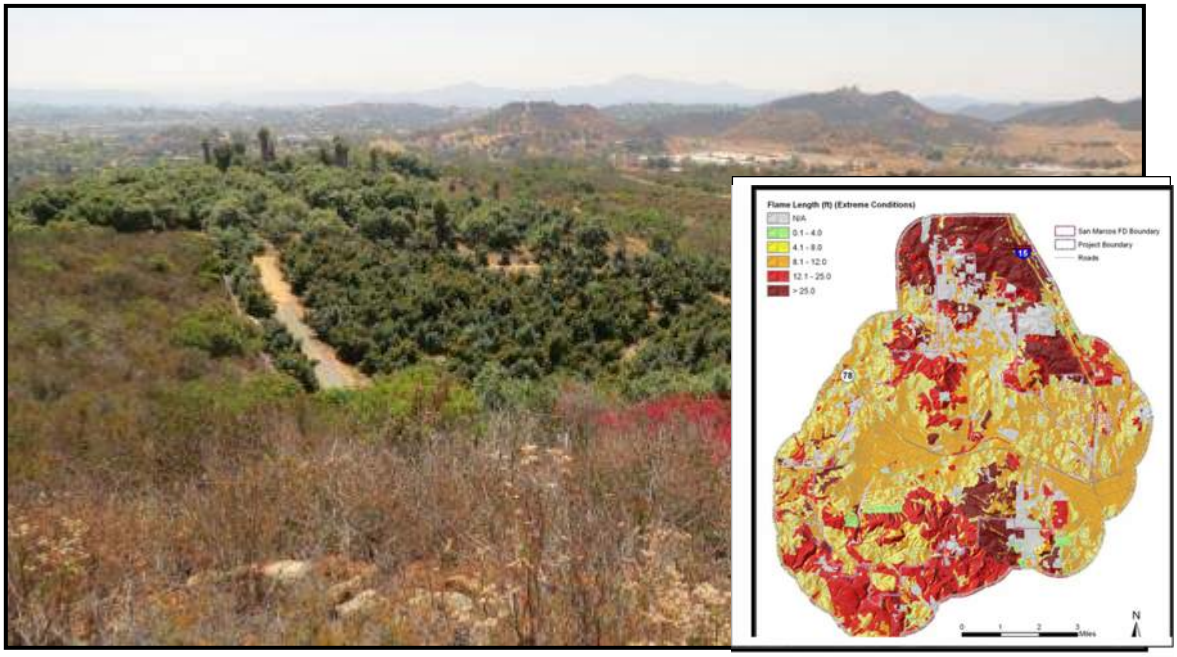
Valiano
FIRE PROTECTION PLAN

PROJECT NUMBER: 02690.007.02
San Marcos Fire Department and Fire Protection District
County of San Diego



March 12, 2015

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Date: March 12, 2015 *Revision*

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EXECUTIVE SUMMARY

This Fire Protection Plan (FPP) for the proposed Valiano Development has been prepared to evaluate the level of fire hazard that would affect or be caused by the proposed project and the methods proposed to minimize that hazard. The FPP identifies and prioritizes the measures necessary to adequately reduce the fire risks to the project. The FPP also evaluated the consistency of the proposed project with applicable fire protection regulations. 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, fire resistive building materials for residential structures, technical guidance for protection of commercial structures, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management.

The Valiano Specific Plan is a single family residential development on approximately 210 acres within an area called Eden Valley, which is part of an unincorporated area of North County San Diego. The Valiano Specific Plan is situated adjacent to the City of San Marcos (population 83,000) to the north and west, and Escondido (population 143,000) to the north and east.

The property is located approximately one mile south of the Highway 78 and the Nordahl exit. From the Nordahl exit head south on Nordahl to Country Club Drive, Country Club Drive to Hill Valley Drive. On Hill Valley Drive (west) you enter the north end of Valiano Specific Plan. Located to the northeast of the property a short distance is a light industrial business park and high density mobile home park; to the west are single family homes; to the east are semi-rural single family homes and small equestrian facilities; and, to the south is a 742 unit residential project under construction known as Harmony Grove Village.

When fully developed, Valiano will provide 326 residential units on varying lot sizes in small groupings of homes within five neighborhoods. Valiano will include semi-custom detached homes ranging from 1,400 to 4,000 square feet.

The land plan was designed with respect to the existing natural resources and topography where the roadways meander through the natural setting. Valiano will include walking and hiking on multi-purpose trails; equestrian uses on trails and turnouts; open space with passive park settings; and, a community recreation center all within a semi-rural atmosphere and setting.

The San Marcos Fire Department (SMFD) encompasses the entire site within its boundaries, and the applicant will work with the SMFD to provide fire service for the project. This FPP must be submitted to the San Marcos Fire Department (SMFD) and the San Diego County Planning & Development Services (PDS) for review and approval. It provides a potential menu of requirements which would be imposed when each lot within a phase is developed, and recommends standards that should be followed when detailed design is completed for each phase of development and each lot within each phase.

This plan is consistent with SMFD‘s local fire code and County guidance and referenced material in the 2014 Consolidated Fire Code, Guidelines for Determining Significance, and applicable State of California requirements. All detailed phase plans shall comply with the requirements of the County Consolidated Fire and Building Codes

The Rincon Del Diablo Municipal Water District will serve the water needs for this residential project. This water supply will meet the requirements of the San Diego County Consolidated Fire Code and the County of San Diego Fire Code for a commercial/business/residential development.

This FPP provides fuel modification requirements to mitigate the exposure of people or structures to a significant risk of loss, injury or death from wildland fires. Fuel modification will be achieved by removing, clearing, or modifying combustible vegetation and other flammable materials from the edge of all structures. Where one hundred fifty (150') feet of fuel modification beyond the edge of each structure cannot be met entirely within the boundary of the project, alternative measures that achieve the same level of protection may be used, including but not limited to one of the following: 1) utilization of adjacent irrigated and managed agricultural crops (orchards, etc.) which provide required fuel modification; 2) fuel modification and hazard abatement required and completed on adjacent and contiguous land to meet fire code requirements; 3) enhanced ignition-resistant construction methods and the use of other non-combustible features (i.e., parking lots, sidewalks, concrete patios, decorative rock, natural boulders on-site, and similar landscape features); 4) fire-barrier walls where structures face off-site native flammable fuels along the northeast, northwest, and southwest boundaries; 5) perimeter and property boundary sprinkler systems; or, 6) an easement acquired from adjacent landowners for the purpose of maintaining required fuel modification.

Ignition-resistant construction for all structures will provide significant protection in this very high fire hazard zone. Ignition-resistant construction requirements provide critical improvements to structures for them to survive a worst case scenario fire. Another significant requirement will be that the maintenance and repair of the proposed structures will be with the same ignition-resistant materials and construction features. Also, the FPP requires that ignition-resistant construction would apply to mitigate the ignitability of all future proposed structures and projections (i.e., exterior balconies, carports, decks, patio covers, unenclosed roofs and floors).

Lastly, plant species planted in this project will be those listed in APPENDIX 'A' – San Diego County Approved Plant List for High Fire Hazard Areas. Highly flammable, non-fire resistive vegetation will be removed and not re-planted within the area. Three specific non-fire resistive plants that will not be permitted to grow in the Fuel Management Zones even as specimen plants because of their flammability are:

- California sagebrush, *Artemisia californica;*
- Flat-topped buckwheat, *Eriogonum fasciculatum*; and,
- Black sage, *Salvia mellifera*.

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Valiano Project
FIRE PROTECTION PLAN
PROJECT NUMBER: ODS 2013-29-13-001
ENVIRONMENTAL LOG NUMBER: PDS 2013-ER-12-08-002

1.0 INTRODUCTION

This Fire Protection Plan (FPP) has been prepared for the proposed Valiano community. The purpose of the FPP is to evaluate the level of fire hazard that would affect or be caused by the proposed project and the methods proposed to minimize that hazard. The FPP also evaluated the consistency of the proposed project with applicable fire protection regulations. As part of the assessment, the plan has considered the property location; topography; geology; combustible vegetation (fuel types); climatic conditions; and fire history. The plan addresses water supply; access (including secondary/emergency access where applicable); structural ignitability and ignition resistive building features; fire protection systems and equipment; impacts to existing emergency services; defensible space; and vegetation management. The plan identifies areas for hazardous fuel reduction treatments and recommends the types and methods of such treatment. The plan recommends measures that property owners will take to reduce the probability of ignition of structures throughout the development addressed by the plan.

This FPP is based upon SMFD's local fire code and County guidance and referenced material in the 2014 Consolidated Fire Code, Guidelines for Determining Significance, the 2013 State of California Building Code, Chapter 7A, and San Diego County requirements for Ignition-Resistant Building Construction, and the California State Fire Marshal requirements for fire resistive construction.

An initial field visit was conducted on July 17, 2012 to evaluate lot layout, primary and secondary access road locations, hazardous fuels and topography.

1.1 Project Location

The Valiano Specific Plan is a single family residential development on approximately 210 acres within an area called Eden Valley, which is part of an unincorporated area of North County San Diego. The Valiano Specific Plan is situated adjacent to the City of San Marcos (population 83,000) to the north and west, and Escondido (population 143,000) to the north and east.

