Fire Protection Plan

Majestic Otay FPP

JULY 2023

Prepared for:

COUNTY OF SAN DIEGO
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Table of Contents

SECTION **PAGE NO.**

TABLES

FIGURES

APPENDICES

Executive Summary

This Fire Protection Plan (FPP) has been prepared for Majestic Otay Project (Project) located in the unincorporated community of East Otay Mesa in the Otay Subregional Planning Area, in the southernmost portion of San Diego County, California. This FPP provides measures for fire protection that meet the 2023 San Diego County Consolidated Fire Code. The Project would be required to meet the adopted codes at the time of construction. 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, access, building ignition and fire resistance, and fire protection systems, among other pertinent fire protection criteria. The purpose of this plan is to generate and memorialize the fire safety requirements and standards of the San Diego County Fire Protection District (SDCFPD) along with project-specific measures based on the site, its intended use, and its fire environment.

This document provides analysis of the site's fire environment and its potential impact on the Project as well as the Project's potential impact on the existing fire protection service. Tasks completed in preparation of this FPP include data review, code review, site fire risk analysis, land use plan review, fire behavior modeling, and site-specific recommendations. Requirements and recommendations herein are based on site-specific fire environment analysis and Project characteristics and incorporates area fire planning documents, site risk analysis, and standard principles of fire protection planning.

As determined during the analysis of this site and its fire environment, Majestic Otay Project site, in its current condition, may include characteristics that, under favorable weather conditions, could have the potential to facilitate fire spread. Under extreme conditions, wind-driven wildfires from the nearby Otay Mesa Open Space Preserve could cast embers onto the property. Once the Project is built, Majestic Otay Project's on-site fire potential will be much lower than its current condition due to conversion of wildland fuels to building footprints, parking areas, managed landscapes, fuel modification areas, improved accessibility for fire personnel, and structures built to the latest ignition and ember resistant fire codes.

It is important to note that the fire safety requirements that will be implemented on this site, including ignition resistant construction standards, along with requirements for water supply, fire apparatus access, fuel modification and defensible space, interior fire sprinklers and five minute or less fire response travel times were integrated into the code requirements and internal guidelines based on results of post-fire assessments, similar to the After Action Reports that are now prepared after large fire events. When it became clear that specifics of how structures were built, how fire and embers contributed to ignition of structures, what effects fuel modification had on structure ignition, how fast firefighters could respond, and how much (and how reliable) water was available, were critically important to structure survivability, the Fire and Building codes were revised appropriately. San Diego County now boasts some of the most restrictive codes for building within Wildland Urban Interface (WUI) areas that focus on preventing structure ignition from heat, flame, and burning embers.

The developed portion of this property is proposed for improvements that include construction of approximately 2,850,000 square feet of industrial development on roughly 183.5 gross-acres. The undeveloped portion of the Project consists of 51.3 acres of permanent biological open space and 15.83 acres for conservation of vernal pools on-site. The entire site has been designed with fire protection as a key objective. The site improvements are designed to facilitate emergency apparatus and personnel access throughout the site. Driveway and road improvements with fire engine turnouts and turnarounds provide access to within 150 feet of all sides of every building. Water availability and flow will be consistent with requirements including fire flow and hydrant distribution

required by local and state codes. These features along with the ignition resistance of all buildings, the interior sprinklers, and the pre-planning, training and awareness will assist responding firefighters through prevention, protection and suppression capabilities.

As detailed in this FPP, the Project site's fire protection systems will include a redundant layering of protection methods that have proven to reduce overall fire risk. The requirements and recommendations included herein are performance based and site–specific, considering the Project's unique characteristics rather than a prescriptive, one-size-fits-all approach. The fire protection systems are designed to increase occupant and building safety, reduce the fire risk on site, to minimize risks associated with typical uses, and aid the responding firefighters during an emergency. No singular measure is intended to be relied upon for the site's fire protection, but rather, a system of fire protection measures, methods, and features combine to result in enhanced fire safety, reduced fire potential, and improved safety in the development.

Early evacuation for any type of wildfire emergency at Majestic Otay Project is the preferred method of providing for occupant and business safety, consistent with the Owner's and SDCFA current approach for evacuation. As such, Majestic Otay Project's Owner and Property Management Company will formally adopt, practice, and implement a "Ready, Set, Go!" approach to site evacuation. The "Ready, Set, Go!" concept is widely known and encouraged by the state of California and most fire agencies, including; 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.

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

1. Project buildings will be constructed of ignition resistant[1] construction materials and include automatic fire sprinkler systems based on the latest adopted Building and Fire Codes for occupancy types.
2. Fuel Modification will be provided as needed around the proposed structure, as required by SDCFA and will be 100 feet wide.
3. Landscape plantings will not utilize prohibited plants that have been found to be highly flammable.
4. Maintenance would occur as needed, and the Property Owner would annually hire a third party, SDCFA-approved, FMZ inspector to provide annual certification that it meets the requirements of this FPP.
5. Fire apparatus access roads (i.e., public and private streets) will be provided throughout the development and will vary in width and configuration, but will all provide at least the minimum required unobstructed travel lanes, lengths, turnouts, turnarounds, and clearances required by applicable codes. Primary access and internal circulation will comply with the requirements of the SDCFA.
6. Buildings will be equipped with automatic commercial fire sprinkler systems meeting SDCFA requirements.

[1] A type of building material that resists ignition or sustained flaming combustion sufficiently to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with wildfire exposure of burning embers and small flames, as prescribed in CBC, Chapter 7A and State Fire Marshal Standard 12-7A-5, Ignition-Resistant Materials.

7. Water capacity and delivery provide for a reliable water source for operations and during emergencies requiring extended fire flow.
8. The Property Owner or Property Management Company will provide informational brochures at time of occupancy, which will include an outreach and educational role to ensure fire safety measures detailed in this FPP have been implemented and development-wide "Ready, Set, Go!" plans prepared.[2]

[2] https://www.readysandiego.org/content/dam/oesready/en/Resources/wildfire_preparedness_guide.pdf

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1 Introduction

This Fire Protection Plan has been prepared for the Majestic Otay Project in southernmost portion of San Diego County (County), California. The purpose of the FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those impacts. Additionally, this plan generates and memorializes the fire safety requirements of the Fire Authority Having Jurisdiction (FAHJ), which is the SDCFPD. Requirements and recommendations are based on site-specific project characteristics and incorporate input from the Project applicant and the FAHJ.

As part of the assessment, the plan has considered the property location, topography, surrounding combustible vegetation (fuel types), climatic conditions, and fire history. The plan addresses water supply, access, structural ignitability and fire resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management. The plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect one or more at-risk communities and essential infrastructures. The following tasks were performed toward completion of this plan:

- Gather site specific climate, terrain, and fuel data;
- Collect site photographs;
- Process and analyze the data using the latest 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 emergency response capabilities;
- Assess the risk associated with the Project and the Project site; and
- Prepare this FPP detailing how fire risk will be mitigated through a system of fuel modification, structural ignition resistance enhancements, and fire protection delivery system upgrades.

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

1.2 Applicable Codes/Existing Regulations

This FPP demonstrates that the Project would comply with applicable portions of the 2023 Consolidated Fire Code or the most current fire and building codes at the time of tentative map approval. The Project also would be consistent with the 2022 California Building Code, Chapter 7A; the 2022 California Fire Code, Chapter 49; and the 2022 California Residential Code, Section 337 as adopted by San Diego County. Chapter 7A of the California Building Code addresses reducing ember penetration into structures, a leading cause of structure loss from wildfires (California Building Standards Commission 2019). Thus, code compliance is an important component of the requirements of this FPP, given the Project's wildland/urban interface (WUI) location that is within an area statutorily designated as a State Responsibility Area (SRA) High Fire Hazard Severity Zone by CAL FIRE (FRAP 2007). Fire hazard designations are based on topography, vegetation, and weather, among other factors with more hazardous sites, including steep terrain, unmaintained fuels/vegetation, and WUI locations. Projects situated in High Fire Hazard Severity Zones require fire hazard analysis and application of fire protection measures to create defensible communities within these WUI locations. As described in this FPP, the Project would meet applicable code requirements for building in these higher fire hazard areas or meet the intent of the code through the application of site-specific fire protection measures. This is applicable for all structures within the Project site. These codes have been developed through decades of wildfire structure save and loss evaluations to determine the causes of structure loss during wildfires. The resulting fire codes now focus on mitigating 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 2022 California Building Code (Chapter 7A, Section 701A Scope, Purpose, and Application) (California Building Standards Commission 2022).

