Castlerock Development Project
FIRE PROTECTION PLAN
City of San Diego Development Services Department
Tracking Number: 10046
Job Order Number: 42-1653

Applicant: Pardee Homes

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Date: May 17, 2012

August 7, 2012 Revision/Update

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1.0 INTRODUCTION

This Fire Protection Plan (FPP) has been prepared for the Castlerock Development Project (hereafter, the Development). The approximately 203.64 acre Development site is located along the eastern boundary of the East Elliot area within the City of San Diego, County of San Diego, California. The site is located within the jurisdiction of the City of San Diego adjacent to the City of Santee's western boundary. The City of San Diego is the lead agency for the Development under California Environmental Quality Act ("CEQA") and its municipal codes and policies do not require a FPP. The Development is a dual scenario project with a No Annexation Scenario, whereby the project would remain in the City of San Diego and an Annexation Scenario whereby the City of Santee would process an application with the Local Agency Formation Commission ("LAFCO") to reorganize the boundaries of the Development into Santee's jurisdiction. The City of Santee's Code requires projects in Urban Wildland Interface Areas, such as the Development, to develop a Fire Protection Plan. Accordingly, the purpose of the FPP is to evaluate for Santee whether implementation of the Annexation Scenario with the applicant's design measures identified herein would expose people or structures to a significant risk of loss, injury or death involving wildland fires. As part of the assessment, the plan has considered the property location, topography, geology, combustible vegetation (fuel types), climate conditions, and fire history. The plan addresses seven points; namely, Impacts to Adequacy of Existing Emergency Services, Fire Apparatus Access (including secondary or emergency access), Water Supply, Ignition-Resistive Construction and Fire Protection Systems, and Defensible Space (a.k.a. brush management or vegetation management), and Cumulative Impacts, The plan identifies measures the applicant has included in its project design that in ***FIREWISE*** **2000, Inc.'s** professional opinion will prevent exposure of people or structures to a significant risk of loss, injury or death involving wildland fires.

1.1 Project Location

The Development is located approximately one-half mile east of State Highway 52, one-half mile north of Mission Gorge Road, and immediately west of Santee Lakes Regional Park in the City of San Diego, San Diego County, California (Figure 1 – Vicinity Map). The site is situated within the Rancho El Cajon Spanish Land Grant, in Township 15 South, Range 1 West, of the 7.5-minute USGS Poway quadrangle. The site can be accessed from the south along trails across from West Hills Community Park and West Hills High School, situated along Mast Boulevard. It can also be accessed from the east via Moana Kia Lane.

Figure 1 - Vicinity Map

An existing network of dirt roads and trails provides access to most areas on project site. In the general vicinity surrounding the development are Santee Lakes Regional Park and residential areas of the City of Santee to the east, West Hills Park and West Hills High School to the south along Mast Boulevard, the Sycamore Canyon Landfill and Little Sycamore Canyon to the west, the Marine Corps Air Station Miramar to the northwest, and Mission Trails Regional Park a short distance away to the southwest.

An SDG&E substation, located roughly in the middle of the site is in a separate ownership.

1.2 Project Description

The proposed project would result in the construction of 283 detached single-family residences, 147 single-family detached units clustered on larger lots, parks, a pedestrian trail, public streets and private driveways, and 94.68 acres of open space on the 203.64-acre site, within the East Elliot Community Planning area of the City of San Diego. Proposed development on the Castlerock site, including portions of Brush Management Zone 2 (BMZ-2), would result in the disturbance to approximately 108.96 acres of on-site native and non-native vegetation communities. BMZ-2 areas total 8.54 acres on-site with 6.54 acres within the development area. Approximately 102.42 acres of vegetation on site would be disturbed by the proposed project. The remaining 94.68 acres would be conveyed to the City of San Diego as natural open space within the Multi-Habitat Planning Area (MHPA).The MHPA open space includes 90.03 acres of open space as well as 1.64 acre vernal pool restoration area, a 1.01 acre public improvements lot, and an additional 2.0 acres which overlap with BMZ-2 areas within the homeowners association (HOA) lots. Off-site improvements include grading of Street 'E' along the northern site boundary and the SDG&E parcel that is "not a part" situated within the site boundary.

DUAL PROJECT SCENARIOS – As previously discussed above, there is one project with two development scenarios: (1) No Annexation includes project development within the City of San Diego , and (2) Annexation includes reorganization of the project's territory into the City of Santee. The No Annexation scenario is adequately addressed in the City of San Diego's project documents and assessed according to the City of San Diego guidelines and thresholds. The No Annexation scenario would involve slight changes in the land uses with 282 detached single-family residences and 140 single-family detached small lot units. The changes are immaterial to the FPP's analysis, which serves to supplement the City of San Diego's already adequate analysis. The Annexation scenario is also adequately addressed in the City of San Diego project documents and the FPP provides supplemental analysis that also takes into account the City of Santee's requirements for a FPP.

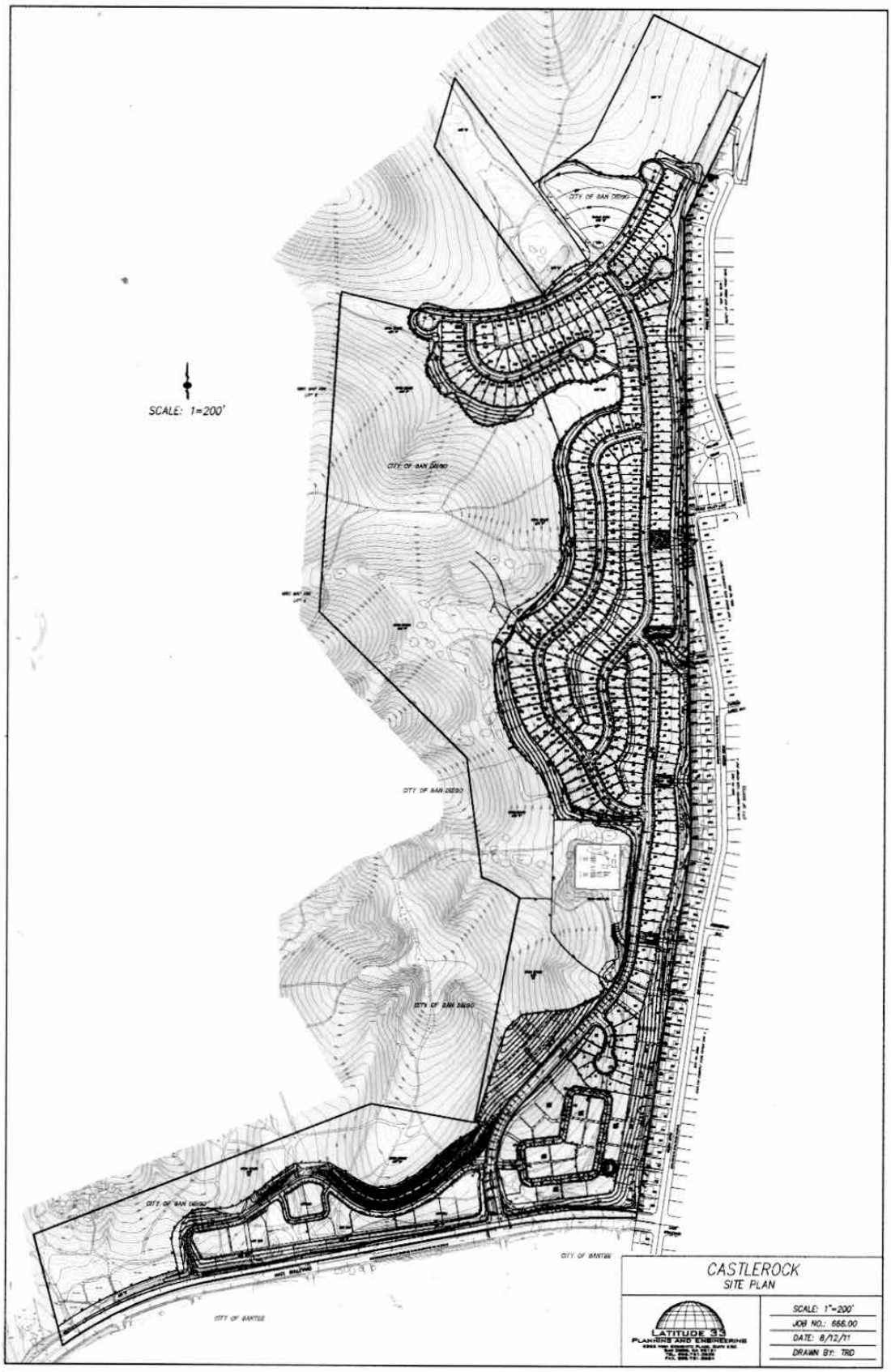

Figure 2 - Castlerock Site Plan

Figure 3 - Castlerock Site Plan - Annexation Scenario

Figure 4 - Castlerock Site Land Use Plan - No-Annexation Scenario

1.3 Land Uses

Land uses in the general vicinity surrounding the Castlerock site include Santee Lakes Regional Park and residential areas of the City of Santee to the east, West Hills Park and West Hills High School to the south along Mast Boulevard, the Sycamore Canyon Landfill and Little Sycamore Canyon to the west, the Miramar Marine Corps Air Station to the northwest, and Mission Trails Regional Park a short distance away to the southwest. A SDG&E substation, located roughly in the middle of the site is in a separate ownership.

Open Space Easements. The Castlerock project site is located within the City of San Diego Multiple Species Conservation Program (MSCP) Sub Area Plan-Eastern Area. Those portions of Castlerock located within the MHPA will be conveyed to the City of San Diego and incorporated into the City's management program. The City will also manage and maintain lands obtained as mitigation where those lands have been dedicated to the City in fee title or easement, and land acquired with regional funds within the City's MHPA boundaries. Open space easements are proposed over land to protect slopes and biological resources.

1.4 Environmental Setting

The Castlerock project site is located within the MSCP Sub Area Plan-Eastern Area. This section of the MSCP has three general guidelines, all of which deal with the Sycamore Canyon Landfill. There are no MSCP guidelines specific to the Development site. In general, the development site is located within the area designated for development on the City of San Diego's MSCP map.

The project vicinity is a near-urban area that would be considered wildland-urban interface (WUI). It is an area of low to highly flammable vegetation as depicted by the California Department of Forestry Very High Fire Hazard Severity Zone map (See Figure 5). The following sections discuss the surrounding land use, topography, climate, vegetation, and fire history.

1.4.1 Topography and Uses

In the general vicinity surrounding the Castlerock site are Santee Lakes Regional Park and residential areas of the City of Santee to the east, West Hills Park and West Hills High School to the south along Mast Boulevard, the Sycamore Canyon Landfill and Little Sycamore Canyon to the west, the Miramar Marine Corps Air Station to the northwest, and Mission Trails Regional Park a short distance away to the southwest.

A SDG&E substation, located roughly in the middle of the site is in a separate ownership. Several species of exotic landscape trees and shrubs are present in association with this electrical power substation.

The site ranges in elevation from 376 feet above mean sea level (msl) in the eastern portion of the site to 668 feet above mean sea level (msl) in the northeastern portion of the site. Several seasonal drainages flow generally south and south eastward into the Sycamore Channel along the eastern boundary. These drainages eventually flow into the San Diego River, a short distance to the south.