The property is located approximately one mile south of the Highway 78 and the Nordahl exit. From the Nordahl exit, drive south on Nordahl to Country Club Drive; Country Club Drive to Hill Valley Drive. On Hill Valley Drive (west) you enter the north end of Valiano Specific Plan. Located to the northeast of the property a short distance is a light industrial business park and high density mobile home park, to the west are single family homes, to the east are semi-rural single family homes and small equestrian facilities (See Figure 1–Vicinity Map). Approximately one quarter mile to the south is a 742 unit residential project under construction known as Harmony Grove Village.

1.2 Project Description

When fully developed, Valiano will provide 326 residential units on varying lot sizes in small groupings of homes within five neighborhoods. Valiano will include semi-custom detached homes ranging from 1,400 to 4,000 square feet.

The project area is divided into five neighborhoods within two separate sites. Area 1 contains Neighborhoods 1, 2, 3 and 4. Area 2 contains Neighborhood 5. Area 1 is proposed to take access from Country Club Drive/Eden Valley Lane and Mount Whitney Road with an emergency service access from Hill Valley Drive and one off Mount Whitney Road. Area 2 is proposed to take access from two points off Country Club Drive.

The land plan was designed with respect to the existing natural resources and topography where the roadways meander through the natural setting. Valiano will include walking and hiking on multi-purpose trails, equestrian uses on trails and turnouts, open space with passive park settings, a community recreation center, all within a semi-rural atmosphere and setting.

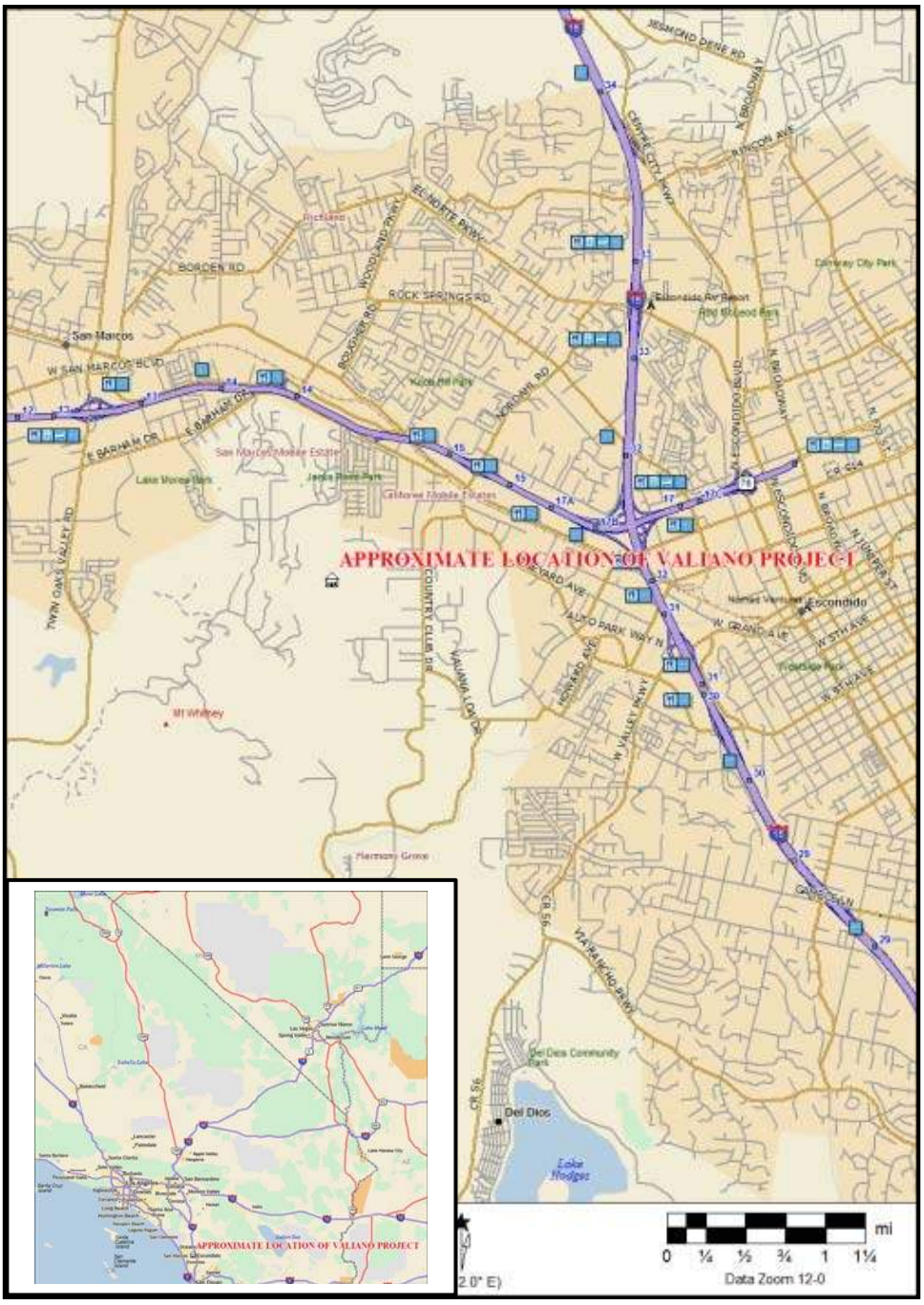

Figure 1 - Vicinity Map

1.3 Community Overview

The San Marcos Fire Department response area is located in North San Diego County, approximately 45 miles north of San Diego, California. The San Marcos Fire Department serves both the City of San Marcos and the San Marcos Fire Protection District. The SMFD response area is bordered on the north by Vista Fire Protection District and San Marcos Fire Department, on the east by the city of Escondido, on the south by unincorporated San Diego County, and on the west by the cities of Carlsbad and Vista. SMFD covers an area of 21,025 acres (33 square miles) and provides service to 81,554 residents. Primary accesses to SMFD response areas would be via I-15 or I-5 and Highway 78.

The San Marcos Fire Department provides emergency response to all structural fire, vegetation fire, rescues, medical emergencies and other associated emergencies within the SMFD response area. The SMFD response area is comprised of the 24 square miles within the City of San Marcos and 9 square miles within the San Marcos Fire District for a total area of 33 square miles served. The SMFD has primary responsibility for vegetation fire suppression on all Local Responsibility Areas (LRA) and also provides initial attack suppression services to a small State Responsibility Area located within the District. The SMFD has four fire stations with 22 fire suppression personnel on duty each day. The SMFD has received an Insurance Services Office rating of 2.

The community is located entirely within the boundaries of the Rincon del Diablo Municipal Water District. Imported water and sewer service would be provided by the Valley Center Municipal Water District. In order to provide sewer service, the project would construct a new water reclamation facility on-site located on the southeast corner off Country Club Drive. The extension of sewer and water utilities will be required by the project.

Open space easements are proposed to protect slopes and biological resources. The steeper slopes and drainage courses around the planned neighborhoods on-site would be open space (See Figure 2 - Site Plan).

1.4 Environmental Setting

The vicinity of the proposed Valiano community is a near-urban area that would be considered wildland-urban interface (WUI). It is an area of low to highly flammable vegetation. The following sections discuss the surrounding land use, topography, vegetation, climate, and fire history. It is situated at the eastern toe of the Merriam Mountains. The highest point on the property is near the middle, creating runoff to the north, east, and south. Elevations range from approximately 761 feet above mean sea level (amsl) in the northeastern portion of the site to 926 feet amsl in the southwestern portion of the site. Residential development occurs to the north, east, and west, with rural/agricultural uses to the south.

1.4.1 Topography and Uses

On-site topography is varied ranging from rolling to steeper slopes and nearly level terrain. The elevation ranges from approximately 761 feet above mean sea level (amsl) in the northeastern portion of the site to 926 feet amsl in the southwestern portion of the site. Steeper slopes allow faster combustion of fuel in the upslope direction. As a general rule, then, it can be assumed that the steeper slopes on-site would contribute to faster fire rates of spread. Agriculture has had a profound effect on the distribution, abundance, and type of native fuels. If agricultural operations in the watershed ceased, the Valiano property would be significantly more xeric and all of the potential wetlands would revert to uplands or non-wetland (from the *Jurisdictional Delineation Report for Eden Hills / IPQ-08 / / HELIX Environmental Planning, May 1, 2012).*

