CAMPUS PARK WEST PROJECT

APPENDIX K

FIRE PROTECTION PLAN

SPA05-001, GPA05-003, REZ05-005,
TM 5424, LOG NO. 05-02-009

for the

DRAFT SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

August 2013

Fire Protection Plan

Campus Park West

(APN's 108-121-14, 125-061-01, 125-063-01, 125-063-07, and 125-063-08)

North County Fire Protection District

(GPA 05-003, SPA 05-001, REZ 05-005, TM 5424, ER 05-02-009)

May 20, 2010, Revised April 27, 2013

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CAMPUS PARK WEST FIRE PROTECTION PLAN
TRACT 5424
May 20, 2010, Revised April 27, 2013

EXECUTIVE SUMMARY

This Fire Protection Plan (FPP) has been prepared for the Campus Park West project, County of San Diego located in the unincorporated community of Fallbrook. The FPP identifies and prioritizes the measures necessary to adequately mitigate those impacts. The FPP has considered the property location, topography, geology, combustible vegetation (fuel types), climatic conditions and fire history. It considers water supply, access, structure ignitability and fire resistive building materials, fire protection systems and equipment, impacts to existing emergency services, defensible space and vegetation management.

The project was analyzed to identify potential adverse effects to the Campus Park West project that could result from a wildland fire that occurs on or adjacent to the project. The evaluation determined that the North County Fire Protection District (NCFPD) as the fire service provider although the property is not at this time with the District. Response travel times and the proximity of the development to the Wildland Urban Interface (WUI), in a High Fire Hazard Severity Zone require that fire sprinklers be installed in all residential structures.

This project complies with applicable fire regulations, including the California Fire Code, San Diego County Consolidated Fire Code, and the fire requirements of the NCFPD. The comprehensive FPP and the project are consistent with the San Diego County Planning and Development Services (PDS) recommendations including fuel modification.

Project Description. The Campus Park West project consists of the development of 23 lots which will include a mixture of uses including light industrial, commercial and multi-family dwelling units. The types of industrial and commercial occupancies have not been determined. The NCFPD and the PDS require a FPP that meets the requirements of County of San Diego Fire Code and Article 86, Section 8601 of the California Fire code.

On-site Vegetation. The Campus Park West project has three (3) distinct on-site areas: the Southern Riparian Forest, Adjacent Coastal Sage Scrub/Grasslands and the Development Area. The Southern Riparian Forest, representative of over 10% of the project site, has the greatest variety of vegetation and flammable vegetation that is to be preserved as Open Space. This vegetation is located along an intermittent unnamed stream and is characterized for fire planning purposes as a Fuel Model TL9 – Very High Load Broadleaf Litter combined equally with SCAL-18 – Sage/Buckwheat on its perimeter. This is the heaviest vegetation found within the project. The Coastal Sage Scrub/Grasslands represents the smaller area that will remain following grading and is located primarily in the northern portion of the project. The Development Area, representing approximately 80% of the project site, will have little or no flammable vegetation remaining following planned grading. A small area of Eucalyptus Woodland will be removed through grading. The Open Space Area to the south, representative of the remaining 8% of the project site, has a continuous fuel bed of natural and

native vegetation to carry a wildland fire. A Combined Fuel Model of SCAL-18 Sage/Buckwheat and GR4 – Moderate Load Dry Climate Grass is representative of this area and will be used for fire protection planning purposes.

Off-site Vegetation. Off-site undeveloped land located to the east and south of the Campus Park West southern perimeter is a continuation of Fuel Model SCAL18 – Sage/Buckwheat and GR4 – Moderate Load Dry Climate Grass. These fuels are typically 18 inches in height. A portion of the adjacent properties located south of Highway 76 today are planted and maintained groves. Firewise 2000, Inc. assumed a worst case in that these groves would at some point in the future be lost and replaced by native and nonnative species. A small area of Sage/Buckwheat will exist west of the project in the right-of-way for Interstate 15.

Fire History. Data from the California Fire Alliance Fire Planning and Mapping Tools was used to determine the fire history of wildland fire in the vicinity of the Campus Park West project. Several large fires of over 100 acres have occurred on or near the project. The Campus Park West project is located within a San Diego County PDS Transitional Climate Zone. The vegetation within the Campus Park West project is consistent with the Climate Zone.

Defensible Space and Vegetation Management. In addition this FPP lists fuel modification requirements to mitigate the exposure of people or structures from a significant risk of loss, injury or death from wildland fires. Zone 1 will be an irrigated landscaped zone and is commonly called the defensible space zone for fire suppression forces and protects structures from radiant and convective heat. This landscaped zone is permanently irrigated and consists of fire resistant and maintained plantings. Zone 2 is the area beyond Zone 1, including manufactured slopes and excludes all prohibited highly combustible native vegetation, but permits plantings with very specific criteria. The owners will be responsible to the North County Fire Protection District Fire Marshal for the annual completion of all designated Fuel Modification Treatments prior to June 15th or when fuels become cured.

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CAMPUS PARK WEST FIRE PROTECTION PLAN, TRACT 5424

Unincorporated Community of
Fallbrook, California
May 20, 2010, Revised April 27, 2013

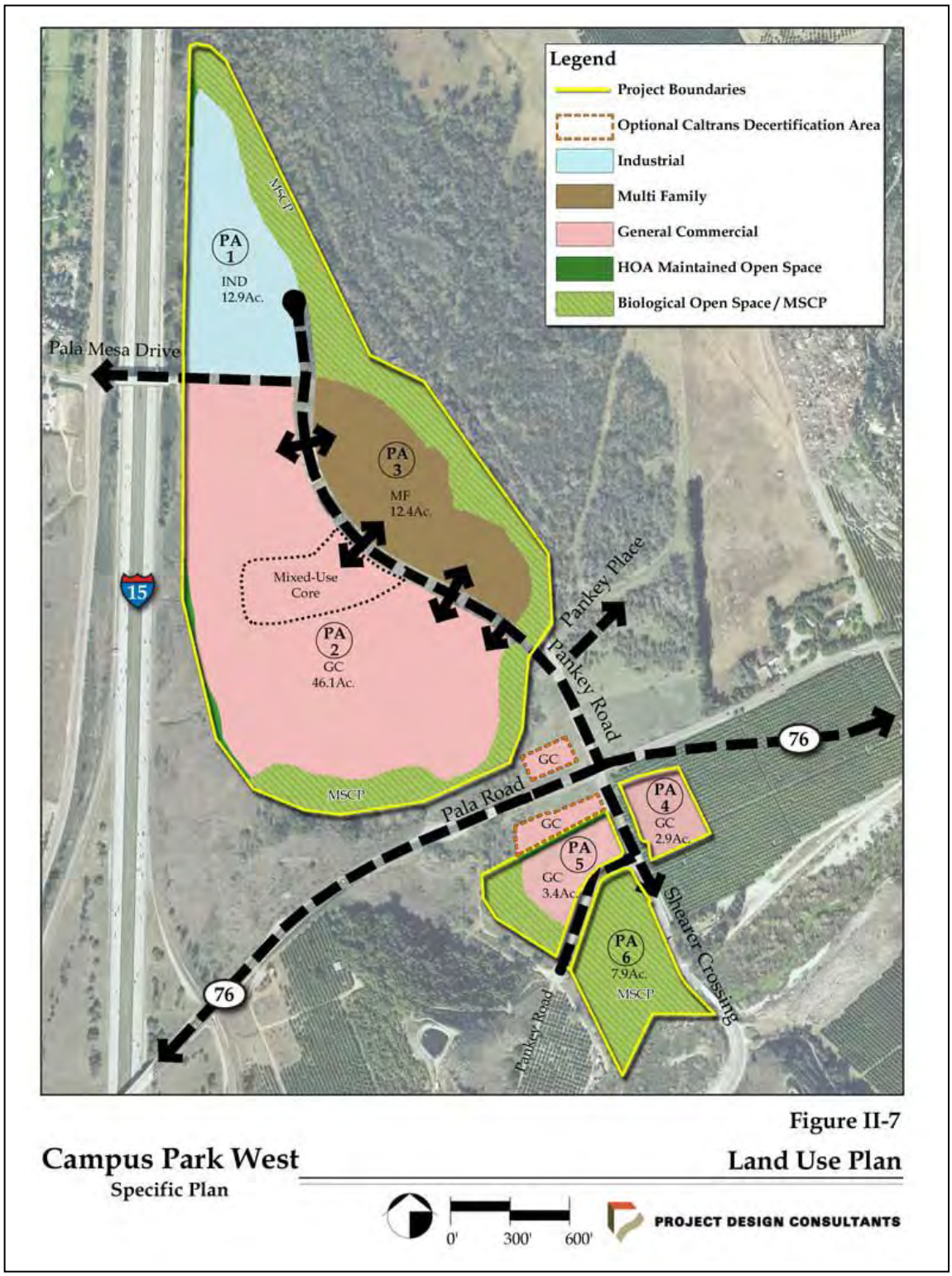
INTRODUCTION

This Fire Protection Plan (FPP) has been prepared for the proposed Campus Park West Project (TM 5424) located east of Interstate 15 and north and south of SR 76 in an unincorporated portion of the County of San Diego. The purpose of this FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate geology, combustible vegetation (fuel types), climatic conditions and fire history. The plan addresses water supply, access (including secondary and/or emergency access where applicable), structural ignitability and fire resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management. The plan identifies and prioritizes areas for hazard fuel reduction treatments and recommends the types and methods of treatment that will protect one or more-at-risk homes and essential infrastructures. The plan recommends measures that property owners will need to take to reduce the probability of ignition of structures throughout the area addressed by the plan. Appendix material shall be considered a part of this FPP.

CHAPTER 1: PROJECT LOCATION, DESCRIPTION AND ENVIRONMENTAL SETTING

1.1 Project Location

The project site is located within the community of Fallbrook, an unincorporated area of northern San Diego County, California (see Figure No. 1). The site is located north of the City of Escondido and immediately east of the I-15 freeway on both sides of Highway 76 or Pala Road. The Figure shows the general project design including the various uses, location of nearby roadways and existing development.



↑ **Figure 1 – Aerial View of the Land Use Map For The Campus Park West Project Provided By Project Design Consultants. Map Provided by Project Design Consultants.**

1.2 Project Description

The project also described as Tract 5424 consists of the development of approximately 91.2 acres of the 116.5 acre site. This includes the creation of 23 lots consisting of the following uses:

Classification	Number of Lots
Light Industrial	4
Multi-Family Residential	4
General Commercial (with a mixed-use core)	8
H.O.A.	3
Open Space	4

A maximum of 283 dwelling units will be permitted (248 within the multi-family area and 35 within the mixed-use core). Buildings would be no more than 35 feet in height above grade, unless otherwise approved by NCFPD. Architectural projections may extend above 35 foot height requirement, subject to NCFPD review and approval. Currently, NCFPD cannot ladder three story buildings. Therefore, unless NCFPD acquires upgraded facilities/equipment or otherwise determines greater heights may be safely allowed, residential structures with pitched roofs are limited to a top of fascia height of 24 feet and a topmost ridgeline of 35 feet and non-residential buildings with flat roofs over 24 feet will require an exterior ladder at that point in order to reach the roof. All designated open space lots are to be protected from development and fuel modification treatments. Several planned storm water detention basins are planned on the perimeter and within the development. These open to sky basins will have the capability of growing vegetation which could pose a fire hazard if not fuel treated on a regular basis. Future plans may call for covering or building underground basins which would eliminate the need for fuel treatment.

The Lot Area Table for the Campus Park West project follows:

Table 1
Lot Area Table

Light Industrial

Lot Number	Gross Area (Acres)	Net Area (Acres)
1	3.24	2.83
2	3.09	2.56
3	3.09	2.94
4	3.13	2.80
Subtotal	**12.55**	**11.13**

Multi-Family Residential

Lot Number	Gross Area (Acres)	Net Area (Acres)		Lot Number	Gross Area (Acres)	Net Area (Acres)
11	2.08	2.02		5	4.55	3.55
12	4.18	4.12		6	6.29	5.72
13	4.13	4.10		7	9.30	9.28
14	1.98	1.95		8	11.15	11.14
				9	9.10	9.09
				10	5.74	5.73
				15	2.87	2.76
				16	3.39	3.35
Subtotal	**12.37**	**12.19**		**Subtotal**	**52.39**	**50.62**

Commercial

H.O.A.

Lot Number	Gross Area (Acres)	Net Area (Acres)		Lot Number	Gross Area (Acres)	Net Area (Acres)
17	0.33	0.33		20	15.18	15.18
18	0.90	0.90		21	5.77	5.77
19	0.19	0.19		22	2.02	2.02
				23	7.98	7.98
Subtotal	**1.42**	**1.42**		**Subtotal**	**30.95**	**30.95**

Open Space

General Plan Land Use Designations

The Campus Park West project site is within the jurisdiction of the North County Fire Protection District (NCFPD). The NCFPD and the San Diego County Planning and Development Services (PDS) require a Fire Protection Plan (FPP) that meets the requirements of County of San Diego Fire Code and Article 86, Section 8601 of the California Fire code. The FPP is to be submitted and approved by the NCFPD Fire Marshal, PDS, and County of San Diego. The FPP shall be consistent with County of San Diego "Guidelines for Determining Significance and Report Format and Content Requirements" – Wildland Fire and Fire Protection – Land Use Environmental Group."