1.3 Project Summary

1.3.1 Location

The 250 gross-acre site is located in the unincorporated community of East Otay Mesa in the Otay Subregional Planning Area, in the southernmost portion of San Diego County. The Project is located north of of Otay Mesa Road, south of La Media Rd, approximately 0.5 mile east of the State Route SR-125. (Figure 1, Project Location Map). Access would be provided by Otay Mesa Road, Zinser Road, and Lone Star Road. The Project would include the construction of Harvest Road and Sunroad Boulevard on-site as well as construction of several private roadways for internal circulation. The Project site is situated within Section 25 of Township 18 South, and Range 1 West on the Otay Mesa, California, United States Geological Survey (USGS), 7.5-minute topographic map.

1.3.2 Existing and Surrounding Land Use

The Project site is within the East Otay Mesa Specific Plan (SP 93-004) and is currently open space. The parcels immediately north, east, and west of the Project site are currently vacant, and the southern extent of the Project site is bound by Otay Mesa Road and an existing warehouse development south of buildings 9 and 10 and west of Harvest Rd. Surrounding land uses include industrial, transportation and vacant/open space. The Otay open Space Preserve is approximately 2 miles east of the Project site.

1.3.3 Project Description

The Project proposes a Specific Plan Amendment (SPA) to the East Otay Mesa Business Park Specific Plan, Tentative Parcel Map, and a Site Plan to establish a new Light Industrial Master Planned Business Park. The Project site is approximately 250 gross acres in the East Otay Mesa area of the County of San Diego and is currently undeveloped. The SPA would designate the site for Light Industrial and Conservation land uses. The Project would allow for development on approximately 183.5 acres and include approximately 51.3 acres of permanent biological open space in the northeastern portion of the Project site. Additionally, the Project includes approximately 15.83 acres for conservation of vernal pools on-site. Grading would occur on approximately 183.5 acres of the Project site.

The SPA would allow for up to 2,850,000 square feet of Class A industrial buildings. However, it should be noted that the Site Plan proposes 2,402,405 square feet of development spread out over 5 proposed phases. Development would be phased as follows:

- **Phase 1:** Buildings 1-4
- **Phase 2:** Buildings 5-7
- **Phase 3:** Building 8
- **Phase 4:** Buildings 9-10
- **Phase 5:** Buildings 11-12

Although the Site plan proposes 2,402,405 square feet of development, for purposes of analysis, the maximum square footage allowed by the SPA (2,850,000 square feet) is evaluated herein.

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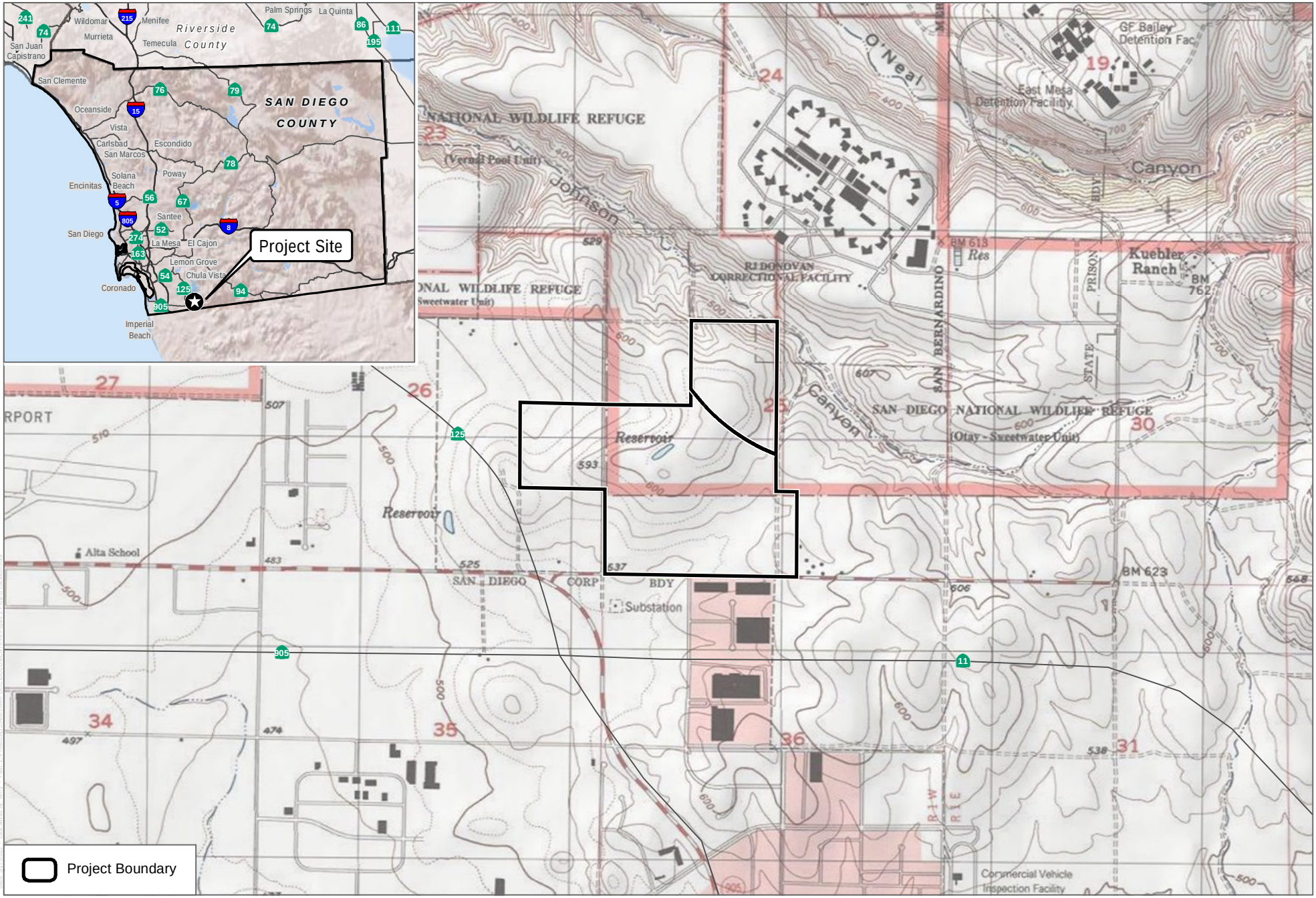

SOURCE: USGS 7.5-Minute Series Otay Mesa Quadrangle

DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

Fire Protection Plan for the Majestic Otay Project

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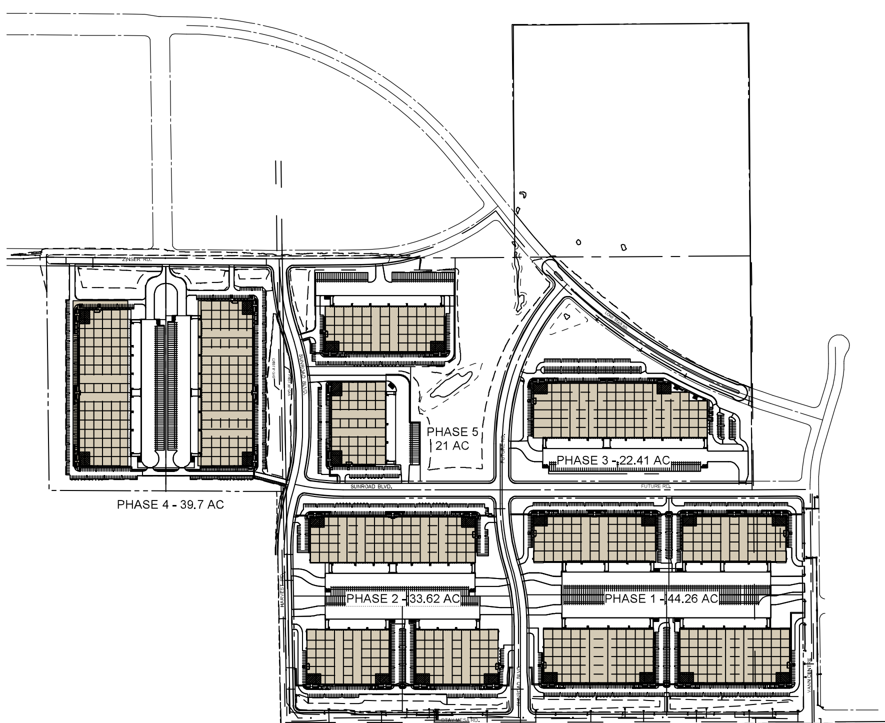
1 MASTER SITE PLAN
1" = 200'-0"



