Fire Protection Plan

Tyler Street Residential Development Project Santee, California

APRIL 2022

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AMSL	Above Mean Sea Level
BTU	British Thermal Unit
CAL FIRE	California Department of Forestry and Fire Protection
CBC	California Building Code
CEQA	California Environmental Quality Act
CFC	California Fire Code
CFR	Code of Federal Regulations
CSA	County Service Area
FAHJ	Fire Authority Having Jurisdiction
FMZ	Fuel Modification Zone
FPP	Fire Protection Plan
FRAP	Fire and Resource Assessment Program
GIS	Geographic Information Systems
HOA	Homeowner's Association
IFC	International Fire Code
LRA	Local Responsibility Area
MPH	Miles Per Hour
NFPA	National Fire Protection Association
PDMWD	Padre Dam Municipal Water District
Project	Tyler Street 14-lot Residential Development Project
SFD	Santee Fire Department
SRA	State Responsibility Area
USGS	United States Geological Survey
VHFHSZ	Very High Fire Hazard Severity Zone
WUI	Wildland Urban Interface

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Executive Summary

This Fire Protection Plan (FPP) has been prepared for the Tyler Street 14-Lot Residential Development Project (Project) within the City of Santee, San Diego County, California. The purpose of this plan is to generate and memorialize the fire safety requirements of the City of Santee along with project-specific measures based on the site, its intended use, and its fire environment. This FPP provides measures for fire protection that meet, and in some areas exceed, the City of Santee Municipal Code and Ordinance 570. The Proposed Project would be required to meet the adopted codes at time of construction unless the requirements herein are more restrictive.

This FPP evaluates and identifies the potential fire risk associated with the Project's land uses and identifies requirements for water supply, fuel modification and defensible space, emergency access, building ignition and fire resistance, fire protection systems, and wildfire emergency pre-planning, among other pertinent fire protection criteria. The primary focus of this FPP is providing an implementable framework for suitable protection of the planned structures and the people living and using them as well as for minimizing potential project-caused fire ignitions. Tasks completed in the preparation of this FPP include data review, code review, site fire risk analysis, land use plan review, fire behavior modeling, and review of a previous site FPP.

Where possible, this FPP incorporates principles of sustainability that are important components of the Proposed Project. Preservation and conservation of resources, including native plant communities, energy and water, along with conservation and maintenance of the site's aesthetics, are important components of the Proposed Project. These principles have been duly considered and integrated into this FPP, with priority assigned to fire protection and safety.

The Project site includes the subdivision of an approximately 27.35-acre parcel into 14 detached single-family residential home lots. The entirety of the Tyler Street Project site lies within the local responsibility area (LRA) Very High Fire Hazard Severity Zone (VHFHSZ), as designated by the SFD and CAL FIRE. Therefore, the requirements in Chapter 7A of the California Building Code (CBC) will be implemented for this development and the proposed fire protection measures for the Project will meet or under certain circumstances, exceed all applicable fire and building codes requirements, including Santee's Ordinance 570, chapter 11.18. The area is provided fire protection by Santee Fire Department (SFD). The structures in the Proposed Project would be built to ignition-resistant standards per the California Fire and Building Codes and the Santee Municipal Code in effect at the time of building permit issuance. Chapter 7A of the California Building Code and Santee Municipal Code focuses on structure ignition resistance from flame impingement and flying embers in areas designated high fire hazard areas. The site's fire hardened structures would be complemented by an improved water availability, capacity, and delivery system; firefighting resources on site; fire department access throughout the developed areas; monitored and customized defensible space/fuel modification; interior, automatic fire sprinkler systems in all structures; and other components that would provide a high level of Proposed Project fire ignition resistance. This system of protections provides a redundant and layered fire hardening that has the dual benefit of minimizing on-site ignitions and fire spread which in turn minimizes the potential for off-site ignitions.

Based on modeling and analysis of the Project area to assess its unique fire risk and fire behavior, it was determined that the California and Santee standard of 100-foot-wide fuel modification zones (FMZs) would be appropriate for portions of the Proposed Project. The Project will be exposed to naturally-vegetated pockets of open space to the north, as well as to the west, south, southeast, and east, however, the northern and northeastern portions of the Project development will be directly adjacent to an existing residential community. Approximately 1,800 feet east

of the Project site is I-125 and another existing residential community, and approximately 2,600 feet south of the Project site is the Grossmont College Campus. FMZs will be provided around all new single-family development lots within the Project development that are adjacent to open space areas. All dwelling units on the Project site will be highly ignition resistant based on required construction design, materials, and methods. However, there are seven lots that cannot achieve a full 100 feet of FMZ on the Project property for various reasons, including property boundary constraints (Lots 1 through 3), being adjacent to an open space easement area (Diegan Sage Scrub Easement per document 1994-0535919 recorded 9-8-94) for the Diegan coastal sage scrub located in the southeastern portion of the Project site (adjacent to Lots 7 and 8), or an ephemeral drainage channel abuts the northeastern portion of Lots 1 through 5.

Fire hazard designations are based on topography, vegetation, and weather, amongst other factors with more hazardous sites including steep terrain, unmaintained fuels/vegetation, and WUI locations. The Project site and adjacent open space areas primarily support Diegan coastal sage scrub and pockets of non-native grasslands. Related to on-site fire risk, the growth of vegetation types/fuels models is influenced by aspect (orientation), soil constituents, soil depth, soil moisture, and weather. The vegetation occurring adjacent to the southern and western borders of the property represents the greatest potential fire threat. With that said, an open space easement (Diegan Sage Scrub Easement per document 1994-0535919 recorded 9-8-94) for the Diegan coastal sage scrub located in the southeastern portion of the Project site (adjacent to Lots 7 and 8) has been obtained and requires this area to stay in its natural state. However, in order to create the necessary fuel modification around Lots 7 and 8, the Project shall be utilizing the existing easement to conduct irrigation and thinning within the Diegan sage scrub area, and a mitigation program shall be put in place to replace the sensitive habitat that is removed. Additionally, an ephemeral drainage channel abuts the northeastern portion of the Project site (adjacent to Lots 1 through 6) and an open space easement has been obtained. The area, like all of San Diego County, is subject to seasonal weather conditions that can heighten the likelihood of fire ignition and spread, and, considering the site's terrain and vegetation, may result in fast moving and moderate-intensity wildfire.

FMZs, when properly maintained, have proven effective at minimizing structure ignition from direct flame impingement or radiant heat, especially for structures built to the latest ignition resistant codes. The FMZs for Tyler Street Project would be maintained in perpetuity by the homeowner and the Project's Homeowner's Association (HOA). Maintenance would occur throughout the year and would be monitored and enforced by the HOA. The property owner would obtain an FMZ inspection and report from a qualified SFD-approved 3rd party inspector in May of each year certifying that vegetation management activities throughout the Project Site have been performed pursuant to this Letter Report, including verifying that wood bark and other combustible mulches shall not be used within the first 5 feet from the homes. A copy of the annual inspection report would be provided to the Proposed Project HOA and a copy made available to SFD, if requested.

This document provides an analysis of the site's fire environment and its potential impact on the Project as well as the Project's potential impact on the existing fire protection service in the area. Requirements and recommendations herein are based on site-specific fire environment and Project characteristics and incorporate input from the SFD, local fire personnel, area fire planning documents, site risk analysis, and standard principles of fire protection planning.

Fire service would be provided by the SFD. The anticipated Project population and number of calculated emergency calls would minimally affect the response capabilities of SFD's nearest existing station(s). The calls from the Project would not be responded to within the City's response time goals of six-minutes overall response time standard (four minutes travel time) from existing stations (City's General Plan). The closest existing Santee Fire Station can be on

site within 4 minutes and 30 seconds minutes travel time, which is consistent with National Fire Protection Association (NFPA) 1710 standard.

As determined during the analysis of this site and its fire environment, the proposed 14 detached, single-family residential development Project, in its current undeveloped condition, is considered to include characteristics that, under favorable conditions, have the potential to facilitate fire spread. Under extreme conditions, wildfires originating in the adjacent mountain side could burn erratically and aggressively and result in significant ember production. Once the Project is constructed, the on-site fire potential will be significantly lower than its current condition due to conversion of areas of wildland fuels to managed landscapes, fuel modification areas, improved accessibility to firefighting personnel and equipment, and new structures built to the latest ignition resistant codes. However, it is anticipated that fire will occasionally encroach upon the Project site and subject its structures to wildfire. This FPP contemplates wildfire encroachment and provides specific requirements that will minimize the potential for structural damage.

Early evacuation for any type of wildfire emergency near the Project Site is the preferred method of providing for resident safety, consistent with the City's current approach. As such, each property owner will be individually responsible to adopt, practice, and implement a "Ready, Set, Go!" model, which is that is widely known and encouraged by the state of California and most fire agencies. Pre-planning for emergencies, including wildfire emergencies, focuses on being prepared, having a well-defined plan, minimizing potential for errors, maintaining the site's fire protection systems, and implementing a conservative (evacuate as early as possible) approach to evacuation and site uses during periods of fire weather extremes.

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1 Introduction

This Fire Protection Plan has been prepared for the proposed Tyler Street 14-Lot residential development Project in the City of Santee (City) of San Diego County (County), California. Preparation of this FPP has been required for the Project by the Santee Fire Department (SFD). The purpose of this FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those impacts. This FPP provides specific measures for fire protection which meet or provide equivalent protection as 2019 California Fire and ignition-resistant Building Codes. It also identifies the fire risk associated with proposed land uses, and identifies requirements for fuel modification, building design and construction, and other pertinent development infrastructure criteria for fire protection. The purpose of this plan is to generate and memorialize the fire safety requirements of the Fire Authority Having Jurisdiction (FAHJ), namely the SFD. These requirements are based on site-specific characteristics and incorporate input from the Project's developer/applicant, planners, engineers, and architects, fire protection planners, as well as the City.

As part of the assessment, this fire protection plan has considered the property location, topography, surrounding combustible vegetation (fuel types), climatic conditions, and fire history. This FPP also addresses water supply, access, structural ignitability and fire resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management. Further, this plan identifies fuel modification zones and recommends the types and methods of treatment that will protect the Project's homeowners and essential infrastructures. The FPP recommends measures that the property owner, developer, and builders will implement to reduce the probability of ignition to the structures throughout the area addressed by the plan.

The following tasks were performed toward completion of this plan:

Gather Project site specific climate, terrain, and fuel data.

Collect Project site photographs.

Process and analyze the data using the latest Geographical Information System (GIS) technology.

Predict fire behavior using scientifically based fire behavior models, comparisons with actual wildfires in similar terrain and fuels, and experienced judgment.

Analyze and guide design of proposed infrastructure.

Analyze the existing SFD emergency response capabilities and potential impacts from the Proposed Project.

Evaluating regional firefighting ad emergency medical resources.

Assess the risk associated with the Project and the Project site;

Analyzing the latest fire safety research and after-fire lessons learned; and

- Prepare this FPP detailing how fire risk will be mitigated through a system of fuel modification, homeowner education, structural ignition resistance enhancements, and fire protection delivery system upgrades.

Field observations were utilized to augment existing digital on-site data in generating the fire behavior models and formulating the recommendations presented in this FPP. Refer to Appendix A for Project site photographs of existing on-site conditions.

1.1 Intent

The intent of this FPP is to provide fire planning guidance and requirements for reducing fire risk and demand for fire protection services associated with the Project. To that end, the fire protection "system" detailed in this FPP includes redundant layering of measures, including pre-planning, fire prevention, fire protection, passive and active suppression, and related measures proven to reduce fire risk. The fire protection system planned for the Project has proven, through real-life wildfire encroachment examples throughout Southern California, to reduce the fire risk associated with this type of commercial development.

1.2 Applicable Codes and Existing Regulations

This FPP demonstrates compliance with applicable portions of the City of Santee Municipal Code and Ordinance No. 570. The Proposed Project would also be consistent with the 2019 California Fire Code (CFC), Chapter 49, the 2019 California Building Code (CBC), Chapter 7A, 2019 California Referenced Standard Code Chapter 1-7A, and 2019 California Residential Code, Section R327 as adopted by the City of Santee. Additionally, the Proposed Project will comply with the applicable adopted codes in place at the time of construction.

Chapter 7-A of the California Building Code (CBC) focuses primarily on preventing ember penetration into homes, a leading cause of structure loss from wildfires. Thus, it is an important component of the requirements of this FPP given the Proposed Project's wildland urban interface (WUI) location that is within an area statutorily designated a Very High Fire Hazard Severity Zone (VHFHSZ) by CAL FIRE. Fire hazard designations are based on topography, vegetation, and weather, amongst other factors with higher hazard category sites including steep terrain, unmaintained fuels/vegetation, and WUI locations. Projects situated in VHFHSZs require fire hazard analysis and application of fire protection measures that have been developed to specifically result in defensible communities in these WUI locations. It should be noted that roughly 70 percent of San Diego County is designated as a VHFHSZ. The areas that have not received this designation are primarily the urbanized areas. The fact that an area is designated as a VHFHSZ does not preclude development but indicates that additional measures are required to address the increased likelihood of wildfire. The Project incorporates all of the required measures and provides for a comprehensive wildfire protection approach that has been shown to perform well in wildfire.

As described in this FPP, the Proposed Project would meet or exceed all applicable Code requirements for building in these higher fire hazard areas. These codes have been developed through decades of after fire structure evaluations to determine what causes building losses and saves during wildfires. The resulting fire codes focus on addressing former structural vulnerabilities through construction techniques and materials so that the buildings are resistant to ignitions from direct flames, heat, and embers, as indicated in the currently adopted 2019 CBC (Chapter 7-A, Section 701A Scope, Purpose and Application; California Building Standards Commission 2019).

1.3 Tyler Street 14-Lot Residential Project Summary

1.3.1 Project Location

As depicted in Figure 1, Project Location Map, the Tyler Street 14-Lot residential Project is located in an area that is within the Santee City limits in what can be describes as southwestern Santee, approximately one mile

east/northeast of Cowles Mountain, a prominent mountain within the City limits of San Diego and also within the Mission Trails Regional Park and west of State Route 125 (SR-125). More specifically, the Project extends from the terminus of Tyler Street, which is accessed from Prospect Avenue and Mesa Heights Road, where Tyler Street will be extended to be the new public street providing access to the 14-lot subdivision. The Project site is located in Sections 32, Township 15 South, Range 1 West on the U.S. Geographical Survey (USGS), 7.5-minute Santee quadrangle map.

1.3.2 Tyler Street 14-Lot Residential Project Description

The proposed Project, currently named the Tyler Street 14-Lot Residential Project is located at the terminus of Tyler Street, in southwestern Santee, and consists of nine existing individually owned lots comprising of approximately 27.35 acres of land. The lot is currently vacant and is adjacent to open space areas primarily support Diegan coastal sage scrub and pockets of non-native grasslands. The area of development is generally flat with a north-facing hillside along the southern and western borders if the property, which represents the greatest potential fire threat. Elevations range from approximately 425 feet above mean sea level (amsl) at the northern portion of the project site to 673 feet amsl at the peak of the mountain rage southeast of the development.

The Project site is bordered on the north and portions of the east by existing residential neighborhoods accessed off Prospect Avenue and State Route 125 (SR-125) farther east; on the west by existing residential homes and Cowles Mountain, a prominent mountain within the City limits of San Diego and also within the Mission Trails Regional Park farther west; and open space, naturally vegetated areas south of the Project site with Grossmont College farther south.

The Project proposes a total of 14 detached, single-family home lots on approximately 6.67 acres (refer to Figure 2, Tyler Street Preliminary Grading Plan). The remaining, eastern 20.68 acres will be left as natural open space. Lot sizes will be varied, with a minimum lot size of 15,000 square feet and up to 27,197 square feet. The Project is accessed by Tyler Street via Prospect Avenue and Mesa Heights Road to the north. The Tyler Street road extension will be an approximately 650-foot dead-end, 36-foot wide roadway with two 10-foot wide sidewalks on each side.

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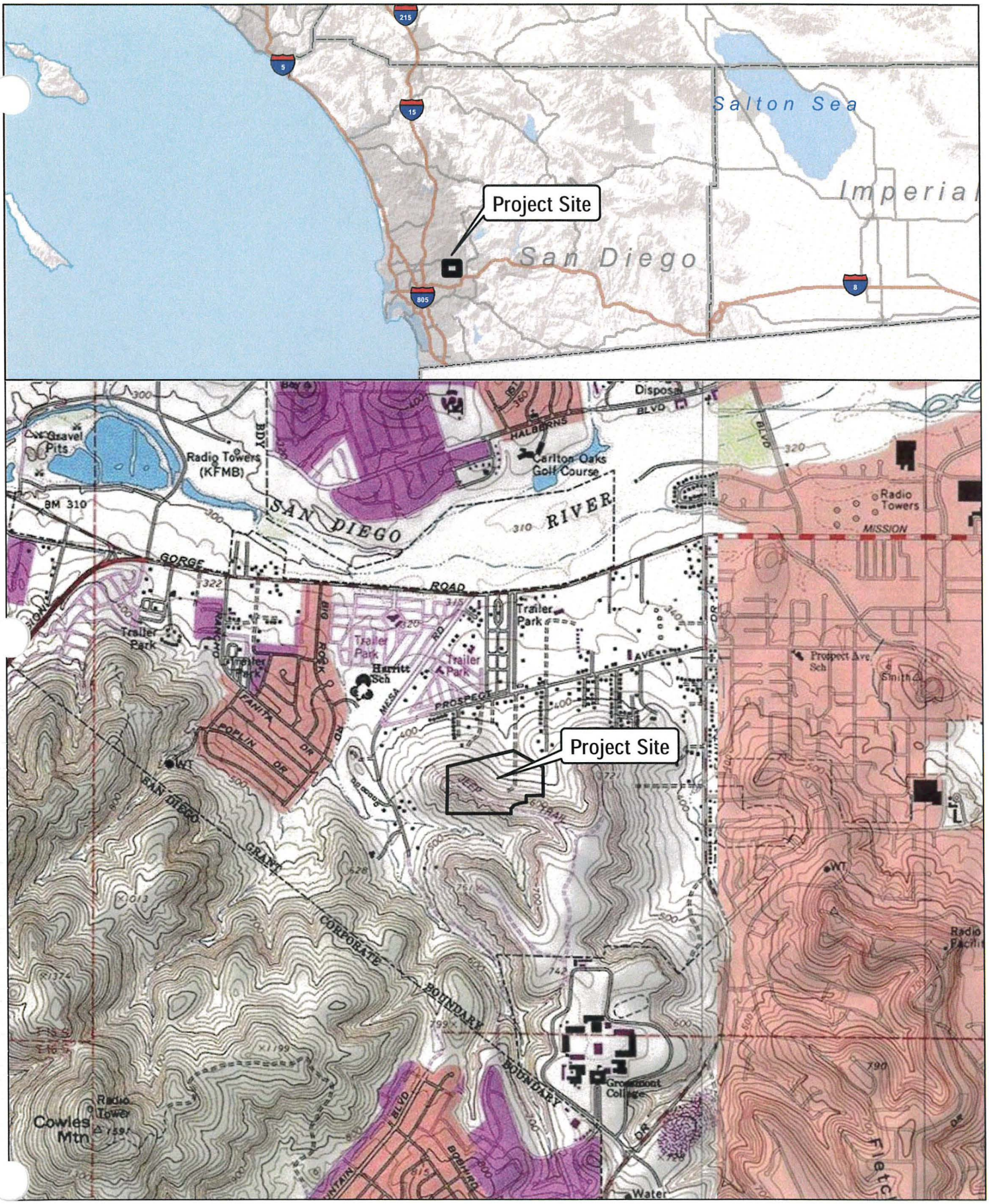

SOURCE: USGS 7.5 Minute Series, La Mesa Quadrangle
Township 15 South, Range 1 West, Section 32

DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

Tyler Street Fire Protection Plan

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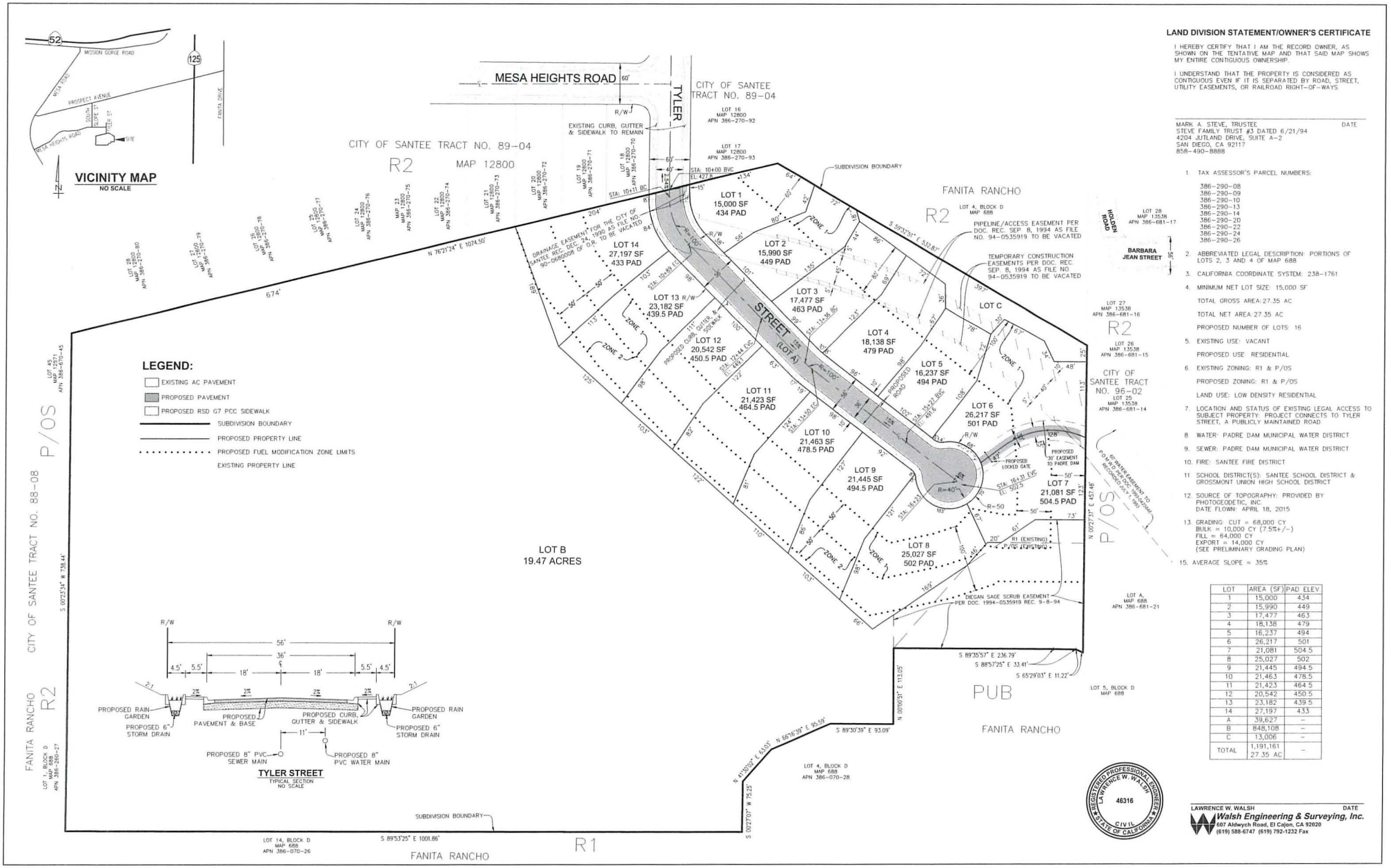

LAND DIVISION STATEMENT/OWNER'S CERTIFICATE

I HEREBY CERTIFY THAT I AM THE RECORD OWNER, AS SHOWN ON THE TENTATIVE MAP AND THAT SAID MAP SHOWS MY ENTIRE CONTIGUOUS OWNERSHIP.

