet 2,500 gpm fire flow. The pressures in the development will remain above 20 psi for a minimum 2 hour duration when meeting the fire requirements for the water service area.

The measures described in the responses to these significance questions are provided more detail in the following sections.

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5 ANTICIPATED FIRE BEHAVIOR

5.1 Fire History

Fire history is an important component of an FPP. Fire history information can provide an understanding of fire frequency, fire type, most vulnerable project areas, and significant ignition sources, amongst others. Appendix B – the Safari Highlands Ranch Vicinity Fire History exhibit, presents a graphical view of the project area's recorded fire history. As presented in the exhibit, there have been several fires recorded since 1910 by CAL FIRE in their FRAP database (FRAP 2015) [2] in the direct vicinity of the project site. These fires, occurring in 1910, 1911, 1912, 1913, 1914, 1919, 1927, 1938, 1943, 1945, 1946, 1949, 1950, 1951, 1952, 1955, 1956, 1962, 1965, 1967, 1970, 1972, 1974, 1975, 1978, 1979, 1980, 1981, 1984, 1985, 1987, 1988, 1989, 1991, 1993, 1995, 1997, 2003, 2004, 2007, and 2013 burned within 5 miles of the project site. The site was burned completely in the 1910s, 1950s, 1993 (Guejito Fire), and 2007 (Witch Fire) and was partially burned in the 1930s. This information excludes fires less than 10 acres. There have been multiple fires throughout North San Diego County inland less than 10 acres. Rapid and overwhelming response to these fires has resulted in their containment before they could grow to the size that would include them in CAL FIRE's database.

As indicated, the Safari Highlands Ranch project's on-site landscape and some natural areas to the east and west of the Proposed Project site last burned approximately nine years ago. These natural landscapes, as with much of the open space in the region, in their present state, represent a potential threat to the many existing homes scattered along Cloverdale Road, the San Diego Zoo Safari Park to the south, and the small avocado ranches and semi-rural homes along the northern and northwestern side of the Proposed Project and beyond, which are all at risk from a Santa Ana wind driven wildfire. Note that once the proposed Safari Highlands Ranch development is built out, the fire spread patterns will be modified in this region, as the development will represent a large fuel break of maintained and irrigated landscapes, which fire may encroach upon and burn around, but will not burn through the Project area with current spread patterns, rates, or intensities. The Proposed Project will convert a relatively undisturbed native landscape to a managed and maintained, ignition resistant, site-wide landscape.

[2] Based on polygon GIS data from CAL FIRE's Fire and Resource Assessment Program (FRAP), which includes data from CAL FIRE, USDA Forest Service Region 5, BLM, NPS, Contract Counties and other agencies. The data set is a comprehensive fire perimeter GIS layer for public and private lands throughout the state and covers fires 10 acres and greater between 1878–2014.

5.2 Fire Behavior Modeling

Three fire behavior modeling efforts were conducted in support of this FPP, as described below:

- **BehavePlus:** Following site evaluation and vegetative fuels data collection efforts, fire behavior modeling was conducted using BehavePlus software to document the type and intensity of fire that would be expected given characteristic site features including topography, vegetation, and weather. BehavePlus provides a tabular output and was utilized to evaluate anticipated fire behavior at seven locations (scenarios) located on or adjacent to the project site.
- **FlamMap:** FlamMap utilizes the same fire spread equations built into the BehavePlus software package, but allows for a geographical presentation of fire behavior outputs as it applies the calculations to each pixel in the associated GIS landscape (Finney 1998). FlamMap was utilized to evaluate potential fire behavior on and within ½ mile of the project site and to evaluate potential fire spread in the project region in order to inform the relocation/evacuation recommendations included in this FPP.
- **FARSITE:** The FARSITE software package is a more robust analysis tool than FlamMap, allowing for an analysis of fire spread over time, rather than a static representation of wildfire characteristics. The software simulates the growth of a fire front by using wave propagation principles over a heterogeneous surface and was utilized to account for dead fuel moisture conditioning, a feature not available in the FlamMap analysis conducted for the project. As with FlamMap, FARSITE was utilized to evaluate potential fire spread in the project region in order to inform the relocation/evacuation recommendations included in this FPP.

5.2.1 Modeling Background

Fire behavior modeling has been used by researchers for approximately 50 years to predict how a fire will move through a given landscape (Linn 2003). The models have had varied complexities and applications throughout the years. One model has become the most widely used for predicting fire behavior on a given landscape. That model, known as "BEHAVE", was developed by the U. S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. Since that time, it has undergone continued research, improvements, and refinement. The current version, BehavePlus, 5.0.5, includes the latest updates incorporating years of research and testing. Numerous studies have been completed testing the validity of the fire behavior models' ability to predict fire behavior given site specific inputs. One of the most successful ways the model has been improved has been through post-wildfire modeling (Brown 1972, Lawson 1972, Sneeuwjagt and Frandsen 1977, Andrews 1980, Brown 1982, Rothermel

and Rinehart 1983, Bushey 1985, McAlpine and Xanthopoulos 1989, Grabner, et. al. 1994, Marsden-Smedley and Catchpole 1995, Grabner 1996, Alexander 1998, Grabner et al. 2001, Arca et al. 2005). In this type of study, Behave is used to model fire behavior based on pre-fire conditions in an area that recently burned. Real-world fire behavior, documented during the wildfire, can then be compared to the prediction results of BehavePlus and refinements to the fuel models incorporated, retested, and so on.

Fire behavior modeling includes a high level of analysis and information detail to arrive at reasonably accurate representations of how wildfire would move through available fuels on a given site. Fire behavior calculations are based on site specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. Predicting wildland fire behavior is not an exact science. As such, the minute-by-minute movement of a fire will probably never be predictable, especially when considering the variable state of weather and the fact that weather conditions are typically estimated from forecasts made many hours before a fire. Nevertheless, field-tested and experienced judgment in assessing the fire environment, coupled with a systematic method of calculating fire behavior yields surprisingly accurate results. To be used effectively, the basic assumptions and limitations of fire behavior modeling applications must be understood.

1. First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is the dead fuels less than 0.25 inches in diameter. These are the fine fuels that carry fire. Fuels greater than 1 inch have little effect, while fuels greater than 3 inches have no effect on fire behavior.
2. Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within 6 feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
3. Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, creating their own weather, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.
4. Fourth, fire behavior computer modeling systems are not intended for determining sufficient fuel modification zone/defensible space widths. However, it does provide the average length of the flames, which is a key element for determining defensible space distances for minimizing structure ignition.

Although BehavePlus has limitations, it can still provide valuable fire behavior predictions, which can be used as a tool in the decision-making process. In order to make reliable estimates of

fire behavior, one must understand the relationship of fuels to the fire environment and be able to recognize the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur in a particular landscape. The type and quantity will depend upon soil, climate, geographic features, and fire history. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

5.2.2 Modeling Inputs

5.2.2.1 Fuels

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

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

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

- Non-burnable Models NB1, NB2, NB3, NB8, NB9
- Grass Models GR1 through GR9

- Grass shrub Models GS1 through GS4
- Shrub Models SH1 through SH9
- Timber understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4.

For the BehavePlus analysis, fuel model assignments were based on observed field conditions. For the FlamMap and FARSITE analyses, fuel model assignments were derived from the acquired LANDFIRE data set, as described in Section 5.2.4.1.

5.2.2.2 Weather

Weather and wind inputs for fire behavior modeling conducted in support of this FPP utilized the guidelines and standards presented by the County of San Diego, Department of Planning and Land Use (County of San Diego 2010). These guidelines identify acceptable fire weather inputs for fire conditions during summer months and Santa Ana fire weather patterns. The County analyzed and processed 44 years of fire weather data from fire stations and Remote Automated Weather Stations (RAWS) between April 15 to December 31 in order to represent the general limits of the fire season. Data provided by the County's analysis included temperature, relative humidity, and sustained wind speed and is categorized by weather zone, including Maritime, Coastal, Transitional, Interior, and Desert.

As identified in the County's guidelines, Dudek utilized the Fine Dead Fuel Moisture (FDFM) tool within BehavePlus (v. 5.0.5) fire behavior modeling software package to determine fuel moisture values to be input into the FlamMap and FARSITE runs discussed in this FPP. The temperature, relative humidity, and wind speed data for the Transitional (SANGIS 2014) weather zone were utilized for this FPP based on the project's location. Reference fuel moistures were calculated in the FDFM tool and were based on site-specific topographic data inputs. Table 2 summarizes the FDFM inputs and the resulting fine dead fuel moisture values. Table 3 presents the fuel moisture and wind speed inputs for the fire behavior modeling efforts conducted for this FPP.

Table 2
BehavePlus Fine Dead Fuel Moisture Calculation

Variable	Summer Weather	Peak Weather
Dry Bulb Temperature	90 -109 deg. F	90 -109 deg. F
Relative Humidity	10 - 14 %	5 - 9 %
Reference Fuel Moisture	2 %	1 %

Table 2
BehavePlus Fine Dead Fuel Moisture Calculation

Variable	Summer Weather	Peak Weather
Month	Feb Mar Apr Aug Sept Oct	Feb Mar Apr Aug Sept Oct
Time of Day	12:00 - 13:59	12:00 - 13:59
Elevation Difference	Level (within 1,000 ft.)	Level (within 1,000 ft.)
Slope	30-50%	25-50%
Aspect	South/West	North/East/Northeast
Fuel Shading	Exposed (< 50% shading)	Exposed (< 50% shading)
Fuel Moisture Correction	1 %	1 %
Fine Dead Fuel Moisture	3 %	2 %

Table 3
Fuel Moisture and Wind Speed Inputs

Variable	Summer Weather	Peak Weather
1h Moisture	3%	2%
10h Moisture	5%	3%
100h Moisture	7%	5%
Live Herbaceous Moisture	60%	30%
Live Woody Moisture	90%	50%
Sustained 20-foot Wind Speed	19 mph	41 mph

5.2.2.3 Slope

Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or downhill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. For the BehavePlus analysis, slope values were measured from site topographic maps at the locations of each modeling scenario, and ranged in value between 16 and 50%. For the FlamMap and FARSITE analyses, slope values were derived from the acquired LANDFIRE data set, as described in Section 5.2.4.1.

5.2.3 BehavePlus Analysis

Following site evaluation and vegetative fuels data collection efforts, fire behavior modeling was conducted to document the type and intensity of fire that would be expected on this site given

characteristic site features such as topography, vegetation, and weather. To objectively predict flame lengths, intensities, and spread rates, the BehavePlus 5.0.5 fire behavior modeling system (Andrews, Bevins, and Seli 2004) was used in seven modeling scenarios and incorporated observed fuel types, measured slope gradients, and wind and fuel moisture values derived from County guidelines. Modeling scenario locations were selected to better understand different fire behavior that may be experienced on the site.

The majority of the property is vegetated with southern mixed chaparral interspersed with large rock outcropping and boulder areas. The chaparral on and adjacent to the Project Site is in varying stages of fire recovery following the 2007 Witch Fire. As such, fuel loads are expected to increase over time, with mature chaparral potentially reaching continuous cover of 10-15 foot tall shrubs on dry, rocky, slopes. Based on the location of modeling scenarios, a fuel model SH5 (dry climate shrub with high fuel load representing chaparral fuels) was used for all BehavePlus fire behavior modeling runs.

Utilizing the dominant on-site vegetation, slope values for the site (16% to 50% slope), and the Peak and Summer wind and fuel moisture values derived from County guidelines and the FDFM analysis, fire behavior calculations were conducted. A summary of the scenario inputs and the results of BehavePlus modeling efforts are summarized in Table 4. BehavePlus modeling results and the location of the BehavePlus modeling scenarios are presented in Figure 4.

Table 4
BehavePlus Fire Behavior Modeling Results

Fire Scenario	Summer Weather (On-shore, 19 mph Sustained Winds)				Peak Weather (Off-shore, 41 mph Sustained Winds)			
	Flame Length (ft.)	*Fireline Intensity (Btu/ft/s)*	*Rate of Spread (mph)*	*Spotting Distance (miles)*	*Flame Length (ft.)*	*Fireline Intensity (Btu/ft/s)*	*Rate of Spread (mph)*	*Spotting Distance (miles)*
1	-	-	-	-	49.7	27,655	9.1	2.3
2	-	-	-	-	49.6	27,533	9.1	2.3
3	-	-	-	-	49.6	27,533	9.1	2.3
4	-	-	-	-	49.5	27,455	9.1	2.3
5	24.0	5,699	2.2	0.9	49.7	27,655	9.1	2.3
6	24.2	5,774	2.2	0.8	-	-	-	_
7	-	-	-	-	50.5	28,674	9.5	2.3

Note: Fire Behavior Analysts recorded peak wind gusts up to 50 mph during the Witch Fire. Using Table 3 Peak Weather fine dead fuel moisture values and observed wildfire peak gusts for the Project Vicinity, the BehavePlus modeling efforts would result in flame lengths of 56 feet, spread rates of 11.8 mph, and fireline intensities reaching up to 35,899 Btu/ft/s. Viable airborne embers could be carried downwind for 2.9 miles and ignite receptive fuels.

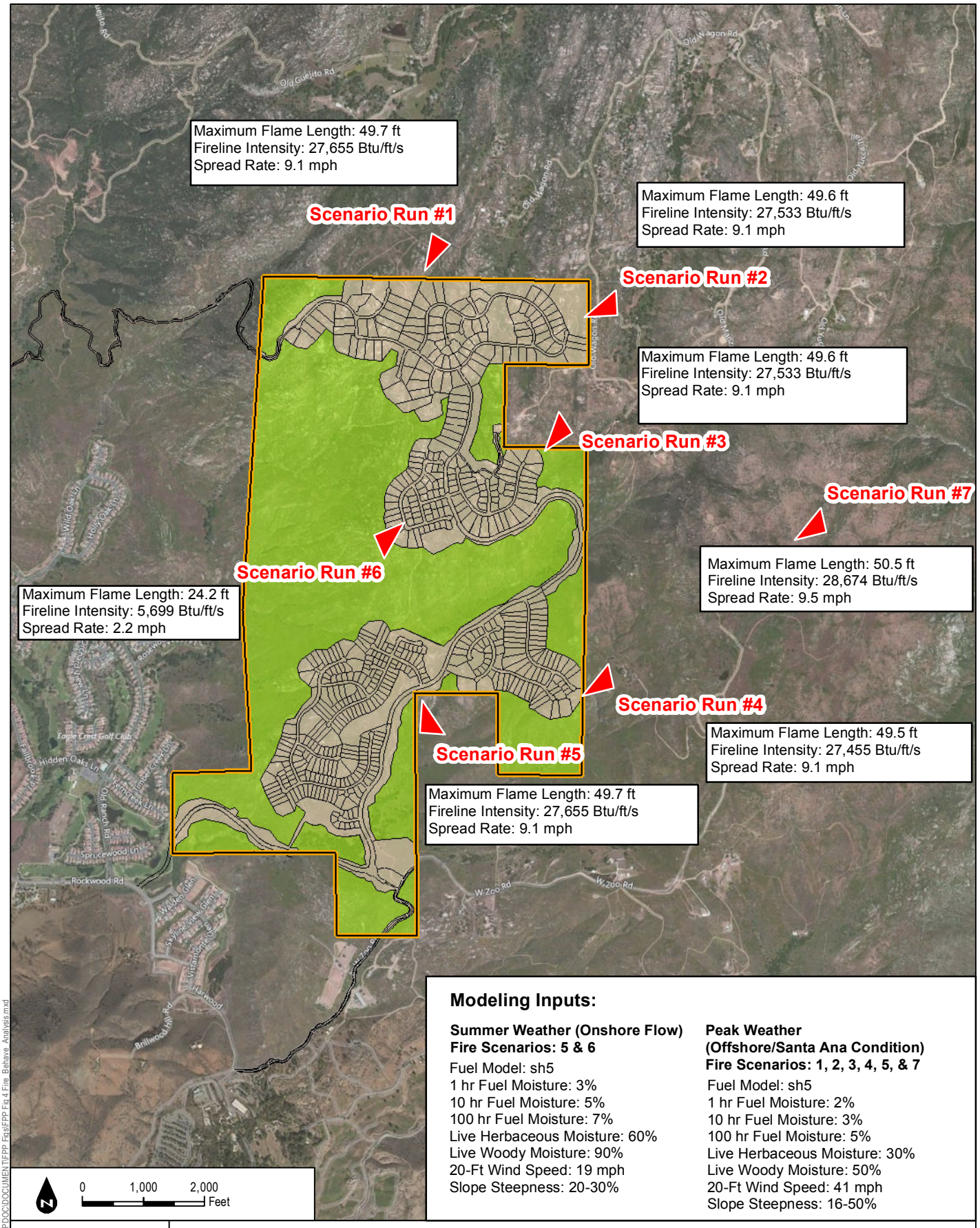
As presented in Table 4, wildfire behavior in non-treated chaparral, presented as a Fuel Model SH5, represents the most extreme conditions, varying with different wind speeds. In this case, flame lengths can be expected to reach up to approximately 24 feet with 19 mph sustained wind speeds and 50.5 feet with 41 mph sustained wind speeds. Spread rates range from 2.2 mph to 9.5 mph under summer and peak weather conditions, respectively. Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from less than 1.0 mile (Summer weather condition) to 2.3 miles (Peak weather condition).

It should be noted that the results presented in Table 4 depict values based on inputs to the BehavePlus software. The fuels models used in this analysis are dynamic models that were designed by the U.S. Forest Service to more accurately represent southern California chaparral fuel beds. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

5.2.4 FlamMap and FARSITE Analyses

The FlamMap and FARSITE software packages were used to evaluate regional fire behavior in order to inform the relocation/evacuation recommendations included in this FPP. As noted, FlamMap utilizes the same fire spread equations built into the BehavePlus software package, but allows for a geographical presentation of fire behavior outputs as it applies the calculations to each pixel in the associated GIS landscape (Finney 1998). The FARSITE software package is a more robust analysis tool than FlamMap, allowing for an analysis of fire spread over time, rather than a static representation of wildfire characteristics. The software simulates the growth of a fire front by using wave propagation principles over a heterogeneous surface and was utilized to account for dead fuel moisture conditioning, a feature not available in the FlamMap analysis conducted for the project. FlamMap software was used to model potential fire behavior across the project site, plus the areas within ½ mile of the project site.

The analysis conducted for this FPP utilized FlamMap's Minimum Travel Time tool and FARSITE fire growth modeling in order to evaluate the amount of time necessary for a fire to reach the project site. The following sections discuss the methods, inputs, and results of the FlamMap and FARSITE analyses.



Modeling Inputs:

Summer Weather (Onshore Flow)
Fire Scenarios: 5 & 6

Fuel Model: sh5
1 hr Fuel Moisture: 3%
10 hr Fuel Moisture: 5%
100 hr Fuel Moisture: 7%
Live Herbaceous Moisture: 60%
Live Woody Moisture: 90%
20-Ft Wind Speed: 19 mph
Slope Steepness: 20-30%

Peak Weather
(Offshore/Santa Ana Condition)
Fire Scenarios: 1, 2, 3, 4, 5, & 7

Fuel Model: sh5
1 hr Fuel Moisture: 2%
10 hr Fuel Moisture: 3%
100 hr Fuel Moisture: 5%
Live Herbaceous Moisture: 30%
Live Woody Moisture: 50%
20-Ft Wind Speed: 41 mph
Slope Steepness: 16-50%

DUDEK

SOURCE: BING 2014

FIGURE 4

Behave Plus Fire Behavior Modeling

Safari Highlands Ranch Fire Protection Plan

Path: Z:\Projects\IS304011\MAPDOC\DOCUMENT\FPP Figs\FPP Fig 4 Fire_Behave_Analysis.mxd

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5.2.4.1 Modeling Inputs

FlamMap and FARSITE software requires a minimum of five (5) separate input files that represent field conditions in the analysis area, including elevation, slope, aspect, fuel model, and canopy cover. Each of these data files was obtained from the LANDFIRE (Landscape Fire and Resource Management Planning Tools) data distribution site. LANDFIRE is shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior and provides landscape-scale, GIS data layers, including those representing elevation, slope, aspect, fuel model, and canopy cover.

The FlamMap and FARSITE analysis area was the same, and encompassed approximately 484,291 acres (757 square miles), ranging from approximately Palomar Mountain in the north, Ramona in the south, San Marcos in the west, and Warner Springs in the east. LANDFIRE data layers were projected to the NAD 83, California State Plane, Zone 6 coordinate system using ArcGIS 10.3.1 and then exported to ASCII format. These files were then utilized in creating a FARSITE Landscape file that served as the base for the FlamMap and FARSITE runs. All LANDFIRE data files had a ground resolution of 30 meters. In addition to the Landscape file, wind and weather data were incorporated into the model inputs.

FlamMap software was utilized to graphically depict potential fire behavior for the project site plus the area within ½ mile of the project site. Peak fall weather conditions (off-shore, Santa Ana conditions) were modeled for the existing conditions in the analysis area. The Minimum Travel Time (MTT) tool in the FlamMap software package is a two-dimensional fire growth model which calculates fire growth based on calculated fire spread rates from an ignition source (point, line, or polygon). The MTT tool uses fire spread rates to find minimum travel paths between data cells in the GIS landscape, with an output data file representing the number of minutes for a wildfire to reach a particular location from the ignition source. As FlamMap provides a static representation of fire behavior, modeling using the MTT tool holds wind and weather inputs constant over the modeling period.

FARSITE is a fire growth simulation modeling system that computes wildfire growth and behavior for long time periods under heterogeneous conditions of terrain, fuels, and weather. FARSITE was used to model the progression of a potential wildfire originating at a particular ignition source. As FlamMap provides a static representation of fire behavior, modeling using the MTT tool holds wind and weather inputs constant over the modeling period. FARSITE calculates fuel moisture during the simulation in response to changing weather conditions.

Four FlamMap runs were completed as described below:

1. One to model potential fire behavior during a Santa Ana wind event (Peak weather condition),
2. One using the MTT tool to represent a fire approaching the project site from the east-northeast during a Santa Ana wind event (Peak weather condition), and
3. One using the MTT tool to represent a fire approaching the site from the west-southwest during typical on-shore weather patterns (Summer weather condition).

Two FARSITE runs were completed as described below:

1. One to represent a fire approaching the project site from the east-northeast during a Santa Ana wind event (Peak weather condition), and
2. One to represent fires approaching the site from the west-southwest during typical on-shore weather patterns (Summer weather condition).

The following paragraphs provide descriptions of the inputs used in processing the FlamMap and FARSITE models. In addition, data sources are cited and any assumptions made during the modeling process are described.

Elevation

The elevation data file represents units of meters above mean sea level (AMSL). Elevations in the FlamMap and FARSITE analysis area range from 62 to 1,870 meters (203 to 6,135 feet) AMSL. Elevation data is a required input file for FlamMap and FARSITE runs and are necessary for adiabatic adjustment of temperature and humidity and for conversion of fire spread between horizontal and slope distances.

Slope

The slope data file represents values in degrees of inclination from horizontal. Slope values in the FlamMap and FARSITE analyses area range from 0–55 degrees. The slope input file is necessary for computing slope effects on fire spread and solar radiance.

Aspect

The aspect data file represents values in azimuth degrees. Aspect values are important in determining the solar exposure of grid cells.

Fuel Model

The fuel model data file was based on the 40 Scott and Burgan (2005) models and represents distinct distributions of fuel loading found among surface fuel components (live and dead), size classes, and fuel types. The fuel models included in the FlamMap and FARSITE analyses area are presented in Table 5.

Table 5
Fuel Models in FlamMap and FARSITE Analyses Area

Fuel Model	Description	Area (acreage)	Coverage Percentage
NB1	Urban/Developed	40.294	8.3%
NB3	Agricultural	238	0.0%
NB8	Open Water	2.090	0.4%
NB9	Bare Ground	939	0.2%
GR1	Short, Sparse Dry Climate Grass	21.687	4.5%
GR2	Low Load, Dry Climate Grass	174.427	36.0%
GS1	Low Load, Dry Climate Grass-Shrub	39.679	8.2%
GS2	Moderate Load, Dry Climate Grass-Shrub	128.413	26.5%
SH1	Low Load Dry Climate Shrub	3	0.0%
SH2	Moderate Load Dry Climate Shrub	8.323	1.7%
SH3	Moderate Load, Humid Climate Shrub	18	0.0%
SH5	High Load, Dry Climate Shrub	15	0.0%
SH6	Low Load, Humid Climate Shrub	5	0.0%
SH7	Very High Load, Dry Climate Shrub	32.819	6.8%
TU1	Low Load Dry Climate Timber-Grass-Shrub	5	0.0%
TU2	Moderate Load Humid Climate Timber-Shrub	4	0.0%
TU5	Very High Load, Dry Climate Timber-Shrub	16.267	3.4%
TL1	Low Load Compact Conifer Litter	0	0.0%
TL2	Low Load Broadleaf Litter	2.685	0.6%
TL3	Moderate Load Conifer Litter	8.740	1.8%
TL4	Small Down Logs	335	0.1%
TL5	High Load Conifer Litter	314	0.1%
TL6	Moderate Load Broadleaf Litter	2.379	0.5%
TL7	Large Downed Logs	2.238	0.5%
TL8	Long-Needle Litter	1.292	0.3%
TL9	Very High Load Broadleaf Litter	1.080	0.2%
	Total:	**484,291**	**100.0%**

Canopy Cover

Canopy cover is necessary for computing shading and wind reduction factors for all fuel models. Canopy cover is measured as the horizontal fraction of the ground that is covered directly overhead by tree canopy. Crown closure refers to the ecological condition of relative tree crown density. Stands can be said to be "closed" to recruitment of canopy trees but still only have 40% or 50% canopy cover. Coverage units for this analysis are in percent cover.

Wind and Fuel Moisture

Wind speed and fuel moisture values for the FlamMap and FARSITE analyses utilized the same values as those used in the BehavePlus runs for Summer and Peak scenarios, as presented in Table 3 and consistent with the standards outlined by the County (County of San Diego 2010). Wind alignment for the Peak (Santa Ana) analyses was set at 70 degrees. This alignment is consistent with Santa Ana wind alignments in the region, as documented in the spread patterns of the 2003 Cedar Fire and 2007 Witch Fire. Wind alignment for the summer (On-Shore) analyses was set at 250 degrees, opposite of the Santa Ana condition.

Fuel moisture information was incorporated into the Fuel Moisture file used as an input in FARSITE. In addition, temperature and relative humidity information was incorporated into a Weather data file to be used during FARSITE runs. As FARSITE incorporates a temporal component to the fire spread model, a detailed wind input file was necessary to incorporate wind direction, as well as sustained wind speeds over the entire analysis period. For the purposes of the FARSITE analyses, wind directions were aligned as noted above and held constant for the entire analysis period.

Ignition Locations

Ignition locations were selected by scenario, as described below:

1. For the FlamMap model analyzing a potential Santa Ana wind-driven fire approaching the project site from the east-northeast (Peak weather condition), an ignition line was used that ran along Highways 76 and 79 from approximately Sengme Oaks Road along Highway 76 in the northwest to the intersection of Highways 78 and 79 in the southeast. Ignitions along these road segments were selected to model vehicle-originated fires and a linear ignition source was selected to better determine the time for a fire to reach the project site should an ignition occur within this section of roadway. Utilizing discrete point ignition sources for this scenario in FlamMap is possible; however, it is possible that the modeled fire would miss the project site, as its perimeter would be very linear in nature due to the significant influence of Santa Ana winds.

2. For the FARSITE model analyzing a potential Santa Ana wind-driven fire approaching the project site from the east-northeast (Peak weather condition), an ignition point was used, located near the intersection of Highways 76 and 79. As with the FlamMap model, this ignition point was selected to model vehicle-originated fires. For FARSITE, a point ignition source was used, given that FARSITE includes a temporal component. Specifically, in FARSITE, line ignitions are often really area ignitions as represented at a given instant in time. The ignition point was selected due to its upwind location relative to the project site and modeled Santa Ana winds (70 degrees).
3. For the FlamMap and FARSITE models analyzing a potential fire approaching the site from the west-southwest during typical on-shore weather patterns (Summer weather condition), three ignition points were used, including one at the intersection of Highway 78 and San Pasqual Road, one at the intersection of Cloverdale Road and Cloveridge Road, and one at the end of Wild Oak Lane. These points were selected to model fires originating from adjacent urban environments, which may include vehicles, arson, accident or equipment use, amongst others.

Other Model Inputs

In addition to the aforementioned inputs, the following inputs were included in the FlamMap runs:

- Simulation Time: The model simulation time was set at 5 hours (300 minutes). This duration was sufficient to allow modeled fires to reach the project site.
- Resolution: The calculation resolution was set at 30 meters, the same resolution as the base data files (e.g., elevation, fuels).
- Wind Vectors: Wind vectors were modeled within the FlamMap runs using WindNinja tool embedded in the FlamMap software. WindNinja models the effect of topography on wind speed and direction generates wind vector files for use in the modeling runs. The grid resolution for the WindNinja analysis was set at 90 meters.

The FARSITE software package also requires additional settings to initiate model runs. The following outlines the settings used for the three FARSITE runs completed in support of this project:

- The ‘Time Step’ used for all runs was 60 minutes (1 hour).
- The ‘Perimeter Resolution’ for all runs was 60 meters.
- The duration for all runs was maximized at 8 hours.

The 'Enable Spot Fire Growth' ignition frequency input variable was set at 5% and the ignition delay was set at 2 minutes for all model runs.