2 PROJECT PHASING
1" = 400'-0"

PROJECT SUMMARY

PHASE	SITE AREA S.F.	SITE AREA AC.	COVERAGE	% OF SITE AREA	BUILDING NO.	BUILDING AREA S.F.	AUTO PARKING R/P	TRAILER STALLS
1	+/- 1,928,273.05	44.26	37%					
	+/- 521,153.13	11.96	37%		1	193,783	194 / 194 (0)	54
	+/- 516,550.42	11.86	38%		2	193,814	194 / 194 (+0)	47
	+/-474,871.27	10.90	38%		3	180,354	181 / 181 (+0)	55
	+/- 415,698.23	9.54	37%		4	153,317	154 / 160 (+6)	52
TOTAL						721,268	723 / 729 (+0)	149
2	+/- 1,464,574.02	33.62	37%					
	+/- 402,785.69	9.25	36%		5	145,461	146 / 146 (0)	39
	+/- 409,914.76	9.41	35%		6	145,461	146 / 146 (0)	39
	+/- 651,873.57	14.96	37%		7	243,762	244 / 244 (+0)	71
TOTAL						534,684	536 / 536 (+0)	208
3	+/- 976,291.93	22.41	30%					
	+/- 976,291.93	22.41	30%		8	291,020	292 / 295(+3)	78
TOTAL						291,020	292 / 295 (+3)	78
4	+/- 1,729,244.67	39.7	31%					
	+/- 856,605.6	19.67	30%		9	259,188	260 / 260 (+0)	67
	+/- 872,639.07	20.03	31%		10	274,372	275 / 275 (+0)	72
TOTAL						533,560	535 / 535 (+0)	133
5	+/- 914,455.64	21.0	35%					
	+/- 389,256.86	8.94	37%		11	145,607	146 / 146 (+0)	39
	+/- 525,198.78	12.06	34%		12	176,090	176 / 176 (+0)	59
TOTAL						321,697	322 / 322 (+0)	269
SUB-TOTAL	+/- 7,012,839.31	160.99	34%	63%		2,402,229	2,408 2,417 (+9)	901
ROADWAYS	+/- 1,232,299.03	28.29		11%		2,451,078		
VACANT LOT	+/- 572,447.74	13.14		6%				
OPEN SPACE	+/- 2,236,413.91	51.34		20%				
GRAND-TOTAL	+/- 11,053,999.99	253.76		100%				

BY | DATE | REVISIONS

BY | DATE | REVISIONS

COMMERCE CONSTRUCTION CO., L.P.
13191 Crossroads Parkway North
Sixth Floor
City of Industry, California 91746-3497
Telephone: (562) 699-0453
License No. 723302

MASTER SITE PLAN

PROPOSED INDUSTRIAL DEVELOPMENT
OTAY MAJESTIC
OTAY MESA ROAD & HARVES ROAD, SAN DIEGO, CA

EXHIBIT 20

PRELIMINARY
NOT FOR
CONSTRUCTION

DRAWN BY: SDG | DATE: 4/28/2023

JOB NO. 7535

SHEET NO. A101

1 OF 1 SHTS.

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2 Proposed Project Site Risk Analysis

2.1 Field Assessment

A field assessment of Majestic Otay Project area was conducted on May 13, 2023 in order to confirm/acquire site information, document existing 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 are:

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

Field observations were utilized to augment existing site data in generating the fire behavior models and formulating the recommendations detailed in this report.

2.2 Site Characteristics and Fire Environment

Fire environments are dynamic systems and include many types of environmental factors and 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 fire environment are topography, climate, and vegetation (fuels). 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 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 site is necessary to understand the potential for fire within and around the Project site.

The following sections discuss the site characteristics, local climate, and fire history within and surrounding the Project site. Majestic Otay Project is similar concerning topography, vegetative cover, and proximity to adjacent residential areas, available access, and planned use. The following sections discuss the characteristics of the Project site at a regional scale. The intent of evaluating conditions at this macro-scale is to provide 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. Flat terrain tends to have little effect on fire spread, resulting in fires that are driven by wind. The Project site was previously graded and is relatively flat, however gently slopes to the south. The elevations on the site range from approximately 537 feet above mean sea level (amsl) along the northern portion of the site to approximately 612 feet amsl in the eastern portion of the site. Elevation across the site is generally approximately 560 feet amsl.

2.2.2 Climate

Throughout southern California, and specifically at the Project site, climate has a large influence on fire risk. The climate of San Diego County is typical of a Mediterranean area, with warm, dry summers and cold, wet winters. The average high temperature for the San Diego area is approximately 72°F, with average highs in the summer and early fall months (July–October) reaching 82°F. The average precipitation for the area is approximately 12.5 inches per year, with the majority of rainfall concentrated in the months of November to April, while smaller amounts of rain are experienced during the other months of the year (World Weather Online, 2020).

The prevailing wind pattern is from the west (on-shore), but the presence of the Pacific Ocean causes a diurnal wind pattern known as the land/sea breeze system. During the day, winds are from the west–southwest (sea) and at night winds are from the northeast (land), averaging 5 miles per hour (mph). During the summer season, the diurnal winds may average slightly higher (approximately 19 mph) than the winds during the winter season due to greater pressure gradient forces. Surface winds can also be influenced locally by topography and slope variations. The highest wind velocities are associated with downslope, canyon, and Santa Ana winds.

Fires can be a significant issue during summer and fall, before the rainy period, especially during dry Santa Ana wind events. Although Santa Ana events can occur anytime of the year, they generally occur during the autumn months, although the last few years have resulted in spring (April May) and summer events. Santa Ana winds may gust up to 75 miles per hour (mph) or higher. This phenomenon markedly increases the wildfire danger and intensity in the Project area by drying out and preheating vegetation (fuel moisture of less than 5% for 1-hour fuels is possible) as well as accelerating oxygen supply, and thereby, making possible the burning of fuels that otherwise might not burn under cooler, moister conditions.

2.2.3 Vegetation

2.2.3.1 Fuels (Vegetation)

The Project property and surrounding areas primarily support disturbed habitat and non-native grasslands. Vegetation types were derived from an on-site field assessment of the Project site. The vegetation cover types were assigned a corresponding fuel models for use during site fire behavior modeling. Section 3.0 describes the fire modeling conducted for the Project Area.

2.2.3.2 Vegetation 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, non-native grass dominated plant communities become seasonally prone to ignition and produce lower intensity, higher spread rate fires.

As described, vegetation plays a significant role in fire behavior, and is an important component to the fire behavior models discussed in this report. A critical factor to consider is the dynamic nature of vegetation communities. Fire presence and absence at varying cycles or regimes disrupts plant succession, setting plant communities to an earlier state where less fuel is present for a period of time as the plant community begins its succession again. In summary, high frequency fires tend to convert shrublands to grasslands or maintain grasslands, while fire exclusion tends to convert grasslands to shrublands, over time. In general, biomass and associated fuel loading will increase over time, assuming that disturbance (fire, 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 fuel modification zones on this site will primarily be paved as loading docks, parking stalls, or driveways. Vegetated areas in the FMZ will consist of irrigated and maintained landscapes as well as thinned native fuel zones that will be subject to regular "disturbance" in the form of maintenance and will not be allowed to accumulate excessive biomass over time, which results in reduced fire ignition, spread rates, and intensity. Conditions adjacent the Project's footprint (outside the fuel modification zones), where the wildfire threat will exist post-development, are classified as low to medium fuel loads due to the dominance of non-native grassland fuels.

2.2.4 Fire History

Fire history is an important component of an FPP. Fire history data provides valuable information regarding fire spread, fire frequency, most vulnerable areas, and significant ignition sources, amongst others. 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.

Fire history represented in this FPP uses the 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.

Appendix B – Majestic Otay Project Vicinity Fire History exhibit, presents a graphical view of the Project area's recorded fire history. As presented in the exhibit, there have been 71 fires recorded since 1910 by CALFIRE in their FRAP database (FRAP 2021)[3] in the vicinity of the Project, which includes two fires that burned into the Project site. These fires, occurring in 1910 (x3), 1911, 1912, 1919 (x2), 1941, 1944 (x2), 1945, 1969 (x2), 1971 (x2), 1978, 1979 (x7), 1980 (x7), 1981, 1982 (x4), 1983, 1984, 1985, 1986, 1987, 1988 (x3), 1989, 1990, 1993, 1994,

[3] 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 1878–2018.