I UNDERSTAND THAT THE PROPERTY IS CONSIDERED AS CONTIGUOUS EVEN IF IT IS SEPARATED BY ROAD, STREET, UTILITY EASEMENTS, OR RAILROAD RIGHT-OF-WAYS

MARK A. STEVE, TRUSTEE — DATE
STEVE FAMILY TRUST #3 DATED 6/21/94
4204 JUTLAND DRIVE, SUITE A-2
SAN DIEGO, CA 92117
858-490-8888

1. TAX ASSESSOR'S PARCEL NUMBERS:
   386-290-08
   386-290-09
   386-290-10
   386-290-13
   386-290-14
   386-290-20
   386-290-22
   386-290-24
   386-290-26
2. ABBREVIATED LEGAL DESCRIPTION: PORTIONS OF LOTS 2, 3 AND 4 OF MAP 688
3. CALIFORNIA COORDINATE SYSTEM: 238-1761
4. MINIMUM NET LOT SIZE: 15,000 SF
   TOTAL GROSS AREA: 27.35 AC
   TOTAL NET AREA: 27.35 AC
   PROPOSED NUMBER OF LOTS: 16
5. EXISTING USE: VACANT
   PROPOSED USE: RESIDENTIAL
6. EXISTING ZONING: R1 & P/OS
   PROPOSED ZONING: R1 & P/OS
   LAND USE: LOW DENSITY RESIDENTIAL
7. LOCATION AND STATUS OF EXISTING LEGAL ACCESS TO SUBJECT PROPERTY: PROJECT CONNECTS TO TYLER STREET, A PUBLICLY MAINTAINED ROAD
8. WATER: PADRE DAM MUNICIPAL WATER DISTRICT
9. SEWER: PADRE DAM MUNICIPAL WATER DISTRICT
10. FIRE: SANTEE FIRE DISTRICT
11. SCHOOL DISTRICT(S): SANTEE SCHOOL DISTRICT & GROSSMONT UNION HIGH SCHOOL DISTRICT
12. SOURCE OF TOPOGRAPHY: PROVIDED BY PHOTOGEODETIC, INC. DATE FLOWN: APRIL 18, 2015
13. GRADING: CUT = 68,000 CY
    BULK = 10,000 CY (7.5%+/-)
    FILL = 64,000 CY
    EXPORT = 14,000 CY
    (SEE PRELIMINARY GRADING PLAN)
15. AVERAGE SLOPE = 35%

LOT	AREA (SF)	PAD ELEV
1	15,000	434
2	15,990	449
3	17,477	463
4	18,138	479
5	16,237	494
6	26,217	501
7	21,081	504.5
8	25,027	502
9	21,445	494.5
10	21,463	478.5
11	21,423	464.5
12	20,542	450.5
13	23,182	439.5
14	27,197	433
A	39,627	-
B	848,108	-
C	13,006	-
TOTAL	1,191,161 SF / 27.35 AC	-

REGISTERED PROFESSIONAL ENGINEER — LAWRENCE W. WALSH — 46316 — CIVIL — STATE OF CALIFORNIA

LAWRENCE W. WALSH — DATE
Walsh Engineering & Surveying, Inc.
607 Aldwych Road, El Cajon, CA 92020
(619) 588-6747 (619) 792-1232 Fax

SOURCE: WALSH ENGINEERING 2022

FIGURE 2
Preliminary Grading Plan
Tyler Street Fire Protection Plan

DUDEK

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2 Proposed Project Site Risk Analysis

2.1 Environmental Setting and Field Assessment

After review of available digital Study Area information, including topography, vegetation types, fire history, and the Project's Development Footprint, a Dudek Fire Protection Planner conducted a Project site evaluation on October 7, 2019, in order to confirm/acquire Project site information, document existing on-site conditions, and to determine potential actions for addressing the protection of the Project's structures. While on-site, Dudek's Fire Planner assessed the area's topography, natural vegetation, and fuel loading, surrounding land use, and general susceptibility to wildfire. Among the field tasks that were completed included:

- Topography evaluation.
- Vegetation/fuel assessments.
- Photograph documentation of the existing condition.
- Confirmation/verification of hazard assumptions.
- Off-site, adjacent property fuel and topography conditions.
- Surrounding land use confirmations.
- Necessary fire behavior modeling data collection.
- Ingress/egress documentation.
- Nearby Fire Station reconnaissance.

Study Area photographs were collected (refer to Appendix A, *Representative Site Photographs*), and fuel conditions were mapped using aerial images. Field observations were utilized to augment existing on-site data in generating the fire behavior models and formulating the requirements and recommendations detailed in the FPP.

2.2 Project Site Characteristics and Fire Environment

Fire environments are dynamic systems and include many types of environmental factors and Project site characteristics. Fires can occur in any environment where conditions are conducive to ignition and fire movement. Areas of naturally vegetated open space are typically comprised of conditions that may be favorable to wildfire spread. The three major components of the fire environment are topography, vegetation (fuels), and climate. The state of each of these components and their interactions with each other determines the potential characteristics and behavior of a fire at any given moment. It is important to note that wildland fire may transition to urban fire if structures are receptive to ignition. Structure ignition depends on a variety of factors and can be prevented through a layered system of protective features including fire-resistive landscapes directly adjacent to the structure(s), application of known ignition resistive materials and methods, and suitable infrastructure for firefighting purposes. Understanding the existing wildland vegetation and urban fuel conditions on and adjacent to the Project site is necessary to understand the potential for fire within and around the Project site.

The following sections discuss the Project site characteristics, local climate, and fire history within and surrounding the Project site. The following sections discuss the characteristics of the Project site at a regional scale. The intent of evaluating conditions at this macro-scale is providing a better understanding of the regional fire environment, which is not constrained by property boundary delineations.

2.2.1 Topography

Topography influences fire risk by affecting fire spread rates. Typically, steep terrain results in faster fire spread up-slope and slower fire spread down-slope in the absence of wind. Terrain that forms a funneling effect, such as chimneys, chutes, and saddles on the landscape can result in especially intense fire behavior. Conversely, flat terrain tends to have little effect on fire spread, resulting in fires that are driven primarily by vegetation and/or wind.

Topography of the Project site consists of relatively flat areas within the Proposed development area of the Project site to a moderate to steep rugged hillside to the west and south of the Project development site that could facilitate fire spread downslope towards the southern portion of the Project site. Slope gradients range from 5% to 32% and graded slopes are assumed to be 50% (2:1 manufactured slopes). Elevations range from approximately 425 feet above mean sea level (amsl) at the northern portion of the project site to 673 feet amsl at the peak of the mountain rage southeast of the development.

2.2.2 Climate

Inland San Diego County and the project area's weather are influenced by the Pacific Ocean and are frequently under the influence of a seasonal, migratory subtropical high-pressure cell known as the "Pacific High" (WRCC 2019). Wet winters and dry summers with mild seasonal changes characterize the Southern California climate. This local climate, which has a large influence on fire risk, is typical of a Mediterranean area. The climate pattern is occasionally interrupted by extreme periods of hot weather, winter storms, or dry, easterly Santa Ana winds. The average high temperature for the Project area during August is around 88°F. Precipitation typically occurs between November through April with an average of 11 inches of rain per year (Weather Spark, 2020). The prevailing wind is an on-shore flow from the Pacific Ocean, which is approximately 15 miles to the west.

Hot, dry (Santa Ana) winds, which typically occur in the fall, but have in recent years also occurred in the spring (May, in particular), are usually from the northeast and can gust to speeds of 50 miles per hour (mph) or higher. The Santa Ana winds are the result of occasional pressure gradients between the high pressure in the plateaus of the Great Basin and the lower pressure gradient over the Pacific Ocean (NOAA, 2007). Drying vegetation with fuel moisture of less than 5% for smaller fuels (which dry faster than larger fuels) is possible during the summer months and becomes fuel available to advancing flames should an ignition occur. Extreme conditions, used in worst-case fire modeling for this site, include 92°F temperatures in summer and winds of up to 50 mph during the fall based on worst-case conditions from San Diego County data sets during the Cedar Fire. Relative humidity of 12% or less is possible during fire season.

2.2.3 Vegetation

2.2.3.1 Fuels (Vegetation)

Extensive vegetation type mapping is useful for fire planning because it enables each vegetation community to be assigned a fuel model, which is used in a software program to predict fire behavior characteristics, as discussed in Section 3.1, Fire Behavior Modeling. Vegetation types, which were derived from the field assessment for the Project site, were classified into a fuel model. This value was used in the modeling analysis for the fuel type adjacent to the site. The majority of the slopes adjacent to the site are vegetated with annual grasses and Coastal sage scrub. Based on the location of modeling scenarios, a Scott and Burgan (2005) fuel model was assigned for the

BehavePlus fire behavior modeling run for existing conditions as follows: fuel model Sh5 (High Load, Dry Climate Shrub) for sage scrub and fuel model Gr2 (Low load, dry climate grass) for the grass field to the north. Fuel models were also assigned to the perimeter fuel modification zones to illustrate post-project fire behavior changes. An irrigated and replanted area (Fuel Modification Zone 1 – FM8) with fire resistive plants that are acceptable to the Santee Fire Department and an area that will include removal of dead, dying and exotic vegetation, and keeping the native vegetation intact and grasses to be cut less than 4-inches in height (Fuel Modification Zone 2 – Gs1) were modeled for post-development. Table 1 summarizes the fuel model characteristics used in the BehavePlus fire behavior modeling analysis. *Appendix A: Fuel Type Photo Series* provides representative photographs of the fuel types and plant spacing in each fire scenario.

2.2.3.2 Vegetative Fuel Dynamics

The vegetation characteristics described above are used to model fire behavior, discussed in Section 3.0 of this FPP. Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (bark thickness, leaf size, branching patterns), and overall fuel loading. For example, the native shrub species that compose the coastal sage scrub and mixed chaparral plant communities on site are considered to exhibit higher potential hazard (higher intensity heat and flame length) than grass dominated plant communities (fast moving, but lower intensity) if ignition occurred. The corresponding fuel models for each of these vegetation types are designed to capture these differences. Additionally, vegetative cover influences fire suppression efforts through its effect on fire behavior. For example, while fires burning in grasslands may exhibit lower flame lengths and heat outputs than those burning in native shrub habitats, fire spread rates in grasslands are often more rapid.

As described, vegetation plays a significant role in fire behavior, and is an important component of fire behavior models discussed in the report. A critical factor to consider is the dynamic nature of vegetation communities. Fire presence and absence at varying cycles or regimes disrupts plant succession, setting plant communities to an earlier state where less fuel is present for a period of time as the plant community begins its succession again. In summary, high-frequency fires tend to convert shrublands to grasslands or maintain grasslands, while fire exclusion tends to convert grasslands to shrublands, over time. In general, biomass and associated fuel loading will increase over time, assuming that disturbance (fire, or grading) or fuel reduction efforts are not diligently implemented. It is possible to alter successional pathways for varying plant communities through manual alteration. This concept is a key component in the overall establishment and maintenance of the proposed fuel modification zones on-site. The Project's FMZs will consist of irrigated and maintained landscapes as well as thinned native fuel zones that will be subject to regular "disturbance" in the form of maintenance and will not be allowed to accumulate excessive biomass over time, which results in reduced fire ignition, spread rates, and intensity. In contrast, conditions outside the fuel modification zones, where the wildfire threat will exist post-development, are classified as medium to heavy fuel loads due to the maturity of the vegetation, which haven't burned for many decades.

2.2.4 Fire History

Fire history is an important component of a site-specific FPP. Fire history data provides valuable information regarding fire spread, fire frequency, most vulnerable areas, significant ignition sources, and vegetation/fuel mosaics across a given landscape. Fire frequency, behavior, and ignition sources are important for fire response and planning purposes. One important use for this information is as a tool for pre-planning. It is advantageous to

know which areas may have burned recently and therefore may provide a tactical defense position, what type of fire burned on the Project site, and how a fire may spread. In turn, this understanding of why fires occur in an area and how they typically spread can then be used for pre-planning and designing defensible communities. Appendix B, Fire History Map provides a graphical representation of the quantity of times the landscape has burned in the area

Fire history represented in the FPP uses the California Department of Forestry and Fire Protection (CAL FIRE) Fire and Resource Assessment Program (FRAP) database. FRAP summarizes fire perimeter data dating to the late 1800s, but which is incomplete due to the fact that it only includes fires over 10 acres in size and has incomplete perimeter data, especially for the first half of the 20th century (Syphard and Keeley 2016). However, the data does provide a summary of recorded fires and can be used to show whether large fires have occurred in the Project area, which indicates whether they may be possible in the future.

According to available data from the CAL FIRE in the FRAP database (FRAP 2019)[1] the Tyler Street 14-lot Project site has not been subject to wildfire (CAL FIRE FRAP 2019), however, the nearest wildfires to the Tyler Street Project site includes an un-named 1944 fire and the 1981 Assist #59 fire (both located in the adjacent Cowles Mountain Range). The lack of recent fires does not suggest that fire cannot occur in the vegetation that will be adjacent to the Project. However, it does suggest that due to the physical landscape features, vegetation, and ignition sources, amongst other variables, fire starts are fewer and/or larger fires have been stopped before they spread into the area. Recorded wildfires within 5 miles range from 24.6 acres (1975 unnamed Fire) to 7,310.7 acres (1989 Assist #59 Fire).

2.2.5 Analysis of Wildfire Risk from Adding New Residents

Humans (i.e., human related activities or human created features, services, or processes) are responsible for the majority of California wildfires (Syphard et al. 2007, 2008; Romero-Calcerrada et al. 2008). Certain human activities result in sparks, flames, or heat that may ignite vegetative fuels without proper prevention measures in place. These ignitions predominantly occur as accidents, but may also be purposeful, such as in the case of arson. Roadways are a particularly high source for wildfire ignitions due to high usage and vehicle caused fires (catalytic converter failure, overheated brakes, dragging chains, tossed cigarette, and others) (Harris 2019; Dudek 2008). In Southern California, and San Diego County, the population living at, working in, or traveling through the wildland urban interface is vast and provides a significant opportunity for ignitions every day. However, it is a relatively rare event when a wildfire occurs, and an even rarer event when a wildfire escapes initial containment efforts. Approximately 90 to 95 percent of wildfires are controlled below 10 acres (CAL FIRE 2019; Santa Barbara County Fire Department 2019).

Research indicates that the type of dense, master planned developments, are not associated with increased vegetation ignitions. Syphard and Keeley (2015) summarize all wildfire ignitions included in the CAL FIRE Fire and Resource Assessment Program (FRAP) database – dating back over 100 years. They found that in San Diego County, equipment-caused fires were by far the most numerous, and these also accounted for most of the area burned, followed closely by the area burned by power line fires. Ignitions classified as equipment caused frequently resulted from exhaust or sparks from power saws or other equipment with gas or electrical motors, such

1 Based on polygon GIS data from CAL FIRE's FRAP, which includes data from CAL FIRE, USDA Forest Service Region 5, BLM, NPS, Contract Counties and other agencies. The data set is a comprehensive fire perimeter GIS layer for public and private lands throughout the state and covers fires 10 acres and greater between 1878–2019.

as lawn mowers, trimmers or tractors and associated with lower density housing. In San Diego County, ignitions were more likely to occur close to roads and structures, and at intermediate structure densities.

As figures 3 through 5 illustrate, housing density directly influences susceptibility to fire because in higher density developments, there is one interface (the community perimeter) with the wildlands whereas lower density development creates more structural exposure to wildlands, less or no ongoing landscape maintenance (an intermix rather than interface), and consequently more difficulty for limited fire resources to protect well-spaced homes. The intermix includes housing amongst the unmaintained fuels whereas the proposed project converts all fuels within the footprint and provides a wide, managed fuel modification zone separating homes from unmaintained fuel and creating a condition that makes defense easier. Syphard and Keeley go on to state that "The WUI, where housing density is low to intermediate is an apparent influence in most ignition maps" further enforcing the conclusion that lower density housing poses a higher ignition riskthan higher density communities. They also state that "Development of low-density, exurban housing may also lead to more homes being destroyed by fire (Syphard et al. 2013). A vast wildland urban interface already exists in the area adjacent to the Tyler Street Project site, dominated by older, more fire-vulnerable structures, constructed before stringent fire code requirements were imposed on residential development, with varying levels of maintained fuel modification buffers. As discussed in detail throughout this FPP, the Tyler Street Development is an ignition resistant community designed to include professionally managed and maintained fire protection components, modern fire code compliant safety features and specific measures provided where ignitions are most likely to occur (such as roadways). Therefore, the development of the Tyler Street community would not be expected to materially increase the risk of vegetation ignitions.

Figure 3. Example higher density development that is ignition resistant and excludes readily ignitable vegetative fuels throughout and provides a perimeter fuel modification zone. This type of new development requires fewer fire resources to defend and can minimize the likelihood of on-site fires spreading off-site.

Figure 4. Example of moderate density development. Homes are located on larger properties and include varying levels of ignition resistance and landscape / fuel modification provision and maintenance. This type of development results in a higher wildland exposure level for all homes and does not provide the same buffers from wildfire encroaching onto the site, or starting at a structure and moving into the wildlands as a higher density project.

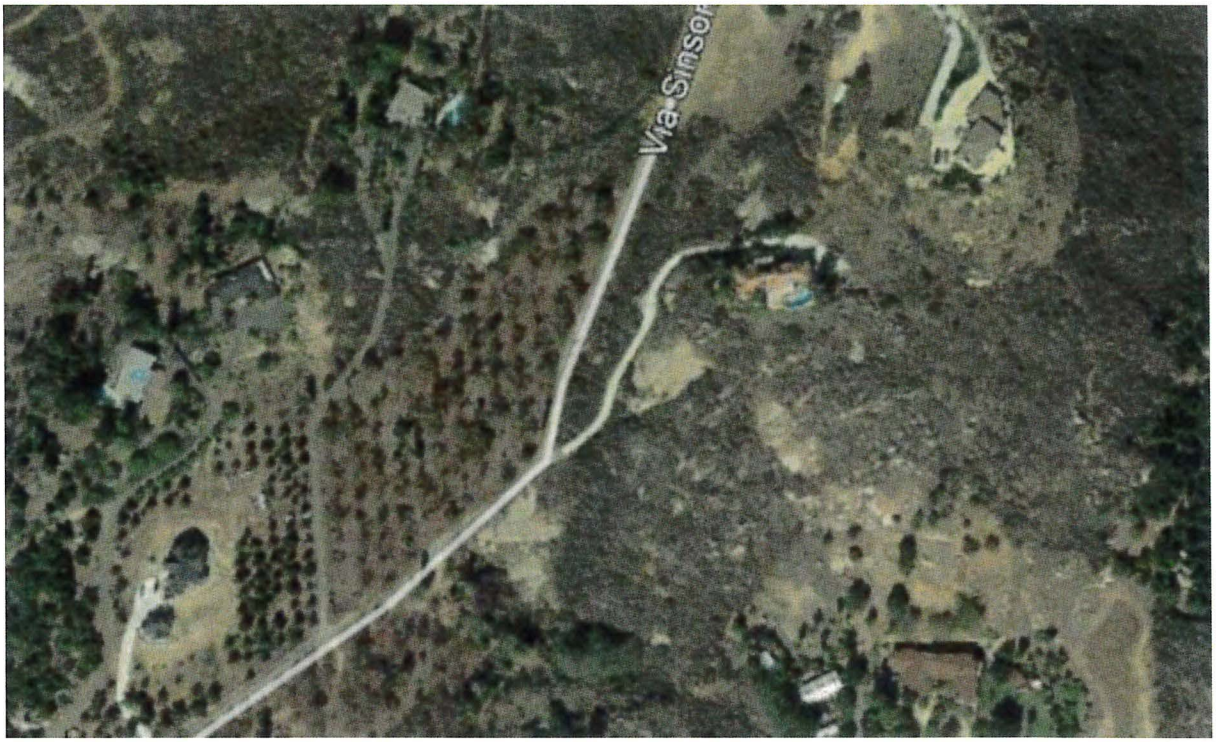

Figure 5. Example of "lower density" development where homes are interspersed amongst wildland fuels, are of varying ages, and include varying levels of fuel modification zone setbacks. Homes are exposed on most or all sides by flammable vegetation and properties rely solely on owners for maintenance, are often far distances from the nearest fire station, and have minimal buffer from on-site fire spreading to wildlands.

Moreover, frequent fires and lower density housing growth may lead to the expansion of highly flammable exotic grasses that can further increase the probability of ignitions (Keeley et al. 2012). This is not the case with the proposed project as the landscapes are managed and maintained to remove exotic fuels that may establish over time.

As discussed above, research indicates that it is less likely for higher density developments to be impacted by wildfires than lower density developments. The same protections that starve wildfire of fuels and minimize or prevent wildfire from transitioning into a higher density community also serve to minimize or prevent on-site fires from transitioning into the wildlands. Customized project FMZs are crucial as the strategic design and placement of fuels treatments can disrupt fire spread, reduce the intensity, and facilitate fire suppression within a landscape (Braziunas et al., 2021). This is true regardless of the direction a vegetation fire may be burning – whether toward a community or from within a community. The risk of a structure being destroyed is significantly lower when defensible space is implemented on both shallow and steep properties (Syphard et al., 2014). Even if just half the landscape is treated, the percentage of houses exposed to fire can decrease from 51% to 16% (Braziunas et al., 2021). Moreover, when FMZs are designed properly, they not only protect homes but also the surrounding environment. For example, when the Tahoe Basin experienced the Angora Fire in 2007, fuel treatments had the dual effect of saving homes and increasing forest survival. (Safford et al., 2009.) In areas where fuel management had been carried out prior to the Angora Fire, home loss was significantly reduced in the adjacent community and 85% of the trees survived, as compared to the 22% that survived in untreated areas. (Safford et al., 2009.) Fuel management treatments also facilitated the ecological benefit of reduced fire severity, including higher post-fire soil litter cover, higher herbaceous plant cover, higher diversity, and lower levels of invasive beetles. (Safford et al.,

2009.) At a minimum, managing defensible space can reduce risk across multiple scales by damping fire risk, reducing the impact of fire, and in turn reducing annual fire risk. (Braziunas et al., 2021.)

Further, the requirement that all structures will include interior fire sprinklers significantly reduces the likelihood that a building fire spreads to the point of flashover, where a structure will burn beyond control and produce embers. Interior sprinklers are very efficient, keeping fires to the room of origin, or extinguishing the fire before the responding firefighters arrive. Similarly, the irrigated fuel modification zones are positioned throughout the development areas as well as the first zones on the perimeter of the project. Irrigated zones include plants with high internal moisture and spacing between plants and plant groups that 1) make it difficult to ignite and 2) make it difficult for fire to spread plant to plant.

Trails exist today around the Tyler Street development envelope, and are frequented by a myriad of locals for hiking, mountain biking, horseback riding, and motorcycle/all-terrain vehicle use. If a wildfire were to ignite from human activity on these trails today, fire detection and response could be delayed due to the remoteness of the area not directly visible from populated areas. Delayed detection would contribute to delayed response to the scene due to the lack of site access. Fire size up (determining the needed firefighting resources) and requests for additional resources, including aerial support, also are delayed in comparison to post-construction of the Tyler Street Project. With the Project, motorized activities on the trails would be prohibited and enforced. If a hiker or mountain biker was to start a fire, detection and response would be anticipated on a fast timeline due to the residents that would be living within the Tyler Street community with the ability to detect fires throughout the property. The quick detection and call to 911 would result in faster response from the closest SFD fire station, which can reach anywhere within the Project in under 5 minutes travel time. If a fire is detected and cannot be accessed by a responding fire engine, it can be sized up and additional aerial and other support requested quickly.

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3 Anticipated Fire Behavior

3.1 Fire Behavior Modeling

Following field data collection efforts and available data analysis, fire behavior modeling was conducted to document the type and intensity of the fire that would be expected adjacent to the Project site given characteristic site features such as topography, vegetation, and weather. Dudek utilized BehavePlus software package version 6 (Andrews, Bevins, and Seli 2008) to analyze potential fire behavior[2] for the wildland fuels to the north, south, southeast, and southwest of the Project site. As is customary for this type of analysis, four fire scenarios were evaluated, including three off-shore, wind-driven fires (Santa Ana conditions) approaching the northern, southern and southeastern property boundaries of the Project site and one on-shore, wind driven fire approaching the southwestern property boundary, with assumptions made for the pre-project slope and fuel conditions. The locations of the fire scenarios and summary of fire modeling inputs are presented in Figure 6, *BehavePlus Fire Behavior Analysis Map*. A summary of the fire behavior modeling runs for both pre-construction and post-construction are presented in Appendices C through E.

3.2 Fire Behavior Modeling Analysis Effort

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and to objectively predict flame lengths (feet), fireline intensities (BTU/feet/second), spotting distance (miles), and spread rates (feet/minute) for four modeling scenarios for the Tyler Street Development Project; these four fire scenarios incorporated observed fuel types representing the dominant on- and- off-site vegetation on vacant land adjacent to the proposed development, in addition to measured slope gradients, wind, and fuel moisture values derived from Remote Automated Weather Stations (RAWS) weather data sets (San Pasqual RAWS) for both the 50th percentile weather (on-shore winds) and the 97th percentile weather (off-shore winds). Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent to the site.

To support the fire behavior modeling efforts conducted for this FPP, the different vegetation types observed on and adjacent to the Project site were classified into the aforementioned numeric fuel models. Dudek analyzed fire behavior for the fuels adjacent to/in close proximity to the property to the north, south, southwest, and southeast. As is customary for this type of analysis, the terrain and fuels within and adjacent to the project area were used for determining flame lengths and fire spread. It is these fuels that would have the potential to affect the project's structures from a radiant and convective heat perspective as well as from direct flame impingement. Fuel beds, including the intermix of coast sage scrub and mixed chaparral fuels (Fuel Model Sh5) with low load grass vegetation (Fuel Model Gr2) found within the development footprint and throughout the adjacent areas. These fuel types can produce flying embers that may affect the Project, but defenses have been built into the structure to prevent ember penetration. Table 1 provides a description of the two existing fuel models observed in the vicinity of the site that were subsequently used in the analysis for this project. A total of four fire modeling scenarios were completed for the Project area. These sites were selected based on the strong likelihood of fire approaching from these directions during a Santa Ana wind-driven fire event (fire scenarios 2 and 3) and an on-shore weather pattern (fire scenarios 1 and 4). Dudek also conducted modeling of the site for post-Fuel Modification Zones' (FMZ) recommendations for

[2] A summary of the fire behavior modeling runs for both pre-construction and post-construction are presented in Appendices C through E.

this project (Refer to Table 1 for post-FMZ fuel model descriptions). Fuel modification includes establishment of irrigated and thinned zones on the periphery of the residential lots as well as interior landscape requirements. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified for the FMZ 1 (Fuel Model 8) and FMZ 2 (Fuel Model Gs1).