5.2.4.2 Modeling Results

The output files generated for each of the FlamMap runs are the result of the analyses for potential fire behavior in the project area and those using the Minimum Travel Time tool. Fire behavior model results represent flame length and spread rate and MTT results represent fire Arrival Time. For the MTT analysis, one grid and one contour file were generated for each run (Summer and Peak) representing the time necessary for a fire to reach a particular location (Arrival Time), considering modeling inputs and ignition location(s). Maps depicting the Arrival Time grid and potential fire behavior and for the Peak and Summer weather scenarios are included in Appendices C-1 through C-4. The FlamMap Arrival Time results vary depending on the scenario analyzed.

Two different output files were generated from the FARSITE models, representing one run for each Scenario (Peak and Summer). The output files are a GIS shapefile representing fire perimeter boundaries at 1 hour intervals for the duration of the FARSITE run (8 hours). Maps depicting the FARSITE fire perimeters for the Peak and Summer weather scenarios are included in Appendices C-5 and C-6, respectively. The FARSITE fire progression results vary depending on the scenario analyzed (Peak or Summer).

For the models analyzing a fire during Peak (Santa Ana) wind and weather conditions, arrival time to the project boundary is approximately 4 hours from the ignition locations based on the FlamMap MTT analysis. Arrival time to the project boundary is also approximately 4 hours from the ignition location based on the FARSITE analysis. For the model analyzing a fire during Summer (On-Shore) wind and weather conditions, arrival time to the project boundary is approximately 40 minutes from the nearest ignition location (end of Wild Oak Lane) based on the FlamMap MTT analysis. Arrival time to the project boundary is also less than 1 hour from this same location based on the FARSITE analysis. For the Summer model, fires originating along San Pasqual Road and Cloverdale Road may take in excess of 3 hours (FlamMap MTT analysis) and up to 5 hours (FARSITE analysis) to reach the project site as they are slowed by developments along Rockwood and Harwood Roads.

The FlamMap and FARSITE modeling results are based on the data inputs presented herein. FlamMap calculates fire growth across the landscape assuming independence of fire behavior between neighboring cells in the landscape and holds the wind and fuel moisture inputs constant for the duration of the modeling run. Therefore, the FlamMap results presented in this FPP provide a conservative estimate of the amount of time necessary for a fire to reach the project site

as the model does not consider changes to wind speed, wind direction, or fuel moisture influenced by terrain, time of day, or changes in regional weather patterns. While the FARSITE model allows for a temporal analysis of fire spread, the inclusion of constant wind speed and direction data in the model were used to represent specific weather scenarios, and do not account for real-world changes in wind speed or direction that may be realized during an actual fire event. Further, current research indicates that FARSITE analyses tend to over-predict fire spread rates (Finney 1998). The FARSITE modeling effort did calculate spotting from surface fires, thus spread rates resulting from FARSITE models are based on the progression of the flaming front of the fire plus spotting ahead of the fire front. Changes in wind, weather, or pockets of different fuel types are not accounted for in this analysis. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including variable weather patterns over time, small-scale topographic variations, or changing vegetation patterns.

Based on the FlamMap analysis of during Peak fire conditions, and consistent with the FARSITE analysis, the rate of spread was approximately 3.4 miles per hour (covering a distance of 13.5 miles in 4 hours). This modeling result is supported by an analysis of previous fires burning in San Diego County during Santa Ana wind events. Specifically, the 2007 Witch Fire, which burned the project site, exhibited extreme fire behavior with spread rates reaching 2.5 miles per hour (Grijalva et al., 2008) and the 2003 Cedar Fire burned at a rate of approximately 3 miles per hour (USFS and CAL FIRE 2003).

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6 EMERGENCY RESPONSE AND SERVICE

6.1 Fire Facilities

The Project is currently located within the CAL FIRE Valley Center Fire Protection District and the County of San Diego. The project proponent proposes an annexation of the entire project site into the City of Escondido. Once finalized, the Escondido Fire Department (EFD) will provide initial response to the Proposed Project site from the on-site station. The EFD operates seven Fire Stations that could respond to a fire or medical emergency at the site. Table 6 provides a summary of the EFD's fire and emergency medical delivery system.

Table 6
Escondido Fire Department Responding Stations Summary

Fire Station	Address	Apparatus	Staffing (Total/Station)	Maximum Travel Distance	Travel Time**
On-Site	Safari Highlands Ranch	Paramedic Engine	TBD	3.05 miles***	1 to 5.8 min
1	310 North Quince Escondido, California 92029	Paramedic Engine Truck Company Brush Engine 2 Ambulances	27	7.3 miles*	16 min
2	421 North Midway Escondido, California 92029	Paramedic Engine Brush Engine Ambulance	9	6.2 miles*	13 min
3	1808 Nutmeg Street Escondido, California 92029	Paramedic Engine Brush Engine	9	9.3 miles*	17 min
4	3301 Bear Valley Parkway Escondido, California 92029	Paramedic Engine Brush Engine	9	6.1 miles*	10 min
5	2319 Felicita Road Escondido, California 92029	Paramedic Engine Brush Engine Ambulance	15	6.9 miles*	15 min
6	1735 Del Dios Road Escondido, California 92029	Paramedic Engine	9	7.8 miles*	14 min
7	1220 North Ash Escondido, California 92029	Paramedic Engine Ambulance	9	7 miles.	15 minutes

* Distance measured to Project entry gate located on Safari Highlands Ranch Road at the southern edge of property except for the On-Site station which measures distance to the most distant lot.

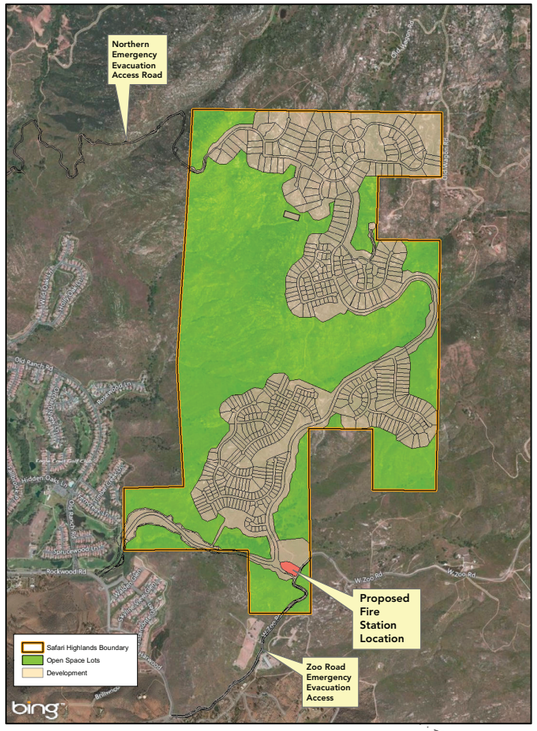
** Assumes travel to the primary project's north end, and speeds calculated with the ISO travel time formula Time = 0.65+1.7(Distance)

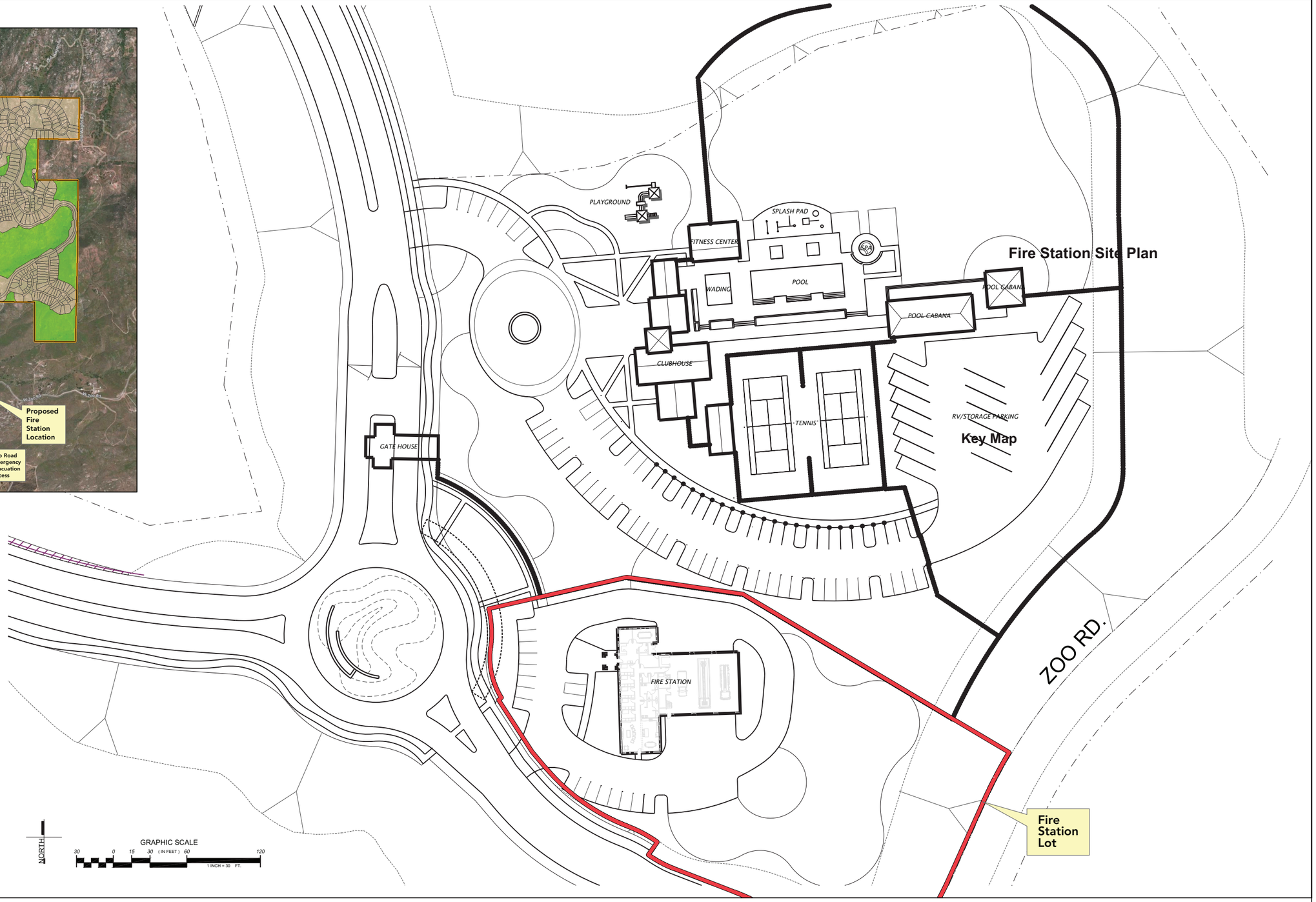
The closest existing EFD Fire Station is FS 4, located at 3301 Bear Valley Parkway, which staffs a minimum of three firefighters 24 hours per day/seven days per week and houses one Paramedic Engine (Type I) and a Type III brush engine. Secondary response would be provided from this and other EFD Fire Stations as needed. Station 2 is the next closest EFD station and is located at 421 North Midway. The station staffs three on-duty, 24-hours per day and houses a Paramedic Engine and a Type III brush engine.

6.2 Emergency Response Travel Time Coverage

The City of Escondido's Quality of Life Standard is to respond to all priority Level One or Emergency type calls within 7 minutes and 30 seconds, a total of 90% of the time. In 2012, EFD's response time for all stations was 6 minutes and 32 seconds for all urgent calls. Response to the project site from the closest existing EFD fire stations would not achieve the response time standard for first arriving. Response from Station 4 is calculated at roughly 10 minutes to main entrance of the site. The full effective firefighting force is estimated to arrive within 16 minutes. Therefore, the project does not comply with the City's response time standards and will require provisions for an on-site fire station.

To mitigate the unachievable City of Escondido's Quality of Life Standard threshold, a new fire station will be built in conjunction with the project. The station will be located at the southern tip of the project boundary, located near the main entrance of the project off of Safari Highlands Ranch Road. The new station will be a 6,000 to 10,000 square feet building with three bays for apparatus and five dorm rooms for staff (See Figure 5). The station will be staffed 24/7 with five to six career firefighters, who would provide initial response. The station will likely have one Paramedic Engine, one Brush Engine and one Ambulance. Travel time from the new station to the most remote (distant) lot within the Project is 5.8 minutes. This would enable just under 2 minutes for dispatch and turnout and is considered to meet the 7.5 minute Escondido Fire Department response goal.





SOURCE: MCCULLOUGH LANDSCAPE ARCHITECTURE, INC. 2016

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FIGURE 5
Proposed On-Site Fire Station Exhibit

Safari Highlands Ranch Fire Protection Plan

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6.3 Estimated Calls and Demand for Service from the Project

The EFD documented 14,536 total emergency calls for 2015 (Escondido Fire Department 2016) for a City population of approximately 147,095[3] (City of Escondido 2016). The call volume of 99 per 1,000 persons per year is higher than the national average of approximately 82 calls. For this analysis, we'll use the higher (most conservative) per capita call volume of roughly 0.1 for City of Escondido. Based on the proposed development plans, the project's estimated 1,716 residents (assumes an average of 3.12 occupants per residence for this type of community (SANDAG 2014)) would generate roughly 172 calls per year (0.5 calls per day), most of which are expected to be medical-related calls (approximately 80.4% of total emergency incidents).

Service level requirements are not expected to be significantly impacted with the increase of 172 calls per year (0.5 call per day) for a station (EFD Station 4) that currently responds to roughly 3 calls per day (1,034 calls per year, 86 calls per month, 21 calls per week) . The next closest fire station is station 2. This EFD station responds to 2,676 calls per year or approximately 7.3 calls per day. For reference, a station that responds to 5 calls per day in an urban setting is considered average and 10 calls per day is considered busy. Therefore, the project is not expected to cause a decline in Station 4 level of service. The requirements described in this FPP are intended to aid firefighting personnel and minimize the demand placed on the existing emergency service system. Regardless of the potential impact on Station 4, the planned new fire station on site will be able to respond to the project's generated calls, and have significant capacity to respond to other calls from outside the project in a timeframe that is a substantial improvement from existing service.

6.4 Response Capability Impact Assessment and Mitigation

Cumulative impacts from multiple projects can cause fire response service decline and must be analyzed for each project. The Safari Highlands Ranch project and its proposed usage by up to 1,716 residents represents an increase in potential service demand of approximately 172 calls per year, well within the capacity of the existing EFD Fire Stations. However, this total adds to an existing busy service obligation for Station 4 and the station's response time to the entrance of the project site exceeds the City's response time standard. This cumulative impact is considered potentially significant, but mitigated through the construction of a new, on-site fire station that is staffed year round. A modern fire station will be built with fair-share contributions by the Project and through assessments, property taxes, and/or a separate agreement. The final funding amount will be determined by the applicant and City of Escondido and included in a Fire Service Agreement to be completed at later stages of planning prior to map recordation.

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[3] City population total number is from San Diego Association of Governments 2014 estimates which reflect 2010 U.S. Census data.

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

7.1 Roads

7.1.1 Access and Egress

Site access will comply with the requirements of the 2014 San Diego County Consolidated Fire Code, California Code of Regulations; Title 14, and Escondido 2016 Fire Code (Sections 503.1 and 503.2). The project's circulation system will consist of both public and private roads with each being built to the respective standards and maintained by funded entities (HOAs and/or Facilities Maintenance Fee, or San Diego County).

The project site would have one main access road, Safari Highlands Ranch Road, which intersects with Rockwood Road between Old Ranch Road and Vistamonte Avenue. Safari Highlands Ranch Road will be a public roadway from its starting point at Rockwood Road up to the gated community entry and a private road beyond the entry gate. This road will provide:

- At the entrance gate, a 64-foot-wide curb to curb with two 24-foot-wide travel lanes and a 16-foot-wide median
- Inside the entrance gate, a 48-foot-wide curb to curb with two 20-foot-wide travel lanes and an 8 foot wide median
- At first intersection, road width becomes 42 feet wide curb to curb with two 21-foot-wide travel lanes and demarcated bike lane
- A relatively short section just north of the first intersection includes two 16-foot-wide travel lanes and an 8-foot-wide median
- North of the 40-foot-wide section, the road becomes 36 feet wide curb to curb. This would allow two 12-foot-wide travel lanes and parking on both sides.

The Project includes gated secondary and tertiary emergency access roads at the northwest and southern portions of the development, providing the ability to move vehicles from the project in physically remote locations from the other Project roads. The northwestern road will be approximately 2.4 miles long and will connect to Stonebridge Road in the Hidden Hills Trails development. The southern road will be approximately one mile long and will connect to emergency access Zoo Road, which will be upgraded to accommodate emergency vehicles. Both emergency access roads will be minimum 24 feet wide with two travel lanes.

All internal residential streets will be 36 feet wide curb to curb. Residential driveways serving no more than two single-family dwellings will have a minimum of 16 feet of unobstructed improved width. Parking will not be allowed on streets including widths lower than 32 feet. Access roads to construction areas shall be completed and paved prior to issuance of building permits and prior to combustible construction occurring.

7.1.2 Road Widths

- All on-site roads will be constructed to current County of San Diego Consolidated Fire Code and EFD Road standards, including minimum 12-foot travel lane widths unobstructed by parking (503.2.1), and shall be improved with asphalt paving materials.
- All streets within the project, public and private, include on-street parking when there is at least 36 feet of paved road width. Parking will be restricted along red curb painted fire lanes and by posting of signs stating "No Parking; Fire Lane" correctly marked per the California Vehicle code to preserve the unobstructed width for emergency response. The signs shall include language identifying the towing company and their phone number enabling legal enforcement of the no parking areas.
- Turnouts along the secondary access road (northwestern road) will be provided to EFD's requirements regarding spacing, taper and length.

7.1.3 Road Surface

All fire access and vehicle roadways will be of asphaltic concrete, except as noted for grades exceeding 15%, and designed and maintained to support the imposed loads of fire apparatus (not less than 75,000 pounds) that may respond, including Type I engines, Type III engines, and ladder trucks. Access roads shall be completed and paved prior to issuance of building permits and prior to combustible construction occurring. The project HOA will be a funded entity provided the responsibility to maintain roads so that they meet City of Escondido and EFD requirements.

7.1.4 Interior Circulation Roads

- Interior circulation roads include all roadways that are considered common or primary roadways for traffic flow through the site and for fire department access and serving in excess of two structures. Any dead-end roads serving new buildings that are longer than 150 feet shall have approved provisions for fire apparatus turnaround in accordance with EFD standards at the time of approval. EFD's Fire Marshal shall establish a policy identifying acceptable turnarounds for various Project product types.

- Fire apparatus turnarounds to include turning radius of a minimum 28 feet, measured to inside edge of improved width, per Consolidated Fire Code.
- Minimum paved radius width for a project cul-de-sac is 38 feet. Cul-de-sac bulbs will have signs posted "No Parking; Fire Lane." Cul-de-sacs shall have a red painted curb with white letters "No Parking Fire Lane".
- Cul-de-sac bulbs are required on dead-end roads in residential areas where roadways serve more than two residences.
- Roadways and/or driveways shall provide fire department access to within 150 feet of all portions of the exterior walls of the first floor of the structures (all structures are fire sprinklered).
- Traffic calming devices (including, but not limited to, speed bumps, speed humps, speed control dips, etc.) shall be prohibited unless approved by the fire code official (Sec. 503.4.1 Traffic calming devices).
- Vertical clearance along roadways is required to be 13.5 feet. Proper maintenance is required to ensure that vegetation and trees on roadsides do not grow over or into the roadway and impede emergency apparatus access. No mature tree trunks or branches shall intrude into the road. The type of vegetation shall be fire resistant and comply with this plan. The gate house height will be posted on the roadway indicating a minimum 13.5 foot clearance.
- Interior circulation roads shall maintain a 20 to 50 feet buffer along either side where fuel modification/reduction is completed twice per year as is according to specifications provided in this FPP.
- Angle of approach/departure shall not exceed 7 degrees (12%) (County Consolidated Fire Code, Section 503.2.7), unless mitigated to approval by the Fire Chief. The gradient for a fire apparatus access roadway shall not exceed 15.0%. The fire code official may allow roadway grades up to 20.0% provided that the roadway surface conforms to section 503.2.3. The fire code official may require additional mitigation measures where it is deemed appropriate.

7.1.5 Gates

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

power failure. The gate(s) will include a magnetic or pressure activated switch for automatically opening the gate from the interior of the project for resident egress.

- Pole gates or other structures or devices which could obstruct fire access roadways or otherwise hinder emergency operations shall be equipped with an approved, Knox padlock.

7.1.6 Driveways

Any new structure that is 150 feet or more from a fire apparatus access road shall have a paved driveway meeting the following specifications:

- Grades shall be less than 15%. If over 15%, they require Portland cement base with heavy broom finish and in no case can they exceed 20%.
- Approved fire apparatus turnouts will be provided every 400 feet if driveway is over 800 feet long.
- A residential driveway constructed of 3½" Portland cement concrete may be installed on any slope up to 20% provided that slopes over 15% have a deep broom finish perpendicular to the direction of travel or other approved surface to enhance traction. Driveway gates shall comply with Section 7.1.3.
- Driveway aprons will meet the code standard with a 28 degree inside turning radius.

7.1.7 Premises Identification

Identification of roads and structures will comply with the Consolidated Fire Code, Sections 503.3 and 505, as follows:

- Approved numbers and/or addresses shall be placed on all new and existing buildings and at appropriate additional locations, plainly visible and legible from the street or roadway fronting the property when approaching from either direction. Address numbers on new construction shall be automatically illuminated by low voltage lighting. The numbers shall contrast with their background and shall meet the following minimum size standards: 4" high with a ½" stroke for residential buildings, 6" high with a ½" stroke for commercial and multi-residential buildings and 12" high with a 1" stroke for industrial buildings. Additional numbers shall be required where deemed necessary by the fire code official, such as rear access doors, building corners and entrances to commercial centers. The fire code official may establish different minimum sizes for numbers for various categories of projects (Sec. 505.1 Address numbers).

- Multiple structures located off common driveways will include posting structure identification on structures, on the entrance to individual driveways, and at the entrance to the common driveway.
- If the structure is 100 feet from the roadway, structure identification should also be located at the entrance to the driveway.

7.1.8 Response Map Updates

Any new development, which necessitates updating of emergency response maps by virtue of new structures, hydrants, roadways or similar features, are required to provide map updates to the City of Escondido. The applicant will provide a copy of building plans in Geo-Referenced format to be used by fire department for pre-fire planning purposes and for update of applicable incident response maps. Information shall specifically include a site plan and building plan showing locations of utility shut-offs, fire sprinkler risers and shut-off valves, the fire department connection for fire protection sprinkler system, fire alarm panels, fire hydrants, fire department connection standpipe, and Knox box . The map update information shall be provided in City-approved coordinate system.

7.2 Structures

7.2.1 Ignition-Resistant Structural Requirements

This section outlines ignition-resistant construction (for all structures) that will meet the requirements of the EFD Fire Code. The following construction practices respond to the requirements of the 2016 California Fire Code, the 2016 California Building Code (CBC), the California Code of regulations, Title 14, and the 2014 San Diego County Consolidated Fire Code (SDCCFC) as amended. These requirements include the ignition -resistant requirements found in Chapter 7A of the CBC and County Building Code. While these standards will provide a high level of protection to structures in this development, there is no guarantee of assurance that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

7.2.2 Structure Setbacks

Structure setbacks are required in some jurisdictions, including Rincon Del Diablo (SDCCFC Section 4907.1.3 Structure Setback from Slope). Single-story structures shall be setback a minimum of 15 feet horizontally from top of slope to the farthest projection from a roof. A single-story structure shall be less than 12 feet above grade. A two-story structure shall be setback a minimum of 30 feet horizontally from top of slope to the farthest projection for a roof. Structures greater than two stories may require a greater setback when the slope is greater than 2 to 1. A total

of up to 14 lots (worst case) may not be able to provide a full 30 feet of structure setback. For these lots, a single story structure can be provided if 15 feet of setback is available. For a two story structure to be constructed on these lots, mitigation through alternative materials and methods, as described further in Section 6.0 will be required. The intent of the code is to set back structures from vegetative fuel covered slopes. Some of the identified lots where the setbacks cannot be fully provided are adjacent internal slopes that will be landscaped and managed. These lots are not proposed to receive heat deflecting walls. The heat deflecting view wall potential locations (subject to further study and EFD approval) are depicted in (Appendix D).

7.2.3 Additional Requirements and Recommendations Based on Occupancy Type

All retail, commercial, and office buildings will comply with appropriate building codes.

7.3 Fire Protection Systems

7.3.1 Water

Water service for the Safari Highlands Ranch project will be provided by the City of Escondido Water Division (EWD) and will be consistent with EFD requirements (Section 507.2/507.3) for a residential development within a VHFHSZ area. Water utilities will include a connection to the City of Escondido water system, pumps to boost water, water storage tank, backup power, and an internal water distribution system that will use both pumps, reducing stations, and gravity feed. The City's water service area requires new development to meet a 2,500 gpm fire flow which can be supplied from two or more fire hydrants. The pressures in the Proposed Project site will remain above 20 psi for a minimum duration of two hours when meeting the fire requirements for the City's water service area and EFD fire flows. Fire hydrants will be operable prior to combustible lumber being dropped on site.

7.3.2 Hydrants

Hydrants shall be located along fire access roadways as determined by the EFD Fire Marshal to meet operational needs, at intersections, at the beginning radius of cul-de-sacs, and at a code exceeding 500 feet (on-center) spacing of fire access roadways, pursuant to the City of Escondido Fire Code (Ordinance No. 2016-116, 1-4; Section 507.5.1.1). Hydrants will be consistent with EFD Design Standards as follows:

- ***Required installations.*** The location, type and number of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided on the public or private street, or on the site of the premises to be protected or both. Fire hydrants shall

be accessible to the fire department apparatus by roads meeting the requirements of section 503 of the CFC. Fire service laterals, valves, backflow preventers, and meters will be installed on site as required by the EWD. All fire department connections shall be installed in accordance with mounting requirements as specified by the EFD Fire Marshal. The northwestern emergency secondary access road will be provided two water tanks (10,000 gallons each) at locations approved by the EFD and fitted with connections compatible with EFD requirements. The water tanks will be independent, truck filled, secured to prevent water theft, and monitored at least annually. The tanks will be maintained by an independent contractor through the HOA.

- ***Location of fire hydrants.*** Hydrants will be in place and serviceable prior to delivery of combustible materials to the site. Fire hydrants shall be located according to engineering standards and as required by the fire code official using the following criteria and taking into consideration departmental operational needs. Fire hydrants will be every 1,000 feet apart along Safari Highlands Ranch Road. Hydrants within Project neighborhoods shall be 500 feet apart. Prior to the issuance of building permits, the applicant shall submit to EFD plans demonstrating a water system capable of handling the fire flow requirements.
- ***Fire hydrant construction and configuration***. All fire hydrants shall be of bronze construction, including all internal parts except seats. Alternative materials may be used if approved by EFD's Fire Marshal and EWD. The stems shall be designed and installed in a manner that will ensure that they will not be projected outward from the main body by internal water pressure due to disassembly. The number and size of fire hydrant outlets shall be at a minimum one 4-inch port and two, 2 1/2-inch ports.
- ***Signing of water sources and fire department connections***. Fire hydrants shall be identified by a reflectorized blue marker and fire department connections shall be identified by a reflectorized green marker, with a minimum dimension of 3 inches, in the center of the travel lane adjacent the water source (SDCCFC Sec. 507.5.7.1). Crash posts will be provided where needed in on-site areas where vehicles could strike fire hydrants and will be consistent with Section 312 of the CFC.
- ***Vegetation Clearance***. A three-foot clear space (free of ornamental landscaping and retaining walls) shall be maintained around the circumference of all fire hydrants.

7.3.3 Fire Sprinklers

All structures will be provided interior fire sprinklers. Automatic internal fire sprinklers shall be in accordance with National Fire Protection Association (NFPA) 13 or 13-D and City of Escondido installation requirements as appropriate. Actual system design is subject to final building design and the occupancy types in the structure.

7.3.4 Smoke Alarm Systems

All residential units shall have electric-powered, hard-wired smoke detectors in compliance with County of San Diego Consolidated Fire Code. Hard-wired smoke alarms are to be equipped with battery backup.

7.4 Defensible Space/Fuel Modification Zones

An important component of a fire protection system is the fuel modification area. Fuel modification zones (FMZ) are designed to gradually reduce fire intensity and flame lengths from advancing fire by placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other on the perimeter of all structures and adjacent open space areas. Therefore, the fuel modification area is an important part of the fire protection system designed for this site.

Predicted flame lengths vary on the site-adjacent slopes which will be directly adjacent the provided fuel modification zones. The zones are customized for the site based on slope and vegetation characteristics as well as resulting fire behavior modeling exercises. These variations were analyzed as were the site's specific features and conditions which complement and augment the proposed fuel modification areas. Fire behavior modeling, as previously described, was used to predict flame lengths and was not intended to determine sufficient fuel modification zone widths. However, the results of the modeling do provide important information which is a key element for determining distances for minimizing structure ignition and providing "defensible space" for firefighters.

The significance of the Project's FMZ's cannot be understated. Based on scientifically modeled fire behavior calculations customized for the site, flame lengths under the most extreme fire weather conditions within the WUI areas could approach 65 feet in height. Under summer weather conditions, flame lengths could approach 33 feet in height along the southern and western edges of the Proposed Project site. Therefore, an appropriate FMZ would likely be roughly 100 feet under summer conditions and 150 feet wide under extreme weather conditions. Thus, providing enough set-back from flammable fuels and providing "defensible" space for firefighters in which they can work. For this project, as indicated in Appendix D, the FMZs are at least three times wide as the modeled flame lengths in each of the fuel types represented on site, resulting in fuel modification areas that exceed the standard 100 foot wide requirement. For the entire eastern and northern portions of the project, they are 200 feet, a 100% increase over the standard.