Photos of the project site follow which illustrate recent wildfire activity, existing roads, riparian issues, vegetation and related issue

↑ **Photo 2: North View Along I-15. The 2007 Rice Fire Burned The Trees Along The Highway To The Right. Vegetation Within The Drainage To The Right Consists Of Mulefat Shrubs, Oaks, Cottonwood and Willow Trees. Large Amounts of Giant Reed Are Present In Burned Areas and Lesser Amounts Where There Is A Dense Tree Canopy.**

↑ **Photo 3: East View From The South Side Of Open Space Lot 48. Note The Heavy Vegetation On The Left Side Of The Photo. This Southern Riparian Forest Transitions To A Combination Of Sage/Buckwheat and Grass Vegetation To The Right Due To Lack Of Moisture.**

↑ **Photo 4: View Of The Riparian Area That Burned During The 2007 Rice Fire. The Bamboo Looking Plants Are Called Giant Reed or <u>Arundo</u> <u>Donax</u>. When These Plants Get Older, They Accumulate Large Amounts Of Dead Material Which Poses A Fire Hazard. The Willow And Cottonwood Trees Will Recover From The Recent Fire.**

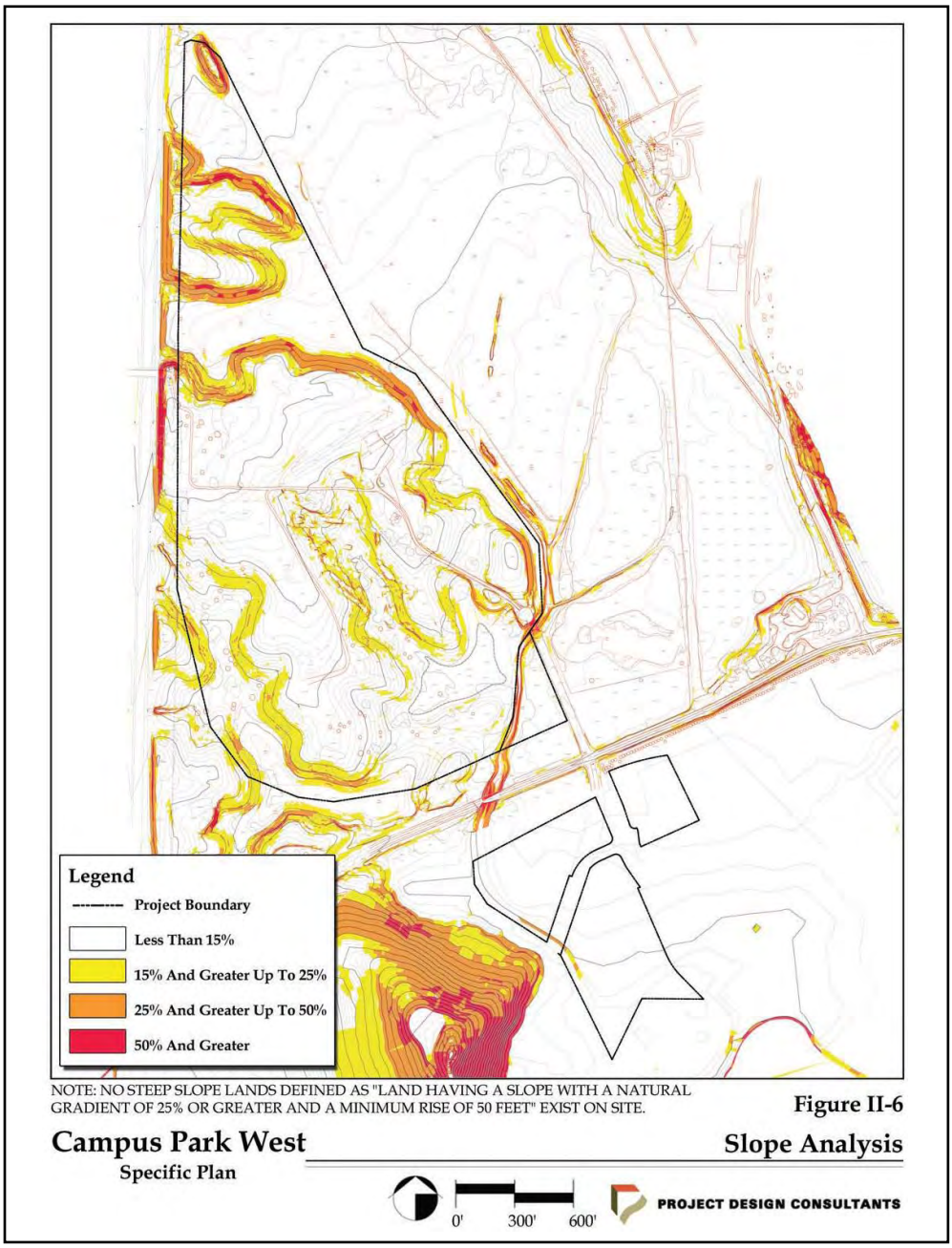
↑ **Photo 5: North View From Pankey Road In Planning Area 6. The Area In The Foreground Is To Be Designated As Open Space. A Paved All Weather Roadway Can Be Seen Next To The Grove Of Trees. This Grove Is Not A Part Of The Project.**

↑ **Photo 6: View Of Streambed Vegetation in PA-6 Taken From Pankey Road At The Southern End Of Open Space Lot 23. Surface Water Was Present Beneath The Vegetation. The Photo Was Taken In June, 2008.**

↑ **Photo 7: The View Is Toward The East. An Existing Bridge For Pala Mesa Drive That Will Connect Old Highway 395 To Pankey Road. This Roadway Will Provide Access From The West Across Interstate I-15.**

1.3 Environmental Setting.

The Campus Park West development is located within an interior Transitional Climate Zone approximately 14 miles inland from the Pacific Ocean. It is located immediately east of I-15 on both sides of Pala Road or SR 76. The existing land use on the site consists of a small orchard of avocados and citrus, a model plane airport site and undeveloped land. Native vegetation on the project site per the project biological report ranges from a small area of Southern Riparian Scrub to a disturbed area of Coastal Sage Scrub adjacent to an intermittent streambed.



↑ **Map 1 – Slope Analysis Provided By Project Design Consultants. Except For Along The Intermittent Stream, Slopes Are Generally Less Than 15%.**

1.3.1 Topography and Roads. The topography of the project site consists of rolling terrain generally characterized by slopes from < 15% as shown in Map 1. The lack of steep uphill slopes will reduce fire impacts. All wildfire exposure aspects of north, east, south and west are found within the project. Elevation ranges from 254+/- feet to 324 +/- feet above mean sea level.

In general terms the rolling terrain is dominated by non-native grasslands, an intermittent streambed, and maintained orchards. The adjoining lands are similar in topography with the exception of an area west of PA-5, Lot 22 where uphill slopes exceed 50%. The designated open space easement lots will retain natural vegetation and thus future structures built within these lots will need to be setback from the Multiple Species Conservation Program (MSCP) lands.

Currently, the project site is accessed by two (2) roadways; Pankey Road, a paved roadway leading to the north and south off of SR 76 and Pala Mesa Drive which is accessed via an existing bridge over Interstate 15 from the west. Pala Mesa Drive will be further developed and will connect to Pankey Road. None of the roads exceed a 15 percent grade.

1.3.2 On-site Vegetation. The selection of the on-site vegetation type is based upon field surveys done by the wildland fire consultant, review of the vegetation cover types prepared by R.E.C. Consultants and the likely climax plant community that would be found without human intervention.

It is the consultant's finding that the property has three (3) distinct areas that need to be addressed.

Located along the eastern side of the planning areas north of Pala Road and west of PA-5 south of Pala Road is Southern Riparian Forest (see Photos No. 3, 4, & 6). The dominant vegetation consists of Willow and Cottonwood trees with areas of Giant Reed. Associated species include Flat Top Buckwheat and native and non-native grasses. A combined Fuel Model (FM) consisting of FM TL9 – Very High Load Broadleaf Litter (50%) and SC18 - Sage/Buckwheat (50%), best describes the area for fire planning purposes.

In the northernmost portion of the project is an area of Coastal Sage Scrub, a portion of which will remain following development. Along the Southern Riparian Forest as seen in Photo 3, there is a transition area to shrubs mixed with grass and then nearly all grass. This transitional zone is a wildland fire concern as not only are the species more flammable but also the slopes on which they exist are in alignment with strong winds from the north and east. A combined FM consisting of SCAL18 – Sage/Buckwheat (50%) and GR4 – Moderate Load Dry Climate Grass (50%) best describes this area.

Last, is the area planned for development; it consists of large areas that will be graded for construction. Currently, a portion of PA-4 contains tree groves

(see Photo 5) that are irrigated and maintained. For future fire behavior planning purposes, the likely climax vegetation in the open space within of PA-4 that was used for fire modeling presented later in this FPP is considered a combination of Sage/Buckwheat and grass. This climax vegetation, for fire behavior purposes, consists of a combined FM of GR4 - Moderate Load Dry Climate Grass (60%) and SCAL 18 – Sage/Buckwheat (40%).

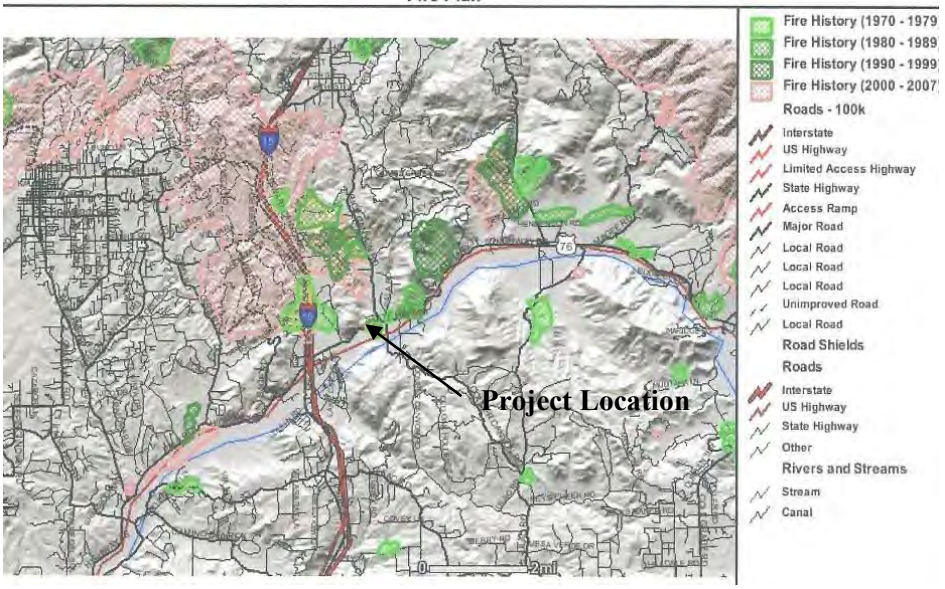
1.3.3 Off-site Vegetation. Areas surrounding the Campus Park West development are the same as those described in the On-site Vegetation. It is assumed that the existing groves located on adjoining property to the southeast may over time be lost and revert to natural and exotic plant species. Of benefit to the project is that the existing roadways on the east and a portion of the southern boundary will separate the protected open space from the developed portion of the project. The vegetative fuel type in this off-site area is a combined FM SCAL18 and GR4 noted in Section 1.3.2.

A major feature both within and adjacent to the eastern project boundary north of Pala Road is the riparian forest. The fuels within the riparian area are heavy but of species that are commonly found on fuel modification plant lists including, but not limited to, Cottonwood, Willow, and Mule Fat.

1.3.4 Fuel Loading. Several Fuel Models were considered for this project based on current and potential future vegetative cover including treated fuels. The Fuel Model selection was based on the descriptions presented in the enhanced Fuel Models developed and used in the BehavePlus 4.0.0 program. The selected Fuel Models and loadings are as follow:

Fuel Model	Description	1-hr Fuel Load tons/acre	10-hr Fuel Load tons/acre	100-hr Fuel Load tons/acre	Live Herbaceous Fuel Load tons/acre	Live Woody Fuel Load tons/acre	Fuel Bed Depth ft.	Dead Fuel Moisture of Extinction
GR1	Short Grass	0.10	0	0	0	0	0.4	15%
GR4	Moderate Load, Dry Climate Grass	0.25	0	0	0	0	2.0	15%
TL6	Moderate Load Broadleaf Litter	2.4	1.2	1.2	0	0	0.3	25%
TL9	Very High Load Broadleaf Litter	6.7	3.3	4.2	0	0	0.6	35%
SCAL 18	Sage / Buckwheat	5.5	0.8	0.1	0.75	2.5	3.0	25%

1.3.5 Fire History. To determine the history of wildland fire in the vicinity of the Campus Park West project, data from the California Fire Alliance Fire Planning and Mapping Tools was acquired. This tool provided access to fire history of wildland fire occurring in designated 10-year increments within an approximate 3 mile radius of the project site. The 10-year periods used are: 1970-1979, 1980-1989, 1900-1999 and 2000-2007 (see Map 2 below).

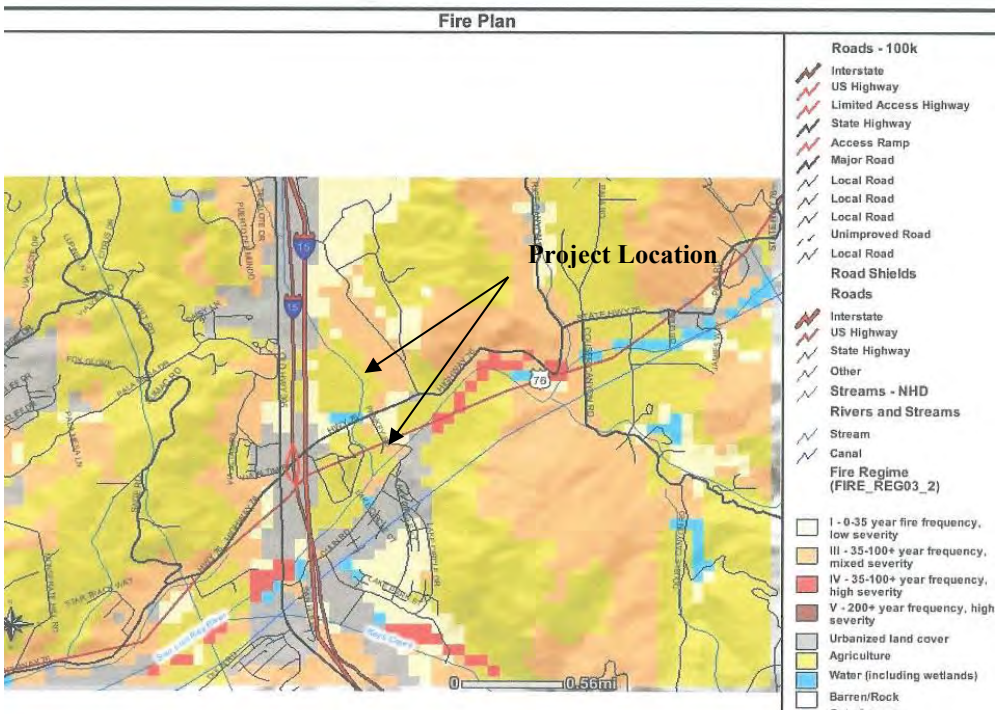


↑ **Map 2 – Large Fires (Over 100 Acres) Adjacent To The Project That Occurred Between 1970 and 2007. Data From The California Fire Alliance Fire Planning And Mapping Tools.**

Note: the map above shows several significant large (over 100 acres) wildland fires that have occurred during the past 37 years. The most notable recent fire was the 2007 Rice Fire (pink) which burned a part of the northern end of the project. This 9,472 acre fire started on October 22, 2007 and burned for several days destroying over 200 homes and businesses. Many smaller fires have occurred within the project area. Due to a combination of suppression activity, fuels treatment, weather and related factors, these fires never became large devastating fires as that which occurred on October 22, 2007.

The Fire Frequency Map (Map 3) shows the anticipated large fire return frequency based on historic data and vegetation type. Much of the project site is classified as Agriculture or Urbanized but those areas outside of these classifications indicate a fire frequency of < 35 years and generally of low severity. A small area to the northeast of the project is classified as moderate severity where the fire return frequency is between 35-100 years and of mixed severity. The only noted high severity areas near the project are within the San Luis Rey River located just south of the project. Designated

open space riparian areas in the project are scheduled to be preserved as part of the Multiple Species Conservation Program and thus will not be impacted by development or fuel treatments.



↑ **Map 3 – Fire Frequency and Expected Severity Within And Adjacent To The Project. Much Of The Project Area Is Classified By The State As Agriculture Or Urban. The Project Is Located To The North And South Of Highway 76. Data Is From The California Fire Alliance Fire Planning And Mapping Tools.**

1.3.6 Climate/Weather. The Campus Park West project is located within a San Diego County PDS Transitional Climate Zone. The general characteristic of this climate zone consists of mild, wet winters and warm dry summers. The bulk of the annual precipitation (average of 13-15 inches per year) falls between January and March. Following the mild wet winter months are frequent periods of extended drought, and long hot and dry spring, summer and fall seasons. This phenomenon is responsible for drying of the vegetation thus making the project area, as well as most of southern California's wildland vegetation highly flammable for a significant portion of the year. The vegetation within the Campus Park West project is no exception.