Table 1. Fuel Models Used for Fire Behavior Modeling

Fuel Model	Description	Location of Fuel Models	Fuel Bed Depth (Feet)
Existing Conditions			
Gr2	Low-load, dry climate grasses	Represented throughout the development areas and adjacent areas surrounding the Project site.	<2.0 ft.
Sh5	High Load Dry Climate Shrub	Represented throughout the development areas and adjacent areas surrounding the Project site.	<5.0 ft.
Post-Development Conditions			
FM8	Compact litter	Fuel Modification Zone 1 – irrigated, landscapes	<1.0 ft.
Gs1	Low load, Dry Climate Grass-Shrub	Fuel Modification Zone 2: removal of dead, dying, and exotic vegetation	<3.0 ft.

Table 2 summarizes the weather and wind input variables used in the BehavePlus modeling process.

Table 2. BehavePlus Fire Behavior Modeling Inputs

Model Variable	Summer Weather Condition (50th Percentile)	Peak Fall Weather Condition (97th Percentile)
Fuel Models	FM8, Gs1, and Sh5	FM8, Gs1, Gr2, and Sh5
1-hour fuel moisture	3%	2%
10-hour fuel moisture	6%	3%
100-hour fuel moisture	8%	5%
Live herbaceous moisture	60%	30%
Live woody moisture	90%	60%
20 ft. wind speed	19 mph (sustained winds)	18 mph[1] (sustained winds); wind gusts of 50 mph
Wind adjustment factor	0.4	0.4
Slope (uphill)	27%	5 to 32%

Note:
[1] mph= Miles per hour

3.3 Fire Behavior Modeling Results

The results of fire behavior modeling analysis for pre- and post-Project conditions are presented in Table 3 and Table 4, respectively. Identification of modeling run (fire scenarios) locations is presented graphically in Figure 6, *BehavePlus Fire Behavior Analysis Map*.

As presented, wildfire behavior on the Project site is expected to be primarily of moderate to high intensity throughout the non-maintained shrubs and chaparrals intermixed with surface grass dominated fuels throughout the perimeter areas of the Project site. As mentioned, the BehavePlus fire behavior modeling software package was utilized in evaluating anticipated fire behavior adjacent to the Proposed Project site. Four focused analyses were completed for both the existing project site conditions and the post project conditions, each assuming worst-case fire weather conditions for a fire approaching the project site from the north, south, southwest, and southeast. The results of the modeling effort included anticipated values for surface fires flame length (feet), rate of spread (mph), fireline intensity (Btu/ft/s), and spotting distance (miles). The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2008). Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in initial attack and fire suppression efforts (Rothermel and Rinehart 1983). Spotting distance is the distance a firebrand or ember can travel down wind and ignite receptive fuel beds. Four fire modeling scenario locations were selected to better understand the different fire behavior that may be experienced on or adjacent the site based on slope and fuel conditions; these fire scenarios are explained in more detail below:

Fire Scenario Locations and Descriptions:

Scenario 1: A summer, on-shore fire (50th percentile weather condition) burning in high-load shrubs and chaparral dominated vegetation located in the hillside to the southwest of the Project site. The terrain is moderately steep (approximately 27% slope) with potential ignition sources from a hiker using the trails or a wildland fire originating in the non-maintained vegetated west/southwest of the Proposed Project site. This type of fire would typically spread down slope relatively slow towards the southwestern side of the development.

Scenario 2: A fall, off-shore fire (97th percentile weather condition) burning in high-load shrubs and chaparral dominated vegetation located in the hillside to the south of the Project site. The terrain is relatively steep (approximately 32% slope) with potential ignition sources from a hiker using the trails or a wildland fire originating in the non-maintained vegetated south/west/southwest of the Proposed Project site. This type of fire would typically spread down slope relatively slow towards the southern portion of the development.

Scenario 3: A fall, off-shore fire (97th percentile weather condition) burning in high-load shrubs and chaparral dominated vegetation located east of the Project site. The terrain is moderately steep (approximately 24% slope) with potential ignition sources from a car fire along SR-125 or a wildland fire originating in the non-maintained vegetated areas east of the Proposed Project site. This type of fire would typically spread down slope relatively slow towards the south/easter portion of the development.

Scenario 4: A summer, on-shore fire (50th percentile weather condition) burning in maintained grasses located north of the development. The terrain is flat (approximately 4% slope) with potential ignition sources from a house or car fire within the existing residential communities to the north of the proposed Project site. This type of fire would typically spread slowly towards the northern portion of the development.

The results presented in Tables 3 and 4 depict values based on inputs to the BehavePlus software and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

3.3.1 Existing Conditions

Based on the BehavePlus analysis result presented below and in Tables 3 and 4, a worst-case wildfire being fanned by 50 mph, offshore winds (fire approaching from the south) in untreated sage scrub habitat (Fuel Model Sh5) would result in a fire spreading at approximately 6.3 mph with highest flame length values reaching approximately 42 feet in specific portions of the property. Maximum spotting distance for an offshore wind-driven fire is projected to occur at 2.3 miles, downwind. Additionally, a worst-case wildfire being fanned by 19 mph sustained, on-shore winds (fire approaching from the southwest) in untreated sage scrub habitat (Fuel Model Sh5) would result in a fire spreading at approximately 1.4 mph with highest flame length values reaching approximately 19.3 feet in specific portions of the property. Maximum spotting distance for an onshore wind-driven fire is projected to occur at 0.7 miles, downwind.

Table 3: RAWS BehavePlus Fire Behavior Model Results – Existing Conditions

Fire Scenarios	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Ave. Slope: 27%, 50th Percentile Weather Conditions (Untreated Fuels) – Fire from the SW				
Fuel Model Sh5	19.3	3,546	1.4	0.7
Scenario 2: Ave. Slope-32%, 97th Percentile Weather Conditions (Untreated Fuels) – Fire from the South				
Fuel Model Sh5	24.7 (41.6)	6,021 (18,824)	2.0 (6.3)	0.8 (2.3)
Scenario 3: Ave. Slope-24%, 97th Percentile Weather Conditions (Untreated Fuels) – Fire from the SE				
Fuel Model Sh5	24.1 (41.4)	5,737 (18,537)	1.9 (6.2)	0.8 (2.3)
Scenario 4: Flat Slope-<5%, 97th Percentile Weather Conditions (Untreated Fuels) – Fire from the North				
Fuel Model Gr2	9.0 (14.1)	681 (1,791)	1.6 (4.2)	0.4 (1.1)

3.3.2 Post-Development Conditions

As previously mentioned, Dudek conducted modeling of the site for post-fuel modification zones. Fuel modification includes establishment of irrigated (Zone 1) and removal of dead, dying, and exotics vegetation (Zone 2) zones on the periphery of the project site, beginning at the structure. For modeling the post-FMZ treatment condition, the

fuel model assignment for moderate load, dry climate grass-shrub fuels were re-classified according to the specific fuels management (e.g., irrigated, fire resistive landscaping vs. removal of dead, dying and exotic vegetation and leaving native vegetation intact) treatment.

As depicted in Table 4, the FMZ areas experience a significant reduction in flame length and intensity. The approximately 41.6-foot flame lengths predicted for scrub habitat during pre-treatment modeling for fire scenarios 1, 2, 3, and 4 are reduced to approximately 12 feet at the outer edges of the FMZ (Zone 2) and to two (2) feet by the time the inner portions of the FMZ (Zone 1) are reached (fire scenarios 1, 2, 3, and 4 Post-Construction). Lower fire intensity and spotting distances are due to the higher live and dead fuel moisture contents in Zone 1.

Note: *The results presented depict values based on inputs to the BehavePlus software and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design. Model results should be used as a basis for planning only, as actual fire behavior for a given location would be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.*

Table 4: RAWS BehavePlus Fire Behavior Model Results – Post Project Conditions

Fire Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Ave. Slope-27%, 50th Percentile Weather Conditions (Treated Fuels) – Fire from the SW				
Fuel modification zone 1 (FM8)	1.8	20	0.1	0.1
Fuel modification zone 2 (Gs1)	5.1	192	0.4	0.3
Scenario 2: Ave. Slope-32%, 97th Percentile Weather Conditions (Treated Fuels) – Fire from the South				
Fuel modification zone 1 (FM8)	2.0 (2.6)	18 (46)	0.1 (0.1)	0.1 (0.3)
Fuel modification zone 2 (Gs1)	6.9 (12.1)	377 (1,283)	0.7 (2.4)	0.3 (1.0)
Scenario 3: Ave. Slope-24%, 97th Percentile Weather Conditions (Treated Fuels) – Fire from the SE				
Fuel modification zone 1 (FM8)	1.9 (2.6)	23 (46)	0.1 (0.1)	0.1 (0.3)
Fuel modification zone 2 (Gs1)	6.7 (12.1)	358 (1,283)	0.7 (2.4)	0.3 (1.0)
Scenario 4: Flat Slope-<5%, 97th Percentile Weather Conditions (Treated Fuels) – Fire from the North				
Fuel modification zone 1 (FM8)	1.9 (2.6)	22 (46)	0.1 (0.1)	0.1 (0.3)
Fuel modification zone 2 (Gs1)	6.6 (12.1)	344 (1,283)	0.6 (2.4)	0.3 (1.0)

1 All table values in parenthesis represent peak gusts of 50 mph.

Surface Fire:

Flame Length (feet): The flame length of a spreading surface fire within the flaming front is measured from midway in the active flaming combustion zone to the average tip of the flames.

Fireline Intensity (Btu/ft/s): Fireline intensity is the heat energy release per unit time from a one-foot-wide section of the fuel bed extending from the front to the rear of the flaming zone. Fireline intensity is a function of rate of spread and heat per unit area, and is directly related to flame length. Fireline intensity and the flame length are related to the heat felt by a person standing next to the flames.

- Surface Rate of Spread (mph): Surface rate of spread is the "speed" the fire travels through the surface fuels. Surface fuels include the litter, grass, brush and other dead and live vegetation within about 6 feet of the ground.

The information in Table 5 presents an interpretation of the outputs for five fire behavior variables as related to fire suppression efforts. The results of fire behavior modeling efforts are presented in Tables 3 and 4. Identification of modeling run locations is presented graphically in Figure 6 of this FPP.

Table 5. Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 to 8 feet	100-500 BTU/ft/s	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 to 11 feet	500-1000 BTU/ft/s	Fires may present serious control problems -- torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

3.4 Project Area Fire Risk Assessment

Given the climatic, vegetative, topographic characteristics, and local fire history of the area, the Project site, once developed, is determined to be subject to occasional wildfires. Potential for wildfire encroaching on, or showering embers on the site is considered low to moderate, but risk of ignition from such encroachments or ember showers is considered low based on the type of construction, fuel modification zones, and fire protection features that will be provided for the structures.

Therefore, it will be critical that the latest fire protection technologies, developed through intensive research and real-world wildfire observations and findings by fire professionals, for both ignition resistant construction and for creating defensible space in the ever-expanding WUI areas, are implemented and enforced. The Tyler Street 14-Lot Residential Project, once developed, would provide each structure with defensible space that would reduce projected flame lengths to levels that would be manageable by firefighting resources for protecting the site's structures, especially given the ignition resistance of the structures and the planned ongoing maintenance of the entire sites' landscapes. In addition, the 100-foot FMZ widths for the Project site (where achievable) would be approximately two times as wide as the longest calculated flame lengths during off-shore wind conditions for portions of the proposed developed area that abut coastal scrub and mixed chaparral vegetation types.

Wildland fires are a common natural hazard in most of southern California with a long and extensive history. Southern California landscapes include a diverse range of plant communities, including vast tracts of shrublands, like those found adjacent to the Project site. Wildfire in this Mediterranean-type ecosystem ultimately affects the

structure and functions of vegetation communities (Keeley 1984) and will continue to have a substantial and recurring role (Keeley and Fotheringham 2003). Supporting this are the facts that 1) native landscapes, from chaparral to grasslands, become highly flammable each fall; 2) the climate of southern California has been characterized by fire climatologists as the worst fire climate in the United States (Keeley 2004) with high winds (Santa Ana) occurring during autumn after a six-month drought period each year; and 3) homes embedded in natural and managed landscape vegetation in what may be accurately described as a wildland urban intermix. Based on this research, it can be anticipated that periodic wildfires will occur in the designated open space areas adjacent to portions of the property site.

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Table 2. BehavePlus Fire Behavior Modeling Inputs

Model Variable	97th Percentile Weather (Off-Shore Wind)	50th Percentile Weather (On-Shore Wind)
Weather		
1 h[1] fuel moisture	2%	3%
10 h fuel moisture	3%	6%
100 h fuel moisture	5%	8%
Live herbaceous moisture	30%	60%
Live woody moisture	60%	90%
20 ft. wind speed	18 mph[2] sustained winds (50 mph peak gusts)	19 mph Sustained winds
Wind adjustment factor	0.4	0.4
Terrain		
Natural Slope	24% to 32%	27%
Fuel Model		
Fuel Models	Sh5, FM 8, and Gs1	Sh5, FM 8, Gs1

Note:
1 h=hour
2 mph= Miles per hour

Table 3. Tyler Street BehavePlus Fire Behavior Model Results Existing Conditions[1]

Fire Scenarios	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Average Slope-27%, 50th Percentile Weather Conditions (Untreated Fuels) – Fire from the Southwest				
Fuel Model Sh5	19.3 ft.	3,546	1.4	0.7
Scenario 2: Average Slope-32%, 97th Percentile Weather Conditions (Untreated Fuels) – Fire from the South				
Fuel Model Sh5	24.7' (41.6')	6,021 (18,824)	2.0 (6.3)	0.8 (2.3)
Scenario 3: Average Slope-24%, 97th Percentile Weather Conditions (Untreated Fuels) – Fire from the Southeast				
Fuel Model Sh5	24.1' (41.4')	5,737 (18,537)	1.9 (6.2)	0.8 (2.3)

Table 4. Tyler Street BehavePlus Fire Behavior Model Results Post-Project Conditions [1]

Fire Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 4: Average Slope-27%, 50th Percentile Weather Conditions (Treated Fuels) – Fire from the Southwest				
Fuel modification zone 1 (FM8)	1.8	20	0.1	0.1
Fuel modification zone 2 (Gs1)	5.1	192	0.4	0.3
Scenario 5: Average Slope-32%, 97th Percentile Weather Conditions (Treated Fuels) – Fire from the South				
Fuel modification zone 1 (FM8)	2.0 (2.6)	18 (46)	0.1 (0.1)	0.1 (0.3)
Fuel modification zone 2 (Gs1)	6.9 (12.1)	377 (1,283)	0.7 (2.4)	0.3 (1.0)
Scenario 6: Average Slope-24%, 97th Percentile Weather Conditions (Treated Fuels) – Fire from the Southeast				
Fuel modification zone 1 (FM8)	1.9 (2.6)	23 (46)	0.1 (0.1)	0.1 (0.3)
Fuel modification zone 2 (Gs1)	6.7 (12.1)	358 (1,283)	0.7 (2.4)	0.3 (1.0)

1 All table values in parenthesis represent peak gusts of 50 mph.

SOURCE: AERIAL-BING MAPPING SERVICE 2018

DUDEK

FIGURE 6
BehavePlus Analysis Map
Tyler Street Fire Protection Plan

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4 Emergency Response Service

The following sections analyze the Project in terms of current Santee Fire Department (SFD) Fire Service capabilities and neighboring fire agency resources to provide Fire Protection and Emergency Services. The analysis that follows examines the ability of the closest existing SFD fire stations to adequately serve the Project. Response times were evaluated using Project build-out conditions. It was assumed that phased construction would include an access road to the newly constructed buildings and that the shortest access route to those structures would be utilized.

4.1 Emergency Response Fire Facilities

The Project site is located within the SFD jurisdictional response area. SFD services approximately 16.5 square miles and a population of approximately 58,000 in the City of Santee (City of Santee website 2021)[3]. The Fire Department provides structural and wildland fire protection and advanced life support-level emergency medical services within the City limits. SFD operates two Fire Stations (Station 4 and 5) with 53 uniformed fire personnel. Figure 7 illustrates the location of the two fire stations. Table 6 provides fire station information for the existing SFD Stations 4 and 5, which are proximal to the Proposed Tyler Street Project site. For additional support, SFD relies on numerous Automatic Aid agreements with City-adjoining jurisdictions, including Heartland and City of San Diego. Once built, SFD would provide initial response to the Proposed Project from SFD Station 5.

As depicted in Table 6, SFD Fire Station No. 5, located at 9130 Carlton Oaks Drive, Santee is the closest SFD station that would provide services the Project site. This Station is covered by three shifts, each of which is staffed by eight (8) fulltime fire personnel. Station 5 is equipped with two (2) Type 1 Fire Engines (Engines 5 and 205) and one (1) Medic Ambulance. SFD Station 5 is approximately 2.4 miles from the entrance into the development and 2.6 miles from the most remote lots of the Project site and could respond to an incident within approximately four minutes and 30 seconds travel time. SFD Fire Station 4, which are located at 8950 Cottonwood Avenue, Santee, is the next closest SFD station that could respond to the Project site. Station 4 is located approximately 2.9 miles from the entrance into the development and 3.1 miles from the most remote lots of the Project site and is covered by three shifts, each of which is staffed by nine fulltime fire personnel. Station 4 is equipped with one (1) Type 1 Fire Engine (Engine 4), one (1) Truck company (Truck 4), one (1) Brush Engine (Brush 4), one (1) Medic Ambulance (Medic 4), and one (1) Battalion unit.

Emergency travel time for first arriving engines from each station to the Project Site are provided in Table 6. Travel distances are derived from Google road data while travel times are calculated using response speeds of 35 mph, consistent with nationally recognized National Fire Protection Association (NFPA) 1710 and Insurance Services Office (ISO) Public Protection Classification Program's Response Time Standard formula (Time=0.65 + 1.7(Distance). The ISO response travel time formula discounts speed for intersections, vehicle deceleration and acceleration, and does not include turnout time. Automatic and/or Mutual Aid agreements with surrounding fire departments are in place and would potentially result in additional resources that are not analyzed in this FPP.

3 https://www.cityofsanteeca.gov/government/fire-department/department-overview

Table 6. SFD Emergency Response Analysis Stations Summary

Station No.	Location	Equipment	Staffing*	Maximum Travel Distance**	Est. Travel Time***
SFD Station #4	9130 Carlton Oaks Drive, Santee, CA	(1) Type 1 Engine 4 (1) Truck 4 (1) Medic Ambulance 4 (1) Brush Engine 4 (1) Battalion Unit 2	(2) Fire Captain (2) Engineer (4) Firefighter/Paramedics (1) Battalion Chief (9 personnel/shift)	3.1 mi.	5 minutes, 19 seconds.
SFD Station #5	8950 Cottonwood Avenue, Santee, CA	(1) Type 1 Engine 5 (1) Type 1 Engine 205 (1) Medic Ambulance 5	(2) Fire Captain (2) Engineer (4) Firefighter/Paramedic (8 personnel/shift)	2.6 mi.	4 minutes, 30 seconds.

* Stations are staffed 24/7 by three rotating shifts.
** Distance measured to farthest portion of Project site
*** Assumes travel at 35 mph travel speed and does not include donning turnout gear and fire dispatch time. Actual travel speeds are likely to be closer to 45 mph speed limits

4.1.1 Emergency Response Travel Time Coverage

The City of Santee's Quality of Life Standard is for emergency response to all priority Level One or Emergency type calls within 6 minutes, 90% of the time. Response includes travel time along with dispatch and turnout time, which can add an additional two minutes to travel time. As indicated in Table 6 and Figure 7, response to the Project site from the closest existing SFD fire station (Station 5) would not achieve the response time standard for first arriving. Response travel time from Station 5 is calculated at roughly 4 minutes 10 seconds to the entrance of the Tyler Street site and 4 minutes 30 seconds to the furthest lots at the end of Tyler Street. The second engine to the site is estimated to arrive within approximately 4 minutes 59 seconds travel time to the entrance and 5 minutes and 19 seconds to the furthers lots of the Project site. All response calculations are based on an average response speed of 35 mph, consistent with nationally recognized National Fire Protection Association (NFPA) 1710. Based on these calculations, the project would not fully comply with the City's response time standards from existing fire stations and may require provisions for additional resources, however, the Project is consistent with National Fire Protection Association (NFPA) 1710 standard.

In addition, there are automatic aid agreements and dropped boundary agreements on first alarm or greater emergency calls with surrounding communities, ensuring that the closest unit will be dispatched, regardless of jurisdictional boundaries. The SPD is also part of both the San Diego County and State of California Master Mutual Aid Agreements.

4.2 Estimated Calls and Demand for Service from the Project

Determining the potential impact associated with the Project's estimated population increase is required in order to compare how many additional calls may be realized and determine what effects they may have on the available response resources. The estimated incident call volume of the Project is based on a conservatively calculated estimate from the maximum potential number of additional persons that would be expected on site. Emergency call

volumes related to typical projects, such as new residential developments, can be reliably estimated based on the historical per-capita call volume from a particular fire jurisdiction.

During 2019, SFD documented a response to 5,791 total incident calls (Santee Fire Department, 2019a) that were generated by a City-wide service area total population of approximately 58,000 persons. The City's per capita annual call volume is approximately 100 calls per 1,000 persons. The resulting per capita call volume is 0.100.

As previously described, the Project's proposed development plan includes the construction of 14 detached single-family lots with an average unit occupancy of 2.85 people per dwelling unit for this type of community (U.S. Census Bureau 2021), which calculates to a total population of approximately 40 people (2.85 x 14 SFUs = 39.9 persons). The Project's estimated 40 residents would generate roughly 4 calls per year, most of which are expected to be medical-related calls; consistent with typical emergency call statistics (see Table 7). The estimated incident call volume at buildout from the Project is based on a conservative estimate of the maximum potential number of persons on site at any given time (considered a "worst case" scenario).

Service level requirements are not expected to be significantly impacted with the increase of approximately 4 calls per year or 0.011 calls per day for a station (SFD Station 5) that currently responds to roughly 8 calls per day in its primary service area[4]. For perspective, a typical station averages five calls per day and a busy station responds to about ten calls per day. With the currently average call volume at Stations 4 and 5, the additional approximately 4 calls per year associated with build out can be absorbed and still result in acceptable emergency response coverage. Therefore, the Project is not expected to cause a significant decline in SFD's emergency response times.

Table 7. Calculated Call Volume Associated with the Project

Emergency Calls per 1,000 (County Data)	Number of Residents	Avg. No. Calls per Year (40\1,000)x100	Avg. No. Calls per Day (4/365)
100	+/-40	4	0.011

4.3 Cumulative Impacts on Fire Response

The available firefighting and emergency medical resources in the vicinity of the Project site include an assortment of fire apparatus and equipment considered capable of responding to the type of fires and emergency medical services potentially occurring within the Project site. The Project, which includes the construction of 14 detached single-family residential lots and its proposed usage by up to 40 residents is an increase in potential service demand of approximately 4 calls per year, well within the capacity of the existing Fire Stations that will service the Tyler Street Project. Other future projects in the vicinity of Stations 4 and 5 are not known at the time of this FPPs preparation, but when considered cumulatively, the potential impact of multiple projects is considered less than significant, mitigated by increased funding available from each project to the SFD through property taxes and other fees associated with each project, including the Tyler Street Project. In addition, the Project would enter into a mutually

[4] This number is based on the department total of 5,791 calls annually split between the two stations, which averages to approximately 16 calls per day for the entire service area or roughly 8 calls per day per station.

agreed Fire Service Agreement or equivalent with the SFD, to be completed at later stages of project planning. This funding would be utilized to maintain or enhance fire response capabilities.

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SOURCE: AERIAL-Google Maps 2021

DUDEK

FIGURE 7
SFD Station Location Map
Tyler Street Fire Protection Plan

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5 Fire Safety Requirements - Buildings, Infrastructure, and Defensible Space

The City of Santee's Municipal Code and Ordinance No. 570 (Refer to Section 1.2 of this FPP for code references) governs the building, infrastructure, and defensible space requirements detailed in this FPP. The Project will meet applicable codes or will provide alternative materials and/or methods that will be approved by the SFD prior to their implementation. While these standards will provide a high level of protection to structures for the Project site, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

The following summaries highlight important fire protection features. Prior to bringing combustible materials onto the site, all underground utilities shall be in place, hydrants operational, water mains, curbs, gutters, sidewalks, and an approved all-weather roadway in place, and interim fuel modification zones established and approved. All items listed here shall meet approval by the SFD.

5.1 Fire Apparatus Site Access

Site access, including fire lane, driveway, and entrance road widths, primary access, turnarounds, dead end lengths, signage, surface, and other requirements will comply with the requirements of the 2019 or most recently adopted CFC and City Ordinance No. 570, and the 2019 California Building Code, Chapter 7A (Municipal Code Chapter 6, Article 3). Fire access will be reviewed and approved by SFD prior to construction.