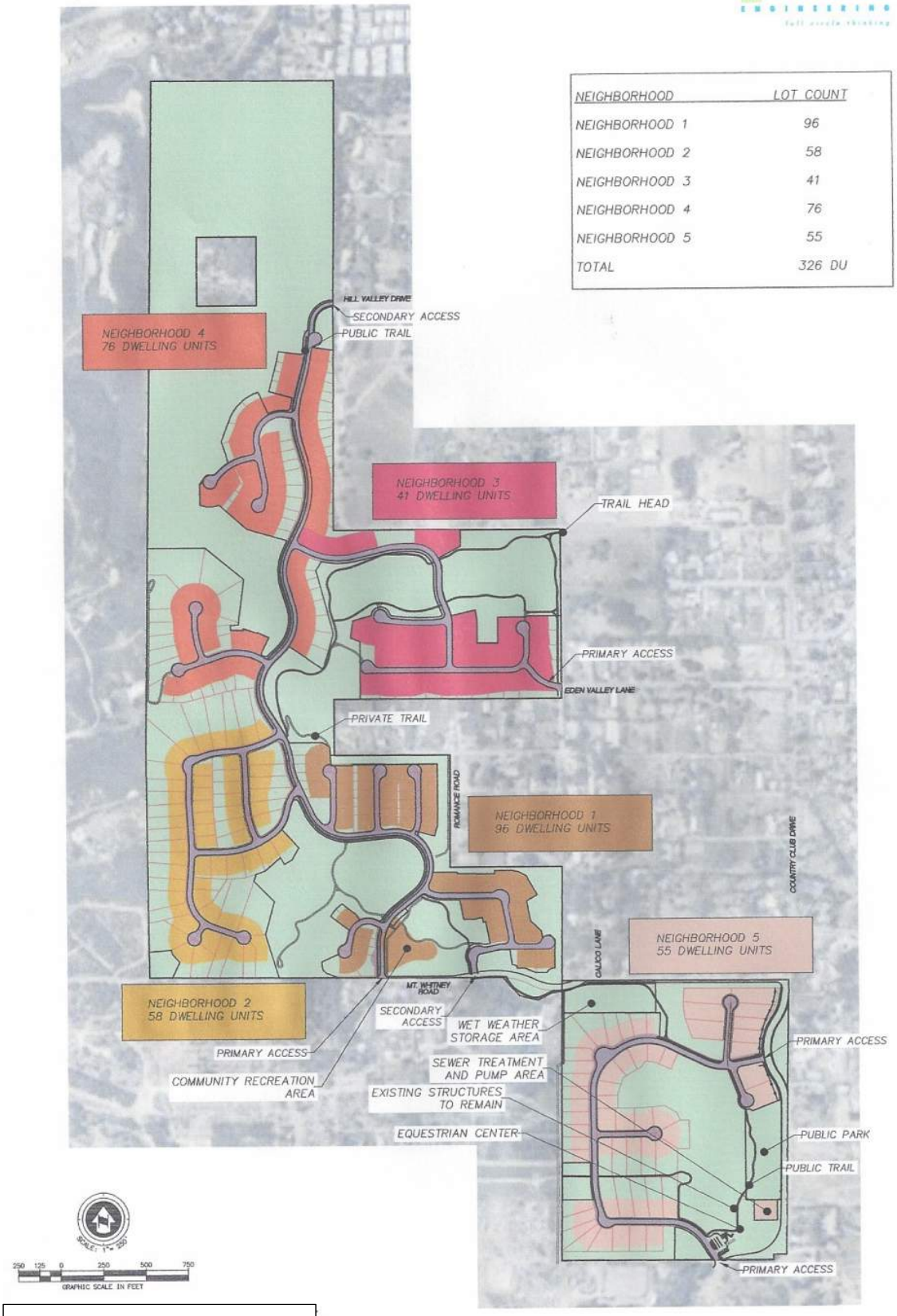

Figure 2 – Site Plan

1.4.2 Vegetation

Most of the site is planted with avocado (*Persea americana*) and limited amounts of citrus. These are located primarily on the steep slopes on site. Non-native grassland is also abundant on site, with most of the grassland located in the south-central and southeastern parts of the site. Over half of the non-native grassland was at one time planted and irrigated with agricultural grooves. Native vegetation present on site includes southern mixed chaparral, coast live oak woodland, southern riparian forest, herbaceous wetland, Diegan coastal sage scrub, southern willow scrub (including disturbed), southern riparian woodland, and mule fat scrub. Eucalyptus woodland, non-native vegetation, non-native woodland, disturbed wetland, tamarisk scrub, disturbed habitat, and developed areas also occur on site.

Wetlands are dominated by hydrophytic plants, and have wetland hydrology and hydric soils. Wetland plant species on site include willows (*Salix* spp.), watercress (*Nasturtium officinale*), southern cattail (*Typha domingensis*), rush (*Juncus* spp.), saltgrass (*Distichlis spicata*), western goldenrod (*Euthamia occidentalis*), dock (*Rumex* spp.), tamarisk (*Tamarix* sp.), and Mexican fan palm (*Washingtonia robusta*).

1.4.3 Climate

The county is divided into five climate zones from the coast to the desert: Maritime, Coastal, Transitional, Interior, and Desert (Climate Zones in San Diego County, Guidelines for Determining Significance, Wildland Fire and Fire Protection). These climate zones are determined by several factors: proximity to the ocean, terrain, elevation, and latitude. Southern California has a Mediterranean climate, characterized by mild, sometimes wet winters and warm, very dry summers. The Mediterranean climate includes all coastal areas, valleys and foot hills. Annual precipitation amounts increase gradually from the coast to the mountain crests, then drop dramatically into the deserts. Most precipitation comes from winter storms between November and March. The Valiano site is located on the western edge of the transitional climate zone. The Roblar RAWS station is the nearest RAWS station within the Transitional climate zone.

The following chart represents the typical weather of a hot summer day in the Transitional Climate Zone, Santa Ana and "peak" (or worst case fire weather/climate conditions) elements for this FPP:

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

The BehavePlus 5.0.5 Fire Modeling Program (to be discussed later in this plan) utilizes fuel moisture levels in both live and dead vegetation, projected wind, topography and vegetation type to determine fire behavior. Temperature is not an input. Large fires may occur at much lower temperatures than shown above. Relative humidity of less than 5 percent may also occur.

The Burning Index listed above is an indicator of the relative difficulty of fire control and is part of the National Fire Danger Rating Program. The higher the number, the more intense and severe a wildfire would be burning under the weather conditions described.

Generalized climate for the site is regarded as dry, sub-humid mesothermal with warm dry summers and cold moist winters. Mean annual precipitation is between 14 and 18 inches and the mean annual temperature is between 60 and 62 degrees. The frost – free season is 260 to 300 days.

The most critical wind pattern to the project area would be 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 (> 60-MPH), hot, dry winds with very low (<15%) relative humidity. Santa Ana winds are caused by high-pressure weather systems and can occur any time of the year. However, they generally occur in the late fall (September through November). The mean maximum wind gusts are 41 mph, with gust potential of 100 mph (100 mph Santa Ana wind gusts recorded during the 2007 Rice Fire). This is also when non-irrigated vegetation is at its lowest moisture content. Wind gusts, precipitation and temperature, particularly in a regional context, will significantly impact wildland fire.

The typical, prevailing summer time wind pattern is out of the south or southwest and normally is of a much lower velocity (5-19 MPH with occasional gusts to 30-MPH). It is associated with higher relative humidity readings (> 30% and frequently more than 60%) due to a moist air on-shore flow from the ocean.

All other (northwest, south, west) wind directions may be occasionally strong and gusty. However, they are generally associated with cooler, moist air and often have higher relative humidity (> 40%). They are considered a serious wildland fire weather condition when wind speeds reach > 20 MPH.

1.4.4 Fire History

San Diego County has a history of large, severe wildfires in which people have died and extensive burning of property/structures. The large fires of 2003 and 2007 are the most recent example of catastrophic wildfires which have struck San Diego County (See Figure 3). In addition, there were a series of Santa Ana wind driven fires in May 2014, such as the Bernardo Fire and the Cocos Fire.

The wind factor is a key to the spread of wildfires in southern California. Embers from fires driven by high winds (Santa Ana winds) can start fires up to 1.5 miles away from the 'front' of the fire. The maximum distance of '1.5 miles' is the canonical wisdom; it apparently is larger in some cases. A home on Queenston Drive in Escondido burned October 22, 2007, when an ember from 2 miles away landed on its wood shake roof. This is a minimum distance, since the fire never burned closer than two miles to this house (San Diego Union Tribune, 1 November 2007, NI-1). Spot fires spread in the direction of the wind, and in turn can start new spot fires in whatever direction the wind is blowing.

In summary, any wind or topography driven wildfire burning under a northeast (Santa Ana) wind pattern creates a very high wildland fire hazard, especially for wildland fires starting off-site north and northeast of the project. The primary threat during this scenario would be flying fire embers. In addition, a typical fire day with a southwest wind will create a high wildland wildfire hazard. Fuel treatment and setback will all but eliminate direct fire impingement and radiant heat from around the perimeter of the structures.