The following PDS chart represents the typical weather that occurs in the Transitional Climate Zone which consists of a hot summer day, Santa Ana, and Peak or worst case fire weather (climate conditions) elements utilized within this Fire Protection Plan:

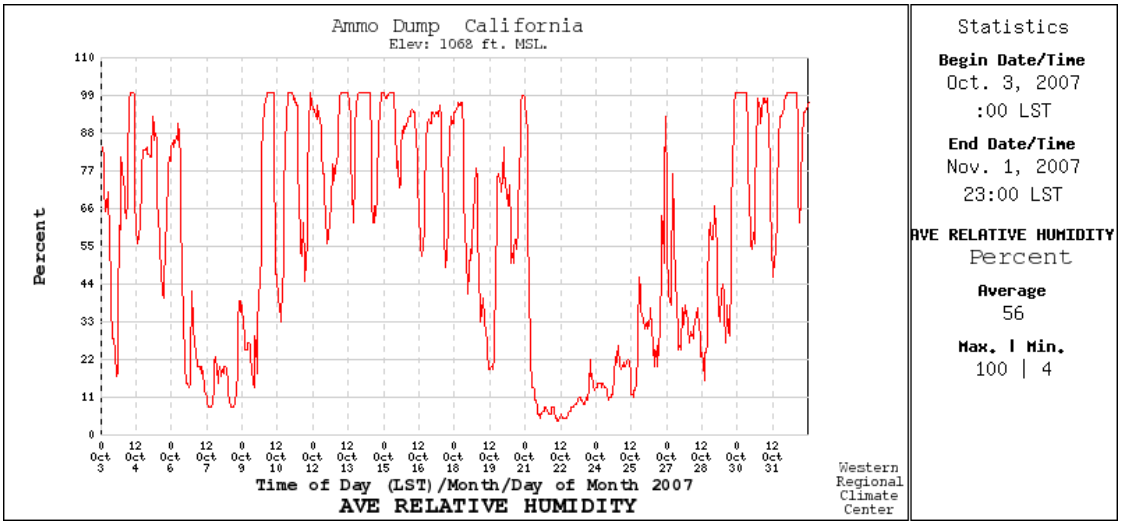
Period	Temperature	Relative Humidity	Sustained Wind Speed	Burning Index (99%)
Summer	90 – 109 deg F	10 – 14%	19 mph	119
Santa Ana	90 – 109 deg F	5 – 9%	28 mph	145
Peak	90 – 109 deg F	5 – 9%	41 mph	-

The Behave 4.0.0 Fire Modeling Program to be discussed in more detail later in this plan utilizes "worst case" fuel moisture levels in both live and dead vegetation, projected wind, topography and vegetation type data to determine fire behavior. Large fires may occur at much lower temperatures than are shown above. Relative humidity of less than 5 percent may also occur.

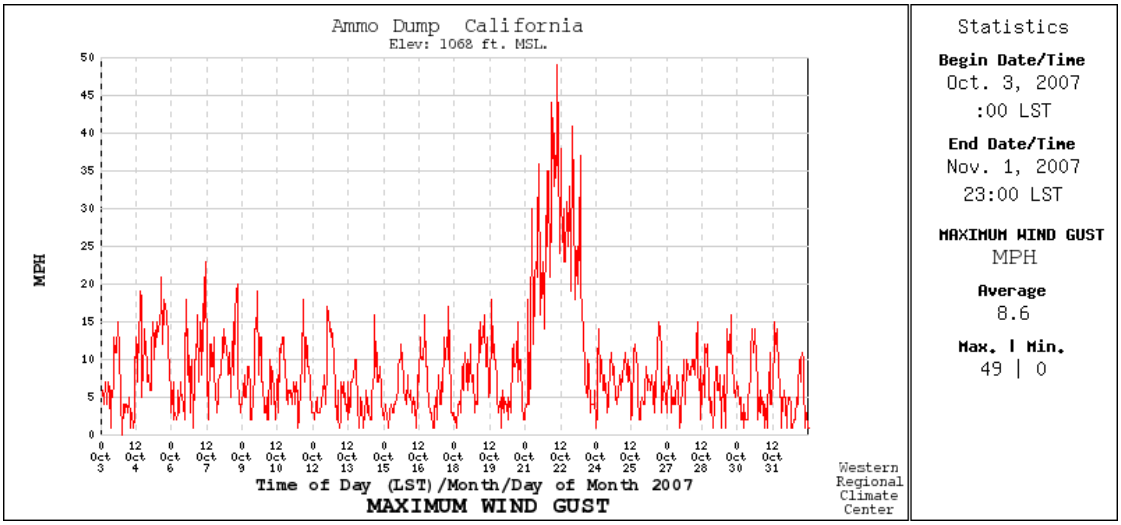
The key to how fast, how hot and at what intensity a wildland fire will burn is directly related to wind speed, wind direction, the age, composition and condition of burnable vegetative fuel and amount of moisture in the atmosphere. Wind direction usually determines how dry or moist (expressed as relative humidity) the air will be in the wind pattern. Local weather conditions (wind speed and live and dead fuel moistures) still are the key ingredients in determining fire intensity and rate of spread.

The most critical wind pattern to Campus Park West is an off-shore wind coming out of the north/northeast, typically referred to as a Santa Ana wind. Such wind conditions are usually associated with strong (> 40-MPH), hot, dry winds with very low (< 15%) relative humidity. Santa Ana winds originate over the dry desert land and can occur anytime of the year; however, they generally occur in the late fall (September through November). This is also when non-irrigated vegetation is at its lowest moisture content.

Fire Agencies throughout the western United States rely on a sophisticated system of Remote Automated Weather Stations (RAWS) to monitor weather conditions and aid in the forecasting of fire danger. The climatic data acquired from RAWS is important to modeling wildland fire behavior. ***FIREWISE*** **2000, Inc.** determined that the Ammo Dump RAWS locate at LATITUDE: 33.3814. LONGITUDE: 117.2856 is the closest station to the project that has been in continuous operation since June of 2001. It captured significant weather data during the major southern California fires of October 2003 and most recently the fires of 2007 which is shown in Figures 1 and 2 which follow:



↑ **Figure 1: Ammo Dump RAWS Relative Humidity During The Fires of October, 2007. Note That The Rice Fire Started On October 22, 2007. Humidity Was Recorded At 4 Percent That Day.**



↑ **Figure 2: Ammo Dump RAWS Wind Gusts During The Fires Of October, 2007. Note The Peak Wind Gust Of 49 Miles Per Hour Occurred During The Same Dry Period Shown In Figure 1.**

In reviewing the figures above, note that in late October the wind gusts were very strong and relative humidity was very low, an indicator of a Santa Ana wind event. For planning purposes, ***FIREWISE* 2000, Inc.** utilized 60 MPH winds as the extreme or worst case wind likely on the Campus Park West Project. On ridges to the east, higher wind gusts may occur but these will not directly impact the project site.

The Ammo Dump RAWS is located approximately 8 miles to the northwest of the Project at an elevation of 1,068 feet. Data for all RAWS is archived in the Western Region Climate Center in Reno, Nevada. Weather data for October 2007 is presented in APPENDIX 'A', as an example of extreme fire weather. Historic weather data was used to help determine the fuel moisture regimes found later in this plan.

1.3.7 On-site and Off-site Land Uses. The on-site land use will consist of approximately 283 residential homes in a multi-family area (lots 11-14) and a mixed use core, and approximately 503,000 ft^2 of commercial and 120,000 ft^2 of industrial/office buildings are to be located on several lots. The residential area will be separated from the commercial and industrial lots by Pankey Road, a 100 plus foot wide four lane roadway that extends along the entire western side of the residential area.

Off-site land uses include the proposed development of two large projects to the east (Meadowood and Campus Park). These projects have already been approved by the County Board of Supervisors. They include additional land uses and planned access roadways to improve traffic circulation. Interstate 15, a major transportation roadway exists to the west of the project.

1.3.8 Public and Private Ownership of Land in the Vicinity. All properties in the vicinity are under private ownership and are residential, vacant land or commercial agricultural properties. There is little or no public ownership of lands in the vicinity other than for roads, and public utilities at the time of the preparation of this FPP. Commercial orchards will remain along the eastern boundary south of Pala Road.

1.3.9 Dates of Site Inspections/Visits conducted. Members of ***FIREWISE* 2000, Inc.** visited the site of the Campus Park West project on two occasions. The dates of visits were:

Date	Purpose of Inspection	Persons Present
August 30, 2007	Preliminary site visit	Dave Bacon
June 24, 2008	Site inspection	Dave Bacon, Herbert Spitzer and Mel Johnson
April 30, 2010	Site Visit to identify changes	Dave Bacon & Herbert Spitzer
March, 2013	Evaluate PA-1	Dave Bacon

CHAPTER 2: GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

This FPP evaluates the potential adverse effects to the Campus Park West development that could result from a wildland fire occurring on, or adjacent to, the project. The FPP will also make appropriate recommendations to mitigate any adverse impacts and to ensure that development of this project does not unnecessarily expose people or buildings to a significant risk of loss, injury or death because of a wildland fire. The FPP also evaluates from a fire perspective the positive environmental effects that may occur by developing this particular property.

2.1 Analysis of Project Effects.

This project demonstrates compliance, or offers "Modifications", with applicable fire regulations, including but not limited to the County Consolidated Fire Code, Chapter 1, Section 104.8. All the required fuel treatments of 100 feet can be established within the project when all buildings are setback from the project boundary a minimum of 100 feet. Based upon projected worst case fire behavior from the west and south, fuel treatment will consist of 50 feet of Irrigated Zone 1 around each structure followed by 25 feet of Zone 2 and at the outer edge of each building lot abutting wildland fuels a 6 foot tall solid non-combustible wall shall be installed as shown on the Fuel Treatment Location Map found in Section 3.2. The fuel treatment zone shall be totally located within the 75 foot wide limited building zone. The combination of fuel treatments and a limited building zone provides compliance with the intent and purpose of the code. Furthermore, the combination of treatments does not lessen health, life and fire safety requirements. Grading will remove nearly all wildland fuels in all lots except for those designated as Open Space. No fuel treatment will be required in the Southern Riparian Forest or the Biological Open Space East of Pankey Road. A conservancy or a similar entity will manage the Riparian Forest and Open Space.

The comprehensive FPP and the project are consistent with the San Diego County PDS recommendations including fuel modification.

2.2 Emergency Response Travel Times and Standards.

The Campus Park West project is located within the NCFPD. The NCFPD is the Fire Authority Having Jurisdiction (FAHJ). The NCFPD provides fire services to approximately 92 square miles and serves a population of nearly 50,000. The firefighting services of the District are provided to the communities of Fallbrook, Bonsall and Rainbow. The District currently has six (6) fire stations.

The NCFPD has expressed concerns that the District currently does not have adequate fire protection facilities and equipment to support the proposed project. Campus Park West will be conditioned to enter into an agreement with the NCFPD and pay a proportionate fair share contributions for necessary improvements.

The closest fire station to the project is NCFPD Station #4 located at 4375 Pala Mesa Drive. The next in station would likely be NCFPD Station #5. The project is located within an acceptable travel time for the first responding station. Based on NFPA 1142, Standard on Water Supplies For Suburban and Rural Fire Fighting 2007 Edition Table C.11 (b), below are the fire station locations, response distance to the farthest point in the project from the fire station and the expected travel times in ascending order:

Station	Address	Distance	Travel time
NCFPD FS #4	4375 Pala Mesa Drive	0.8 miles	2-3 minutes
NCFPD FS #5	31403 Old River Road.	6.4 miles	11-14 minutes

NCFPD Fire Station #4, being the closest engine, in all likelihood would be the first due engine and during an emergency would travel the distance in 2 – 3 minutes. The planned access will be across I-15 on Pala Mesa Road and into the project. Stations #5 and 6 would be requested at the same time as NCFPD Station #4. Additional engines and firefighting resources can be requested through the statewide mutual aid system.

The Public Facility Element of the County General Plan includes emergency travel time criteria to minimize fire and emergency risks. These criteria are shown below:

Land Use Category	Travel Time Maximum	Land Use Category Definition
Town:	5 minutes	Single-family residential lots of less than two acres, or more intensive uses such as multi-family residential. Includes all industrial development and all commercial development except neighborhood commercial.
Estate:	10 minutes	Single-family residential lots from two acres to four acres in size. Includes neighborhood commercial development.
Rural:	20 minutes	Large lot single-family residential and agricultural development. Lot sizes of greater than four acres.

Being that the closest station will be within 3 minutes of all portions of the project, the project meets the emergency response objectives identified in the Public Facilities Element of the San Diego County General Plan.

2.3 Primary and Secondary Access Roads.

The Campus Park West primary access for fire response is Pala Mesa Drive from the west and Pankey Road from the south. Pala Mesa Drive contains a total right-of-way width of 72-feet with two 12-foot travel lanes, six-foot Class II bike lanes, eight-foot paved shoulders, and a five-foot sidewalk on the north side of the road separated from the roadbed by a five-foot landscaped strip. The south side of the roadway contains a 10-foot landscaped area. The project includes a design modification for the bridge to maintain the existing 40-foot curb to curb width rather than widen the bridge to meet the standard 52-foot curb to curb width. The existing cross section includes two 20-foot travel lanes with a five-foot sidewalk on one side.

Pankey, north of SR 76, will have an easement of 106-118 feet. Within this easement will be a four-lane boulevard with a landscaped median, including Class II bike lanes along both sides of the roadway and 14-foot parkways with irrigated landscaping, a sidewalk, and pathway. Should Pala Mesa be blocked, access will be via Pala Road (SR76) to Pankey Road. This secondary alternative route is longer and would require an additional 1-2 minutes for emergency fire apparatus to arrive at the scene of an emergency. Pala Mesa Drive and Pankey Road will have adequate space for fire apparatus to turn around. All cul-de-sacs in residential areas shall have a minimum unobstructed paved radius of 42 feet.

Within the project, Pankey Road will extend northward from Pala Mesa Drive for a distance of approximately 425 feet. This roadway will service lots 1-4**.** In commercial and industrial areas, cul-de-sacs shall be paved to a radius of 50 feet per the County Public Road Standards, Ordinance 9062.

On the south side of Pala Road, Pankey Road will provide access to the lots located in PA-4, 5 & 6. South of SR-76, Pankey Road has a total right-of-way width of 118-feet with four 12-foot travel lanes, two 12-foot left turn pockets, two eight-foot paved shoulders for Class II bike lanes, and eight-foot Type D Special Pathways on both sides of the road separated from the roadbed by five-foot landscaped strips. A road modification request has been approved for this segment of Pankey Road to allow for a grade break of 1.5 percent at the southerly edge of the eastbound SR-76 travel lane and to allow for a reduction in design speed from 40 miles per hour (mph) to 30 mph in the 220-foot sag vertical curve segment between SR-76 and Shearer Crossing. These design modifications are necessary to keep floodwaters from overtopping Pankey Road. At the intersection of Pankey Road and Shearer Crossing, Pankey Road veers west and transitions into a 72-foot right-of-way with two 12-foot travel lanes, two eight-foot shoulders for Class II bike lanes, and five-foot sidewalks on both sides of the road separated from the roadbed by five-foot landscaped strips.