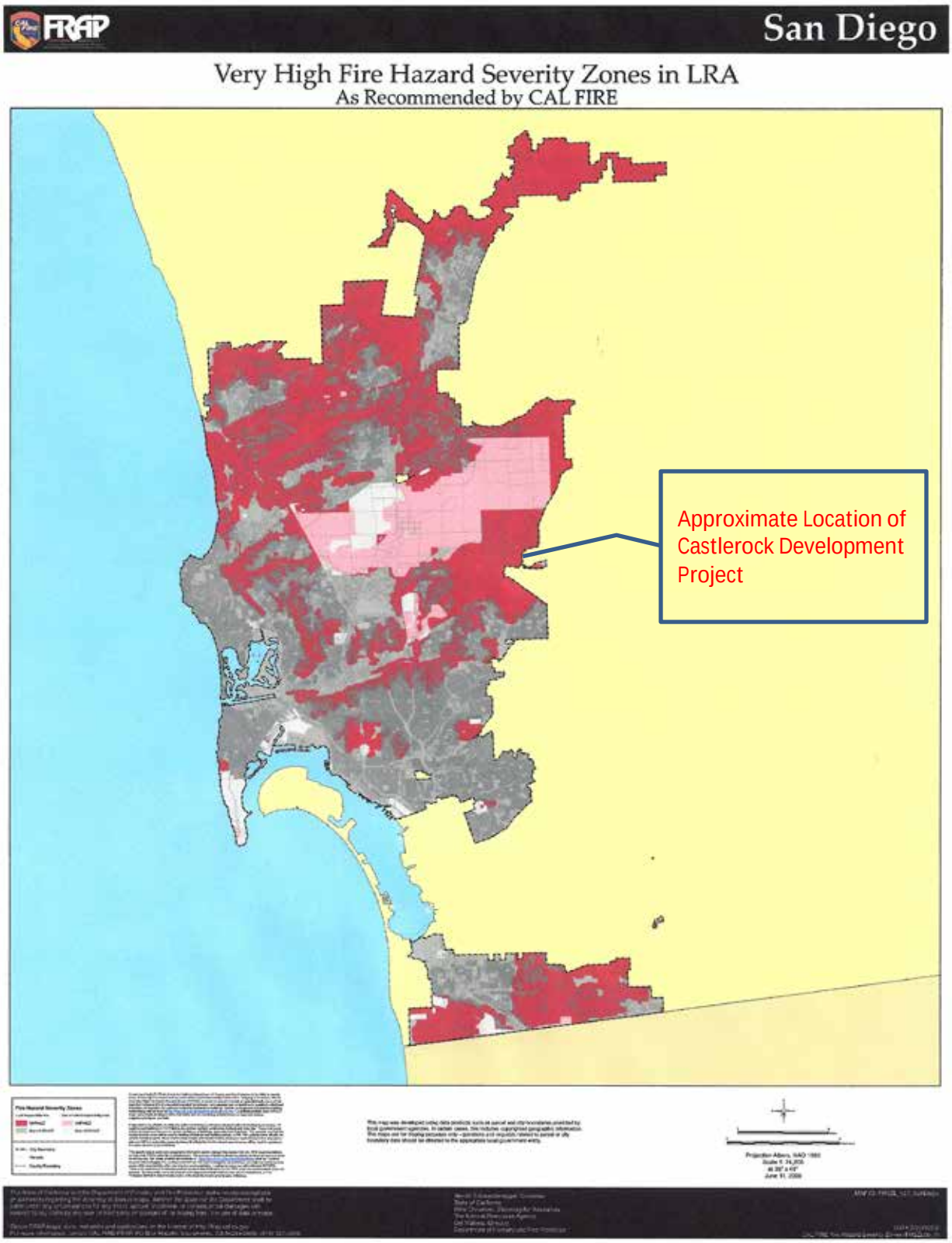

Figure 5 - Fire Hazard Severity Zones-San Diego LRA

1.4.2 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 foothills. 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 Castlerock site is located on the boundary between coastal and the transitional climate zone. The Western Regional Climate Center's RAWS station for El Capitan Dam was used to determine climate parameters utilized in the fire behavior modeling process. The mean precipitation for the development site is 15.68 inches per year and the average minimum air temperature for the site for a year is approximately 49.8 degrees, with an average maximum temperature of 80.0 degrees. The average maximum temperatures during the fire season months of July through October is 90.6 degrees. The average mean wind speed on an annual basis is from 4 to 19 mph, while the mean average maximum wind gust is 45 mph. Wind gusts, precipitation and temperature, particularly in a regional context impact wildland fire behavior.

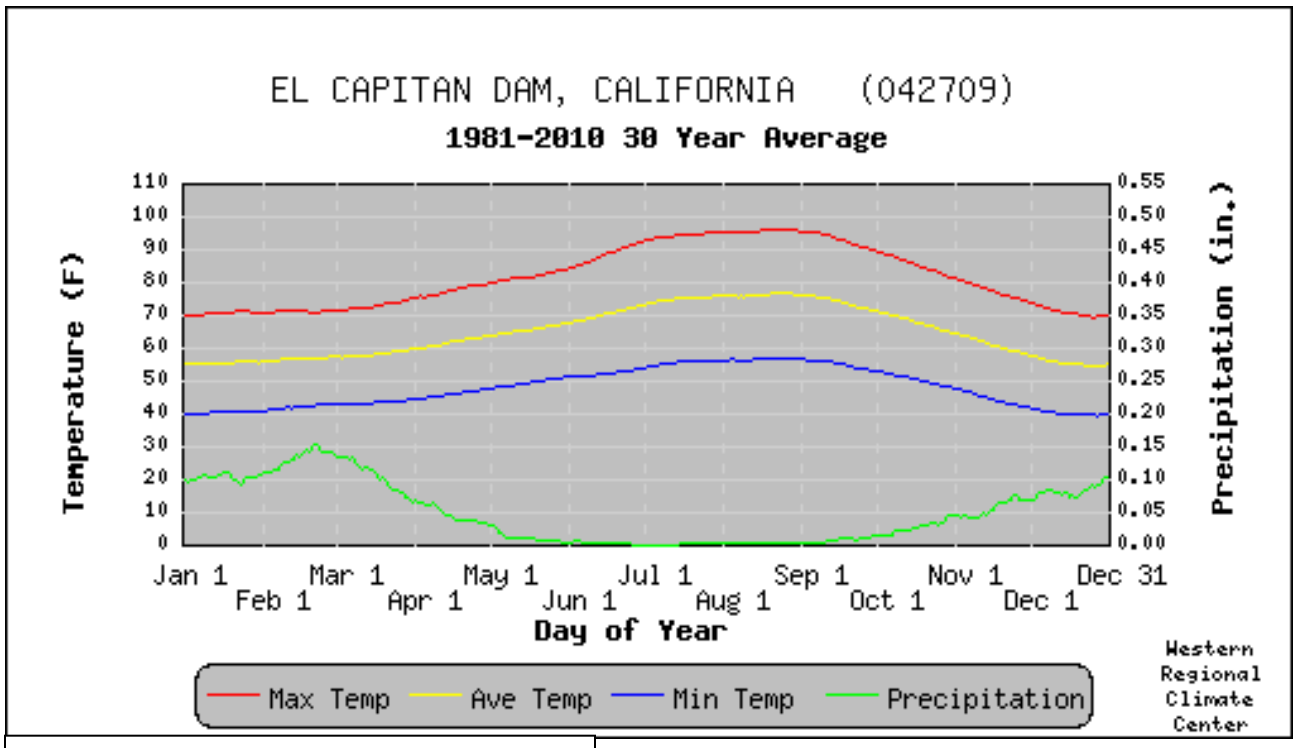

Figure 6: Temperature and Precipitation Chart

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 , hot, dry winds with very low (<15%) relative humidity. Santa Ana winds are caused by high-pressure weather systems 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.

The typical prevailing summer time wind pattern is out of the south or southwest and normally is of a much lower velocity with occasional gusts up 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%).

1.4.3 Fire History

The project site has burned mostly under the influence of Santa Ana wind-driven wildfires. Prior to the 2003 Cedar Fire, the property had previously been burned in the 1994 Rocoso Fire. In addition to the 1994 Rocoso Fire, the Sage Hill area burned in the 1940's, 1960's and 1980's. The Quarry Fire burned the central portion of the project area in the 1950's prior to the Santa Ana wind season.

The wind factor is a key component to the spread of wildfires in southern California. The available data suggests that in the second half of the 20th Century the frequency of small fires increased in southern California while their average size decreased. In San Diego County this has resulted in an increased rate of wildfires burning in low elevation grassland and coastal scrubland. The data indicates that in the last 50 years, there have been several large fires in and around the project site. The Cedar Fire of 2003 burned almost all vegetation on the project site. Vegetation has shown recovery since the fire.

2.0 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

A Fire Protection Plan evaluates the potential adverse environmental effects that the Castlerock development may have from wildland fire in light of the applicant's project design measures described herein. Based on significance determination thresholds, the following guidelines were used to determine the significance of potential impacts resulting from wildland fire hazards:

2.1 People and Structure Exposure to Fire

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

2.2 Adequacy of Existing Fire Protection Services

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

2.3 Fire Apparatus Access

Would the development result in adequate emergency access for fire apparatus?

2.4 Water Supply

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

2.5 Ignition-Resistant Construction and Fire Protection Systems

Would ignition-resistant building requirements found in the California Building Code and supplemented in the applicant's project design measures prevent the risk of loss, injury or death to people or structures involving wildland fires (especially the risk of flying embers from entering a structure) from rising to a significant level ?.

3.0 ANTICIPATED FIRE BEHAVIOR AND ANALYSIS

The Castlerock proposed development is in a moderately steep coastal zone located approximately fifteen (15) miles inland from the ocean. The east, south and west sides of this proposed development are bordered for the most part by scattered residential development, pockets of annual grasslands, Diegan coastal sage scrub and coastal sage scrub. As determined by the State Fire Code, the project area is located in Very High Fire Hazard Severity Zone.

Prior to the October 2003 Cedar Fire, the north and northeastern boundaries were bordered by large areas of unbroken southern mixed chaparral dominated by chamise and ceanothus, and scattered residential and agricultural development located in the Eucalyptus Hills area. Upon maturity, a the greatest wildland fire threat may come from a fire burning in this off-site native and non-native vegetation to the north and northeast of this proposed project.

3.1 Vegetative Fuel Assessment

Historic. The off-site undeveloped areas north and northeast of the site was historically dense, old growth native southern mixed chaparral vegetation which consisted of a mix of chamise *(Adenostoma fasciculatum),* black sage *(Salvia mellifera),* California sagebrush *(Artemisia califomica),* flat-topped buckwheat *(Eriogonum fasciculatum),* Ramona Wild-Lilac *(Ceanothus tomentosus)* Mission manzanita *(Xylococcus bicolor)* and laurel sumac *(Malosma laurina)* with several of these shrub species growing to more than 6-feet in height at maturity. As is typical of southern mixed chaparral plants, a high percentage of these plants frequently have an abundance of dead material. This is due to the effects of age and the Mediterranean climate, where sometimes there are long, wet winters that promote an abundance of new growth and long, hot and dry summer seasons, and occasionally, multi-year droughts which 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.

The on-site historic vegetation on the majority of the development boundaries is characterized as a Fuel Model SCAL 18 – Coastal Sage Scrub (Sage/Buckwheat). The natural fuels on the development site have been significantly altered by the recent events and activities during and after the Cedar Fire of 2003, which included brush management/hazard abatement work on the development site for wildfire protection of the community along the eastern boundary. However, if all disturbance activities were discontinued, this area could return to a mature SCAL 18 Fuel Model. This scenario would be the greatest concern for the development area during a worst case scenario northeastern wind pattern (Santa Ana) with hot dry wind speeds.

Existing. As of the date of this plan, the site consists of weeds, invasive plants and native and non-native grasses resulting from recent fires and the re-growth from annual mowing and brush management. There are small pockets of native fuel in locations around the site. At present, the regrowth vegetation and fuels on the northern exposure is lighter fuels as a result of the Cedar Fire of 2003. Existing fuel loading is found in the Development's southwest and west exposure, but it presents less of a risk because it is rare to have a southwest wind, during late fire season.

The majority of the Development is comprised of grassland and scrub fuels, with little wetland vegetation. A majority of the grassland areas are a combination of native and nonnative grassland components. In some areas, grasslands are intermixed with low and sparse coastal sage scrub. Disturbed to mature coastal sage scrub occurs on the slopes and ridges in the northern and western portions. Several species of exotic landscape trees and shrubs are present, which are associated with an electrical power substation situated in the southeastern portion.

Major vegetation types and other surface features on the site were field-mapped in March and April of 2005 and updated in 2006, 2007, and 2010 (from A Biological Resources Assessment of the approximately 203.64 acre Castlerock Site Development by Natural Resources Consultants. June 30, 2011). According to this report, ten vegetation communities were identified on the Development: 1) vernal pool; 2) emergent wetland; 3) coastal and valley freshwater marsh; 4) native grassland; 5) disturbed coastal sage scrub; 6) coastal sage scrub; 7) baccharis-dominated coastal sage scrub; 8) non-native grassland; 9) eucalyptus woodland; and 10) disturbed or developed. Concurrent with the surveys completed for this report, 208 species of plants were identified. Of these, 56, or approximately twenty-seven percent, were non-native species.

The following information from the Biological Resources document above provides the following important information regarding the status and presence of on-site vegetation. It states that the coastal form of coastal sage scrub is characterized by a mixture of drought-deciduous and evergreen shrubs and sub-shrubs. Drought-deciduous elements, such as California sagebrush (*Artemisia californica*), bush sunflower (*Encelia californica*), San Diego County viguiera (*Viguiera laciniata*), and bush monkeyflower (*Mimulus aurantiacus*) shed or reduce their leaves to minimize water losses during the dry summer months, whereas others such as the California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), and spiny redberry (*Rhamnus crocea*) reduce water loss during the drought months with thick, waxy leaves. Other typical woody species of this plant association include white sage (*Salvia apiana*), black sage (*Salvia mellifera*), California brickellbush (*Brickellia californica*), and ropevine (*Clematis pauciflora*).

The mature coastal sage scrub on this site is naturally open, but the composition and structure (height and proportion of shrub cover) varies greatly with slope and aspect. In the area of this project, mature stands range between three and five feet in average height and between 50 and 90% shrub cover, with the greatest height and density on north-facing slopes and the lowest on southeast-facing slopes. Drier, more exposed slopes of coastal sage scrub also commonly support stands of the shrub-forming cacti, coastal prickly pear (*Opuntia littoralis*) and coast cholla (*Cylindropuntia prolifera*).

Openings in the coastal sage scrub support herbaceous plants, including both native and non-native grasses, perennial and annual wildflowers. The herbaceous elements of coastal sage scrub often support such native species as purple needlegrass (*Nassella pulchra*), lilac mariposa lily (*Calochorus splendens*), blue-dicks (*Dichelostemma capitatum*), rattlesnake weed (*Daucus pusillus*), golden-yarrow (*Eriophyllum confertiflorum*), bicolored cudweed (*Gnaphalium bicolor*), California everlasting (*Gnaphalium californicum*), fascicled tarplant (*Hemizonia fasciculata*), California-aster (*Lessingia filaginifolia*) and rosinweed (*Osmadenia tenella*). Also present are non-native species such as wild oats (*Avena fatua, Avena barbata*), foxtail brome (*Bromus madritensis* ssp. *rubens*), soft chess (*Bromus hordaceus*), ripgut grass (*Bromus diandrus*), black mustard (*Brassica nigra*), long-beaked filaree (*Erodium botrys*) and redstemmed filaree (*Erodium cicutarium*).