7.4.1 Project Fuel Modification Zone Standards

Fuel modification zones will be implemented according to the following requirements. These zones are presented graphically in Appendices D-1 through D-4. In addition, a Prohibited Plant

List is provided in Appendix E. Each zone would include permanent field markers to delineate the zones, aiding ongoing maintenance activities that will occur on site. The project would also hire a qualified EFD-approved 3rd party fuel modification zone inspector to provide inspections twice annually, as detailed in the following sections.

7.4.1.1 Zone 1 – Irrigated Structure Setback Zone (75 to 100 feet wide)

Zone 1 is applicable site wide for every structure. All fuel modification will be provided within the project boundaries so there will be no off-site FMZ areas. The fuel modification zones start at the structures (rear wall) and extend outward. All developed landscape areas internal to the project will be to Zone 1 conditions. The standard Zone 1 will be a minimum 75 feet wide starting at the structure and moving outward (100 feet for the north and east sides of the project). All flammable native vegetation shall be removed. Single trees, ornamental shrubbery or cultivated ground covers may be permitted provided they are maintained in a manner that they do not readily transmit fire to the structure and meet the requirements herein. This zone will be planted with drought-tolerant, less flammable plants from the proposed Project Plant Palette (Appendix F) and an automatic irrigation system will be installed in this area to maintain hydrated plants without over-watering, allowing for run-off, or attracting nuisance pests. There will be no inclusion of non-fire resistive trees in the project's interior landscapes or perimeter fuel modification zones.

Zone 1 includes the following key components:

1. Minimum of 75 feet wide;
2. Automatic irrigation system to maintain hydrated plants without over-watering or attracting nuisance pests;
3. High-leaf-moisture plants as ground cover, less than 4 inches high;
4. Shrubs are prohibited beneath tree crowns.
5. No trees within 10 feet of structures (drip line of mature trees shall be maintained 10 feet from structures);
6. Tree spacing of a minimum 10 feet between canopies or as specified in Table 7;
7. No tree limb encroachment within 10 feet of a structure or chimney, including outside barbecues or fireplaces;
8. Tree maintenance includes limbing-up (canopy raising) 6 feet or one-third the height of mature tree;

9. Maintenance including ongoing removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying plantings, maintenance of the programming and functionality of the irrigation system, regular trimming to prevent ladder fuels;
10. A minimum of 60 inches of horizontal clearance and unlimited vertical clearance around the exterior of the structure (360°) provided for firefighter access. Within this clearance area, landscape such as low ground covers and shrubs are permitted so long as their placement and mature height do not impede firefighter access, consistent with purpose of this guideline;
11. No combustible construction (structures) allowed in Zone 1 – HOA responsible for confirming that these conditions are met;
12. No permanent or portable fire pits, fire places, or flame generating devices that burn wood allowed within Zone 1 or within 10 feet of vegetation – HOA responsible for confirming that these conditions are met;
13. Trees and tree form shrub species that naturally grow to heights that exceed 2 feet shall be vertically pruned to prevent ladder fuels;
14. Grasses shall be cut to 4 inches in height. Native grasses can be cut after going to seed;
15. Ground covers within first 5 feet from structure restricted to non-flammable materials such as stone, rock, concrete, bare soil, or other; and
16. Vegetation/Landscape Plan prepared and submitted to EFD in compliance with this plan.

7.4.1.2 Zone 2 – Thinning Zone (75 to 100 feet wide)

A thinning zone reduces the fuel load of a wildland area adjacent to Zone 1, and thereby, reduces heat and ember production from wildland fires, slows fire spread, and reduces fire intensity. Zone 2 adjoins Zone 1 and measures 75 or 100 feet in most areas with some slight variation in width, depending on available distance to property line. Along the northern and eastern sides of the project, where effects of a Santa Ana wind driven wildfire would be greatest, a full 100 feet of Zone 2 will be provided.

Zone 2 includes the following key components:

1. Zone 2 requires a minimum of 50% thinning or removal of plants (50% no fuel);
2. Grasses shall be cut to 4 inches in height. Native grasses can be cut after going to seed;
3. Ground cover less than 6 inches high;
4. No trees, except coast live oak (*Quercus agrifolia*), or Engelmann oak (*Quercus engelmannii*);

5. Trees and tree-form shrub species that naturally grow to heights that exceed 4 feet shall be vertically pruned to prevent ladder fuels;
6. No shrubs, except single-specimen native shrubs, exclusive of sage scrub, 20 feet on center;
7. Maintenance including ongoing removal and thinning of dead/dying planting, and regular trimming to prevent ladder fuels;
8. Plant species introduced into Zone 2 shall not include prohibited or highly flammable species;
9. No vegetation found on the Prohibited Plant List (Appendix E) shall be planted or remain in any Fuel Modification Zone.

7.4.2 Other Vegetation Management

7.4.2.1 Roadside Fuel Modification Zones

As required under SDCCFC, an area of 20 feet from each side of fire apparatus access roads within most neighborhoods shall be improved to Zone 1 standards described above and maintained clear of all but fire-resistive vegetation. Safari Highlands Ranch Road, the primary access backbone road will have an area of 50 feet of fuel modification on each side. The roadside fuel modification zones will consist of 20 feet of Zone 1 and 30 feet of Zone 2 or a 50-foot wide Zone 1. Both emergency access roadways will have 10 feet of thinned vegetation (Zone 2) adjacent to both sides of the road. These areas shall be maintained by the HOA. Vertical clearance of 13 feet 6 inches shall also be maintained along fire apparatus access roads.

7.4.2.2 Tree Planting and Maintenance Standards

Trees may be planted within the Proposed Project site as long as they conform to the SDCCFC, Section 4907.3.1.Trees (EFD has adopted the County standard). On the Project site, tree planting in the park and maintenance areas as well as along roadways is acceptable, as long as they meet the following restrictions as described below:

- For streetscape plantings, fire resistive trees can be planted 10 feet from edge of curb to center of tree trunk. Care should be given to the type of tree selected, that it will not encroach into the roadway, or produce a closed canopy effect.
- Crowns of trees located within a FMZ shall maintain a minimum horizontal clearance of 10 feet for fire resistant trees. Mature trees shall be pruned to remove limbs one-third the height or 6 feet, whichever is less, above the ground surface adjacent to the trees.
- Dead wood and litter shall be regularly removed from trees.
- Ornamental trees shall be limited to groupings of 2–3 trees with canopies for each grouping separated horizontally as described in Table 7.

Table 7
Distance Between Tree Canopies by Percent Slope

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

1 Determined from canopy dimensions as described in Sunset Western Garden Book (Current Edition)
2 2014 CFC Section 4907.3.1. Trees, County of San Diego.

7.4.2.3 Trail Vegetation Management

Trails include the community pathways that are all accessible from public roads and the network of open space trails, interconnecting the community. Trail maintenance shall occur on the trails to remove flashy fuels and maintain the trail in a useable, low fuel condition. The community pathways will be accessible by emergency all-terrain vehicles, such as "UTVs" accessed at numerous locations within the community. The open space trail network will be accessible from the Proposed Project via trail access points and trails that will be wide enough for emergency UTV/ATV access.

7.4.2.4 Environmentally Sensitive/Riparian Areas

Once the FMZs are in place, there will not be a need to expand them as they have been planned to meet the fire code. However, if unforeseen circumstances were to arise that required hazard reduction within an area considered environmentally sensitive or part of the Multispecies Conservation Plan, it may require approval from the City or County and the appropriate resource agencies (California Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers) prior to any vegetation management activities occurring within those areas.

7.4.2.5 Pre-Construction Structure Locations

1. Vegetation management on structure location will not be required until construction begins, unless it is located within the fuel modification zone of a structure under construction or completed.
2. Prior to issuance of a permit for any construction, grading, trenching, or installation of fences, the outermost 50 feet of each structure location (building pad) is to be maintained as a Vegetation Management Zone. This entails removal of vegetation as needed.
3. The remainder of the Vegetation Management Zones required for the particular lot shall be installed and maintained prior to combustible materials being brought onto any lot under construction.

4. Existing flammable vegetation shall be reduced by 100% on vacant lots upon commencement of construction.
5. Dead fuel, ladder fuel (fuel which can spread fire from ground to trees), and downed fuel shall be removed and trees/shrubs shall be properly limbed, pruned, and spaced per this plan.

7.4.3 Undesirable Plants

Certain plants are considered to be undesirable in the landscape due to characteristics that make them highly flammable. These characteristics can be physical or chemical. The plants included in the Prohibited Plant List (Appendix E) are unacceptable from a fire safety standpoint, and will not be planted on the site or allowed to establish opportunistically within the fuel modification zones or landscaped park and maintenance areas.

7.4.4 Fuel Modification Area Vegetation Maintenance

All fuel modification area vegetation management shall occur as-needed for fire safety, compliance with the FMZ requirements detailed in this FPP, and as determined by the EFD. The Project HOA or other established funding and management entity for each development area or neighborhood if separate, shall be responsible for all vegetation management throughout the respective project sites, in compliance with the requirements detailed herein and FAHJ requirements. The HOA(s) shall be responsible for ensuring long-term funding and ongoing compliance with all provisions of this FPP, including vegetation planting, fuel modification, vegetation management, and maintenance requirements throughout the Safari Highlands Ranch project.

7.4.5 Annual FMZ Compliance Inspection

The Project HOA shall obtain an FMZ inspection and report from a qualified EFD-approved 3rd party inspector in May and September of each year certifying that vegetation management activities throughout the project site have been performed pursuant to this FPP. This inspection report and certification of compliance with the FPP shall be provided to EFD annually by June 1st and October 1st.

7.4.6 Construction Phase Vegetation Management

Vegetation management requirements shall be implemented at commencement and throughout the construction phase. Vegetation management shall be performed pursuant to this FPP and EFD requirements on all building locations prior to the start of work and prior to any import of

combustible construction materials. Adequate fuel breaks shall be created around all grading, site work, and other construction activities in areas where there is flammable vegetation.

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

- All new power lines shall be underground for fire safety during high wind conditions or during fires on a right-of-way that can expose aboveground power lines. Temporary construction power lines may be allowed in areas that have been cleared of combustible vegetation.
- A construction fire prevention plan shall be prepared to minimize the likelihood of ignitions and pre-plan the site's fire prevention, protection and response plan.
- Caution must be used not to cause erosion or ground (including slope) instability or water runoff due to vegetation removal, vegetation management, maintenance, landscaping, or irrigation.

8 ALTERNATIVE MATERIALS AND METHODS FOR NON-CONFORMING TOP OF SLOPE SETBACKS

There are up to 14 lots that cannot provide a full 30 feet of setback from top of slope for two story homes (Appendix D). Single story homes may be constructed on these lots provided that 15 feet of setback is available with no additional measures provided. Some of these lots are adjacent to internal slopes and as those slopes may be landscaped and maintained absent of native fuels, they will not be provided heat deflecting walls. Further analysis of which homes will be adjacent slopes with native, more flammable fuels will be provided to determine which will be subject to the heat deflecting walls. As such, this FPP incorporates additional analysis and measures that will be implemented to compensate for potential fire related threats to these lots. These measures are customized for this site based on the analysis results and focus on providing functional equivalency as a full fuel modification zone.

The maximum number of 14 lots that cannot provide a full 30 feet setback from the top of slope are being protected through a combination of extended fuel modification zone (up to 200 feet) and will also be provided heat deflecting walls/view walls if two story structures are planned. No additional mitigation measures are required if single story residences are built.

Research has indicated that the closer a fire is to a structure, the higher the level of heat exposure (Cohen 2000). However, studies indicate that given certain assumptions (e.g., 10 meters of low fuel landscape, no open windows), wildfire does not spread to homes unless the fuel and heat requirements (of the home) are sufficient for ignition and continued combustion (Cohen 1995, Alexander et al. 1998). Construction materials and methods can prevent or minimize ignitions. Similar case studies indicate that with nonflammable roofs and vegetation modification from 10–18 meters (roughly 32–60 feet) in southern California fires, 85–95% of the homes survived (Howard et al. 1973, Foote and Gilless 1996). Similarly, San Diego County after fire assessments indicate strongly that the building codes are working in preventing home loss: of 15,000 structures within the 2003 fire perimeter, 17% (1,050) were damaged or destroyed. However, of the 400 structures built to the 2001 codes (the most recent at the time), only 4% (16) were damaged or destroyed. Further, of the 8,300 homes that were within the 2007 fire perimeter, 17% were damaged or destroyed. A much smaller percentage (3%) of the 789 homes that were built to 2001 codes were impacted and an even smaller percentage (2%) of the 1,218 structures built to the 2004 Codes were impacted (IBHS 2008). Damage to the structures built to the latest codes is likely from flammable landscape plantings or objects next to structures or open windows or doors (Hunter 2008).

These results support Cohen's (2000) findings that if a community's homes have a sufficiently low home ignitability (i.e., 2014 San Diego County Consolidated Code and 2016 California Building Code), the community can survive exposure to wildfire without major fire destruction.

This provides the option of mitigating the wildland fire threat to homes/structures at the residential location without extensive wildland fuel reduction. Cohen's (1995) studies suggest, as a rule-of-thumb, larger flame lengths and widths require wider fuel modification zones to reduce structure ignition. For example, valid SIAM results indicate that a 20-foot high flame has minimal radiant heat to ignite a structure (bare wood) beyond 33 feet (horizontal distance). Whereas, a 70-foot high flame may require about 130 feet of clearance to prevent structure ignitions from radiant heat (Cohen and Butler 1996). This study utilized bare wood, which is more combustible than the ignition resistant exterior walls for structures built today.

Obstacles, including steep terrain and non-combustible walls can block or deflect all or part of the radiation and heat, thus making narrower fuel modification distances possible. Fire behavior modeling conducted for this project indicates that fires in the off-site areas would result in roughly 33-foot flame lengths under summer conditions. Extreme conditions may result in longer flame lengths, approaching 65 feet.

As indicated in this report, the FMZs and additional fire protection measures proposed for this project provide equivalent wildfire buffer. They are based on a variety of analysis criteria including predicted flame length, fire intensity (Btu), site topography and vegetation, extreme and typical weather, position of structures on pads, position of roadways, adjacent fuels, fire history, current vs. proposed land use, neighboring communities relative to the proposed project, and type of construction. The fire intensity research conducted by Cohen (1995), Cohen and Butler (1996), and Cohen and Saveland (1997) and Tran et al. (1992) supports the structure setback alternatives proposed for this project.

8.1 Heat Deflecting Walls

The project's slopes in the areas of concern along with the elevated lots/pads adjacent, provide an opportunity to place a non-combustible, six foot tall, heat-deflecting wall (lower 1 to 2 feet block wall and upper 4 to 5 feet dual pane, one pane tempered glazing) to provide additional deflection for these lots to compensate for top of slope setbacks.

When buildings are set back from slopes, and a wall is placed at the top of slope, flames spreading up those slopes are deflected vertically and over the structure where cooling occurs, reducing the effects of convective heat on the structure. If a structure cannot be setback adequately, or where the slope is less than 30%, a noncombustible wall can help deflect the flames from the structure (NFPA 2005). The duration of radiant heat impact on the downhill facing side of the house is also reduced. An imaginary line extended along the slope depicts the path of the heat (hot air rises) and flame. The structure set back is important to avoid heat and/or flame intersection with the structure.

Figure 6. Example of Heat Deflecting Wall

Heat-deflecting landscape view walls of masonry construction with fire-rated glazing that are six feet in height (roughly lower two feet masonry construction and upper tfour feet dual pane, one pane tempered glazing or equivalent and meeting Chapter 7A and/or EFD approval) will be incorporated at top of slope/edge of lot for lots where a full 30 feet of structure setback for the second story is not possible (Typical example illustrated in Figure 6). The landscape walls provide a vertical, non-combustible surface in the line of heat, fumes, and flame travel up the slope. Once these fire byproducts intersect the wall, they are deflected upward or, in the case where lighter fuels are encountered, they are quickly consumed, heat and flame are absorbed or deflected by the wall, and the fuels burn peaks out within a short (30 second–2 minute) time frame (Quarles and Beall 2002). Walls like these have proven to deflect heat and airborne embers on numerous wildfires in San Diego, Orange, Los Angeles, Ventura, and Santa Barbara County. Rancho Santa Fe Fire Protection District, Laguna Beach Fire Protection District, Orange County Fire Authority, and others utilize these walls as Alternative methods based on observed performance during wildfires. This has led to these agencies approving use of non-combustible landscape walls as mitigations for reduced setbacks at top of slope. These walls are consistent with NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire – 2008 Edition, Section 5.1.3.3 and A.5.1.3.3 and International Urban Wildland Interface Code (ICC 2012). NFPA 1144, A.5.1.3.3 states: "Noncombustible walls and barriers are effective for deflecting radiant heat and windblown embers from structures."

8.2 Additional Structure Protection Measures

The following additional measures will be implemented to "mitigate" potential structure fire exposure related to the provided FMZs and top of slope structure setbacks on this project. These measures are customized for this site, its unique topographical and vegetative conditions, and focus on providing functional equivalency for structure setbacks. In order to provide compensating structural protection in the absence of a full FMZ, and in addition to all residences being built to the latest ignition resistant codes, the structures exposed to the preserved biological riparian woodlands will receive varying degrees of additional measures.

8.2.1 Additional Project Fire Protection Measures

- Any additional structure or landscape item (in addition to the residence) in the designated Fuel Modification Zone areas must be constructed from non-combustible materials such as stone, steel, or heavy timber/pre-treated, fire retardant wood. HOA must enforce as part of the CC&Rs, a landscape plan review process for a formal landscape improvement

plan submittal and approval by a licensed landscape architect to ensure that plant palette and non-combustible materials are employed within the designated Fuel Modification Zones and private lot landscaping.

- Fuel modification for common area lots will be pre-designed and installed by the project developer. For private lots, landscape plans for front, side, and rear yards for the entire project will need to be approved by the HOA landscape committee and EFD through a formal process prior to any landscape improvement work by a homeowner.
- Designated Fuel Modification Zones that include rear and side-yard areas (outside house setback envelopes) will be inspected annually by the landscape committee and/or Escondido Fire Department or a third party inspector for conformance with the requirements provided in the project's Fire Protection Plan. Inspections will include common lots and the contractor will work with the HOA to provide compliance and a report to the EFD. CC&R's shall include this language so that homeowners acknowledge this provision.
- The 3rd party fuel modification zone inspector will be tasked with at least annually providing evaluation of the northern emergency access road water tank levels.
- All structures will be built to the Chapter 7A ignition resistant standards and will be provided interior sprinklers, to code.
- Structure eaves will be closed when facing wildland fuels, per code.
- External dryer vents will be baffled or fitted with ember resistant mesh.
- Exposed wood, including fascia and architectural trim boards, will not be allowed on the side of structures facing the wildland fuels unless considered "heavy timber" or beams with a minimum nominal dimension of 4 inches.
- No combustible fences or gates will be allowed attached to dwellings, the first five feet from the structure will be non-combustible. Fences using fire retardant treated wood products or other materials to meet this requirement will be subject to approval of the EFD.
- The project proponent will provide an emergency equipped UTV vehicle equipped with a patient gurney and other EFD requested equipment (specifications to be determined in a fire service agreement) for use on the trails and community pathways.

It is understood that the EFD may require additional measures based on a structure's proximity to fuels and the fuel loads represented by those areas. This FPP is provided to assist the EFD with determinations of any additional measures. The information provided herein supports the ability of the proposed structures and FMZs to withstand the predicted short duration, low to moderate intensity wildfire and ember shower that would be expected from wildfire burning in the vicinity of the site or within the site's landscape.

9 EMERGENCY PRE-PLANNING - EVACUATION

9.1 Quick Reference - Wildland Fire Evacuation Plan

Evacuation is a process by which people are moved from a place where there is immediate or anticipated danger, to a safer place, and offered temporary shelter facilities. When the threat passes, evacuees are able to return to their normal activities, or to make suitable alternative arrangements.

Figure 7 indicates the Emergency Evacuation Routes available to the Safari Highlands Ranch Community. The exhibit highlights the community's backbone interior roads along with primary access points and off-site roads and major traffic corridors leading to designated evacuation areas.

The available evacuation routes for the residents and guests of Safari Highlands Ranch are (Figure 7):

1. **Egress to the west and south via Rockwood Road** – This is the primary Safari Highlands Ranch access road and interconnects with Cloverdale Road to the West. Cloverdale Road north is a dead end. Cloverdale Road south offers travel options to SR-78 east or west, or continuing south to San Pasqual Road which intersects Bear Valley Parkway to the south and west and into Escondido.
2. **Egress to the south and west on Zoo Road** - this gated secondary access road provides a route to Old Battlefield Road (gated road into existing Eagle Crest Golf Course community), which connects into Rockwood Road and then to the south and west as described above. Zoo Road continues south past Old Battlefield Road to SR-78, from which point, travel to the east or west is possible.
3. **Egress to the west via north emergency secondary egress route** – this gated emergency only secondary access road interconnects with Meadow Creek Lane to the west which then intersects Hidden Trails Road, which offers travel to the S6 (Valley Parkway/Valley Center Road) or continued travel to the west into urban areas of Escondido. *Travel to the west along this emergency secondary egress may be directed by law enforcement. However, residents are not advised to utilize this route without law enforcement direction because it is a gated road and should not be assumed passable.*

This evacuation plan has been prepared specifically for the Safari Highlands Ranch and focuses on wildland fire evacuations, although many of the concepts and protocols will be applicable to other emergency situations. Ultimately, this plan will be used by the Safari

Highlands Ranch Homeowner's Association to educate community residents as to their evacuation approach during wildfires and other similar emergencies.

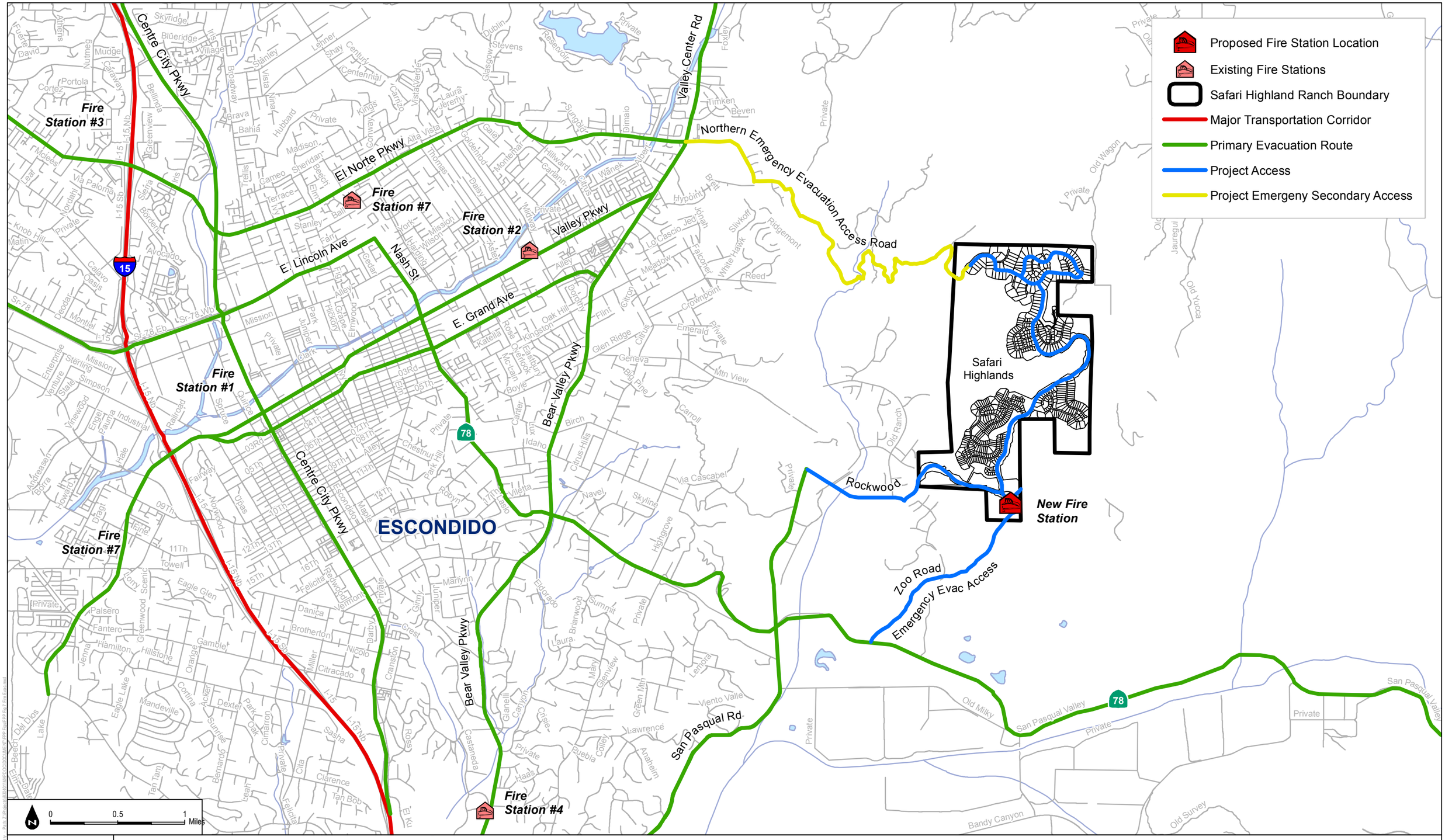
It is recognized that wildfire and other emergencies are often fluid events and that the need for evacuations are typically determined by 1) on-scene first responders, 2) a collaboration between first responders, law enforcement, and designated emergency response teams, including Office of Emergency Services and the Incident Command established for larger emergency events. As such, and consistent with all emergency evacuation plans, this Emergency Evacuation plan is to be considered a tool that supports existing pre-plans, as available for the area, and provides for citizens who are familiar with the evacuation protocol, but is subservient to emergency event-specific directives provided by agencies managing the event.

This Emergency Evacuation Plan will be reviewed by Escondido Fire Department, San Diego County Fire Authority, and San Diego County Sheriff's Department. Provided input and edits will be integrated resulting in a coordinated effort and collaborative plan.

9.2 Background

This Safari Highlands Ranch Evacuation Plan has been prepared based on the Unified San Diego County Emergency Services Organization and County of San Diego Operational Area Emergency Operations Plan (EOP) – Evacuation Annex. In order to establish a framework for implementing well-coordinated evacuations, the County of San Diego Office of Emergency Services (OES) developed an Evacuation Annex as part of the Area EOP (San Diego County 2014). Large-scale evacuations are complex, multi-jurisdictional efforts that require coordination between many agencies and organizations. Emergency services and other public safety organizations play key roles in ensuring that an evacuation is effective, efficient, and safe.

Evacuation during a wildfire is not necessarily directed by the fire agency, except in specific areas where fire personnel may enact evacuations on-scene. The San Diego County Sheriff's Department, California Highway Patrol, and other cooperating law enforcement agencies have primary responsibility for evacuations. These agencies work closely within the Unified Incident Command System, with the County Office of Emergency Services, and responding fire department personnel who assess fire behavior and spread, which should ultimately guide evacuation decisions. To that end, EFD, County Fire, law enforcement, Public Works, Planning, Emergency Services Departments, and CalTrans, amongst others, have worked with a County Pre-Fire Mitigation Task Force to address wildland fire evacuation planning for San Diego County.



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SOURCE: SANDAG, 2016

FIGURE 7
Fire Evacuation Plan

Safari Highlands Ranch Fire Protection Plan

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It is important to note that every evacuation scenario will include some level of unique challenges, constraints, and fluid conditions that require interpretation, fast decision making, and alternatives. For example, one roadway incident that results in blockage of evacuating vehicles may require short-term or long-term changes to the evacuation process. Risk is considered high when evacuees are evacuating late, and fire encroachment is imminent. This hypothetical scenario highlights the importance of continuing to train responding agencies, model various scenarios, educate the public, and take a very conservative approach to evacuation decision timelines (early evacuation) as well as providing contingency plans.

Equally as important, the evacuation procedures should be regularly updated with lessons learned from actual evacuation events, as they were following the 2003, 2007 and 2014 San Diego County fires. The authors of this Evacuation Plan recommend that occasional updates are provided, especially following lessons learned from actual incidents, as new technologies become available that would aid in the evacuation process, and as changing landscapes and development patterns occur within and adjacent the Safari Highlands Ranch project that may impact how evacuation is accomplished. At the time of this plan's preparation, there was no encompassing emergency evacuation plan available for the greater region. This Safari Highlands Ranch Wildland Fire Evacuation Plan is consistent with County evacuation planning and can be integrated into a regional evacuation plan when and if the area officials and stakeholders (EFD, CAL FIRE, San Diego Fire, San Diego County Fire Authority, Office of Emergency Services, San Diego Sheriff's Department, and others) complete one.

As demonstrated during large and localized evacuations occurring throughout San Diego County over the last 15 years, an important component to successful evacuation is early assessment of the situation and early notification via managed evacuation declarations. San Diego County utilizes early warning and informational programs to help meet these important factors. Among the methods available to citizens for emergency information are radio, television, social media/internet, neighborhood patrol car PA notifications, and Reverse 911.