The developer shall provide a response map update in a format acceptable with current department mapping to the SFD (Section 505.5).

5.1.1 Fire Apparatus Access Roads

The Project will be accessible by a public roadway and would involve the construction of new single-family residential structures, driveways, and would generate new trips to and from the Project site. The primary Project access will be via an extension of Tyler Street via Prospect Avenue and Mesa Heights Road to the north. The primary circulation element within the Project is a proposed 36-foot wide, two-land public road, dead-end road, and will provide internal circulation to all lots in the proposed Project. Site access, including road widths and connectivity, will comply with the City's development review process, as well as compliance with applicable emergency access standards that would facilitate emergency vehicle access during project construction and operation. Additionally, an adequate water supply and approved paved access roadways shall be installed prior to any combustibles on site and will include:

Primary access throughout the Project site will be provided via an extension of Tyler Street. Primary circulation within the Project is a proposed 36-foot wide, two-land public road. Tyler Street shall comply with two-way access road standards of not less than 26 feet exclusive of shoulders and are capable of supporting an imposed load of at least 75,000 pounds.

Tyler Street is considered a common or primary roadway for traffic flow through the site and for fire department access.

Any dead-end roads and/or driveways serving new buildings that exceed 150 feet shall have approved provisions for fire apparatus turnaround in accordance with SFD standards at the time of approval. SFD's Fire Marshal would establish a policy identifying acceptable turnarounds for various Project product types.

Roadways and/or driveways would provide fire department access to within 150 feet of all portions of the exterior walls of the first floor of the structures (all new structures are fire sprinklered).

Minimum paved radius width for a project cul-de-sac would be 38 feet with no parking, or a Fire Department-approved alternative. Cul-de-sac bulbs would have signs posted "No Parking; Fire Lane." Cul-de-sacs would have a red painted curb with white letters "No Parking Fire Lane".

Cul-de-sac bulbs are required on dead-end roads in residential areas where roadways serve more than two residences.

Public streets shall meet all project approved fire code requirements and/or mitigated exceptions for maximum allowable dead-end distance, paving, and fuel management prior to combustibles being brought to the site.

Traffic calming devices (including, but not limited to, speed bumps, speed humps, speed control dips, etc.) would be prohibited unless approved by the fire code official. The Project proposes seven round-abouts for SFD review and approval.

- Vertical clearance along roadways is required to be 13 feet 6 inches. Maintenance is required to ensure that vegetation and trees on roadsides do not grow over or into the roadway and impede emergency apparatus access. Vegetation would be fire resistant and comply with this plan.
- The angles of approach and departure for fire apparatus access roads shall not exceed 7 degrees (12%) for the first 30 feet or as approved by a fire code official (Section 503.2.8).
- The developer shall provide a response map update in a format acceptable with current department mapping to the SFD (Section 505.5).

5.1.2 Road Widths and Circulation

All on-site road widths would be constructed according to the Specific Plan standards. All streets within the project, public and private, include on-street parking when there is at least 36 feet of paved road width. Parking would be restricted along red curb painted fire lanes and by posting of signs stating "No Parking; Fire Lane" correctly marked per the California Vehicle Code to preserve the unobstructed width for emergency response. The signs would include language identifying the towing company and their phone number enabling legal enforcement of the no parking areas.

5.1.3 Dead-Ends

Tyler Street is the Project's main access road and is a dead-end road, and will consistent with Section 503.2.5 of the CFC, which states that dead-end fire access road in excess of 150 feet in length shall be provided with an approved area for turning around emergency apparatus. Minimum paved radius width for a project cul-de-sac would be 38 feet with no parking, or a Fire Department-approved alternative. Cul-de-sac bulbs would have signs posted "No Parking; Fire Lane." Cul-de-sacs would have a red painted curb with white letters "No Parking Fire Lane."

5.1.4 Grade

The proposed internal road grades will comply with Section 503.2.7 of the 2019 CFC. The grade for proposed fire apparatus access roadway or driveway shall not exceed 15% within the Project and shall be capable of supporting the dynamic weight of a 75,000-pound fire apparatus (Section 503.2.3).

The angles of approach and departure for fire apparatus access roads shall not exceed 7 degrees (12%) for the first 30 feet or as approved by a fire code official (Section 503.2.8).

5.1.5 Surface

All on-site fire access and vehicle roadways shall be constructed and maintained to support the imposed loads of fire apparatus (not less than 75,000 lbs.) and shall be provided with an approved surface as described above. Access roads would be completed and paved prior to issuance of building permits and prior to the occurrence of combustible construction. All underground utilities, hydrants, water mains, curbs, gutters and sidewalks must be installed, and the drive surface shall be approved by SFD prior to combustibles being brought on site.

5.1.6 Vertical Clearance

Minimum unobstructed vertical clearance of 13 feet 6 inches will be maintained for the entire required width for all streets, including driveways that require emergency vehicle access.

5.1.7 Premise Identification

Identification of roads and structures will comply with the 2019 or most recently adopted CFC, Sections 505, as follows:

1. Approved numbers and/or addresses would be placed on all new and existing buildings and at appropriate additional locations, plainly visible and legible from the street or roadway fronting the property when approaching from either direction. The numbers would contrast with their background and would meet the following minimum size standards: 4" high with a ½" stroke for residential buildings, 6" high with a ½" stroke for commercial and multi-residential buildings and 12" high with a 1" stroke for industrial buildings. Additional numbers would be required where deemed necessary by the fire code official, such as rear access doors, building corners and entrances to commercial centers. The fire code official may establish different minimum sizes for numbers for various categories of projects.
2. Multiple structures located off common driveways would include posting structure identification on structures, on the entrance to individual driveways, and at the entrance to the common driveway.
3. If the structure is 100 feet from the roadway, structure identification should also be located at the entrance to the driveway.

5.2 Ignition Resistant Construction and Fire Protection Systems

Each of the proposed 14 single-family residential structures will be constructed to meet the requirements of the City's Fire and Building Codes. The following construction practices respond to the requirements of the Santee Municipal Code and Ordinance 570 and are consistent with the 2019 California Fire and Building Codes (Chapter 7A) as amended by the City of Santee. These requirements address roofs, eaves, exterior walls, vents, appendages, windows, and doors and result in hardened structures that have been proven to perform at high levels (resist ignition) during the typically short duration of exposure to burning vegetation from wildfires. While these standards will provide a high level of protection to structures in this development and should reduce the potential for ordering evacuations in a wildfire, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases. It should be noted, code updates are likely to occur before the Proposed Project is fully constructed. As such, building plans must meet the "then-current" California Building and Fire Codes and City amendments in effect at the time of building plan submittal.

There are three primary concerns for structure ignition: 1) radiant and/or convective heat, 2) burning embers, and 3) direct flame contact (NFPA 1144 2008, Ventura County Fire Protection District 2011, IBHS 2008, and others). Burning embers have been a focus of building code updates for at least the last decade, and new structures in the WUI built to these codes have proven to be very ignition resistant. Likewise, radiant and convective heat impacts on structures have been minimized through the Chapter 7A exterior fire ratings for walls, windows and doors. Additionally, provisions for modified fuel areas separating wildland fuels from structures have reduced the number of fuel-related structure losses. As such, most of the primary components of the layered fire protection system provided by the Proposed Project are required by the City, County, and state codes. However, these requirements are worth listing because they have proven effective for minimizing structural vulnerability to wildfire and, with the inclusion of required interior sprinklers (required by SFD since 1989), of extinguishing interior fires, should embers succeed in entering a structure.

Even though these measures are now required by the latest Building and Fire Codes, at one time, they were used as mitigation for buildings in WUI areas, because they were known to reduce structure vulnerability to wildfire. These measures performed so well, they were adopted into local and state codes. For instance, San Diego County after-fire assessments, indicate strongly that the building codes are working in preventing home loss: of 15,000 structures within the 2003 fire perimeter, 17% (1,050) were damaged or destroyed. However, of the 400 structures built to the 2001 codes (the most recent at the time), only 4% (16) were damaged or destroyed. Further, of the 8,300 homes that were within the 2007 fire perimeter, 17% were damaged or destroyed. A much smaller percentage (3%) of the 789 homes that were built to 2001 codes were impacted and an even smaller percentage (2%) of the 1,218 structures built to the 2004 Codes were impacted (IBHS 2008). It has been reasoned by fire officials conducting after-fire assessments that damage to the structures built to the latest codes is likely from unmaintained flammable landscape plantings or objects next to structures or open windows or doors (Hunter 2008).

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

1. Application of Chapter 7A, ignition resistant building requirements.
2. Exterior walls of all structures and garages to be constructed with approved non-combustible (stucco, masonry, or approved cement fiber board) or ignition-resistant material from grade to underside of roof

system. Wood shingle and shake wall covering is prohibited. Any unenclosed under-floor areas would have the same protection as exterior walls. Per City Building Code, Chapter 7A: Exterior wall coverings to extend from top of foundation to the underside of roof sheathing, and terminate at 2-inch nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure). The underside of any cantilevered or overhanging appendages and floor projections would maintain the ignition-resistant integrity of exterior walls, or projection would be enclosed to grade.

3. Eaves and soffits would meet the requirements of SFM 12-7A-3 or be protected by ignition-resistant materials or non-combustible construction on the exposed underside, per City Building Code.
4. There would be no use of paper-faced insulation or combustible installation in attics or other ventilated areas.
5. There would be no use of plastic, vinyl (with the exception of vinyl windows with metal reinforcement and welded corners), or light wood on the exterior
6. New class-A fire rated roof and associated assembly. With the proposed class-A fire rated roof, there will be attic or void spaces requiring ventilation to the outside environment. The attic spaces will require either ember-resistant roof vents or a minimum 1/16-inch mesh (smaller sizes restrict air flow) and shall not exceed 1/8-inch mesh for side ventilation (recommend BrandGuard, O'Hagin or similar vents). Minimum vent size is provided as smaller mesh may result in ventilation issues. All vents used for this project will be approved by SFD.
7. Multi- pane glazing with a minimum of one tempered pane, fire-resistance rating of not less than 20 minutes when tested according to NFPA 257 (such as SaftiFirst, SuperLite 20-minute rated glass product), or be tested to meet the performance requirements of State Fire Marshal Standard 12-7A-2.
8. Doors to conform to SFM standard 12-7A-1, or would be of approved noncombustible construction or would be solid core wood having stiles and rails not less than 1 3/8 inches thick or have a 20-minute fire rating. Doors to comply with City Building Code, Chapter 7-A. Garage doors to be solid core 1.75-inch-thick wood or metal, to comply with code.
9. Automatic, Interior Fire Sprinkler System to code for all habitable, detached, single-family residential dwellings and garages
10. Modern infrastructure, access roads, and water delivery system.

5.3 Infrastructure and Fire Protection Systems Requirements

The following infrastructure components are made in order to comply with the SFD and City of Santee requirements, which has adopted and amended the 2019 California Fire Code, and nationally accepted fire protection standards, as well as additional requirements to assist in providing reasonable on-site fire protection.

5.3.1 Water Supply

The Project will be served by the Padre Dam Municipal Water District (PDMWD). The water system shall be a public system designed and installed by PDMWD and will be consistent with SFD requirements which follows the water flow requirements of the 2019 CFC, Section 507.2 and 507.2.3 based on Appendix B. The public water system will be through connections to existing water mains running along Tyler Street. The system will provide reliable fire service providing 2,500 gallons per minute at 20 pounds per square inch (PSI) for a 2-hour duration.

5.3.2 Fire Hydrants

Hydrants are subject to SFD approval. Hydrants to be located on the normal fire apparatus response side of the road, at the beginning radius of cul-de-sacs, and at 300-foot spacing as required by SFD within VHFHSZs. Where applicable, hydrants to be located at the entrance to cul-de-sac bulb (not in the bulb itself unless specified by SFD). Hydrants would be consistent with SFD Design Standards as follows:

Required installations. The location, type and number of fire hydrants connected to a water supply capable of delivering the required fire flow would be provided on the public or private street, or on the site of the premises to be protected or both. Fire hydrants would be accessible to the fire department apparatus by roads meeting the requirements of section 503 of the CFC. Fire service laterals, valves, backflow preventers, and meters would be installed on site as required by the PDMWD. All fire department connections would be installed in accordance with mounting requirements as specified by the SFD Fire Marshal.

Location of fire hydrants. Hydrants would be in place and serviceable prior to delivery of combustible materials to the site. Fire hydrants would be located according to engineering standards and as required by the fire code official using the following criteria and taking into consideration departmental operational needs. Fire hydrants along Tyler Street would be 300 feet apart. Prior to the issuance of building permits, the applicant would submit to SFD plans demonstrating a water system capable of handling the fire flow requirements.

Fire hydrant construction and configuration. All fire hydrants would be of bronze construction, including all internal parts except seats. Alternative materials may be used if approved by SFD's Fire Marshal and PDMWD. The stems would be designed and installed in a manner that would ensure that they would not be projected outward from the main body by internal water pressure due to disassembly. The number and size of fire hydrant outlets would be at a minimum one 4-inch port and two, 2 1/2-inch ports.

Signing of water sources and fire department connections. Fire hydrants would be identified by a reflectorized blue marker and fire department connections would be identified by a reflectorized green marker, with a minimum dimension of 3 inches, in the center of the travel lane adjacent the water source. Crash posts would be provided where needed in on-site areas where vehicles could strike fire hydrants and would be consistent with Section 312 of the CFC.

Vegetation Clearance. A three-foot clear space (free of ornamental landscaping and retaining walls) would be maintained around the circumference of all fire hydrants.

5.3.3 Automatic Fire Sprinkler Systems

All structures within the Project site will include the installation of an automatic, residential interior fire sprinkler system. Automatic internal sprinkler systems shall be in accordance with the National Fire Protection Association (NFPA) 13-D and City of Santee installation requirements as appropriate, that are consistent with Section R313.3 of the 2019 California Residential Code, Chapter 9, Section 903 of the 2019 California Fire Code, and Section 602 of the Urban-Wildland Interface Code. The requirements for NFPA 13-D systems are two-fold. First, a one-hour vertical separation is required between individual living units from floor level to underside of roof. Secondly, each unit must have its own dedicated and properly sized water meter for the NFPA 13-D system. The sprinkler system will be remotely supervised by an approved 24/7 central-station (NFPA 71). Fire sprinkler monitoring plans for each building will be submitted to SFD for approval before installation.

5.3.4 Fire Alarm Systems and Residential Hazard Detectors

All residential units shall have electric-powered, hard-wired smoke detectors in compliance with SFD Fire Code Ordinance, including the 2019 CFC and CBC requirements.

5.4 Ongoing Building and Infrastructure Maintenance

The Project HOA shall be responsible for long term funding and maintenance of private roads and fire protection systems, including fire sprinklers.

5.5 Pre-Construction Requirements

Prior to bringing combustible materials onto the site, all utilities and site improvements within the active development shall be in place, fire hydrants operational, an approved all-weather roadway in place, and fuel modification zones established and approved.

5.6 Defensible Space and Vegetation Management

5.6.1 Defensible Space and Fuel Modification Zone (FMZ)

WUI fire protection requires a systems approach, which includes the components of infrastructure and water, structural safeguards (addressed in the FPP), and adequate defensible space setbacks. This section provides defensible space details for the Tyler Street 14-Lot Residential Development Project.

An important component of a fire protection system for this Project is the provision for ignition-resistant landscapes, modified vegetation buffers, and the installation of six-foot heat deflecting walls. FMZs are typically designed to provide vegetation buffers that gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones and irrigated zones adjacent to each other on the perimeter of the WUI exposed structure(s). FMZs are arguably more important when situated adjacent to older structures that were built prior to the latest ignition resistant codes and interior sprinkler requirements. The Project will be exposed to naturally-vegetated pockets of open space to the north, as well as to the west, south, southeast, and east, however, the northern and northeastern portions of the Project development will be directly adjacent to an existing residential community. Approximately 1,800 feet east of the Project site is I-125 and another existing residential community, and approximately 2,600 feet south of the Project site is the Grossmont College Campus. FMZs will be provided around all new single-family development lots within the Project development that are adjacent to open space areas. All dwelling units on the Project site will be highly ignition resistant based on required construction design, materials, and methods. There are seven lots that cannot achieve a full 100 feet of FMZ on the Project property for various reasons, including property boundary constraints (Lots 1 through 3), being adjacent to an open space easement area (Diegan Sage Scrub Easement per document 1994-0535919 recorded 9-8-94) for the Diegan coastal sage scrub located in the southeastern portion of the Project site (adjacent to Lots 7 and 8), or an ephemeral drainage channel abuts the northeastern portion of Lots 1 through 5. To mitigate for the reduced FMZs on Lots 1 through 6, the Project's applicant will apply for a 1602 Permit, which is a Lake and Streambed Alteration Program by the CA Department of Fish and Wildlife that would allow for 30% thinning (Zone 2) of the dead and dying material or mowing non-native grasses to lower than 4-inches (if present) within these Drainage areas and by doing so, allowing Lots 3 through 6

to achieve a full 100 feet of fuel modification, Additionally, a 6-foot concrete masonry unit (CMU) fire wall will be installed along the property boundary adjacent to Lots 1 through 3 and code exceeding construction and landscape alternatives are proposed for Lots 1 through 3.

Finally, in order to mitigate and provide the remaining FMZ along the southern and southeastern sides of Lots 7 and 8 within the Diegan Sage Scrub easement areas, a program has been put in place by the Project's biologist that would allow for irrigating (Zone 1) and 30% thinning (Zone 2) of the dead and dying material or mowing non-native grasses to lower than 4-inches (if present) within this Diegan Sage Scrub easement area. By doing so, Lots 7 and 8 will be able to provide a full 100 feet of FMZ in all directions, including a full 50-foot irrigated Zone 1 and a full 50-foot Zone 2. Zone 1 BMZ impacts are considered significant and if required, additional on-site mitigation would be required at a 2:1 mitigation ratio; this mitigation would be completed onsite within the proposed open space areas along the western side of the development. Zone 2 BMZ impacts are considered impact neutral and not considered a significant biological impact. As a result, no compensatory mitigation is required for Zone 2 impacts, including offsite Zone 2 BMZ impacts. Additional code exceeding construction and landscape alternatives that provide the same practical effect as the 100 feet FMZ will also be provided for Lots 7 and 8.

Cohen (1995) performed structure ignition fire research studies that suggest, as a rule-of-thumb, larger flame lengths and widths require wider fuel modification zones to reduce structure ignition. For example, valid Structure Ignition Assessment Modeling results indicate that a 20-foot-high flame has minimal radiant heat to ignite a structure (bare wood) beyond 33 feet (horizontal distance). Whereas, a 70-foot-high flame requires about 130 feet of clearance to prevent structure ignitions from radiant heat (Cohen and Butler 1996). For this fire study example, bare wood was used, which is more combustible than the ignition resistant exterior walls that will be used to build the single-family residences of the Tyler Street Project. For the Tyler Street Project, assuming 42-foot flame lengths, reduced fuel modification zones are justifiable for the limited building areas.

A minimum 100-foot-wide FMZ is required by the SFD (Santee Municipal Code Chapter 11.18.020, Section 4907.2, Title 14, and PRC 4290-4291) for defensible space in areas adjacent to naturally vegetated, open space lands. Based on the site plan, the majority the lots within the Project site achieve 100 feet or more of on-site FMZ, which includes a minimum 50-foot wide Zone 1 (irrigated and re-planted with SFD approved fire resistive, less flammable plant species) and a 50-foot wide Zone 2 (no more than 30% of the dead and dying vegetation material remain within the square footage of the planted area). However, as stated above, conceptual building footprints partially protrude into the 100 feet FMZ along the northern boundary, more specifically Lots 1 through 3 are constrained to providing between 50 to 100 feet of achievable on-site fuel modification. The remaining on-site fuel modification is restricted in the north by an ephemeral drainage easement (adjacent to Lots 1 through 5) and to the south and southeast by a Diegan coastal sage scrub easement (adjacent to Lots 7 and 8), which require the existing natural vegetation in these areas to remain undisturbed and in their natural state, unless mitigated for or a 1602 Permit is obtained. By providing a mitigation program and obtaining a 1602 Permit, the Project would be allowed to remove dead, dying and exotic vegetation, and keep the native vegetation intact and grasses to be cut less than 4-inches in height within these areas. Figure 8 illustrates the configuration of the FMZs for the development footprint and the areas where the additional required irrigated Zone 1 and Zone 2 would occur within the drainage areas adjacent to Lots 1 through 6 and within the Diegan Sage Scrub area adjacent to Lots 7 and 8. In addition to thinning out the dead and dying materials within these areas above, Dudek and the Project's applicant are proposing additional code exceeding fire protection mitigation measures for the lots achieving less than 100 feet on-site FMZ, including the construction of a 6-foot CMU fire wall adjacent to Lots 1 through 3. These measures are analyzed to result in adequate separation and radiant wildfire heat protection as supported by scientific research and successful

application of these mitigations for many other projects throughout southern California, including in numerous San Diego County fire agency jurisdictions.

This section provides standard Santee Fire Department FMZ requirements. These requirements will be applicable to all portion of the Project site. Areas where the Project cannot achieve a full 100 feet of on-site FMZ, the Project proposes a minimum six-foot non-combustible heat-deflecting fire wall as a fire protection feature providing same practical effect as FMZ. Further information about the construction of a non-combustible minimum six-foot heat deflecting fire wall can be found in Section 7 below.

5.6.1.1 City of Santee Fuel Modification Zone Standards

Customized FMZs would be implemented according to the requirements described in the following sections. These FMZs are not standard SFD FMZs, as previously mentioned and described below. These zones are presented graphically in Figure 8 and vary in their configuration (Zones 1 and 2) depending where they are located in the Proposed Project. All fuel modification would be provided within the project boundaries (no off-site easements needed). FMZs would be measured along a horizontal plane. Each respective FMZ would include permanent field markers (see Appendix F for zone marker details) meeting the approval of SFD to delineate the zones. Permanent markers will be installed at line of site or where FMZs change direction. These markers will aid ongoing maintenance activities that would occur on site and avoid the tendency for non-demarcated FMZs to become wider at the expense of preserved open space, over time.

Plantings used in Zone 1 and interior portions of the development footprint will include drought-tolerant, fire resistive plant material. The planting list and spacing will be reviewed and approved by the SFD, included on submitted landscape plans. An automatic irrigation system would be installed in Zone 1 to maintain hydrated plants without over-watering, allowing for run-off, or attracting nuisance pests. In Zone 2, no more than 30% of the dead and dying vegetation material remain within the square footage of the planted area, as described below.

The Project would also hire a qualified SFD-approved 3rd party FMZ inspector to provide annual inspections, unless SFD prefers to conduct the inspections, as detailed in the following sections.

5.6.1.2 Zone 1 – Irrigated Zone (minimum 50 feet wide)

Zone 1 is minimum 50 feet of the rear- or side-yard from the furthest projection of the structure (e.g., the outer edge of the eave) to the property line adjacent to Lots 1 and 2, the drainage channel adjacent to Lots 3 through 6, of Zone 2 adjacent to Lots 7 through 14. This area would be included in the overall site FMZs and would consist of low fuel density, ignition resistant ground covers and plantings consisting of pathways, turf, and permanently irrigated and maintained landscaping. Zone 1 would be planted with drought-tolerant, fire resistant plant material and would be maintained by the property owner.

Zone 1 includes the following key components:

1. High-efficiency, automatic irrigation system with low precipitation sprinkler heads to maintain hydrated plants without over-watering or attracting nuisance pests, such as red imported fire ants.
2. High-leaf-moisture plants as ground cover, less than 4 inches high.
3. Shrubs are prohibited beneath tree crowns.

4. Fire resistive trees are allowed if placed or trimmed so that the drip line (e.g., canopy edge) of mature trees is maintained more than 10 feet from the structure, especially the roof or eave. Tree spacing of a minimum 10 feet between canopies or as specified in Table 8 for steeper slopes.
5. No tree limb encroachment within 10 feet of a chimney, including outside propane or natural gas barbecues or fireplaces.
6. Highly flammable trees, including but not limited to conifers, eucalyptus, cypress, junipers, palms, and pepper trees are not allowed within this zone.
7. Tree maintenance includes limbing-up (canopy raising) 6 feet above ground or one-third the height of mature tree, whichever is greater.
8. All structures, including habitable buildings, patio covers, gazebos, decks, arbors, etc., would require plan review approval by SFD.
9. Trees and tree form shrub species that naturally grow to heights that exceed 10 feet would be vertically pruned to prevent ladder fuel.
10. Grasses would be cut to 4 inches in height.
11. Ground covers within the first five feet from structure restricted to non-flammable materials such as stone, rock, concrete, bare soil, or other. This provides protection for the weep screed[5] area that has been shown to be a potential vulnerability for fire impingement from burning ground cover.
12. Maintenance including ongoing removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying plantings, maintenance of the programming and functionality of the irrigation system, and regular trimming to prevent ladder fuels[6].
13. No permanent or portable fire pits, outdoor fireplaces, or flame-generating devices that burn wood are allowed within Zone 1. Chimneys serving fireplaces, barbecues, or decorative heating appliances in which liquid fuel (natural gas or propane) is used would be provided with a spark arrester of woven or welded wire screening of 12-guage standard wire having openings not exceeding 1/4-inch.
14. Fencing within all lots that are directly adjacent open space or naturally vegetated areas would be constructed with non-combustible materials (e.g., stone, block), fire-rated wood, treated fire-rated vinyl, or SFD-approved materials. In no case would the fence return (closest five feet of fencing to a structure) be constructed of combustible materials.
15. Homeowners would be responsible for ensuring that rear- or side-yard landscaping is maintained for annual inspection.