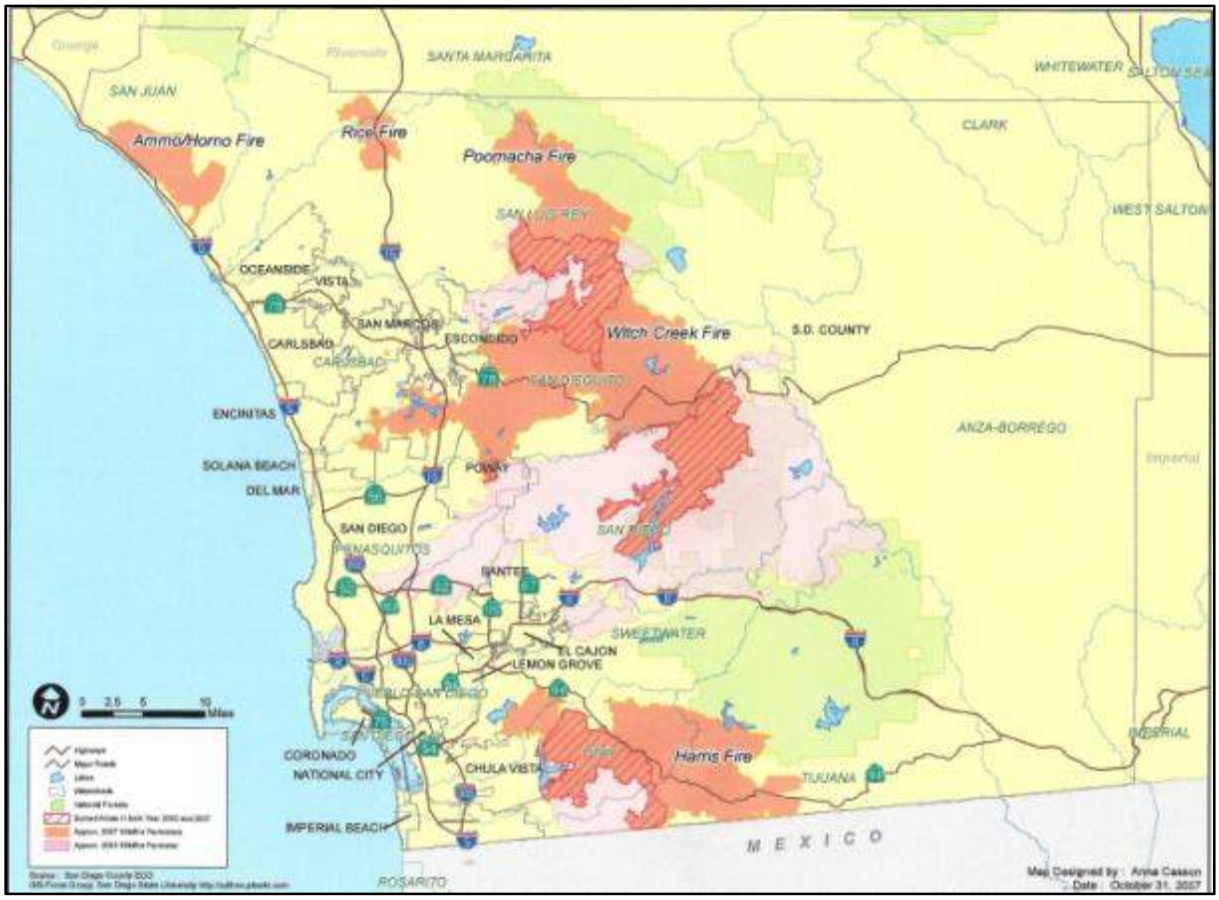

Figure 3 - San Diego County Wildfires of 2003 and 2007

Fire ecology research has shown that the natural fire regime for the shrub lands and forests in San Diego County is one of frequent small fires and occasional large fires. However, over the last 100 years the natural fire process has changed due to fire suppression policies, the introduction of invasive plant species that burn readily (i.e., eucalyptus and palm trees), and building and living within the wildland-urban interface areas.

The map in Figure 4 illustrates large wildfires (100+ acres) that have occurred in San Diego County unless there were unusual circumstances. The San Marcos Fire Department did respond to approximately 142 confirmed vegetation fires in San Marcos from 2000 to 2005. This is an average of 24 wildland fire responses in San Marcos per year. There is past history of frequent wildfires in similar vegetation and topography found on- and off-site the proposed Valiano project site. However, ***FIREWISE* 2000, Inc.** did not find that any large fires have burned the project area in the last 50 years. As stated earlier, existing and past agricultural activities in the majority of the project site has profoundly changed the native fuels. This history of agriculture in the area could be a reason and likely cause of no large catastrophic wildfires in the immediate area.

Residential development in the WUI is and will be increasing in the vicinity of the Valiano development. As the density of structures and the number of residents in the interface increases, potential ignition sources will multiply and a large wildfire occurrence increases. Efforts in this FPP will be made to mitigate the increased likelihood of human ignition of a wildfire spreading to the surrounding wildland fuels.

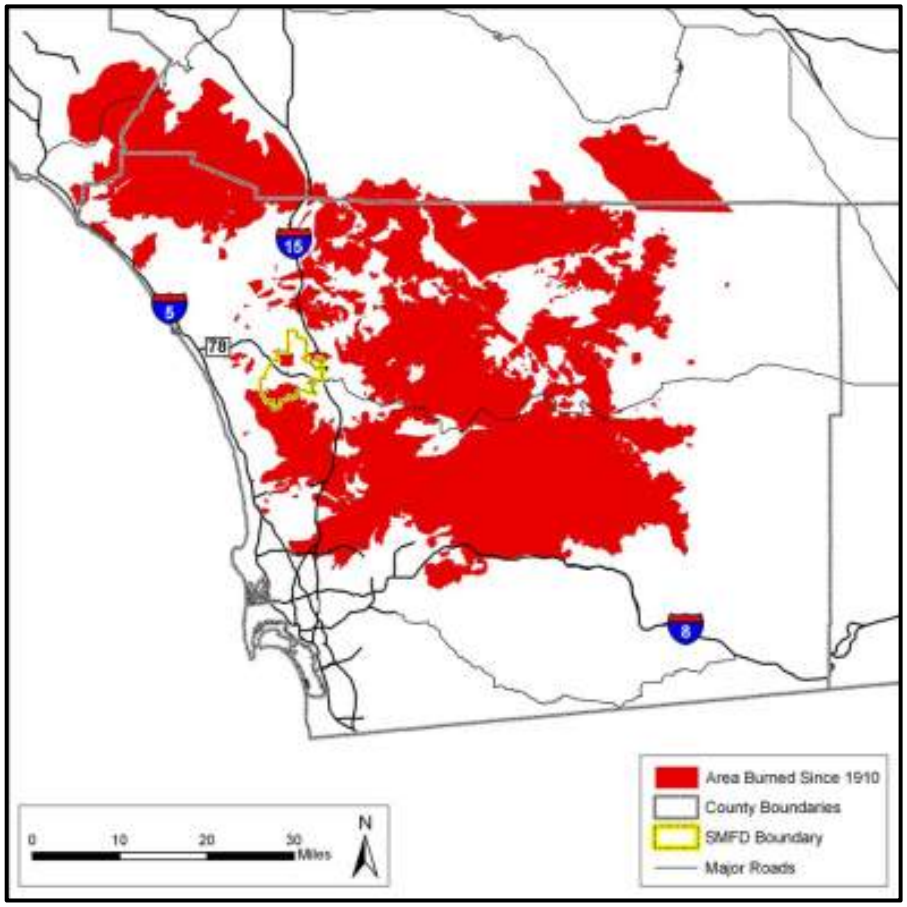

Figure 4- San Diego County Fire History Map with SMFD Boundary Illustrated

1.4.5 Community Fire Defensibility

The Valiano community will be built to County Building Code, Chapter 7A, ignition-resistant building standards for structures in the wildland urban interface. There are two primary concerns for structure ignition: 1) radiant and/or convective heat and, 2) burning embers (NFPA 1144 20081, Ventura County Fire Protection District 20112, IBHS 20083, and others). Burning embers have been a focus of building code updates for at least the last decade, and new structures in the WUI built to these codes have proven to be very ignition resistant. Likewise, radiant and convective heat impacts on structures have been minimized through the Chapter 7A exterior fire ratings for roofs, walls, windows and doors. Additionally, provisions for modified fuel areas separating wildland fuels from structures have reduced the number of fuel-related structure losses. As such, most of the primary components of the layered fire protection system provided the Valiano Project are required by city and state codes but are worth listing because they have been proven effective for minimizing structural vulnerability to wildfire and, with the inclusion of required interior sprinklers (required in the 2010 Building/Fire Code update), for extinguishing interior fires, should embers succeed in entering a structure. Even though these measures are now required by the latest Building and Fire Codes, until recently they were used as fire hazard reduction measures for buildings in WUI areas because they were known to reduce structure vulnerability to wildfire. These measures performed so well they were adopted into the code.

The following project features are required for new development in WUI areas and form the basis of the system of protection necessary to minimize structural ignitions as well as providing adequate access by emergency responders:

- Application of Chapter 7A, ignition resistant building requirements
- Ignition resistant exterior walls and doors
- Class A roof assemblies
- Multi- pane glazing with a minimum of one tempered pane, fire-resistance rating of not less than 20 minutes when tested according to NFPA 257
- Ember resistant vents (recommend Brand Guard or similar vents)
- Sprinklers to code for all occupancies
- Modern infrastructure, access roads, and redundant water delivery system

These required measures are anticipated to result in a fire safe community that will be less vulnerable to wildland and structure fires than most of the existing SMFD/SMFPD communities.

1.4.6 Local Preparedness and Firefighting Capability

The San Marcos Fire Department provides emergency response to all structural fire, vegetation fire, rescues, medical emergencies and other associated emergencies for both the City of San Marcos and the San Marcos Fire Protection District. The SMFD response area is comprised of the 24 square miles within the City of San Marcos and 9 square miles within the San Marcos Fire District for a total area of 33 square miles served. The SMFD has primary responsibility for vegetation fire suppression on all Local Responsibility Areas (LRA) and also provides initial attack suppression services to a small State Responsibility Area located within the District. The SMFD has four fire stations with 22 fire suppression personnel on duty each day. The SMFD has received an Insurance Services Office rating of 2.