The Safari Highlands Ranch community residents will be strongly encouraged to register with Reverse 911, Alert San Diego, and the local Escondido Community Notification System. In addition, the community HOA will organize annual evacuation public outreach as well as maintain a fire safe page on the community Web page, including key sections of this Emergency Evacuation Plan and the FPP and links to important citizen preparedness information.

9.3 San Diego County Evacuation Planning Summary

This Wildland Fire Evacuation Plan incorporates concepts and protocols practiced throughout San Diego County. The San Diego County Evacuation Annex (2014) follows basic protocols set

forth in the County's Operation Area Emergency Operations Plan and the California Master Mutual Aid Agreement, which dictate who is responsible for an evacuation effort and how regional resources will be requested and coordinated.

First responders are responsible for determining initial protective actions before EOCs and emergency management personnel have an opportunity to convene and gain situational awareness. Initial protective actions are communicated to local EOCs and necessary support agencies as soon as possible to ensure an effective, coordinated evacuation.

During an evacuation effort, the designated County Evacuation Coordinator is the Sheriff, who is also the Law Enforcement Coordinator. The Evacuation Coordinator will be assisted by other law enforcement and support agencies. Law enforcement agencies, highway/road/street departments, and public and private transportation providers will conduct evacuation operations. Procurement, regulation, and allocation of resources will be accomplished by those designated. Evacuation operations will be conducted by the following agencies:

- County of San Diego Sheriff's Department
- Fire and Rescue
- County Health and Human Services Agency
- Department of Animal Services,
- Department of Planning and Land Use
- Department of Environmental Health
- Department of General Services
- Department of Public Works
- Department of Agriculture, Weights, and Measures
- Department of Parks and Recreation

The information provided in Appendix G summarizes the larger scale evacuation pre-planning undertaken by County and local agencies as well as standard evacuation pre-planning procedures and techniques including: Evacuation Objectives, Coordination Process, Response Operations, Evacuation Points and Shelters, Sheltering in Place, Evacuation Strategies, Social Aspects of Evacuation, Special Population Evacuation, Animal Evacuations, and Re-Entry Procedures.

9.4 Safari Highlands Ranch Evacuation Road Network

Wildfire emergencies that would be most likely to include an evacuation of Safari Highlands Ranch would be large wildfires approaching from the north, northeast, or east. These fires are often wind driven and occur during declared Red Flag Warning days where low humidity and high winds facilitate fire ignition and spread. If a fire starts in the open lands to the east of the Project and is fanned by these fire weather conditions, an early evacuation of the area may occur as many as 24 or more hours prior to actual threatening conditions, depending on the location of the ignition. Fires occurring on typical weather days, even fires igniting off the local highways, have been very successfully controlled at small sizes within minutes of ignition and would not typically trigger a need to evacuate the project. Partial evacuation or temporary relocation of some neighborhoods could be an option in these cases.

If a wildfire ignited closer to the Safari Highlands Ranch community during weather that facilitates fire spread, where multiple hours are not available for evacuation, a different evacuation approach would need to be explored. It is preferred to evacuate long before a wildfire is near, and in fact, history indicates that most human fatalities from wildfires are due to late evacuations when they are overtaken on roads. Therefore, it is prudent to consider a contingency option. For example, if a wildfire is anticipated to encroach upon the community in a timeframe that is shorter than would be required to evacuate all residents, then options available to responding fire and law enforcement personnel should include 1) partial relocation where residents in perimeter homes on the north/northeast/east edge are temporarily relocated to internal areas or to the Village Core, 2) Individual neighborhood relocations where residents are temporarily relocated to the Village Core or south or east to Escondido, 3) temporary refuge where residents are instructed to remain in their homes while firefighters perform their structure protection function. This approach is consistent with San Diego County's (2014) Evacuation approach which states "*Due to the nature of the threats requiring an evacuation, there may be insufficient time to perform an early evacuation of the area and shelter-in-place instructions may need to be provided*". Although not a shelter in place community, the structures in Safari Highlands Ranch are ignition resistant, defensible and designed to require minimal resources for protection, which enables these contingency options that may not be available to other nearby communities.

The roads that will be used for ingress and egress from the Safari Highlands Ranch community are described as:

- ***Rockwood Road*** – providing primary access to Safari Highlands Ranch, Rockwood Road provides a 40 foot wide paved roadway with a two designated travel lanes each a minimum of 12 feet wide, a center striped median, and turn lanes. Rockwood Road intersects Cloverdale Road, a 42 foot wide paved surface with shoulders, two designated

12 foot wide travel lanes and a 10 foot wide striped median that extends nearly the entire road length and will be widened for the pinch down section. At the intersection with SR-78, there are four lanes provided, a straight, right and left turn lane for southbound traffic and an ingress lane for northbound traffic. This intersection will be provided dual left turn lanes for a total of five lanes.

- ***Zoo Road*** – the post-project Zoo Road will be gated and will provide two 12' foot wide unobstructed travel lanes for the approximately 1.7 miles distance from the southern project entrance to SR-78. Zoo Road intersects with the gated Old Battlefield Road which provides gated access into the Eagle Crest Golf Course community. Old Battlefield Road would only be available during an evacuation if law enforcement directed that the gate be opened and traffic be directed through to Rockwood Road and out. Zoo Road continues south past Old Battlefield Road to the west of the San Diego Safari Park parking lots, where it intersects with SR-78. The gated project access will open automatically for passage to the south.
- ***Northern Emergency Secondary Access*** – the gated northern emergency access route will provide a minimum of two 12 foot wide paved travel routes with turnouts. The road extends 2.4 miles through wildland fuels and is considered an as-needed evacuation road that would be used for non-fire emergencies where evacuation using southern access points is not possible or for wildfire emergencies when evacuation is occurring at least two to three hours prior to wildfire threatening the site. The gated access will need to be opened for passage.

As evidenced by mass evacuations in San Diego County and elsewhere, even with roadways that are designed to the code requirements, it may not be possible, or necessary to move large numbers of persons at the same time. Road infrastructure throughout the United States, and including San Diego County is not designed to accommodate a short-notice, mass evacuation. The need for evacuation plans, pre-planning, and tiered or targeted and staggered evacuations becomes very important for improving evacuation effectiveness. Among the most important factors for successful evacuations in urban settings is control of intersections downstream of the evacuation area. If intersections are controlled by law enforcement, barricades, signal control, or other means, potential backups and slowed evacuations can be minimized. Another important aspect of successful evacuation is a managed and phased evacuation declaration. Evacuating in phases, based on vulnerability, location, or other factors, enables the subsequent traffic surges on major roadway to be smoothed over a longer time frame and can be planned to result in traffic levels that flow better than when mass evacuations include large evacuation areas at the same time. This plan defers to Law Enforcement and Office of Emergency Services to appropriately phase evacuations and to consider the vulnerability of communities when making decisions. For

example, the Safari Highlands Ranch Community will offer its residents a high level of fire safety on site (as detailed in this Fire Protection Plan) along with options for properly equipped and trained firefighter safety zones and temporary resident on-site refuge (within their well-protected homes) as a contingency, as discussed further in this plan.

The Safari Highlands Ranch planned community interior road network and the existing regional road system that it interconnects provide multi-directional primary and secondary emergency evacuation routes consistent with, or exceeding, most communities in this area. Consistent with County of San Diego evacuation planning annex (2014), major ground transportation corridors in the area will be used as primary evacuation routes during an evacuation effort. The road systems were evaluated to determine the best routes for fire response equipment and "probable" evacuation routes for relocating people to designated safety areas. The primary roadways that would be used for evacuation from Safari Highlands Ranch are Rockwood Road, Cloverdale Road, emergency access Zoo Road, northern emergency secondary access road, Meadowcreek Lane, S. Hidden Trails Road, Valley and Parkway. These roads provide access to major traffic corridors including State Route 76 to the south, State Route 78 also to the south, and Interstate 15 to the west.

During an emergency evacuation from the Safari Highlands Ranch community, the primary and secondary roadways may be providing citizen egress while responding emergency vehicles are inbound. Because the roadways are all designed to meet or exceed Fire Code requirements, including 12- foot wide, unobstructed travel lanes, adequate parking, 28-foot inside radius, grade maximums, and signals at intersections, potential conflicts that reduce the roadway efficiency required for smooth evacuations are minimized.

The community's primary evacuation routes are accessed through a series of internal neighborhood roadways, which intersect with the primary ingress/egress roads that intersect off-site primary and major evacuation routes. Based on the existing road network, the community can evacuate to the north (once off-site), south, east and west depending on the nature of the emergency.

Depending on the nature of the emergency requiring evacuation, it is anticipated that the majority of the community traffic would exit the project via Rockwood Road or Zoo Road. These are the most direct routes from the Village Core. The northern emergency access route may be used by the northerly neighborhoods, including E-1, E-2, R-4 and R-5, depending on the time available for evacuation and the need for additional movement via the northerly route. In a typical evacuation that allows several hours or more time (as experienced in 2003, 2007, and 2010 wildfires), all traffic may be directed to the south and out Rockwood Road and/or Zoo Road. If less time is available, fire and law enforcement officials may direct some neighborhoods, primarily E-1 and E-2, to utilize the northerly gated route

9.4.1 Evacuation Route Determination

Fire and law enforcement official will identify evacuation points before evacuation routes are announced to the public. Evacuation routes are determined based on the location and extent of the incident and include as many pre-designated transportation routes as possible. Absent direction from fire and/or law enforcement officials, residents would be advised to use the primary access road – Rockwood Road for evacuations.

9.4.2 Roadway Capacities and Maximum Evacuation Time Estimate

Roadway capacity represents the maximum number of vehicles that can reasonably be accommodated on a road. Roadway capacity is typically measured in vehicles per hour and can fluctuate based on the number of available lanes, number of traffic signals, construction activity, accidents, and obstructions as well as positive effects from traffic control measures.

Each roadway classification has a different capacity based on level of service, with freeways and highways having the highest capacities. Based on traffic engineer estimates (Linscott, Law & Greenspan 2016), and using peak numbers and a conservative estimate, roads that would be the most likely available to Safari Highlands Ranch residents and their hourly capacities are:

1. ***Rockwood Road*** –2,600 vehicles/hour
2. ***Zoo Road*** - 1,900 vehicles/hour
3. ***Cloverdale Road*** – minimum 2,600 vehicles/hour
4. ***Northerly emergency evacuation route*** - 1,000 vehicles/hour

Using these averages, the length of time it will take for an area to evacuate can be determined by dividing the number of vehicles that need to evacuate by the total roadway capacity. Based on Safari Highland Ranch's estimated 550 single family homes, and assuming 2.2 cars per household (Cal Poly San Luis Obispo 2016), during an evacuation, it is calculated that up to 1,210 vehicles could be evacuating in a major incident that required full evacuation of the community, although this is a conservative estimate as that number would likely be far lower as many families would likely drive in one vehicle versus in multiple vehicles and depending on the time of day, many of these vehicles may already be off-site, such as if a fire occurred during typical work hours.

Neighboring communities within the sphere of influence of the Safari Highlands Ranch evacuation that may be evacuating in a similar time frame, depending on the type of wildfire emergency, are the 580 unit Rancho San Pasqual community (accessed via Rockwood Road and Cloverdale Road) and

the 80 unit Vista Monte community (accessed via Rockwood Road). Additionally, the San Pasqual Union School located off Rockwood Road would affect typical evacuations.

Based on the number of units or daily use averages (school and animal park), the estimated time requirement for evacuation was calculated.

Evacuating Vehicles per Household or Average Daily Usage

Rancho San Pasqual – 580 units x 2.2 vehicles = 1,276 vehicles

Vista Monte – 80 units x 2.2. vehicles = 176 vehicles

San Pasqual Union School – 560 students and staff, 180 from outside the area = estimated 200 vehicles (others are already accounted for in community estimates)

Based on the combined vehicle estimates for existing communities and land uses neighboring the Safari Highlands Ranch Project during an evacuation, it is calculated that up to 1,652 vehicles in addition to the 1,210 vehicles from Safari Highlands Ranch (total of 2,862 vehicles) could be evacuating in a similar time frame during a major incident that required full evacuation of the area, although this is a conservative estimate as that number would likely be far lower as many families would likely drive in one vehicle versus in multiple vehicles and depending on the time of day, many of these vehicles may already be off-site, such as if a fire occurred during typical work hours.

Based on the internal roadway capacities, three potential egress routes, and off-site roadway capacities, and using the lowest capacity roadway (bottleneck) as the determining factor, and discounting the capacity for the possibility that traffic would move slower during some evacuations, it is estimated that between 2 to 3 hours may be necessary for a complete evacuation of Safari Highlands Ranch, the neighboring communities and the school simultaneously.

While the capacity of these roadways is adequate to facilitate the evacuation of the total number of vehicles generated by these communities/uses in an estimated one hour or less, this timeframe also assumes "wheels rolling", actual travel time and additional time that must be considered in the evacuation process (Figure 8), including:

1. Fire detection and reporting (up to 10 minutes)
2. Dispatch and fire response (up to 10 minutes)
3. Evacuation decision (10 minutes or more)
4. Message to dispatch (5 minutes)

5. Evacuation message dissemination (up to 45 minutes)
6. Residents to gather personal items, pets, livestock (if able) and begin evacuation travel (45 minutes)
7. Contingency time to allow for shadow evacuees, special needs population, unforeseen congestion or blockages (30 minutes)

Total minimum time that may be needed for a large-scale evacuation from the detection of a fire until the last person is out of harm's way is 90 to 180 minutes, with variation on the size of the evacuation and the minutes required for each step.

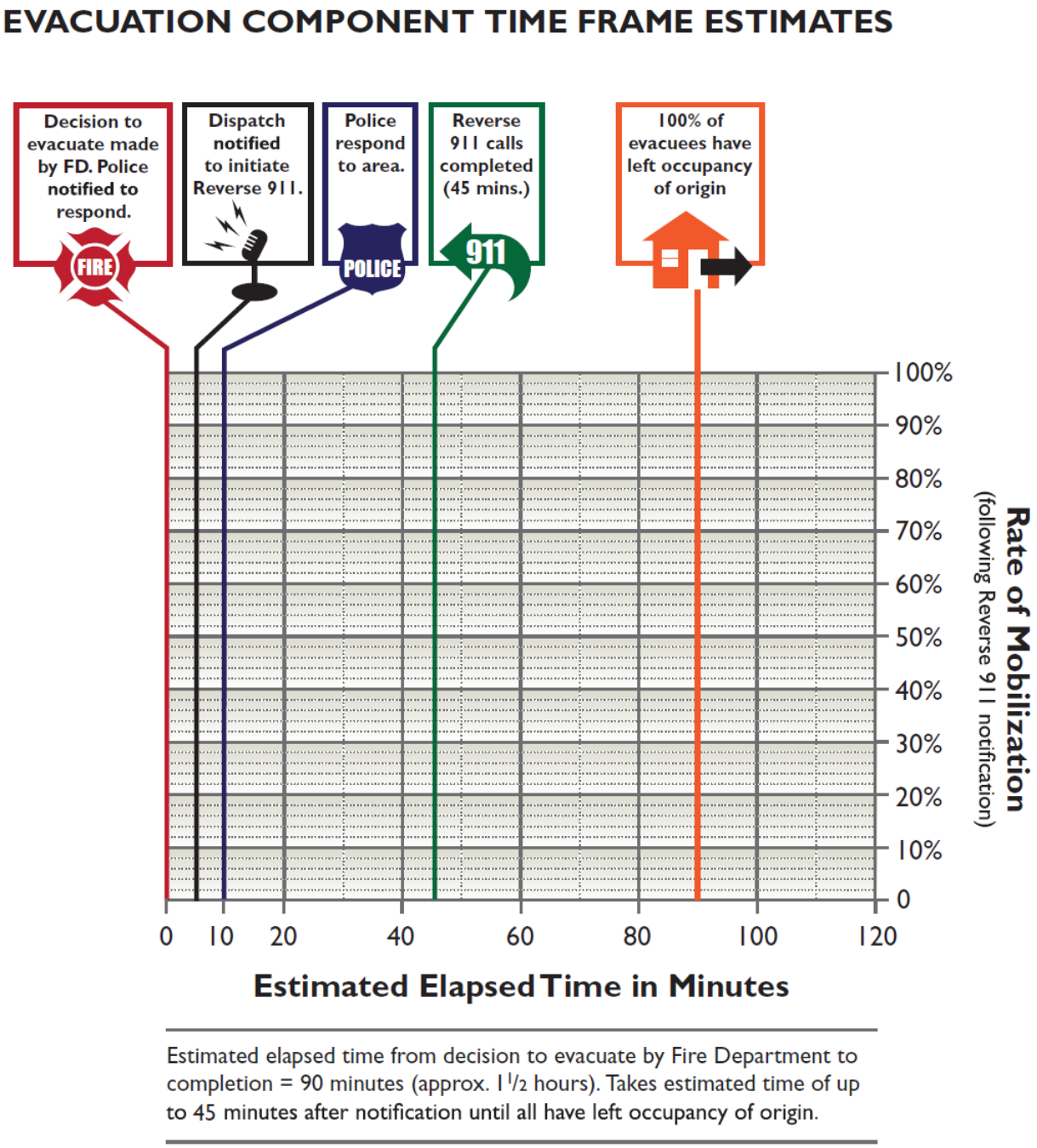
The maximum timeframe is a very conservative estimate that may be reduced with law enforcement managing traffic flow and maximize efficiency by routing neighborhoods out the three available egress routes and then south, north, or west, as appropriate. Up to three hours for complete evacuation is not considered unusual and would be accommodated during large, wind driven wildfires from the east. Wildfires originating closer to the community would allow significantly less time for evacuation, and Safari Highlands Ranch offers decision makers with contingency options, including evacuating or relocating a portion of the community (much lower number of vehicles and faster evacuation time, proportional to the vehicle total being moved).

9.5 Safari Highlands Ranch Resident Fire/Evacuation Awareness

The Safari Highlands Ranch Community HOA will be active in its outreach to residents regarding fire safety and general evacuation procedures. There are aspects of fire safety and evacuation that require a significant level of awareness by the residents and emergency services in order to reduce and/or avoid problems with an effective evacuation. Mitigating potential impediments to successful evacuations requires focused and repeated information through a strong educational outreach program. The Safari Highlands Ranch HOA will engage residents and coordinate with local fire agencies for fire safety awareness through a variety of methods.

This FPP and evacuation plan will be provided to each homeowner/HOA member as well as being accessible on the HOA Website. Annual reminder notices will be provided to each homeowner encouraging them to review the plan and be familiar with community evacuation protocols. The HOA will work with local fire agencies to hold an annual fire safety and evacuation preparedness informational meeting. The meeting will be attended by representatives of the fire agencies and important fire and evacuation information reviewed. One focus of these meetings and of the HOA's annual message will be on the importance of each resident to prepare and be familiar with their own "Ready, Set, Go!" evacuation plan. The "Ready, Set, Go!" program is defined at: http://wildlandfirersg.org/ and information about preparing an individual Action Plan is provided in Appendix H.

Figure 8 Evacuation Component Time Frame Estimates



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The focus of the "Ready, Set, Go!" program is on public awareness and preparedness, especially for those living in the wildland-urban interface (WUI) areas. The program is designed to incorporate the local fire protection agency as part of the training and education process in order to insure that evacuation preparedness information is disseminated to those subject to the potential impact from a wildfire. There are three components to the program:

"READY" – Preparing for the Fire Threat: Take personal responsibility and prepare long before the threat of a wildfire so you and your home are ready when a wildfire occurs. Create defensible space by clearing brush away from your home as detailed in this FPP (Dudek 2015). Use only fire-resistant landscaping and maintain the ignition resistance of your home. Assemble emergency supplies and belongings in a safe spot. Confirm you are registered for Reverse 911, AlertSanDiego, and Community Alert System. Make sure all residents residing within the home understand the plan, procedures and escape routes.

"SET" – Situational Awareness When a Fire Starts: If a wildfire occurs and there is potential for it to threaten Safari Highlands Ranch, pack your vehicle with your emergency items. Stay aware of the latest news from local media and your local fire department for updated information on the fire. If you are uncomfortable, leave the area.

"GO!" – Leave Early! Following your Action Plan provides you with knowledge of the situation and how you will approach evacuation. Leaving early, well before a wildfire is threatening your community, provides you with the least delay and results in a situation where, if a majority of neighbors also leave early, firefighters are now able to better maneuver, protect and defend structures, evacuate other residents who couldn't leave early, and focus on citizen safety.

"READY! SET! GO!" is predicated on the fact that being unprepared and attempting to flee an impending fire late (such as when the fire is physically close to the community) is dangerous and exacerbates an already confusing situation. This Safari Highlands Ranch Wildland Fire Evacuation Plan provides key information that can be integrated into the individual Action Plans, including the best available routes for them to use in the event of an emergency evacuation.

Situation awareness requires a reliable information source. One of the most effective public notification methods is Reverse 911. The San Diego County Office of Emergency Services operates the reverse 911 notification system that provides a recorded message over land line telephone systems relating to evacuation notices. In addition, the Office of Emergency Services operates a program known as "Alert San Diego" that has the capability to send emergency notifications over both land lines as well as to cell phones and via text messages. It is up to individual residents to register their cell phones for "Alert San Diego". The registration of cell phones can be done on line at www.ReadySanDiego.com.

In addition, Escondido provides a separate Community Notification System which allows people to register to receive email or text message notifications about urgent or other information, including events that may result in traffic delays or road closures. Anyone can subscribe at www.nixle.com and selecting "Residents" and "Sign up" This system is not affiliated with the San Diego County Reverse 9-1-1 system and is informational only. It will not be used to issue an evacuation order.

As part of the Safari Highlands Ranch resident fire awareness and evacuation readiness program, information will be delivered in a variety of methods. The HOA will be responsible to provide and distribute to each homeowner a complete copy of the project's Fire Protection Plan and this Wildland Fire Evacuation Plan, including materials from the READY! SET! GO! Program. The HOA is also responsible for insuring the distribution of copies of the aforementioned materials to those individuals that purchase properties for re-sales and to the management of multi-family residential and other non-residential properties. The management of multi-family residential units that do not have individual unit ownership will be responsible for conducting informational sessions regarding the Fire Safety measures and Evacuation Plan details and will be responsible for making copies of the Evacuation Plans available for each unit. As with the multi-family residential properties, management of the commercial properties will be responsible for the dissemination of the Evacuation Plan information to their employees.

As part of the approval of this project, it shall be binding on the HOA to actively participate as a partner with the EFD, the SDFD, SDCFA, and the local FireSafe Council (Valley Center and/or Ramona West End Firesafe Councils) and to assist with the coordination and distribution of fire safety information they develop.

9.6 Safari Highlands Ranch Evacuation Procedures

It is estimated that the minimum amount of time needed to move the Safari Highlands Ranch population to urbanized and/or designated evacuation areas may require in excess of one hour to evacuate and up to two or more hours under varying constraints that may occur during an evacuation. This includes additional allowances for the time needed to detect and report a fire, for fire response and on-site intelligence, for Reverse 911 and in the field patrol cars announcing evacuations, and for notifying special needs citizens. Wolshon and Marchive (2007) simulated traffic flow conditions in the wildland urban interface (WUI) under a range of evacuation notice lead times and housing densities. To safely evacuate more people, they recommended that emergency managers (1) provide more lead time to evacuees and (2) control traffic levels during evacuations so that fewer vehicles are trying to exit at the same time.

Wildfire emergency response procedures will vary depending on the type of wildfire and the available time in which decision makers (Incident Command, EFD, SDFD, CAL FIRE, SDCFA,

SDSD, and/or County Office of Emergency Management) can assess the situation and determine the best course of action. Based on the community, it's road network, and the related fire environment, the primary type of evacuation envisioned is an orderly, pre-planned evacuation process where people are evacuated from the Safari Highlands Ranch community to more urban areas further from an encroaching wildfire (likely to urban areas south and west) well before fire threatens. This type of evacuation must include a conservative approach to evacuating, i.e., when ignitions occur and weather is such that fires may spread rapidly, evacuations should be triggered on a conservative threshold that includes time allowances for unforeseen, but possible, events that would slow the evacuation process.

Evacuation is considered by many to offer the highest level of life protection to the public, but it can result in evacuees being placed in harm's way if the time available for evacuation is insufficient (Cova et al. 2011). An example of this type of evacuation which is highly undesirable from a public safety perspective, is an evacuation that occurs when fire ignites close to vulnerable communities. Safari Highlands Ranch is not considered a vulnerable community, however there are vulnerable communities within the region. This type of situation is inherently dangerous because there is generally a higher threat to persons who are in a vehicle on a road when fire is burning in the immediate area than in a well-defended, ignition resistant home. Conditions may become so poor, that the vehicle drives off the road or crashes into another vehicle, and flames and heat overcome the occupants. This scenario occurred in San Diego County during the 2003 Cedar Fire. Even though hundreds of thousands of people were successfully evacuated, a night time evacuation on Wildcat Canyon Road resulted in fatalities. A vehicle offers little shelter from a wildfire if the vehicle is situated near burning vegetation or catches fire itself. This type of evacuation must be considered a very undesirable situation by law and fire officials in all but the rarest situations where late evacuation may be safer than seeking temporary refuge in a structure (such as when there are no nearby structures, the structure(s) is/are already on fire, or when there is no other form of refuge).

The third potential type of evacuation is a hybrid of the first two. In cases where evacuation is in process and changing conditions result in a situation that is considered unsafe to continue evacuation, it may be advisable to direct evacuees to pre-planned temporary refuge locations, including their own home if it is ignition resistant and defensible, such as those at Safari Highlands Ranch. As with the second type of evacuation discussed above, this situation is considered highly undesirable, but the evacuation pre-planning must consider these potential scenarios and prepare decision makers at the IC level and at the field level for enacting a contingency to evacuation when conditions dictate.

Indications from past fires and related evacuations, in San Diego County and throughout Southern California, which have experienced increasingly more frequent and larger fires, are that

evacuations are largely successful, even with a generally unprepared populace. It then stands to reason that an informed and prepared populace would minimize the potential evacuation issues and related risk to levels considered acceptable from a community perspective.

Evacuation orders or notifications are often triggered established and pre-determined model buffers which are based on topography, fuel, moisture content of the fuels and wind direction. Evacuations are initiated when a wildfire reaches or crosses one of these pre-determined buffers. Evacuations can also be very fluid. The incident command, law enforcement and County OES would jointly enact evacuations based on fire behavior.

9.6.1 Safari Highlands Ranch Evacuation – Santa Ana Wind Conditions

When compared to fire spread modeling and the time various fire ignitions would require to reach the project, a threshold of evacuation vs contingency options is delineated. As depicted in Appendices C-1 and C-5, which illustrate fire spread rates and progression during extreme fire weather (high wind, low humidity) and an ignition off the SR-76, approximately 15 miles north and east of the Safari Highlands Ranch, fire could reach the northeastern extents of the project (est. 5% of project) within 4 hours. Within 5 hours, wildfire may reach approximately 90 to 95% of the project site. These estimates are based on current conditions and would be different post project development, which would include landscapes that would not burn consistently with wildland fuels. Fire would be expected to burn around the developed areas and fuel modification zones with a slower spread rate and patchy burn with lower flame lengths and intensity.

Because the arrival time of a fire originating along the SR-76 is just under 4 hours for the northern portion of the project, and considering it may take up to 2 hours or more (depending on conditions) for a complete evacuation of all Safari Highlands Ranch residents, it is recommended that under extreme conditions, if a fire ignites along the SR-76 between Rincon and Santa Ysabel, that evacuation of the northern neighborhoods of Safari Highlands Ranch begin as quickly as possible and utilize the northern emergency egress route and the main entrance on Rockwood Road. This will enable time to move northerly residents out of the area to designated evacuation points (likely within Escondido) since this would require the movement of, at max, approximately 500 vehicles, which can be accommodated in 30 minutes to 1 hour, providing a time buffer in this conservative approach. Evacuation of the community should continue, as conditions allow and are necessitated, with the southerly neighborhoods evacuating to off-site areas in Escondido. However, if at any time fire is anticipated to threaten evacuation routes, incident managers should evaluate evacuation contingencies, including moving people to the Village Core, nearby San Pasqual Union Elementary School, or Eagle Crest Golf Course, San Diego Safari Park or temporarily refuging some or all remaining residents in their homes for the short duration that active wildfire would burn adjacent the site's FMZs. Fire ignitions closer to

the Safari Highlands Ranch will likely include a shorter available timeframe for evacuations, so contingency options may be implemented on a faster timeline.

9.6.2 Safari Highlands Ranch Evacuation – Typical Summer Weather Conditions

As depicted in Appendices C-2 and C-6, which illustrate fire spread rates and progression during typical Summer weather conditions (on-shore winds and average humidity) and an ignition off Wild Oak Lane approximately 1/2 mile from the northwestern project boundary, fire could reach the western boundary (est. 5% of project) within approximately 40 minutes. Within 2 hours, wildfire may reach approximately 30% of the project, all in the northern half of the property, and within 5 hours, fire may reach up to 70% of the project site. An ignition under the same weather conditions occurring off SR-78 near its intersection with Cloverdale Road would include slower fire spread due to the developed/maintained landscapes that occur in the area. Fire may not reach the project site until approximately 3 hours after ignition. After 5 hours, less than 10% of the project site is reached, all in the extreme southern and southwestern portions of the Project. These estimates are based on current conditions and would be different for the post project development, which would include landscapes that would not burn consistently with wildland fuels. Fire would be expected to burn around the developed areas and fuel modification zones with a slower spread rate and patchy burn with even lower flame lengths and intensity.