Table 8. Distance Between Tree Canopies by Percent Slope[1]

Percent of Slope	Required Distances Between Edge of Mature Tree Canopies[2]
0–20	10 feet
21–50	20 feet
51+	30 feet

1 Source: City of Santee Ordinance 500
2 Determined from canopy dimensions as described in Sunset Western Garden Book (Current Edition)

5 A weep screed, which consists of galvanized steel or thermoplastic, is used along the base of an exterior stucco wall. The screed serves as a vent so that moisture can escape the stucco wall finish just above the foundation.
6 Ladder fuels are flammable plant material that can transmit fire burning in low-growing vegetation to taller vegetation. Examples of ladder fuels include low-lying tree branches and shrubs, climbing vines, and tree-form shrubs underneath the canopy of a large tree.

5.6.1.3 Zone 2 – Retain 30% of Vegetation (50 to 100 feet wide)

Zone 2 reduces the fuel load of a wildland area adjacent to Zone 1, and thereby, reduces heat and ember production from wildland fires, slows fire spread, and reduces fire intensity as it approaches the Zone 1. Zone 2 adjoins Zone 1 on its outer edge and measures 50 to 100 feet in width. In this Zone, areas outside of the riparian area within the Project Site require a minimum 70% thinning or removal of plants, focus on removing the most flammable species, and dead and dying plant material, while creating a mosaic of shrub groupings. The Zone 2 areas within the riparian area with native wetland trees, will include a minimum 30% thinning of only the dead and dying vegetation material. Zone 2 requries periodic inspection and maintenance by the HOA.

Zone 2 areas outside of the riparian area includes the following key components:

1. Zone 2 areas outside of the riparian area within the Project site requires no more than 30% of the dead and dying vegetation material remain within the square footage of the planted area, while creating a mosaic of shrub groupings.
2. Zone 2 consists of low-growing, fire resistant shrubs and groundcovers with an average height less than 24 inches.
3. Grasses between shrub groupings would be cut to 4 inches in height.
4. Ground cover between shrub groupings to be maintained less than 6 inches high.
5. Trees and tree-form shrub species that naturally grow to heights that exceed 4 feet would be vertically pruned to prevent ladder fuels.
6. Maintenance including ongoing removal and thinning of dead/dying shrubs.

5.6.2 Other Vegetation Management

5.6.2.1 Vacant Parcels and Lots

1. A Fuel Modification Phasing/Development Plan shall be drafted and implemented for the phasing of the Tyler Street Project to ensure the safety of the homes and occupants during phasing/development of the project. All bullet items in this list shall be per that plan.
2. Vegetation management would not be required on vacant lots until construction begins. However, perimeter FMZs must be implemented prior to commencement of construction utilizing combustible materials.
3. Vacant lots adjacent to active construction areas/lots would be required to implement vegetation management if they are within 50 feet of the active construction area. Perimeter areas of the vacant lot would be maintained as a vegetation management zone extending 50 feet from roadways and adjacent construction areas.
4. Prior to issuance of a permit for any construction, grading, digging, installation of fences, etc., on a vacant lot, the 50 feet at the perimeter of the lot is to be maintained as a vegetation management zone.
5. In addition to the establishment of a 50-foot-wide vegetation management zone prior to combustible materials presence on site, existing vegetation on the lot would be reduced by at least 70% upon commencement of construction.
6. Dead fuel, ladder fuel (fuel which can spread fire from ground to trees), and downed fuels would be removed and trees/shrubs would be properly limbed, pruned and spaced per this plan.

5.6.2.2 Environmentally Sensitive Areas

In environmentally sensitive areas that contain sensitive habitat, cultural sites, riparian areas, biological buffer areas, detention basins, permission would be needed from the City, and the resource agencies, as appropriate. The Tyler Street Project's managed and maintained FMZs are designed to be included within portions of environmentally sensitive areas, specifically, within the drainage channel along the northern property boundary as well as within the Diegan Sage Scrub Easement area adjacent to Lots 7 and 8.

5.6.2.3 Private Lots

None of the plant materials listed in Appendix G (Undesirable Plant Species) would be planted on private lots that are exposed to the WUI (this includes all lots in the community, due to potential for ember production during wildfire). The Tyler Street HOA would provide that list and other recommendations to all buyers in a private property owners' guide to fire safe vegetation management on private lots.

Deed restrictions would be recorded against private lots including any portion of the FMZs on the private lot and would specify approved plant palettes, prohibitions regarding combustible structures, including fencing and other accessory structures. Deed restrictions would run with the land and be conveyed to any subsequent owner of the private lot.

In addition, the Project Covenants, Conditions, and Restrictions (CC&Rs) would include a reference to the FPP to ensure compliance with the FPP. Owners of private lots would be notified in the project's CC&Rs and property disclosures that they are prohibited from conducting any vegetation management activities outside their private property.

5.6.2.4 Undesirable Plants

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

Exception

1. *Podocarpus* species, *Bougainvillea* species, and Salvia species are allowed, if deadwood is removed annually and tree/shrub canopies properly thinned out to make less prone to ignite or spread flames to other vegetation. *Bougainvillea* spp. will not be planted near nor attached to trellis structures that are attached to a combustible structure.
2. Olive trees will be used in an orchard setting under intensive, agricultural management to minimize fire hazard (See orchard maintenance standards in section 6.2.5: Farmland - Row Crops, and Orchards, or Vineyards).

5.6.2.5 Fuel Modification Maintenance

All fuel modification area vegetation management shall be completed annually by May 1 of each year and more often as needed for fire safety, as determined by the SFD. The project HOA shall be responsible for all vegetation

management throughout the common areas of the project site, in compliance with the requirements detailed herein and SFD requirements. Additionally, private lot owners will be responsible for installing their irrigated fuel modification zones. Prior to establishment of the irrigated fuel modification zone, the entire required irrigated fuel modification zone will be mowed to 4-inch stubble height until such time that the homeowner installs the irrigated fuel modification zone, which will be required to be in place within 6 months of structure occupancy. The residents shall maintain fuel modification zone(s) on their properties. Furthermore, the community CC&R's shall require the HOA to inspect rear yards along the perimeter and require owners to maintain their property in accordance with this Letter Report. Should owner not comply, HOA shall notify the SFD and the SFD will provide inspections per their internal standards.

5.6.2.6 FMZ Compliance Inspections

The property owner would obtain an FMZ inspection and report from a qualified SFD-approved 3rd party inspector in May of each year certifying that vegetation management activities throughout the Project Site have been performed pursuant to this Letter Report, including verifying that wood bark and other combustible mulches shall not be used within the first 5 feet from the homes. A copy of the annual inspection report would be provided to the Proposed Project HOA and a copy made available to SFD, if requested.

5.6.2.7 Pre-Construction Requirements

- Perimeter fuel modification areas must be implemented and approved by the SFD prior to combustible materials being brought on site.
- Existing flammable vegetation shall be reduced by 70% on vacant lots upon commencement of construction.
- Dead fuel, ladder fuel (fuel which can spread fire from ground to trees), and downed fuel shall be removed and trees/shrubs shall be properly limbed, pruned, and spaced per this plan.
- Private lot owners will be responsible for installing their irrigated fuel modification zones. Prior to establishment of the irrigated fuel modification zone, the entire required irrigated fuel modification zone will be mowed to 4-inch stubble height until such time that the homeowner installs the irrigated fuel modification zone, which will be required to be in place within 6 months of structure occupancy.

5.6.2.8 Construction Phase Fuel Management

Vegetation management requirements would be implemented at commencement and throughout the construction phase. Vegetation management would be performed pursuant to this FPP and SFD requirements on all building locations prior to the start of work and prior to any import of combustible construction materials. Adequate fuel breaks, as approved by SFD, would be created around all grading, site work, and other construction activities in areas where there is flammable vegetation. Fuel breaks would range between 50 and 150 feet around grading activities.

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

- All new power lines would be underground, for fire safety during high wind conditions or during fires on a right of way, which can expose aboveground power lines. Temporary construction power lines may be allowed in areas that have been cleared of combustible vegetation.

- Caution must be used to avoid erosion or ground (including slope) instability or water runoff due to vegetation removal, vegetation management, maintenance, landscaping, or irrigation. No uprooting of treated plants is necessary.

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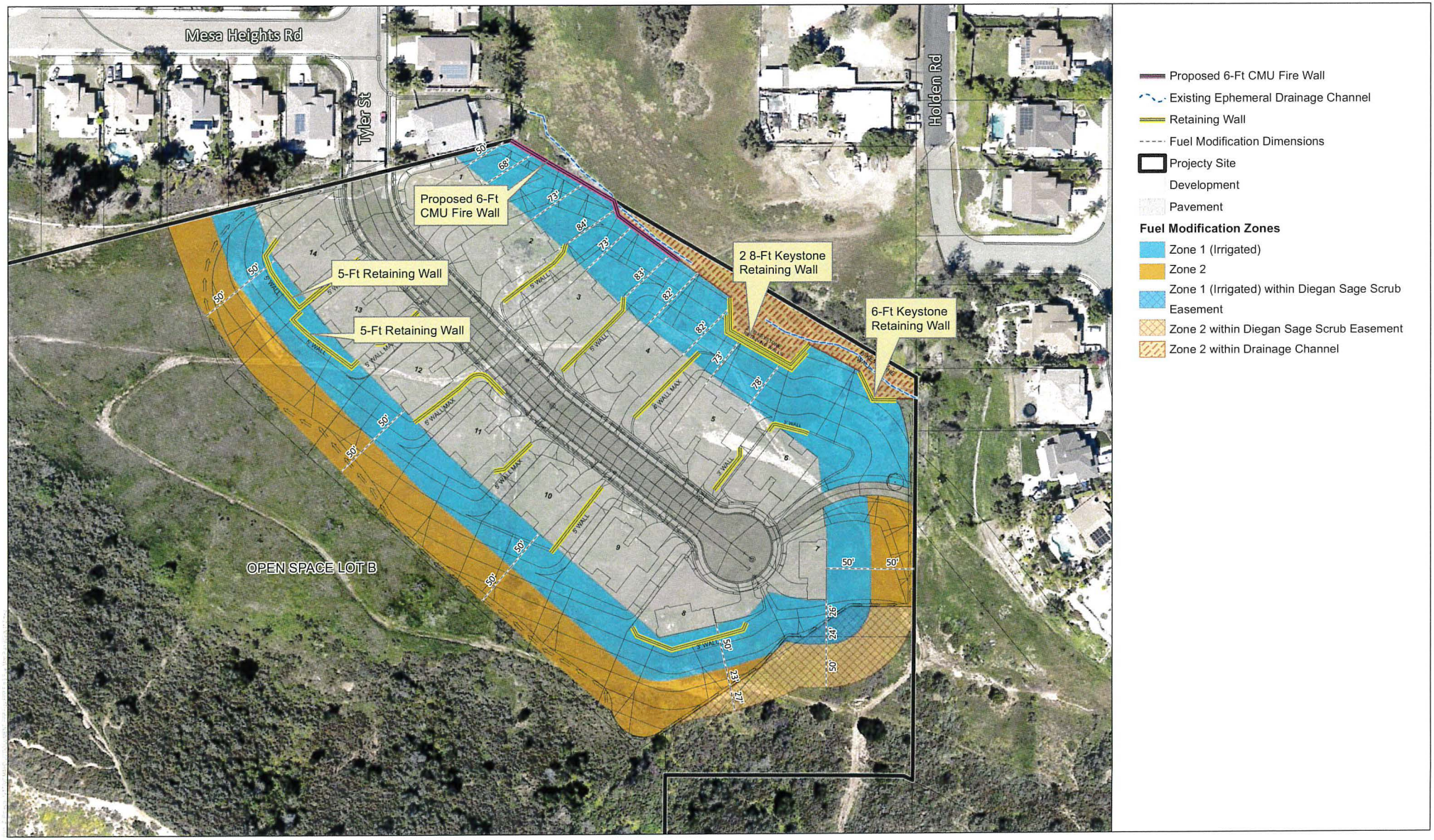

SOURCE: AERIAL-SANGIS 2017; DEVELOPMENT-WALSH ENGINEERING 2021

DUDEK

0 50 100 200 Feet

FIGURE 8
Fuel Modification Zone Map
Tyler Street Fire Protection Plan

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6 Alternative Materials and Methods for Non-Conforming Fuel Modification

As previously mentioned, due to site constraints, it is not possible to achieve a full 100 feet FMZ width for every Project lot. As such, this Preliminary Fire Assessment Summary Letter provides both City and State fire and building code required elements for constructing a residential structure in a very high fire hazard severity area, as well as enhanced, code exceeding mitigation measures for the lots with non-conforming fuel modifications zones. The code exceeding mitigation measures are customized for this Project site based on the fire behavior modeling analysis results and site fire environment evaluation and focus on meeting or exceeding the fire safety provided by a City defined, full 100 feet of fuel modification zone.

As indicated in this report, the FMZs and additional fire protection measures proposed for the Project provide equivalent wildfire buffer but are not standard zones. Rather, they are based on a variety of analysis criteria including predicted flame length, fire intensity (Btu), site topography and vegetation, extreme and typical weather, the position of structures on pads, position of roadways, adjacent fuels, fire history, current vs. proposed land use, neighboring communities relative to the proposed Project, and type of construction. The fire intensity research conducted by Cohen (1995), Cohen and Butler (1996), and Cohen and Saveland (1997), and Tran et al. (1992) supports the fuel modification alternatives proposed for this Project.

6.1 Additional Structure Protection Measures and Justification

The following **are City and State fire and building code required measures for** building in wildland urban interface areas.

1. The proposed Tyler Street 14-lot single-family residential subdivision achieves a minimum 50 feet of on-site FMZ for every lot, and Lots 9 through 14 achieve a full 100 feet of FMZ (50 feet irrigated Zone 1 and 50 feet of a Zone 2) without the need to provide additional mitigation. Lots 1 through 8 are unable to achieve a full 100 feet of FMZ within the property limits for various reasons; these lots are able to achieve between 50 and 100 feet of FMZ and will be required to implement the **code exceeding mitigation measures** described below.

2. Each of the new single-family residential structures within the proposed Tyler Street 14-lot subdivision site will be code compliant, ignition resistive, and fully-sprinklered in compliance with applicable portions of the City of Santee Municipal Code, as well as with the 2019 edition of the California Building Code (CBC), Chapter 7A (or then current edition); 2019 edition of the California Fire Code (CFC), Chapter 49 (or then current edition); and 2019 edition of the California Residential Code (CRC), Section 237 (or then current edition), as adopted by the City;

3. All rooms and enclosed spaces within each of the new single-family residences, including within the garages, will be provided with an NFPA 13D fire sprinkler system with additional coverage. The NFPA 13D system is required:
   a) To be designed by a licensed fire protection engineer or SFD-approved sprinkler contractor.
   b) To provide fire inspector's test value five feet above grade. To install a fire sprinkler box in garage with wrench and three heads of each type used in design of fire sprinkler system;
   c) To provide sufficient water supply as determined by fire sprinkler hydraulic calculations, which may require increased meter and piping size. If fire flow is insufficient for the designed system, alternative options, such as a fire pump designed to boost fire flow, may be considered, to the approval of SFD. Alternative options will be submitted to SFD for approval before installation;
   d) Automatic or self-closing doors shall be installed and conform to the exterior door assembly standards addressed in Chapter 7 of the CBC;

4. A fire alarm system shall be installed in accordance with NFPA 72, *Fire Protection Signaling System* and SFD requirements, for monitoring the flow switch and inter-connection with the dwellings' smoke detectors. The fire alarm system will be supervised by a third-party alarm company. The system will be tested annually, or as needed, with test results provided to SFD;

5. Zone 1 requires a minimum 50 feet of irrigated landscape planted with drought-tolerant, fire resistive plants. No undesirable, highly flammable plant species shall be planted. The landscaping will be routinely maintained and will be watered by an automatic irrigation system that will maintain healthy vegetation with high moisture contents that would prevent ignition by embers from a wildfire;

6. The new residential design also provides an unimpeded, all-weather pathway (minimum three feet wide) on all sides of the residential structures for firefighter access around the entire perimeter of the structure;

The following **code exceeding mitigation measures** are being provided for nonconforming **lots unable to achieve a full 100 feet of fuel modification (Lots 1 through 8).** These code exceeding mitigations were found to meet or exceed the code required 100 feet fuel modification zones through science and application and were accepted by numerous fire agencies throughout California:

1. To mitigate for the reduced FMZs on Lots 1 through 6, the Project's applicant will apply for a 1602 Permit, which is a Lake and Streambed Alteration Program by the CA Department of Fish and Wildlife that would allow for 30% thinning (Zone 2) of the dead and dying material or mowing non-native grasses to lower than 4-inches (if present) within these Drainage areas and by doing so, allowing Lots 3 through 6 to achieve a full 100 feet of fuel modification.

2. To mitigate and provide the remaining FMZ along the southern and southeastern sides of Lots 7 and 8 within the Diegan Sage Scrub easement areas, a program has been put in place by the Project's biologist that would allow for irrigating (Zone 1) and 30% thinning (Zone 2) of the dead and dying material or mowing non-native grasses to lower than 4-inches (if present) within this Diegan Sage Scrub easement area. By doing so, Lots 7 and 8 will be able to provide a full 100 feet of FMZ in all directions, including a full 50-foot irrigated Zone 1 and a full 50-foot Zone 2. Zone 1 BMZ impacts are considered significant and if required,

additional on-site mitigation would be required at a 2:1 mitigation ratio; this mitigation would be completed onsite within the proposed open space areas along the western side of the development. Zone 2 BMZ impacts are considered impact neutral and not considered a significant biological impact. As a result, no compensatory mitigation is required for Zone 2 impacts, including offsite Zone 2 BMZ impacts. Additional code exceeding construction and landscape alternatives that provide the same practical effect as the 100 feet FMZ will also be provided for Lots 7 and 8 (refer to Project's Biological Report for more information on mitigation).

3. Lots 1 through 6 will be required to be maintained as an extended irrigated Zone 1 FMZ landscape with drought-tolerant, fire resistive plants. The Zone 1 FMZ will extend up to the drainage channel adjacent to Lots 1 through 6. The extended irrigated Zone 1 landscape will include no undesirable, highly flammable plant species shall be planted, that will be routinely maintained and watered by an automatic irrigation system that will maintain healthy vegetation with high moisture contents that would prevent ignition by embers from a wildfire;

4. Because of property boundary constraints, Lots 1 through 3 are unable to achieve a full 100 feet of FMZ onsite. To mitigate for the reduced FMZ, a 6-foot high non-combustible CMU fire wall will be constructed along the rear lot line behind Lots 1 through 3 will be constructed. The fire wall will be installed to function as heat-deflecting walls.

5. In addition to the construction of a 6-foot high CMU wall, the Project proposes to provide exterior glazing in windows (and sliding glass doors, garage doors, or decorative or leaded glass doors) facing the open space and naturally vegetated areas to be dual pane with both panes tempered glass to mitigate for the reduced FMZ within Lots 1 through 3. Dual pane, one pane tempered glass has been shown during testing and in after fire assessments to significantly decrease the risk of breakage and ember entry into structures. Therefore, requiring code-exceeding dual pane, both panes tempered is anticipated to be an important safety measure that provides enhanced structure protection and provides mitigation for reduced fuel modification zones and limited setbacks from adjacent structures. *The window upgrade also exceeds the requirements of Chapter 7A of the CBC and providing additional protection for the structure's most vulnerable, exterior side* **(CODE EXCEEDING MITIGATION MEASURE);**

6. Wildland exposed sides of the structures on Lots 1 through 3 shall also include 5/8-inch Type X fire rated gypsum sheathing applied behind the exterior covering or cladding (stucco or exterior siding) on the exterior side of the framing, from the foundation to the roof for a facade facing the open space and naturally vegetated areas. 5/8-inch Type X fire rated gypsum sheathing is required to be manufactured in accordance with established ASTM standards defining type X wallboard sheathing as that which provides not less than one-hour fire resistance when tested in specified building assemblies and has been tested and certified as acceptable for use in a one-hour fire rated system. CertainTeed Type X Gypsum Board has a Flame Spread rating of 15 and Smoke Developed rating of 0, in accordance with ASTM E 84, (UL 723, UBC 8-1, NFPA 255, CAN/ULC-S102); UL classified for Fire Resistance (ANSL/UL 263; ASTM E119) and listed under UL File No. CKNX.R3660 (Certainteed, 2021). Please refer to the specification in Appendix H for a more

detailed description of CertainTeed 5/8-inch Type X Fire Rated Gypsum sheathing (or similar product) **CODE EXCEEDING MITIGATION MEASURE;**

7. Areas requiring ventilation to the outside environment will require ember-resistant vents such as Brandguard, Vulcan, or O'Hagin brands. These vents exceed the code requirement of a minimum 1/16-inch not to exceed 1/8-inch openings. All vents used for this project will be approved by SFD. Please refer to the specification in Appendices I and J for a more detailed description of Brandguard, Vulcan, and O'Hagin ventilation brands. These use of these ember resistant vents are a **CODE EXCEEDING MITIGATION MEASURE;**

8. Non-combustible fencing shall be required to be installed for areas within Fire Hazard Severity Zones and/or Wildland Urban Interface Areas, including within five feet of every structure and along the side yards of each residence (Santee Municipal Code, Chapter 11.18.020, Section 4908.1). Dudek agrees with the requirements for avoiding wood/combustible fences on perimeter lots that abut unmaintained open space areas. However, the use of **Kroy Vinyl Fencing** (see *Appendix K – Kroy Vinyl Fencing Fire Rating*) or fire retardant treated lumber, such as **Hoover's lumber product**, are considered acceptable fencing materials to use for the proposed interior 6-foot high fencing (see Appendix L – OSFM Approved Hoover X);

9. No eave overhangs. By requiring no eaves instead of the code required boxed eaves, the structure eliminates the ability of capturing hot air and embers that may circulate under a boxed eave and instead allows the hot air to either bounce off the side of the structure or fly over the structure entirely (**CODE EXCEEDING MITIGATION MEASURE);**

10. Annual FMZ Inspections. Yearly fuel modification maintenance shall be required by the Project's HOA and each individual property owner. The communities HOA as well as individual property owners, shall be responsible for obtaining an FMZ inspection and report from a qualified SFD-approved 3rd party inspector in May of each year certifying that vegetation management activities throughout the Project site and within each individual lot have been performed pursuant to this Fire letter. This includes verifying that wood bark and other combustible mulches shall not be used within the first 5 feet from the homes. See details regarding the fuel modification zone vegetation maintenance program below **(CODE EXCEEDING MITIGATION MEASURE).**

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7 Justification for Reduced Fuel Modification Zones

As presented in this FPP, the FMZs provided for the proposed Tyler Street Project are not standard FMZs. Rather, Lots 1 through 8 cannot achieve the required 100 feet of FMZ due to lot constraints and Project boundary limitations. However, by applying for a 1602 Permit, which would allow for 30% thinning (Zone 2) of the dead and dying material or mowing non-native grasses to lower than 4-inches (if present) within the Drainage areas along the northern property boundary, Lots 3 through 6 would ultimately be able to achieve a full 100 feet of fuel modification, Additionally, the construction of a 6-foot CMU fire wall along the rear property boundary adjacent to Lots 1 through 3, will function as heat-deflecting wall and stop the progression of a ground fire from advancing into the rear yards of these lots. Furthermore, to mitigate and provide the remaining FMZ along the southern and southeastern sides of Lots 7 and 8 within the Diegan Sage Scrub easement areas, a program has been put in place by the Project's biologist that would allow for irrigating (Zone 1) and 30% thinning (Zone 2) of the dead and dying material or mowing non-native grasses to lower than 4-inches (if present) within this Diegan Sage Scrub easement area. By doing so, Lots 7 and 8 will be able to provide a full 100 feet of FMZ in all directions, including achieving a full 50-foot irrigated Zone 1 and a full 50-foot Zone 2. Zone 1 BMZ impacts are considered significant and if required, additional on-site mitigation would be required at a 2:1 mitigation ratio; this mitigation would be completed onsite within the proposed open space areas along the western side of the development. Zone 2 BMZ impacts are considered impact neutral and not considered a significant biological impact. As a result, no compensatory mitigation is required for Zone 2 impacts, including offsite Zone 2 BMZ impacts. Additional code exceeding construction and landscape alternatives that provide the same practical effect as the 100 feet FMZ will also be provided for Lots 7 and 8 (refer to Project's Biological Report for more information on mitigation.