Certain openings in coastal sage scrub are found on naturally open clay or dense cobble soils, and support sparse bulbiferous plants, wildflowers, succulents, and crust-forming primitive plants such as mosses, lichens, and spike-mosses. Plants occurring in these areas include purple needlegrass, common goldenstar (*Bloomeria crocea*), lavender mariposa lily, small-flowered soap-plant (*Chlorogalum parviflorum*), blue dicks

(Dichelostemma pulchellum), dot-seed plantain (*Plantago erecta*), and San Diego goldenstar (*Muilla clevelandii*).

3.2 Model Selected

Practice and experienced judgment in assessing the fire environment, coupled with a systematic method of calculating fire behavior, can yield surprisingly good results even though minute-by-minute movement of wildland fires cannot be entirely predicted. (Rothermel, 1983).

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 BEHAVE PLUS 5.0.5 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. "Because 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 APPENDIX 'D'.

The primary driving force in the fire behavior calculations is the dead fuel which is less than one-fourth inch in diameter; these are the fine fuels that carry the fire. Fuels larger than 1/4-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. 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 fire behavior projections, flame length is the most critical in determining structure protection requirements.

3.3 Wildland Fire Behavior Calculations for the Off-Site and On-Site Hazardous Vegetative Fuels.

Wildland fire behavior calculations have been projected for the hazardous vegetative fuels on undeveloped areas in proximity to all lots and evacuation routes in the proposed development. These projections were based on "worst-case" local area fire weather condition assumptions. The tables display 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) for ten separate BehavePlus—Fire Behavior Prediction and Fuel Modeling System Computer Calculations. The tables include the calculation inputs used in the BehavePlus program, which were obtained from on-site observations of the Development site and its vicinity.

The worst-case climate parameters and assumptions used for the fire behavior modeling process were as follows for a typical prevailing wind scenario and two "worst-case" scenarios :

Fire Scenario 1 - *Typical Prevailing (normal late summer) Afternoon Wind Pattern.*

- 1-Hour Fine Fuel Moisture 4%
- 10-Hour Fuel Moisture 6%
- 100-Hour Fuel Moisture 8%
- Live Herbaceous Fuel Moisture 80%

Fire Scenario 2 - Late fire season above-average southwest wind pattern. *A rare event under the following fuel moisture condition; occurring only one or two times in a ten-year frequency cycle. This event occurs with the breakdown of a strong Santa Ana wind episode.*

- 1-Hour Fine Fuel Moisture 2%
- 10-Hour Fuel Moisture 3%
- 100-Hour Fuel Moisture 5%
- Live Herbaceous Fuel Moisture 50%

Fire Scenario 3 – Fire Approaching from the North and Northeast in Late Fire Season (Santa Ana Wind Conditions) with SCAL 18 fuel. *An annual event often occurring two or three times a year.*

- 1-Hour Fine Fuel Moisture 2%
- 10-Hour Fuel Moisture 3%
- 100-Hour Fuel Moisture 5%
- Live Herbaceous Fuel Moisture 50%

Fire Scenario 4 - Fire Approaching from the North and Northeast in Late Fire Season (Santa Ana Wind Conditions with Mixed Southern Chaparral fuel. *An annual event often occurring two or three times a year.*

- 1-Hour Fine Fuel Moisture 2%
- 10-Hour Fuel Moisture 3%
- 100-Hour Fuel Moisture 5%
- Live Herbaceous Fuel Moisture 50%

Other site characteristics used for Fire Behavior modeling are as follows:

- **Slopes.** The majority of on-site natural slopes within the footprint of the development range from 9 to 30 percent, with a majority of the development occurring on the lower end of this slope range. The open space area on the slopes above the footprint of the development range in slope between approximately from 15 to 50 on average. These steeper slopes are located to the west and southwest. The off-site steeper lands to the north and northeast would also contribute to wildfire hazard for the development during extreme northeast wind conditions .

  The range of on-site slopes will change when the final grading is completed for the development. With this in mind and with consideration of the steeper lands, a representative slope of 20 percent was used for fire behavior modeling.

- **Fuel Model.** There are two Fuel Models which are used to represent the natural fuels that face or are adjacent to proposed structures on-site. Southern California fuel model SCAL 18 –coastal sage scrub and southern mixed chaparral were used to represent the natural fuels that face or are adjacent to proposed structures and evacuation routes on the site. Fuel treatment and setbacks will all but eliminate direct fire impingement and radiant heat from around the perimeter of all structures and evacuation routes. The adjacent steeper lands, especially those north and northeast of the project site would contribute to wildfire hazard to the development during extreme northeast wind conditions. The hazard is principally from burning embers carried by strong winds. These wind-carried burning embers can enter a structure or vehicle, land on a receptive fuel and start a new fire. However, fuel treatment and ignition-resistant construction measures required in this plan and incorporated by the applicant would reduce this risk to below a level of significance.

- **Fire Scenarios.** Four (4) fire scenarios are presented based on, 1) normal prevailing late fire season weather conditions, 2) an unusual late fire season 30 MPH southwest wind (generally after the

breakdown of Santa Ana winds, and 3) late fire season northeast winds (Santa Ana's), the "worst case" fire weather assumptions for the development site; and 4)) late fire season northeast winds (Santa Ana's) with a Southern Mixed Chaparral fuel. Each fire scenario displays the expected Rate of Fire Spread (expressed in miles per hour), Fireline Intensity (expressed in btu's per foot per second) and Flame Length (expressed in feet), for untreated fuel load and treated fuel load for two Fuel Models, FM SCAL 18 and FM 4. The tables below include the "worst-case climate parameters and assumption inputs for the BEHAVE Plus Version 5.0.5 fire behavior calculations, which were obtained from project site observations and fuel levels typically observed during the local fire season.

3.4 Fuel Behavior Modeling

For fire modeling purposes, the on-site historic and dominant plant community is best characterized as Fuel Model SCAL 18 - Coastal Sage Scrub. For fire modeling purposes the southern mixed chaparral plant community is best characterized as FM 4 – Chaparral. Fire behavior from a fire moving toward the development during worst case weather conditions will be the most extreme along the north and northeast boundaries. Any wildfire burning in the coastal sage scrub/chaparral plant community south and west of this proposed development under a prevailing southwest wind condition late in the fire season creates a moderate wildland fire hazard to the structures on the south and west sides.

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 (Andrews 1986)".

The BehavePlus Fire Modeling System was used extensively to predict the wildland fire behavior (rate-of-spread, and flame length) for the northern and western boundary vegetative fuels. The document, entitled "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 nationwide.

The ***FIREWISE*** **2000, Inc.** evaluation team used the computer based BEHAVEPLUS version 5.0.5 Fire Behavior Prediction Model to make the fire behavior assessments and projections for the hazardous vegetative fuels on the areas in proximity to the proposed site for the Development (See APPENDIX 'D' for actual calculations).

Normal weather conditions include onshore flow from the southwest. This condition has a lower temperature and higher humidity then does a Santa Ana condition. A fire under normal conditions is typically a fuel driven fire. However, wind will also contribute to the rate of spread. The late fire season strong non-typical southwest winds and the late fire season northeast winds (Santa Ana winds) create the most dangerous and severe conditions for wildfires. Modification and/or elimination of hazardous fuels and the reduction of fuel loading is key to firewise planning. In order to project the fire behavior benefit for the proposed brush management plan for the project, worst-case scenarios were used in the modeling system.

Fire Behavior Modeling Summary. The following tables summarize the expected rate of fire spread (expressed in feet per minute), fire line intensity (Btu/ft./sec) and flame length (feet) for four different BEHAVEPLUS – Fire Behavior Prediction and Fuel Modeling System fuel model computer calculations. The untreated fuel calculations are based on forecast vegetation conditions of a typical Fuel Model SCAL 18 - Coastal Sage Scrub and Fuel Model 4 – Southern Mixed Chaparral vegetation communities. Variables were slope, projected wind speed, and under the "worst case" weather scenarios.

The expected fire behavior in treated fuels is based on modifying the native fuels to a Fuel Model sh1. This treated fuel scenario would create widely scattered, pruned shrubs with interspersed native and non-native forbs and grasses in Brush Management Zone 2. In addition, maintenance would require removal of 100-hour fuels, dead shrubs and dead branches, and mow or weed-whip the forbs and grasses to a 2-inch stubble height on an annual basis. The sh1 Fuel Model most closely resembles the level of brush management required by the City of San Diego's brush management regulations.

Table 3.4A

Fire Scenario # 1 – Fire Approaching from the South and West in Late Fire Season Normal Prevailing Southwest Wind Conditions in SCAL 18 Fuel Model

Fire Behavior Calculation Input Data	Anticipated Fuel Moistures
· *20 percent slope*	· *1-Hour Fine Fuel Moisture 4%*
· *4mph mid-flame wind speed*	· *10-Hour Fuel Moisture 6%*
· *180° aspect from north*	· *100-Hour Fuel Moisture 8%*
· *45° wind direction from north*	· *Live Herbaceous Fuel Moisture 50%*
	· *Live Woody Fuel Moisture 80%*

Expected Fire Behavior in Undisturbed SCAL Fuel Model

Fuel Model SCAL 18 – Coastal Sage Scrub

Rate of Spread – *40.6 feet/minute*
Fireline Intensity – *2549 BTU'S/foot/second*
Flame Length – *16.6 feet in length*

Expected Fire Behavior in Treated Fuels

Fuels shall be modified to a Fuel Model sh1 with further adjustments made to account for brush management techniques required by the City of San Diego's brush management regulations. In this treated fuel scenario, there would be widely scattered, pruned shrubs**;** modification/maintenance would require removal of 100-hour fuels, dead shrubs and dead branches and selectively thinning 50 percent of the widely scattered shrubs in this vegetation community; forbs and grasses in Zone 2 would be mowed or weed-whipped on an annual basis to a 2-inch stubble. More specifically, San Diego brush management regulations would require(1) Zone 2 to cut and clear 50 percent of the plants over 24 inches in height to 6 inches; (2) Prune the remaining 50 percent in BMZ 2 to reduce fuel loading; (3) restrict new plantings in BMZ 2 to a maximum height of 24 inches; (4) restrict new tree plantings in BMZ 2 to a low branch height that is three times the height of adjacent plants; (5) BMZ 1 plantings shall be irrigated, Ignition-Resistive, low-growing vegetation less than 4 feet in height; (5) BMZ 1 plantings less than 24-inches need no irrigation; (6) BMZ 1 trees may exceed 4 feet, but must be located away from structures by a minimum of 10 feet as measured by the drip line of the mature tree; and (7) no habitable structures are allowed in BMZ**.** The expected fire behavior would be as follows in this San Diego-modified treated fuels scenario:

Rate of Spread, reduced to - 5.8 feet/minute
Fireline Intensity, reduced to – 41.3 BTU's/foot/second
Flame Length, reduced to - 1.4 feet

Table 3.4B

Fire Scenario # 2 – Fire Approaching from the South and West in Late Fire Season Unusual 30 MPH Southwest Wind Conditions in SCAL 18 Fuel Model

Fire Behavior Calculation Input Data	Anticipated Fuel Moistures
· *20 percent slope*	· *1-Hour Fine Fuel Moisture 2%*
· *12 mph mid-flame wind speed*	· *10-Hour Fuel Moisture 3%*
· *180° aspect from north*	· *100-Hour Fuel Moisture 5%*
· *45° wind direction from north*	· *Live Herbaceous Fuel Moisture 30%*
	· *Live Woody Fuel Moisture 50%*

Expected Fire Behavior, Untreated Fuels

Fuel Model SCAL 18 – Coastal Sage Scrub

Rate of Spread – *156.8 feet/minute*
Fireline Intensity – *11388 BTU'S/foot/second*
Flame Length – *33.1 feet in length*

Expected Fire Behavior in Treated Fuels

Fuels shall be modified to a Fuel Model sh1 with further adjustments made to account for brush management techniques required by the City of San Diego's brush management regulations. In this treated fuel scenario, there would be widely scattered, pruned shrubs**;** modification/maintenance would require removal of 100-hour fuels, dead shrubs and dead branches and selectively thinning 50 percent of the widely scattered shrubs in this vegetation community; forbs and grasses in Zone 2 would be mowed or weed-whipped on an annual basis to a 2-inch stubble. More specifically, San Diego brush management regulations would require(1) Zone 2 to cut and clear 50 percent of the plants over 24 inches in height to 6 inches; (2) Prune the remaining 50 percent in BMZ 2 to reduce fuel loading; (3) restrict new plantings in BMZ 2 to a maximum height of 24 inches; (4) restrict new tree plantings in BMZ 2 to a low branch height that is three times the height of adjacent plants; (5) BMZ 1 plantings shall be irrigated, Ignition-Resistive, low-growing vegetation less than 4 feet in height; (5) BMZ 1 plantings less than 24-inches need no irrigation; (6) BMZ 1 trees may exceed 4 feet, but must be located away from structures by a minimum of 10 feet as measured by the drip line of the mature tree; and (7) no habitable structures are allowed in BMZ**.** The expected fire behavior would be as follows in this San Diego-modified sh1 treated fuels scenario:

Rate of Spread, reduced to - 23.9 feet/minute
Fireline Intensity, reduced to – 170.6 BTU's/foot/second
Flame Length, reduced to - 2.6 feet

Table 3.4C

<u>Fire Scenario #3</u> – Fire Approaching from the North and Northeast in Late Fire Season 60 MPH Winds (Santa Ana) in SCAL 18 Fuel Model

<u>Fire Behavior Calculation Input Data</u>	**<u>Anticipated Fuel Moistures</u>**
· ***20 percent slope***	· ***1-Hour Fine Fuel Moisture 2%***
· ***12 mph mid-flame wind speed***	· ***10-Hour Fuel Moisture 3%***
· ***180^{o} aspect from north***	· ***100-Hour Fuel Moisture 5%***
· ***45^{o} wind direction from north***	· ***Live Herbaceous Fuel Moisture 30%***
	· ***Live Woody Fuel Moisture 50%***