1996 (x2), 1999, 2003 (x3), 2004 (x2), 2005 (x4), 2006, 2007, 2012, 2013 (x2), 2014, 2018 (x2) and 2019 (x4); burned within a five mile radius of the Project Area. A total of two fires, ranging from 164.2 acres (Otay 2013) to 265.8 acres (Otay #4 1980), have burned into the Project site. There are no recorded fires occurring within the Project site, and a majority of the historical fires have occurred within the Otay Mesa Open Space Preserve. Based on an analysis of the CAL FIRE FRAP fire history data set, specifically the years in which the fires burned, the average interval between wildfires in the area (includes areas up to roughly 5 miles from the Project site) was calculated to be 1.6 years with intervals ranging between 1 and 24 years. Based on this analysis, it is expected that wildfire that could impact the Project may occur, if weather conditions coincide, roughly every 1.6 years with the realistic possibility of shorter or longer interval occurrences, as observed in the fire history records.

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 fire that would be expected adjacent to the Project site given characteristic site features such as topography, vegetation, and weather. Dudek utilized the current version of BehavePlus (BehavePlus 6.0), which includes the latest updates and incorporates years of research and testing (Andrews, Bevins, and Seli 2008) to analyze potential fire behavior for the wildland fuels to the northwest, north, northeast/east, southeast, and west/southwest of the project site. As is customary for this type of analysis, five fire scenarios were evaluated, including two summer, onshore weather condition (north/northwest and west/southwest of the project site) and three extreme fall, offshore weather condition (north/northeast, east, and southeast of the project site). Results are provided below and a more detailed presentation of the BehavePlus analysis, including fuel moisture and weather input variables, is provided in Appendix C.

3.2 Fire Behavior Modeling Effort

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and to objectively predict flame lengths, intensities, spotting distance, and spread rates for five modeling scenarios for the Otay Mesa 200 Project. These fire scenarios incorporated observed fuel types representing the dominant on-site and off-site vegetation on vacant land adjacent to the proposed development, in addition to measured slope gradients, and wind and fuel moisture values derived from Remote Automated Weather Stations (RAWs) weather data sets (San Miguel Station) 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 the site.

To support the fire behavior modeling efforts conducted for this FPP, the different vegetation types observed within the project areas and adjacent to the project site were classified into the aforementioned numeric fuel models. 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 non-native grasslands, are adjacent to the proposed project development site. These fuel types can produce flying embers that may affect the project, but defenses will have been built into the structures to prevent ember penetration. Table 1 provides a description of the three fuel models observed in the vicinity of the site that were subsequently used in the analysis for this project. Modeled areas include low and moderate load grassland ground fuels (Fuel Models: FM1, Gr2, and Gr4) found throughout and adjacent to the project site. A total of five fire modeling scenarios were completed for the site. 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, 3, and 4) and an on-shore weather pattern (fire scenarios 1 and 5). Dudek also conducted modeling of the site for post-Fuel Modification Zones' (FMZ) recommendations for this project (Refer to Table 2 for post-FMZ fuel model descriptions). Fuel modification includes establishment of irrigated and thinned zones on the periphery of the Industrial building(s) as well as interior landscape requirements. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified as non-burnable for the non-combustible parking areas and for FMZs 1 and 2 (Fuel Model 8) and FMZ 3 (Fuel Model Gr1) as applicable.

Table 1. Existing Fuel Model Characteristics

Fuel Model Assignments	Vegetation Description	Location	Fuel Bed Depth (Feet)
FM1	Short Grasses	Represented throughout the adjacent areas surrounding the Project	>1.0 ft.
Gr2	Low Load Dry Climate Grass	Represented throughout the adjacent areas surrounding the Project.	>2.0 ft.
Gr4	Moderate Load, Dry Climate Grass	Represented throughout the adjacent areas surrounding the Project	>4.0 ft.

Table 2. Post-development Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
NB1	Non-burnable	Non-combustible parking lot areas	0 ft.
8	Compact litter	Fuel Modification Zone 1 and 2: irrigated landscape	<1.0 ft.
Gr1	Sparse, Sparse Load, Dry Climate Grass	Fuel Modification Zone 3: 50% thinning of grasses	>1.0 ft.

3.3 Fire Behavior Modeling Results

As mentioned, the BehavePlus fire behavior modeling software package was utilized in evaluating anticipated fire behavior adjacent to the Proposed Project site. Five 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 northwest, north/northeast, east, southeast, and west/southwest. 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 four 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 low to moderate-load grass dominated vegetation located northwest of the project site. The terrain is flat (approximately 1% to 2% slope) with potential ignition sources from a car fire along CA-125 or a wildland fire north/northwest of

the property. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.

- Scenario 2: A fall, off-shore fire (97th percentile weather condition) burning in low to moderate-load grass dominated vegetation located north of the project site. The terrain is relatively flat (approximately 7% slope) with potential ignition sources from a structure/facility fire or wildland fire from the north/northeast of the proposed property. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.
- Scenario 3: A fall, off-shore fire (97th percentile weather condition) burning in low to moderate-load grass dominated vegetation located north/northeast of the project site. The terrain is flat (approximately 5% slope) with potential ignition sources from a structure/facility fire or car fire east of the proposed property. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.
- Scenario 4: A fall, off-shore fire (97th percentile weather condition) burning in low to moderate-load grass dominated vegetation located southeast of the project site. The terrain is flat (approximately 3% slope) with potential ignition sources from a structure/facility fire or car fire from the east and/or south of the proposed property. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.
- Scenario 5: A summer, on-shore fire (50th percentile weather condition) burning in low to moderate-load grass dominated vegetation located northwest of the project site. The terrain is flat (approximately 2% slope) with potential ignition sources from a car fire along Otay Mesa Road. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.

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

Fire Scenario	Flame Length (feet)	Spread Rate (mph)	Fireline Intensity (Btu/ft./sec)	Spot Fire (Miles)
Scenario 1: 1% slope, Summer on-shore wind from the NW, 12 mph sustained winds (Current conditions)				
Low-load grasses (Gr2)	4.3’	0.4	132	0.2
Moderate-load grasses (Gr4)	8.0’	0.8	522	0.3
Short grasses (FM1)	4.0’	0.9	115	0.2
Scenario 2: 7% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Low-load grasses (Gr2)	8.4’ (14.1’)	1.4 (4.2)	580 (1,791)	0.3 (1.1)
Moderate-load grasses (Gr4)	15.7’ (33.3’)	2.7 (14.0)	2,259 (11,574)	0.5 (2.0)
Short grasses (FM1)	7.8’ (12.7’)	2.9 (8.3)	489 (1,415)	0.3 (1.0)
Scenario 3: 5% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Low-load grasses (Gr2)	8.4’ (14.1’)	1.4 (4.2)	577 (1,791)	0.3 (1.1)
Moderate-load grasses (Gr4)	15.7’ (33.3’)	2.7 (13.9)	2,249 (11,563)	0.5 (2.0)
Short grasses (FM1)	7.8’ (12.7’)	2.9 (8.3)	487 (1,415)	0.3 (1.0)
Scenario 4: 3% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Low-load grasses (Gr2)	8.4’ (14.1’)	1.4 (4.2)	577 (1,791)	0.3 (1.1)

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

Fire Scenario	Flame Length (feet)	Spread Rate (mph)	Fireline Intensity (Btu/ft./sec)	Spot Fire (Miles)
Moderate-load grasses (Gr4)	15.7’ (33.3’)	2.7 (13.9)	2,249 (11,563)	0.5 (2.0)
Short grasses (FM1)	7.8’ (12.7’)	2.9 (8.3)	487 (1,415)	0.3 (1.0)
Scenario 5: 5% slope, Summer, On-shore wind from the W/SW, 12 mph sustained winds (Current conditions)				
Low-load grasses (Gr2)	4.3’	0.4	132	0.2
Moderate-load grasses (Gr4)	8.0’	0.8	522	0.3
Short grasses (FM1)	4.0’	0.9	115	0.2

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

Fire Scenario	Flame Length (feet)	Spread Rate (mph)	Fireline Intensity (Btu/ft./sec)	Spot Fire (Miles)
Scenario 1: 1% slope, Summer on-shore wind from the NW, 12 mph sustained winds (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.0’	0.0	5	0.1
FMZ Zone 3 (Gr1)	1.7’	0.2	18	0.1
Scenario 2: 7% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.7’ (2.6’)	0.1 (0.1)	19 (45)	0.1 (0.3)
FMZ Zone 3 (Gr1)	3.1’ (3.1’)	0.5 (0.5)	67 (67)	0.2 (0.4)
Scenario 3: 5% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.7’ (2.6’)	0.1 (0.1)	19 (45)	0.1 (0.3)
FMZ Zone 3 (Gr1)	3.1’ (3.1’)	0.5 (0.5)	67 (67)	0.2 (0.4)
Scenario 4: 3% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.7’ (2.6’)	0.1 (0.1)	19 (45)	0.1 (0.3)
FMZ Zone 3 (Gr1)	3.1’ (3.1’)	0.5 (0.5)	67 (67)	0.2 (0.4)
Scenario 5: 5% slope, Summer, On-shore wind from the W/SW, 12 mph sustained winds (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.0’	0.0	5	0.1
FMZ Zone 3 (Gr1)	1.7’	0.2	18	0.1

Notes (Tables 3 and 4):

1 mph = miles per hour

2 Spotting distance from a wind driven surface fire.

3 It should be noted that the wind mph in parenthesis represent peak gusts of 50 mph

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.