Because the arrival time of a fire originating to the south or west of the project during typical, Summer conditions is just under 1 hour for the Wild Oak Lane scenario and approximately 3 hours for the Cloverdale Road scenario, and considering it may take up to 2 hours or more (depending on conditions) for a complete evacuation of all Safari Highlands Ranch residents – and they would be evacuating into the path of the fire, the following recommendations are considered:

1. Because a fire igniting to the north of Eagle Creek Golf Club is likely to burn toward the project and largely affect the northern half of the project, internal project relocation of the northerly neighborhoods to the Village Core or off-site to the south (not using the northern emergency secondary access road), may be considered as options. Depending on fire spread and control, the southern portion of Safari Highlands Ranch may not need to be evacuated. This type of fire is not wind-driven and is burning in fuels with higher moisture levels, and will allow more options than a fire during high winds and low humidity.
2. Fire igniting at the SR-76 and Cloverdale Road would burn toward the project's southern boundaries, and would likely require an immediate temporary refuge of residents on site at both the Eagle Creek Golf Course Community and Safari Highlands Ranch, as the primary evacuation route would be into the fire. Once the fire moved east and north, Eagle Crest Golf Course Community could be evacuated while Safari Highlands Ranch

would likely continue to refuge on site. Evacuation of Safari Highland Ranch to the South along Zoo Road would be possible for a period of up to 2 hours from ignition, so it may be possible to relocate a large number of persons via this route. It would not be recommended to utilize the northern emergency secondary access route in this scenario since it would require crossing through a fuel bed with the possibility of spot fires ahead of the main fire front.

9.6.3 Safari Highlands Ranch Evacuation Baseline

For purposes of this Evacuation Plan, the first and most logical choice for all of the residents and guests within the boundaries of the Safari Highlands Ranch Community is to adhere to the principals and practices of the "READY! SET! GO!" Program previously mentioned in this document. As part of this program, it is imperative that each resident develop a plan that is clearly understood by all family members and attends the educational and training programs sponsored by the Safari Highlands Ranch HOA and the local fire agencies. In addition, it is imperative that the "READY! SET! GO!" Program information is reviewed on a routine basis along with the accompanying maps illustrating evacuation routes, temporary evacuation points and pre-identified evacuation points. It must be kept in mind that conditions may arise that will dictate a different evacuation route than the normal roads used on a daily basis.

Residents are urged to evacuate as soon as they are notified to do so or earlier if they feel uncomfortable. Directions on evacuation routes will be provided in most cases, but when not provided, Safari Highlands Ranch residents will proceed according to known available routes away from the encroaching fire. Depending on the type of emergency and the resulting evacuation, it could take as long as two hours or more to complete a community-wide evacuation, based on nationally recognized road capacity standards and competing use of the roads by residents from other areas.

Note: this evacuation plan will require adjustment and continued coordination by the Safari Highlands Ranch HOA and/or developer and Fire/Law enforcement agencies during each of the construction phases. With each phase, the evacuation routes may be subject to changes with the addition of both primary and secondary evacuation routes.

9.6.4 Civilian and Firefighter Evacuation Contingency

As of this document's preparation, no community in California has been directed to shelter in place during a wildland fire. Even the communities in Rancho Santa Fe, California which are designed and touted as shelter in place communities, were evacuated during the 2007 Witch Creek Fire. This is not to say that people have not successfully sheltered in place during wildfire,

where there are numerous examples of people sheltering in their homes, in hardened structures, in community buildings, in swimming pools, and in cleared or ignition resistant landscape open air areas. The preference will likely always be early evacuation following the "Ready, Set, Go!" model, but there exists the potential for unforeseen civilian evacuation issues, and having a contingency plan will provide direction in these situations that may result in saved lives. Potential problems during wildfire evacuation from Safari Highlands Ranch include:

- Fires that prevent safe passage along planned evacuation routes
- Inadequate time to safely evacuate
- Fire evacuations during rush hour traffic or when large events are occurring
- Blocked traffic due to accidents or fallen tree(s) or power pole(s)
- The need to move individuals who are unable to evacuate

It is recommended that a concerted pre-planning effort focus on evacuation contingency planning for civilian populations when it is considered safer to temporary seek a safer refuge than evacuation.

9.6.4.1 Safety Zones

The International Fire Service Training Association (IFTSA; Fundamentals of Wildland Fire Fighting, 3rd Edition) defines Safety Zones as areas mostly devoid of fuel, which are large enough to assure that flames and/or dangerous levels of radiant heat will not reach the firefighting personnel occupying them. Areas of bare ground, burned over areas, paved areas, and bodies of water can all be used as safety zones. The size of the area needed for a safety zone is determined by fuel types, its location on slopes and its relation to topographic features (chutes and saddles) as well as observed fire behavior. Safety zones should never be located in topographic saddles, chutes or gullies. High winds, steep slopes or heavy fuel loads may increase the area needed for a Safety Zone.

The National Wildland Fire Coordinating Groups (NWFCG), Glossary of Wildland Fire Terminology provides the following definitions for Safety Zone and Escape routes

> Safety Zone. An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuelbreaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity.

According to NWFCG, Safety Zone(s):

- Must be survivable without a fire shelter
- Can include moving back into a clean burn
- May take advantage of natural features (rock areas, water, meadows)
- Can include Constructed sites (clear-cuts, roads, helispots)
- Are scouted for size and hazards
- Consider the topographic location (larger if upslope)
- Should be larger if downwind
- Should not include heavy fuels
- May need to be adjusted based on site specific fire behavior

The definition for a safety zone includes provisions for separation distance between the properly equipped and trained firefighter and the flames of at least four times the maximum continuous flame height. Distance separation is the radius from the center of the safety zone to the nearest fuels. For example, considering worst case 70 foot tall flame lengths that may be possible adjacent this site, then a 280 foot separation would be required, and more if there were any site-specific features that would result in more aggressive fire behavior. In order to provide 280 feet in all directions, a minimum 7.2 acres is considered necessary for a safety zone to be considered appropriate for one 3 person engine crew during an extreme weather fire.

If one considers the ignition resistant and maintained landscaping within each of the Safari Highlands Ranch neighborhoods, along with the adjacent fuel modification zones that vary between 150 and 200 feet wide, and Chapter 7A of California Building Code compliant structures, each neighborhood's interior roads would provide Safety Zones available to responding firefighters. Additionally, areas such as the San Pasqual Union Elementary School, the Eagle Crest Golf Community, and the Safari Park provide opportunities for safety zones. These areas and the Safari Highlands Ranch neighborhoods as Safety Zones can be part of EFD's and County's pre-planning efforts, although during the fire, the identified safety zones may not be feasible due to distance, location, fire behavior, etc.

Potential safety zones likely require additional focused study by EFD and other fire and law enforcement agencies.

9.6.4.2 Temporary Firefighter Refuge Areas

Firescope California defines a contingency plan when it is not possible to retreat to a safety zone. This contingency includes establishment of firefighter TRA(s), which are defined as:

> A preplanned area where firefighters can immediately take refuge for temporary shelter and short-term relief without using a fire shelter in the event that emergency egress to an established Safety Zone is compromised.

Examples of a TRA may include the lee side of a structure, inside of a structure, large lawn or parking areas, or cab of apparatus, amongst others. Differences between a TRA and a Safety Zone is that TRA's are closer to the immediate firefighting area, are considered a contingency to being able to get to a Safety Zone, do not include a requirement for a large area set back four times the flame lengths of adjacent fuels, and cannot be feasibly pre-planned until firefighters arrive on-scene and size up the situation.

Firescope appropriately notes that although Safety Zones and viable Escape Routes shall always be identified in the WUI environment, they may not be immediately available should the fire behavior increase unexpectedly. Often a TRA is more accessible in the WUI environment. A TRA will provide temporary shelter and short-term relief from an approaching fire without the use of a fire shelter and allow the responders to develop an alternate plan to safely survive the increase in fire behavior.

TRAs are pre-planned areas (planned shortly after firefighters arrive on scene) where firefighters may take refuge and temporary shelter for short-term thermal relief, without using a fire shelter in the event that escape routes to an established safety zone are compromised. The major difference between a TRA and a safety zone is that a TRA requires another planned tactical action, i.e., TRAs cannot be considered the final action, but must include self-defense and a move out of the area when the fire threat subsides. A TRA should be available and identified on site at a defended structure. TRAs are NOT a substitute for a Safety Zone. TRA pre-planning is difficult, at best because they are very site and fire behavior specific. For the Safari Highland Ranch Community, TRAs would likely include navigating into any of the neighborhoods where 150 to 200 feet wide fuel modification zones provide defensible space and maintained landscapes are provided, along with ignition resistant residences and wide roads that offer numerous opportunities for TRA.

The entire developed portions of the Safari Highlands Ranch community, but especially the interior areas of neighborhoods, are considered TRAs. This is an important concept because it offers last-resort, temporary refuge of firefighters, and in a worst-case condition, residents. This approach would be consistent with Firescope California (2013) which indicates that firefighters

must determine if a safe evacuation is appropriate and if not, to identify safe refuge for those who cannot be evacuated, including civilians.

Each of the site's residences that can be considered for TRA includes the following features:

- Ignition Resistant Construction
- 150 to 200 feet wide Fuel Modification Zones around perimeter of project
- Annual inspections by 3rd party fuel modification zone inspectors
- Wide roadways with fire hydrants
- Maintained landscapes and roadside fuel modification
- Ember resistant vents
- Interior fire sprinklers

Because there is the possibility that evacuation of the project may be less safe than temporarily refuging on-site, such as during a fast-moving, wind driven fire that ignites nearby, including temporary refuge within residences, at the Village Core, or elsewhere on site is considered a contingency plan for Safari Highlands Ranch. This concept is considered a component of the "Ready, Set, Go!" model as it provides a broader level of "readiness" should the ability to execute an early evacuation be negated by fire, road congestion, or other unforeseen issues. Note: this approach would be considered a last-resort contingency during wildfire with the primary focus being on early evacuation.

9.7 Evacuation Plan Limitations

This Wildland Fire Evacuation Plan has been developed based on wildfire and evacuation standards and the San Diego County Evacuation Annex (San Diego County 2014) and is specifically intended as a guide for evacuations for the Safari Highlands Ranch Community. This plan provides basic evacuation information that will familiarize residents with standard evacuation preparedness protocols as well as travel route options that may be available to them during an emergency. However, because emergencies requiring evacuation have many variables and must be evaluated on a case by case basis, this plan shall be subservient to real-time law enforcement and fire personnel/ agencies' decision making and direction during an emergency requiring evacuation.

This Evacuation Plan promotes the "Ready, Set, Go!" model, adopted by the State of California and many fire agencies statewide, including EFD. The goal is to raise agency and citizen awareness of potential evacuation issues and get a majority of the public "Ready" by

taking a proactive stance on preparedness, training drills, and visitor education, and evacuation planning efforts. The Safari Highlands Ranch populace will be "Set" by closely monitoring the situation whenever fire weather occurs and/or when wildland fire occurs, and elevating pre-planned protocol activities and situation awareness. Lastly, officials will implement the plan and mandate that populations "Go" by executing pre-planned evacuation procedures in a conservative manner, i.e., evacuation will occur based on conservative decision points, as proposed in this evacuation plan or when directed by fire and law enforcement personnel, whichever is more conservative. The preferred alternative will always be early evacuation. However, there may be instances when evacuation is not possible, is not considered safe, or is not an option based on changing conditions. For example, should a fire occur and make evacuation from the project ill advised, a contingency plan for residents will be available. This contingency would include moving people to pre-designated temporary refuge areas until it is safe to evacuate or the threat has been mitigated.

Ultimately, it is the intent of this Evacuation Plan to guide the implementation of evacuation procedure recommendations such that the process of evacuating people from the Safari Highlands Ranch project is facilitated in an efficient manner and according to a pre-defined evacuation protocol as well as providing a contingency option of temporarily refuging, if evacuation is considered less safe.

It is recommended that the evacuation process is carried out with a conservative approach to fire safety. This approach must include maintaining the Safari Highlands Ranch fuel modification landscape, infrastructural, and ignition resistant construction components according to the appropriate standards and embracing a "Ready, Set, Go!" stance on evacuation. Accordingly, evacuation of the wildfire areas should occur according to pre-established evacuation decision points, or as soon as they receive notice to evacuate, which may vary depending on many environmental and other factors. Fire is a dynamic and somewhat unpredictable occurrence and it is important for anyone living at the wildland-urban interface to educate themselves on practices that will improve safety.

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10 HOMEOWNER'S ASSOCIATION WILDFIRE EDUCATION PROGRAM

The Safari Highlands Ranch HOA will provide on-going resident education outreach regarding wildfire safety, the "Ready, Set, Go!"[4] pre-planning model, and this FPP's requirements for the entire master-planned development. The community building will include site-specific wildfire information including practices that will not be allowed due to fire risk. Informational handouts, facility Web-site page, mailers, fire safe council participation, inspections, and seasonal reminders are some methods that will be used to disseminate wildfire and relocation awareness information. The HOA will coordinate with EFD and other applicable fire agencies regarding wildfire educational material/programs before printing and distribution.

The Safari Highlands Ranch residents and visitors of commercial and property facilities will be provided homeowners informational brochures at point of sale regarding wildfire and this FPP's requirements. This educational information must include maintaining the landscape and structural components according to the appropriate standards and embracing a "Ready, Set, Go " stance on evacuation. Of particular importance in this FPP is the guidance in the types of plants that are allowed or prohibited in landscaped areas and appropriate construction within vegetation management zones.

The Safari Highlands Ranch residents will be aware of this evacuation plan as the HOA will post it on its Website and provide reminders to residents on at least an annual basis. This educational outreach will result in a populace that understands the potential for evacuations and the routes and options that may be presented to them.

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

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11 CONCLUSION

This FPP is submitted in support of an application for project entitlement of the Safari Highlands Ranch project. It is submitted in compliance with requirements of the EFD Fire Code. The requirements in this document meet or exceed fire safety, building design elements, fuel management/modification, and landscaping recommendations of the City or provide alternative measures that meet the intent of the code. Fire and Building Codes and other local, county, and state regulations in effect at the time of each building permit application supersede these recommendations unless the FPP recommendation is more restrictive.

Where the project does not strictly comply with the Code, for top of slope setback, alternative materials and methods have been proposed that provide functional equivalency as the code intent. The information provided herein supports the ability of the proposed structures and FMZs to withstand the predicted short duration, low to moderate intensity wildfire and ember shower that would be expected from wildfire burning in the vicinity of the site or within the site's landscape.

The recommendations provided in this FPP have been designed specifically for the proposed construction of structures adjacent the WUI zone at the Project site. The Proposed Project site's fire protection system includes a redundant layering of protection methods that have been shown through post-fire damage assessments to reduce risk of structural ignition.

Modern infrastructure will be provided along with implementation of the latest ignition resistant construction methods and materials. Further, all structures are required to include interior sprinklers consistent with EFD requirements. Fuel modification that is up to twice the standard width requirement will occur throughout the project site. The FMZs will be maintained annually by the HOA and inspected by a 3rd party to certify that they meet the EFD standards. Maintenance includes removing all dead and dying materials and maintaining appropriate horizontal and vertical spacing. In addition, plants that establish or are introduced to the fuel modification zone that are not on the approved plant list will be removed.

Ultimately, it is the intent of this FPP to guide, through code and other project specific requirements, the construction of structures that are defensible from wildfire and, in turn, do not represent significant threat of ignition source for the adjacent native habitat. It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions and mitigating actions identified in this report are designed to reduce the likelihood that fire would impinge upon the proposed structures. There are no guarantees that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property. Implementation of the required enhanced construction features provided by the applicable codes and the mitigating fuel modification requirements provided in this FPP will accomplish the goal

of this FPP to assist firefighters in their efforts to defend these structures and reduce the risk associated with this project's WUI location.

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

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APPENDIX A

Representative Photographs

Appendix A

Representative Photographs

Safari Highlands Ranch

Photograph #1.

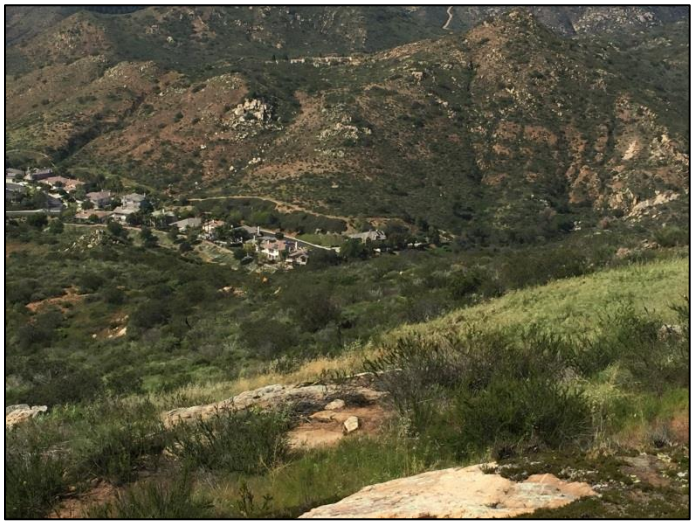
Photograph #2.

Photograph #3.

Photograph #4.

Photographs were taken on March 10, 2016

Photograph #5.



Photograph #6.

Photograph #7.

Photograph #8.

Photographs were taken on March 10, 2016

Photograph #9.

Photograph #10.

Photograph #11.

Photograph #12.

Photographs were taken on March 10, 2016

Photograph #13.

Photograph #14.

Photograph #15.

Photograph #16.

Photographs were taken on March 10, 2016

Photograph #17.

Photograph #18.

Photograph #19.

Photograph #20.

Photographs were taken on March 10, 2016

Photograph #21.

Photograph #22.

Photograph #23.

Photograph #24.

Photographs were taken on March 10, 2016

Photograph #25.

Photograph #26.

Photograph #27.

Photograph #28.

Photographs were taken on March 10, 2016

Photograph #29.

Photograph #30.

Photograph #31.

Photograph #32.

Photographs were taken on March 07, 2014

Photograph #33.

Photograph #34.

Photograph #35.

Photograph #36.

Photographs were taken on March 07, 2014

Photograph #37.

Photograph #38.

Photograph #39.

Photograph #40.

Photographs were taken on March 07, 2014

Photograph #41.

Photograph #42.

Photograph #43.

Photograph #44.

Photographs were taken on March 07, 2014

Photograph #45.

Photograph #46.

Photograph #47.

Photograph #48.

Photographs were taken on March 07, 2014

Photograph #50.

Photograph #51.

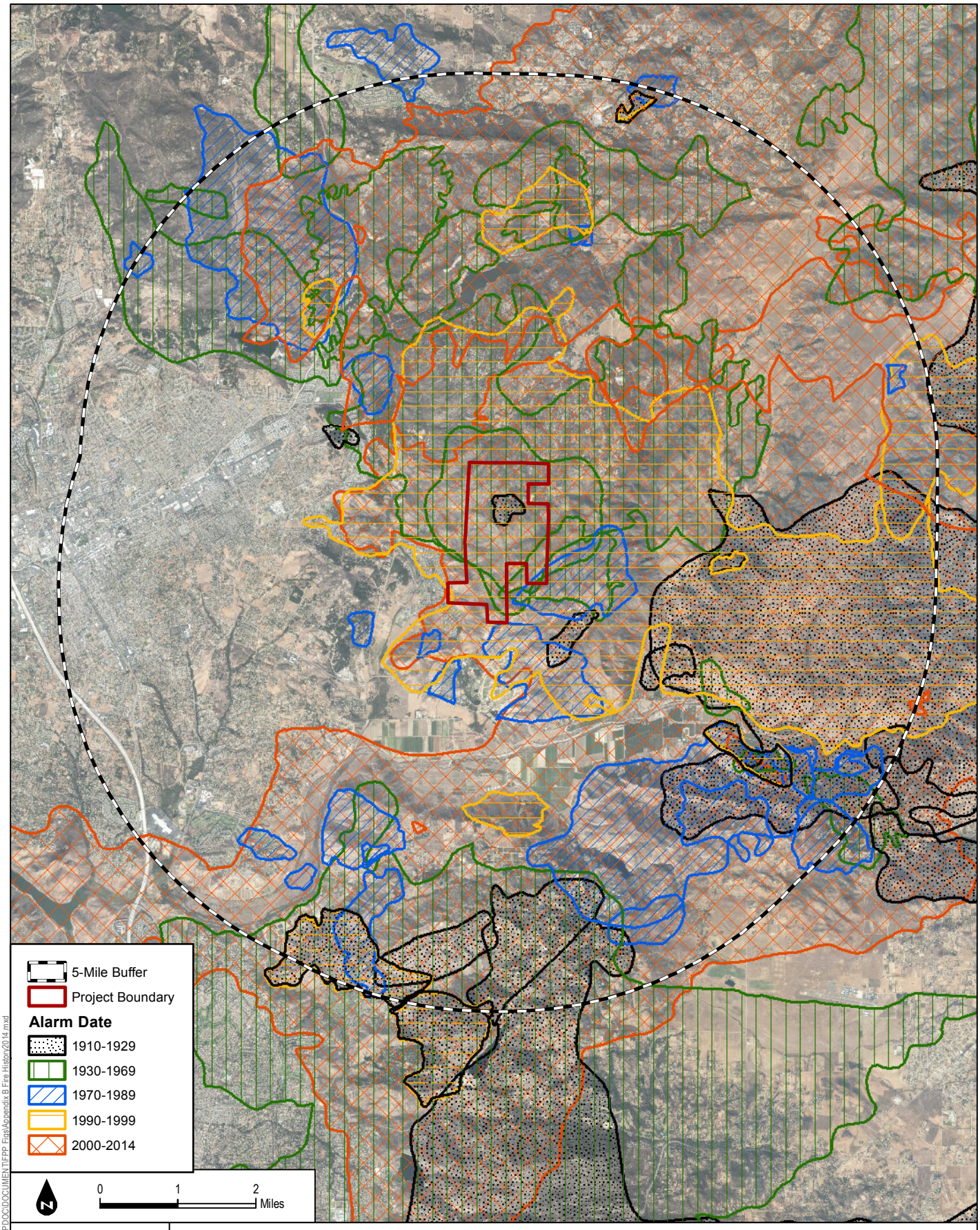
Photograph #52.

Photograph #53.

Photographs were taken on March 07, 2014

APPENDIX B

Fire History



Path: Z:\Projects\830401\MAPDOC\DOCUMENT\FPP Figs\Appendix B Fire History\2014.mxd

DUDEK

SOURCE: ESRI; Cal Fire 2014

APPENDIX B

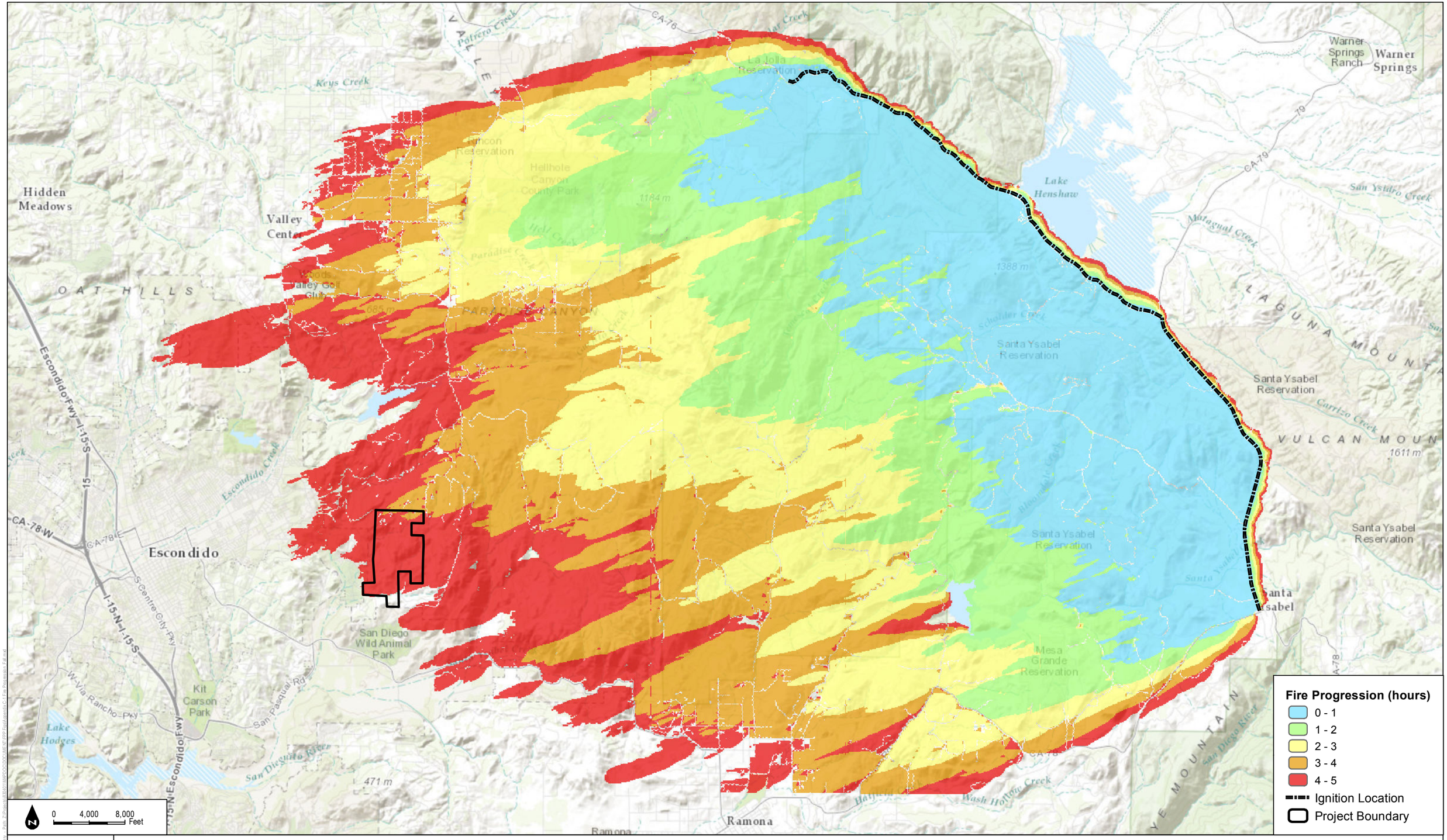
Safari Highlands Ranch Vicinity Fire History