Expected Fire Behavior, Untreated Fuels

Fuel Model SCAL 18 – Coastal Sage Scrub

Rate of Spread – *291.6 feet/minute*
Fireline Intensity – *21180 BTU'S/foot/second*
Flame Length – *44.0 feet in length*

Expected Fire Behavior in Treated Fuels

Fuels shall be modified to a Fuel Model sh1 with further adjustments made to account for brush management techniques required by the City of San Diego's brush management regulations. In this treated fuel scenario, there would be widely scattered, pruned shrubs**;** modification/maintenance would require removal of 100-hour fuels, dead shrubs and dead branches and selectively thinning 50 percent of the widely scattered shrubs in this vegetation community; forbs and grasses in Zone 2 would be mowed or weed-whipped on an annual basis to a 2-inch stubble. More specifically, San Diego brush management regulations would require(1) Zone 2 to cut and clear 50 percent of the plants over 24 inches in height to 6 inches; (2) Prune the remaining 50 percent in BMZ 2 to reduce fuel loading; (3) restrict new plantings in BMZ 2 to a maximum height of 24 inches; (4) restrict new tree plantings in BMZ 2 to a low branch height that is three times the height of adjacent plants; (5) BMZ 1 plantings shall be irrigated, Ignition-Resistive, low-growing vegetation less than 4 feet in height; (5) BMZ 1 plantings less than 24-inches need no irrigation; (6) BMZ 1 trees may exceed 4 feet, but must be located away from structures by a minimum of 10 feet as measured by the drip line of the mature tree; and (7) no habitable structures are allowed in BMZ**.** The expected fire behavior would be as follows in this San Diego-modified sh1 treated fuels scenario:

Rate of Spread, reduced to - 61.4 feet/minute
Fireline Intensity, reduced to – 438.9 BTU's/foot/second
Flame Length, reduced to - 4.1 feet

Table 3.4D

Fire Scenario #4 – Fire Approaching from the North and Northeast in Late Fire Season 60 MPH Winds (Santa Ana) in Mixed Southern Chaparral (Fuel Model 4)

Fire Behavior Calculation Input Data	Anticipated Fuel Moistures
· *45 percent slope* · *24 mph mid-flame wind speed* · *180^{o} aspect from north* · *45^{o} wind direction from north*	· *1-Hour Fine Fuel Moisture .....2%* · *10-Hour Fuel Moisture .....3%* · *100-Hour Fuel Moisture .....5%* · *Live Herbaceous Fuel Moisture .....30%* · *Live Woody Fuel Moisture 50%*

Expected Fire Behavior, Untreated Fuels

Fuel Model FM 4 – Coastal Sage Scrub

Rate of Spread – *1524.3 feet/minute*
Fireline Intensity – *87658 BTU'S/foot/second*
Flame Length – *84.5 feet in length*

Expected Fire Behavior in Treated Fuels

Fuels shall be modified to a Fuel Model sh1 with further adjustments made to account for brush management techniques required by the City of San Diego's brush management regulations. In this treated fuel scenario, there would be widely scattered, pruned shrubs**;** modification/maintenance would require removal of 100-hour fuels, dead shrubs and dead branches and selectively thinning by 50 percent of the widely scattered shrubs in this vegetation community; forbs and grasses in Zone 2 would be mowed or weed-whipped on an annual basis to a 2-inch stubble. More specifically, San Diego brush management regulations would require(1) Zone 2 to cut and clear 50 percent of the plants over 24 inches in height to 6 inches; (2) Prune the remaining 50 percent in BMZ 2 to reduce fuel loading; (3) restrict new plantings in BMZ 2 to a maximum height of 24 inches; (4) restrict new tree plantings in BMZ 2 to a low branch height that is three times the height of adjacent plants; (5) BMZ 1 plantings shall be irrigated, Ignition-Resistive, low-growing vegetation less than 4 feet in height; (5) BMZ 1 plantings less than 24-inches need no irrigation; (6) BMZ 1 trees may exceed 4 feet, but must be located away from structures by a minimum of 10 feet as measured by the drip line of the mature tree; and (7) no habitable structures are allowed in BMZ**.** The expected fire behavior would be as follows in this San Diego-modified sh1 treated fuels scenario:

Rate of Spread, reduced to - 61.4 feet/minute
Fireline Intensity, reduced to – 438.9 BTU's/foot/second
Flame Length, reduced to- 4.1 feet

In the Brush Management Zones existing Fuel Models will be replaced with less hazardous Fuel Model sh1, further modified by City of San Diego's brush management regulations. Table 3.4E below summarizes the predicted flame length when this brush management program is implemented.

The fire behavior modeling demonstrates that should a wildfire occur during extreme fire danger weather conditions, fire line intensity and flame length would be significantly reduced with the required fuel modification within Zone 1 and 2. The tables above include the calculation inputs used in the Modeling System obtained from project site observations and fuel levels typically observed during the local fire season.

An interpretation of fire intensity is the rate of heat produced by a wildland fire at a point in time, and is expressed in British Thermal Units per foot per second (BTU/ft./sec). Further, it is influenced by the amount of fuel available for burning, local weather conditions before and at the time of a fire, and the topography of the burning site. Flame length is an estimator of fire line intensity and provides an estimate to fire suppression personnel of the difficulty in fighting fires. A useful output from the BehavePlus Fire Modeling is the flame length calculation, which is then used for designing the fuel modification zones.

TABLE 3.4E
Summary of Predicted Flame Lengths for the Brush Management Plan
(Based on modifying fuels to FM-sh1 with application of City of San Diego Brush Management Regulations)

Condition	Zone	Fuel Model	Predicted Flame Length for Brush Management Plan
Fire Scenario 1	2	FM-sh1	1.4
Fire Scenario 2	2	FM-sh1	2.6
Fire Scenario 3	2	FM-sh1	4.1
Fire Scenario 4	2	FM-sh1	4.1

The modeling demonstrates that the brush management zones required for the Castlerock Development provide a level of fire protection adequate to prevent the risk of loss, injury or death to people or structures from rising to a level of significance.

4.0 APPLICANT DESIGN MEASURES

With the placement of a residential and commercial development in flammable native and non-native vegetative area, this FPP identifies a combination of Applicant Design Measures necessary to prevent the risk of loss, injury or death to people or structures from rising to a level of significance when wildfires do occur and to provide a level of fire protection functionally equivalent to the level of fire protection provided through proscribed response times for fire fighters to reach the site. The Applicant Design Measures are summarized in the bullets below and more specifically discussed in sections 4.1 through 4.8 below. This plan is incorporated by reference into the Applicant's project description and in some cases may be repeated in the Development's conditions of approval.

- The requirement to implement and maintain a standard to provide an irrigated BMZ 1 (low fuel volume/defensible space), a selectively thinned non-irrigated BMZ 2 around each residential and commercial structure, and along roadways. Firewise Communities© use *"Survivable Space"* (a.k.a. "Defensible Space" or "Brush Management Zone") strategies that enable their communities to survive a wildfire on their own. Recognizing that Fire Departments often will intervene and order evacuation, Firewise Communities© are also designed to provide evacuation routes with adequate BMZ 1 and/or BMZ 2 buffers combined with fire walls where necessary to evacuate residents safely. Finally, Firewise Communities© use a combination of BMZ 1, BMZ 2, firewalls, and ignition-resistant structural enhancements to provide a level of fire protection that accommodate longer response times so the level of fire protection provided by San Diego's response time goals are maintained. This approach also frees up firefighters to contain the wildfire rather than having to defend poorly constructed and maintained homes.

- For the benefit of the community, the brush management and maintenance of common areas will be put under the control of a homeowners association (HOA) or other common ownership, established in perpetuity, and regulated through periodic Fire Department inspections.

- All buildings or structures that interface with wildland fire areas and where APPENDIX 'E' indicates there is less than 100 feet of combined BMZ 1 and BMZ 2 setback from an wildland fire interface area must provide the following Ignition-Resistive Construction in accordance with the City of San Diego's Fire Prevention Bureau Policy B-09-1:

  1) Roofs – All roofs shall have non-combustible Class A roof covering material. Tile, if used, shall be flat or be grouted such that burning brands cannot penetrate the space in between the tiles.

  2) Walls and Openings – Due to the adjacent fuel load, the fire resistance of walls shall be one hour with 45 minute protected openings. There are no structures where adjacent fuel loading would require the fire resistance of walls to be two hours with 60 minute protected openings. Operable windows and doors shall be protected with an automatic closing mechanism, such as UV fire sensor operated window shutters, and self-closing doors. Fire resistance shall extend horizontally and vertically along the fact of the building adjacent to the native/naturalized vegetation with a minimum 10-foot perpendicular return along adjacent wall faces. In no instance shall parapets be required for brush management.

  3) Construct in accordance with the structural requirements set forth under Chapter 7A of the 2010 California Building Code (as may be amended from time to time) for structures located in the "Very High Fire Hazard Severity Zone." This applies to all structures regardless of BMZ width.

  4) Construct fire-barrier walls, which may include, decorative rock, natural boulders, and similar landscape features at the locations indicated on APPENDIX 'E', which were approved by the City of San Diego Fire Department.

  5) All vents shall exceed the current Building Code requirements. For example, they shall use vents produced by Vulcan, Brandguard, etc.

- Fire sprinkler systems shall be installed in all structures within the project which shall meet NFPA 13D (residential) and 13 (Commercial) Standards. The 2010 California Building Standards Codes published July 1, 2010, with an effective date of January 1, 2011, requires a fire sprinkler system in all new one- and two-family dwellings and townhouse construction statewide. Fire sprinkler systems provide initial fire suppression to allow occupants more time to exit the structure and more time for the Fire Department to respond to the fire. The requirement to install fire sprinkler systems was established after the City of San Diego set the fire response time goals identified in the Draft EIR. Accordingly, the City of San Diego's fire response goals did not take into account the benefit of this internal fire suppression system and the beneficial impact it would have on extending fire response times. Firewise believes the fire sprinklers with the longer response times stated in the Draft EIR provides a level of fire protection functionally equivalent to the fire protection provided to an existing development constructed without fire sprinklers that is located closer to a City of San Diego Fire Department that can meet the response times. For an extra measure of safety, all structures shall be constructed with a centrally-monitored electronic fire alarm system to alert the Fire Department to a structural fire faster than homes without such centralized alarm features. Accordingly, there is no significant risk of loss, injury or death to persons from a structural fire or a wildland fire despite the Development's location farther away from City of San Diego Fire Department services.

Implementing these basic fire protection concepts would create acceptable structural and wildfire protection for all the structures and evacuation routes within this development.

4.1 Adequate Emergency Services

This development must comply with the emergency travel time requirements for a responding fire station to reach the furthest structure in this 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.

At present, fire service would be provided by the City of San Diego Fire-Rescue Department (SDFD). Fire protection service by the SDFD calls for attainment of the following established response time goals (or provide a level of fire protection functionally equivalent to that provided by such response times):

- Total response time for deployment and arrival of the first-in engine company for fire suppression incidents should be within 4 minutes 90 percent of the time. Add one minute for turnout time and one minute for dispatch time.

- Total response time for deployment and arrival of the full first alarm assignment for fire suppression incidents should be within 8 minutes 90 percent of the time. Add one minute for turnout time and one minute for dispatch time.

The City of San Diego's Fire Department's current response time to East Elliott area exceeds the above response time goals. The nearest City of San Diego Fire Station to the project site is the one located at 6565 Cowles Mountain Boulevard (approximately 6.3 miles away). Using NFPA Standard 1142 (2007 ed.) Table C1.11 (b) the expected emergency travel time to the furthest point from this station is estimated approximately 11.5 minutes. The next closest City Fire Station is Station 39 located at 4949 La Cuenta Drive, approximately 8.37 miles from the furthest structure within the proposed development.

To prevent this scenario's direct and cumulative fire service impact from rising to a level of significance, the following feasible applicant design measures provide functional equivalent protection for the development.

4.1.2 Install a fire alarm system in habitable structures within the project with centralized, remote electronic monitoring

4.1.3 Installing fire sprinkler systems in all structures within the project which meet NFPA 13D (residential) and Standard 13 (commercial) Standards.

4.1.4 Construct and maintain non-combustible fire-barrier /deflection wall along the perimeter of the development to enhance fire protection along portions of Project as shown in APPENDIX 'E'. A Fire barrier/deflection wall provides significant protection from a wildfire encroaching into the Brush Management Zone, but also provides protection to fire personnel from engaged in suppressing a wildfire approaching the development. Some place with less than 100-feet of Brush Management Zones can be adequately protected without a firewall through the use of Ignition-Resistant building features and/or expansion of BMZ 1's width beyond 35-feet. Accordingly, not every lot with less than 100 feet of Brush Management Zone requires a fire wall.

4.1.5 A long-term, brush management plan to minimize any loss of structures within this proposed development from wildfire. Properly designed and maintained brush management treatments

will safely mitigate wildfire hazard and enhance the survivability of structures. The brush management treatments reduce the Project's dependency on fire apparatus and fire personnel reaching the Project within the published response time goals.

4.1.6 Alternatively, prior to issuance of an occupancy permit, Applicant can provide evidence of an agreement for provision of fire protection services within the required response times through an automatic aid agreement, a mutual aid agreements, or annexation into the City of Santee.