As presented in Table 3, wildfire behavior on the Project site is expected to be primarily of low to moderate intensity throughout the non-maintained surface grass dominated fuels throughout the perimeter areas of the project site. Worst-case fire behavior is expected in untreated, surface grass vegetation under peak weather conditions (represented by Fall Weather, Scenario 2). The fire is anticipated to be a wind-driven fire from the north/northeast during the fall. Under such conditions, expected surface flame length is expected to be significantly lower in the areas where fuel modification occurs, with flames lengths reaching approximately 33 feet with wind speeds of 50+ mph. Under this scenario, fireline intensities reach 11,574 BTU/feet/second with moderate spread rates of 14.0 mph and could have a spotting distance up to 2.0 miles away.

Wildfire behavior in non-maintained grasslands, modeled as FM1, Gr2, and Gr4 fuel models being fanned by 12 mph sustained, on-shore winds Fires burning from the west/northwest and pushed by ocean breezes typically exhibit less severe fire behavior due to lower wind speeds and higher humidity. Under typical onshore weather conditions, a low-load grass/grass-shrub vegetation fire could have flame lengths between approximately 4 feet and 8 feet in height and spread rates between 0.4 and 0.9 mph. Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 0.2 to 0.3 miles.

As depicted in Table 4, the FMZ areas experience a significant reduction in flame length and intensity. The 12.7- to 33.3-foot flame lengths predicted for non-maintained grassland habitats during pre-treatment modeling for fire scenarios 2, 3, and 4 are reduced to approximately 3.1 feet at the outer edges of the FMZ (Zone 3) and to 2.6 feet by the time the inner portions of the FMZ (Zones 1 and 2) are reached. During on-shore weather conditions, a fire approaching from the west towards the development footprint would be reduced from approximately 9-foot-tall flames to less than 1.1-foot tall for Zones 1, 2, and 1.7 with low fire intensity and spotting distances due to the higher live and dead fuel moisture contents. These reductions of flame lengths and intensities are assumed to occur within the 100 feet of fuel modification that is achieved throughout the site (a combination of Zones 1, 2, and 3).

It should be noted that the results presented in Tables 3 and 4 depict values based on inputs to the BehavePlus software. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis, but models provide a worst-case wildfire condition as part of a conservative approach. Further, this modeling analysis assumes a correlation between the Project site vegetation and fuel model characteristics. 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.

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Table 1. Existing Fuel Model Characteristics

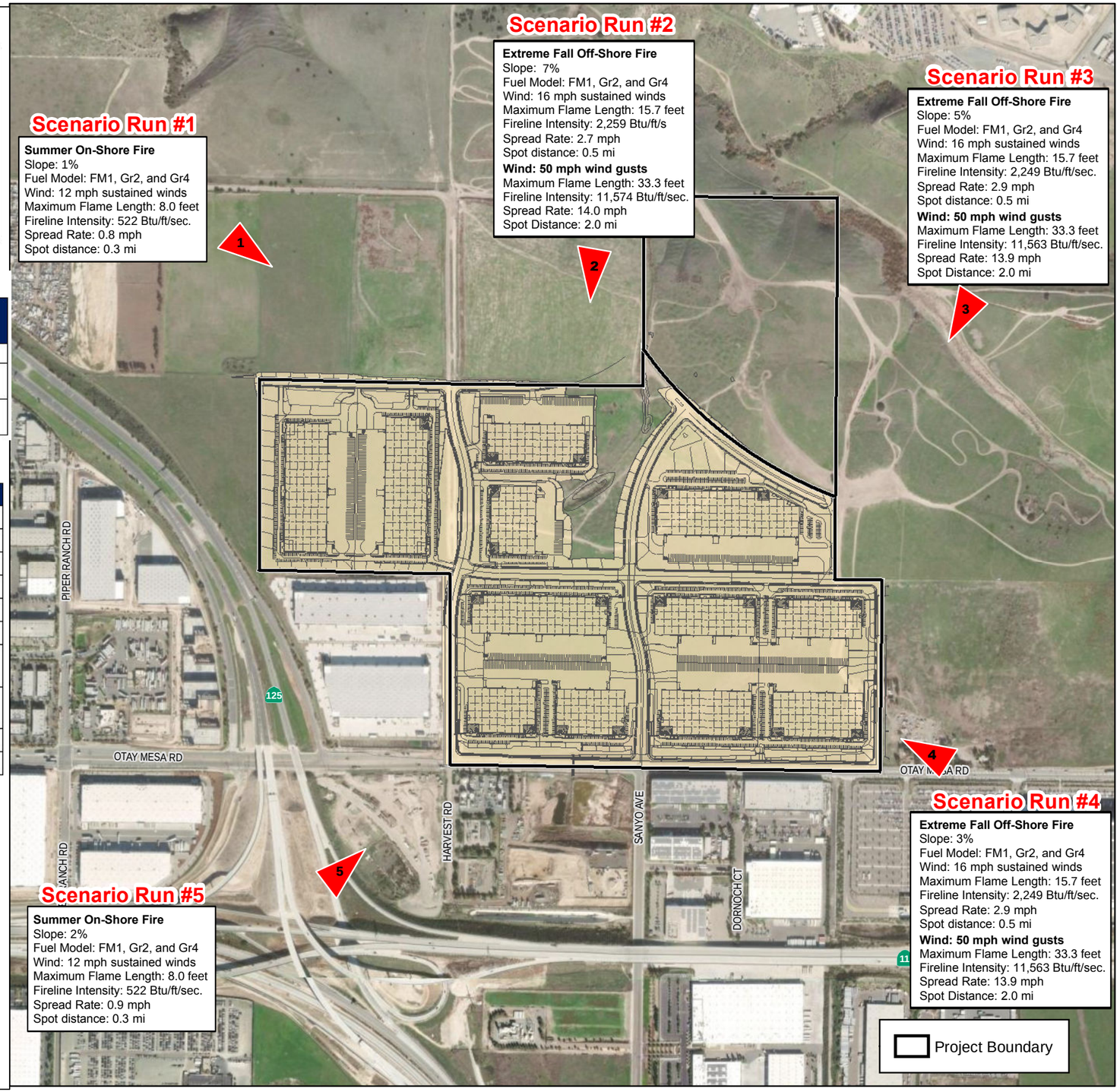
Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
FM1	Short Grasses	Represented throughout the adjacent areas surrounding the Project	>1.0 ft.
Gr2	Low Load Dry Climate Grass	Represented throughout the adjacent areas surrounding the Project.	<2.0 ft.
Gr4	Moderate Load, Dry Climate Grass	Represented throughout the adjacent areas surrounding the Project	>3.0 ft.

Table 2. Post-development Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
NB1	Non-burnable	Non-combustible parking lot areas	0 ft.
8	Compact litter	Fuel Modification Zone 1 and 2: irrigated landscape	<1.0 ft.
Gr1	Sparse, Sparse Load, Dry Climate Grass	Fuel Modification Zone 3: 50% thinning of grasses	>1.0 ft.

Table 3: Variables Used for Fire Behavior Modeling

Model Variable	Summer Weather (50th Percentile)	Peak Weather (97th Percentile)
Fuel Models	FM1, Gr2, and Gr4	FM1, Gr2, and Gr4
1 h fuel moisture	8%	2%
10 h fuel moisture	9%	3%
100 h fuel moisture	15%	8%
Live herbaceous moisture	59%	30%
Live woody moisture	118%	60%
20 ft. wind speed	12 mph (sustained winds)	16 mph (sustained winds); wind gusts of 50 mph
Wind Directions from north (degrees)	220 and 300	20, 90, and 150
Wind adjustment factor	0.4	0.4
Slope (uphill)	1 to 2%	3 to 7%



SOURCE: AERIAL-ESRI MAPPING SERVICE

DUDEK

0 400 800 1,600 Feet

FIGURE 3
BehavePlus Analysis Map
Fire Protection Plan for the Majestic Otay Project

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4 Emergency Response and Service

The following sections analyze the Project in terms of current SDCFPD/CAL FIRE Service capabilities and resources to provide Fire Protection and Emergency Services. The analysis that follows examines the ability of the existing SDCFPD/CAL FIRE fire stations to adequately serve the Project site. Response times were evaluated using Project build-out conditions. It was assumed that the shortest access route to the proposed structure(s) would be utilized.