Safari Highlands Ranch Fire Protection Plan

APPENDICES C-1 THROUGH C-6

Fire Progression Modeling
for Fall and Summer Conditions

APPENDIX C-1



SOURCE: LANDFIRE 2016; Dudek 2016

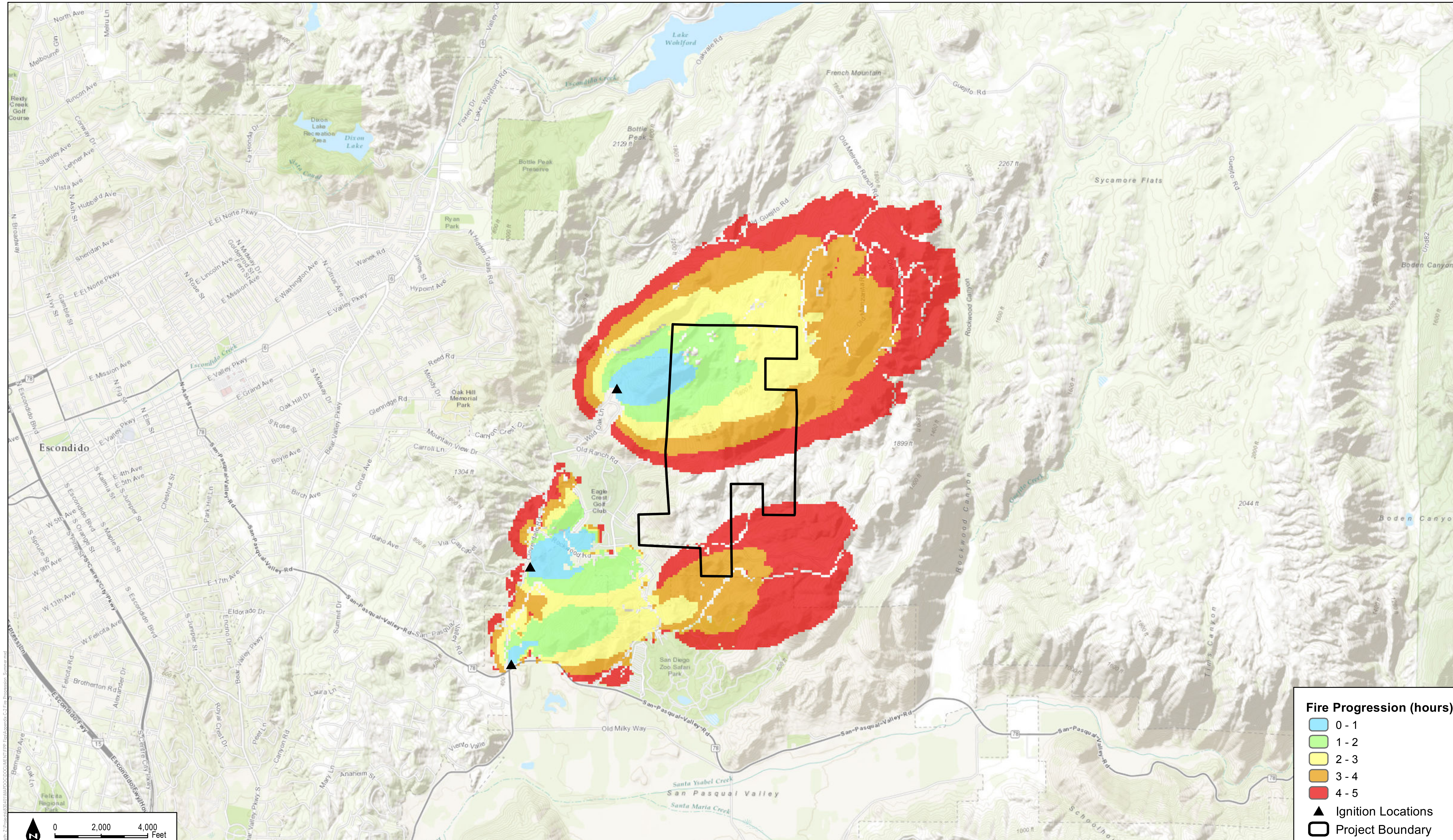
APPENDIX C-1

FlamMap Fire Behavior Modeling - Fall Fire Arrival Time

DUDEK

Safari Highlands Ranch Fire Protection Plan

APPENDIX C-2



SOURCE: LANDFIRE 2016; Dudek 2016

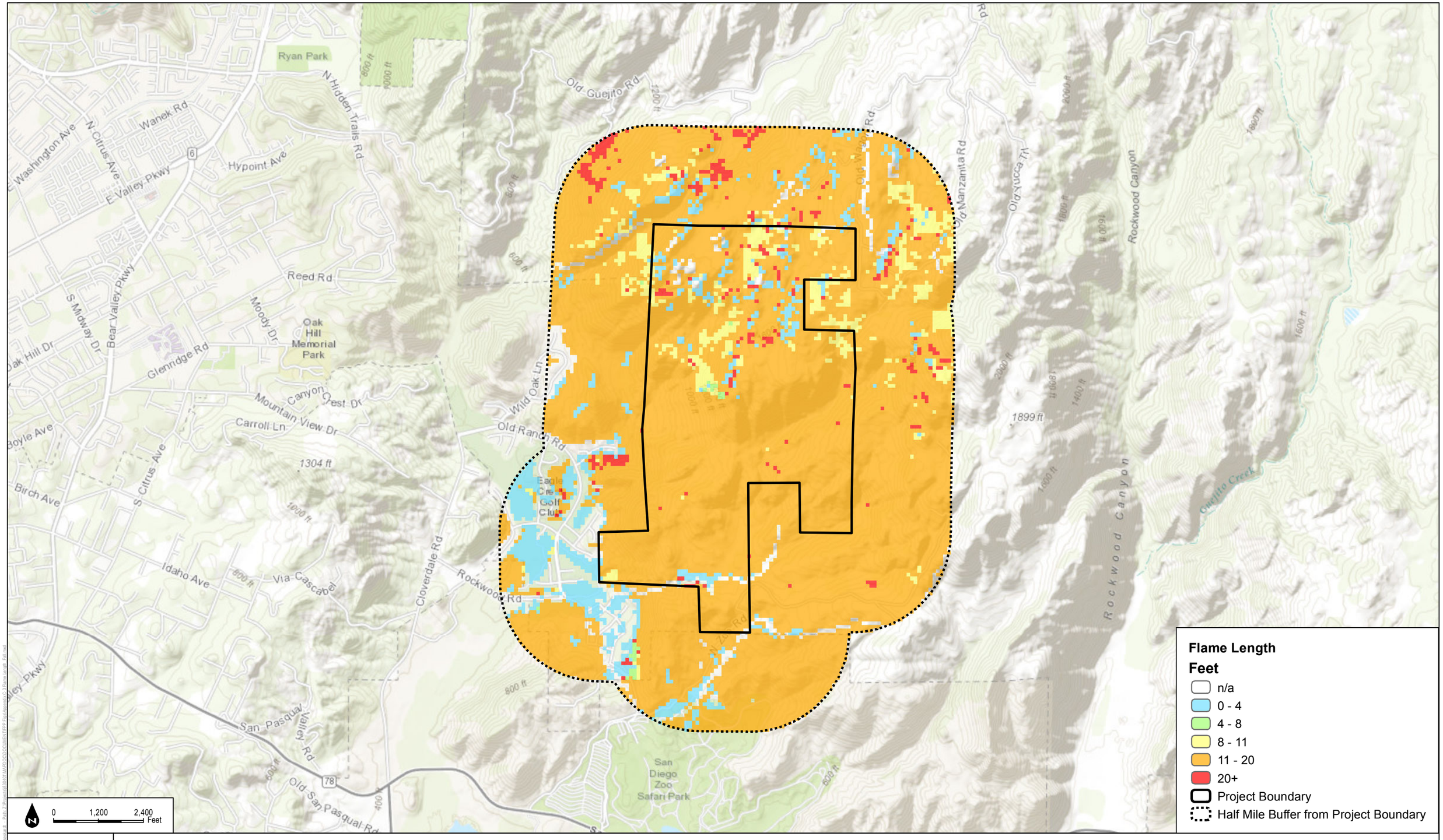
DUDEK

APPENDIX C-2

FlamMap Fire Behavior Modeling - Summer Fire Arrival Time

Safari Highlands Ranch Fire Protection Plan

APPENDIX C-3



SOURCE: LANDFIRE 2016; Dudek 2016

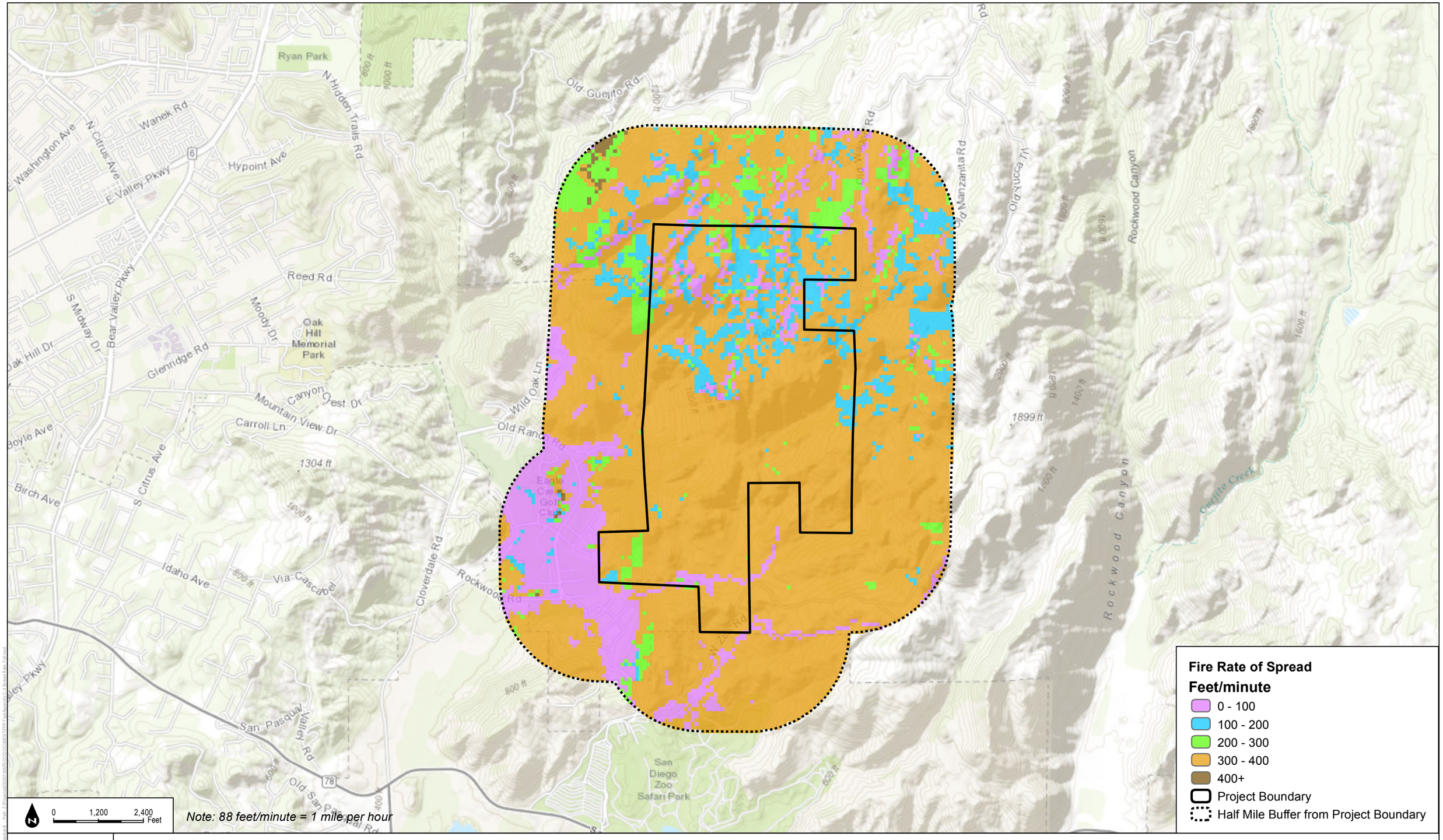
APPENDIX C-3

FlamMap Fire Behavior Modeling - Fall Fire Flame Length

DUDEK

Safari Highlands Ranch Fire Protection Plan

APPENDIX C-4



SOURCE: LANDFIRE 2016; Dudek 2016

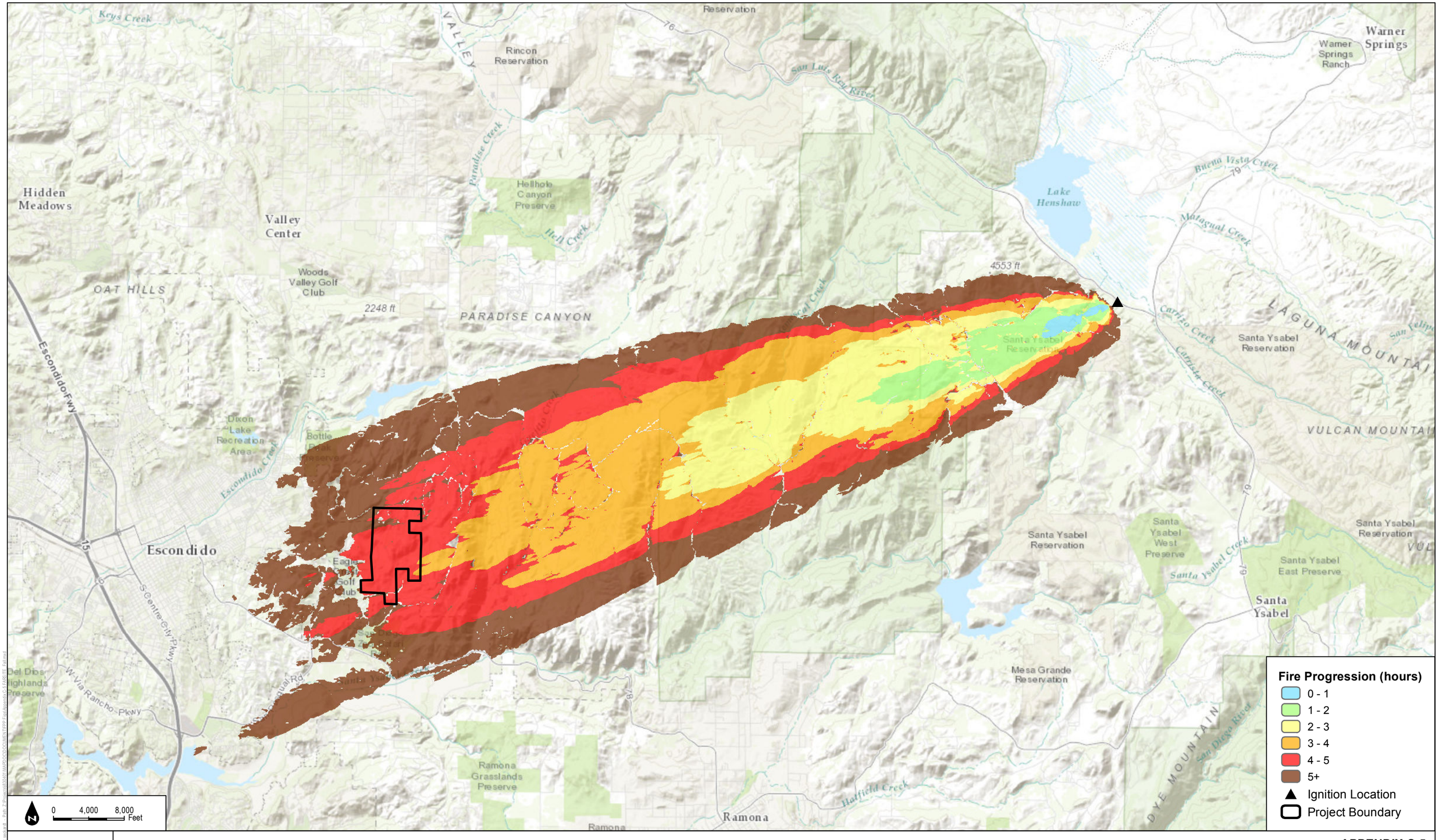
APPENDIX C-4

FlamMap Fire Behavior Modeling - Fall Fire Rate of Spread

DUDEK

Safari Highlands Ranch Fire Protection Plan

APPENDIX C-5



DUDEK

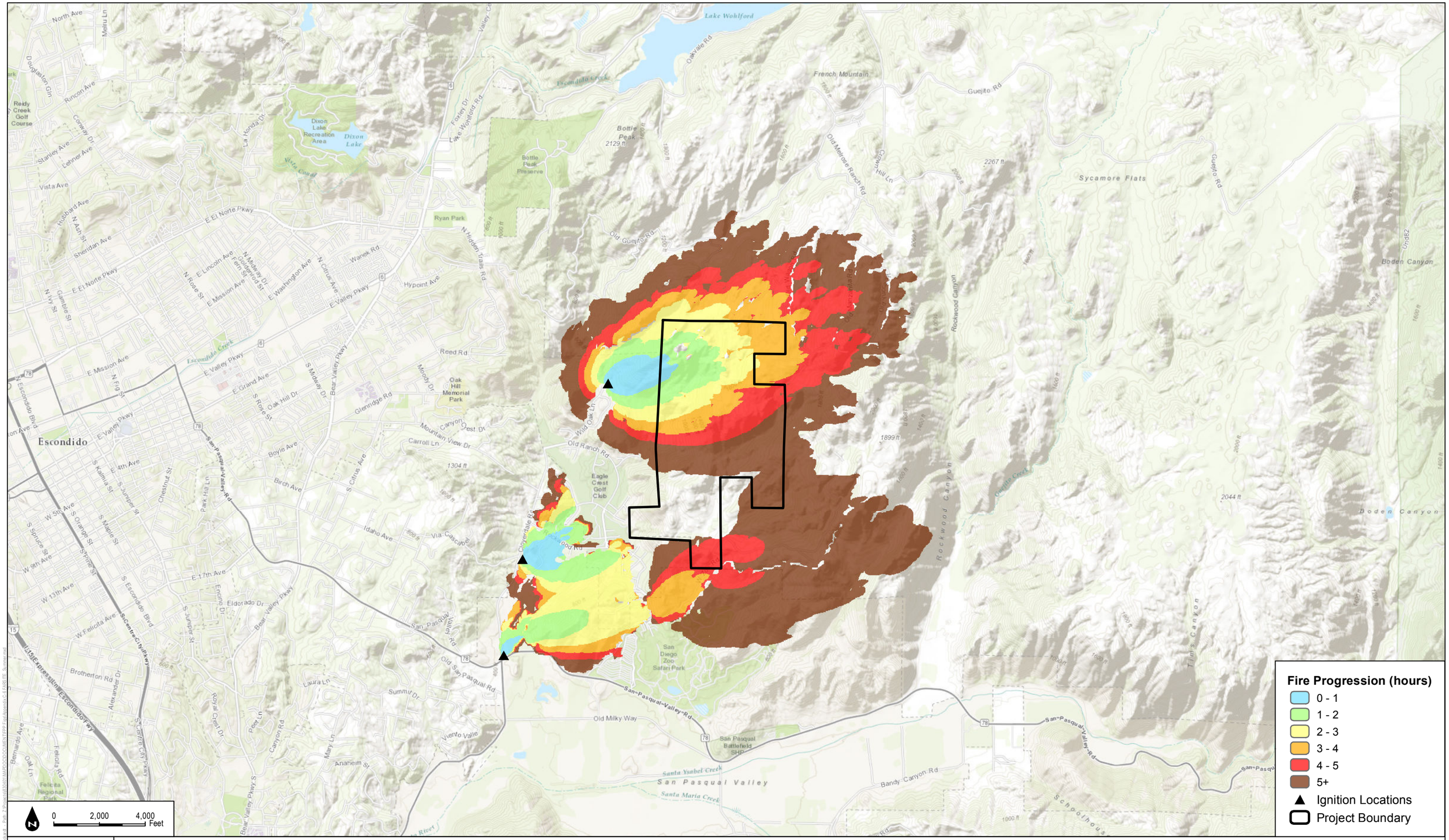
SOURCE: LANDFIRE 2016; Dudek 2016

APPENDIX C-5

FARSITE Fire Behavior Modeling - Fall Fire Arrival Time

Safari Highlands Ranch Fire Protection Plan

APPENDIX C-6



SOURCE: LANDFIRE 2016; Dudek 2016

DUDEK

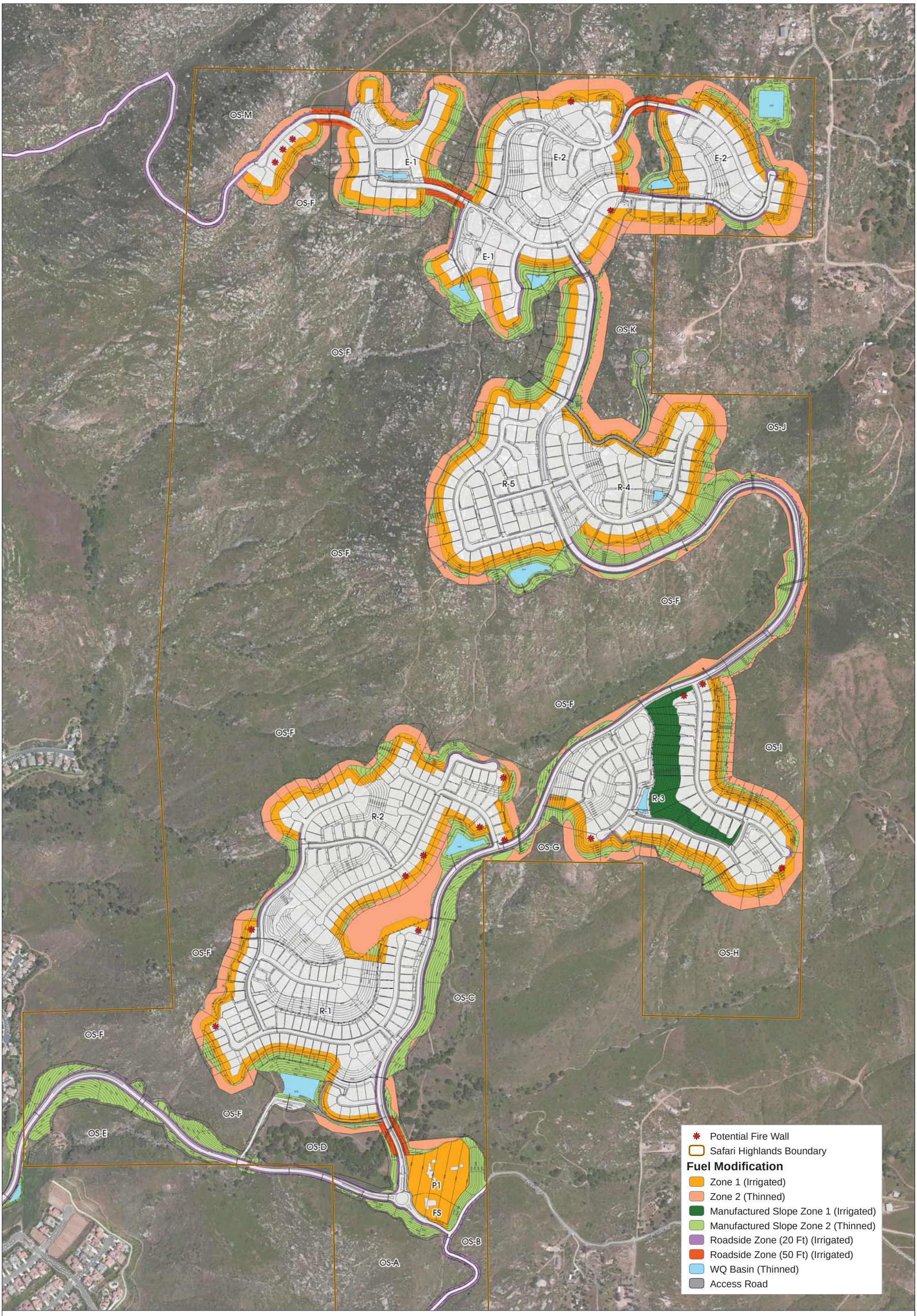
APPENDIX C-6

FARSITE Fire Behavior Modeling - Summer Fire Arrival Time

Safari Highlands Ranch Fire Protection Plan

APPENDIX D

Fuel Modification Zones and Landscape Walls



DUDEK Date: 4/25/2017

0 200 400 800 Feet

APPENDIX D

Safari Highlands Ranch Fuel Modification Zones

APPENDIX E

Prohibited Plant List

Appendix E
Examples of Prohibited Plants

Botanical Name	Common Name	Comment*
Trees		
Abies species	Fir	F
Acacia species (numerous)	Acacia	F, I
Agonis juniperina	Juniper Myrtle	F
Araucaria species (A. heterophylla, A. araucana, A. bidwillii)	Araucaria (Norfolk Island Pine, Monkey Puzzle Tree, Bunya Bunya)	F
Callistemon species (C. citrinus, C. rosea, C. viminalis)	Bottlebrush (Lemon, Rose, Weeping)	F
Calocedrus decurrens	Incense Cedar	F
Casuarina cunninghamiana	River She-Oak	F
Cedrus species (C. atlantica, C. deodara)	Cedar (Atlas, Deodar)	F
Chamaecyparis species (numerous)	False Cypress	F
Cinnamomum camphora	Camphor	F
Cryptomeria japonica	Japanese Cryptomeria	F
Cupressocyparis leylandii	Leyland Cypress	F
Cupressus species (C. fobesii, C. glabra, C. sempervirens,)	Cypress (Tecate, Arizona, Italian, others)	F
Eucalyptus species (numerous)	Eucalyptus	F, I
Juniperus species (numerous)	Juniper	F
Larix species (L. decidua, L. occidentalis, L. kaempferi)	Larch (European, Japanese, Western)	F
Leptospermum species (L. laevigatum, L. petersonii)	Tea Tree (Australian, Tea)	F
Lithocarpus densiflorus	Tan Oak	F
Melaleuca species (M. linariifolia, M. nesophila, M. quinquenervia)	Melaleuca (Flaxleaf, Pink, Cajeput Tree)	F, I
Olea europea	Olive	I
Picea (numerous)	Spruce	F
Palm species (numerous)	Palm	F, I
Pinus species (P. brutia, P. canariensis, P. b. eldarica, P.	Pine (Calabrian, Canary Island, Mondell, Aleppo, Italian Stone,	F

Appendix E
Examples of Prohibited Plants

Botanical Name	Common Name	Comment*
halepensis, P. pinea, P. radiata, numerous others)	Monterey)	
Platycladus orientalis	Oriental arborvitae	F
Podocarpus species (P. gracilior, P. macrophyllus, P. latifolius)	Fern Pine (Fern, Yew, Podocarpus)	F
Pseudotsuga menziesii	Douglas Fir	F
Schinus species (S. molle, S. terebenthifolius)	Pepper (California and Brazilian)	F, I
Tamarix species (T. africana, T. aphylla, T. chinensis, T. parviflora)	Tamarix (Tamarisk, Athel Tree, Salt Cedar, Tamarisk)	F, I
Taxodium species (T. ascendens, T. distichum, T. mucronatum)	Cypress (Pond, Bald, Monarch, Montezuma)	F
Taxus species (T. baccata, T. brevifolia, T. cuspidata)	Yew (English, Western, Japanese)	F
Thuja species (T. occidentalis, T. plicata)	Arborvitae/Red Cedar	F
Tsuga species (T. heterophylla, T. mertensiana)	Hemlock (Western, Mountain)	F
Groundcovers, Shrubs & Vines		
Acacia species	Acacia	F, I
Adenostoma fasciculatum	Chamise	F
Adenostoma sparsifolium	Red Shanks	F
Agropyron repens	Quackgrass	F, I
Anthemis cotula	Mayweed	F, I
Arbutus menziesii	Madrone	F
Arctostaphylos species	Manzanita	F
Arundo donax	Giant Reed	F, I
Artemisia species (A. abrotanium, A. absinthium, A. californica, A. caucasica, A. dracunculus, A. tridentata, A. pynocephala)	Sagebrush (Southernwood, Wormwood, California, Silver, True tarragon, Big, Sandhill)	F
Atriplex species (numerous)	Saltbush	F, I
Avena fatua	Wild Oat	F
Baccharis pilularis	Coyote Bush	F
Bambusa species	Bamboo	F, I
Bougainvillea species	Bougainvillea	F, I

Appendix E
Examples of Prohibited Plants

Botanical Name	Common Name	Comment*
Brassica species (B. campestris, B. nigra, B. rapa)	Mustard (Field, Black, Yellow)	F, I
Bromus rubens	Foxtail, Red brome	F, I
Castanopsis chrysophylla	Giant Chinquapin	F
Cardaria draba	Hoary Cress	I
Carpobrotus species	Ice Plant, Hottentot Fig	I
Cirsium vulgare	Wild Artichoke	F,I
Conyza bonariensis	Horseweed	F
Coprosma pumila	Prostrate Coprosma	F
Cortaderia selloana	Pampas Grass	F, I
Cytisus scoparius	Scotch Broom	F, I
Dodonaea viscosa	Hopseed Bush	F
Eriodictyon californicum	Yerba Santa	F
Eriogonum species (E. fasciculatum)	Buckwheat (California)	F
Fremontodendron species	Flannel Bush	F
Hedera species (H. canariensis, H. helix)	Ivy (Algerian, English)	I
Heterotheca grandiflora	Telegraph Plant	F
Hordeum leporinum	Wild barley	F, I
Juniperus species	Juniper	F
Lactuca serriola	Prickly Lettuce	I
Larix species (numerous)	Larch	F
Larrea tridentata	Creosote bush	F
Lolium multiflorum	Ryegrass	F, I
Lonicera japonica	Japanese Honeysuckle	F
Mahonia species	Mahonia	F
Mimulus aurantiacus	Sticky Monkeyflower	F
Miscanthus species	Eulalie Grass	F
Muhlenbergia species	Deer Grass	F
Nicotiana species (N. bigelovii, N. glauca)	Tobacco (Indian, Tree)	F, I
Pennisetum setaceum	Fountain Grass	F, I
Perovskia atroplicifolia	Russian Sage	F
Phoradendron species	Mistletoe	F
Pickeringia montana	Chaparral Pea	F
Rhus (R. diversiloba, R.	Sumac (Poison oak, Laurel, Pink	F

Appendix E
Examples of Prohibited Plants

Botanical Name	Common Name	Comment*
laurina, R. lentii)	Flowering)	
Ricinus communis	Castor Bean	F, I
Rhus Lentii	Pink Flowering Sumac	F
Rosmarinus species	Rosemary	F
Salvia species (numerous)	Sage	F, I
Salsola australis	Russian Thistle	F, I
Solanum Xantii	Purple Nightshade (toxic)	I
Silybum marianum	Milk Thistle	F, I
Thuja species	Arborvitae	F
Urtica urens	Burning Nettle	F
Vinca major	Periwinkle	I

*F = flammable, I = Invasive

NOTES:

1. Plants on this list that are considered invasive are a partial list of commonly found plants. There are many other plants considered invasive that should not be planted in a fuel modification zone and they can be found on The California Invasive Plant Council's Website www.cal-ipc.org/ip/inventory/index.php. Other plants not considered invasive at this time may be determined to be invasive after further study.
2. For the purpose of using this list as a guide in selecting plant material, it is stipulated that all plant material will burn under various conditions.
3. The absence of a particular plant, shrub, groundcover, or tree, from this list does not necessarily mean it is fire resistive.
4. All vegetation used in Vegetation Management Zones and elsewhere in this development shall be subject to approval of the Fire Marshal.
5. Landscape architects may submit proposals for use of certain vegetation on a project specific basis. They shall also submit justifications as to the fire resistivity of the proposed vegetation.