The Cities of Santee and San Diego formerly had a mutual aid agreement for fire suppression resources; however, this agreement is no longer in effect. The renewal or re-instatement of the mutual aid agreement with the City of Santee's Station 5 would provide compliance with the emergency travel time requirements for emergency fire response. Station 5 is located at 9130 Carlton Oaks Drive is 1.76 miles from the furthest point in the development, an estimated 3.6 minutes from the furthest point in the development. Station 4 is located at 8950 Cottonwood Avenue and is approximately 3.8 miles from the furthest point in the development, and an estimated 7 minutes response time. The Santee stations have several fire apparatus, including a 100-foot ladder truck at Station 4.

The 430 units proposed in the development would cause an increase in the demand for fire emergency services. This increase in demand would result in the need for additional facilities in Santee. If required, an incremental increase in fire service demand would be met through additional staffing and equipment paid for through property taxes and Santee Development Impact Fees (DIF) generated from the Project.

The goal to accomplish adequate emergency services and assure cumulative fire service impacts do not rise to a level of significance would be achieved through implementation of this FPP because it would achieve a level of fire protection functionally equivalent to the applicable response time performance criteria.

4.2 Fire Apparatus Access

4.2.1 The primary access to the development will be via Mast Boulevard, an existing public road located along the south boundary of the project site. A secondary and emergency access will be via Medina Drive on the east side of the development and within the City of Santee.

4.2.2 Fire apparatus access roads shall have an unobstructed improved width of not less than 24-feet, and will be maintained at all times. Fire apparatus access roads will not be obstructed in any manner, including the parking of vehicles. Specific interior roadways will be designated "fire access roadways" or "fire lanes". All standards for apparatus access roads will follow APPENDIX 'D' of the California Fire Code.

4.2.3 Emergency vehicle turnarounds shall be provided on "fire lanes" exceeding 150-feet in length. In this development, turnarounds must be approved by the fire department, especially for aerial ladder trucks for proposed multiple story structures, where appropriate.

4.2.4 Fire apparatus access road shall extend within 150-feet of all portions of a structure and all portions of the exterior walls of the first story of the building as measured by a route around the exterior of every building in the development.

4.2.5 All roads shall be provided with an approved driving surface prior to construction and/or bringing combustible building products onto each parcel.

4.2.6 Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus of not less than 80,000 pounds and will be provided with an approved paved surface so as to provide all-weather driving capabilities.

4.2.6 Any gate or barrier across a fire access roadway shall have specific plans reviewed and approved prior to installation by the fire department.

4.2.7 The road and street grade standard for fire apparatus shall not exceed 20 percent, and that any roadway over 15 percent shall be a concrete surface with a deep broom finish perpendicular to the direction of travel to enhance traction.

4.2.9 Secondary Access and Dead End Roadways. The development in combination with designated and marked "fire lanes" shall provide adequate secondary access. The maximum length of a dead-end road shall not exceed 800 feet, without specific approval from the fire department. A secondary access point is located off Medina Drive in the City of Santee.

4.3 Water Supply

The Padre Dam Municipal Water District would supply water for this development if the annexation scenario is implemented.

The City of San Diego Public Utilities Department would supply water for this development if the annexation scenario is not implemented. Alternatively, the City of San Diego could enter into an Out of Service Agreement with the Padre Dam Municipal Water District.

The following specific water supply requirements shall be required.

4.3.1 Fire hydrants shall be installed at intersections, at the beginning radius of cul-de-sacs, and every 300 feet of fire access roadways, regardless of parcel size. All fire hydrants will be of bronze construction, including all internal parts except seats.

4.3.2 An approved fire hydrant/water supply system shall be capable of supplying 2500 gallons-per-minute fire flow for 2 hours (California Fire Code and the City of San Diego Fire-Rescue Department). Waterlines for fire control must be capable of supplying this required demand through the hydrants, plus the largest fire sprinkler demand, plus any domestic use supplied from that line.

4.3.3 When an on-site waterline serves more than two hydrants, the line must be looped, providing two hydraulically remote points of connection with the water district lines. The interior loop must have isolation valving, such that not more than two hydrants and/or sprinkler systems are between isolation points. If the on-site fire water system for a building is a private loop, the two points of connection are needed to the public supply and appropriate fire department connections.

4.3.4 Hydrants shall be located along "fire lanes" and shall not be closer than 50-feet or further than 150 feet from each structure or as approved by the fire department.

4.3.5 Each hydrant for this development shall have two 4-inch and one 2-1/2-inch outlets.

4.3.6 The fire department approval shall be required for on-site hydrant and fire service waterline based on the final building construction location, type and largest building size.

4.3.7 All structures and other improvements shall be reached with a maximum hose pull of 150 feet.

4.3.8 All hydrants shall be located along an access roadway and shall not be closer than 50 feet from structures.

4.3.9 Fire hydrants shall be located with blue reflective raised pavement markers at approved locations for each hydrant

4.3.10 All buildings shall be fully protected with automatic fire sprinkler systems. The installation of an automatic fire sprinkler system shall meet NFPA 13D (residential) standards and NFPA 13 (commercial). The 2010 California Building Standards Codes published July 1, 2010, with an effective date of January 1, 2011, requires that all residential fire sprinklers in all new one-and two-family dwellings and townhouse construction statewide.

4.4 Defensible Space (Brush Management/Vegetation Management)

The project site is subject to risk of wildfire due to its location adjacent to natural open space. The California Fire Code requires management of flammable vegetation within 100 feet of structures. The fuel management will be divided into BMZs with the first 35 feet from the edge of all structures (BMZ 1) will have the most restrictions with regard to type of plants allowed, location and density and requirements for maintenance. The remaining 65 feet beyond the first Zone (BMZ 2) will be less restrictive and in some instances will not be necessary as a result of a maintained or developed land use within the 65 feet; i.e., roadways, parking areas, irrigated manufactured slopes. The proposed project shall also provide brush management of fire access/evacuation roadways by providing a separation of at least 30 feet of paved area or selectively thinned/modify fuels between the evacuation route and the Wildland Interface Area. Most areas also have an additional BMZ 2 area that provides an extra measure of defensible space during an evacuation. The project's evacuation route shown in APPENDIX 'E' is on the side of the street away from the Wildland Interface Area.

A brush management plan would encompass 19.35 acres for the Annexation Scenario and 18.86 acres under the No Annexation Scenario. BMZ 1 requirements will generally occur on the graded pads for each residential lot with the application of BMZ 2 occurring almost entirely on the project's manufactured slopes. Given the brush management plan, the level of impacts associated with the risk of wildfire would be less than significant. The following are the BMZs required for this development for either an annexation or no-annexation scenario:

4.4.1 Brush Management Zone 1

BMZ 1 generally comprises the first 35 feet from the edge of each structure. This BMZ consists mostly of irrigated lawns, fire resistant, maintained native or ornamental plantings. Trees may exceed 4 feet, but must be located away from structures by a minimum of 10 feet as measured from the drip line of a mature tree. The shrubs may be up to 4 feet, but must be irrigated and fire resistant. This BMZ may also contain individual well-spaced ornamental plantings up to 24 inches in height. Plants in this BMZ need to be fire resistant and shall not include any pyrophytes that are high in oils and resins. No habitable structures are allowed in this BMZ. As stated above, this BMZ may contain items such as parking and roadways.

The BMZ widths have been permanently established by the City of San Diego Fire Department. In the No Annexation Scenario, requirements for plantings and maintenance within BMZ 1 shall be in accordance with the City of San Diego Land Development Code, which is generally consistent with City of Santee requirements. In the Annexation Scenario, homeowners and the HOA shall comply with requirements for plantings and maintenance within BMZ 1 shall be in accordance with the City of San Diego Land Development Code and supplemented by the City of Santee's requirements where stricter, but in no event shall it be conducted in a manner inconsistent with the Multiple Species Conservation Program.

Following are among the requirements for the proposed BMZ 1 fuel modification to make it more consistent with the City of Santee requirements:

4.4.1.1 This BMZ shall be irrigated (micro-irrigation acceptable when overhead irrigation may cause erosion). Landscaping material from the approved plant list (see APPENDIX 'A') required or in an approved landscape plan and approved by the Fire Marshal.

4.4.1.2 All undesirable non-native vegetation (see APPENDIX 'B') shall be removed. Also, no plants on the California Exotic Pest Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California as of October 1999" or more recent version shall be planted.

4.4.1.3 Vegetation may include single or cluster (no more than two to three plants/tree) of trimmed fire resistant native and ornamental plants.

4.4.1.4 Dense plant masses adjacent to the structures and at bases of trees and tree clusters shall not be placed in this BMZ. Vegetation must be low growing, fire resistive, deep rooted, drought tolerant plantings to maintain erosion control and soil stability, especially on manufactured slopes.

4.4.1.5 Mature native or ornamental trees can be retained within this BMZ. They shall be pruned to maintain a vertical separation of at least 6 feet above the ground. Pruning of the shrubs will minimize the impact of the tree pruning.

4.4.1.6 Trees may be planted and/or maintained as individual specimens, or clustered. Groups should be two to three trees maximum, with mature foliage of any group separated horizontally by at least 10 feet, if planted on less than 20 percent slope, and 20 feet, if planted on greater than 20 percent slope.

4.4.1.7 Tree canopies shall not be allowed to overhang the roof of any structure; the outer edge of the canopies of mature trees will be a minimum of 10 feet from the building eaves, and free of all dead or dying parts. All the dead material must be pruned out of all vegetation on a regular basis. Trees and vegetation should not be planted in areas where fire truck access is impaired, should not impair or obstruct the use of fire department ladders. Accordingly, at a minimum, overhead branches of trees near the driveway must allow 13-1/2-feet of vertical clearance within the driveway for emergency and escape vehicle clearance.

4.4.1.8 Trees may not be planted near electrical lines.

4.4.1.9 Mulches, chips and other small multi-cuttings (cut to less than two inches in diameter and four inches in length) shall be evenly spread over the area no more than 4 inches, at least 50

feet from structures. This can be used to maintain soil moisture and prevent grass and weed encroachments within the treated areas. Regular maintenance, vegetation pruning, and irrigation to establish drought tolerant, fire-resistant landscaping are very important in this BMZ.

4.4.1.10 Construction materials, firewood, and other combustible materials shall not be stored in unenclosed spaces beneath buildings or structures, or on decks or under eaves, canopies or other projections or overhangs. Storage may occur in the defensible space located a minimum of 20 feet from structures and separated from the crown of trees by a minimum of 15 feet, measured horizontally. Firewood stack may not be located on a slope above a structure to prevent a burning log from rolling downhill and igniting the structure.

4.4.1.11 Ornamental plants will not be planted or allowed to become established within this BMZ, unless shown in the Recommended Plant Lists in APPENDIX 'A'. Plants in this BMZ will not include any pyrophytes that are high in oils and resins.

4.4.1.12 Non-flammable patios, walkways, rock, driveways and gravel can be used to break up fuel continuity within this BMZ.

4.4.1.13 If shrubs are located underneath a tree's drip line, the lowest branch will be a least three times as high as the under story shrubs.

4.4.1.14 Trees may be planted and/or maintained as individual specimens, or clustered with 2 to 3 trees in a single cluster; crowns of mature trees shall maintain a minimum horizontal clearance of 10 feet for fire resistant trees (or ones on slopes up to 50 percent) and 30 feet for non-fire resistive trees (or ones on slopes over 50 percent); and avoid planting trees directly uphill of one another.

4.4.1.15 No goats may be used to perform brush management in BMZ 1.

4.4.2 Brush Management Zone 2

BMZ 2 is generally 65 feet beyond the edge of BMZ 1 to the edge of wildland interface area of undisturbed flammable native fuels. BMZ 2 is selectively cleared of shrub species by 50 percent and the remaining shrubs pruned by 50 percent to provide fuel discontinuity and a reduction in the fuel load. The treated fuel load will be modified to meet Fuel Model sh1 criteria.

The BMZ widths have been permanently established by the City of San Diego Fire Department. In the No Annexation Scenario, requirements for plantings and maintenance within BMZ 2 shall be in accordance with the City of San Diego Land Development Code, which is generally consistent with City of Santee requirements. In the Annexation Scenario, homeowners and the HOA shall comply with requirements for plantings and maintenance within BMZ 2 shall be in accordance with the City of San Diego Land Development Code and supplemented by the City of Santee's requirements where stricter, but in no event shall it be conducted in a manner inconsistent with the Multiple Species Conservation Program.

Among the specific BMZ 2 criteria are the following:

4.4.2.1 Forbes and grasses would be mowed or weed-whipped to a 2-inch stubble on an annual basis.

4.4.2.2 Clear and cut 50 percent of the plants over 24 inches in height of 6-inches. Non-native plants shall be pruned before native plants.

4.4.2.3 Prune the remaining 50 percent of vegetation by 50% to reduce fuel loading.

4.4.2.4 Restrict new plantings to a maximum height of 24 inches.

4.4.2.5 Restrict new tree plantings to a low branch height that is three times the height of adjacent plants.

4.4.2.6 No structures are permitted in BMZ 2.

4.4.2.7 No goats may be used to perform brush management in BMZ 2.

4.4.2.8 All of the dead material in the remaining plants must be pruned out on an as needed basis, but at least annually each spring. Trimmed material can be cut and scattered as mulch which helps prevent the establishment of invasive species. Mulches, chips and other small multi-cuttings should be evenly spread over the area not to exceed 4 inches in depth.

4.4.2.9 No brush management activities shall be performed within coastal sage scrub, maritime succulent scrub, and coastal sage-chaparral habitats from March 1 through August 15.

Manufactured Slope Brush Management – Manufactured Slopes in BMZ 2 are temporarily irrigated, or non-irrigated and maintained slopes replanted with low fuel volume plants. Maintenance of these manufactured slopes will be the responsibility of the individual homeowners if they fall within the lot boundary. The HOA will be responsible for the maintenance of all manufactured slopes outside of the lot boundaries.