4.1 Emergency Response

The Project site is located within the unincorporated area of the County and State Responsibility Area (SRA), within SDCFPD's jurisdictional area. Fire protection services within the County are typically provided by various City and rural district or volunteer fire departments. In addition, the County has cooperative Fire Protection Agreements with CAL FIRE for fire and emergency services for portions of the County. CAL FIRE responds typically to wildland fires, although firefighters are trained in structural firefighting techniques and will respond to structure fires as well as medical emergencies. The County and State operate as "One Team, One Mission".

The SDCFPD protects approximately 44,747 residents over 1.5 million acres and 3,035 road miles. SDCFPD currently operates 35 Fire Stations, including 17 County-funded stations, 5 Amador-funded stations, and 13 State-funded stations, one of which are analyzed herein due to its proximity to the Project site. Table 5 presents a summary of the location, equipment, staffing levels, maximum travel distance, and estimated travel time for SDCFPD/CAL FIRE Fire Station 43. 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.

The San Diego County General Plan Safety Element includes Travel Time Standards from the "Closest Fire Station" (County of San Diego 2021). The San Diego County General Plan utilizes a 5 minute response time goal for urban areas and up to a 20 minute or more response time for rural areas. The 5 minutes is for travel time and is based on the time typically involved in a room fire reaching the point of "flashover" where control is very difficult and the critical time following a heart attack or stroke for medical intervention. Travel time does not represent total response time, which is calculated by adding the travel time to the call processing time and to the turnout/reflex time. Generally, the call processing and turnout/reflex time would add between two to three minutes to the travel time. Table 6 establishes a service level standard, not a requirement, for fire and first responder emergency medical services that is appropriate to the area where a development is located. Standards are intended to (1) help ensure development occurs in areas with adequate fire protection and/or (2) help improve fire service in areas with inadequate coverage by requiring mitigation for service-level improvements as part of Project approval.

Table 5. County of San Diego Time Response Standards*

Travel Time	Regional Category (and/or Land Use Designation)	Rationale for Travel Time Standards**
5 min	▪ Village (VR-2 to VR-30) and limited Semi-Rural Residential Areas (SR-0.5 and SR-1) ▪ Commercial and Industrial Designations in the Village Regional Category ▪ Development located within a Village Boundary	In general, this travel time standard applies to the County's more intensely developed areas, where resident and business expectations for service are the highest.
10 min	▪ Semi-Rural Residential Areas (> SR-1 and SR-2 and SR-4) ▪ Commercial and Industrial Designations in the Semi-Rural Regional Category ▪ Development located within a Rural Village Boundary	In general, this travel time provides a moderate level of service in areas where lower-density development, longer access routes and longer distances make it difficult to achieve shorter travel times.
20 min	Limited Semi-Rural Residential areas (>SR-4, SR-10) and Rural Lands (RL-20) All Commercial and Industrial Designations in the Rural Lands Regional Category	In general, this travel time is appropriate for very low-density residential areas, where full-time fire service is limited and where long access routes make it impossible to achieve shorter travel times.
>20 min	Very-low rural land densities (RL-40 and RL-80)	Application of very-low rural densities mitigates the risk associated with wildfires by drastically reducing the number of people potentially exposed to this hazard. Future subdivisions at these densities are not required to meet a travel time standard. However, independent fire districts should impose additional mitigation requirements on development in these areas.

Source: San Diego County General Plan, Safety Element, Table S-3

* The most restrictive standard will apply when the density, regional category and/or village/rural village boundary does not yield a consistent response time standard.

** Travel time standards do not guarantee a specific level of service or response time from fire and emergency services. Level of service is determined by the funding and resources available to the responding entity.

The closest fire station is San Diego Fire Protection District Station #43, located at 1590 La Media Road San Diego, approximately 1.10 miles from the southwestern portion of the Project site and approximately 2.10 miles to the northeastern portion of the Project site. San Diego Fire Protection District Station 43 cross staffs an Engine, Brush and a Crash Rescue. CAL FIRE/San Diego County Fire Authority is also currently residing at Station #43 and cross staffs a Ladder Truck and Brush Engine and is staffed with two engine companies 24-hours per day/seven days per week. San Diego Fire Protection District Station #43 could be relied upon as the first-in responding fire station, since it is occupied with an engine and crew all the time.

Table 6. Closest Responding Fire Station Summary

Station No.	Location	Equipment	Staffing*	Maximum Travel Distance**	Travel Time**
San Diego FPD #43	Otay Station 1590 La Media Road	▪ Type 1 Engine ▪ Truck ▪ Brush Unit ▪ Crash Unit ▪ Ladder Truck ▪ Brush Engine	1 SDCFPD Engine Company (3 full time firefighers) 1 CAL FIRE/ San Diego County FPD Engine Company (3 full time firefighers)	2.10 mi.	4 minutes, 13 seconds

Notes:
* 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.

Based on the Project site location in relation to existing San Diego Fire Protection District Station #43, travel time to the site for the first responding engine is not expected to exceed 4 minutes and 13 seconds to the farthest portion of the Project site along Lonestar Road. As it currently is configured, the Project would meet the County's General Plan travel time requirement for full time coverage within 5 minutes travel time.

Further, County Fire Station 38 has been under construction since July of 2022 just south of the Otay Mesa Road and Alta Road intersection, which is approximately 1 miles from the southeast corner of the Project site. The proposed four-bay fire station would be a full-time station staffed with career firefighters manning a ladder truck, fire engine, and ambulances. Station 38 is anticipated to begin serving the area in October 2023. Once in service, this fire station would become the first-in responding station for the Project site. The estimated travel time from this station to the project site would be 2 minutes and 21 seconds.

The Project's is currently designated as "Technology Business Park" in the East Otay Mesa Specific Plan; however, a Specific Plan Amendment is currently being processed which will change the designation of this area to "Heavy Industrial" which will be used as the basis of the site plan characteristics. The Project is designated Village Regional Category, which requires a 5-minute travel time as described in Table 6. The furthest portion of the Project site is calculated at approximately 4 minutes and 13 seconds; therefore, the Project would meet County response time standards.

4.2 Estimated Calls and Demand for Service from the Project

Using San Diego County fire agencies' calculated 155 annual calls per 1,000 population, the Project's estimated 2,333 on-site employees associated with the Project sites would generate up to 361 calls per year (roughly 30 calls per month or 1 call per day) most of which would be expected to be medical-related calls, consistent with typical emergency call statistics (See Table 7).

Table 7. Calculated Call Volume Associated with the Project

Emergency Calls per 1,000 (County Data)	Number of Staff	Avg. No. Calls per Year (2,333\1,000)x155	Avg. No. Calls per Day (361/365)
155	2,333	361	1

Service level requirements are not expected to be significantly impacted with the increase of approximately 30 calls per month for the local fire response system. For example, SDCFPD's Station 43 currently responds to roughly 4 calls per day (1,447 calls for CY 2022, 120 calls per month or 30 calls per week[4]) in its primary service area. For reference, a Fire Station that responds to 5 calls per day in an urban setting is considered average and 10 calls per day is considered busy (Hunt Research Corporation 2010). Therefore, the Project is not expected to cause a decline in the emergency response times by adding an estimated 1 call per day or 361 calls per year. The requirements described in this FPP are intended to aid firefighting personnel and minimize the demand placed on the existing emergency service system. Further, the newly constructed Station 38 will become the first-in engine for the project site alleviating the added call volume from the Majestic Otay project and more. Station 38 will be completed in October 2023, prior to the full start of construction of the Majestic Otay project.

4 Personal phone and email conversation with Tiffany from Station #20 and Jenna Lee, Data and Policy Analyst with CAL FIRE and SDCFA.

5 Fire Safety Requirements- Infrastructure, Building Ignition Resistance, and Defensible Space

The County Fire Code (Ordinance No. 10836) and Building Codes govern the building, infrastructure, and defensible space requirements detailed in this FPP. The Project will meet or exceed applicable codes or will provide alternative materials and/or methods. The following summaries highlight important fire protection features. All underground utilities, hydrants, water mains, curbs, gutters, and sidewalks will be installed, and the drive surface shall be approved prior to combustibles being brought on site.