All roads shall be installed and serviceable prior to issuance of building permits. With the development of the roads, the County General Plan Public Facilities Elements for emergency travel time will be met. This includes both Pankey Road from SR 76 and Pala Mesa Drive from Old 395. Additional information concerning access can be found in the project EIR.

2.3.1 Access Road Widths. Major streets within the project shall be constructed to an unobstructed improved width of 40 feet or more within a right of way width of 50 or more feet exceeding all Fire Code and San Diego County Standards for Private Roads requirements.

Pala Road has been recently widened to a four lane roadway thus capable of supporting emergency relocation of residents should the need occur. All streets shall be surfaced with asphaltic concrete (AC) or an equivalent material. All public and private access streets including driveways shall have an unobstructed vertical clearance of 13 ft. 6 in. This meets the County Consolidated Fire Code Requirements (§503.2.1) and the requirements of the NCFPD.

Separated lanes of one-way traffic are allowed for: fire access roadways, gated entrances with card readers, guard stations or center medians, provided that each lane is not less than 12 feet wide.

Where on street parking on both sides of the street is planned, the roadway width shall be a minimum 36 feet in width and of AC.

A future roadway (Pankey Place) will connect the Meadowood and Campus Park projects located to the east of Pankey Road. The future connection location is identified on grading plans and will be built by others. It will provide another means of ingress and egress and may further improve fire department travel times. The NCFPD requires that Pala Mesa Drive be improved from the existing Fire Station #4 to Horse Ranch Creek Road (in Meadowood) as a circulation element road.

Parking must be located outside the required fire access road width. The minimum access road width identified above shall not be obstructed at any time.

2.3.2 Road and Driveway Surfaces. All streets shall be all-weather paved with capacity to support fire apparatus weighing up to 75,000 pounds and shall be provided with an approved surface so as to provide all-weather driving capabilities meeting County Fire Code requirements (§503.2.3) and those of the NCFPD.

The paving and sub-base shall be installed to the standards specified in Section I-M of the County of San Diego Off-street Parking Design Manual. 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 to enhance traction satisfying County Fire Code Section 503.2.3.1 and the fire requirements of the NCFPD. The angle of departure and angle of approach of a fire access roadway shall not exceed seven degrees (12 percent) or as approved by the fire code official.

2.3.3 Turning Radius - All fire apparatus access roadways shall meet the minimum 28 foot turning radius measured from the inside edge of the improvement width satisfying County Fire Code §503.2.4.

Where the left turn traffic volume is estimated to exceed 300 vehicles at peak hour, an additional 12 feet of right-of-way may be required for provision of a dual left turn lane.

The angle of departure along the public road and the adjacent driveway shall not exceed 7%. The angle of departure is the smallest angle made between the road surface and a line drawn from the front point of the ground contact of the front tire for a pumper fire apparatus (as per Standard NFPA 1901) to any projection of the apparatus in front of the front axle. Fire apparatus access roads shall be installed and arranged in compliance with sections 503.2.1 through 503.2.7 of the San Diego County Consolidated Fire Code.

2.3.4 Dead-Ends - All residential streets including driveways exceeding 150 ft. in length shall have an approved turn-around for emergency vehicles. Cul-de-sacs shall be provided on dead-end roadways regardless of the number of parcels served per County Fire Code Amendments of January 30, 2011 Section 503.1.2 and requirements of the NCFPD. The turning radius for cul-de-sacs shall be 42 feet. The roadway serving lots 1- 4 is approximately 425 feet in length and shall be provided with a cul-de-sac.

2.3.5 Speed Control Devices. - Roadway design features (speed bumps, speed humps, speed control dips, etc.) which may interfere with emergency apparatus responses shall not be installed on fire access roadways, unless they meet design criteria and specific location approval by the NCFPD.

2.3.6 Road and Street Grades - All street grades are 15% or less within the project. No enhancements to the road surfaces are therefore required.

2.3.7 Street Signs and Markings. All streets shall be signed and marked according to County of San Diego Department of Public Works Design Standard DS #13A – 13G. An entrance signed is planned for the entrance onto Pankey Road from SR 76.

2.3.8 Building and Facilities Access. Approved fire apparatus access roads shall be provided for every facility, building or portion of building constructed or moved into the Campus Park West development. Fire apparatus access roads, including private residential driveways, shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from the closest point of fire department vehicle access per County Fire Code Section 503.1.

2.3.9 Gates. No entrance gates are planned for this development. However, if at some point in the future a gate is to be installed, the gate shall have a roadway setback of 50 feet on either side of the gate, be automatic, and be equipped with an approved emergency Knox key-operated switches overriding all command functions to open the gate(s). Gates shall also be equipped with an approved emergency tract control-activating strobe light sensor(s) Opticom sensor or other devices approved by the NCFPD Fire Marshal, which will activate the gate on the approach of emergency apparatus with a battery back-up or manual mechanical disconnect in case of power failure. Exit loop detectors shall also be provided. Additional requirements can be found in the NCFPD Policy and Procedure Manual, regarding Electric Gates dated 05/10/05.

2.4 Premise Identification.

The following are required to aid emergency responders in finding persons, buildings etc. within the project.

2.4.1 Street Numbers. Approved numbers and/or addresses shall be placed and maintained on all buildings and at appropriate additional locations as to be plainly visible and legible from the street or roadway fronting the property from either direction of approach. Said numbers shall contrast with their background, and shall meet the following minimum standards as to size: 4" high with a 3/8" stroke for residential buildings, 6" high with a ½" stroke for commercial and multi-residential buildings, 12" high with a 1" stroke for industrial buildings.

2.4.2 Map/Directory. A lighted directory map, meeting current NCFPD standards, shall be installed at each driveway entrance to multiple unit residential projects with 15 or more units per the County Consolidated Fire Code Section 505.4.

2.5 Water Supply and Fire Hydrants.

Pursuant to the 2011 County Consolidated Fire Code Sec. 508.3, Campus Park West is required to obtain a public water supply from a provider that can maintain a continuous water flow in the mains of 2,500 gallons per minute (GPM) at 20 psi residual pressure for a 2 hour duration to the residential area. For commercial and light industrial lots, assuming that no one structure on a lot will be greater than 175,000 ft^2 in size, the minimum flow available for firefighting shall be 4,500 GPM for a 4 hour duration. The water supply system shall be a looped system served from two points. The fire flow requirements may be increased by the NCFPD depending on the actual building construction and use. See Table B105.1 of the California Building Code for additional information.

Fire hydrant locations and spacing shall meet the 2011 County Consolidate Fire Code Sec. 508.5.1.1 requirements in Group R-3 and Group U occupancies which reads: "an approved water supply capable of supplying the required fire flow for fire protection shall be provided to each property upon which a facility or structure is constructed". Fire Code Sec. 508.5.1.1.2 requirements for multi-family, commercial and industrial zones, fire hydrants shall be installed at intersections, at the beginning radius of cul-de-sacs and every 300 feet of fire apparatus access roadways, regardless of parcel size and served from public water mains. Hydrants shall be installed to NCFPD and RMWD standards, with drip cap and blue dot markers, each capable of supplying a minimum 1500 GPM flow from a public water supply in residential areas. Additional fire flows from individual hydrants may be required by the NCFPD.

The project will receive water service from the Rainbow Municipal Water District (RMWD) and will need to be annexed into this district and detached from the San Luis Rey Municipal Water District (SLRMWD). Vegetative fuel modification areas may be irrigated with reclaimed water should a source be developed.

All fire hydrants are to be installed and serviceable prior to issuance of building permits.

2.6 Ignition-Resistant Construction and Fire Protection Systems.

All proposed (new) buildings or those moved onto the site shall be built to County of San Diego Fire and Building Code. The construction methods for exterior wildfire exposure in a wildland-urban interface fire area shall be as provided in Chapter 7A of the County Building Code and as described in San Diego PDS Form #664 "Enhanced" fire-resistant construction requirements (see APPENDIX 'D'). The requirements for exterior ignition-resistant construction will be the most restrictive that are in effect at the time of Building Permit Application.

Commercial (including recreation centers, future school buildings) and light industrial buildings shall be provided with the following fire protection systems and design features:

1. Automatic fire sprinkler systems in accordance with NFPA 13 – Standard for the Installation of Sprinkler Systems. 2013 Edition.

2. Riser rooms to structures shall be located in a separate room from the general occupancy. The riser room shall have an exterior access door(s).

3. Standpipe fire protection systems shall be provided as set forth in Table No. 1004-A of the California Fire Code. These systems shall also be provided in parking structures should they be provided.

4. A Class III standpipe system shall be installed in parking structures, if so provided.

Within residential multi-family areas, fire sprinkler systems shall meet the following standards

1. All R-1 occupancies shall be protected with automatic fire sprinkler systems in accordance with NFPA 13-R - Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, 2013 Edition.
2. All R-1 occupancies exceeding 16 individual units shall be protected with automatic fire sprinkler systems I accordance with NFPA 13 – Standard for the Installation of Sprinkler Systems, 2013 Edition.
3. All R-3 occupancies to be protected with automatic fire sprinkler systems in accordance with NFPA 13-D – Standard for the Installation of Sprinkler Systems in One- And Two-Family Dwellings and Manufactured Homes, 2013 Edition.

2.7 Defensible Space and Vegetation Management.

Below are the wildfire assessments of on-site and off-site fuels followed by the fire behavior calculations followed by the required vegetation management for along roadways and adjacent to structures.

2.7.1 Off-site Fire Hazard and Risk Assessment. The project area is located in a moderately high fire hazard severity zone about twelve (12) miles inland from the Pacific Ocean. The proposed multi-family homes, commercial and industrial lots are bordered by highways, designated open space and an existing commercial irrigated orchard. A notable wildland fire threat will come from a wildland wildfire burning in the off-site flammable native and non-native vegetation east of the northern portion of the project. This is undeveloped land with native Southern Riparian Forest with Coastal Sage Scrub and grass bordering it. It is the area of greatest threat to the project as firebrands from this area are likely to be carried a long distance (one mile or more) by fire drafts or strong winds. An additional wildfire threat is possible from the west or south under typical or extreme prevailing southwest wind

conditions, as a portion of this land is located along Interstate 15 where fuel treatment cannot be performed. The highway system and adjacent planned development will fragment vegetation continuity and thereby reduce the potential for a damaging wildland fire.

2.7.2 On-site Fire Hazard and Risk Assessment. If left undisturbed by natural events or without any fire hazard abatement practices the disturbed areas within the project would most likely reestablish themselves over time as a mixed coastal sage scrub with grass plant community.

The mixed coastal sage scrub found at the northern end of the project in open space lot 45, is characterized by a Fuel Model SC 18 – Sage/Buckwheat and GR 4 – Moderate Load Dry Climate Grass is significantly wildfire concern during a worst case scenario consisting of a northeastern wind pattern (Santa Ana) with an unusually hot dry wind speeds that could reach 60 MPH. These extreme weather conditions would be similar to what was experienced during the October 2007 Rice Fire. In this vegetation type, a high percentage of the vegetation would have an abundance of dead material. This is especially true of the black sage and buckwheat plants. This is due to the effects of the local Mediterranean climate where warm wet winters promote new growth, and long, hot and very dry summer seasons sometimes occur. Occasionally, multi-year droughts cause significant parts of these plants to die back. All of these plants are adapted to the intense wildfires that they need for species regeneration. However, when fire occurs at too frequent intervals, the coastal sage scrub plant community frequently reverts to a more flammable, less desirable community of short-lived annual grasses with little wildlife value and poor ability to protect the soil. The on-site wildland fire threat from this native vegetation can be mitigated within the development envelope. Each planned building will be required to have fuel modification and to incorporate "firewise" landscaping criteria and building features.

In summary, any wind or topography driven wildfire burning under a northeastern (*Santa Ana*) wind pattern from the north, northeast or east creates a moderate to high wildland fire hazard, especially for wildland fires starting north and/or east of the project site. Also, a "rare event" strong southwest wind of 30 MPH fire day will create a low to moderate wildland wildfire hazard depending on the particular vegetation type burning. However, with the proposed fuel modification treatments, "firewise" landscaping, and the use of exterior ignition-resistant building construction standards, the wildfire threat will be mitigated to less than significant levels. As a result, the potential for loss of any building due to direct fire impingement, wind driven embers, or radiant heat is extremely low.

2.8 Wildland Fire Behavior Assessment.

The minute-by-minute movement of a wildland fire will probably never be totally predictable; certainly not from weather conditions forecast many hours before the fire. Nevertheless, practice and experienced judgment in assessing the fire environment coupled with a systematic method of calculating fire behavior, yields surprisingly good results (Rothermel 1983).

Many fire models can be used to forecast fire behavior. Los Alamos National Laboratory's FIRETEC computer model, which won a R&D 100 award in 2003, simulates wildfire behavior in high-resolution over a variety of terrain scenarios. This physics based model has been refined with other numerical models (Behave) to perform realistic, 3-dimensional wildfire simulations. ***FIRE*WISE 2000, Inc.** has experience in working with this model and Los Alamos staff. It is the best if not one of the best fire behavior models in the world. However, it requires a super computer to perform the calculations, the program is not available to the public, and it requires precise data inputs to produce quality data. It has been used to perform post incident analysis with excellent results. Another model that could be used is FARSITE. This program is used in a Windows operating system. It utilizes the BehavePlus algorithms and fuel models but produces the results in a 2-dimensional fire growth model, much like watching television. FlamMap, another fire model, also utilizes the algorithms in FARSITE to produce raster maps of an entire landscape. It is used by the National Park Service in support of fire management activities.

The BehavePlus Fire Modeling System (Version 4.0.0) has been used to predict the wildland fire behavior (rate-of-spread, fire line intensity and flame length) for the vegetative fuels in the Campus Park West project. The BEHAVE: Fire Behavior Prediction and Fuel Modeling System–Burn Subsystem, Part 1 by Patricia L. Andrews, is one of the best systematic methods for predicting wildland fire behavior. The BEHAVE fire behavior computer modeling system was developed by USDA–Forest Service research scientists at the Intermountain Forest Fire Laboratory, Missoula, Montana, and is utilized by wildland fire experts including fire behavior analysts nationwide. Since the model was designed to predict the spread of a fire, the fire model describes the fire behavior only within the flaming front. The primary driving force in the fire behavior calculations is the dead fuel less than one-fourth inch in diameter; these are the fine fuels that carry the fire. Fuels larger than three (3") inches in diameter are not included in the calculations at all (Andrews 1986)".

BehavePlus, Version 4.0.0, is an updated and enhanced form of the original BEHAVE System. The BEHAVE fire model describes a wildfire spreading through surface fuels, which are the burnable materials within six (6') feet of the ground and contiguous to the ground. Regardless of the limitations expressed, experienced wildland fire managers can use the BEHAVE modeling system to project the expected fire intensity, rate-of-spread and flame lengths with a reasonable degree of certainty for use in fire protection planning purposes.