The SMFD response area is bordered on the north by Vista Fire Protection District and San Marcos Fire Department, on the east by the city of Escondido, on the south by unincorporated San Diego County, and on the west by the cities of Carlsbad and Vista. SMFD covers an area of 21,025 acres (33 square miles) and provides service to 81,554 residents. Primary access to the response areas is via I-15 or I-5 and Highway 78.

2.0 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

The FPP will evaluate the level of fire hazard that would affect or be caused by the proposed project and the methods proposed to minimize that hazard. The FPP also evaluated the consistency of the proposed project with applicable fire protection regulations. As part of the assessment, the plan has considered the property location, topography, geology, combustible vegetation (fuel types), climatic conditions, and fire history. The plan addresses water supply, access (including secondary/emergency access where applicable), solar structural ignitability, protection systems and equipment, impacts to existing emergency services, and vegetation management.

The FPP will consider factors such as the modification of fuels, fire access, water supply and the use of ignition-resistant construction to protect people and structures from exposure to wildfire events. The FPP was prepared in accordance with the County of San Diego Guidelines for Determining Significance for Wildfire and Fire Protection.

2.1 People and Structures Exposure to Fire

This FPP will evaluate this proposed community and its survivability in a worst case scenario of northeast winds with gusts of 60 MPH (Santa Ana winds) and 'rare event' 30-MPH southwest winds during a wildland wildfire event in the area. It will document fuel modification requirements in combination with the non-combustible construction materials and other fire protections systems for the protection of life and property within this proposed community.

2.2 Fire Access

Access by fire apparatus from the primary fire station to the proposed development would be via Highway 78, CR S14, North Citracado Parkway, and Country Club Drive. Ingress and egress for the proposed development would be via Hill Valley Road, Eden Valley Lane, Mt. Whitney Road, and two points off Country Club Drive. There will also be two more emergency access points at Eden Valley Lane and Mt. Whitney Road. This FPP will evaluate and document these fire access code requirements for fire access. There will be off-site fire access requirements.

2.3 Water Supply

Rincon del Diablo Municipal Water District has agreed to serve the water needs for this residential project. This FPP will analyze and ensure that the water supply meets fire emergency water needs, including water sprinkler system for all facilities on the proposed development.

2.4 Ignition-Resistant Construction and Fire Protection Systems.

This FPP will evaluate ignition-resistant construction related to protecting new structures from an approaching wildfire. These construction standards will provide a high level of protection to structures built in the wildland/urban interface area when done in combination with other fire protections systems within this proposed development.

3.0 ANTICIPATED FIRE BEHAVIOR IN THE VICINITY

As determined by the State Fire Code, fire severity is zoned as "Very High" Fire Severity for some portions, and "Moderate" for the remainder located approximately eleven (11) miles inland from the ocean. Several scenarios were developed to determine the potential fire behavior of a wildland fire that might occur in the vicinity of the proposed Valiano Project. Fire Behavior calculations were used to determine clearance requirements, allowable distances of vegetation treatment and maintenance requirements. The distances and requirements are delineated as Fuel Modification Zones (FMZ).

3.1 Fire Behavior Potential

The San Marcos Fire Department Community Wildfire Protection Plan (CWPP) was compiled 2006 and 2007 with maps which graphically display potential crown fire activity, flame length, and rate of spread, given average weather conditions and extreme fire weather conditions that were calculated in FamMap, using average fuel moisture values. The difference between the average and extreme conditions for fire behavior potential results was the wind speed used in calculations. Average fire behavior prediction maps used average wind speeds (13 mph) with average fuel moisture fuel moisture characteristics. The extreme condition maps used wind speeds typical of days dominated by Santa Ana wind conditions (29 mph). As

stated in the CWPP and experience by ***FIREWISE* 2000, Inc.** personnel, these calculations seem to be conservative compared to observed fire behavior and Santa Ana wind speeds recorded during wildfire events during with worst case scenario Santa Ana wind events. For example, in a worst case scenario, the Rice Fire of 2007 in the northern part of San Diego County recorded wind gusts of 100 mph. It should be noted that in the County of San Diego's Report Format and Content Requirements (2010) it lists the typical weather on a hot summer day in the Transitional Climate Zone during a Santa Ana wind event as 28 mph with sustained gusts up to 41 mph. In the late hot, dry summer during a worst case Santa Ana wind event, the sustained peak winds average 60 mph. This extreme worst case wind speed (60 mph) will be used for fire behavior modeling in this FPP for the proposed Valiano development. This represents the worst case fire scenario conditions in 1, 10 and 100 hour fuels, live herbaceous fuel moisture, and live woody fuel moisture.

The maps displaying potential wildfire behavior are best used for pre-planning and not as a stand-alone product for tactical planning. They can also be combined with the WHR and Values at Risk information to generate current and future "areas of concern," which are useful for prioritizing mitigation actions. When this information is used for tactical planning, fire behavior calculations should be done with actual weather observations during the fire event. For greatest accuracy, the most current Energy Release Component (ERC) values should be calculated and distributed during the fire season to be used as a guideline for fire behavior potential.

3.2 On-Site Vegetation

Historic. The *Jurisdictional Delineation Report for Eden Hills* by HELIX (May 1, 2012) states that in an undisturbed environment, the historic native vegetative communities would predominately have been coastal sage scrub, southern coast live oak riparian woodland and mixed southern chaparral.

Existing. Most of the site is planted with avocado (*Persea americana*) and limited amounts of citrus (*Citrus* sp.). These are located primarily on the steep slopes on site. Non-native grassland is also abundant on site, with most of the grassland located in the south-central and southeastern parts of the site. Over one-half of the non-native grassland was at one time planted and irrigated with agricultural grooves. Native vegetation present on site includes southern mixed chaparral, coast live oak woodland, southern riparian forest, herbaceous wetland, Diegan coastal sage scrub, southern willow scrub (including disturbed), southern riparian woodland, and mule fat scrub. Eucalyptus woodland, non-native vegetation, non-native woodland, disturbed wetland, tamarisk scrub, disturbed habitat, and developed areas also occur on site.

Wetlands are dominated by hydrophytic plants, and have wetland hydrology and hydric soils. Wetland plant species on site include willows (*Salix* spp.), watercress (*Nasturtium officinale*), southern cattail (*Typha domingensis*), rush (*Juncus* spp.), saltgrass (*Distichlis spicata*), western goldenrod (*Euthamia occidentalis*), dock (*Rumex* spp.), tamarisk (*Tamarix* sp.), and Mexican fan palm (*Washingtonia robusta*).

Presently, the exposure to natural fuel loads will remain in the planned open space areas within the development. These open space corridors will be fire prone areas with wildfire threat. However, the Implementation of prescribed Fuel Management Zones (FMZs) recommended in this FPP would create acceptable wildfire protection for all the structures within this development.

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. Also, a "rare event" 30 MPH southwest wind will create a moderate wildland wildfire hazard. However, the vegetation

on the eastern and southern exposure of the development has much lighter fuels and adjacent to rural residential parcels and agricultural crops. The worst case, on-site fuel loading scenario is found in the west and southwest exposure. These exposures are from planned fuel loads and steeper slopes. However, with

the proposed fuel modification treatments, "*firewise*" landscaping, and the use of ignition resistive building construction standards, the wildfire threat will be mitigated to less than significant levels. As a result, the potential loss of any structure due to direct flame impingement, wind driven embers, or radiant heat around the perimeter of any planned house is extremely low.

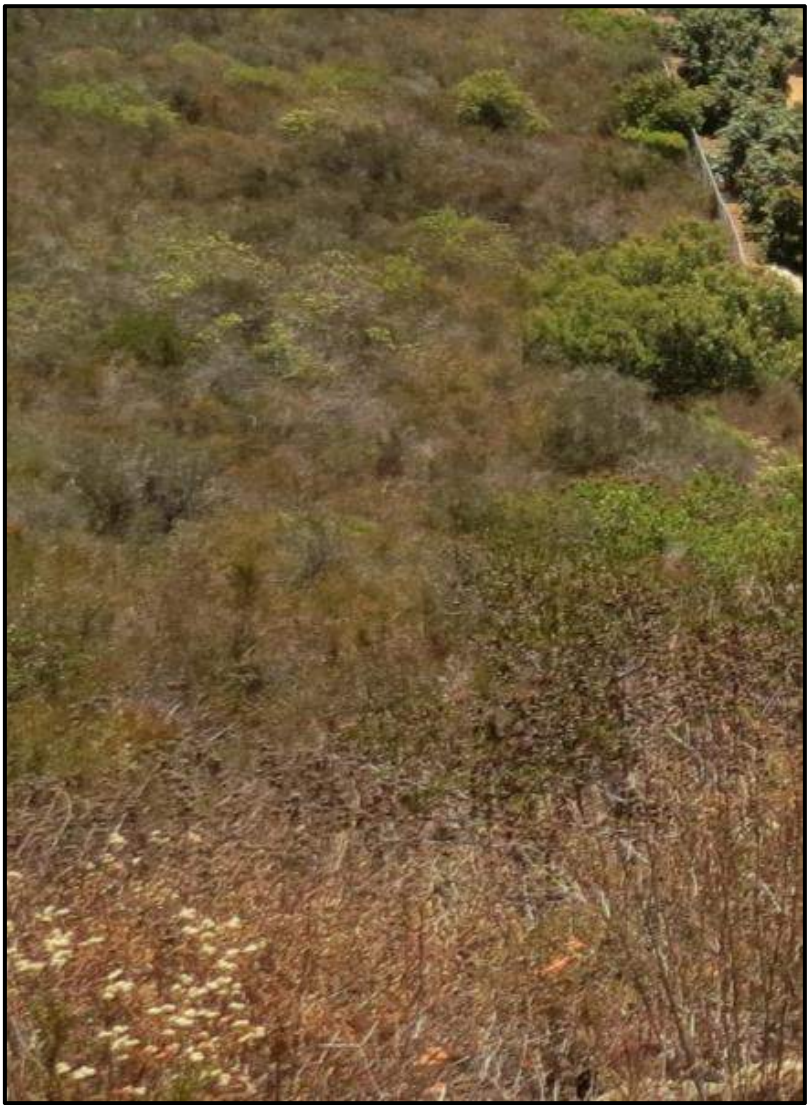

Photo 1 - View and Example of Existing Historic Native Vegetation

For fire modeling purposes, the historic and dominant plant communities are best characterized as coastal sage scrub (SCAL18 FM) and southern mixed chaparral (sh7 FM - very heavy load, dry climate shrub). The southern mixed chaparral is estimated to be the dominant plant community and thereby the sh7 –very heavy load, dry climate shrub will be used for fire modeling purposes for existing and historic native fuels on- and off-site.