5.1 Roads

5.1.1 Access

Site access will comply with the requirements of the County Fire Code (Section 503.1 and 503.2). The Project site would have direct access from:

- Otay Mesa Rd to Harvest Road which has seven vehicular access points.
- Otay Mesa Rd to Harvest Rd to Zinser Rd which has three vehicular access points.
- Otay Mesa Rd to Sunroad Blvd which has ten vehicular access points.
- Otay Mesa Rd to Vann Centre Rd which has four vehicular access points.

The primary access to the entire project is from Otay Mesa Road which provides access to Harvest Road, Sunroad Blvd, and Vann Centre Rd which carry traffic north to all portions of the Project and provides for both ingress and egress. Each warehouse will have approved access roadways around the perimeter of each warehouse with widths ranging from 26 feet to 80 feet. Roadways will provide access to within 150 feet of all portions of the structure served. The site's fire apparatus access roads do not include parking as all site parking is within designated parking spots. The site's access roads will be signed and or red-curb provided, Per Section 503.3 of the San Diego County Consolidated Fire Code. No parking areas will be designated:

> Sec. 503.3 Marking. When required by the fire code official, approved signs or other approved notices or markings that include the words "NO PARKING FIRE LANE" shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. Signs or notices shall be maintained in a clean and legible condition at all times and be replaced or repaired when necessary to provide adequate visibility.
>
> Sec. 503.3.1 Fire lane designation. Where the fire code official determines that it is necessary to ensure adequate fire access, the fire code official may designate existing roadways as fire access roadways as provided by Vehicle Code Section 22500.1.

5.1.2 Road Widths and Circulation

- All on-site roads will be constructed to current Fire Codes and County of San Diego Standards for Public and Private Roads, including minimum 24-foot road widths with an unobstructed vertical clearance of not less than 13 feet 6 inches.
- All on-site roads shall be constructed and maintained to support the imposed loads of fire apparatus (75,000 lbs.) and shall be improved with asphalt paving materials.
- The horizontal radius of any road or driveway shall be a minimum of 28 feet, as measured on the inside edge of the improved width.
- Parking will be restricted along the primary interior access road by posting of signs stating “No Parking; Fire Lane” to preserve the unobstructed width for emergency response.

5.1.3 Gates

Access gates will comply with County Fire Code (Section 503.6). Public roads shall not be gated, per the County Fire Code. Gates on private roads, such as those on the warehouse access ways, shall comply with County standards for electric gates, namely:

- Access gates will be equipped with a key-operated switch, which overrides all command functions and opens the gate. Key switches shall be provided on the interior and exterior of gates.
- Automatic gates accessing through the main entrance and secondary/emergency access roadways shall be equipped with Opticom control-activating strobe light sensor(s) which will activate the gate from both directions of travel on the approach of emergency apparatus. The automatic gate will have a battery back-up or manual mechanical disconnect in case of a power failure.
- Pole gates or other structures or devices which could obstruct fire access roadways or otherwise hinder emergency operations shall be equipped with an approved, Key-operated padlock.

Further, it is recommended that the gate(s):

- Include area lighting and that the width of the gated area be two feet wider than the road that is gated.
- Be constructed from noncombustible materials.
- Have provisions for manual operation from both sides, if power fails. Gates shall have the capability of manual activation from the development side, via contact by a person or a vehicle (including a traffic pressure tripping loop).
- Be located 30 feet from any intersecting road.

5.1.4 Driveways

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

- Grades shall be less than 15% without providing Portland cement base with heavy broom finish and in no case, greater than 20%
- Approved provisions for turning around fire apparatus.

- Driveways serving two or fewer structures shall be 16 feet wide unobstructed and have a fire apparatus turnaround. Driveways serving more than two structures shall be 24 feet unobstructed.

5.1.5 Premises Identification

Identification of roads and structures will comply with County Consolidated Fire Code Section 505.1, as follows:

- All industrial structures are required to be identified by street address numbers at the structure. Numbers to be minimum 12 inches high with 1-inch stroke, visible from the street. Numbers shall contrast with background and shall be electrically illuminated during the hours of darkness where building setbacks exceed 100 feet from the street or would otherwise be obstructed; numbers shall be displayed at the property entrance.
- Multiple structures located off common driveways or roadways will include posting addresses on structures and on the entrance to individual driveway/road or at the entrance to the common driveway/ road for faster emergency response.
- Proposed private and public streets within the development will be named, with the proper signage installed at intersections to satisfaction of the Department of Public Works.
- Streets will have street names posted on non-combustible street signposts. Letters/numbers will be per Department of Public Works standards (County of San Diego Standard DS-13A through DS-13B).
- Temporary street signs shall be installed on all street corners within the Project prior to the placing of combustible materials on site. Permanent signs shall be installed prior to occupancy of buildings.

5.1.6 Ongoing Infrastructure Maintenance

Majestic Otay Project Owner/Property Management Company shall be responsible for long term funding and maintenance of internal private roads.

5.1.7 Pre-Construction Requirements

Prior to bringing lumber or combustible materials onto the site, site improvements within the active development area shall be in place, including utilities, operable fire hydrants, an approved, temporary roadway surface, and fuel modification zones established. These features will be approved by the fire department or their designee prior to combustibles being brought on site. A pre-construction meeting between the builder and the fire department is recommended.

5.2 Ignition Resistant Construction and Fire Protection Systems

The Project shall meet the requirements of the San Diego County Fire Code (Ordinance No. 10836). The following construction practices respond to the requirements of the Fire Code, Section 4905 and the County Building Code (Chapter 7A), “Construction Methods for Exterior Wildfire Exposure.” These requirements include the ignition resistant requirements found in Chapter 7A of the County Building Code. While these standards will provide a high level of protection to structures in this development and should reduce or eliminate the need to order evacuations,

there is no guarantee of assurance that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

All new structures will be constructed to County standards. Each of the proposed buildings will comply with the enhanced ignition-resistant construction standards of the latest California Building Code (Chapter 7A). 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.

5.3 Fire Protection Systems

5.3.1 Water Supply

Water service for Majestic Otay Project site will be provided by Otay Mesa Water District. All water storage and hydrant locations, mains, and water pressures would be designed to fully comply with San Diego County Fire Code Fire Flow Requirements. As detailed in the County Fire Code Section 96.1.903.2 and California Fire Code Section 903.2, all structures are required to have NFPA 13 property protection internal fire sprinklers. Therefore, water supply must meet a four-hour fire flow requirement of 2000 gpm with 20-pounds per square inch (psi) residual pressure, which must be over and above the daily maximum water requirements for this development.

5.3.2 Hydrants

- Hydrant type and locations shall be subject to SDCFPD approval and shall be located on the normal fire apparatus response side of the road.
- Hydrants shall have one 4-inch outlet and two 2.5-inch outlets. Prior to issuance of building permits, the appropriate number of fire hydrants and their specific locations, approved by the County Fire Marshal, will be identified and they will be constructed accordingly.
- Prior to the issuance of building permits, the applicant shall submit to the County plans demonstrating a water system capable of handling the fire flow requirements.
- Fire service laterals, valves, and meters will be installed on site as required by the County Fire Marshal.
- Reflective blue dot hydrant markers shall be installed in the street to indicate location of the hydrant.
- Crash posts will be provided where needed in on-site areas where vehicles could strike fire hydrants, fire department connections, etc.
- A three-foot clear space (free of ornamental landscaping and retaining walls) shall be maintained around the circumference of all fire hydrants.
- On site hydrants will be in place and serviceable early in the construction process.

5.3.3 Fire Sprinklers

- All new structures, of any occupancy type, are required by the County Fire Code to have an internal, automatic fire sprinkler system. Per the County Fire Code Section 96.1.903.2 and California Fire Code Section 903.2, the Project's structures shall have NFPA 13 property protection internal fire sprinklers.
- Actual system design is subject to final building design and the occupancy types in the structure.