The ***FIREWISE*** **2000, Inc.** evaluation team used the computer based BehavePlus 4.0.0 Fire Behavior Prediction Model to make the fire behavior assessments and projections for the hazardous vegetative fuels located in proximity and within the proposed building lots (see APPENDIX 'E' for actual calculations). The projections are based on scenarios that are "worst case" San Diego County fire assumptions for vegetation and weather.

Ten (10) different fire scenarios are presented based on "worst case" fire weather assumptions for the project area. Each fire scenario displays the expected Rate of Fire Spread (expressed in feet per minute), Fireline Intensity (expressed in British Thermal Units per foot per second) and Flame Length (expressed in feet).

Predications were also made for the treated fuels following the completion of the required fuel modification work. The tables also include the calculation inputs used in the BehavePlus program which were obtained from project site observations and fuel moisture levels typically observed during the local fire season and expected worse case winds based on a review of nearby RAWS.

To the north and east of PA-1, tall dense understory vegetation consisting of Giant Reed, Arundo Donax, can be found. This exotic vegetation, often growing to 12-15 feet in height creates the potential for a crown fire during "worst case" fire weather which is not modeled. Due to the presence of this species, additional mitigation measures are found in section 2.10 Required Fuel Modification Zones for Buildings, Structures and Access Roads.

Table 2 *Fire Scenario # 1 - North Boundary* *(Late Fire Season - 60 MPH North, Northeast And East Wind Conditions)*	
Fire Behavior Calculation Input Data • 50 percent slope • 60 mph 20-foot wind speed • 45° aspect from north • 45° wind direction from north	**Anticipated Fuel Moistures** * 1-Hour Fine Fuel Moisture of .....2% * 10-Hour Fuel Moisture of.....3% * 100-Hour Fuel Moisture of .....5% * Live Herbaceous Fuel Moisture of ...30% * Live Woody Fuel Moisture of 50%
Expected Fire Behavior – Wildland Fuels **Combined Fuel Model [SCAL 18 – Sage/Buckwheat 50% and GR4 - Moderate Load Dry Climate Grass 50%]**	
Rate of Spread - 1,200 feet/minute	
Fireline Intensity - 42,641 BTU's/foot/second	
Flame Length - 60.7 feet in length	
Expected Fire Behavior – Treated Fuels **Combined Fuel Model** **[TL6 – Moderate Load Broadleaf Litter 50% and GR2 Short, Low Load, Dry Climate Grass]**	
Rate of Spread - 238 feet/minute	
Fireline Intensity - 1,684 BTU's/foot/second	
Flame Length - 13.7 feet in length	

Table 3 *Fire Scenario # 1 - East Boundary On Slope To Streambed* *(Late Fire Season - 60 MPH North, Northeast And East Wind Conditions)*	
Fire Behavior Calculation Input Data • 50 percent slope • 60 mph 20-foot wind speed • 45° aspect from north • 45° wind direction from north	**Anticipated Fuel Moistures** * 1-Hour Fine Fuel Moisture of .....2% * 10-Hour Fuel Moisture of.....3% * 100-Hour Fuel Moisture of .....5% * Live Herbaceous Fuel Moisture of....30% * Live Woody Fuel Moisture of.....50%
Expected Fire Behavior – Wildland Fuels **Combined Fuel Model [TL9 – Very High Load Broadleaf Litter 70% and SCAL 18 - Sage/Buckwheat 30%]**	
Rate of Spread - 110 feet/minute	
Fireline Intensity - 4,262 BTU's/foot/second	
Flame Length - 21.0 feet in length	
Expected Fire Behavior – Treated Fuels **Combined Fuel Model** **[TL6 – Moderate Load Broadleaf Litter 50% and GR2 – Low Load, Dry Climate Grass (50%)]**	
Rate of Spread - 36.6 feet/minute	
Fireline Intensity - 255 BTU's/foot/second	
Flame Length - 5.8 feet in length	

Table 4 *Fire Scenario # 2 - South Boundary Intermittent Creek* *(A Rare Event 30 MPH South, West and Southwest Wind Condition)*	
Fire Behavior Calculation Input Data • 15 percent slope • 30 mph 20-foot wind speed • 225° aspect from north • 225° wind direction from north	**Anticipated Fuel Moistures** * 1-Hour Fine Fuel Moisture of ……2% * 10-Hour Fuel Moisture of……3% * 100-Hour Fuel Moisture of ……5% * Live Herbaceous Fuel Moisture of…...30% * Live Woody Fuel Moisture of…….....60%
Expected Fire Behavior – Wildland Fuels Combined Fuel Model [TL9 – Very High Load Broadleaf Litter 50% and SCAL 18 - Sage/Buckwheat 50%]	
Rate of Spread - 52 feet/minute	
Fireline Intensity - 2,522 BTU's/foot/second	
Flame Length - 16.5 feet in length	
Expected Fire Behavior – Treated Fuels Combined Fuel Model [TL6 – Moderate Load Broadleaf Litter 50% and GR1 Short, Sparse Dry Climate Grass]	
Rate of Spread - 29 feet/minute	
Fireline Intensity - 105 BTU's/foot/second	
Flame Length - 3.8 feet in length	

Table 5 *Fire Scenario #2 - West Boundary Adjacent to I-15* *(A Rare Event 30 MPH South, West and Southwest Wind Condition)*	
Fire Behavior Calculation Input Data • 25 percent slope • 30 mph 20-foot wind speed • 245° aspect from north • 225° wind direction from north	**Anticipated Fuel Moistures** * 1-Hour Fine Fuel Moisture of ……2% * 10-Hour Fuel Moisture of……3% * 100-Hour Fuel Moisture of ……5% * Live Herbaceous Fuel Moisture of…….30% * Live Woody Fuel Moisture of…….....60%
Expected Fire Behavior – Wildland Fuels Combined Fuel Model [GR4 – Moderate Load Dry Climate Grass (60%) and SCAL 18 - Sage/Buckwheat (40%)]	
Rate of Spread - 488 feet/minute	
Fireline Intensity - 15970 BTU's/foot/second	
Flame Length - 38.6 feet in length	
Expected Fire Behavior – Treated Fuels Combined Fuel Model [TL6 – Moderate Load Broadleaf Litter 50% and GR2 Short, Sparse Dry Climate Grass]	
Rate of Spread 149 feet/minute	
Fireline Intensity - 1,187 BTU's/foot/second	
Flame Length - 11.7 feet in length	

No treated vegetation fire behavior is shown in Table 6 as flame lengths in Fire Scenario #1 are greatest for the Northern Fuels and therefore fuel modifications will be equal to or less than those shown above in Table 4 – Treated Fuels.

Table 6 ***Fire Scenario # 1 - Biological Open Space Easement*** ***(Typical 60 MPH North, Northeast, East Wind Conditions)***	
Fire Behavior Calculation Input Data • 8 percent slope • 60 mph 20-foot wind speed • 225° aspect from north • 45° wind direction from north	**Anticipated Fuel Moistures** * 1-Hour Fine Fuel Moisture of ……..…2% * 10-Hour Fuel Moisture of..……..……3% * 100-Hour Fuel Moisture of ……..……5% * Live Herbaceous Fuel Moisture of……..30% * Live Woody Fuel Moisture of…….....50%
Expected Fire Behavior – Wildland Fuels **Combined Fuel Model [SCAL 18 - Sage/Buckwheat (50%) and GR4 – Moderate Load Dry Climate Grass (50%)]**	
Rate of Spread - 1181 feet/minute	
Fireline Intensity - 42641 BTU's/foot/second	
Flame Length - 60.7 feet in length	

Note: The Biological OS vegetation cannot be treated and therefore no calculations are presented. Building setbacks, fuel modification and construction standards are designed to mitigate the wildland fire threat.

Table 7 ***Fire Scenario #3 - West Boundary Adjacent to I-15*** ***(Typical Summer Day - 10 MPH South, West and Southwest Wind Conditions)***	
Fire Behavior Calculation Input Data • 20 percent slope • 10 mph 20-foot wind speed • 335° aspect from north • 225° wind direction from north	**Anticipated Fuel Moistures** * 1-Hour Fine Fuel Moisture of ……..…4% * 10-Hour Fuel Moisture of..……..……6% * 100-Hour Fuel Moisture of ……..……8% * Live Herbaceous Fuel Moisture of…...50% * Live Woody Fuel Moisture of…….....60%
Expected Fire Behavior – Wildland Fuels **Combined Fuel Model [GR4 – Moderate Load Broadleaf Litter (50%) and SCAL 18 - Sage/Buckwheat (50%)]**	
Rate of Spread - 78 feet/minute	
Fireline Intensity - 1825 BTU's/foot/second	
Flame Length - 14.2 feet in length	
Expected Fire Behavior – Treated Fuels **Combined Fuel Model** **[TL6 – Moderate Load Broadleaf Litter 50% and GR1 Short, Sparse Dry Climate Grass]**	
Rate of Spread - 9 feet/minute	
Fireline Intensity - 32 BTU's/foot/second	
Flame Length - 2.2 feet in length	

2.9 Summary of Fire Behavior.

The two worst case fire behavior calculations are presented below in Tables 8A and 8B and the corresponding values under the same Fire Scenario following fuel treatment to Thinning Zone 2 criteria presented in Section 2.2.6.5. Fire behavior in Zone 1 would be significantly less or nearly nonexistent due to the irrigated landscape, fire resistant plants and maintenance.

TABLE 8A (Fire Scenario #1 – 60 mph Northeast Wind)
North and East Exposures

Prior to Fuel Treatment		VS.	After Fuel Treatment	
Rate of Spread	1,200 ft/min		Rate of Spread	238 ft/min
Fireline Instensity	42,641 BTU/ft/sec		Fireline Instensity	1,684 BTU/ft/sec
Flame Length	**60.7 Feet**		Flame Length	**13.7 Feet**

TABLE 8B (Fire Scenario #2 – 30 mph Southwest Wind)
South & West Exposures

Prior to Fuel Treatment		VS.	After Fuel Treatment	
Rate of Spread	488 ft/min		Rate of Spread	149 ft/min
Fireline Instensity	15,970 BTU/ft/sec		Fireline Instensity	1187 BTU/ft/sec
Flame Length	**38.6 Feet**		Flame Length	**11.7 Feet**

Appendix E provides the actual data outputs from the Behave 4.0.0 model. Listed for each calculation is also the spotting distance which may exceed 2 miles under worse case fire weather. This points to the fact that windblown embers from a fire burning immediately north of the project would likely impact the entire project.

2.10 Required Fuel Modification Zones for Buildings, Structures and Access Roads.

Projects located in Hazardous Fire Areas shall include Fuel Management Zones (FMZ) surrounding all buildings that are greater than 250 square feet in size. San Diego County Code stipulates that the FMZ be a minimum of 100-foot area surrounding and extending in all directions from all buildings, in which flammable vegetation or other combustible growth is cleared away or modified.

The San Diego County 2011 Consolidated Fire Code states that a fuel modification zone shall comply with the following (Section 4907.2 Fuel Modification):

(a) When a building or structure in a hazardous fire area is located 100 feet or more from the property line the person owning or occupying the building or structure shall maintain a fuel modification zone within 100 feet of the building or structure. The area within 50 feet of a building or structure shall be cleared of vegetation that is not fire resistant and re-planted with fire-resistant plants. In the area between 50 to 100 feet from a building all dead and dying vegetation shall be removed. Native vegetation may remain in this area provided that the vegetation is modified so that combustible vegetation does not occupy more than 50% of the square footage of this area. Trees may remain in both areas provided that the horizontal distance between crowns of adjacent trees and crowns of trees and structures is not less than 10 feet.

(b) When a building or structure in a hazardous fire area is setback less than 100 feet from the property line, the person owning or occupying the building or structure shall meet the requirements in subsection (a) above, to the extent possible, in the area between the building or structure and the property line.

(c) The building official and the FAHJ may provide lists of prohibited and recommended plants.

(d) The fuel modification zone shall be located entirely on the subject property unless approved by the FAHJ. This required fuel modification zone may be reduced as allowed in subsection (b) above or increased as required by a fire protection plan.

(e) When the subject property contains an area designated to protect biological or other sensitive habitat or resource, no building or other structure requiring a fuel modification zone shall be located so as to extend the fuel modification zone into a protected area.

Maintenance of fuel treatment zones is highly important. Latham (1989) found that ember ignitions of surface fuels were primarily a function of ground fuels, especially litter depth. Also imporant to ignition of a ground fuel is moisture content, size of the litter material as well as the mineral content of the dead vegetation. To the benefit of the eventual lot and homeowners, surface fires burn with significantly less intensity than an aerial fuel. Well maintained landscapes have an inherent resistance to wildfire.

Below are the detailed definitions and required treatments for Fuel Modification Zones. In most cases, there are two fuel modifcation zones required, each one 50 feet in width, for a total of 100 feet of fuel treatment around each building. The western most portion of the project along the Interstate 15 corridor shall be provided 75 feet of fuel treatment (see Section 2.11.2 – Fuel Modification Zone 2). In addition, the edge of each driveway and along roadways are to be fuel treated to significantly reduce ignition starts and reduce flame encroachment into a roadway. It will simultaneously provide relatively safe ingress and egrees should a wildfire

occur for both residents and emergency responders. Each of these zones is described below in greater detail.

To the north and east of PA-1, to dramatically reduce the potential for a crown fire and advanced fire behavior, all Giant Reed, Arundo Donax, will be removed annually within 150 feet of the northern and eastern boundary of Lots 1-4 (See Fuel Treatment Location Map – Section 3.2).

Two alternatives are provided regarding fuel modification west of Pankey Road, north and south of SR 76, an area of approximately 8.5 acres. Currently Cal Trans owns this property. The property may be decertified and become part of the project. If that occurs, the area north of SR76 would not contain any habitable strcutures – it would be used for signage only. The area south of SR76 may contain additional commercial buildings. The options are:

- Option 1 – Existing Land Ownership

- Option 2 - Include the Cal Trans decertification zone north of Lot 16 and south of Lot 21 adjacent to SR 76 and treat as part of the overall development.

Below is a map showing the two areas on the north and south sides of SR 76 which may be included in the development. In the example where the property is included in the development, fuel treatments along the northern property lines of lots 15 and 16 are significantly reduced, taking advantage of SR 76, a four lane highway, as the off-site fuel treatment. Both options are shown on the Fuel Treatment Location Maps described in Section 3.2.

↑ **Map 4 – Areas outlined in orange represents areas which may be included in the final plan. Both fuel treatment alternatives are provided in Section 3.2 of this plan.**

All distances in this report are measured horizontally. These distances are depicted on the Fuel Treatment Location Map included herein as Exhibit 1. Prior to construction on any building site, each access roadway and the fire hydrant and water system for this development shall be accepted by the NCFPD Fire Marshal and operable.

The responsibility for the fuel modification maintainence defined below shall remain with each lot owner and any subsequent owners, and as such shall run with the land and the HOA for the common areas. In the event a lot is repossessed or sold, the unit/agency holding title to the lot will be responsible for such maintenance.