APPENDIX F

Proposed Project Plant Palette

CANDIDATE PLANT MATERIAL- STREETSCAPES, PARKS, ENTRIES, COMMON AREAS

BOTANICAL NAME

EVERGREEN/DECID. SCREEN TREE

MELALEUCA QUINQUENERVIA
LYONOTHAMNUS FLORIBUNDUS SSP ASPLENIIFOLIUS
HYMENOSPORUM FLAVUM TRISTANIA CONFERTA
POPULUS NIGRA ITALICA
PLATANUS RACEMOSA
PLATANUS ACERFOLIA
CUPRESSUS SEMPRIVIRENS
LIGUSTRUM LUCIDUM
FICUS SPP.
AFROCARPUS GRACILIAR

STREET TREES AND STREET ACCENT TREES

TIPUANA TIPU
METROSIDEROS EXCELSUS
POPULUS NIGRA ITALICA
ULMUS PARVIFOLIA
LIQUIDAMBER STYRACIFLUA 'PALO ALTO'
OLEA EUROPAEA
MAGNOLIA GRANDIFLORA
ARBUTUS 'MARINA'
ALNUS RHOMBILIFOLIA
PLATANUS RACEMOSA
PLATANUS ACERFOLIA
QUERCUS ILEX
QUERCUS AGRIFOLIA
QUERCUS ENGELMANIA
PYRUS 'BRADFORDI
TRISTANIA CONFERTA
FICUS SPP.
AFROCARPUS GRACILIAR
SALIX SPP.
CERCIDIUM HYBRID 'DESERT MUSEUM'
POPULUS SPP.
MANZANITA SPP.
TABEBUIA IMPETIGINOSA
GEIJERA PARVIFOLIA
LYONOTHAMNUS FLORIBUNDUS SSP ASPLENIIFOLIUS
KOELREUTERIA BIPINNATA
PISTACHIA CHINENSIS
LAGERSTROEMIA INDICA
CITRUS SPP.
FRUIT SPP.
CERCIS CANADENSIS 'FOREST PANSY'

EVERGREEN SCREENING SHRUB

MELALEUCA NESOPHILA
PITTOSPORUM TOBIRA 'VARIEGATA'
XYLOSMA CONGESTUM 'COMPACTA'
LIGUSTRUM JAPONICUM 'TEXANUM'
FIEJOA SELLOWIANA
EUGENIA UNIFLORA
RHAMNUS ILICIFOLIA
CARISSA MACROCARPA
GREWIA OCCIDENTALIS
FICUS NITIDA 'GREEN GEM'

EVERGREEN VERTICAL ACCENT SHRUB

LEPTOSPERMUM LAEVIGATUM
MONARDELLA SUBGLABRA
CYATHEA COOPERI
DRACENA MARGINATA
ALOE BAINESII
HETEROMELES ARBUTIFOLIA
LEUCOPHYLUM SPP.
LEUCODENDRON SPP.
ELAEOCARPUS DECIPIENS
FREMONTODENDRON SPP
MAHONIA SPP
EUPHORBIA INGENS

EVERGREEN FLOWERING/ACCENT SHRUBS OR SUCCULENTS

AGAVE DESMETTIANA 'VARIEGATA'
AGAVE ATTENUATA
AGAVE SPP.
ALOE ARBORESCENS
ALOE SPP.
AGAPANTHUS AFRICANUS
ARMERIA MARITIMA
ABELIA GRANDIFLORA
AEONIUM ARBORIUM
ANIGOZANTHOS SPP.
BRUGMANSIA SANGUINEA
BUXUS MICROPHYLLA JAPONICA
CALLISTEMON 'LITTLE JOHN'
CAREX SPP.
COTANEASTER PARNEYII
CEANOTHUS 'JOYCE COULTER'
CHAMELAUCIUM UNCINATUM
CISTUS PURPUREUS
COLEONEMA PULCHRUM
CRASSULA FALCATA
DIANELLA SPP.
DIPLACUS SPP.
DODENEA VISCOSA
ECHIUM FASTUOSUM
ESCALLONIA FRADESII
EUONYMUS SPP.
EUPHORBIA SPP.
FOUQUIERIA SPLENDENS
GAILLARDIA X GRANDIFLORA
GAURA LINDHEIMERI
GREVILLEA SPP.
GREWIA OCCIDENTALIS
HETEROMELES ARBUTIFOLIA
HESPERALOE PARVIFLORA
HEMEROCALLIS HYBRIDS
KALANCHIE BLOSSFELDIANA
LANTANA SPP.
LAVANDULA SPP.
LAVATERA MARITIMA
LEPTOSPERMUM SPP.
LEUCOPHYLLUM FRUTESCENS
MELALEUCA NESOPHYLA
MYRTUS COMMUNIS 'COMPACTA'
NANDINA DOMESTICA
OPUNTIA ROBUSTA
POLYGALA X DALMAISIANA
PHORMIUM SPP.
PROTEA CYNAROIDES
PHOTINIA FRASERI
PRUNUS LYONII
RHAPHIOLEPIS 'MAJESTIC BEAUTY'
RHAMNUS CALIFORNICA
RUSSELIA EQUISETIFORMIS
ROMNEYA COULTERI
RHODODENDRON SPP.
ROSMARINUS SPP.
ROSA SPP.
RHUS INTEGRIFOLIA
RUSSELIA EQUISETIFORMIS
SANTOLINA VIRENS
SALVIA GREGII
SALVIA LEUCOPHYLLA
WESTRINGIA FRUTICOSA
YUCCA SPP.
RIBES SPP.
IVA HAYESIANA
DIETES VEGETA
ECHINOCACTUS GRUSONII

EVERGREEN FLOWERING GROUND COVER

BACCHARIS 'PIGEON POINT'
FESTUCA OVINA 'GLAUCA'
X GRAPTOVERIA
CRASSULA FALCATA
BOUGAINVILLEA SPP
SENECIO MANDRALISCAE
ECHEVERIA HYBRIDS
ARMERIA MARITIMA
ARTEMISIA 'POWIS CASTLE'
BERGENIA CRASSIFOLIA
SCAEVOLA 'MAUVE CLUSTERS'
AEONIUM 'PSEUDOTABULAEFORME'
CEANOTHUS GRISEUS HORIZONTALIS
GERANIUM SPP.
LANTANA SPP.
MYOPORUM PARVIFOLIUM
MYOPORUM PACIFICUM
THYMUS PRAECOX ARCTICUS 'REITER'S'
TRACHELOSPERMUM JASMINOIDES
PELARGONIUM SPP.
HEUCHERA SANGUINEA
OSTEOSPERMUM SPP.
GAZANIA SPP.
LIRIOPE MUSCARI 'LILAC BEAUTY'
CAREX SPP.

EVERGREEN FLOWERING VINE

GREWIA OCCIDENTALIS
CAMPSIS RADICANS
CLYTOSTOMA CALLISTEGIOIDES
PARTHENOCISSUS TRICUSPIDATA
MACFADYENA UNGUIS-CATI
CALLIANDRA INAEQUILATERA
DISTICTIS SPP.
PYROSTEGIA VENUSTA
ROSA SPP.
TRACHELOSPERMUM JASMINIODES
WISTERIA SINENSIS

CANDIDATE PLANT MATERIAL- INTERIOR SLOPES (NOT NATIVE ADJACENT) TRANSITIONAL SLOPES AND/OR FUEL MODIFICATION (IRRIGATED)

COAST LIVE OAK WOODLAND MIX

SHRUBS AND GROUNDCOVERS

BERBERIS REPENS
CEANOTHUS SPP.
CARPENTARIA CALIFORNICA
COMAROSTAPHYLLIS DIVERSIFOLIA
GALVEZIA JUNCEA
GALVEZIA SPECIOSA
GARRYA ELLIPTICA
KECKIELLA CORDIFOLIA
RIBES SPECIOSUM
RIBES VIBURNIFOLIUM
ROSA CALIFORNIACA
HETEROMELES ARBUTIFOLIA
IVA HAYESIANA
PHILADELPHUS LEWISII
PRUNUS ILICIFOLIA
RHAMNUS CALIFORNICA
RHUS OVATA
SALVIA SPP.
TRICHOSTEMA LANATUM
VERBENA LILACINA

TREES

PLATNUS RACEMOSA
QUERCUS AGRIFOLIA
QUERCUS ENGELMANII
CERCIS OCCIDENTALLIS
ARBUTUS UNEDO
MANZINITA SPP
TRISTANIA CONFERTA

PERENNIALS

LUPINUS EXCUBITUS
MIMULUS AURANTIACUS
PENSTEMON EATONII
PENSTEMON HETEROPHYLLUS
ROMNEYA COULTERI
SALVIA SONOMENSIS
SALVIA SPATHACEA
SISYRINCHIUM BELLUM

GENERAL SLOPE LANDSCAPES

SHRUBS AND GROUNDCOVERS

ABELIA GRANDIFLORA
ALOE SPP
AGAVE SPP
ACACIA SPP.
BOUGANVILLEA SPP.
CEANOTHUS SPP.
CARPENTARIA CALIFORNICA
COMAROSTAPHYLLIS DIVERSIFOLIA
CISTUS PURPUREUS
CISTUS SPP.
COPROSMA REPENS
COTONEASTER MICROPHYLLUS
COTONEASTER LACTEUS
DENDROMECON ARFORDII
ECHIUM FASTUOSUM
ELAEGNUS PUNGENS
GREVILLEA NOELLI
GREWIA OCCIDENTALIS
GARRYA ELLIPTICA
HETEROMELES ARBUTIFOLIA
IVA HAYESIANA
LANTANA SPP.
LAVENDULA SPP.
MELALEUCA NESOPHILA
NERIUM OLEANDER
PHOTINIA FRASERI
PRUNUS CAROLINIANA
PRUNUS ILICIFOLIA
RHAMNUS CALIFORNICA
ROSA SPP
RHUS OVATA
ROSA CALIFORNIACA
SALVIA SPP.
YUCCA SPP.

TREES

PLATNUS RACEMOSA
QUERCUS AGRIFOLIA
QUERCUS ENGELMANII
CERCIS OCCIDENTALLIS
ARBUTUS UNEDO
MANZINITA SPP
TRISTANIA CONFERTA
POPULUS NIGRA ITALICA
LYONOTHAMNUS FLORIBUNDUS
SSP ASPLENIIFOLIUS
CALLISTEMON VIMINALIS

PERENNIALS/HYROSEED MIX

BROMUS MOLLIS
ENCELIA CALIFORNICA
ESCHSCHOLZIA CALIFORNICA
LOTUS SCOPARIUS
LUPINUS BICOLOR
LUPINUS SUCCULENTUS
MIMULUS PUNICEUS
MIMULUS AURANTIACUS
PENSTEMON EATONII
PENSTEMON HETEROPHYLLUS
PLANTAGO INSULARIS
SISYRINCHIUM BELLUM

EVERGREEN SCREENING SHRUB

PITTOSPORUM TOBIRA 'VARIEGATA'
XYLOSMA CONGESTUM 'COMPACTA'
LIGUSTRUM JAPONICUM 'TEXANUM'
FIEJOA SELLOWIANA
EUGENIA UNIFLORA
RHAMNUS ILICIFOLIA
CARISSA MACROCARPA
GREWIA OCCIDENTALIS
FICUS NITIDA 'GREEN GEM'

EVERGREEN FLOWERING VINE

GREWIA OCCIDENTALIS
CAMPSIS RADICANS
CLYTOSTOMA CALLISTEGIOIDES
PARTHENOCISSUS TRICUSPIDATA
MACFADYENA UNGUIS-CATI
CALLIANDRA INAEQUILATERA
DISTICTIS SPP.
PYROSTEGIA VENUSTA
ROSA SPP.
TRACHELOSPERMUM JASMINIODES
WISTERIA SINENSIS

CANDIDATE PLANT MATERIAL- SPECIFIC HABITAT REVEGETATION AND/OR SELECT FUEL MOD ZONE 2 (NON-IRRIGATED)

SOUTHERN CACTUS SCRUB COMMUNITY

CONTAINER PLANTS

OPUNTIA LITTORALIS
OPUNTIA PROLIFERA
SAMBUCUS MEXICANA
CNEORIDIUM DUMOSUM
ENCELIA CALIFORNICA
ISOCOMA MENZIESII
ISOMERIS ARBOREA
KECKIELLA CORDIFOLIA
NASSELLA LEPIDA
SOLANUM XANTII
YUCCA WHIPPLEI

HYDROSEED MIX

ERIOPHYLLUM CONFERTIFLORUM
ESCHSCHOLZIA CALIFORNICA
GNAPHALIUM CALIFORNICUM
LUPINUS TRUNCATUS
PLAGIOBOTHRYUS NOTHOFULVUS
MIMULUS AURANTIACUS
NASSELLA LEPIDA
NASSELLA PULCHRA
PLANTAGO INSULARIS
SISYRINCHIUM BELLUM

WILLOW WOODLAND COMMUNITY

CONTAINER PLANTS OR SEED MIX

BACCHARIS GLUTINOSA
ROSA CALIFORNIACA
RUBUS URSINUS
SALIX HINDSIANA
ANEMOPSIS CALIFORNICA
ARTEMESIA DOUGLASIANA
ARTEMESIA PALMERII
ELYMUS CONDENSATUS
IVA HAYESIANA
JUNCUS ACUTUS
ORTHOCARPUS PURPURASCENS
PHACELIA CAMPANULARIA

HYDROSEED MIX

SEE ABOVE

TREES

POPULUS FREMONTII
SALIX GOODDINGOO
SALIX LAEVIGATA
SALIX LASIOLEPIS
PLATNUS RACEMOSA
QUERCUS AGRIFOLIA

COASTAL SAGE SCRUB COMMUNITY

CONTAINER PLANTS OR SEED MIX

HETEROMELES ARBUTIFOLIA
BACCHARIS SAROTHROIDES
ENCILIA CALIFORNICA
ERIOPHYLLUM CONFERTIFLORUM
ESCHSCHOLZIA CALIFORNICA
FESTUCA MEGALURA
LOTUS SCO[RIUS
LUPINUS BICOLOR
LUPINUS SUCCULENTS
MUMULUS PUNICEUS
ORTHOCARPUS PURPURASCENS
PHACELIA CAMPANULARIA
SISYRINCHIUM BELLUM
STIPA LEPIDA
STIPA PULCHRA

HYDROSEED MIX

SEE ABOVE

TREES

POPULUS FREMONTII
PLATNUS RACEMOSA
QUERCUS AGRIFOLIA
QUERCUS ENGELMANII

CANDIDATE PLANT MATERIAL- ORCHARD TREES

TREES

AVOCADO
LEMON
ORANGE
TANGERINE
LIME
GRAPEFRUIT
GUAVA
PERSIMMON
KUMQUAT
LOQUAT
FIG
POMEGRANATE
PLUMS
PEACH
NECTARINES
APRICOTS
PEAR

CANDIDATE PLANT MATERIAL- DETENTION BASIN

CONTAINER PLANTS IN BASIN

ACORUS GRAMINEUS 'VARIEGATUS'
CAREX FLACCA
CAREX PANSA
CAREX TUMULICOLA
CHONDROPETALUM TECTORUM
DIANELLA REVOLUTA 'LITTLE REV'
FESTUCA MAIREI
JUNCUS EFFUSUS 'QUARTZ CREEK'
JUNCUS INFLEXUS 'BLUE ARROWS'
JUNCUS PATENS 'ELK BLUE'
LEYMUS CONDENSATUS 'CANYON PRINCE'
LOMONDRA LONGIFOLIA 'BREEZE'
SESLERIA AUTUMNALIS

TREES

POPULUS FREMONTII
SALIX GOODDINGOO
SALIX LAEVIGATA
SALIX LASIOLEPIS
PLATNUS RACEMOSA
QUERCUS AGRIFOLIA
ALNUS RHOMBIFOLIA

CONTAINER PLANTS ADJACENT TO BASIN/TOP OF SLOPE

BERBERIS REPENS
CEANOTHUS SPP.
CARPENTARIA CALIFORNICA
COMAROSTAPHYLLIS DIVERSIFOLIA
GALVEZIA JUNCEA
GALVEZIA SPECIOSA
GARRYA ELLIPTICA
KECKIELLA CORDIFOLIA
RIBES SPECIOSUM
RIBES VIBURNIFOLIUM
ROSA CALIFORNIACA
HETEROMELES ARBUTIFOLIA
IVA HAYESIANA
PHILADELPHUS LEWISII
PRUNUS ILICIFOLIA
RHAMNUS CALIFORNICA
RHUS OVATA
TRICHOSTEMA LANATUM
VERBENA LILACINA

APPENDIX G

Agency Evacuation Pre-Planning Procedures and Techniques

APPENDIX G
Agency Evacuation Pre-Planning Procedures and Techniques

1.1 Evacuation Objectives

The overall objectives of emergency evacuation operations and notifications are to:

1. Expedite the movement of persons from hazardous areas;
2. Institute access control measures to prevent unauthorized persons from entering vacated, or partially vacated areas;
3. Provide for evacuation to appropriate transportation points, evacuation points, and shelters;
4. Provide adequate means of transportation for persons with disabilities, the elderly, other persons with access and functional needs, and persons without vehicles;
5. Provide for the procurement, allocation, and use of necessary transportation and law enforcement resources by means of mutual aid or other agreements;
6. Control evacuation traffic;
7. Account for the needs of individuals with household pets and service animals prior to, during, and following a major disaster or emergency;
8. Provide initial notification, ongoing, and re-entry communications to the public through the Joint Information Center (JIC); and
9. Assure the safe re-entry of the evacuated persons.

The San Diego Sheriff's Department (SDSD) is the lead agency for evacuations of the unincorporated areas of San Diego County, including Deer Springs Fire Protection District and the Newland Sierra project. The SDSD, as part of a Unified Command, assesses and evaluates the need for evacuations, and orders evacuations according to established procedures. Additionally, as part of the Unified Command, the SDSD identifies available and appropriate evacuation routes and coordinate evacuation traffic management with the California Department of Transportation (Caltrans), the California Highway Patrol (CHP), other supporting agencies, and jurisdictions.

The decision to evacuate an area is not made lightly and there is a significant impact to public safety and the economy. The following process describes how emergency evacuation decisions are coordinated, allowing emergency managers and other supporting response organizations to make collaborative decisions.

1.2 Evacuation Coordination Process

1. If the emergency only impacts a local jurisdiction, the decision to evacuate will be made at the local jurisdiction level with regional collaboration considerations.
    a. Based on the information gathered, local jurisdictions will generally make the determination on whether to evacuate communities as the need arises, on a case-by-case scenario basis.
    b. The decision to evacuate will depend entirely upon the nature, scope, and severity of the emergency; the number of people affected; and what actions are necessary to protect the public.
    c. Local jurisdictions may activate their Emergency Operations Center (EOC) and conduct evacuations according to procedures outline in their Emergency Operations Plan (EOP).
    d. The EOC may make recommendations on whether a jurisdiction should evacuate and may help coordinate the evacuation effort.
    e. The Evacuation Annex is automatically activated when an incident occurs requiring an evacuation effort that impacts two or more jurisdictions.
    f. The EOC will coordinate with fire, law enforcement, public health, and other relevant support agencies to obtain recommendations on protective actions.
    g. The EOC will coordinate with jurisdictional emergency management personnel and other public safety personnel. The Policy Group within the EOC will coordinate will other officials from jurisdictions within the OA to identify command decisions, including:
        i. Gaining regional situational awareness
        ii. Determining response status
        iii. Reviewing status of initial protective actions
        iv. Considering additional protective actions
        v. Evaluating public information needs
        vi. Determining next steps
        vii. Establishing a regular time to share updates
    h. The EOC will coordinate emergency public information to citizens in accordance with established procedures.
    i. The EOC may support coordinating the evacuation response according to the EOP, including:

i. Providing transportation for those who need assistance

ii. Provide support for people with disabilities and other access and functional needs

iii. Coordinate and communicate with the private sector, community groups, and faith based organizations to utilize their services and resources available to support the response

iv. Providing shelter for evacuees

1.3 Evacuation Response Operations

An evacuation of any area requires significant coordination among numerous public, private, and community/non-profit organizations. Wildfire evacuations will typically allow time for responders to conduct evacuation notification in advance of an immediate threat to life safety; giving residents time to gather belongings and make arrangements for evacuation. On the other hand, other threats, including wildfires igniting nearby, may occur with little or no notice and certain evacuation response operations will not be feasible (for example, establishing contra flow requires between 24 to 72 hours to be implemented; a no-notice event will not allow for contra flow to be established). Evacuation assistance of specific segments of the population may also not be feasible.

1.3.1 Evacuation Points and Shelters

When the SDSD implements an evacuation order, they coordinate with the responding fire agency, the EOC, and others to decide on a location to use as a Temporary Evacuation Point (TEP). The SDSD Dispatch Center will utilize the AlertSanDiego system to direct evacuees to the established TEP or shelter. These evacuation points will serve as temporary safe zones for evacuees and will provide basic needs such as food, water, and restrooms. If there are residents unable to evacuate and need transportation assistance to get to a TEP or shelter, the SDSD may establish transportation points to collect and transport people without transportation resources to evacuation points. These points should be large, well known sites such as shopping centers, libraries, and schools. Transportation should be accessible to all populations, including people with disabilities and other access and functional needs.

The Pets Evacuation and Transportation Standards Act of 2006 amends the Stafford Act, and requires evacuation plans to take into account the needs of individuals with household pets and service animals, prior to, during, and following a major disaster or emergency.

The San Diego County Department of Animal Services (DAS) has plans in place to transport and shelter pets in a disaster under Annex O of the OA EOP, including the Animal Control Mutual Aid Agreement. Animal Control Officers, the San Diego Humane Society, and private animal

care shelters will assist in the rescue, transport, and sheltering of small and large animals. In addition, potential volunteer resources and private groups should be identified and tracked in WebEOC. Only non-emergency resources and personnel, such as public and private animal services agencies, will be used to rescue and transport animals during an evacuation effort.

In most cases, DAS and the OA EOC will coordinate and attempt to co-locate animal shelters with people shelters.

1.3.2 Shelter-in-Place

Sheltering-in-place is the practice of going or remaining indoors during or following an emergency event. This procedure is recommended if there is little time for the public to react to an incident and it is safer for the public to stay indoors for a short time rather than travel outdoors. Sheltering-in-place also has many advantages because it can be implemented immediately, allowing people to remain in their familiar surroundings, and providing individuals with everyday necessities such as telephone, radio, television, food, and clothing. However, the amount of time people can stay sheltered-in-place is dependent upon availability of food, water, medical care, utilities, and access to accurate and reliable information.

The decision on whether to evacuate or shelter-in-place is carefully considered with the timing and nature of the incident (San Diego County 2014). Sheltering-in-place is the preferred method of protection for people that are not directly impacted or in the direct path of a hazard. This will reduce congestion and transportation demand on the major transportation routes for those that have been directed to evacuate by police or fire personnel. Safari Highlands Ranch provides decision makers with the option of temporarily sheltering the population, or portions thereof.

1.4 Available Evacuation Strategies

There are many evacuation strategies that are available that can be implemented during an evacuation effort to enhance traffic flow and reduce the overall evacuation time. These strategies include contra-flow, traffic signal coordination, closure of off and on-ramps, Intelligent Transportation Systems, segregation of pedestrian and vehicle traffic, exclusive bus routes, phased evacuation, phased release of parking facilities, use of designated markings, road barriers, and use of the San Diego Freeway Patrol Service. These methods are summarized below and would be used by law enforcement agencies as necessary to meet evacuation objectives.

1.4.1 Intersection Control

Experience with evacuations and input from law enforcement personnel experienced with conducting wildfire evacuations indicates that a key factor for maintaining traffic movement out of evacuation areas is “controlling the intersections”. This includes intersections downstream,

possibly including the primary intersections along SR-78, Cloverdale Lane and internal Escondido streets along Valley Parkway. Typically, available law enforcement personnel may be a limiting factor on how well the intersections are controlled.

Intersections must be controlled by law enforcement personnel early, while they are still open. Once an intersection becomes gridlocked, it is almost impossible to re-open traffic flow (public hearing presentation by Orange County Sheriff's Department 2013). Therefore, intersections along the detailed Safari Highlands Ranch evacuation routes are critical to keep open and flowing traffic south and eastward. Keeping these roads flowing will provide for fast evacuation of the Safari Highlands Ranch Project as well as other communities in the area.

1.4.2 Contra-Flow Operations

Contra-flow is a tactic in which one or more lanes of a roadway are reversed to allow for an increase of traffic flow in one direction. Contra-flow can be implemented for highway and arterial roadways, however, the divided north bound and south bound directions, access-controlled configurations, and lack of signals on highways make these roadways ideal for contra-flow operations. An important consideration in the development of contra-flow plans is the identification of inception and termination points for the corridor. Congestion at these points can significantly reduce the effectiveness of these operations. Effective implementation of these plans includes the deployment of appropriate signage, signals, and barriers as well as the use of CHP and San Diego Sheriff's Department personnel. For safety considerations, contra-flow operations should only be performed during daylight hours. In addition, an emergency return lane must also be designated.

1.4.3 Traffic Signal Coordination and Timing

Traffic signal coordination and timing plans are intended to maximize traffic flow in the outbound direction during an evacuation effort. Depending on the extent of the evacuation, coordination may be necessary both locally and regionally to re-time the traffic signal systems.

1.4.4 Closure of On and Off-Ramps

Closure of outbound on-ramps on designated evacuation routes (such as I-15) will reduce congestion on these roadways resulting from traffic originating at intermediate locations between evacuation origins and destinations. In addition to reducing congestion, closure of outbound on-ramps will also help eliminate entrance queuing. Closure of off-ramps will ensure evacuees remain on designated evacuation routes. These tactics will require coordinated efforts between CHP, Caltrans, Sheriff's, and other emergency personnel to place and staff barricades at the tops of such ramps throughout the evacuation route.

1.4.5 Intelligent Transportation Systems

Intelligent Transportation Systems include a broad range of technologically based tools that enable transportation and emergency managers to monitor traffic conditions, respond to capacity-reducing events, and provide real-time road conditions. San Diego is equipped with numerous forms of Intelligent Transportation Systems technologies including roadway electronic surveillance, automatic vehicle location, Changeable Message Signs, and Highway Advisory Radio. These types of technologies provide real-time information to the San Diego Transportation Management Center. The San Diego Transportation Management Center integrates Caltrans Traffic Operations, Caltrans Maintenance, and CHP Communications into a unified, co-located communication and command center. The Transportation Management Center functions to provide communications, surveillance, and computer infrastructure required for coordinated transportation management. Using Intelligent Transportation Systems technologies, the Transportation Management Center can quickly detect, verify, and respond to incidents, such as recommending a different evacuation route due to congestion.

1.4.6 Segregation of Pedestrian and Vehicle Traffic

Although not anticipated for wildfire evacuations, this strategy will designate certain urban roadways as pedestrian only. This will provide separation between vehicles and pedestrians during an evacuation, thus reducing confusion and increasing the efficiency and safety of the evacuation.

1.4.7 Exclusive Bus Routes

This strategy involves the designation of certain lanes within an evacuation route exclusively for buses or other large capacity or high occupancy vehicles. Exclusive bus routes may also be established along alternative evacuation routes. The implementation of this strategy will help support and expedite transportation point operations and can greatly increase the number of people that can be evacuated within a set period of time.

1.4.8 Phased Evacuation

The purpose of a phased evacuation is to reduce congestion and transportation demand on designated evacuation routes by controlling access to evacuation routes in stages and sections. This strategy can also be used to prioritize the evacuation of certain communities that are in proximity to the immediate danger.

1.4.9 Use of Designated Markings

Designated markings and signs will play a key role in accomplishing a safe and efficient evacuation. Signs, flags, and other markings can be used to provide guidance and information to evacuees en-route.

1.4.10 Road Barriers

Road barriers are used in conjunction with other transportation strategies to ensure evacuees remain on designated evacuation routes or are blocked from entering closed areas.

Roadblocks and barricades

A variety of methods are used to stop or divert traffic. Roadblocks and barriers include a number of different technologies:

- Tape barriers
- Portable signs
- Cones
- Barrels
- DOT Type II rail barricades: must be at least 3 feet high with two rails 2 feet in length.
- DOT Type III rail barricades: must be at least 5 feet high and have three rails that are at least 3 feet long.
- Concrete or water-filled barricades (manual)
- Automated vehicle barricades
- Manual swinging gate barricades

These devices can be set in place without staffing or staffed (labor and time intensive) by traffic guides or law enforcement personnel (traffic control). In general, un-staffed and removable barricades are not very effective as drivers can circumvent them rather easily. The importance of maintaining intersections flowing traffic will supersede the possibility of using these types of barricades during most evacuations.

1.5 Social Aspects of Wildfire Evacuation

Orderly movement of people is the result of planning, training, education, and awareness, all of which are promoted in San Diego County. Evacuation has been the standard term used for

emergency movement of people and implies imminent or threatening danger. The term in this Wildland Fire Evacuation Plan, and under the "Ready, Set, Go!" concept, indicates that there is a perceived threat to persons and movement out of the area is necessary, but will occur according to a pre-planned and practiced protocol, reducing the potential for panic.

Citizen reactions may vary during an evacuation event, although several studies indicate that orderly movement during wildfire and other emergencies is not typically unmanageable. Evacuation can be made even less problematic through diligent public education and emergency personnel training and familiarity. Social science research literature indicates that reactions to warnings follow certain behavior patterns that are defined by people's perceptions (Aguirre 1994, Drabek 1991, Fitzpatrick and Mileti 1994, Gordon 2006, Collins 2004) and are not unpredictable. In summary, warnings received from credible sources by people who are aware (or have been made aware) of the potential risk, have the effect of an orderly decision process that typically results in successful evacuation. This success is heightened when evacuations are practiced (Quarentelli and Dynes 1977; Lindell and Perry 2004) as will occur within the Safari Highlands Ranch project. Further, in all but the rarest circumstances, evacuees will be receiving information from credible sources during an evacuation. Further, it would be anticipated that law enforcement and/or fire personnel would be on site to help direct traffic and would be viewed by evacuees as knowledgeable and credible. The importance of training these personnel cannot be understated and annual education and training regarding fire safety and evacuation events will be essential for successful future evacuations.