3.3 Off-Site Vegetation

Historic. The historic vegetation communities listed as the dominant fuel loads would be similar to the historic on-site vegetation. In a wildland fire the native vegetation provides the fuel, which usually includes both living and dead vegetation.

The off-site area surrounding the development site presently consists of residential communities with interspersed agricultural crops (orchards) and interspersed islands of native vegetation.

Northern Boundary. The majority of the area directly north of the proposed development is an irrigated and managed avocado orchard. The area beyond the avocado orchard is residential lots, La Moree Road and a very large mobile home park. The greatest risk from this exposure would be wind-blown fire embers during a worst case scenario of late fire season northeast Santa Ana winds.

Eastern Boundary. Along the eastern boundary lines of the development are existing residential areas with only a few smaller interspersed native vegetation areas. The majority of the fuels have been greatly altered by historic agriculture and is adjacent to an existing residential areas. The altered and managed landscapes along with required hazard abatement by existing developments along these exposures will significantly decrease the fire hazard and threat to the Valiano development.

Southern Boundary. The exposure of the southern boundary of the project site is significantly reduced by the agriculture (avocado). An extensive area southwest of the southwest corner of the proposed Valiano project is also avocado orchard. This adds additional fuel modification of native fuels in the area and significantly reduces the wildfire hazard. The greatest exposure for the Project are the native fuels located beyond the orchards and the potential of fire brands transported by above average 30 mph south, west and southwest wind that occur periodically during the dry hot summer season during the late fire season.

Western Boundary. The western boundary is the most significant exposure to the project site. There are large interspersed native fuel areas and residential structures. Ignition of these fuels greatest threat to the development would by flying embers during above average 30 mph winds from the southwest and west. A wildfire approaching the project perimeter along this exposure would be on a downhill slope. The fact is that the worst-case weather conditions do not occur from this direction. Generally, the winds from this direction have higher relative humidity and lower temperatures (as opposed to extreme worst-case San Ana northeast winds).

3.4 Wildland Fire Behavior Assessment

3.4.1 Fuel Modeling

The minute by minute movement of a wildland fire is never totally predictable, and is certainly not predictable 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).

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 ¼ inch contribute to fire intensity, but not necessarily to fire spread. The BehavePlus 5.0.5 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.

Fuels larger than three (3") inches in diameter are not included in the calculations (Andrews 1986). Regardless of the limitations expressed, experienced wildland fire managers can use the BehavePlus 5.0.5 modeling system to project the expected fire intensity (expressed as Btu/ft./sec), rate-of-spread

(feet/minute) and flame lengths (feet) with a reasonable degree of certainty for use in Fire Protection Planning purposes. Of these three projected fire parameters, flame length is the most critical in determining structure protection requirements.

The BehavePlus 5.0.5 Fire Behavior Prediction and Fuel Modeling System by Patricia L. Andrews and Collin D. Bevins is one of the best systematic methods for predicting wildland fire behavior. The BehavePlus 5.0.5 fire behavior computer modeling system was developed by USDA–Forest Service research scientists at the Intermountain Forest Fire Laboratory, Missoula, Montana, 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 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 results of the modeling calculations are summarized in Tables 1 through 4 and APPENDIX 'D' shows the results of actual calculations for the fire scenarios.

The ***FIREWISE*** **2000, Inc.** evaluation team used the computer based BehavePlus 5.0.5 Fire Behavior Prediction Model to calculate the fire behavior parameters and projections for the historic and existing hazardous vegetative fuels on- and off-site of the proposed Valiano community. For purposes of evaluating worst case scenarios it was assumed that if the disturbance to the site were discontinued the site would revert quickly to some form of a very high load, dry climate brush fuel models (Fuel Model sh7).

These calculations will be the basis for recommended fuel modifications for the project site development. The existing on-site and off-site fuels will also be considered in evaluating the wildfire threat to this proposed development.

In order to project the fire behavior benefit for the proposed fuel modifications for the project, worst case scenarios were used in the modeling system to project fire behavior variables. Four (4) worst case fire scenarios were calculated 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), Fire Line Intensity (expressed in BTU's/foot/sec, and Flame Length (expressed in feet).

These fire behavior parameters are calculated for the following scenarios:

Scenario 1: A 60-MPH northeast wind (Santa Ana winds) in the SCAL18 Fuel Model historic fuels and then expected fire behavior in fuels that have been modified (treated) for favorable fire behavior variables within this fuel load

Scenario 2: A late fire season, strong, non-typical (30-MPH) southwest winds in Fuel Model sh7 and the expected fire behavior after they have been modified (treated) for favorable fire behavior variables within this this fuel load

Scenario 3: A 60 MPH northeast wind in Fuel Model sh7 and the expected fire behavior after fuel modification (treated) in this fuel load
Scenario 4: A 30-MPH southwest wind in Fuel Model sh7 the expected fire behavior after fuel modification in this fuel load

The fire behavior modeling with BehavePlus 5.0.5 Fire Behavior Modeling System provided computer based fire behavior parameters calculations. These calculated fire behavior parameters are key to recommended fuel modification for the development, but they are also based on project site observations, experience, and fuel levels and typical fire behavior observed during local fire seasons. Modification and/or elimination of hazardous fuels and the reduction of fuel loading are key to "*firewise*" planning.

The worst-case climate parameters and assumptions used for the fire behavior modeling process were as follows:

- 1-Hour Fine Fuel Moisture of 2%
- 10-Hour Fuel Moisture of..... 3%
- 100-Hour Fuel Moisture…….....5%
- Live Herbaceous Fuel Moisture……..30%
- Live Fuel Moisture.....50%

The steepness of slopes representative of the project site will be key to accurate fire behavior parameters calculations. The steeper locations on the project site will not be developed but would create an overall concern and fire threat to the development.

The range of on-site site slopes will change when the final grading is completed for the development. The fire behavior model representative slope after the final graded landscape is projected to be 10 percent or less. Ten percent slope will be used as the representative slope for fire behavior parameter calculations

3.4.2 Fire Behavior Modeling Summary

The following tables summarize the expected wildland fire behavior for the fuel model within and adjacent to the proposed Valiano development under the worst case scenarios. Tables 1 thru 4 display the expected Rate of Fire Spread (expressed in feet per minute), Fireline Intensity (Btu/ft./sec) and Flame length (feet) for four different BehavePlus 5.0.5 – Fire Behavior Prediction and Fuel Modeling System fuel model computer calculations. All of these calculations are based on forecast vegetation conditions of a typical very heavy fuel load, dry climate (Fuel Model sh7). Variables were slope, projected wind speed, and anticipated weather.

Fire Behavior Summary Tables. The two worst-case fire scenario behavior calculations are summarized in tables 1 thru 2, including the reduction in flame length that fuel treatment in Thinning Zone B will provide.

Table 1 – Fire Scenario 1 Summary

Fire Scenario 1–60 MPH Northeast Wind, very heavy fuel load, dry climate (Fuel Model sh7) North and Northeast Exposures		
Prior to Fuel Treatment	VS.	After Fuel Treatment
Rate of Spread: 503.0 ft./min		Rate of Spread: 406.2 ft./min
Fireline Intensity: 23,284 BTU/ft./sec		Fireline Intensity: 5051 BTU/ft./sec
Flame Length: **45.9 Feet**		Flame Length: **22.7 Feet**

Table 2 – Fire Scenario 2 Summary

Fire Scenario 2–30 MPH Southwest Wind, very heavy fuel load, dry climate (Fuel Model sh7) Southwest and West Exposures		
Prior to Fuel Treatment	VS.	After Fuel Treatment
Rate of Spread: 206.7 ft./min		Rate of Spread: 142.7 ft./min
Fireline Intensity: 9567 BTU/ft./sec		Fireline Intensity: 1837 BTU/ft./sec
Flame Length: **30.5 Feet**		Flame Length: **14.3 Feet**

4.0 MITIGATION MEASURES AND DESIGN CONSIDERATIONS

This Fire Protection Plan will provide mitigation measures and design considerations based on the sequencing and approval of construction. For example, the projected plan is to initiate construction by phases. The timing of construction for each phase will be determined at a later time but will be required to comply with the mitigation measures contained in this FPP.