An important component of a fire protection system for this Project is the provision for ignition-resistant construction and modified vegetation buffers. The structure ignition resistance standards detailed in the 2019 California Fire Code and Chapter 7A of the 2019 California Building code will enable the new single-family residential structures to withstand the type of wildfire that may occur in the fuels outside the development footprint. Fuel modification zone requirements, including a minimum 50 feet of fully irrigated landscapes with drought-tolerant, fire resistive plantings (Zone 1) and a 50-foot zone (Zone 2), will provide a reasonable level of wildfire protection to the ignition resistant structure. Additionally, undesirable, highly flammable plant species shall not be planted in fuel modification zones. For Lots 1 through 3 that are unable to achieve the full 100-foot FMZ, windows (and sliding glass doors, garage doors, or decorative or leaded glass doors) facing the open space and naturally vegetated areas will be required to be dual pane with both panes tempered glass. Additionally, the exposed sides of structures shall include 5/8-inch Type X fire rated gypsum sheathing applied behind the exterior covering or cladding (stucco or exterior siding) on the exterior side of the framing, from the foundation to the roof for a facade facing the open space and naturally vegetated areas. The installation of the 5/8-inch Type X fire rated gypsum sheathing increases a wall's fire rating to a minimum of 1 hour, from the 30-minute rating for standard ½-inch drywall. Also, yearly fuel modification maintenance shall be required for all 14 lots by the Project's HOA and each individual property owner. The communities HOA as well as individual property owners, shall be responsible for obtaining an FMZ inspection and report from a qualified SFD-approved 3rd party inspector in May of each year. Dudek has found that the code exceeding mitigation measures provided have been used for many other similar successful projects and demonstrate that they meet or exceed the code required 100 feet fuel modification zone. Fire behavior modeling, as previously presented, was used to predict flame lengths and was not intended to determine sufficient fuel modification zone widths. However, the results of the fire modeling provide important fire behavior projections, which is key supporting

information for determining buffer widths that would minimize structure ignition and provide "defensible space" for firefighters. With that said, it is anticipated that the proposed structures will be able to withstand the short duration, low to moderate intensity fire and ember shower that is projected from off-site, adjacent fuels based on several factors, as discussed below.

7.1 Structure Ignition

There are two primary concerns for structure ignition: 1) radiant and/or convective heat and 2) burning embers (NFPA 1144 2008, IBHS 2008, and others). Burning embers have been a focus of building code updates for at least the last decade, and new structures in the WUI built to these codes have proven to be very ignition resistant. Likewise, radiant and convective heat impacts on structures have been minimized through the Chapter 7A exterior fire ratings for walls, windows and doors. Additionally, provisions for modified fuel areas separating wildland fuels from structures have reduced the number of fuel-related structure losses. As such, most of the primary components of the layered fire protection system provided for the Tyler Street Project are required by the City of Santee and State codes but are worth listing because they have been proven effective for minimizing structural vulnerability to wildfire and, with the inclusion of required interior sprinklers (required in the 2013 Building/Fire Code update), of extinguishing interior fires, should embers succeed in entering a structure. Even though these measures are now required by the latest Building and Fire Codes, at one time, they were used as mitigation measures for buildings in WUI areas, because they were known to reduce structure vulnerability to wildfire. These measures performed so well, they were adopted into the code. The following project features are required for this new development in WUI areas and form the basis of the system of protection necessary to minimize structural ignitions as well as providing adequate access by emergency responders:

1. Application of Chapter 7A, ignition resistant building requirements
2. Minimum 1-hour rated exterior walls and doors
3. Multi- pane glazing with a minimum of one tempered pane, fire-resistance rating of not less than 20 minutes when tested according to NFPA 257, or be tested to meet the performance requirements of State Fire Marshal Standard 12-7A-2. For lots unable to achieve the full 100 feet of FMZs (Lots 1 through 5, 7 and 8) dual pane dual tempered glass windows will be installed on the exposed sides of the new residential structures. Dual pane, one pane tempered glass has been shown during testing and in after fire assessments to significantly decrease the risk of breakage and ember entry into structures. Therefore, requiring code-exceeding dual pane, both panes tempered is anticipated to be an important safety measure that provides enhanced structure protection and provides mitigation for reduced fuel modification zones and limited setbacks from adjacent structures. *The window upgrade also exceeds the requirements of Chapter 7A of the CBC and providing additional protection for the structure's most vulnerable, exterior side.*
4. Ember resistant vents (recommend BrandGuard or similar vents)
5. Automatic, interior fire sprinkler system to code for occupancy type.

7.2 Fuel Separation

As experienced in numerous wildfires, including the most recent fire storms in San Diego County (2003 and 2007), homes in the WUI are potential fuel. The distance between the wildland fire that is consuming wildland fuel and the

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

These results support Cohen's (2000) findings that if a community's homes have a sufficiently low home ignitability, the community can survive exposure to wildfire without major fire destruction. This provides the option of mitigating the wildland fire threat to homes/structures at the residential location without extensive wildland fuel reduction. Cohen's (1995) studies suggest, as a rule-of-thumb, larger flame lengths and widths require wider fuel modification zones to reduce structure ignition. For example, valid SIAM results indicate that a 20-foot-high flame has minimal radiant heat to ignite a structure (bare wood) beyond 33 feet (horizontal distance). Whereas, a 70-foot-high flame requires about 130 feet of clearance to prevent structure ignitions from radiant heat (Cohen and Butler 1996). This study utilized bare wood, which is more combustible than the ignition resistant exterior walls for structures built today. Obstacles, including steep terrain and non-combustible fire walls can block or deflect all or part of the radiation and heat, thus making narrower fuel modification distances possible. Fires in ravines, chutes, coves, v-drainages, and steep-sided canyons can, under specific conditions, result in an upward draft, similar to a fireplace chimney. Chimneys on the landscape are created when air is drawn in from lower elevations, creating strong upslope drafts. The result can be acceleration of radiant and convective heat as well as actual fire spread, similar to opening the damper in a fireplace chimney. Areas where the terrain includes a restriction or narrowing can result in this type of acceleration. The terrain features adjacent the Project site include few mild examples of these "chimneys" that are not expected to significantly alter fire behavior.

7.3 Heat Deflecting Walls

The reduced lot sizes of Lots 1 through 3 which are adjacent to a vacant property to the north are areas of concern and provide an opportunity to place a non-combustible, six-foot tall, heat-deflecting wall (lower 1 to 2 feet block wall and upper 4 to 5 feet dual pane, one pane tempered glazing or a six-foot high CMU block wall) to provide additional deflection for these lots to compensate for the reduced fuel modification zones. Walls like these have proven to deflect heat and airborne embers on numerous wildfires in San Diego, Orange, Los Angeles, Ventura, and Santa Barbara County. Rancho Santa Fe Fire Protection District, Laguna Beach Fire Department, Orange County Fire Authority, and others utilize these walls as Alternative methods based on observed performance during wildfires. This has led to these agencies approving use of non-combustible landscape walls as mitigations for reduced fuel modification zones and reduced setbacks at top of slope. These walls are consistent with NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire – 2008 Edition, Section 5.1.3.3 and A.5.1.3.3 and

International Urban Wildland Interface Code (ICC 2012). NFPA 1144, A.5.1.3.3 states: "Noncombustible walls and barriers are effective for deflecting radiant heat and windblown embers from structures." These walls and barriers are usually constructed of noncombustible materials (concrete block, bricks, stone, stucco) or earth with emergency access openings built around a development where 30 feet (9 meters) of defensible space is not available.

7.4 Non-Combustible Fencing

The side yard fencing is proposed to use vinyl fencing. The fence returns to the structure (the portion of the fence that attaches to the house and extends perpendicular to the house until it attaches to the property line fencing) would be of a non-combustible material, possibly including masonry, steel, fire retardant-treated wood, or other fire department-approved materials. This fencing arrangement conforms with best practices to minimize the likelihood that fencing material enables fire a pathway to the structure by 1) using non-combustible materials at the wildland interface, 2) ensuring that the fence return to the structure is non-combustible, and 3) utilizing a vinyl product, separated from both the wildland fuels and the structure, that has been fire rated and shown to not sustain burning. Although there are no current Office of the State Fire Marshal (OSFM)-approved listings for vinyl fencing materials, the Kroy CertainTeed Bufftech vinyl fencing proposed by Cornerstone Communities includes a fire rating indicating that it has been fire tested to ASTM standards and performed well and that it exhibits no sustained burn, and can be considered self-extinguishing

Dudek has evaluated the use of exterior fire-retardant treated lumber for the rear- or side-yard fencing on perimeter residential lots within the Tyler Street residential community Project. Dudek has determined that the ignition resistant construction requirements for structures remain applicable and valid. However, fire retardant treated lumber, such as Hoover's lumber product, can be used to substitute for solid block, solid masonry or solid steel in areas designated as a high fire hazard. Per the Office of the State Fire Marshal (OSFM) website, Listing Number 2520-1701:0100 – Hoover Treated Lumber with Exterior Fire X is an approved building material listing product for high fire hazard areas (See Appendix L – OSFM Approved Listing 2520-1701:0100). It should be noted that there currently is not an OSFM approved listing for vinyl fencing materials.

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8 Homeowner's Wildfire Education Program

Early evacuation for any type of wildfire emergency at the Project site is the preferred method of providing for resident safety, consistent with the SFD's current approach within San Diego County. As such, the Project's Homeowner's Association (HOA) would formally adopt, practice, and implement a "Ready, Set, Go!" pre-planning approach to evacuation[7]. The "Ready, Set, Go!" concept is widely known and encouraged by the State of California and most fire agencies. Pre-planning for emergencies, including wildfire emergencies, focuses on being prepared, having a well-defined plan, minimizing the potential for errors, maintaining the Project site's fire protection systems, and implementing a conservative (evacuate as early as possible) approach to evacuation and Project area activities during periods of fire weather extremes.

The Project's residents will be provided a proactive educational component disclosing the potential wildfire risk and this report's requirements as part of their purchase documents. Property owner will be required to sign notice of receiving this information during escrow. This educational information must include maintaining the landscape and structural components according to the appropriate standards and embracing a "Ready, Set, Go!" stance on evacuation.

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

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9 Conclusion

This FPP has been prepared for the Tyler Street 14-Lot Residential Project. It is submitted in compliance with requirements of the SFD and applicable portions of the City of Santee Municipal Code. The recommendations in this document meet fire safety, building design elements, infrastructure, fuel management/modification, and landscaping recommendations of the applicable codes. The recommendations provided in this FPP have been designed specifically for the proposed construction of 14 detached single-family residential lots adjacent the WUI in order to protect human life based on the best available science and code requirements. The Project's fire protection system includes a redundant layering of protection materials, measures, and methods that have been shown through post-fire damage assessments to reduce risk of structural ignition. Based upon Dudek's analysis of the Project, the enhanced building features along with along with the additional proposed fire protection measures would provide a level of safety equal to or greater than a 100-foot wide FMZ.

Ultimately, it is the intent of this FPP to guide, through code and other project specific requirements, the construction of structures that are defensible from wildfire and, in turn, do not represent significant threat of ignition source for the adjacent native habitat. It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Fire safety precautions and measures identified in this report are designed to reduce the likelihood that fire would impinge upon the proposed structures. There's no guarantee that wildfires will not occur in the area that could damage property or harm persons. However, implementation of the required enhanced construction features provided by the applicable codes and the mitigating fuel modification requirements provided in this FPP will accomplish the goal of this FPP to assist firefighters in their efforts to defend these structures and reduce the risk associated with this project's WUI location. For maximum benefit, the developer, contractors, engineers, and architects are responsible for proper implementation of the concepts and requirements set forth in this report. Homeowners and HOA are responsible to maintain their structures and landscaping as required by this report, the applicable Fire Code, and the SFD.

This FPP recommends that the Project maintains a conservative approach to fire safety. This approach must include maintaining the landscape and structural components according to the appropriate standards and embracing a "Ready, Set, Go!" stance on evacuation. Although the proposed development and landscape will be significantly improved in terms of ignition resistance, it should not be considered a shelter-in-place community, but this approach to public safety may be utilized by incident managers as a contingency to an unsafe evacuation. Accordingly, evacuation of the site and the area should occur according to pre-established evacuation decision points, or as soon as notice to evacuate is received, which may vary depending on many environmental and other factors, whichever is more conservative. Fire is a dynamic and somewhat unpredictable occurrence and it is important for anyone living at the Project to educate themselves on practices that will improve their home survivability and their personal safety.

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10 Limitations

This FPP does not provide a guarantee that all residents and visitors will be safe at all times because of the enhanced fire protection features it requires. There are many variables that may influence overall safety. This FPP provides requirements and recommendations for implementation of the latest fire protection features that have proven to result in reduced wildfire related risk and hazard. Even then, fire can compromise the fire protection features through various, unpredictable ways. The goal is to reduce the likelihood that the system is compromised through implementation of the elements of this FPP and a regular occurring maintenance program.

For maximum benefit, the developer, contractors, engineers, and architects are responsible for proper implementation of the concepts and requirements set forth in this report. Homeowners are responsible to maintain their structures and lots as required by this report, the applicable City Fire and Building Codes.

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Appendix A

Tyler Street Site Photograph Log

Tyler Street Fire Protection Plan Project Photo Series

OCTOBER 2019

Appendix A

Tyler Street Fire Protection Plan Project
Fuels Photo Series

Photograph 1. Photograph illustrates the terrain and fuels modeled in fire scenario numbers 1, 2, and 3 on the east side of the proposed residential development site. Photograph taken facing southeast.

Photograph 2. Photograph illustrates the terrain and fuels modeled in fire scenario numbers 1, 2, and 3 on the western side of the proposed residential development site. Photograph taken facing southwest.

Tyler Street Fire Protection Plan Project
Fuels Photo Series

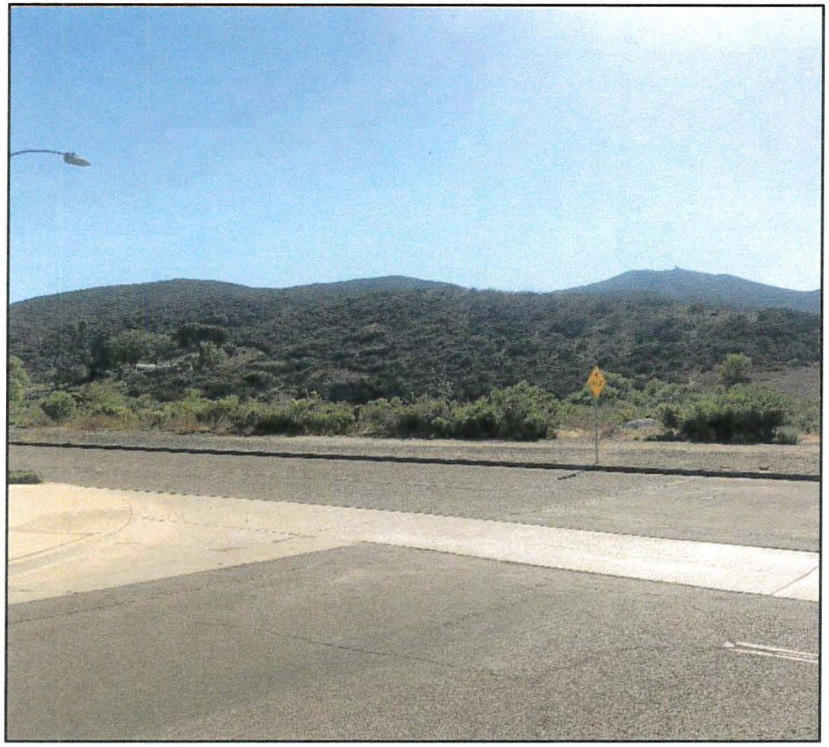
Photograph 3. Photograph illustrates the terrain and fuels modeled in fire scenario numbers 1, 2, and 3 on the east side of the proposed residential development site. Photograph taken facing east. Note existing residential homes that boarder the northern and eastern portions of the project site.

Photograph 4. Photograph illustrates the terrain and fuels modeled in fire scenario numbers 1, 2, and 3 on the west side of the proposed residential development site. Photograph taken facing west. Note existing residential homes that boarder the northern and western portions of the project site.

Tyler Street Fire Protection Plan Project
Fuels Photo Series

Photograph 5. Photograph illustrates the existing residential community along Tyler Street that borders the northern portion of the project site. Photograph taken facing north.

Photograph 6. Photograph illustrates the terrain standing at the end of Tyler Street, facing south towards the project site.

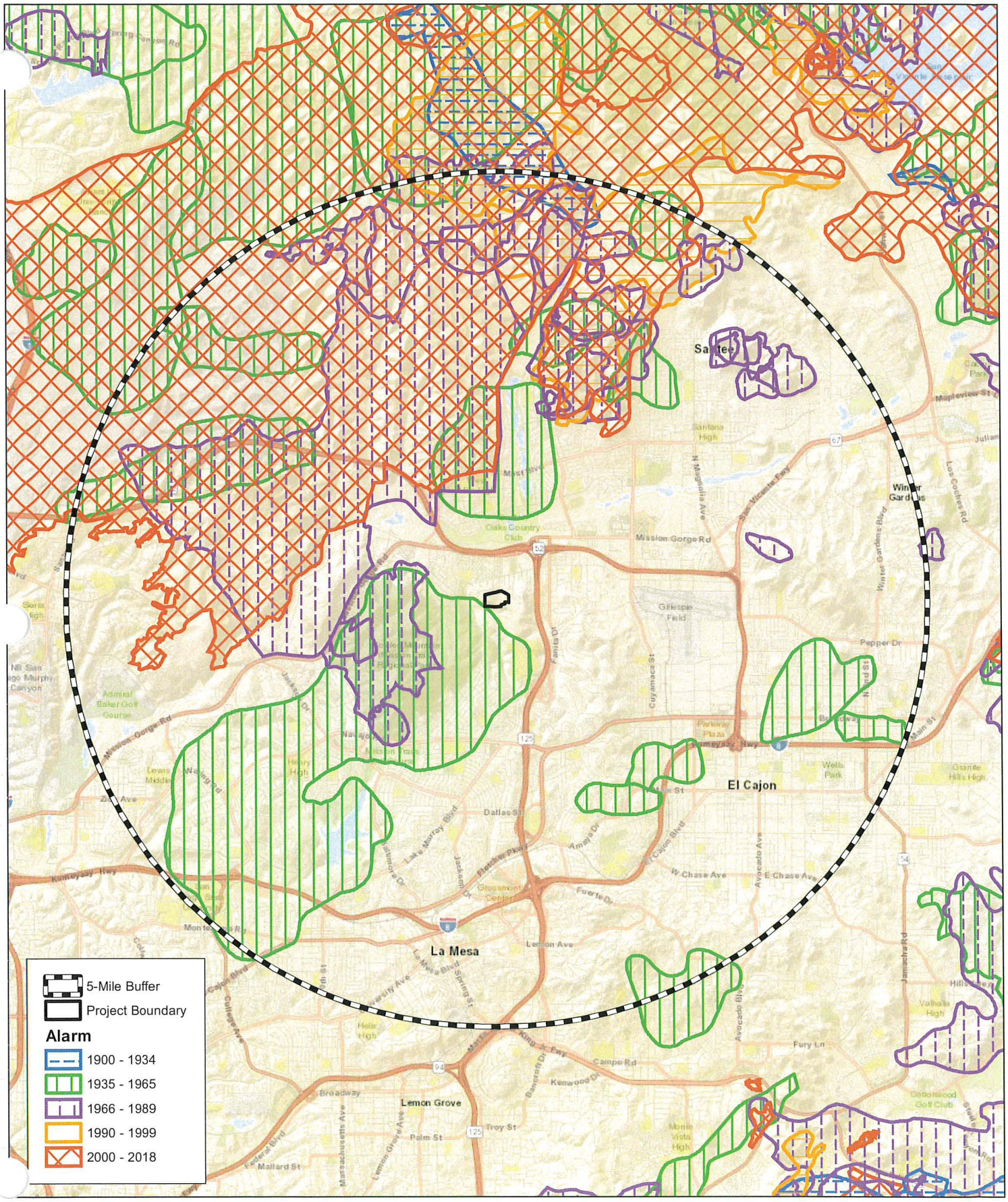


Photograph 7. Photograph illustrates the northeastern side of Cowles Mountain, standing at the intersection of Mesa Road and Mesa Heights Road. Photograph taken facing southwest.

Photograph 8. Photograph illustrates the northeastern side of Cowles Mountain, standing on Mesa Road facing south.

Appendix B

Fire History Map



SOURCE: BASE- ESRI; FIRE DATA-CALFIRE 2018

DUDEK

0 1 2 Miles

APPENDIX B

Fire History Map

Tyler Street Fire Protection Plan

Appendix C

BehavePlus Modeling Runs (97th Percentile Weather)

Inputs: SURFACE, SPOT

Description		Scenario 2: 97th Percentile Peak Weather

Fuel/Vegetation, Surface/Understory

Fuel Model		sh5

Fuel/Vegetation, Overstory

Downwind Canopy Height	ft	4
Downwind Canopy Cover		Open

Fuel Moisture

1-h Fuel Moisture	%	2
10-h Fuel Moisture	%	3
100-h Fuel Moisture	%	
Live Herbaceous Fuel Moisture	%	
Live Woody Fuel Moisture	%	60

Weather

20-ft Wind Speed	mi/h	18, 50
Wind Adjustment Factor		0.4
Direction of Wind Vector (from upslope)	deg	0

Terrain

Slope Steepness	%	32
Ridge-to-Valley Elevation Difference	ft	154
Ridge-to-Valley Horizontal Distance	mi	.14
Spotting Source Location		VB

Run Option Notes

Maximum effective wind speed limit IS imposed [SURFACE].

Fire spread is in the HEADING direction only [SURFACE].

Wind is in specified directions [SURFACE].

Wind and spread directions are degrees clockwise from upslope [SURFACE].

Direction of the wind vector is the direction the wind is pushing the fire [SURFACE].

Output Variables

Surface Fire Rate of Spread (mi/h) [SURFACE]

Surface Fireline Intensity (Btu/ft/s) [SURFACE]

Surface Fire Flame Length (ft) [SURFACE]

Spot Dist from a Wind Driven Surface Fire (mi) [SPOT]

(continued on next page)

Input Worksheet (continued)

Notes

Scenario 2: 97th Percentile Peak Weather

Head Fire

20-ft Wind Speed mi/h	Surface Fire Rate of Spread mi/h	Surface Fireline Intensity Btu/ft/s	Surface Flame Length ft	Surface Fire Spot Dist mi
18	2.0	6021	24.7	0.8
50	6.3	18824	41.6	2.3

Discrete Variable Codes Used
Scenario 2: 97th Percentile Peak Weather

Fuel Model
145 sh5 High load, dry climate shrub (S)

Downwind Canopy Cover
Open Open

Spotting Source Location
VB Valley Bottom

Inputs: SURFACE, SPOT

Description		Scenario 3: 97th Percentile Peak Weather

Fuel/Vegetation, Surface/Understory

Fuel Model		sh5

Fuel/Vegetation, Overstory

Downwind Canopy Height	ft	4
Downwind Canopy Cover		Open

Fuel Moisture

1-h Fuel Moisture	%	2
10-h Fuel Moisture	%	3
100-h Fuel Moisture	%	
Live Herbaceous Fuel Moisture	%	
Live Woody Fuel Moisture	%	60

Weather

20-ft Wind Speed	mi/h	18, 50
Wind Adjustment Factor		0.4
Direction of Wind Vector (from upslope)	deg	315

Terrain

Slope Steepness	%	24
Ridge-to-Valley Elevation Difference	ft	183
Ridge-to-Valley Horizontal Distance	mi	0
Spotting Source Location		VB

Run Option Notes

Maximum effective wind speed limit IS imposed [SURFACE].

Fire spread is in the HEADING direction only [SURFACE].

Wind is in specified directions [SURFACE].

Wind and spread directions are degrees clockwise from upslope [SURFACE].

Direction of the wind vector is the direction the wind is pushing the fire [SURFACE].

Output Variables

Surface Fire Rate of Spread (mi/h) [SURFACE]

Surface Fireline Intensity (Btu/ft/s) [SURFACE]

Surface Fire Flame Length (ft) [SURFACE]

Spot Dist from a Wind Driven Surface Fire (mi) [SPOT]

(continued on next page)

Input Worksheet (continued)

Notes

Scenario 3: 97th Percentile Peak Weather

Head Fire

20-ft Wind Speed mi/h	Surface Fire Rate of Spread mi/h	Surface Fireline Intensity Btu/ft/s	Surface Flame Length ft	Surface Fire Spot Dist mi
18	1.9	5737	24.1	0.8
50	6.2	18537	41.4	2.3

Discrete Variable Codes Used
Scenario 3: 97th Percentile Peak Weather

Fuel Model

145	sh5	High load, dry climate shrub (S)

Downwind Canopy Cover

Open	Open

Spotting Source Location

VB	Valley Bottom

Appendix D

BehavePlus Modeling Run (50th Percentile Weather)

Inputs: SURFACE, SPOT

Description		Scenario 1: 50th Percentile Summer Weather

Fuel/Vegetation, Surface/Understory

Fuel Model		sh5

Fuel/Vegetation, Overstory

Downwind Canopy Height	ft	4
Downwind Canopy Cover		Open

Fuel Moisture

1-h Fuel Moisture	%	3
10-h Fuel Moisture	%	6
100-h Fuel Moisture	%	
Live Herbaceous Fuel Moisture	%	
Live Woody Fuel Moisture	%	90

Weather

20-ft Wind Speed	mi/h	19
Wind Adjustment Factor		0.4
Direction of Wind Vector (from upslope)	deg	45

Terrain

Slope Steepness	%	27
Ridge-to-Valley Elevation Difference	ft	195
Ridge-to-Valley Horizontal Distance	mi	0
Spotting Source Location		VB

Run Option Notes

Maximum effective wind speed limit IS imposed [SURFACE].