Natural Slopes Brush Management- There are natural slopes covered with native plants that are part of the BMZ. After removing the prohibited highly flammable species, the remaining plants are thinned out to 50% canopy coverage. Ground fuels are weed whipped to a 2-inch stubble height when cured or by May 1 of each year, whichever is first. The HOA will be responsible for the maintenance of all natural slopes outside of the lot boundaries and along all roads.

Roadside/Evacuation Route Brush Management. The thinning is required to provide safe emergency ingress/egress during Fire Storm conditions for fire apparatus and evacuation of residents. The portions of the road outside the evacuation route and parkway area are maintained to BMZ 1 standards. Most areas also have additional buffers where selective thinning to BMZ 2 standards is performed to provide additional protection.

4.4.3 Maintenance

Maintenance within the BMZ 1 shall be performed year-round and seasonally within BMZ 2. Among the maintenance tasks are the following:

- Prune and thin trees around structures to decrease fuel volume, retain succulent growth and to provide adequate clearance between structures and plants. Native trees retained and planted trees shall have a minimum canopy separation described above.
- Tree branches overhanging roofs shall be removed.

- Trash and combustible debris shall be cleared from around structures, and removed from roofs and rain gutters.
- In BMZ 1, irrigation systems shall be maintained to ensure that they function properly and plantings are watered sufficiently to maintain succulent growth.

4.5 Fire Resistant Construction and Fire Protection Systems

Construction requirements must meet all current San Diego Fire-Rescue Department Building Codes requirements, the State of California Building Codes (Chapter 7A) requirements for construction in the "Very High Fire Hazard Severity Zone," California Residential Code Section R327, andCalifornia Refernece Standards Code Chapter 12-7A. In addition, habitable strucutures that do not have 100-feet of BMZ must meet the extra requirements of San Diego Fire Prevention Bureau Policy B-08-1 "Clarification of Brush Management Regulations and Landscap Stanards." Where secondary environmental impacts are not created, the Project shall substantially conform to Santee Local Amendments to the above building codes. Ignitiion-resistant building requirements found in these sources will significantly reduce the threat of wildfire for this development.

Following are specific Ignition-Resistant building features that shall be applied to all structure construction within the development:

4.5.1 All stuctures within the development shall be built with a Class A roof assembly, including a Class A roof covering (per California Building Code, Chapter 7A).

4.5.2 All vents (roof, foundation, combustion-air, etc.) shall resist the intrusion of flames and embers or shall be protected by louvers and 1/8" non-combustible, corrosion-resistant mesh.Turbine attic vents shall be equipped to allow rotation in only one direction. All ventilation shall comply with the requirements of the California Fire Code.

Exception: Where APPENDIX 'E' indicates a 100-foot BMZ from a structure to the wildland interface area cannot be met in the, all vents shall exceed the current Building Code requirements. For example, they shall use vents produced by Vulcan, Brandguard, etc..

4.5.3 All exterior walls on all sides of the buildings shall be constructed with one-hour fire resistant building materials, and protected with two-inch nominal solid blocking between rafters at all roof overhangs and under the exterior wall covering. Wood siding of 3/8-inch plywood or 3/4-inch drop siding is permitted, but must have an underlayment of ½-inch fire-rated gypsum sheathing that is tightly butted or taped and mudded, or other ignition-resistive materials approved by the San Diego Fire Department.

4.5.4 Attic ventilation openings or ventilation louvers will not be permitted in soffits, in eave overhangs, between rafters at eaves, or in other similar exterior overhanging areas in this wildland/urban interface area.

Exception: Where APPENDIX 'E' indicates a 100-foot BMZ from a structure to the wildland inteface area cannot be met, all vents shall exceed the current Building Code requirements. For example, they shall use vents produced by Vulcan, Brandguard, etc.).

4.5.5 All eaves of roof overhangs shall be enclosed (boxed eaves) on all sides with non combustible materials or constructed with heavy timber such as 2x starter board and 3x6 rafter tails.

4.5.6 Structure openings: Louvers, ventilators, or openings in walls, roofs, attics, and underfloor areas having headroom less than four (4) feet in height which are not fitted with sash or doors shall be covered with wire screen. The screen covering of such openings will be of corrosion-resistant metal or other approved material that offers equivalent protection, and will have a maximum mesh of 1/8-inch.

Exception: Where APPENDIX 'E' indicates a 100-foot BMZ from a structure to the wildland inteface area cannot be met, all openings must be fitted with 45-minute fire resistant building materials. Operable windows and doors shall be protected with an automatic closing mechanism, such as UV fire sensor operated window shutters, and self-closing doors. Fire resistance shall extend horizontally and vertically along the face of the building adjacent to the native/naturalize vegetation with a minimum 10-foot perpendicular return along adjacent wall faces. In no instance shall parapets be required for brush management.

4.5.7 All projections (exterior balconies, stairs, covers, unenclosed roofs and floors, and similar architectural appendages and projections) shall be of non-combustible construction, one-hour fire resistive construction on the underside, or heavy timber construction. When such appendages and projections are attached to exterior ignition-resistant walls, they shall be constructed to maintain the ignition-resistant integrity of the wall.

4.5.8 All glass or other transparent, translucent or opaque glazing materials, including skylights, shall be constructed of tempered glass or a dual glazed windows with minimally one pane of tempered glass.

4.5.9 Fences and other structures less than 5 feet from a building shall be non-combustible construction.

4.5.10 All rain gutters, down spouts and gutter hardware shall be constructed from metal or other noncombustible material to prevent wildfire ignition along eave assemblies.

4.5.11 Gutters shall be designed to reduce the accumulation of leaf litter and debris that contribute to roof edge ignition.

4.5.12 Exterior door assemblies shall conform to the performance requirements of standard SFM 12-7A-1 or will be of approved non-combustible construction, or solid core wood having stiles and rails not less than 1 3/8-inches thick with interior field panel thickness no less than 1 ¼-inches thick, or will have a fire-resistance rating of not less than 20 minutes when tested according to ASTME 2074.

4.5.13 All windows to be screened shall be provided with 1/8 inch mesh metal or similar non-combustible screens to prevent embers from entering the structure during high wind condition.

4.6 Additional Requirements

4.6.1 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 to a maximum depth of four inches and located away from structures.

4.6.2 All roadside brush management within the project is the maintenance responsibility of the property owners or HOA.

4.6.3 A lighted directory of the development noting building numbers, etc. shall be installed near the primary entrance to the development.

4.6.4 Outdoor fireplace, barbecues and grills shall not be built, or install without approval from the fire department. Portable, wood-burning outdoor portable fireplaces and appliances shall not be permitted within the Very High Fire Hazard Severity Zone or Wildnad Urban Interface Areas.

4.6.5 Chimneys serving fireplaces, barbecues, incinerators or decorative heating appliances in which solid or liquid fuel is used, shall be provided with a spark arrester of woven or welded wire screening of 12-gauge standard wire having openings not exceeding ¼-inch.

4.6.6 Firewood and combustible materials shall not be stored in unenclosed spaces beneath buildings or structures, or on decks, under eaves, canopies or other projections or overhands and shall be stored at least 20 feet from structures and separated from the crown of trees by a minimum horizontal distance of 15 feet.

4.7 Cumulative Impact Analysis

The combination of San Diego County's weather, fuel, and terrain contributes to wildland fires, including the Cedar Fire in October 2003. As the population of San Diego County increases and the Wildland Urban Interface (WUI) expands, fire hazards and risks will continue to be encountered. The proposed development is adjacent to wildlands that have the potential to support wildland fires. As designed, neither the unoccupied project during construction nor the occupied project after its construction will expose people or habitable structures to a significant risk of loss, injury or death.

Implementation of the proposed development would result in an incremental increase in demand for public services including fire emergency services, but due to its Applicant Design Measures does not require the construction of new facilities. Nevertheless, the project's demand, together with other cumulative development in the area, may result in a need for new firefighting equipment. This cumulative impact is potentially significant. However, the City of San Diego requires the applicant to pay an ad hoc fee per dwelling unit for added Fire Department/Emergency Medical Service equipment or otherwise meet its cumulative impact performance criteria. In order to establish the ad-hoc fee, the City of San Diego will adopt concurrent with this project an East Elliott Public Facilities Financing Plan that includes funding for the acquisition of a Type III Brush Fire Engine at an estimated cost of approximately $383,400. which includes 8% for City administrative costs. The ad-hoc fee would be applicable to all development within East Elliott at a rate of $777. per residential unit and $4,662. per commercial/office acre. In the No Annexation Scenario, the project's cumulative impacts on the demand for fire services from San Diego are mitigated to below a level of significance through the payment of this ad hoc fees or otherwise satisfying the performance criteria.

Likewise, under the Annexation Scenario, the City of Santee has mechanisms in place as part of their citywide program to mitigate impacts to the cumulative demand for fire service to below a level of significant through payment of Santee development impacts fees (DIF), which is approximately $509. per residential unit. In the Annexation Scenario, the project's cumulative impacts on the demand for fire services from Santee are mitigated to below a level of significance through the payment of the DIF.

4.8 Brush Management Location Map

APPENDIX 'E' depicts the location of proposed Brush Management Zone locations and Evacuation Plan.

5.0 CONCLUSIONS

This FPP evaluated the adverse environmental effects that the Castlerock development may have from wildland fire and through its Applicant Design Measures assures that the Development does not expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

Defensible Space / Brush Management. The requirements of this FPP provide the brush management standards to prevent the exposure of people or structures to a significant risk of loss, injury or death. The BMZ 1 provides the defensible space zone for fire suppression activities and protects structures from radiant and convective heat. This BMZ will also be a landscaped zone that includes plantings that are fire resistant and permanently irrigated. Proposed BMZ 1 and BMZ 2 when combined with the other Applicant Design Measures will provide more than adequate protection for the development from potential wildfires burning in the area. The BMZs are reinforced with use of ignition-resistant construction materials and design (for construction and maintenance) and non-combustible fire deflector walls along key points shown in Appendix E to address the areas with the greatest wildfire threat or that have less than 100 feet of BMZ.

5.1 Adequate Emergency Services, Emergency Access, and Evacuation. In the No-Annexation Scenario, the Development prevents its demand on emergency services from rising to the level of significance through the incorporation of several measures that provide a level of fire service protection functionally equivalent to the level of fire protection provided by projects closer to fire stations and that can meet the City of San Diego's fire response time goals. Among them are (1) the internal fire sprinkler systems that are now required, but were not required at the time the City of San Diego established its fire response times; and (2) the electronic fire alarms with remote central monitoring that dispatch fire services faster to homes with them than homes constructed without them. In the Annexation Scenario, the project will be served by the City of Santee, which can meet the applicable response time goals. The evacuation routes are all located on the side of the street away from the wildland interface area and provide BMZ 1 and in some cases additional BMZ 2 defensible space for evacuees in the event the fire department orders an evacuation. Finally, all standards for fire apparatus access roads follow Appendix D of the California Fire Code.

5.2 Water Supply. The project has planned for adequate water supply for fire suppression from the City of San Diego in the No Annexation Scenario and from Padre Dam Municipal Water District in the Annexation Scenario.

5.3 Fire Protection Services – The project adequately addresses its cumulative increased demand on fire services through payment of applicable fair share Development Impact Fees or Ad Hoc Fees that can be used to provide additional equipment. The project will also generate new property taxes that can be used to operate and staff faire departments that will serve the project.

The FPP incorporates the State of California Building Codes (Chapter 7A) requirements for construction in the "Very High Fire Hazard Severity Zone," California Residential Code Section R327, California Reference Standards Code Chapter 12-7A, CBC/ART 86 CFC; California Public Resource Code Sections 4290 and 4291 and California Code of Regulations Title 14 Section's 1270-1299 "SRA Fire Safe Regulations". In addition, habitable strucutures that do not have 100-feet of BMZ must meet the extra requirements of San Diego Fire Prevention Bureau Policy B-08-1 "Clarification of Brush Management Regulations and Landscape Standards." Where secondary environmental impacts are not created, the Project shall substantially conform to Santee Local Amendments to the above building codes.

Given the requirements set forth in this FFP and incorporated into the project design, ***FIREWISE* 2000, Inc.** agrees with the City of San Diego's assessment that the level of impacts associated with the risk of wildfire would be less than significant. [1]

6.0 LIST OF PREPARERS, PERSONS, AND ORGANIZATIONS CONTACTED

6.1 List of Preparers

The principal author and preparer of this Fire Protection Plan is C. Douglas Pumphrey, Senior Wildland Fire Associate of ***FIREWISE* 2000, Inc**. and certified by David C. Bacon, President of ***FIREWISE* 2000, Inc.** and a San Diego County DPLU certified wildland fire consultant.