4.1 Adequate Emergency Services

The San Marcos Fire Department (SMFD) provides emergency response to all structural fire, vegetation fire, rescues, medical emergencies and other associated emergencies within the SMFD response area. The SMFD response area is comprised of the 24 square miles within the City of San Marcos and 9 square miles within the San Marcos Fire District for a total area of 33 square miles served. The SMFD has primary responsibility for vegetation fire suppression on all Local Responsibility Areas (LRA) and also provides initial attack suppression services to a small State Responsibility Area located within the District. The SMFD has four fire stations with 22 fire suppression personnel on duty each day. The SMFD has received an Insurance Services Office rating of 2. The District is funded through special District assessments, County fees, and tax allocations supplemented by state and federal grants.

The San Marcos Fire Department provides service from four fire stations geographically located throughout the City and a regional emergency services training facility.

- Fire Station One is located at 180 West Mission Road which is in the center part of the city and houses one paramedic engine company, one paramedic truck company, one paramedic rescue, and one paramedic ambulance. Station One primarily provides service to the central portion of the city and supports emergency operations anywhere in the city as needed.

- Fire Station Two is located at 1250 South Rancho Santa Fe Road and houses one paramedic engine company and one paramedic ambulance. Station Two primarily provides service to the western portion of the city and supports emergency operations anywhere in the city as needed.

- Fire Station Three is located at 404 Woodland Parkway and houses one paramedic engine company. Station Three primarily provides service to the eastern portion of the city and supports emergency operations anywhere in the city as needed.

- Fire Station Four is located at 204 San Elijo Road and houses one paramedic engine company. Station Four primarily provides service to the southwestern portion of the city, San Elijo area, and supports emergency operations anywhere in the city as needed.

The department operates the following emergency resources on a daily basis:

- 4 – Paramedic assessment engine companies
- 1 – Paramedic assessment truck company
- 4 – Paramedic transport ambulances
- 1 – Shift battalion chief
- 1 – On-call duty chief

Note: The department also cross-staffs three wildland fire engines and a state of California Office of Emergency Services (OES) water tender.

Emergency Response Requirement and Initial Emergency Travel Times for SMFD. The emergency response objective is identified in the Public Facilities Element of the County General Plan. Valiano must demonstrate that fire services can be provided that meets the minimum travel time identified in the Public Facilities Element. Travel time is defined as the estimated time it will take for the nearest station to reach the furthest structure in a proposed development project. Travel time is determined by measuring the most direct reliable route with consideration given to safe operating speeds for heavy fire apparatus. Travel time does not include reflex or reaction time, or on-scene size-up and set-up prior to attacking the fire, all of which are critical precursors of actual firefighting. The emergency travel times for fire stations in the immediate area are based on NFPA 1142, Standard on Water Supplies for Suburban and Rural Fire Fighting; 2012 Edition Table C.11 (b).

The required provision of fire protection services for all calls is to attain the following travel time goals (or provide a level of fire protection functionally equivalent to that provided by such response times):

- The Public Facilities Element of the County General Plan requires that total travel time for deployment and arrival of the first-in engine company for a fire suppression incident should be within 5 minutes. Add one minute for turnout time and one minute for dispatch time.

- Total travel time for deployment and arrival of the full first alarm assignment for a fire suppression incident should be within 8 minutes. Add one minute for turnout time and one minute for dispatch time.

Figure 5 – Location of San Marcos Fire Department Fire Stations and the Valiano Project Area

The closest and primary Fire Station within SMFD's jurisdiction for the proposed Valiano development is Station #3 located at 404 Woodland Parkway (See APPENDIX 'E' – Project Facility Availability Form 399F). This fire station is fully staffed 24 hours a day, seven days a week. The travel time from this station to the furthest structure, which would be in planned Neighborhood 2, would be approximately 7.0 minutes. This travel time is based on an average safe speed of 35 mph and would exceed the County General Plan policy for maximum travel time. If the travel time is based on posted speeds of the roadway (e.g., Country Club Road posted speed is 45 mph), the calculated travel time would be significantly reduced. Strobe sensors on the major intersection street/traffic lights would also decrease the travel time by reducing the acceleration/deceleration constant for emergency apparatus. The approximate travel time would be reduced by approximately 1-1/4 minutes when travel is based on posted speeds and installation of strobe sensors. As stated above, travel time is calculated based on NFPA 1142, using the formula T= 0.65 + XD, where T=time (min) of average one-way trip travel, X=average speed factor (60/average speed), and D=one-way distance.

Recommended Alternatives and Potential Options to Provide Emergency Response Travel Times

The SMFD has established several mutual and automatic aid agreements with surrounding fire departments. For example, the Escondido Fire Department (EFD) has 7 fire stations in the vicinity of the proposed Valiano development. EFD's Fire Station #6, located at 1735 Del Dios Road, is 3.1 miles and approximately 5.9 minutes travel time to the Valiano Project. EFD's Fire Station #1, located at 310 North

Quince, is 4.2 miles and approximately 7.50 minutes travel time. The robust capabilities and support that can be provided Station #1 includes 1 paramedic Engine, 1 truck company, 1 brush engine, 1 ambulance, and 12 personnel per each shift. This robust compliment of personnel (including a Battalion Chief) and apparatus would have the capability to respond with four different emergency apparatus, including a truck company. Through existing agreements, EFD would provide secondary service to emergency incidents which occur on the Valiano development.

The calculated times by EFD stations (Figure 6 - Emergency Response Stations) are based on the average safe speed of 35 mph. Again, if travel times were based minimally on posted speed limits and installation of strobe sensors these travel times would be significantly reduced.

EFD is also preparing to implement San Diego's Regional Computer Assisted Dispatch (CAD) Inoperability Program (RCIP). The EFD is one of the many fire departments/fire protection districts/agencies which have or will implement this Program in the near future. In the initial contact with EFD, the Fire Chief felt that implementation of RCIP would occur by September, 2013. However, in a recent discussion with EFD, the September implementation has been delayed per a conversation between Fire Chief Mike Lowry and Doug Pumphrey, ***FIRE*****WISE 2000, Inc.**, in July 2013 during a meeting with EFD. This implementation of RCIP would be key for this option for EFD to provide secondary emergency services to the Valiano Project. RCIP ties together all dispatch centers in San Diego County and ensures that the closest emergency fire apparatus or EMS unit will be dispatched to an emergency incident. In the case of the Valiano Project, EFD's Station #6 and Station #1 would be stations that could respond to fire or EMS emergencies, with multiple emergency apparatus, to assist and reinforce emergency responses.

EFD will also become part of the North County CAD system in the future. However, the costs associated with implementation of this system will delay EFD from becoming part of this system in the near future (per discussion with Chief Lowry in July 2013).

The preferred option that could provide and/or meet the required travel time of 5 minutes for the Valiano Project is the future new fire station for the Harmony Grove Village Development, which is in the immediate vicinity of the Valiano Development. The new fire station will be at a location that could provide emergency services for both the Harmony Grove Village Development and the Valiano Development on a fair share basis. The approval of the Valiano development shall be conditioned on a negotiated agreement to use the planned new fire station for the Harmony Grove Village development to provide the required travel time requirement for Valiano development. This station will be operational before completion of these two developments, and would meet the required 5-minute travel time to the Valiano Project for the first-in engine company for an emergency incident.