Fire spread is in the HEADING direction only [SURFACE].

Wind is in specified directions [SURFACE].

Wind and spread directions are degrees clockwise from upslope [SURFACE].

Direction of the wind vector is the direction the wind is pushing the fire [SURFACE].

Output Variables

Surface Fire Rate of Spread (mi/h) [SURFACE]

Surface Fireline Intensity (Btu/ft/s) [SURFACE]

Surface Fire Flame Length (ft) [SURFACE]

Spot Dist from a Wind Driven Surface Fire (mi) [SPOT]

(continued on next page)

Input Worksheet (continued)

Notes

Scenario 1: 50th Percentile Summer Weather

Head Fire

Surface Fire Rate of Spread	1.4	mi/h
Surface Fireline Intensity	3546	Btu/ft/s
Surface Fire Flame Length	19.3	ft
Spot Dist from a Wind Driven Surface Fire	0.7	mi

Discrete Variable Codes Used
Scenario 1: 50th Percentile Summer Weather

Fuel Model

145	sh5	High load, dry climate shrub (S)

Downwind Canopy Cover

Open	Open

Spotting Source Location

VB	Valley Bottom

Appendix E

BehavePlus Modeling Runs (Post Construction)

Inputs: SURFACE, SPOT

Description		Scenario 4: 50th Percentile Summer Weather (Post Const

Fuel/Vegetation, Surface/Understory

Fuel Model		8, gs1

Fuel/Vegetation, Overstory

Downwind Canopy Height	ft	4
Downwind Canopy Cover		open

Fuel Moisture

1-h Fuel Moisture	%	3
10-h Fuel Moisture	%	6
100-h Fuel Moisture	%	8
Live Herbaceous Fuel Moisture	%	60
Live Woody Fuel Moisture	%	90

Weather

20-ft Wind Speed	mi/h	19
Wind Adjustment Factor		0.4
Direction of Wind Vector (from upslope)	deg	45

Terrain

Slope Steepness	%	27
Ridge-to-Valley Elevation Difference	ft	195
Ridge-to-Valley Horizontal Distance	mi	0
Spotting Source Location		VB

Run Option Notes

Maximum effective wind speed limit IS imposed [SURFACE].

Fire spread is in the HEADING direction only [SURFACE].

Wind is in specified directions [SURFACE].

Wind and spread directions are degrees clockwise from upslope [SURFACE].

Direction of the wind vector is the direction the wind is pushing the fire [SURFACE].

Output Variables

Surface Fire Rate of Spread (mi/h) [SURFACE]

Surface Fireline Intensity (Btu/ft/s) [SURFACE]

Surface Fire Flame Length (ft) [SURFACE]

Spot Dist from a Wind Driven Surface Fire (mi) [SPOT]

(continued on next page)

Input Worksheet (continued)

Notes

Scenario 4: 50th Percentile Summer Weather (Post)

Head Fire

Fuel Model	Surface Fire Rate of Spread mi/h	Surface Fireline Intensity Btu/ft/s	Surface Flame Length ft	Surface Fire Spot Dist mi
8	0.1	20	1.8	0.1
gs1	0.4	192	5.1	0.3

Discrete Variable Codes Used
Scenario 4: 50th Percentile Summer Weather (Post)

Fuel Model

8	8	Short needle litter
121	gs1	Low load, dry climate grass-shrub (D)

Downwind Canopy Cover

Open	Open

Spotting Source Location

VB	Valley Bottom

Inputs: SURFACE, SPOT

Description		Scenario 5: 97th Percentile Peak Weather (Post Const.)

Fuel/Vegetation, Surface/Understory

Fuel Model		8, gs1

Fuel/Vegetation, Overstory

Downwind Canopy Height	ft	4
Downwind Canopy Cover		open

Fuel Moisture

1-h Fuel Moisture	%	2
10-h Fuel Moisture	%	3
100-h Fuel Moisture	%	5
Live Herbaceous Fuel Moisture	%	30
Live Woody Fuel Moisture	%	60

Weather

20-ft Wind Speed	mi/h	18, 50
Wind Adjustment Factor		0.4
Direction of Wind Vector (from upslope)	deg	0

Terrain

Slope Steepness	%	32
Ridge-to-Valley Elevation Difference	ft	154
Ridge-to-Valley Horizontal Distance	mi	.14
Spotting Source Location		VB

Run Option Notes

Maximum effective wind speed limit IS imposed [SURFACE].

Fire spread is in the HEADING direction only [SURFACE].

Wind is in specified directions [SURFACE].

Wind and spread directions are degrees clockwise from upslope [SURFACE].

Direction of the wind vector is the direction the wind is pushing the fire [SURFACE].

Output Variables

Surface Fire Rate of Spread (mi/h) [SURFACE]

Surface Fireline Intensity (Btu/ft/s) [SURFACE]

Surface Fire Flame Length (ft) [SURFACE]

Spot Dist from a Wind Driven Surface Fire (mi) [SPOT]

(continued on next page)

Input Worksheet (continued)

Notes

Scenario 5: 97th Percentile Peak Weather (Post Const.)

Head Fire

Surface Fire Rate of Spread (mi/h)

Fuel Model	20-ft Wind Speed mi/h	
	18	50
8	0.1	0.1
gs1	0.7	2.4

Scenario 5: 97th Percentile Peak Weather (Post Const.)

Head Fire

Surface Fireline Intensity (Btu/ft/s)

Fuel Model	20-ft Wind Speed mi/h	
	18	50
8	24	46
gs1	377	1283

Scenario 5: 97th Percentile Peak Weather (Post Const.)

Head Fire

Surface Fire Flame Length (ft)

Fuel Model	20-ft Wind Speed mi/h	
	18	50
8	2.0	2.6
gs1	6.9	12.1

Scenario 5: 97th Percentile Peak Weather (Post Const.)

Head Fire

Spot Dist from a Wind Driven Surface Fire (mi)

Fuel Model	20-ft Wind Speed mi/h	
	18	50
8	0.1	0.3
gs1	0.3	1.0

Discrete Variable Codes Used
Scenario 5: 97th Percentile Peak Weather (Post Const.)

Fuel Model

8	8	Short needle litter
121	gs1	Low load, dry climate grass-shrub (D)

Downwind Canopy Cover

Open	Open

Spotting Source Location

VB	Valley Bottom

Inputs: SURFACE, SPOT

Description		Scenario 6: 97th Percentile Peak Weather (Post Const.)

Fuel/Vegetation, Surface/Understory

Fuel Model		8, gs1

Fuel/Vegetation, Overstory

Downwind Canopy Height	ft	4
Downwind Canopy Cover		open

Fuel Moisture

1-h Fuel Moisture	%	2
10-h Fuel Moisture	%	3
100-h Fuel Moisture	%	5
Live Herbaceous Fuel Moisture	%	30
Live Woody Fuel Moisture	%	60

Weather

20-ft Wind Speed	mi/h	18, 50
Wind Adjustment Factor		0.4
Direction of Wind Vector (from upslope)	deg	315

Terrain

Slope Steepness	%	24
Ridge-to-Valley Elevation Difference	ft	183
Ridge-to-Valley Horizontal Distance	mi	0
Spotting Source Location		VB

Run Option Notes

Maximum effective wind speed limit IS imposed [SURFACE].

Fire spread is in the HEADING direction only [SURFACE].

Wind is in specified directions [SURFACE].

Wind and spread directions are degrees clockwise from upslope [SURFACE].

Direction of the wind vector is the direction the wind is pushing the fire [SURFACE].

Output Variables

Surface Fire Rate of Spread (mi/h) [SURFACE]

Surface Fireline Intensity (Btu/ft/s) [SURFACE]

Surface Fire Flame Length (ft) [SURFACE]

Spot Dist from a Wind Driven Surface Fire (mi) [SPOT]

(continued on next page)

Input Worksheet (continued)

Notes

Scenario 6: 97th Percentile Peak Weather (Post Const.)

Head Fire

Surface Fire Rate of Spread (mi/h)

Fuel Model	20-ft Wind Speed mi/h	
	18	50
8	0.1	0.1
gs1	0.7	2.4

Scenario 6: 97th Percentile Peak Weather (Post Const.)

Head Fire

Surface Fireline Intensity (Btu/ft/s)

Fuel Model	20-ft Wind Speed mi/h	
	18	50
8	23	46
gs1	358	1283

Scenario 6: 97th Percentile Peak Weather (Post Const.)

Head Fire

Surface Fire Flame Length (ft)

Fuel Model	20-ft Wind Speed mi/h	
	18	50
8	1.9	2.6
gs1	6.7	12.1

Scenario 6: 97th Percentile Peak Weather (Post Const.)

Head Fire

Spot Dist from a Wind Driven Surface Fire (mi)

Fuel Model	20-ft Wind Speed mi/h	
	18	50
8	0.1	0.3
gs1	0.3	1.0

Discrete Variable Codes Used
Scenario 6: 97th Percentile Peak Weather (Post Const.)

Fuel Model

8	8	Short needle litter
121	gs1	Low load, dry climate grass-shrub (D)

Downwind Canopy Cover

Open	Open

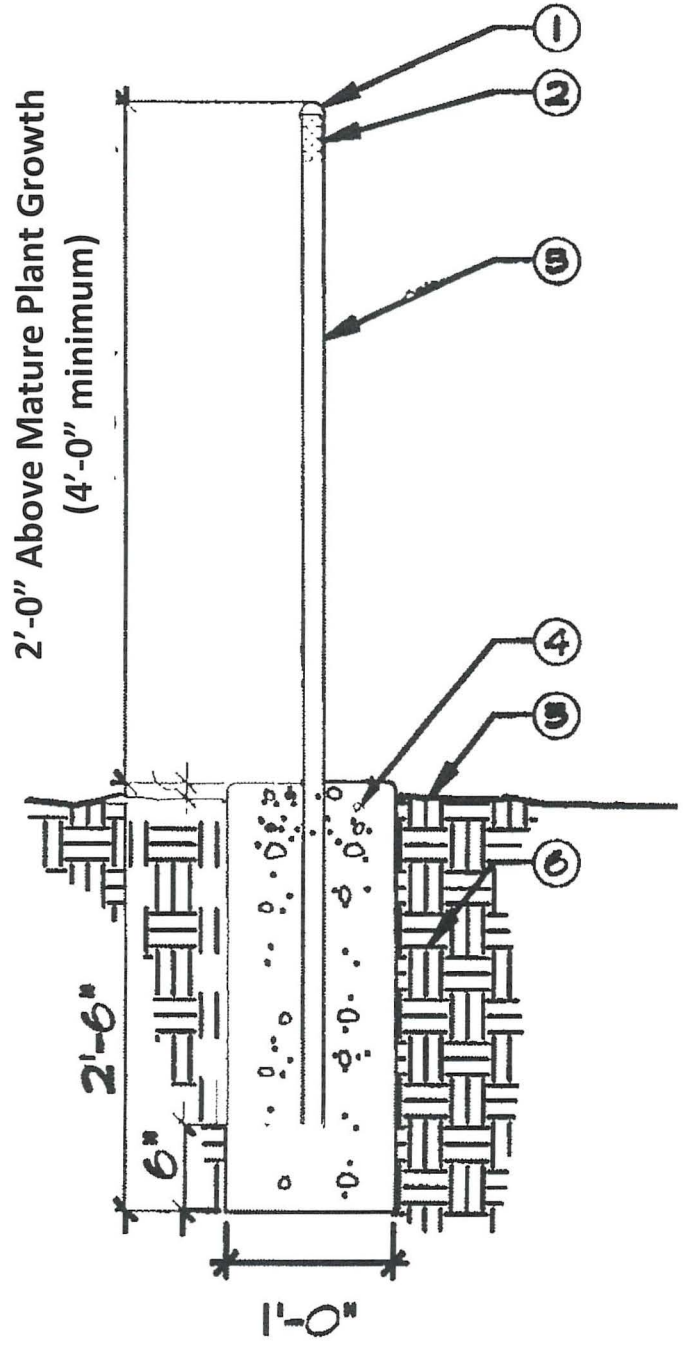
Spotting Source Location

VB	Valley Bottom

Appendix F

Fuel Modification Zone Marker Details

Fuel Modification Zone Marker Detail



1) Post Cap
2) 2" X 8" Zone Indicator
3) 1 ½" Diameter Galvanized Post
4) Concrete Footing
5) Finish Grade
6) Compacted Subgrade

Example of Zone Marker installed in fuel modification zone.

Appendix G

Undesirable Plant List

Botanical Name	Common Name	Comment*
Trees		
Abies species	Fir	F
Acacia species (numerous)	Acacia	F, I
Agonis juniperina	Juniper Myrtle	F
Araucaria species *(A. heterophylla, A. araucana, A. bidwillii)*	Araucaria (Norfolk Island Pine, Monkey Puzzle Tree, Bunya Bunya)	F
Callistemon species *(C. citrinus, C. rosea, C. viminalis)*	Bottlebrush (Lemon, Rose, Weeping)	F
Calocedrus decurrens	Incense Cedar	F
Casuarina cunninghamiana	River She-Oak	F
Cedrus species *(C. atlantica, C. deodara)*	Cedar (Atlas, Deodar)	F
Chamaecyparis species (numerous)	False Cypress	F
Cryptomeria japonica	Japanese Cryptomeria	F
Cupressocyparis leylandii	Leyland Cypress	F
Cupressus species *(C. fobesii, C. glabra, C. sempervirens,)*	Cypress (Tecate, Arizona, Italian, others)	F
Eucalyptus species (numerous)	Eucalyptus	F, I
Juniperus species (numerous)	Juniper	F
Larix species *(L. decidua, L. occidentalis, L. kaempferi)*	Larch (European, Japanese, Western)	F
Leptospermum species *(L. laevigatum, L. petersonii)*	Tea Tree (Australian, Tea)	F
Lithocarpus densiflorus	Tan Oak	F
Melaleuca species *(M. linariifolia, M. nesophila, M. quinquenervia)*	Melaleuca (Flaxleaf, Pink, Cajeput Tree)	F, I, #7
Olea europea	Olive	I, #8
Picea (numerous)	Spruce	F
Palm species (numerous)	Palm	F, I
Pinus species *(P. brutia, P. canariensis, P. b. eldarica, P. halepensis, P. pinea, P. radiata,* numerous others)	Pine (Calabrian, Canary Island, Mondell, Aleppo, Italian Stone, Monterey)	F
Platycladus orientalis	Oriental arborvitae	F
Podocarpus species (*P. gracilior, P. macrophyllus, P. latifolius)*	Fern Pine (Fern, Yew, Podocarpus)	F, #7
Pseudotsuga menziesii	Douglas Fir	F
Schinus molle	Peruvian Pepper Tree	F
Schinus terebinthifolia	Brazilian Pepper Tree	F
Tamarix species *(T. africana, T. aphylla, T. chinensis, T. parviflora)*	Tamarix (Tamarisk, Athel Tree, Salt Cedar, Tamarisk)	F, I
Taxodium species *(T. ascendens, T. distichum, T. mucronatum)*	Cypress (Pond, Bald, Monarch, Montezuma)	F
Taxus species *(T. baccata, T. brevifolia, T. cuspidata)*	Yew (English, Western, Japanese)	F
Thuja species *(T. occidentalis, T. plicata)*	Arborvitae/Red Cedar	F
Tsuga species *(T. heterophylla, T. mertensiana)*	Hemlock (Western, Mountain)	F
Groundcovers, Shrubs and Vines		
Acacia species	Acacia	F, I
Adenostoma fasciculatum	Chamise	F
Adenostoma sparsifolium	Red Shanks	F

Botanical Name	Common Name	Comment*
Agropyron repens	Quackgrass	F, I
Anthemis cotula	Mayweed	F, I
Groundcovers, Shrubs and Vines (cont.)		
Arbutus menziesii	Pacific Madrone	F
Arctostaphylos species	Manzanita	F
Arundo donax	Giant Reed	F, I
Artemisia species *(A. abrotanium, A. absinthium, A. californica, A. caucasica, A. dracunculus, A. tridentata, A. pynocephala)*	Sagebrush (Southernwood, Wormwood, California, Silver, True tarragon, Big, Sandhill)	F
Atriplex species (numerous)	Saltbush	F, I
Avena fatua	Wild Oat	F
Baccharis pilularis	Coyote Bush	F
Bambusa species	Bamboo	F, I
Bougainvillea species	Bougainvillea	F, I, #7
Brassica species *(B. campestris, B. nigra, B. rapa)*	Mustard (Field, Black, Yellow)	F, I
Bromus rubens	Foxtail, Red brome	F, I
Castanopsis chrysophylla	Giant Chinquapin	F
Cardaria draba	Hoary Cress	I
Carpobrotus species	Ice Plant, Hottentot Fig	I
Cirsium vulgare	Wild Artichoke	F,I
Conyza bonariensis	Horseweed	F
Coprosma pumila	Prostrate Coprosma	F
Cortaderia selloana	Pampas Grass	F, I
Cytisus scoparius	Scotch Broom	F, I
Dodonaea viscosa	Hopseed Bush	F
Eriodictyon californicum	Yerba Santa	F
Eriogonum species *(E. fasciculatum)*	Buckwheat (California)	F
Fremontodendron species	Flannel Bush	F
Hedera species *(H. canariensis, H. helix)*	Ivy (Algerian, English)	I
Heterotheca grandiflora	Telegraph Plant	F
Hordeum leporinum	Wild barley	F, I
Juniperus species	Juniper	F
Lactuca serriola	Prickly Lettuce	I
Larix species (numerous)	Larch	F
Larrea tridentata	Creosote bush	F
Lolium multiflorum	Ryegrass	F, I
Lonicera japonica	Japanese Honeysuckle	F
Mahonia species	Mahonia	F
Mimulus aurantiacus	Sticky Monkeyflower	F, #7
Miscanthus species	Eulalie Grass	F
Muhlenbergia species	Deer Grass	F
Nicotiana species *(N. bigelovii, N. glauca)*	Tobacco (Indian, Tree)	F, I
Pennisetum setaceum	Fountain Grass	F, I

Botanical Name	Common Name	Comment*
Perovskia atroplicifolia	Russian Sage	F
Phoradendron species	Mistletoe	F
Groundcovers, Shrubs and Vines (cont.)		
Pickeringia montana	Chaparral Pea	F
Rhus (R. laurina, R. lentii)	Sumac (Laurel,Pink Flowering)	F
Ricinus communis	Castor Bean	F, I
Rhus Lentii	Pink Flowering Sumac	F
Rosmarinus species	Rosemary	F
Salvia species (numerous)	Sage	F, I, #7
Salsola australis	Russian Thistle	F, I
Solanum Xantii	Purple Nightshade (toxic)	I
Silybum marianum	Milk Thistle	F, I
Thuja species	Arborvitae	F
Urtica urens	Burning Nettle	F
Vinca major	Periwinkle	I

* F = flammable, I = Invasive

NNotes:

1 This list was prepared by Dudek for Tyler Street Project. Certain plants are considered to be undesirable in the landscape due to characteristic that make them highly flammable. These characteristics can be either physical or chemical. Physical properties would include large amounts of dead material retained within the plant, rough or peeling bark, and the production of copious amounts of litter. Chemical properties include the presence of volatile substances such as oils, resins, wax, and pitch. Plants with these characteristics should not be planted within the first 50 feet adjacent to a structure in fire hazard areas. These species are typically referred to as "Target Species" since their complete or partial removal form the landscape is a critical part of hazard reduction.
2 Plants on this list that are considered invasive are a partial list of commonly found plants. There are many other plants considered invasive that should not be planted in a fuel modification zone and they can be found on The California Invasive Plant Council's Website www.cal-ipc.org/ip/inventory/index.php. Other plants not considered invasive at this time may be determined to be invasive after further study.
3 For the purpose of using this list as a guide in selecting plant material, it is stipulated that all plant material will burn under various conditions.
4 The absence of a particular plant, shrub, groundcover, or tree, from this list does not necessarily mean it is fire resistive.
5 All vegetation used in Fuel Modification Zones and elsewhere in this development shall be subject to approval of the City of Santee Fire Marshal.
6 Landscape architects may submit proposals for use of certain vegetation on a project specific basis. They shall also submit justifications as to the fire resistivity of the proposed vegetation to the City of Santee Fire Marshal.
7 Plant species is allowed, if deadwood is removed annually or as needed to minimize flammability.
8 Olive trees will be used in an orchard setting under intensive, agricultural management to minimize fire hazard.

References

City of Santee. 2021. Santee Municipal Code, Chapter 11.18.020 Section 4907.2.1 Fuel Modification Defensible Space, Zone One. January 2022.

County of Los Angeles Fire Department. 2011. Fuel Modification Plan Guidelines. Appendix III, Undesirable Plant List. July 2011.

County of San Diego. 2004. Department of Planning and Land Use, Building Division. Fire, Plants, Defensible Space and You (DPLU #199). June 2004.

Willis, E. 1997. San Diego County Fire Chief's Association. Wildland/Urban Interface Development Standards. August 1997.

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Appendix H

Type X Fire Rated Gypsum Fire Safety Information Sheet

CertainTeed

Veneer Plaster Base

Gypsum Board

Product Data and Submittal

Product Description

CertainTeed Veneer Plaster Base is an interior gypsum board with a specially formulated face paper for use under gypsum veneer plaster. It consists of a solid set, fire-resistive gypsum core enclosed in a highly absorptive paper surface.

Basic Uses

CertainTeed Veneer Plaster Base is ideal for virtually any type of one- or two-coat veneer plaster system. It can be used in commercial and residential wall and ceiling construction, including wood or steel framing, or furring and masonry.

Advantages

- Rapid installation reduces overall construction time.
- Significantly lower cost than regular plastering with equally attractive surface appearance.
- Consistently high quality, defect-free board.
- Uniformly flat, attractive appearance.
- High edge hardness.
- No wavy edges, warps, bows or deformities.
- Uniform high-strength cores eliminate crumbling, cracking.
- Edge tapers consistent to form perfect joints.
- GREENGUARD Gold Certified

Product Data

Thickness: 5/8" (15.9 mm) Type X

Width: 4' (1220 mm)

Length: 8' (2440 mm), 12' (3660 mm)

Weight (approx.): 2.25 lb/ft^2 (11.0 kg/m^2)

Core: Gypsum Type X (noncombustible)

Edge: Tapered, paper bound – factory finished

End: Square – factory cut

Packaging: Two pieces per bundle, face-to-face and end-taped.

Custom lengths may be available on special order. Consult your CertainTeed sales representative.

Technical Data

Surface Burning Characteristics

All CertainTeed Gypsum Board has a Flame Spread rating of 15 and Smoke Developed rating of 0, in accordance with ASTM E84, (UL 723, CAN/ULC-S102). ULC 0/0.

Fire Resistance

Fire resistance tests are conducted in accordance with ASTM E119, (ANSI/UL 263, CAN/ULC-S101).

CertainTeed Veneer Plaster Base Type X is Classified by Underwriters Laboratories Inc. for USA and Canada. Fire ratings equivalent to those of drywall systems can be obtained with appropriate application of veneer plaster, framing member size and spacing, and fasteners. Underwriters Laboratories tests have proven that joint finishing is not required for the rating in certain assemblies. For fire resistance ratings, refer to the Gypsum Association Fire Resistance Design Manual GA-600 and UL /cUL/ULC Fire Resistance Directory.

UL/ cUL/ ULC Designation

Type X-1

Applicable Standards and References

- ASTM C1396
- ASTM C843
- ASTM C844
- CAN/CSA-A82.27
- Gypsum Association - Veneer Plaster
- International Building Code (IBC)
- International Residential Code (IRC)
- National Building Code of Canada (NBCC)

Installation

Limitations

- For interior use only.
- Avoid exposure to continuous moisture.

Continued on back

Job Name _____

Contractor _____ **Date** _____

Products Specified: _____

Submittal Approvals
(Stamps or Signatures)

CertainTeed
SAINT-GOBAIN

- Not recommended for continuous exposure to temperatures exceeding 125°F (52°C).

  Framing spacing is limited and partition heights reduced compared to some standard constructions.
- Boards should be stacked flat with care taken to prevent sagging or damage to edges, ends and surfaces.
- Storing board lengthwise, leaning against the framing is not recommended.
- Boards should be carried, not dragged, to place of installation to prevent damaging finished edges.

Recommendations
Installation of CertainTeed Veneer Plaster Base should be consistent with methods described in the standards and references noted.

Decoration
Temperature, humidity, water's mineral content and variances in aggregates can cause shading discoloration in plaster. Therefore, veneer plaster should not be considered a final finish; plaster should be painted or decorated. Consult paint manufacturers for compatible products.