6.2 List of Persons Contacted During the Course of this Project

6.2.1 Jimmy Ayala, Pardee Homes
6.2.2 Ted Shaw, Principal, Latitude 33 Planning and Engineering
6.2.3 Dawna De Mars, Environmental Specialist, RECON Environmental, Inc.
6.2.4 Larry Prame, Assistant Fire Marshal, San Diego City Fire-Rescue Department

TECHNICAL APPENDICES

APPENDIX A – ACCEPTABLE PLANTS FOR A DEFENSIBLE SPACE IN FIRE PRONE AREAS
APPENDIX B – UNDESIRABLE PLANT LIST
APPENDIX C – LITERATURE REFERENCED
APPENDIX D – BEHAVEPLUS VERSION 5.0.5 FIRE BEHAVIOR CALCULATIONS
APPENDIX E – BRUSH MANAGEMENT TREATMENT LOCATION & EVACUATION MAPS

[1] We note that the Draft EIR Cumulative Impact section states that the Project has a significant cumulative impact on the demand for fire services, but then imposes mitigation measure SER-1 requiring the applicant to demonstrate prior to issuance of an occupancy permit, to the satisfaction of the San Diego Fire Department or the Director of the Development Services Department that adequate fire protection services and emergency medical services shall be provided to all dwelling units within the project, with reference to the San Diego General Plan's fire response time goals (or providing a level of fire protection and emergency medical service functionally equivalent to that provided by such response times). This FPP establishes the functional equivalency and would meet the requirements of mitigation measure SER-1. Due to the fact the FPP is a feature of the project, we conclude there is no significant cumulative impact, but recognize that the City of San Diego may also meet the requirements of SER-1 through other means. Regardless of whether the FPP is viewed as a feature of the Project or fulfills mitigation measure SER-1, the FPP is enforceable so the net effect is that there is no significant impact and the information in support of that conclusion is properly before the public and decision-makers during the public comment period.

APPENDIX 'A'

COUNTY OF SAN DIEGO
ACCEPTABLE PLANTS FOR DEFENSIBLE SPACE
IN FIRE PRONE AREAS

ALL NATIVE PLANTS ON THE FOLLOWING LIST are considered to be drought-tolerant in the particular climate zone they are found. Those that grow best in riparian areas, as indicated by the "R", are generally the least drought-tolerant plants on the list.

SPECIAL NOTE: When planting, it is necessary to water deeply to encourage the plant roots to seek natural moisture in the soil. This watering should continue for at least three years to allow the plants to naturalize. More water should be provided in summer and less (if any) in the winter. These plants should be weaned off the supplemental irrigation and become less dependent on it over the establishment period.

No plant is totally fire resistant. The plants listed were chosen due to their high water content, minimum amount of flammable resins and/or low fuel volume.

Definitions:

Defensible Space: The area around a structure, where material capable of causing fire has been cleared, reduced or changed, to act as a barrier between an advancing fire and the structure.

Drought-Tolerant Plant Materials: This includes trees, shrubs, groundcovers, and other vegetation capable of sustained growth and reproduction with only natural moisture. Occasional supplemental irrigation is necessary only in extreme drought situations.

Establishment Period: The time it takes for a plant to become drought-resistant. This is usually a period of three years and is the time when supplemental irrigation is necessary.

Native or Naturalizing Plant Species: Plant species native to the region or introduced which, once established, are capable of sustaining growth and reproduction under local climatic conditions without supplemental irrigation.

***FIRE*WISE 2000, Inc. Note:** The plant list which follows was developed using the plants found on the San Diego County approved plant list. This list was then compared to those plants which are suitable for the climatic zone in which the project is located. Only those plants suitable for the project area listed below. The list is therefore shorter than that provided by the County. By providing this custom list, plants that are likely to be killed or seriously damaged by frost or will not perform in hot dry conditions have been eliminated. ***FIRE*WISE 2000, Inc.** believes that the planting of species suited to the site is essential to fire management goals and is an environmentally sound practice.

San Diego County
Customized Acceptable Plant List
For the Castlerock Project

No.	Type	Genus	Species	Common Name
1	Annual	Lupinus spp.	nanus	Lupine
2	Groundcover	Achillea	millefolium	Yarrow
3	Groundcover	Arctostaphylos spp.		Manzanita
4	Groundcover	Cerastium	tomentosum	Snow-in-Summer
5	Groundcover	Coprosma	kirkii	Creeping Coprosma
6	Groundcover	Cotoneaster spp.		Redberry
7	Groundcover	Drosanthemum	hispidum	Rosea Ice Plant
8	Groundcover	Dudleya	virens	Island Live-Forever
9	Groundcover	Eschscholzia	californica	California Poppy
10	Groundcover	Ferocactus	viridescens	Coast Barrel Cactus
11	Groundcover	Gaillardia	grandiflora	Blanket Flower
12	Groundcover	Gazania spp.		Gazania
13	Groundcover	Helianthemum spp.		Sunrose
14	Groundcover	Lantana spp.		Lantana
15	Groundcover	Lasthenia	californica	Common Goldfields
16	Groundcover	Lasthenia	glabrata	Coastal Goldfields
17	Groundcover	Lupinus spp.		Lupine
18	Groundcover	Pyracantha spp.		Firethorn
19	Groundcover	Rosmarinus	officinalis	Rosemary
20	Groundcover	Santolina	chamaecyparissus	Lavender Cotton
21	Groundcover	Trifolium	frageriferum	O'Connor's Legume
22	Groundcover	Verbena	rigida	Verbena
23	Groundcover	Viguiera	laciniata	San Diego Sunflower
24	Groundcover	Vinca	major	Periwinkle
25	Groundcover	Vinca	minor	Dwarf Periwinkle
26	Perennial	Coreopsis	grandiflora	Coreopsis
27	Perennial	Coreopsis	maritima	Sea Dahlia
28	Perennial	Coreopsis	verticillata	Coreopsis
29	Perennial	Heuchera	maxima	Island Coral Bells
30	Perennial	Iris	douglasiana	Douglas Iris
31	Perennial	Kniphofia	uvaria	Red-Hot Poker
32	Perennial	Lavandula spp.		Lavender
33	Perennial	Penstemon spp.		Penstemon
34	Perennial	Satureja	douglasii	Yerba Buena
35	Perennial	Sisyrinchium	bellum	Blue-Eyed Grass
36	Perennial	Sisyrinchium	californicum	Golden-Eyed Grass
37	Perennial	Solanum	xantii	Purple Nightshade
38	Perennial	Zauschneria	'Catalina'	Catalina Fuschia
39	Perennial	Zauschneria	californica	California Fuschia
40	Perennial	Zauschneria	cana	Hoary California Fuschia
41	Shrub	Agave	americana	Desert Century Plant
42	Shrub	Agave	Amorpha fruticosa	False Indigobush
43	Shrub	Agave	deserti	Shaw's Century Plant
44	Shrub	Agave	shawii	NCN
45	Shrub	Agave		Century Plant
46	Shrub	Arbutus	menziesii	Madrone

47	Shrub	Arctostaphylos spp.		Manzanita
48	Shrub	Atriplex	canescens	Hoary Saltbush
49	Shrub	Atriplex	lentiformis	Quail Saltbush
50	Shrub	Baccharis	pilularis	Coyote Bush
51	Shrub	Baccharis	salicifolia	Mule Fat "R"
52	Shrub	Carissa	macrocarpa	Natal Plum
53	Shrub	Ceanothus spp.		California Lilac
54	Shrub	Cistus spp.		Rockrose
55	Shrub	Cneoridium	dumosum	Bush rue
56	Shrub	Comarostaphylis	diversifolia	Summer Holly
57	Shrub	Convolvulus	cneorum	Bush Morning Glory
58	Shrub	Elaeagnus	pungens	Silverberry
59	Shrub	Encelia	californica	Coast Sunflower
60	Shrub	Encelia	farinosa	White Brittlebush
61	Shrub	Eriobotrya	deflexa	Bronze Loquat
62	Shrub	Eriophyllum	confertiflorum	Golden Yarrow
63	Shrub	Escallonia spp.		Escallonia
64	Shrub	Feijoa	sellowiana	Pineapple Guava
65	Shrub	Fouqueria	splendens	Ocotillo
66	Shrub	Fremontodendron	californicum	Flannelbush
67	Shrub	Fremontodendron	mexicanum	Southern Flannelbush
68	Shrub	Galvezia	juncea	Baja Bush-Snapdragon
69	Shrub	Galvezia	speciosa	Island Bush-Snapdragon
70	Shrub	Garrya	elliptica	Coast Silktassel
71	Shrub	Garrya	flavescens	Ashy Silktassel
72	Shrub	Heteromeles	arbutifolia	Toyon
73	Shrub	Lantana spp.		Lantana
74	Shrub	Lotus	scoparius	Deerweed
75	Shrub	Mahonia spp.		Barberry
76	Shrub	Malacothamnus	clementinus	San Clemente Island Bush
77	Shrub	Malacothamnus	fasciculatus	Mesa Bushmallow
78	Shrub	Melaleuca spp.		Melaleuca
79	Shrub	Mimulus spp.		Monkeyflower
80	Shrub	Nolina	parryi	Parry's Nolina
81	Shrub	Photinia spp.		Photinia
82	Shrub	Pittosporum	rhombifolium	Queensland Pittosporum
83	Shrub	Pittosporum	tobira 'Wheeleri'	Wheeler's Dwarf
84	Shrub	Plumbago	auriculata	Cape Plumbago
85	Shrub	Prunus	caroliniana	Carolina Laurel Cherry
86	Shrub	Prunus	ilicifolia	Hollyleaf Cherry
87	Shrub	Prunus	lyonii	Catalina Cherry
88	Shrub	Puncia	granatum	Pomegranate
89	Shrub	Pyracantha spp.		Firethorn
90	Shrub	Rhamus	alaternus	Italian Buckthorn
91	Shrub	Rhamus	californica	Coffeeberry
92	Shrub	Rhaphiolepis spp.		Rhaphiolepis
93	Shrub	Rhus	continus	Smoke Tree
94	Shrub	Rhus	ovata	Sugarbush
95	Shrub	Rhus	trilobata	Squawbush
96	Shrub	Romneya	coulteri	Matilija Poppy
97	Shrub	Rosa	californica	California Wild Rose
98	Shrub	Rosa	minutifolia	Baja California Wild Rose
99	Shrub	Salvia spp.		Sage
100	Shrub	Sambucus spp.		Elderberry

101	Shrub	Symphoricarpos	mollis	Creeping Snowberry
102	Shrub	Syringa	vulgaris	Lilac
103	Shrub	Teucrium	fruticans	Bush Germander
104	Shrub	Verbena	lilacina	Lilac Verbena
105	Shrub	Xylosma	congestum	Shiny Xylosma
106	Shrub	Yucca	schidigera	Mojave Yucca
107	Shrub	Yucca	whipplei	Foothill Yucca
108	Tree	Acer	macrophyllum	Big Leaf Maple
109	Tree	Acer	saccarum	Sugar Maple
110	Tree	Acer	saccharinum	Silver Maple
111	Tree	Alnus	rhombifolia	White Alder "R"
112	Tree	Arbutus	unedo	Strawberry Tree
113	Tree	Brahea	edulis	Guadalupe Palm
114	Tree	Ceratonia	siliqua	Carob
115	Tree	Cercis	occidentalis	Western Redbud
116	Tree	Cerdidium	floridum	Blue Palo Verde
117	Tree	Cornus	nuttallii	Mountain Dogwood
118	Tree	Cornus	stolonifera	Redtwig Dogwood
119	Tree	Elaeagnus	angustifolia	Russian Olive
120	Tree	Eriobotrya	japonica	Loquat
121	Tree	Gingko	biloba "Fairmount"	Fairmount Maidenhair Tree
122	Tree	Gleditisia	triacanthos	Honey Locust
123	Tree	Juglans	californica	California Walnut
124	Tree	Juglans	hindsii	California Black Walnut
125	Tree	Lagerstroemia	indica	Crape Myrtle
126	Tree	Ligustrum	lucidum	Glossy Privet
127	Tree	Liquidambar	styraciflua	Sweet Gum
128	Tree	Liriodendron	tulipifera	Tulip Tree
129	Tree	Melaleuca spp.		Melaleuca
130	Tree	Nerium	oleander	Oleander
131	Tree	Parkinsonia	aculeata	Mexican Palo Verde
132	Tree	Pistacia	chinensis	Chinese Pistache
133	Tree	Pistacia	vera	Pistachio Nut
134	Tree	Pittosporum	phillyreoides	Willow Pittosporum
135	Tree	Platanus	acerifolia	London Plane Tree
136	Tree	Platanus	racemosa	California Sycamore "R"
137	Tree	Populus	alba	White Poplar
138	Tree	Populus	fremontii	Western Cottonwood "R"
139	Tree	Populus	trichocarpa	Black Cottonwood "R"
140	Tree	Prunus	caroliniana	Carolina Laurel Cherry
141	Tree	Prunus	cersifera ‘Newport’	Newport Purple-Leaf Plum
142	Tree	Prunus	ilicifolia	Hollyleaf Cherry
143	Tree	Prunus	lyonii	Catalina Cherry
144	Tree	Prunus	serrulata ‘Kwanzan’	Flowering Cherry
145	Tree	Prunus	xblireiana	Flowering Plum
146	Tree	Prunus	yedoensis ‘Akebono’	Akebono Flowering Cherry
147	Tree	Quercus	agrifolia	Coast Live Oak
148	Tree	Quercus	engelmannii	Engelmann Oak
149	Tree	Quercus	suber	Cork Oak
150	Tree	Rhus	lancea	African Sumac
151	Tree	Salix spp.		Willow "R"
152	Tree	Ulmus	parvifolia	Chinese Elm
153	Tree	Ulmus	pumila	Siberian Elm
154	Tree	Umbellularia	californica	California Bay Laurel "R"

155	Vine	Antigonon	leptopus	San Miguel Coral Vine
156	Vine	Distictis	buccinatoria	Blood-Red Trumpet Vine
157	Vine	Keckiella	cordifolia	Heart-Leaved Penstemon
158	Vine	Lonicera	japonica ‘Halliana’	Hall’s Honeysuckle
159	Vine	Lonicera	subspicata	Chaparral Honeysuckle
160	Vine	Solanum	jasminoides	Potato Vine

APPENDIX 'B'

UNDESIRABLE PLANT LIST

The following species are highly flammable and should be avoided when planting within the first 50 feet adjacent to a structure. The plants listed below are more susceptible to burning, due to rough or peeling bark, production of large amounts of litter, vegetation that contains oils, resin, wax, or pitch, large amounts of dead material in the plant, or plantings with a high dead to live fuel ratio. Many of these species, if existing on the property and adequately maintained (pruning, thinning, irrigation, litter removal, and weeding), may remain as long as the potential for spreading a fire has been reduced or eliminated.