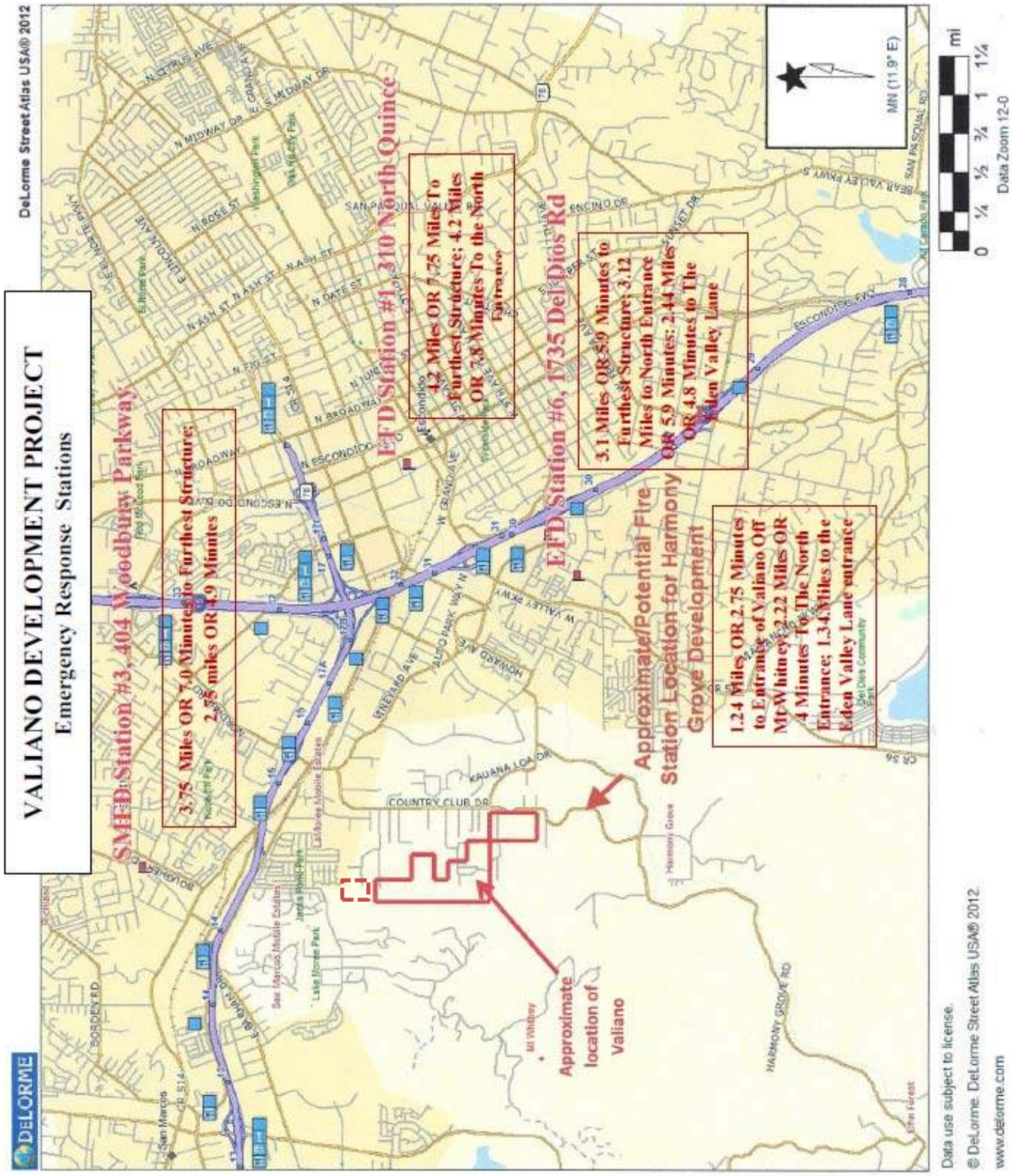

Figure 6 - Emergency Response Stations

Summary

The closest and primary Fire Station with SMFD for the proposed Valiano development is Station #3. The travel time from this station to the furthest structure would be in planned Neighborhood 2, and would exceed the County General Plan policy for maximum travel time. In summary, the following are alternatives and potential options to enhance and mitigate the travel time requirement:

1. Through auto and mutual aid agreements with surrounding fire agencies/departments, additional response to emergency incidents would assist and reinforce emergency responses to the Valiano development. Escondido's Station #6 could respond in approximately 5.9 minutes (based on an average safe speed of 35 mph; travel time based on posted speeds of the roadway (e.g., Country Club Road posted speed is 45 mph) and use/installation of strobe sensors on the major intersection street/traffic lights will significantly decrease travel time.

2. The illustrations in Figures 7 and 8 below show projected coverage by SMFD's Station #3, EFD's Station #6, and the planned Harmony Grove Station. The use of the new Harmony Grove Station would provide the required emergency services for the Valiano Development. For example, as illustration in Figure 7 shows that for the 5-minute travel time requirement, SMFD's Station #3 would provide coverage to 0 structures (0%), EFD's Station #6 would provide coverage to 128 structures (39%), and the Harmony Grove Station could provide coverage to 326 structures (100%). Figure 8 shows that coverage within 6 minutes travel time, the coverage for SMFD's Station 3 would be 118 structures (36%), Station 6 would cover would be 326 structures (100%), and the Harmony Grove Station would be 326 structures (100%). Additionally, it is estimated that EFD's Station #1 would be able to respond to the Valiano Project in approximately 7.5 minutes. This station has the capability to support an emergency incident within the Valiano Project with a robust response with four different emergency apparatus, to include a paramedic engine, a truck company, a brush engine, and an ambulance. Thus, the response to an emergency incident by these stations would ensure response of multiple emergency apparatus or equipment from 5 to 7.5 minutes..

3. In the near future when Escondido Fire Department is able to complete the implementation of RCIP, this would further enhance the ability for all surrounding fire agencies/departments to assist and ensure that the closest emergency response will be from the closest resource. At present and in Valiano's case, EFD's Fire Station #6 would, in most cases, be the first unit to respond to an emergency incident.

4. There is a new fire station that will be built as a requirement of the nearby Harmony Grove Village development. Though not yet negotiated, this new station would provide emergency service to this Project within 5 minutes.

As stated earlier, the approval of the Valiano Development shall be conditioned on a cost share basis agreement to provide and/or meet the required travel time with services that the planned new fire station for the Harmony Grove Village development would provide.

It is the discretion of the Director of PDS to determine if emergency services to the project are adequate. The alternatives and potential options listed above would provide enhanced and significant protection of structures and other emergency needs for the development.

The preferred option that could provide and/or meet the required travel time of 5 minutes for the Valiano Project is the future new fire station for the Harmony Grove Village Development, which is in the immediate vicinity of the Valiano Development. The new fire station will be at a location that will provide emergency services for both the Harmony Grove Village development and the Valiano development on a fair share basis. The approval of the Valiano development shall be conditioned on a negotiated agreement to use the planned new fire station for the Harmony Grove Village development to provide the required travel time requirement for Valiano development. This station will be operational before completion of these two developments, and would meet the required 5-minute travel time to the Valiano Project for the first-in engine company for an emergency incident.

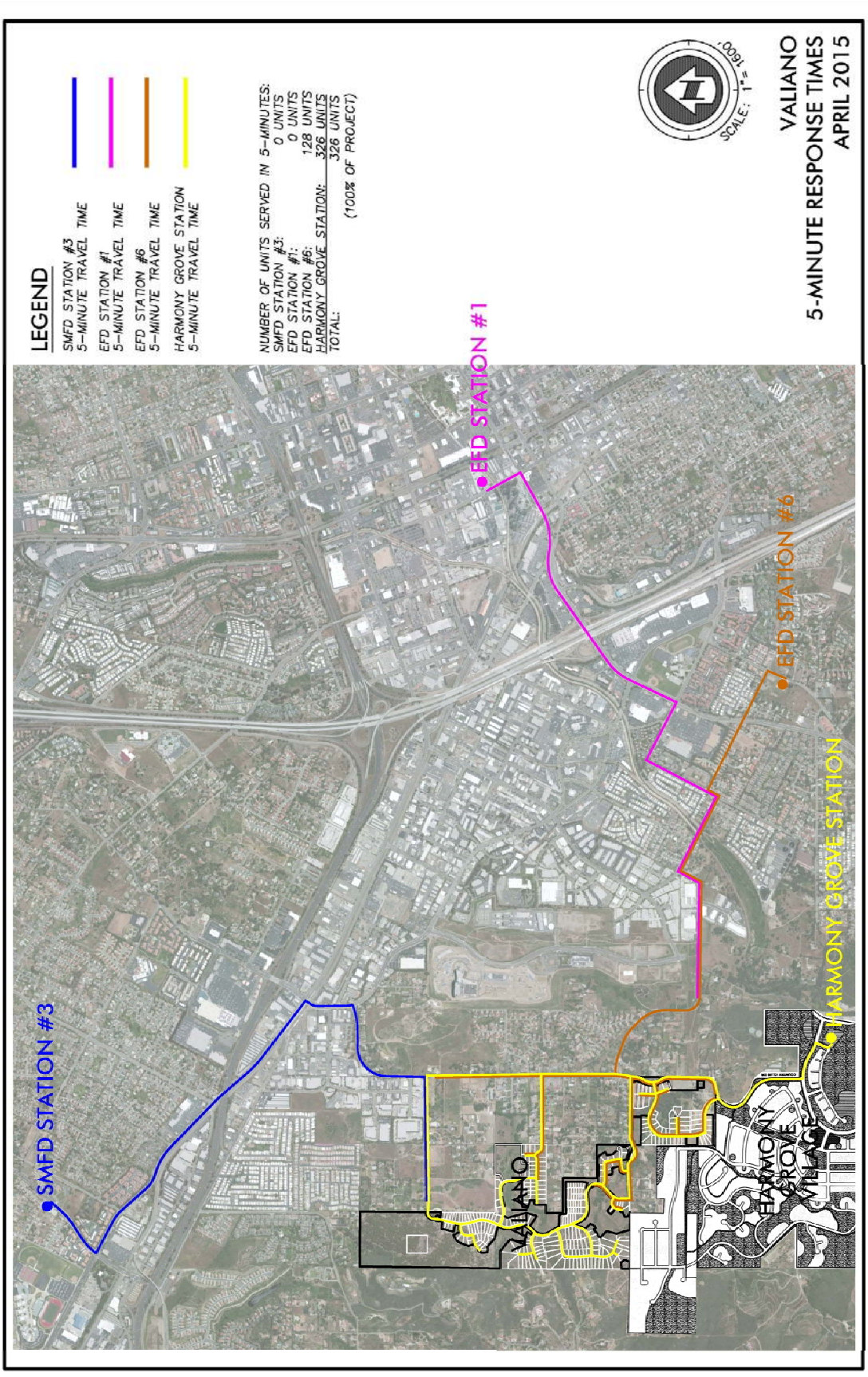

Figure 7 - 5-Minute Response Times