Note that the NCFPD requires per the County Consolidated Fire Code Section 4707.4 that landscape plans be submitted and approved prior to a framing inspection.

2.10.1 Fuel Modification Zone 1 - *(Shown as **Blue** on the Fuel Treatment Map).*

Defined

Zone 1 comprises the first 50 feet around a structure (front, back and side yards) and is commonly called the defensible space zone. It is an irrigated zone and shall be free of all combustible construction and materials. It shall also be designated as a limited building zone.

Required Landscaping

Zone 1 will be cleared of all existing native vegetation and replanted with drought tolerant and irrigated fire resistant lawns, ground covers and shrubs. Landscaping including containerized plants, shall be irrigated and primarily consist of fire resistant, maintained native or ornamental plantings usually less than 18 inches in height. However, this zone may contain occasional fire resistant trees and single well spaced ornamental shrubs up to 48 inches in height, intermixed with ground covers and lawn. Shrubs and ground covers may be located no closer than five (5) feet from the structure provided these plants will not carry fire to the structure. Non-flammable concrete patios, driveways, swimming pools, walkways, boulders, rock, and gravel can be used to break up fuel continuity within Zone 1.

Plants in this zone need to be fire resistant and should not include any pyrophytes that are high in oils and resins such as pines, eucalyptus, cedar, cypress or juniper species. Thick, succulent or leathery leaf species with high moisture content are the most "fire resistant". Refer to APPENDIX 'B' and 'C' for a list of San Diego County desirable and prohibited plants for plant selection.

Trees must be planted so that when they reach maturity the tips of their branches are at least 10 feet away from any structure and must have a minimum of six (6) feet of vertical separation from low growing irrigated vegetation beneath the canopy of the tree.

Xeriphytic landscaping may be used in Zone 1 as long as the plants are from the approved plant list and irrigation is available from drip or similar low water use systems to maintain plant health. Plants with thick leatherly leaves and smooth bark are preferred. Shrub heights are usually less than 12 inches but occasionally fire-resistant trees may be planted. Separation between tree canopies shall be double those shown in Table 9 below. Non-combustible hardscapes including rock, concrete, stone and similar materials are preferred inclusions to reduce vegetation cover and need for irrigation. The xeriphytic landscape shall be free of all fine dead fuels such as annual grass and weeds. An example of a xeriphytic landscape is shown below.

Photo 8 – Example Xeriphytic Landscape that is Fire-Resistant

Rooftop planters are allowed but must meet Zone 1 landscaping requirements to protect against ember ignitions from nearby wildland fuels.

Required Maintenance

The lot shall be maintained year round by the individual property owner(s) within their property boundary (lot lines) as required by this FPP or the NCFPD. Shrubs and trees are to be annually maintained free of dead material. Trees will be maintained so that their crown cover will be more than ten (10) feet from any structure. Ornamental trees shall be limited to groupings of 2-3 trees with canopies for each grouping separated horizontally as described in the Table 9 below:

Table 9 - DISTANCE BETWEEN TREE CANOPIES
Distance between Tree Canopies by Percent Slope

Percent of Slope	Required Distances Between Edge of Mature Tree Canopies
0 - 20	**10 Feet**
21 - 40	**20 Feet**
Over 41	**30 Feet**

Trees shall be maintained to keep a separation of six (6) feet between the ground fuels (shrubs and ground covers) and the lower limbs. All trees and shrubs must be maintained to the current ANSI A300 standards [*Tree, Shrub, and Other Woody Plant Maintenance — Standard Practices (Pruning, Part 1) and (Integrated Vegetation Management)]* (see http://www.isa-arbor.com/store/product.aspx?ProductID=150).

2.10.2 Fuel Modification Zone 2 - *(Shown as Orange on the Fuel Treatment Map).*

Defined

Fuel Modification Zone 2 is the area beginning at the outer edge of Zone 1, 50 feet from each structure. It is typically a non-irrigated thinning zone 50 feet in width and includes all natural and manufactured slopes. Thinning zones are utilized to reduce the vegetative fuel load of a wildland area adjacent to urban developments thereby reducing the radiant and convective heat of wildland fires. The intent is to achieve and maintain an overall 50 percent reduction of the canopy cover spacing and a 50 percent reduction of the original fuel loading by reducing the fuel in each remaining shrub or tree (remove deadwood and dying plant material, raise canopy a minimum of 6 feet above understory vegetation) without substantially decreasing the canopy cover or the removal of tree holding root systems. Combustible construction (i.e. gazebos, trellises, shade covers, etc.) is not allowed in Zone 2. This zone shall also be designated as a limited building zone.

Along the Interstate 15 corridor, those lots that abut the freeway right of way shall have 25 feet of Zone 2 treatment following the required 50 feet of Zone 1 for a total of 75 feet of fuel treatment. In additonal all structures shall be located 75 feet or more from the western project boundary. The hazardous vegetation along the freeway is limited to 18 inches or less in height and consists of a narrow strip of vegetation between the freeway and the development. Projected fire behavior along the south and west sides of the development resulting from a combination of lower projected wind speeds (30 MPH), lighter fuels (18" or less) and minimal topography issues result in significantly less fire behavior than the northern or eastern sides of the development that abut dedicated open space and heavier fuels. Therefore, 75 feet of fuel treatment and structure setbacks from the project boundary of 75 feet or more as shown on the Fuel Treatment Location Map will provide reasonable fire protection for the projected "worst case" fire behavior of 33.2 feet described in Table 5.

On the south east side of Lot 10, it shall have 25 feet of Zone 2 treatment following the required 50 feet of Zone 1 for a total of 75 feet of fuel treatment. In additonal all structures shall be located 75 feet or more from the eastern project boundary and a 6 foot non-combustible wall shall be installed at the top of the slope leading up from Lot 21. The area to the east of Lot 10 contains a designated wetland, containing a roadway, Pankey Road with associated roadside fuel treatment of over 100 feet in width. Additionally, within Lot 21 is a water quality basin which typically supports limited flammable vegetation.

Should Option 1 occur as described in Section 2.10, the fuel treatment north of Lot 16 shall be modified to Zone 1 criteria along its entire

northern exposure as shown on the Fuel Treatment Location Map, Section 3.2. The requirement for a fire wall shall also be removed as the lot will abut SR 76.

The balance of the eastern side of the project is provided with a full 100 feet of fuel treatment.

Required Landscaping
All exotic and flammable native plants (see San Diego County prohibited plant list in APPENDIX 'B') shall be removed and the original canopy and fuel loading reduced by 50%.

Required Maintenance

- Low growing plants and ground covers are to be maintained to a height of 18 inches or less.
- Each tree will be limbed to maintain a separation of 6 feet between the ground fuels (shrubs and ground covers) and the lower limbs.
- Maintenance will be on-going throughout the year as needed with continuous removal and/or thinning of undesirable combustible vegetation to maintain 50% thinning, and limbing and shaping, of the retained fire resistant native plants (see APPENDIX 'B').
- Native annual and perennial grasses will be allowed to grow and produce seed during the winter and spring. As grasses begin to cure (dry out), they will be cut to 8 inches or less in height.
- Continuous removal of all dead and dying vegetation and highly flammable species (see APPENDIX 'C').

2.10.3 Roadways – HOA Maintained *(Shown as Purple on the Fuel Treatment Map)*

Required Maintenance. Clearance of brush or vegetative growth along new and existing on and off-site roadways will comply with the Consolidated Fire Code for the 17 Fire Protection Districts in San Diego County. The requirements were amended and became effective on October 28, 2011. The NCFPD has modified_Section 4707.2.1 to state the following regarding the removal of vegetation along roadways:

> The FAHJ shall require a property owner to modify combustible vegetation in the area within 20 feet from each side of the driveway or a public or private road adjacent to the property to establish a fuel modification zone. The FAHJ has the right to enter private property to insure the fuel modification zone requirements are met.

Exception: The FAJH may reduce the width of the fuel modification zone if it will not impair access.

See Section 3.2 Fuel Treatment Location Map and specific locations of treatment and treatment responsibility.

2.10.4 Driveways.

All driveways to residential areas will be located in the multi-family area. Their location is unknown at this time. All driveways will be provided with 20 feet of Zone 1 fuel treatment on either side of the driveway when they are developed.

2.11 Proposed Plant Species.

Only plant species listed in APPENDIX 'B' – County of San Diego PDS Approved Plant List shall be used. Other recommended plant species meeting the criteria for fire resistive plant characteristic may be planted within any fuel treatment zone only after these plants have been certified by the applicant's landscape architect and fire consultant in conjunction with the NCFPD fire marshal. The list in the Appendix is shorter than what the County of San Diego's PDS generally provides as it has been customized to the project's climatic zone found in the Western Garden Book. The list is thus shorter than what the County provides. Additional explanatory material is found in the Appendix.

2.12 Building Setbacks and Fuel Modification During Construction.

Per the County Consolidated Fire Code, all buildings and structures shall be setback a minimum of 30 feet from the property line unless the County Zoning Ordinance requires a greater minimum. An exception may be made when both the building official and the FAHJ determine that the hazard from a wildland fire is not significant or when the terrain, parcel size or other constraints on the parcel make the required setback infeasible, the building official may allow the setback to be less than 30 feet from the property line when allowed by the Zoning Ordinance.

All buildings located along the western project boundary will be setback from the boundary a minimum of 75 feet from the project boundary to allow space for the fuel treatment described Section 2.11.2 - Fuel Modification Zone 2. All buildings are to be located outside of fuel treatment zones as shown on the Fuel Treatment Location Map (Section 3.2).

Any person doing construction of any kind which requires a permit shall install a fuel modification zone prior to allowing any combustible material to arrive on the construction site and shall maintain the zone during the duration of the project. All roads, water systems and related public improvements shall be operable prior to the delivery of combustible building materials.

2.13 Cumulative Impact Analysis.

The cumulative impact of the Campus Park West project and other future surrounding developments will create an increased emergency response workload for the North County Fire Protection District. Both the number of homes and residents will increase as future development occurs. As mitigation efforts against this increased workload, Campus Park West structures shall be built to County of San Diego Building Code Chapter 7A. As described in Section 2.2, Campus Park West will be conditioned to enter into an agreement with the NCFPD and pay a proportionate fair share contribution for necessary improvements to fire protection.

In addition to the fire-resistive building requirements, a Fire Management Zone (FMZ) shall be constructed around all structures. In most cases a FMZ of 100 ft. (more than twice the calculated flame length) shall be installed. As a result, all structures will be located 100 feet or more from wildland fuels found in protected open space. The FM that best represents the area of greatest concern is a Combined FM [SCAL 18 – Sage/Buckwheat 50% and GR4 - Moderate Load Dry Climate Grass 50%] can produce flame lengths of approximately 60.7 feet. The required fuel treatment of 100 feet required throughout most of the project will mitigate this threat to less than significant levels. Road access and water supply (fire hydrants) shall be provided and will be available to the NCFPD in areas that hydrants do not presently exist.

The FMZ's for the western and southern sides of the project shall be 75 feet in width (50 feet of Zone 1 followed by 25 feet of Zone 2) as the area to the west abuts Interstate 15. Along Interstate 15, a narrow lens of wildland fuel exists that under the worst case will only produce fuel lengths of half of 75 feet which mitigates radiant and convective heat impacts to less than significant levels.

The Campus Park West project's proposed features will assist the NCFPD in their wildland firefighting mission. The assistance will come by virtue of providing a break in native fuel continuity, additional emergency vehicle access and supporting water supply during wildland fire and providing a well maintained development of enhanced building features that will provide reasonable safety for the occupants.

Increased property values and related tax revenue created by Campus Park West will be a positive impact by providing a more balanced funding source for the District.

CHAPTER 3: MITIGATION MEASURES AND DESIGN CONSIDERATIONS

Exterior Ignition-Resistant Construction building materials, fuel modification zones and inclusions in the projects Convents, Conditions and regulations (CC&R's) and other considerations including resident education are described in this chapter.

3.1 Specific Mitigation Measures and Design Considerations

All fire hydrants, water mains, fire flow capability and access roadways shall be installed and operational prior to the arrival of combustibles on-site. Said access roadways shall remain unobstructed to provide traffic circulation and emergency access. The County Building Code requires the developer/owner to establish and maintain a fuel modification zone prior to allowing any combustible material to arrive on the site and shall maintain the zone for the duration of the project. The NCFPD Fire Marshal may at his/her discretion allow for a phased implementation. Larger commercial and industrial buildings may also be required to install a standpipe firefighting system (see APPENDIX 'G').

3.1.1 San Diego County PDS Ignition Resistant Building Materials. All newly constructed structures will be built to San Diego Building Code Chapter 7A requirements; refer to APPENDIX 'D' for the Ignition Resistant Construction Requirements. The installation of automatic interior sprinkler systems (National Fire Protection Association – NFPA Standard 13R - Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, will be required. An additional requirement for all structures is that tempered glass shall be used in at least one panel of all windows and openings in the outer walls.

3.1.2 NCFPD Requirements. Single-story structures shall be setback a minimum 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 from a roof.

3.1.3 One hundred-foot Fuel Modification zones. In most areas, a minimum of 100 ft. of fuel treatment shall be placed around all structures that abut flammable native vegetation located north and east of the project. It is the intent that the first 50 ft. from a structure be landscaped and irrigated, plus an additional 50 ft. of fuel treatment (non-irrigated thinning zone).

On the west and south sides of the project, 75 feet of fuel treatment as described in Section 2.14 will provide fire protection and mitigate the fire threat to less than significant levels. Wildland fuels in these areas are typically 18 inches or less in height. Structures in this area will be built to commercial or light industrial standards.

3.1.4 Requirements for Inclusion in the CC&R's:

1. Each lot owner is personally responsible for all fuel treatment measures within their property lots. Where these zones extend onto an adjoining lot within the development, the lot owner benefiting from the fuel treatment shall be allowed to perform the work on the adjacent property.

2. All property owners shall be members of a Home Owners Association (HOA) and will financially support the annual maintenance of all required Fuel Modification Areas within the common areas of the subdivision in perpetuity.

3. All roadside fuel treatment within the subdivision as shown on the Fuel Modification Zone Map (Section 3.2) is the maintenance responsibility of the HOA.

4. The HOA Board will have the authority for enforcing required fuel treatment measures on all lots and restrictions on combustible structures adjacent to common areas.

5. **TRASH DUMPING OR DISPOSAL OF YARD TRIMMINGS IN THE FUEL TREATMENT ZONES SHALL NOT BE ALLOWED.**

6. The Fuel Treatment Zones, as depicted on the Fuel Treatment Map, shall be shown on the CC&R's and recorded against all lots. The HOA will be responsible for enforcing all required fuel modification treatments on all lots.

7. The HOA Board will be responsible to the North County Fire Protection District for the completion of all required Fuel Modification Treatments prior to the annual fire season or times when growth of additional combustibles makes it necessary as determined by the NCFPD Fire Marshal. This includes the perpetual management of invasive species (exotics) in any zone within this development.