1.5.1 Evacuation of Special Populations

Vogt (1990 and 1991) defines special populations as those groups of people who, because of their special situations or needs, require different planning strategies from those of the general population. Special needs populations include those in institutions or special facilities, those with disabilities in homes, those who need care, children, and others who cannot provide for their own evacuation if necessitated. The special needs population is concentrated in facilities, but is also widespread in terms of facility locations and those who live in residences. Special needs populations in Newland Sierra include the hearing or visually impaired, foreign speaking, visitors passing through the area, temporary visitors such as day workers, and the non-ambulatory confined to residences either temporarily or permanently.

Tourists and temporary visitors may not have knowledge of the area's fire hazard, they may not know how to react in a fire emergency, and they may not understand what they are being told to do. Conversely, this segment of the population would typically be easier to evacuate quickly as they have no possession or pets that they would need to prepare. They can get in their cars and be directed out of the area.

The reasons why special needs populations may fail to respond to warnings to take protective actions is that they may require special transportation while others require different types of warnings or technologies to receive a warning. Some groups must rely on care-givers to hear the warning and respond.

Safari Highlands Ranch Approach:

The Safari Highlands Ranch community will be advised of their need to register as a special needs resident, as applicable, so that accommodations for their transportation or other special requirements can be provided during an emergency evacuation.

1.5.2 Animal Evacuations

Animal evacuations present a host of challenges that may affect the overall successful movement of people and their possessions out of harm's way. For example, livestock owners do not always have the means to load and trailer their livestock out of the area. Further, most wildfire evacuation relief shelters or commercial lodging facilities do not allow people to bring in pets or other animals. Sorensen and Vogt (2006) indicate that an issue receiving increasing attention is what evacuees do with pets or other animals such as livestock when they leave their homes and whether having pets or animals impacts their decision to evacuate.

The Safari Highlands Ranch project will not accommodate livestock of any type on-site, however the trails and trail access points could conceivably include horses during an evacuation notice. Household pets will be a common occurrence.

Safari Highlands Ranch Approach:

- Develop a strong outreach program for pet owners so they understand their responsibilities and that they will not likely be allowed re-entry once evacuated.
- Develop a registration for owners of animals who cannot evacuate them without assistance so that volunteer organizations or individuals, can provide resources.
- Notice horse owners who utilize the Safari Highlands Ranch trailheads of the fire dangers and their responsibility to register with the aviour alert programs and evacuate when given notice.

1.5.3 Re-Entry Procedures

An important component of evacuations that was not executed well during past San Diego County evacuations is that of allowing citizens to re-enter their neighborhoods. Guidance and procedures to ensure a coordinated, safe, and orderly re-entry into impacted communities following an incident is provided in the County of San Diego Re-Entry Protocol.

Re-entry will be initiated by the Incident Commander/Unified Command of the Incident Management Team, with the support of the Director of Emergency Services, the OA EOC Director, and the Operations Section Chief at the OA EOC. In most cases the OA EOC will remain activated until full re-entry is complete. In the event that the OA EOC has been deactivated, the Incident Commander or the Liaison Officer of the Incident Management Team will initiate re-entry procedures.

The Incident Commander will designate a Re-Entry Coordinator and the Operations Section Chief of the OA EOC will coordinate with and support the re-entry coordinator. The Re-Entry Coordinator is responsible for coordinating the re-entry procedures with all involved agencies and ensuring effective communication. Priorities for re-entry include:

The impacted areas must be thoroughly investigated to ensure it is safe for residents to return and normal operations have been restored. This assessment will include verification that:

The public will be notified of the re-entry status through the notification measures previously mentioned in this annex, including SDCountyEmergency.com, SDEmergency App for smart phones, emergency broadcast radio, television, press releases, informational phone lines such as 2-1-1, community briefings, and informational updates at shelters.

Once evacuees are permitted to return, it is important that procedures are established to properly identify residents and critical support personnel, as well as ensure the legitimacy of contractors, insurance adjustors, and other personnel. Re-entry points should be staffed by law enforcement personnel.

1.6 LIMITATIONS

During extreme fire weather conditions, there are no guarantees that a given structure will not burn or that evacuations will be successful all of the time. Wildfires may occur in the area that could damage property or harm persons. However, successful implementation of the recommendations outlined in this Evacuation Plan will provide for an informed populace, pre-planned and practiced fire and law enforcement personnel, and informed evacuation officials. The Newland Sierra community is designed specifically to be resistant to wildfire ignition and perform as a fire adapted project, offering fire and law officials additional options for resident safety than are available from less defensible communities.

This Wildland Fire Evacuation Plan does not provide a guarantee that all persons will be safe at all times because of the recommendations proposed. There are many variables that may influence overall safety. This Plan provides a summary for implementation of standard evacuation protocols, suggested roadway enhancements, and public outreach, which should result in reduced wildfire related risk and hazard. Even then, fire can compromise the procedures through various, unpredictable ways. The goal is to reduce the likelihood that the

system is compromised through implementation of the elements of this Plan and regular occurring program maintenance and updates.

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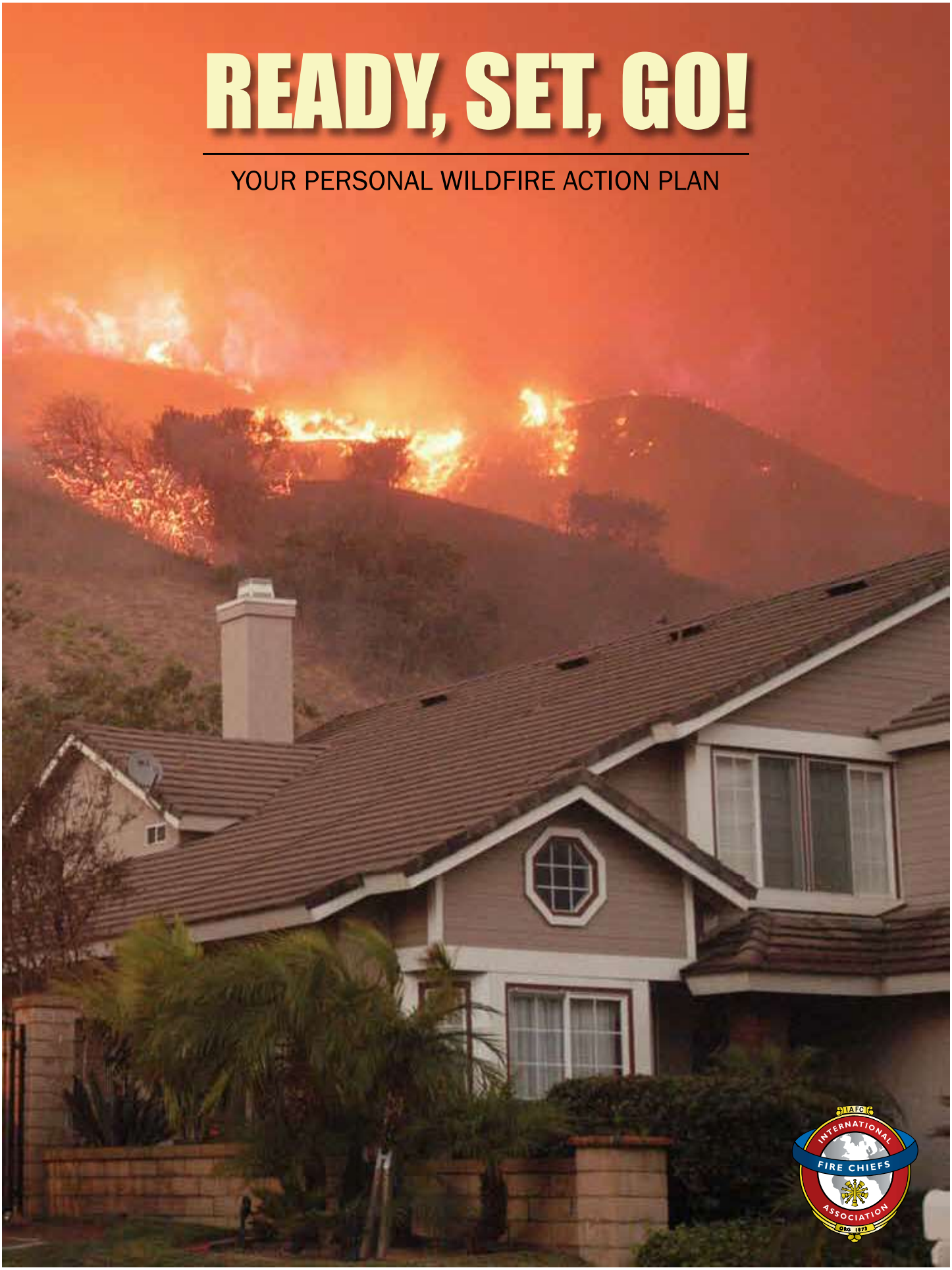
APPENDIX H

Ready, Set, Go! Wildfire Action Plan

READY, SET, GO!

YOUR PERSONAL WILDFIRE ACTION PLAN



READY, SET, GO!

Wildfire Action Plan

Saving Lives and Property
through Advance Planning

The fire season is now a year-round reality in many areas, requiring firefighters and residents to be on heightened alert for the threat of wildfire throughout the year.

Each year, wildfires consume hundreds of homes in the Wildland/ Urban Interface (WUI). Studies show that as many as 80 percent of the homes lost to wildfires could have been saved if their owners had only followed a few simple fire-safe practices. In addition, wildfire-related deaths occur because people wait too late to leave their home.

Your fire department takes every precaution to help protect you and your property from wildfire. However, the reality is that in a major wildfire, there will simply not be enough fire engines or firefighters to defend every home.

Successfully preparing for a wildfire requires **you** to take personal responsibility for protecting yourself, your family and your property. In this publication, we hope to give you the tips and tools you need to prepare and be successful.

Fire is, and always has been, a natural occurance in the wildland. Our brush-covered hills, canyons and forests burned periodically long before we built homes there. Wildfires, fueled by a build-up of dry vegetation and driven by seasonal hot, dry winds, are extremely dangerous and impossible to control. However, many residents have built their homes and landscaped without fully understanding the impact a fire could have on them, and few have adequately prepared their families for a quick evacuation.

It's not a question of **if** but **when** the next major wildfire will occur. That's why the most important person in protecting your life and property is not the firefighter, but you. Through advance planning and preparation, we can all be ready for wildfire. We hope you find the tips in the next pages helpful in creating heightened awareness and a more fire-safe environment for you and your family.

INSIDE

This publication was prepared with the assistance of the Ventura County Fire Department and the Orange County Fire Authority in cooperation with the International Association of Fire Chiefs. Special thanks to the Institute for Business and Home Safety, University of Nevada Cooperative Extension "Living with Fire" program, CAL FIRE, FireSafe Council, Firewise Communities and many other organizations for their contributions to content.

Living in the Wildland Urban Interface and the Ember Zone

Ready, Set, Go! begins with a house that firefighters can defend.

Defensible space works!

If you live next to a natural area, the Wildland Urban Interface, you must provide firefighters with the defensible space they need to protect your home. The buffer zone you create by removing weeds, brush and other vegetation helps to keep the fire away from your home and reduces the risks from flying embers.

A home within one mile of a natural area is in the Ember Zone. Wind-driven embers can attack your home. You and your home must be prepared well before a fire occurs. Ember fires can destroy homes or neighborhoods far from the actual flame front of the wildfire.

What is Defensible Space?

Defensible space is the required space between a structure and the wildland area that, under normal conditions, creates a sufficient buffer to slow or halt the spread of wildfire to a structure. It protects the home from igniting due to direct flame or radiant heat. Defensible space is essential for structure survivability during wildfire conditions.

ZONE ONE

Zone One extends 30 feet out from buildings, structures, decks, etc.

- Remove all dead or dying vegetation.
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from structures and other trees.
- Remove leaf litter (dry leaves/pine needles) from yard, roof and rain gutters.
- Relocate woodpiles or other combustible materials into Zone Two.
- Remove combustible material and vegetation from around and under decks.
- Remove or prune vegetation near windows.
- Remove “ladder fuels” (low-level vegetation that allows the fire to spread from the ground to the tree canopy). Create a separation between low-level vegetation and tree branches. This can be done by reducing the height of low-level vegetation and/or trimming low tree branches.

ZONE TWO

Zone Two extends 30 to 100 feet out from buildings, structures and decks. You can minimize the chance of fire jumping from plant to plant by removing dead material and removing and/or thinning vegetation. The minimum spacing between vegetation is three times the dimension of the plant.

- Remove “ladder fuels.”
- Cut or mow annual grass down to a maximum height of 4 inches.
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from other trees.

What is a Hardened Home?

Construction materials and the quality of the defensible space surrounding it are what gives a home the best chance to survive a wildfire. Embers from a wildfire will find the weak link in your home's fire protection scheme and gain the upper hand because of a small, overlooked or seemingly inconsequential factor. However, there are measures you can take to safeguard your home from wildfire. While you may not be able to accomplish all the measures listed below, each will increase your home's, and possibly your family's, safety and survival during a wildfire.

ROOFS

Roofs are the most vulnerable surface where embers land because they can lodge and start a fire. Roof valleys, open ends of barrel tiles and rain gutters are all points of entry.

EAVES

Embers can gather under open eaves and ignite exposed wood or other combustible material.

VENTS

Embers can enter the attic or other concealed spaces and ignite combustible materials. Vents in eaves and cornices are particularly vulnerable, as are any unscreened vents.

WALLS

Combustible siding or other combustible or overlapping materials provide surfaces or crevices for embers to nestle and ignite.

WINDOWS and DOORS

Embers can enter gaps in doors, including garage doors. Plants or combustible storage near windows can be ignited from embers and generate heat that can break windows and/or melt combustible frames.

BALCONIES and DECKS

Embers can collect in or on combustible surfaces or the undersides of decks and balconies, ignite the material and enter the home through walls or windows.

To harden your home even further, consider protecting your homes with a residential fire sprinkler system. In addition to extinguishing a fire started by an ember that enters your home, it also protects you and your family year-round from any fire that may start in your home.

Tour a Wildfire Ready Home

Home Site and Yard: Ensure you have at least a 100-foot radius of defensible space (cleared vegetation) around your home. Note that even more clearance may be needed for homes in severe hazard areas. This means looking past what you own to determine the impact a common slope or neighbors' yard will have on your property during a wildfire.

Cut dry weeds and grass before noon when temperatures are cooler to reduce the chance of sparking a fire.

Landscape with fire-resistant plants that have a high moisture content and are low-growing.

Keep woodpiles, propane tanks and combustible materials away from your home and other structures such as garages, barns and sheds.

Ensure that trees are far away from power lines.

Roof: Your roof is the most vulnerable part of your home because it can easily catch fire from wind-blown embers. Homes with wood-shake or shingle roofs are at high risk of being destroyed during a wildfire.

Build your roof or re-roof with fire-resistant materials such as composition, metal or tile. Block any spaces between roof decking and covering to prevent ember intrusion.

Clear pine needles, leaves and other debris from your roof and gutters.

Cut any tree branches within ten feet of your roof.

Vents: Vents on homes are particularly vulnerable to flying embers.

All vent openings should be covered with 1/8-inch or smaller metal mesh. Do not use fiberglass or plastic mesh because they can melt and burn.

Attic vents in eaves or cornices should be baffled or otherwise protected to prevent ember intrusion (mesh is not enough).

Windows: Heat from a wildfire can cause windows to break even before the home ignites. This allows burning embers to enter and start internal fires. Single-paned and large windows are particularly vulnerable.

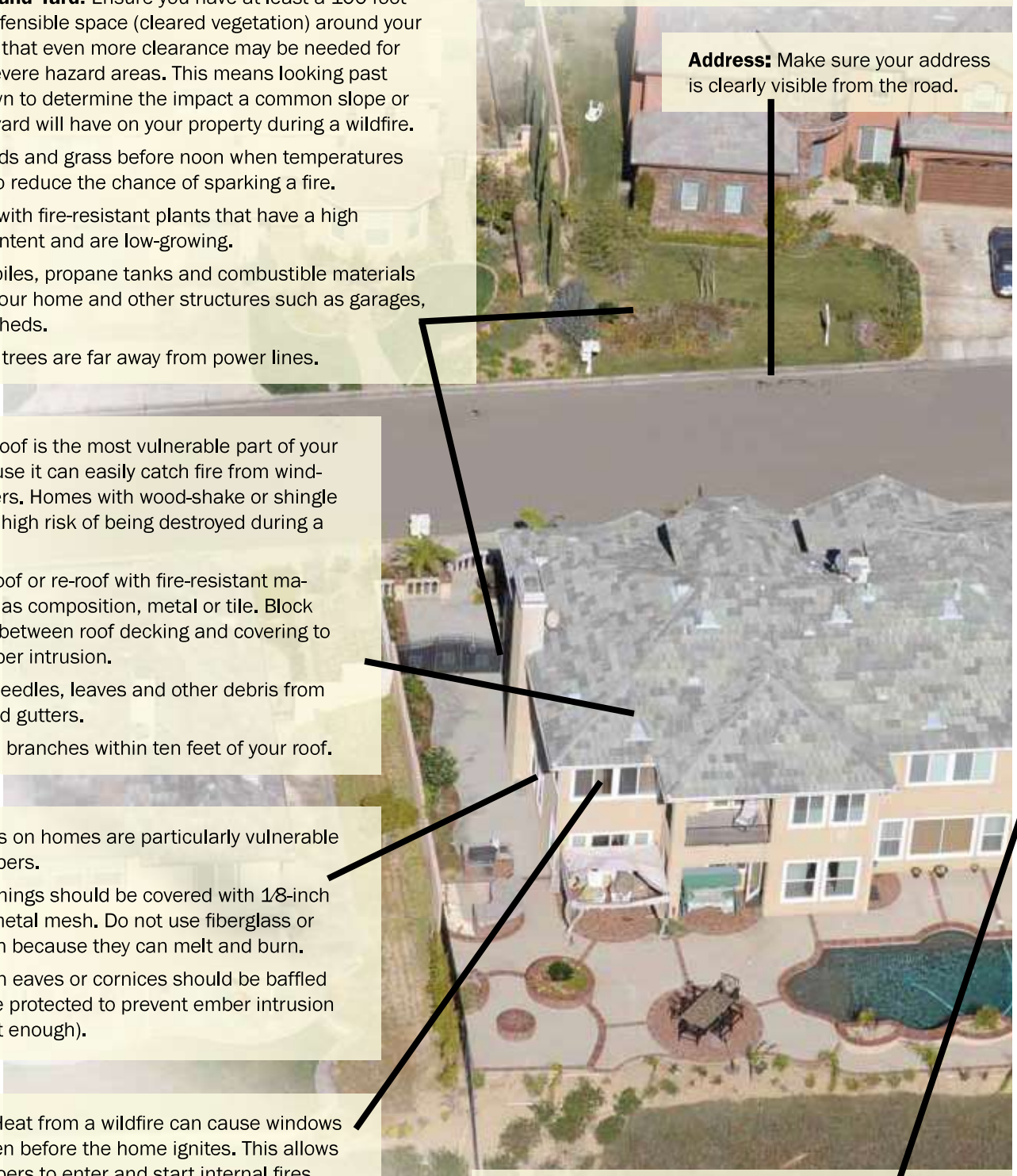
Install dual-paned windows with the exterior pane of tempered glass to reduce the chance of breakage in a fire.

Limit the size and number of windows in your home that face large areas of vegetation.

Inside: Keep working fire extinguishers on hand.

Install smoke alarms on each level of your home and near bedrooms. Test them monthly and change the batteries twice a year.

Address: Make sure your address is clearly visible from the road.



Walls: Wood products, such as boards, panels or shingles, are common siding materials. However, they are combustible and not good choices for fire-prone areas.

Build or remodel with fire-resistant building materials, such as brick, cement, masonry or stucco.

Be sure to extend materials from foundation to roof.

Garage: Have a fire extinguisher and tools such as a shovel, rake, bucket and hoe available for fire emergencies.

Install a solid door with self-closing hinges between living areas and the garage. Install weather stripping around and under door to prevent ember intrusion.

Store all combustibles and flammable liquids away from ignition sources.

Driveways and Access Roads: Driveways should be designed to allow fire and emergency vehicles and equipment to reach your house.

Access roads should have a minimum 10-foot clearance on either side of the traveled section of the roadway and should allow for two-way traffic.

Ensure that all gates open inward and are wide enough to accommodate emergency equipment.

Trim trees and shrubs overhanging the road to a minimum of 13 1⁄2 feet to allow emergency vehicles to pass.

Non-Combustible Fencing: Make sure to use non-combustible fencing to protect your home during a wildfire.

Non-Combustible Boxed In Eaves: Box in eaves with non-combustible materials to prevent accumulation of embers.

Raingutters: Screen or enclose rain gutters to prevent accumulation of plant debris.

Water Supply: Have multiple garden hoses that are long enough to reach any area of your home and other structures on your property.

If you have a pool or well, consider a pump.

Deck/Patio Cover: Use heavy timber or non-flammable construction material for decks.

Enclose the underside of balconies and decks with fire-resistant materials to prevent embers from blowing underneath.

Keep your deck clear of combustible items, such as baskets, dried flower arrangements and other debris.

The decking surface must be ignition resistant if it's within 10 feet of the home.

Chimney: Cover your chimney and stovepipe outlets with a non-flammable screen of 1⁄4-inch wire mesh or smaller to prevent embers from escaping and igniting a fire.

Make sure that your chimney is at least 10 feet away from any tree branches.

READY, SET, GO!

Create Your Own Wildfire Action Plan

Now that you've done everything you can to protect your house, it's time to prepare your family. Your **Wildfire Action Plan** must be prepared with all members of your household well in advance of a fire.

Use these checklists to help you prepare your Wildfire Action Plan. Each family's plan will be different, depending on their situation.

Once you finish your plan, rehearse it regularly with your family and keep it in a safe and accessible place for quick implementation.

GET READY

Prepare Your Family

- ☐ Create a **Family Disaster Plan** that includes meeting locations and communication plans and rehearse it regularly. Include in your plan the evacuation of large animals such as horses.
- ☐ Have fire extinguishers on hand and train your family how to use them.
- ☐ Ensure that your family knows where your gas, electric and water main shut-off controls are and how to use them.
- ☐ Plan several different evacuation routes.
- ☐ Designate an emergency meeting location outside the fire hazard area.
- ☐ Assemble an emergency supply kit as recommended by the American Red Cross.
- ☐ Appoint an out-of-area friend or relative as a point of contact so you can communicate with family members who have relocated.
- ☐ Maintain a list of emergency contact numbers posted near your phone and in your emergency supply kit.
- ☐ Keep an extra emergency supply kit in your car in case you can't get to your home because of fire.
- ☐ Have a portable radio or scanner so you can stay updated on the fire.

GET SET | As the Fire Approaches

- ☐ Evacuate as soon as you are set!
- ☐ Alert family and neighbors.
- ☐ Dress in appropriate clothing (i.e., clothing made from natural fibers, such as cotton, and work boots). Have goggles and a dry bandana or particle mask handy.
- ☐ Ensure that you have your emergency supply kit on hand that includes all necessary items, such as a battery powered radio, spare batteries, emergency contact numbers, and ample drinking water.
- ☐ Stay tuned to your TV or local radio stations for updates, or check the fire department Web site.
- ☐ Remain close to your house, drink plenty of water and keep an eye on your family and pets until you are ready to leave.

INSIDE CHECKLIST

- ☐ Shut all windows and doors, leaving them unlocked.
- ☐ Remove flammable window shades and curtains and close metal shutters.
- ☐ Remove lightweight curtains.
- ☐ Move flammable furniture to the center of the room, away from windows and doors.
- ☐ Shut off gas at the meter. Turn off pilot lights.
- ☐ Leave your lights on so firefighters can see your house under smoky conditions.
- ☐ Shut off the air conditioning.

OUTSIDE CHECKLIST

- ☐ Gather up flammable items from the exterior of the house and bring them inside (e.g., patio furniture, children's toys, door mats, etc.) or place them in your pool.
- ☐ Turn off propane tanks.
- ☐ Don't leave sprinklers on or water running - they can waste critical water pressure.
- ☐ Leave exterior lights on.
- ☐ Back your car into the driveway. Shut doors and roll up windows.
- ☐ Have a ladder available.
- ☐ Patrol your property and extinguish all small fires until you leave.
- ☐ Seal attic and ground vents with pre-cut plywood or commercial seals if time permits.

IF YOU ARE TRAPPED: SURVIVAL TIPS

- ☐ Shelter away from outside walls.
- ☐ Bring garden hoses inside house so embers don't destroy them.
- ☐ Patrol inside your home for spot fires and extinguish them.
- ☐ Wear long sleeves and long pants made of natural fibers such as cotton.
- ☐ Stay hydrated.
- ☐ Ensure you can exit the home if it catches fire (remember if it's hot inside the house, it is four to five times hotter outside).
- ☐ Fill sinks and tubs for an emergency water supply.
- ☐ Place wet towels under doors to keep smoke and embers out.
- ☐ After the fire has passed, check your roof and extinguish any fires, sparks or embers.
- ☐ Check inside the attic for hidden embers.
- ☐ Patrol your property and extinguish small fires.
- ☐ If there are fires that you can not extinguish with a small amount of water or in a short period of time, call 9-1-1.

Go! | *Early!*

By leaving early, you give your family the best chance of surviving a wildfire. You also help firefighters by keeping roads clear of congestion, enabling them to move more freely and do their job.

WHEN TO LEAVE

Leave early enough to avoid being caught in fire, smoke or road congestion. Don't wait to be told by authorities to leave. In an intense wildfire, they may not have time to knock on every door. If you are advised to leave, don't hesitate!

WHERE TO GO

Leave to a predetermined location (it should be a low-risk area, such as a well-prepared neighbor or relative's house, a Red Cross shelter or evacuation center, motel, etc.)

HOW TO GET THERE

Have several travel routes in case one route is blocked by the fire or by emergency vehicles and equipment. Choose an escape route away from the fire.

WHAT TO TAKE

Take your emergency supply kit containing your family and pet's necessary items.

EMERGENCY SUPPLIES

The American Red Cross recommends every family have an emergency supply kit assembled long before a wildfire or other emergency occurs. Use the checklist below to help assemble yours. For more information on emergency supplies, visit the American Red Cross Web site at www.redcross.org.

- ☐ Three-day supply of water (one gallon per person per day).
- ☐ Non-perishable food for all family members and pets (three-day supply).
- ☐ First aid kit.
- ☐ Flashlight, battery-powered radio, and extra batteries.
- ☐ An extra set of car keys, credit cards, cash or traveler's checks.
- ☐ Sanitation supplies.
- ☐ Extra eyeglasses or contact lenses.
- ☐ Important family documents and contact numbers.
- ☐ Map marked with evacuation routes.
- ☐ Prescriptions or special medications.
- ☐ Family photos and other irreplaceable items.
- ☐ Easily carried valuables.
- ☐ Personal computers (information on hard drives and disks).
- ☐ Chargers for cell phones, laptops, etc.

Note: Keep a pair of old shoes and a flashlight handy in case of a sudden evacuation at night.

Write up your Wildfire Action Plan and post it in a location where every member of your family can see it. Rehearse it with your family.

My Personal Wildfire Action Plan

During High Fire Danger days in your area, monitor your local media for information on brush fires and be ready to implement your plan. Hot, dry and windy conditions create the perfect environment for a wildfire.

Important Phone Numbers:

Out-of-State Contact: _____ Phone: _____

Work: _____ _____ _____

School: _____ _____ _____

Other: _____ _____ _____

Evacuation Routes: _____

_____

_____

Where to go: _____

_____

Location of Emergency Supply Kit: _____

_____

Notes: _____

_____

_____

International Association of Fire Chiefs
4025 Fair Ridge Dr.
Fairfax, VA 22033
(703) 273-0911
www.iafc.org/ReadySetGo

READY, SET, GO!

Residential Safety Checklist
Tips To Improve Family and Property Survival During A Wildfire

Home	Yes	No
1. Does your home have a metal, composition, or tile (or other non-combustible) roof with capped ends and covered fascia?	☐	☐
2. Are the rain gutters and roof free of leaves, needles and branches?	☐	☐
3. Are all vent openings screened with 1/8 inch (or smaller) mesh metal screen?	☐	☐
4. Are approved spark arrestors on chimneys?	☐	☐
5. Does the house have non-combustible siding material?	☐	☐
6. Are the eaves "boxed in" and the decks enclosed?	☐	☐
7. Are the windows made of at least double-paned or tempered glass?	☐	☐
8. Are the decks, porches and other similar areas made of non-combustible material and free of easily combustible material (e.g. plastic furniture)?	☐	☐
9. Is all firewood at least 30 feet from the house?	☐	☐

Defensible Space	Yes	No
1. Is dead vegetation cleared to the recommended defensible space area? (Consider adding distance due to slope of property.)	☐	☐
2. Is there separation between shrubs?	☐	☐
3. Are ladder fuels removed?	☐	☐
4. Is there a clean and green area extending at least 30 feet from the house?	☐	☐
5. Is there a non-combustible area within five feet of the house?	☐	☐
6. Is there separation between trees and crowns?	☐	☐

Emergency Access	Yes	No
1. Is the home address visible from the street?	☐	☐
2. Is the home address made of fire-resistant materials?	☐	☐
3. Are street signs present at every intersection leading to the house?	☐	☐
4. Are street signs made of fire-resistant materials?	☐	☐
5. Is flammable vegetation within 10 feet of the driveway cleared and are overhanging obstructions removed?	☐	☐
6. If a long driveway is present, does it have a suitable turnaround area?	☐	☐