BOTANICAL NAME	COMMON NAME
Abies species	Fir Trees
Acacia species	Acacia (trees, shrubs, groundcovers)
Adenostoma sparsifolium**	Red Shanks
Adenostoma fasciculatum**	Chamise
Agonis juniperina	Juniper Myrtle
Araucaria species	Monkey Puzzle, Norfolk Island Pine
Artemesia californica**	California Sagebrush
Bambusa species	Bamboo
Cedrus species	Cedar
Chamaecyparis species	False Cypress
Coprosma pumila	Prostrate Coprosma
Cryptomeria japonica	Japanese Cryptomeria
Cupressocyparis leylandii	Leylandii Cypress
Cupressus forbesii**	Tecate Cypress
Cupressus glabra	Arizona Cypress
Cupressus sempervirens	Italian Cypress
Dodonea viscosa	Hopseed Bush
Eriogonum fasciculatum**	Common Buckwheat
Eucalyptus species	Eucalyptus
Heterotheca grandiflora**	Telegraph Plant
Juniperus species	Junipers
Larix species	Larch
Lonicera japonica	Japanese Honeysuckle
Miscanthus species	Eulalia Grass
Muehlenbergia species**	Deer Grass
Palmae species	Palms
Picea species	Spruce Trees
Pickeringia Montana**	Chaparral Pea
Pinus species	Pines
Podocarpus species	Fern Pine
Pseudotsuga menziesii	Douglas Fir
Rosmarinus species	Rosemary
Salvia mellifera**	Black Sage
Taxodium species	Cypress
Taxus species	Yew
Thuja species	Arborvitae
Tsuga species	Hemlock
Urtica urens**	Burning Nettle

APPENDIX 'C'

Literature Referenced in this FPP

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16. City of San Diego Fire Prevention Bureau Policy B-08-1, *Clarification of Brush Management Regulations and Landscape Standards*, May 3, 2010, Frankie Murphy, Fire Marshall.

17. City of Santee Fire Code, Section 4903 of Chapter 49 Amended—Requirements for Wildland-Urban Interface Areas.

APPENDIX 'D'

BEHAVEPLUS VERSION 5.0.5
FIRE BEHAVIOR CALCULATIONS

BehavePlus 5.0.5 (Build 307)

FIRE SCENARIO1_10MPH_FMSCAL18_20%Slope_Untreated
Mon, Apr 30, 2012 at 22:02:33

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		SCAL18
Fuel Moisture		
1-h Moisture	%	4
10-h Moisture	%	6
100-h Moisture	%	8
Live Herbaceous Moisture	%	50
Live Woody Moisture	%	80
Weather		
Midflame Wind Speed (upslope)	mi/h	4
Terrain		
Slope Steepness	%	20

Run Option Notes

Maximum reliable effective wind speed limit is NOT imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	40.6	ft./min
Heat per Unit Area	3768	Btu/ft2
Fireline Intensity	2549	Btu/ft./s
Flame Length	16.6	ft.
Max Eff Wind Exceeded?	No	

BehavePlus 5.0.5 (Build 307)

5.15.2012 Fire Scenario 1_sh1_10MPH_20%_treated
Tue, May 15, 2012 at 21:34:26

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		sh1
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	4
Terrain		
Slope Steepness	%	20

Run Option Notes

Maximum reliable effective wind speed limit is NOT imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	5.8	ft./min
Fireline Intensity	41.3	Btu/ft./s
Flame Length	1.4	ft.
Max Eff Wind Exceeded?	No	

BehavePlus 5.0.5 (Build 307)

FIRE SCENARIO2_30MPH_FMSCAL18_20%Slope_Untreated
Mon, Apr 30, 2012 at 21:53:32

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		SCAL18
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	12
Terrain		
Slope Steepness	%	20

Run Option Notes

Maximum reliable effective wind speed limit is NOT imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	156.8	ft./min
Heat per Unit Area	4358	Btu/ft2
Fireline Intensity	11388	Btu/ft./s
Flame Length	33.1	ft.
Max Eff Wind Exceeded?	No	

BehavePlus 5.0.5 (Build 307)

5.15.2012 Fire Scenario 2_sh1_30MPH_20%_treated
Tue, May 15, 2012 at 21:32:51

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		sh1
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	12
Terrain		
Slope Steepness	%	20

Run Option Notes

Maximum reliable effective wind speed limit is NOT imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	23.9	ft./min
Fireline Intensity	170.6	Btu/ft./s
Flame Length	2.6	ft.
Max Eff Wind Exceeded?	No	

BehavePlus 5.0.5 (Build 307)

FIRE SCENARIO3_60MPH_FMSCAL18_20%Slope_Untreated
Mon, Apr 30, 2012 at 21:57:24

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		SCAL18
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	24
Terrain		
Slope Steepness	%	20

Run Option Notes

Maximum reliable effective wind speed limit is NOT imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	291.6	ft./min
Heat per Unit Area	4358	Btu/ft2
Fireline Intensity	21180	Btu/ft./s
Flame Length	44.0	ft.
Max Eff Wind Exceeded?	No	

BehavePlus 5.0.5 (Build 307)

5.15.2012 Fire Scenario 3_sh1_60MPH_20%_treated
Tue, May 15, 2012 at 21:30:38

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		sh1
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	24
Terrain		
Slope Steepness	%	20

Run Option Notes

Maximum reliable effective wind speed limit is NOT imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	61.4	ft./min
Fireline Intensity	438.9	Btu/ft./s
Flame Length	4.1	ft.
Max Eff Wind Exceeded?	Yes	

BehavePlus 5.0.5 (Build 307)

SCENARIO 4-FMSCAL18-60MPH-45%SLOPE-UNTREATED

Fri, May 04, 2012 at 00:38:40

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		4
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	24
Terrain		
Slope Steepness	%	45

Run Option Notes

Maximum reliable effective wind speed limit is NOT imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	1524.3	ft./min
Fireline Intensity	87658	Btu/ft./s
Flame Length	84.5	ft.
Max Eff Wind Exceeded?	No	

BehavePlus 5.0.5 (Build 307)

5.15.2012 Fire Scenario 4_sh1_60MPH_20%_treated
Thu, May 17, 2012 at 08:30:28

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		sh1
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	24
Terrain		
Slope Steepness	%	20

Run Option Notes

Maximum reliable effective wind speed limit is NOT imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	61.4	ft./min
Fireline Intensity	438.9	Btu/ft./s
Flame Length	4.1	ft.
Max Eff Wind Exceeded?	Yes	

APPENDIX 'E'

Brush Management Treatment Location & Evacuation Maps

Castlerock Development Project
FIRE PROTECTION PLAN
Brush Management Treatment Location Map

Legend

BMZ 1–Irrigated. **BMZ 1 comprises the first 35 feet from the edge of each structure. This BMZ consists mostly of irrigated lawns, fire resistant, maintained native or ornamental plantings. Trees must be located away from structures by a minimum of 10 feet as measured from the drip line of a mature tree. The shrubs may be up to 4 feet, but must be irrigated and fire resistant. This BMZ may also contain individual well-spaced ornamental plantings up to 24 inches in height. Plants in this BMZ need to be fire resistant and shall not include any pyrophytes that are high in oils and resins. No habitable structures are allowed in this BMZ.** The BMZ may contain items such as parking and roadways. EXCEPTION: Where BMZ 1 is less than 35 feet, alternative compliance will provide a functional equivalent level of protection

BMZ 2 – Non-Irrigated. **BMZ 2 is generally 65 feet beyond the edge of BMZ 1 to the edge of wildland interface area of undisturbed flammable native fuels. BMZ 2 is selectively cleared of shrub species by 50 percent and the remaining shrubs pruned by 50 percent to provide fuel discontinuity and a reduction in the fuel load. The treated fuel load will be modified to meet Fuel Model sh1 criteria.** All undesirable plant species will not be permitted and removed (see Appendix B). Re-planting shall be drought tolerant fire restive plant species. Irrigation may be used to get newly planted vegetation established. Grass and weeds will be mowed or weed-whipped to a 2-inch stubble height by June 15th of each year or when the fuels become cured, whichever occurs first. Manufactured slopes are included in this Zone. EXCEPTION: Where BMZ 2 is less than 65 feet, alternative compliance will provide a functional equivalent level of protection.

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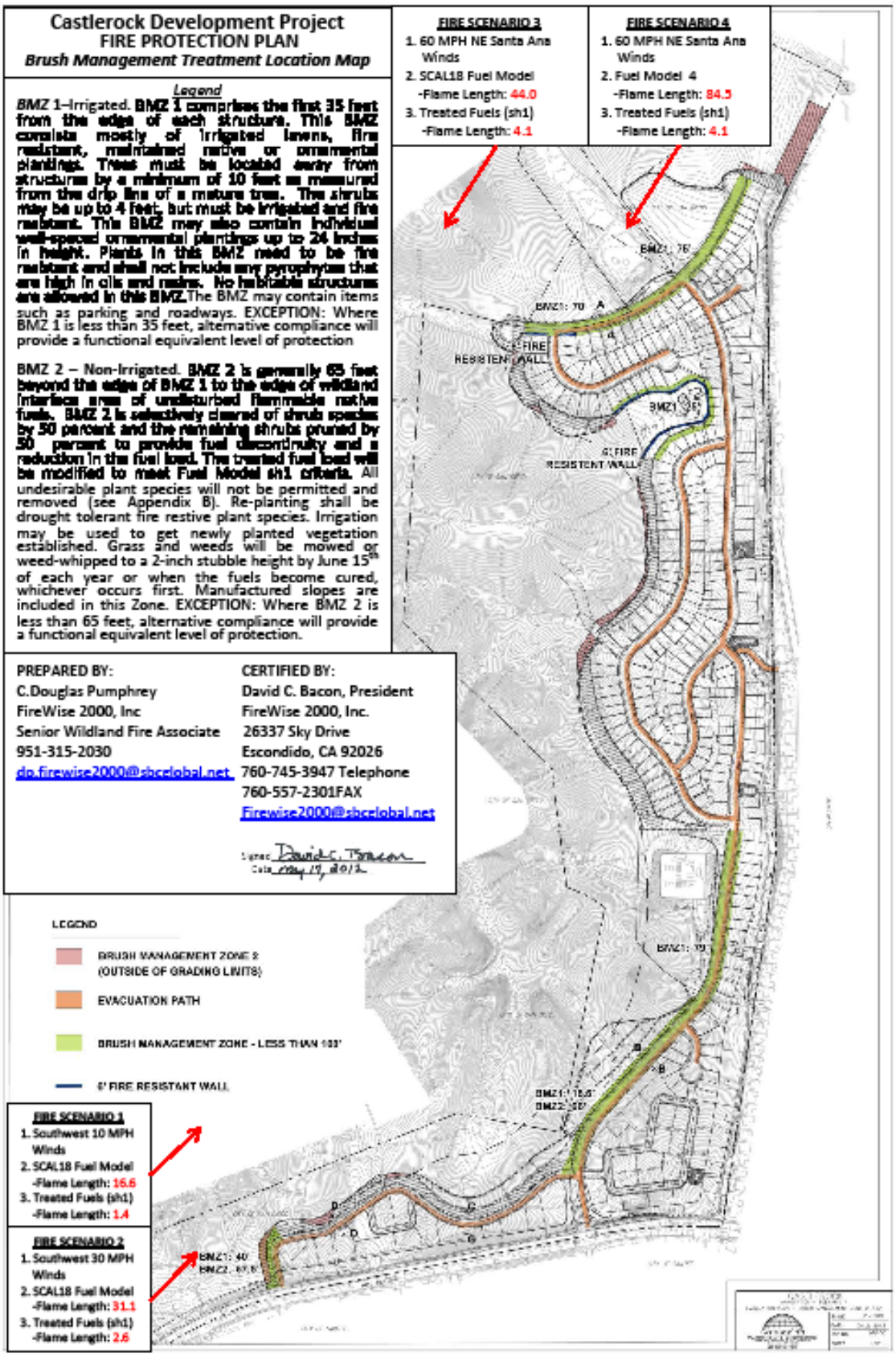
Signed: David C. Bacon
Date: May 17, 2012

FIRE SCENARIO 3
1. 60 MPH NE Santa Ana Winds
2. SCAL18 Fuel Model
   -Flame Length: 44.0
3. Treated Fuels (sh1)
   -Flame Length: 4.1

FIRE SCENARIO 4
1. 60 MPH NE Santa Ana Winds
2. Fuel Model 4
   -Flame Length: 84.5
3. Treated Fuels (sh1)
   -Flame Length: 4.1



FIRE SCENARIO 1
1. Southwest 10 MPH Winds
2. SCAL18 Fuel Model
   -Flame Length: 16.6
3. Treated Fuels (sh1)
   -Flame Length: 1.4

FIRE SCENARIO 2
1. Southwest 30 MPH Winds
2. SCAL18 Fuel Model
   -Flame Length: 31.1
3. Treated Fuels (sh1)
   -Flame Length: 2.6

EVACUATION PLAN + BRUSH MANAGEMENT ZONE 2 PLAN

STREET C

STREET A

PRIVATE DRIVEWAY 'B'

PRIVATE DRIVEWAY 'B'