8. All individual lot landscaping plans, including additional structures, shall be approved by the HOA Board and will comply with the Fire Protection Plan. Any disputes relating to HOA Board approval of individual yard landscaping, with regard to interpretation of the Fire Protection Plan, will be decided by the North County Fire Protection District Fire Marshal. The Fire Marshal's decision will be final and binding on the landowner.

9. Trees shall be placed and maintained so that their crown cover at maturity will be more than ten (10) feet from any structure.

10. All plants including those planted in containers will be in accordance with the San Diego County recommended plant list (See APPENDIX 'B'), or as approved by the North County Fire Protection District Fire Marshal.

11. Upon the sale of a lot to a new owner, a copy of the Fire Protection Plan shall be provided as a condition of the sale.

12. The HOA is responsible to the NCFPD for the completion of all required Fuel Modification Treatments in the common areas. Required on-going maintenance will be accomplished on an as needed basis. Should maintenance not be performed in a manner consistent with this Plan, the NCFPD shall have the right to abate any treatment zone they deem a threat to Campus Park West or adjoining properties. In doing so, all cost incurred will be billed to the owner(s). At the discretion of the NCFPD Fire Marshal, yearly inspection of treatment areas may be required.

13. As used herein, "Fire Prevention Maintenance" shall mean the following:

    a. All portions of the Association Property (or Common Area) that constitute Fuel Modification Zones shall be regularly maintained by the homeowners association on a year round basis in accordance with the Fuel Modification Plan on file with the property manager for the development.

    b. The irrigation system for Fuel Modification Zones shall be kept in good condition and proper working order at all times.

14. Firewood or other combustible materials shall not be stored in unenclosed space beneath a building or structure, on a deck or under eaves, a canopy or other projection or overhang. When required by the fire code official, firewood or other combustible material stored in the defensible space surrounding a structure shall be located at least 30 feet from any structure and separated from the crown of any trees by a minimum of 15 feet, measured horizontally. Firewood and combustible materials not for use on the premises shall be stored to not pose a fire hazard.

3.1.5 Additional Requirements.

- Brush removal shall be completed prior to any combustible material being delivered to the project site and the owner shall maintain the fuel modification zone during the duration of the construction. During construction at least 50 feet of clearance around the structures shall be

kept free of all flammable vegetation as an interim fuel modification zone during construction of structures. No occupancy permit for any structure shall be issued until all the required fuel modifications zones specified in Section 2.11 are established.

- If the landowner is aware of any state or federal listed species on their property, the U.S. Fish and Wildlife Service should be notified prior to the abatement.

- Debris and trimmings produced by thinning and pruning will be removed from the site, or, if left, shall be converted into mulch and evenly dispersed upon the ground to a maximum depth of four inches. Alternatively, the cut branches may be multi-cut into a maximum of 6 inch lengths and spread over the ground to recycle nutrients. Such trimmings will not be placed within 50 feet of structures.

- Any damaged or broken window, siding, roof coverings, and specific non-combustible wall will meet or exceed the original intent of the fire protection discussed in this plan.

- This plan and its requirements shall be incorporated by reference into the final project Conditions of Approval.

3.1.6 Resident Education. The Campus Park homeowners, by reviewing this Fire Protection Plan, shall be aware of the herein described fire protection measures; the types of non-combustible construction; and, the plant materials that are allowed within their lot boundary. The HOA shall yearly review NCFPD requirements for consistency with local fire authority policy and provide the lot owners with information regarding wildfire mitigation efforts necessary for community fire safety that are contained within this FPP. Of particular importance are APPENDICES 'A', 'B', 'D', and 'F' of this plan. These appendices provide guidance in the types of plants that are allowed to be established in landscaped areas, those that are prohibited, and appropriate construction materials for use within fuel modification zones. Plant selection and construction materials are critical as embers often travel over a mile during Santa Ana wind events.

A copy of this plan shall be provided to each lot owner by the builder/developer at the time of the initial sale to the first owner. Upon sale of the property to a new homeowner, the new property owner shall be provided with a copy of this FPP by the HOA to insure continued compliance with all Fuel Modification Zone maintenance and construction requirements.

In the event of a wildfire in the area, the homeowner should perform the following:

- Close all windows and doors (including pet doors) that lead outside to prevent sparks from entering the house.
- Close all doors within the house in case the house does catch on fire; this will slow down the spread of the fire from room to room.
- Move all combustible materials in the home away from windows to prevent the possibility of heat from a fire radiating through windows and glass doors and catching flammable materials inside the home on fire. This includes drapes, curtains and furniture.
- Move combustible materials on patios, decks and sounding the structure inside away from heat and embers or 30 feet away from any structure.
- Close windows and all Venetian blinds or noncombustible window coverings.
- Turn on the lights in each room, porch, and yard. This aids in visibility when the smoke gets thick and darkens the sky.
- Fill all sinks, bathtubs and buckets with water in case the power goes out and water cannot be drawn from hoses or faucets.
- Shut off any gas valves within the house or outside.
- Open the damper on fireplaces to stabilize inside/outside pressure, but close fireplace screens to keep sparks from igniting the house.
- Have all important papers and valuables including family pets ready for transport should the need to relocate occur.
- Place any vehicle to be utilized for relocation in the driveway facing the road until the fire threat has passed.

For additional information, consult with your local Fire Department.

3.2 Fuel Treatment Location Map.

Attached is a folder containing the FUEL TREATMENT LOCATION MAP (Exhibit 1) depicting the location of all proposed fuel modification treatment locations on and adjacent to all lots. Two options are shown for the southern area, PA-4, 5 and 6. Option 1 depicts the project without the CAL TRANS property. Option 2 depicts the addition of decertified CAL TRANS property.

CHAPTER 4: CONCLUSIONS

This chapter reviews the most significant issues regarding wildland fire protection for the Campus Park West Project including design, installation and maintenance features that reduce the wildland fire threat to less than a significant level.

4.1 Exterior Ignition-Resistant Building Materials.

The implementation of the County Ignition-Resistant building standards reduces the potential for a wildland fire to ignite a structure due to radiant/convective heat or from windblown embers to a "less than significant level".

4.2 Fuel Management Zones.

The use of properly planned and maintained fuel modification zones will provide 100 ft. of fuel treatment on the north and east sides of the project and 75 feet on the west and south sides around all structures where applicable. Fire modeling using the combined Fuel Model of GR1 - Sparse Short Dry Climate Grass and FM TL6 – Moderate Load Hardwood with Litter including a requirement that any grass be kept to a minimum 4 inch stubble height will significantly mitigate the fire threat in fuel modification Zone 2. These types of vegetative fuel treatments are more than twice the expected flame lengths created during the Transitional Zone "Peak" wildland fire event. Therefore the threat of loss of life and property would be reduced to a "less than significant" level due to radiant and convective heat.

4.3 Secondary Road Access.

There are two means of access into the Campus Park West development. Pala Mesa Drive and Pankey Road provide access to either the Old Highway 395 or Pala Road, Highway 76 (SR 76). This circulation element provides for rapid ingress and egress by residents, workers and emergency responders. These roads will be completed prior to construction.

4.4 Fire Department Response.

The development will have adequate emergency response in terms of access and construction standards for roadways and streets. In additional to the NCFPD engines, CAL FIRE, and nearby fire departments through mutual aid, will provide fire protection. Negations are being conducted to enhance the NCFPD's emergency response capability for the prescribed land uses and additional workload. Response times and the proximity of the development to the Wildland Urban Interface (WUI), and a subdivision in a moderate to high fire hazard severity zone require fire sprinklers to be installed in all structures. This will assist in mitigation for longer response times which might be expected during worst case weather when several wildfires may be burning simultaneously.

CHAPTER 5: LIST OF PREPARERS, PERSONS AND ORGANIZATIONS CONTACTED

This chapter lists those persons that prepared and that were contacted during the course of the development of this FPP.

5.1 List of Preparers

The principal author and preparer of this Fire Protection Plan was Herbert Spitzer, Senior Wildland Fire Associate - ***FIREWISE* 2000, Inc.** Final review and certification by David C. Bacon, President – ***FIREWISE* 2000, Inc.**, a San Diego County PDS certified wildland fire consultant. Other team members contributed peer review and comments.

5.2 List of Persons contacted During the Course of this Project

1. Thad Johnson, Project Administrator, Pappas Investments
2. Sidney Morel, Fire Marshal, North County Fire Protection District
3. Anthony Ng, Principal, Pacific Coast Civil, Inc.
4. Camille Passon, Project Coordinator, Project Design Consultants
5. Debby Reece, Project Coordinator, Project Design Consultants
6. Elyssa Robertson, Biologist, R.E.C. Consultants
7. Greg Shields, Project Engineer, Project Design Consultants
8. Mark Tarrall, Project Engineer, Project Design Consultants

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CHAPTER 6: DEFINITIONS

For the purposes of this Fire Protection Plan, the following definitions apply to the terms used in this document. Where terms are not included, common usage of the terms shall apply.

ASPECT - Compass direction toward which a slope faces.

AUTHORITY HAVING JURISDICTION (AHJ) – An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

CLIMAX VEGETATION - The final stage in ecological plant succession in which a relatively constant environment is reached and species composition no longer changes in a directional fashion, but fluctuates about some mean, or average, community composition.

COMBUSTIBLE – Any material that, in the form in which it is used and under the conditions anticipated will ignite and burn or will add appreciable heat to an ambient fire.

COMBUSTIBLE VEGETATION – means material that in its natural state will readily ignite, burn, and transmit fire from native or landscape plants to any structure or other vegetation. Combustible vegetation includes dry grass, brush, weeds, litter or other flammable vegetation that creates a fire hazard.

DEFENSIBLE SPACE – is an area either natural or man-made, where material capable of allowing a fire to spread unchecked has been treated, cleared or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations to occur.

EXTREME FIRE BEHAVIOR – "Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One of more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

FIRE RESISTIVE PLANTS – plants that do not readily ignite from a flame or other ignition sources. These plants can be damaged or even killed by fire; however, their foliage and stems do not significantly contribute to the fuel and, therefore, the fire's intensity.

FIRE BEHAVIOR – The manner in which a fire reacts to the influences of fuel, weather and topography.

FIRE HAZARD SEVERITY ZONES – are geographical areas designated pursuant to California Public Resources Code sections 4201 through 4204 and classified as Very High, High and Moderate in State Responsibility Areas or as Local Agency Very High Fire Hazard Severity Zones designated pursuant to California Government Code sections 51175 through 51189. The California Code of Regulations, Title 14, Section 1280 entitles maps of these geographical areas as "Maps of the Fire Hazard Severity Zones in the State Responsibility Area of California."

FLAME LENGTH – The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity.

FUEL MOISTURE – The quantity of moisture in vegetative fuels expressed as a percentage of the weight when thoroughly dried at 212 degrees F.

FUEL MODEL – Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified. Fuel models are utilized in the BehavePlus Fire Model to aid in forecasting fire behavior.
FUEL MODIFICATION – Any manipulation or removal of fuels to reduce the likelihood of ignition or the resistance to fire control.

GROUND FUELS - All combustible materials such as grass, duff, loose surface litter, tree or shrub roots, rotting wood, leaves, peat, or sawdust that typically support combustion.

IGNITION- RESISTIVE – Construction designed to provide reasonable protection against fire.

LADDER FUELS – Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

LIMITED BUILDING ZONE – A protective buffer that surrounds biological open space. A LBZ would prohibit the building of structures that would require vegetation clearing within the protected open space for fuel management purposes.

MITIGATION – Action that moderates the severity of a fire hazard or risk.

ONE-HOUR FUEL - 1-hour fuels consist of those portions of vegetation that are < 0.625 cm (0.25 in.) in diameter. 1-hour fuels are the most important for carrying surface fires and their moisture content governs fire behavior.

RADIANT HEAT – Transfer of heat in straight lines through a gas or vacuum other than by heating of the intervening space

RELATIVE HUMIDITY – A weather term, the amount of moisture in the air as a percentage of the maximum the air will hold at a given temperature. The amount of moisture in a given parcel of air expressed as a percentage of the maximum amount that parcel of air could hold at the same air temperature.

REMOTE AUTOMATED WEATHER STATION – is a combination of sensors, radios and related electronic equipment installed in wildland areas that are designed to monitor the weather and provide weather data that assists land management agencies with a variety of projects such as monitoring air quality, fire danger rating, and providing information for research applications.

SHALL - Indicates a mandatory requirement.

RISK – The measure of the probability of ignition and severity of adverse effects that result from an exposure to a wildland fire (direction flames, radiant heat, or firebrands (embers).

SLOPE – is the variation of terrain from the horizontal; the number of feet, rise or fall per 100 feet, measured horizontally, expressed as a percentage.

STANDPIPE – a type of rigid water piping which is built into multi-story buildings in a vertical position, to which fire hoses can be connected, allowing manual application of water to a fire. Within buildings, standpipes thus serve the same purpose as fire hydrants.

TEN-HOUR FUELS - 10-hour fuels are those portions of plant material that are between (0.625 - 2.5 cm (0.25 to 1 in.) in diameter. Ten-hour fuels are readily consumed when dead fuel moistures are low.

XEROPHYTIC PLANT - A plant that is adapted for life with a limited supply of water. Plants commonly found in desert climates.

WILDFIRE – is any uncontrolled fire spreading through vegetative fuels that threaten to destroy life, property, or resources as defined in Public Resources Code sections 4103 and 4104.

WILDFIRE EXPOSURE – one or a combination of radiant heat, convective heat, direct flame contact and burning embers being projected by vegetation fire to a structure and its immediate environment.

WILDLAND-URBAN INTERFACE – The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

CHAPTER 7.0 – REFERENCES

The publications below were utilized in preparing the Campus Park West Fire Protection Plan:

1. Andrews, Patricia L. 1986. BEHAVE: Fire behavior prediction and fuel modeling system-burn subsystem, part 1. Gen Tech. Rep. INT-194. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 130 p.

2. Andrews, Patricia L.; Carolyn H. Chase. 1989. BEHAVE: Fire behavior prediction and Fuel Modeling System—BURN subsystem, Part 2. Gen. Tech. Rpt. INT-260. Ogden, UT: USDA Forest Service, Intermountain Research Station. 93 p.

3. Andrews, P. L., C. D. Bevins, and R. C. Seli. (2008) BehavePlus fire modeling system, version 4.0: User's Guide. General Technical Report RMRS-GTR-106WWW Revised. Ogden, UT: Department of Agriculture, Forest Service. Rocky Mountain Research Station. (5,872 KB; 116 pages).

4. ANSI A300 – Standard Parts 1-7. Tree Care Operations - Tree, Shrub, And Other Woody Plant Maintenance. International Society of Arboriculture 2009-2011.Various years – 2006 to 2012.

5. California Code of Regulations [CCR] Title 24 part 2, California Building Code 2010.

6. California Code of Regulations (CCR) Title 24 part 9, California Fire Code 2010.

7. *California Public Resources Code 4290* Title 14 – Natural Resources, SRA Fire Safe Regulations 2008.

8. County of San Diego. *2011 Consolidated Fire Code, Title 9, Division 6, chapter 1* of the San Diego County Code. Ordinance number 10172.