BIM/CAD Information

The BIM and CAD UL fire rated assemblies and sound assemblies can be found on CertainTeed's BIM and CAD Design Studio at certainteed.concora.com. CertainTeed's BIM and CAD Design Studio provides BIM and CAD details to many UL fire rated assemblies and sound assemblies in easy to view experience. Plus, downloadable Revit and DWG and PDF CAD Details are available.

Sustainability

Sustainable documentation, including recycled content, EPD's, HPD's, VOC Certifications, can be found at certainteed.ecomedes.com.

Notice

The information in this document is subject to change without notice. CertainTeed assumes no responsibility for any errors that may inadvertently appear in this document.

For Fire Resistance, no warranty is made other than conformance to the standard under which the assembly was tested. Minor discrepancies may exist in the values of ratings, attributable to changes inmaterials and standards, as well as differences between testing facilities. Assemblies are listed as "combustible" (wood framing) and "noncombustible" (concrete and/or steel construction).

The Health Product Declaration® logo is a registered trademark of HPD Collaborative

SAINT-GOBAIN

CertainTeed
CEILINGS • DECKING • FENCE • GYPSUM • INSULATION • RAILING • ROOFING • SIDING • TRIM
20 Moores Road Malvern, PA 19355 Professional: 800-233-8990 Consumer: 800-782-8777 certainteed.com

Important Fire Safety Information
5/8" Type X Gypsum Wallboard
Standards, Testing, and Certification

Summary

- Type X gypsum wallboard, 5/8" in thickness ("5/8" type X wallboard"), is manufactured for use as one component of an assembly/system (such as a wall) where a fire resistance rating is required in a residential, commercial, or other structure by an applicable building code.

- 5/8" type X wallboard is required to be manufactured in accordance with established ASTM standards defining type X wallboard as that which provides not less than one-hour fire resistance when tested in specified building assemblies/systems in a laboratory setting under certain controlled conditions and pursuant to certain ASTM procedures.

- Because ASTM procedures require that fire tests be conducted on complete building assemblies/systems and not just on the wallboard by itself, the ability of a particular 5/8" type X wallboard product to pass a specific ASTM fire test may well depend on factors other than the fire resistance of the wallboard being tested. These factors include the other components used to construct the building system being tested, the manner in which the system is constructed, and the inherent variability of ASTM fire tests.

- Independent third party organizations, such as Underwriters Laboratories Inc. ("UL"), may authorize manufacturers to certify or label their 5/8" type X wallboard as acceptable for use in one-hour fire rated systems based on criteria established by the third party organizations. The third party organizations may approve changes to certified formulations using criteria they believe appropriate, such as new full-scale ASTM fire tests, small-scale fire tests, or engineering studies and evaluations, and without requiring a full-scale ASTM one-hour fire test. Accordingly, the fact that a particular 5/8 " type X wallboard product has been certified as acceptable for use in one-hour fire rated systems by a third party organization does not necessarily mean that wallboard made according to that specific formulation has been subjected to a full-scale ASTM one hour fire test.

- Given the very different circumstances that may exist from one fire to another, the differences between conditions in an actual fire and the laboratory conditions in which a test is conducted, and the inherent variability of ASTM fire tests, passing an ASTM fire test in a controlled laboratory setting or certifying or labeling of 5/8" type X wallboard as acceptable for use in one-hour fire rated assemblies/systems under third party certification or labeling procedures does not mean that either a particular assembly/system incorporating 5/8" type X wallboard or any given piece of 5/8" type X wallboard will necessarily provide "one-hour fire protection" in an actual fire or last for an hour in a new laboratory fire test.

- Even if 5/8" type X wallboard is referred to using terms like "one-hour board" or "has a one-hour fire rating," this does not mean that either a particular assembly/system incorporating 5/8" type X wallboard or any given piece of 5/8" type X wallboard will necessarily last for an hour in a new laboratory fire test or provide "one hour fire protection" in an actual fire.

- Once a 5/8" type X wallboard formula has been certified by a third party organization, the company using that formula to manufacture 5/8" type X wallboard does not have to conduct periodic fire tests on that wallboard as long as the company follows the procedures established by that third party organization to ensure that the wallboard is manufactured in compliance with the certified formula.

Background and Discussion

5/8" Type X gypsum wallboard, 5/8" in thickness, is currently manufactured in accordance with ASTM Standard C 36/1396. One section of ASTM C 36/1396 requires type X gypsum wallboard to meet specific requirements when tested using the test method defined in an ASTM Standard, the E 119 test, *Standard Test Method for Fire Tests of Building Construction and Materials*. Additionally, all gypsum wallboard manufacturers in the United States subscribe to an independent third party certification and labeling service such as UL to ensure product consistency and quality.

ASTM E 119 was initially published in 1918 (as ASTM C 19) and has been used continuously since then as the principal method to test the fire-resistance of construction assemblies/systems. (Similar protocols from other standards groups or laboratories were developed later and are used in some cases.) Refinements have been made in the standard since 1918; however, several of its test criteria, including the conditions required to "pass" an individual fire test, have remained essentially unchanged.

The test method described in the ASTM E 119 standard evaluates (in terms of endurance time) "the ability of an assembly[/system] to contain a fire or to retain its structural integrity, or both, during the test conditions imposed by the standard." By the standard's own definition, ASTM E 119 does not assess individual materials or products for their fire-resistance characteristics. ASTM E 119 does, however, generate results that can be used to evaluate the general fire resistance of **assemblies/systems** made up of multiple components, such as walls, columns, slabs, and floor- and roof-ceiling systems under laboratory conditions.

The ASTM E 119 standard does not contain specific details for construction of the test furnace. Since test furnaces are subject to variation due to individual characteristics of construction and design, including ventilation, atmospheric conditions, and general thermal tendencies, test results are typically not fully repeatable or reproducible from one laboratory to another. Test results attained in an E 119 test are not precise predictors of future performance. Additionally, differences in assembly/system components and construction methods, the design and control features of individual furnaces, and other variables regarding the testing regimen, can cause wide fluctuations in ASTM E 119 test results. A fire test, therefore, is a snapshot of a single assembly/system at a given time that includes the measurement of the performance of a specific assembly/system, composed of specific materials, constructed in a specific test furnace, on a specific day. This simply means that for a "one-hour fire rating" of a gypsum board assembly/system, all requirements of an ASTM E 119 test were successfully met in a testing laboratory furnace for at least 59 minutes and 30 seconds for that specific assembly/system and with those specific components of the assembly/system.

The ASTM E 119 test method does not incorporate all dynamics essential for fire hazard analysis or fire risk assessment of the assemblies/systems under conditions in an actual fire situation. The results of an ASTM E 119 test, therefore, should be regarded as one component among a variety of factors used to assess the potential of a system to perform as part of a structure.

Model building codes reference the ASTM E 119 standard test method (or one of its closely allied counterparts.) Gypsum board systems are tested based on the requirements of the ASTM E 119 standard. Referencing the same test method(s) by the building codes facilitates the descriptions and comparisons of fire resistance ratings of assemblies/systems that have been objectively evaluated. Numerical fire resistance ratings created by ASTM E 119 tests may be considered as benchmarks for comparison purposes. The higher the numerical rating (i.e., one, two, three, or four hour(s)), the longer the assembly's/system's comparative endurance. The hourly fire resistance ratings found in commercial and residential building codes that refer to an ASTM E 119 test do not imply that a specific assembly/system will remain intact for the prescribed time of the hourly rating in an actual fire situation.

Fire resistance classifications are based on results of tests conducted on assemblies/systems created with specific materials and built in a specified manner; therefore, variations from the test conditions or the construction specifications (including, but not limited to, the type and size of materials and the method of construction) will affect the results of fire tests. Because fire exposure conditions vary with changes in a wide variety of factors, including the amount, nature, and distribution of available fuel; ventilation; and the size, configuration, and other characteristics of the compartment, the test method contained in the ASTM E 119 standard should not be considered to be representative of all fire conditions. Fire resistance ratings created through use of the ASTM E 119 test method reflect a relative measure of comparative assembly's/system's performance under specific fire test conditions. ASTM E 119 test results should not be construed as having determined performance of an assembly/system under different conditions.

To maintain industry-wide quality assurance standards for 5/8" type X gypsum wallboard, the Gypsum Association requires that all member companies relying on the generic assemblies/systems contained in the Gypsum Association's *Fire Resistance Design Manual* subscribe to an on-going, third-party, in-plant product inspection and labeling service. This objective certification and labeling process ensures that manufacturers continue to manufacture the same quality of product as that originally tested. For more information on Underwriters Laboratories testing, certification, follow-up, and labeling procedures, visit its Web site at http://www.ul.com.

Appendix I

OSFM Approved Vulcan - Listing_2192:0100

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION
OFFICE OF THE STATE FIRE MARSHAL
FIRE ENGINEERING - BUILDING MATERIALS LISTING PROGRAM

LISTING SERVICE

LISTING No. 8165-2192:0500

CATEGORY: 8165 -- VENTS FOR WILDLAND URBAN INTERFACE (W.U.I.)

LISTEE: Vulcan Technologies8 Commercial Blvd, Suite E, Novato, CA 94949
Contact: Larry Dumm (916) 626-2400 Fax (916) 647-0477
Email: Larry@newcalmetals.com

DESIGN: Models VER2, VER2M, VER3, VER3M, VER4, VER4M, and VER6M Vulcan Eave Round Vents. Products are in sizes 2", 3", 4", or 6" diameter opening with a 1/4" flange, and a depth of 3/4". The vents are manufactured out of 0.020" aluminum incorporating a 5mm hexagonal aluminum matrix core made of 0.05mm aluminum foil with an intumescent coating underneath the louver cap. Models with "M" contain a stainless steel, type 304 woven, 1/16" opening mesh screen, installed between the louvers and the honeycomb core.

Refer to manufacturer's installation instructions and product data sheets.

RATING: Tested in accordance with ASTM E2886

INSTALLATION: In accordance with listee's printed installation instructions, applicable codes and ordinances, and in a manner acceptable to the authority having jurisdiction.

MARKING: Listee's name, model number, rating, and SFM label.

APPROVAL: Listed as eave vents for use in the Wildland Urban Interface Areas for vertical and horizontal installation only. Refer to listee's Installation Instruction Manual for details.

9-17-21 VWW

Date Issued: **September 28, 2021** *Listing Expires* **June 30, 2022**

Authorized By: ***DAVID CASTILLO,**, M.E., F.P.E.*

Fire Engineering Division

Appendix J

Standard O'Hagin Ember Resistant Vent Fire Safety Information Sheet

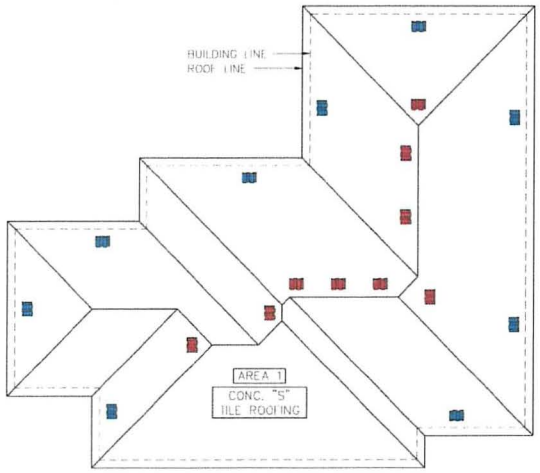
Free Architectural Design Services

How Many Attic Vents Do I Need?

Send us your plans. Don't have plans? No problem. Provide us with your address and we'll figure out the rest.

Email to: vent@ohagin.com

- Let us help you with our FREE architectural and design services!
- We can have your attic ventilation installation plan created in a matter of days.
- A sample of what you get is shown below and is all your contractor needs to properly ventilate your attic space!



LEGEND			NOTES
O'HAGIN STANDARD* "S" STYLE VENTS FOR TILE ROOFS 97.50 SQUARE INCHES OF NFVA** (ICC-ES LEGACY REPORT 9650-A)	HIGH*** (EXHAUST)	LOW*** (INTAKE)	ALL REQUIRED ATTIC VENTILATION SHALL COMPLY WITH THE INTERNATIONAL RESIDENTIAL CODE, (2015); CHAPTER 8 ROOF-CEILING CONSTRUCTION, (PAGE 409); SECTION R806 ROOF VENTILATION. DO NOT INSTALL O'HAGIN VENTS BELOW AREAS OF CONCENTRATED WATER RUNOFF. PLACEMENT ASSUMES GUTTERS ARE INSTALLED IN ALL APPLICABLE AREAS. FOR INSTALLATION INSTRUCTIONS, TECHNICAL BULLETINS, RECOMMENDED PAINTING PROCEDURES AND WARRANTY INFORMATION PLEASE VISIT O'HAGIN'S WEBSITE AT WWW.OHAGIN.COM. FOR HIGH WIND AREAS (70-110 MPH) OR WILDLAND URBAN INTERFACE (WUI) APPLICATIONS, PLEASE CONTACT O'HAGIN TOLL FREE O'HAGIN TOLL FREE AT 877/324-0444 O'HAGIN VENTS ARE DESIGNED TO BE PART OF A COMPLETE ROOFING SYSTEM. FAILURE TO PROPERLY INSTALL ALL COMPONENTS WILL NEGATIVELY IMPACT OVERALL PERFORMANCE AND WILL VOID WARRANTY PROTECTIONS.
*INDEPENDENT LABORATORY TESTED TO RESIST THE INTRUSION OF WIND-DRIVEN RAIN & SNOW (MIAMI-DADE COUNTY PRODUCT CONTROL APPROVED) SEE NOA. **NET FREE VENTILATION AREA (FIGURES BASED ON INDEPENDENT EVALUATION REPORTS) ***REFER TO NOTES 3 & 4 ON ATTACHED OVERVIEW FOR O'HAGIN'S HIGH & LOW VENT PLACEMENT INSTRUCTIONS.			

ATTIC VENTILATION METHOD (O'HAGIN'S BALANCED SYSTEM)

ATTIC AREAS	ATTIC SQUARE FEET	APPLIED RULES OR EXCEPTIONS	SQUARE INCHES NFVA**REQUIRED	O'HAGIN VENTS REQUIRED	SQUARE INCHES NFVA**PROVIDED
AREA 1	2931.00	1/300	1407.00	8 HIGH 8 LOW	1560.00
TOTALS	2931.00	N/A	1407.00	16 @ 97.50 S.I.	1560.00

Free Technical Support Services

FOR YOUR PLANNING, DESIGN, INSTALLATION, AND EDUCATIONAL NEEDS. O'HAGIN OFFERS A RANGE OF FREE SERVICES:

Free Architectural/Design Support Services

- Prompt analysis of roof plans in AutoCAD or other format
- Calculate the number of vents required based on local building codes
- Provide specific recommendations for vent placement

Free Pre And Post-Installation Support

- Meetings with builders, consultants, building code officials, or other members of your design and construction team
- Support regarding any aspect of our product performance or installation

Additional Information

Approvals

- O'Hagin is a recognized leader in attic ventilation testing and design
- O'Hagin products hold local and national approvals including:
  - ICC-ES Legacy Report, 9650-A
  - Class A fire rated
  - Miami-Dade County Product Control Approved.

For complete testing information, call: (877) 324-0444

Instructions

Complete step-by-step installation instructions are available on our website at www.ohagin.com, on our *YouTube* channel (see link below) or by calling our Customer Service Team toll free at (877) 324-0444

O'HAGIN
Superior Attic Ventilation Products

YouTube

Check Out O'Hagin's YouTube Channel
youtube.com/ohaginllc

Phone: (877) 324.0444 | Fax: (707) 588.9187
www.ohagin.com

O'HAGIN
Superior Attic Ventilation Products

Profile Specific Attic Vents For Tile Roof Applications

Optional Fire & Ice® Attic Vents - Resistant To Flames, Embers, Rain & Snow

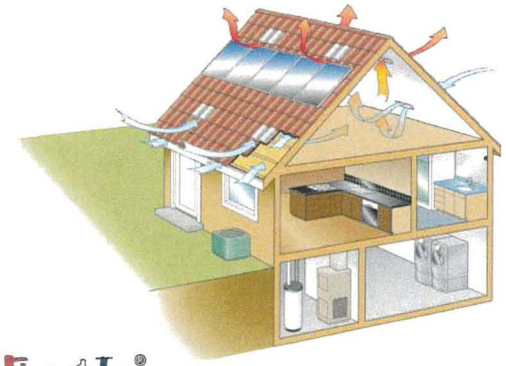
Made In The U.S.A. With U.S. Steel

YouTube

Visit O'Hagin's Website At
www.ohagin.com

210 Classic Court, Suite 100
Rohnert Park • Ca 94928
Phone: (877) 324-0444 • Fax: (707) 588-9187

Benefits of Attic Ventilation

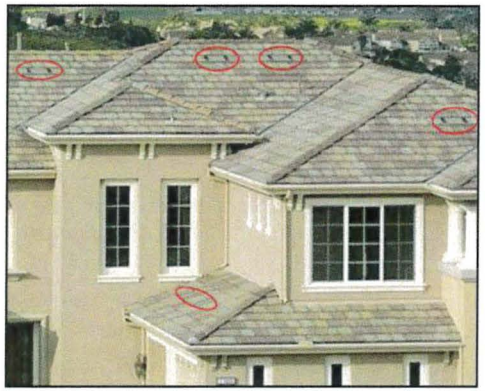


- **Fire & Ice® ATTIC VENTS** Upgrade to these vents in wildfire danger areas - these vents block the entry of firebrands (embers)
- **VOID VALIDATE THE WARRANTY** Most manufacturers of roofing products require **ADEQUATE** attic ventilation to validate their warranties.
- **FITS WITH SOLAR SYSTEMS** Low-profile design is compatible with most panel installations and fits under most rack mount systems.
- **EXTEND THE ROOF'S LIFE** Ventilation protects attic insulation and rafter cavities from moisture, thereby reducing the risk of mold and dry rot.
- **MAINTAIN CURB APPEAL** When painted to match, O'Hagin attic ventilation systems blend into surrounding roofing material.
- **ENHANCES ABOVE-SHEATHING VENTILATION (ASV)** Increases airflow and can increase energy savings in cool roof systems.
- **CONSERVE ENERGY** O'Hagin attic vents are completely passive, reducing energy costs related to heating and cooling.
- **REMOVE TRAPPED GASES** Proper attic ventilation facilitates the removal of hot, trapped gases and fumes, a major cause of indoor air pollution, allergies and related health problems.
- **REDUCE MOISTURE BUILDUP** Proper attic ventilation reduces moisture build up from indoor water sources and condensation that occures naturally in the attic

MADE IN THE U.S.A. WITH U.S. STEEL

Superior Line of Attic Vents

- Patented design
- Use our vents both high (exhaust) and low (intake) for a "balanced" system
- Profile specific to seamlessly blend into surrounding roof tiles. We offer attic vents to match all tile profiles.
- Manufactured with standard finish 26 gauge G-90 galvanized steel (20-year warranty), .032" aluminum, or 16 oz. copper (50-year warranty)
- Passive ventilation – no motors or moving parts.



Net Free Ventilation Area

WIRE MESH	MODEL: FLAT	MODEL: S	MODEL: M
STANDARD 1/4"	98.75 sq. in.	97.50 sq. in.	86.25 sq. in.
OPTIONAL 1/8"	88.87 sq. in.	87.75 sq. in.	77.63 sq. in.

*Figures based on independent evaluation reports.

Fire & Ice® Line of Attic Vents

- Class A fire-rated vent*
- Flame, ember, rain and snow resistant*
- Complies with Wildland Urban Interface Code requirements and accepted for use by many local fire officials for installation in Wildland Urban Interface (WUI) zones
- Interior stainless-steel matrix system
- May be used in place of under-eave and soffit vents:
  - superior airflow
  - balanced airflow
  - decreased construction costs

* Quantified by independent laboratory testing

Fire Build Smart Video

Photos of O'Hagin Fire & Ice® Attic Vents During Extreme Test Conditions

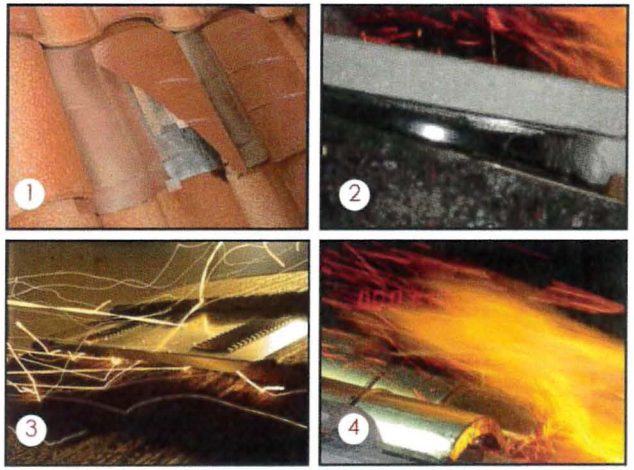


Photo captions:

1. FIRE & ICE® with portion of vent cut away to show stainless-steel matrix and highlight flame and ember resistant airway into attic space;
2. FIRE & ICE® vent installed with concrete flat tile during flame and ember test. Side view shows batten cavity protected from flame and ember intrusion;
3.-4. FIRE & ICE® vents shown during flame and ember tests

Appendix K

Kroy Vinyl Fencing Fire Rating

Kroy Vinyl Fencing Fire Rating

CertainTeed LLC
Jackson Development Center
803 Belden Road
Jackson, MI 49203
517-780-9185

December 4, 2019

Product Compliance Memo

Re: CertainTeed Bufftech Fence and EverNew Deck and Railing Products
Fire Properties of Extruded Products

CertainTeed Bufftech Fence and EverNew Deck and Railing extruded products, and or material used in their manufacture, have been tested in accordance with and comply with the following fire standards / classifications:

Flame Spread Rating[1]
ASTM E-84 *Standard Test Method for Surface Burning Characteristics of Building Materials.*
When tested in accordance with ASTM E-84, CertainTeed Bufftech and EverNew extruded products exhibited a Flame Spread Index of 15[1], complying with the requirements for a Class A, Flame Spread Classification as prescribed by the 2015 and 2018 IBC / IRC, and 2017 Florida Building Code.

Ignition Temperature[2]
ASTM D1929, *Standard Test Method for Determining Ignition Temperature of Plastic.*
Extruded material used in the manufacture of CertainTeed Bufftech and EverNew products, tested in accordance with ASTM D1929, provided values for Self-Ignition / Flash Ignition temperatures of 878°F (470°C) / 734°F (390°C) respectively.

Rate of Burn[2]
ASTM D635, *Standard Test Method for Rate of Burn and/or Extent and Time of Burning of Plastics.* When tested in accordance with ASTM D635, extruded material used in the manufacture of CertainTeed Bufftech and EverNew products exhibited No Sustained Burn, meeting the requirement for a Class CC1 plastic, and can be considered self-extinguishing.

For inquires or additional information regarding the above communication, please contact us.

Neil J. Sexton, A.I.A.
Compliance and Technical Services Manager
CertainTeed LLC

1 Intertek, Report No. G6201.06-121-34, dated November 27, 2017
2 Intertek, Report No. 7613.03-106-10, dated January 22, 2018

Appendix L

OSFM Approved Hoover Fire X Treated Wood Sheet

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION
OFFICE OF THE STATE FIRE MARSHAL
FIRE ENGINEERING - BUILDING MATERIALS LISTING PROGRAM

LISTING SERVICE

LISTING No. 2520-1701:0100

CATEGORY: 2520 -- TREATED LUMBER

LISTEE: HOOVER TREATED WOOD PRODUCTS, INC.154 WIRE ROAD, THOMSON, GA 30824
Contact: Chris Athari (706) 755-5350 Fax (706) 595-6600
Email: cathari@frtw.com

DESIGN: Treated Lumber with EXTERIOR FIRE X. Products are pressure impregnated with "EXTERIOR FIRE X" fire retardant chemical. EXTERIOR FIRE X covers the following types of lumber: Douglas Fir, Southern Yellow Pine, Western Red Cedar, and Redwood Lumber. Refer to listee's printed installation instructions for additional detailed product description and constructions.

RATING: Douglas Fir: 15 Flame Spread; 30 Smoke Developed
Southern Yellow Pine:15 Flame Spread; 50 Smoke Developed
Western Red Cedar:10 Flame Spread; 30-105 Smoke Developed
Redwood:10 Flame Spread; 10-115 Smoke Developed

INSTALLATION: In accordance with listee's printed installation instructions, applicable codes & ordinances and in a manner acceptable to the authority having jurisdiction.

MARKING: Listee's name, product identification, classification, and Underwriter's Laboratory label.

APPROVAL: Listed as exterior type fire retardant treated lumber. Also approved for use as ignition resistant materials as specified in Chapter 7A of the *California Building Code. The lumber must be pressure treated with the fire retardant chemical at the factory under authorized service inspection.

Corrected 9-25-12 il

Date Issued: **July 01, 2021** *Listing Expires* **June 30, 2022**

Authorized By: ***DAVID CASTILLO,,*** *M.E., F.P.E.*

Fire Engineering Division