9. County of San Diego. *Guidelines for Determining Significance and Report Format and Content Requirements Wildland Fire and Fire Protection Land Use and Environment Group Planning and Development Services, Department of Public Works, August 31, 2010.*

10. County of San Diego. *Plant List and Acceptable Plants for a Defensible Space in Fire Prone Areas.* Planning and Development Services, December 15, 1998, revised 6/29/2004.

11. County of San Diego. *Standards for Private Roads."* Department of Public Works, Adopted October, 2012.

12. Fire Planning and Mapping Tools. California Fire Alliance. Web site is available at: http://wildfire.cr.usgs.gov/fireplanning/

13. *Guidance Document Ignition Resistant Eave Construction*. County of San Diego, Planning and Development Services, Building Division, PDS # 198 (3-21-2005).

14. Latham, D. J. and J. A. Schleiter. (1989) Ignition Probabilities of Wildland Fuels Based on Simulated Lightning Discharges. USDA Forest Service General Technical Report INT-411, Ogden, UT. (6,497 KB; 20 pages)

15. National Fire Protection Association - NFPA 13 Standard for the Installation of Fire Sprinkler Systems, 2013 Edition.

16. National Fire Protection Association - NFPA 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting, 2012 Edition.

17. National Fire Protection Association - NFPA 1144 *Standard for Reducing Structure Ignition Hazards from Wildfire* (2013).

18. North County Fire Protection District - Policy and Procedure Manual, May 10, 2005. 3 Pages.

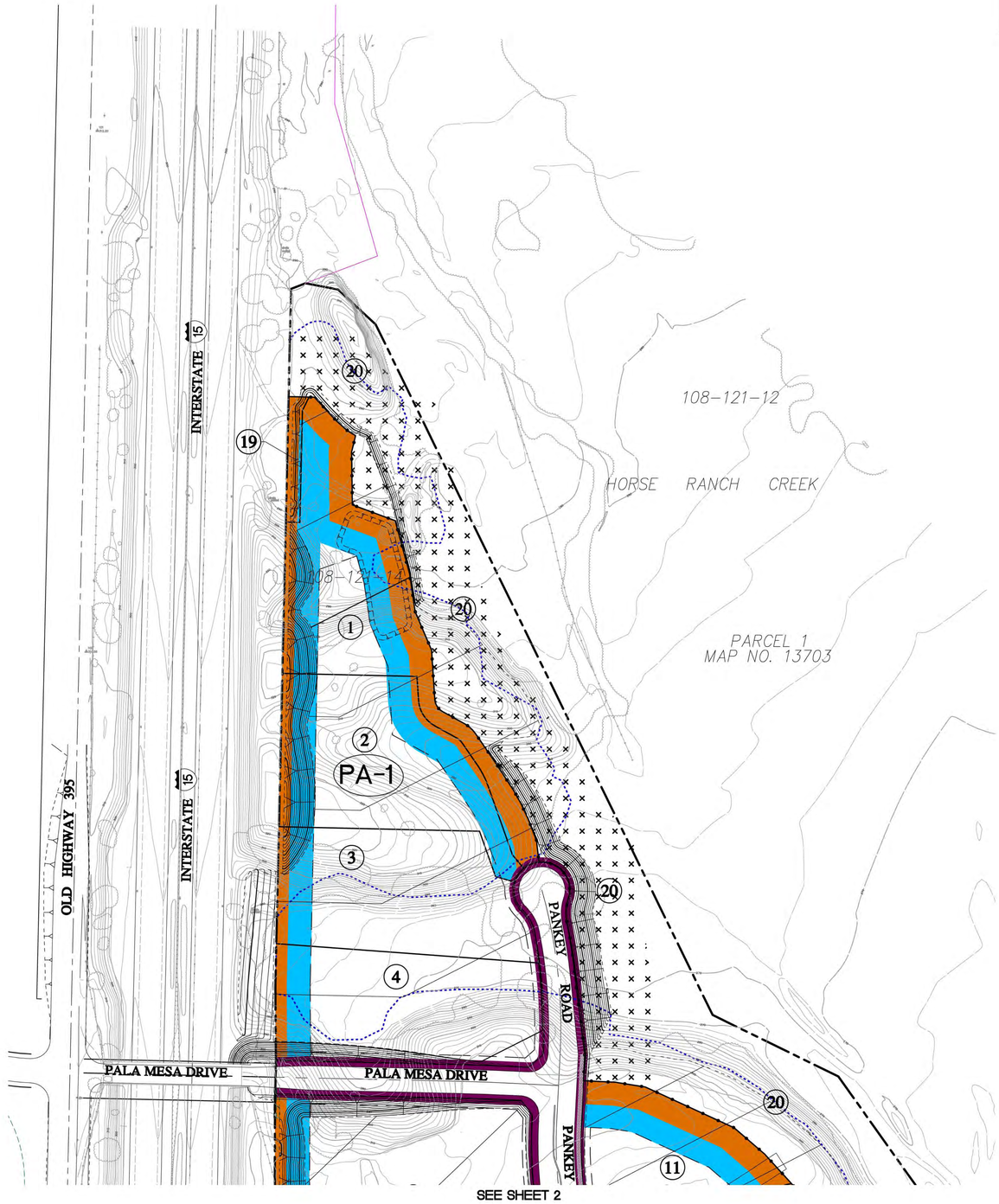
19. Rothermel, R. C. (1983), "How to Predict the Spread and Intensity of Forest Fire and Range Fires", Gen. Tech. Rep. INT-143. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 161 pages.

20. Scott, Joe H.; Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station; 72 p.

21. Western Garden Book 2001 Edition. Editor: Kathleen Norris Brenzel. ISBN-0376039175. Published by: Sunset Publishing Corporation. Menlo Park, CA. 768 Pages.

22. Western Region Climate Center. *Historic Climate Data from Remote Automated Weather Stations*. RAWS USA Climate Archive. Reno, NV. Data for all Remote Automated Weather Stations is available at: http://www.raws.dri.edu/index.html.

23. *Wildland/Urban Interface Development Standards.* San Diego County Fire Chief's Association, originally Developed by Orange County Wildland/Urban Interface Task Force Subcommittee on Open Space Management, July, 1994, Modified by the San Diego County Wildland/Urban Interface Task Force, November, 1995, Revised August, 1997.



60 MPH NE Wind

60.7 Foot Flame Lengths

FUEL TREATMENT LOCATION
For
CAMPUS PARK WEST - SAN DIEGO COUNTY, CALIFORNIA

LOT FRONT, SIDE AND BACK YARDS. Each individual land owner will be responsible for establishing and maintaining their lot/parcel to the North County Fire Protection District's Irrigated Zone 1 criteria. When the area is located within an multi-family residential common area, the H.O.A. shall perform the required maintenance. Alternatively, the area shall be kept clear of all combustible vegetation unless erosion is a concern.

FUEL MODIFICATION ZONE 1/LIMITED BUILDING ZONE (H.O.A. MAINTAINED). Common areas where the H.O.A. is responsible for maintenance of the landscape to Irrigated Zone 1 criteria and the area is designated as a Limited Building Zone (LBZ). Zone 1 shall extend 50 feet from a building. All native plants shall be removed and replaced with plants from the custom San Diego County approved plant list found in the Campus Park West Fire Protection Plan. The area shall be provided with a permanent irrigation system. No combustible structures shall be built within this zone.

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ROADWAYS (H.O.A. MAINTAINED). An area along a road located within the project where the vegetation shall be maintained to Irrigated Zone 1 criteria. All roads shall be maintained within 20 feet of the roadway edge.

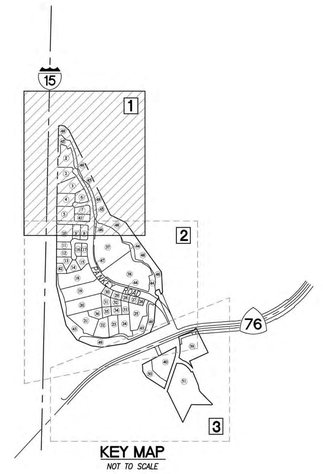
XXX **GIANT REED CLEARED (H.O.A. MAINTAINED).** An area north and east of PA1 where the existing Giant Reed (Arundo Donax) is cleared biannually within 150 feet of the Fuel Modification Zone 2 described above.

SPECIAL FIRE PROTECTION FEATURE - Non-combustible solid wall, six feet in height installed at the locations shown. The wall may contain a view wall in the upper half where tempered glass is installed as long as the wall remains solid and non-combustible.

November 28, 2008, Revised May 20, 2010, August 21, 2012 and April 27, 2013

Prepared For: Pappas Investments
2020 L Street, 5th Floor
Sacramento, CA 95814

Firewise 2000, Inc.
26337 Sky Drive · Escondido, CA · 92026 · Telephone: 760-745-3947



KEY MAP
NOT TO SCALE

30 MPH SW Wind

38.6 Foot Flame Lengths

Certified By

David C. Bacon Apr. 27, 2013

David C. Bacon, President — Date

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0 50 100 200 300

GRAPHICAL SCALE
SCALE: 1" = 100'

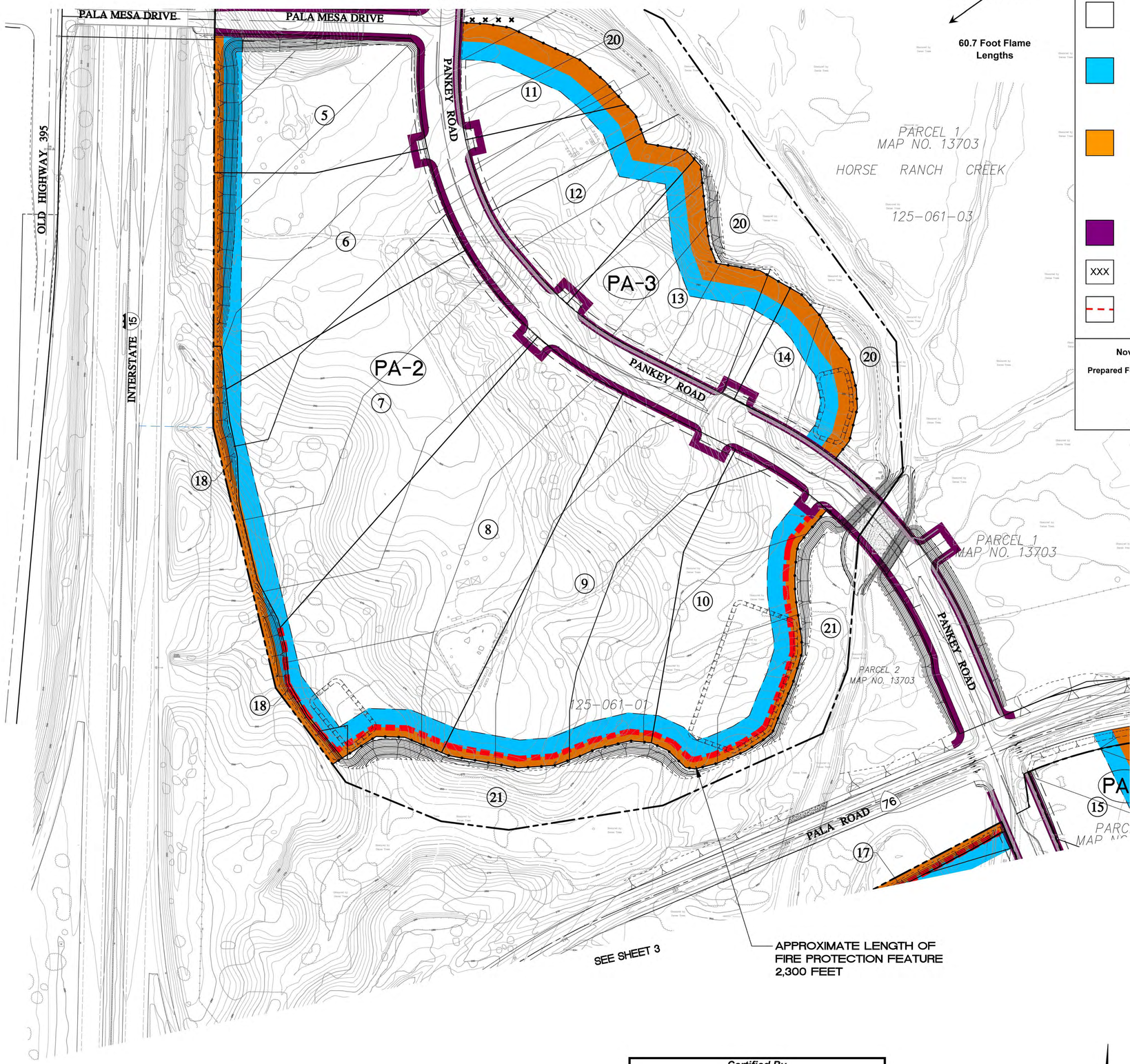
Fuel Treatment Location: TRACT 5424

CAMPUS PARK WEST

SHEET TITLE: Fuel Treatment Location Plan

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

FUEL TREATMENT LOCATION
For
CAMPUS PARK WEST - SAN DIEGO COUNTY, CALIFORNIA



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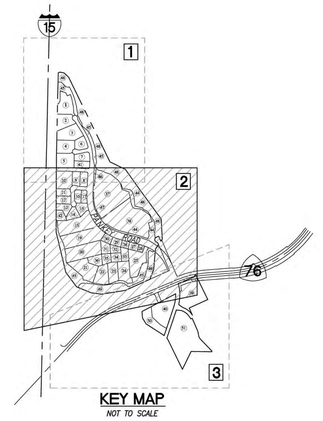

KEY MAP
NOT TO SCALE

30 MPH SW Wind
38.6 Foot Flame Lengths

Certified By

David C. Bacon Apr. 27, 2013
David C. Bacon, President Date

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GRAPHICAL SCALE
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CAMPUS PARK WEST

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60 MPH NE Wind

60.7 Foot Flame Lengths

APPROXIMATE LENGTH OF FIRE PROTECTION FEATURE 450 FEET

SEE SHEET 2

PALA ROAD 76

EXISTING PANKEY ROAD

EXISTING SHEARER CROSSING

PA-4 15 PARCEL 4 MAP NO. 13703 125-063-07

PA-5 16 125-063-01 PARCEL 3 MAP NO. 13703

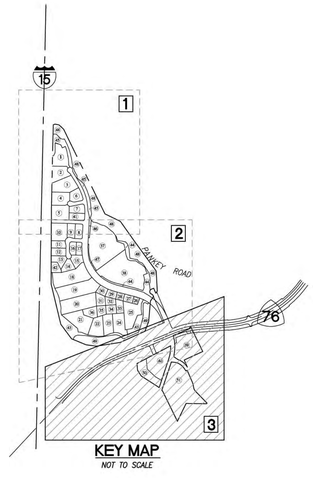
PA-6 23 125-063-08 PARCEL 3 MAP NO. 13703

17 22 125-062-02

OPTIONAL CALTRANS DECERTIFICATION AREA

OPTION 2 - CALTRANS DECERTIFICATION AREA ALTERNATIVE

OPTION 1 - EXISTING LAND OWNERSHIP ALTERNATIVE



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38.6 Foot Flame Lengths

Certified By

David C. Bacon Apr. 27, 2013

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GRAPHICAL SCALE
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