5.4 Defensible Space/Fuel Modification Zones

5.4.1 Zones and Permitted Vegetation

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

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

Based on scientifically modeled fire behavior calculations customized for the site, flame lengths under the most extreme fire weather conditions within the WUI could approach 33.3 feet in height. The fire behavior computer modeling system used to predict flame length was not intended for determining sufficient fuel modification zone widths, but it does provide the average predicted length of the flames, which is a key element for determining "defensible space" distances for minimizing structure ignition. According to the model, wind experienced during extreme conditions would drive flames upslope and would "lay" them over so they paralleled the ground during gusts. Thus, one would expect that the tips of the flaming front would extend 33.3 feet in front of "involved" vegetation. Therefore, the prescribed 100-foot FMZ is adequate in providing enough set-back from volatile fuels so that radiant heat and direct flame impingement is minimized or eliminated, providing firefighters "defensible" space in which they can work. All Project structures will include 100 feet of FMZ or FMZ equivalent (pavement, rock, maintained landscape).

5.4.2 Fuel Modification Zone Requirements

FMZs will be implemented according to the following requirements. Figure 4 provides a conceptual fuel modification plan for the Project. Precise FMZ and landscape plans will be prepared when a parcel map is processed. No vegetation found on the Undesirable Plant List (Appendix D) shall be planted or remain in any FMZ. Each zone would include permanent field markers to delineate the zones, aiding ongoing maintenance activities that will occur on site and the Project would hire a qualified 3rd party fuel modification zone inspector to provide annual inspections, as detailed in the following sections.

Section 3319.1 of the County Consolidated Fire Code requires fuel modification zones to be in place prior to allowing any combustible material to arrive on site. The fuel modification zones shall be maintained throughout the duration of construction.

5.4.2.1 Zone 0 – Immediate Zone (0-5 feet)

Meaning from exterior wall surface of the building extending 5 feet on a horizontal plane. This zone shall be constructed of continuous hardscape or non-combustible materials acceptable to the FAHJ. Removal of combustible materials surrounding the exterior wall area and maintaining area free of combustible materials. The use of mulch and other combustible materials shall be prohibited.

5.4.2.2 Zone 1 – Intermediate Zone (6-50 feet)

This zone shall consist of planting low growth, drought tolerant and fire resistive plant species. The height of the plants in this zone starts as 6 inches adjacent to Zone 0 and extend in a linear fashion up to a maximum of 18 inches at intersection with Zone 2. Vegetation in this zone shall be irrigated and not exceed 6 feet in height and shall be moderate in nature.

Zone 1 includes the following key components:

- Maintenance including ongoing removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying plantings, maintenance of the programming and functionality of the irrigation system, regular trimming to prevent ladder fuels[5].
- A minimum of 36 inches wide pathway with unobstructed vertical clearance around the exterior of each structure (360°) provided for firefighter access (2022 CFC, Section 504.1).
- Trees and tree form shrub species that naturally grow to heights that exceed 2 feet shall be vertically pruned to prevent ladder fuels.
- Grasses shall be cut to 4 inches in height. Native grasses can be cut after going to seed.
- Dead or dying grass, plants, shrubs, trees, branches, leaves, weeds, and pine needles must be removed from the area.
- Vegetation in this zone shall be irrigated and not exceed 6’ in height and shall be moderate in nature per Section 4907.6.4.1 of the County Fire Code.
- Vegetation shall not be cleared to bare soil.
- Brush and plants shall be limbed up off the ground, so the lowest branches are 1/3 height of the bush/ tree/plant.

5.4.2.3 Zone 2 – Extended Zone (51-100 feet)

A ‘thinning’ zone reduces the fuel load of a wildland area adjacent to Zone 1, and thereby, reduces heat and ember production from wildland fires, slows fire spread, and reduces fire intensity. Zone 2 adjoins Zone 1 and measures 50 feet for this Project.

Zone 2 includes the following key components if thinning of native vegetation is required:

- Zone 2 requires a minimum of 50% thinning or removal of plants (50% no fuel) focusing on removal of dead and dying plants and highly flammable species.

5 Plant material that can carry a fire burning in low-growing vegetation to taller vegetation is called ladder fuel. Examples of ladder fuels include low-lying tree branches and shrubs, climbing vines, and tree-form shrubs underneath the canopy of a large tree.

- Fuel continuity should be interrupted so that groupings of shrubs are separated from adjacent groupings.
- Maintenance including ongoing removal and thinning of dead/dying planting, and regular trimming to prevent ladder fuels.
- Trees and tree-form shrub species that naturally grow to heights that exceed 4 feet shall be vertically pruned to prevent ladder fuels.
- Grasses shall be cut to 4 inches in height. Native grasses can be cut after going to seed.
- Single specimen native shrubs, exclusive of chamise and sage, may be retained, on 20-foot centers.
- No vegetation found on the Undesirable Plant List (Appendix D) shall remain in Zone 2.
- Vegetation shall not be cleared to bare soil.
- Brush and plants shall be limbed up off the ground, so the lowest branches are 1/3 height of the bush/tree/plant up to 6 feet above the ground for mature trees.

5.4.3 Vegetation Management Maintenance

Vegetation management, i.e., assessment of fuel modification zone condition and removal of dead and dying and undesirable species; as well as thinning as necessary to maintain specified plant spacing and fuel densities, shall be completed annually by May 1 of each year and more often as needed for fire safety. The interim period vegetation management will be funded by the Project developer and shall be conducted by their contractor. The Project developer shall be responsible for all vegetation management throughout the development, in compliance with the Project FPP that is consistent with requirements. The Project Developer or Property Manager would annually hire a third party, SDCFA-approved, FMZ inspector to provide annual certification that it meets the requirements of this FPP.

The permanent FMZ required for Majestic Otay Project will be maintained by the developer who will be responsible for FMZ vegetation management once the Project is built out and the adjacent areas are developed. The Owner or Property Manager will be responsible for streetscape and public area vegetation management in perpetuity.

On-going/as-needed fuel modification zone maintenance during the interim period while the Project is built out and adjacent parcels are developed, which may be one or more years, will include necessary measures for consistency with the FPP, including:

- Regular Maintenance of dedicated Open Space.
- Removal or thinning of undesirable combustible vegetation and replacement of dead or dying landscaping.
- Maintaining ground cover at a height not to exceed 18 inches. Annual grasses and weeds shall be maintained at a height not to exceed four inches.
- Removing accumulated plant litter and dead wood. Debris and trimmings produced by thinning and pruning should be removed from the site or chipped and evenly dispersed in the same area to a maximum depth of three inches.
- Maintaining manual and automatic irrigation systems for operational integrity and programming. Effectiveness should be regularly evaluated to avoid over or under-watering.
- Complying with these FPP requirements on a year-round basis. Annual inspections are conducted following the natural drying of grasses and fine fuels, between the months of May and June, depending on precipitation during the winter and spring months.

5.4.4 Environmentally Sensitive Areas/Open Space

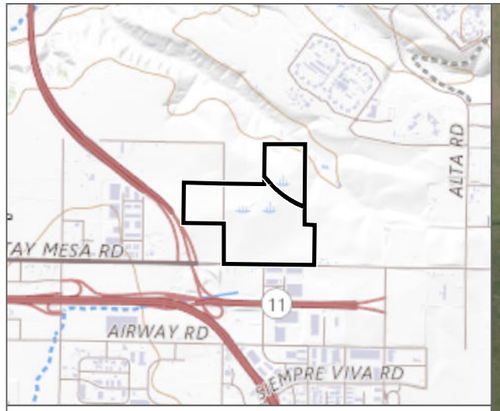
Once the FMZs are in place, there will not be a need to expand them as they have been planned to meet the fire code. However, if unforeseen circumstances were to arise that required hazard reduction within an area considered environmentally sensitive or part of the Multispecies Conservation Plan, it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

5.4.5 Prohibited Plants

Certain plants are considered prohibited in the landscape due to characteristics that make them highly flammable. These characteristics can be physical (structure promotes ignition or combustion) or chemical (volatile chemicals increase flammability or combustion characteristics). The plants included in the Undesirable Plant List (Appendix D) are unacceptable from a fire safety standpoint and will not be planted on the site or allowed to establish opportunistically within fuel modification zones or landscaped areas.

5.4.6 Construction Phase Vegetation Management

Vegetation management requirements shall be implemented at commencement and throughout the construction phase. Vegetation management shall be performed pursuant to the FAHJ on all building locations prior to the start of work and prior to any import of combustible construction materials. Adequate fuel breaks shall be created around all grading, site work, and other construction activities in areas where there is flammable vegetation.



Project Boundary
Grading Limits
Building Footprint

Fuel Modification Zone

Zone 0 (0-5-Ft, irrigated)
Zone 1 (5-50-Ft, irrigated)
Zone 2 (50-100-Ft, thinned)

OPEN SPACE
BLDG. 9
BLDG. 10
BLDG. 12
BLDG. 11
BLDG. 8
BLDG. 7
BLDG. 3
BLDG. 4
BLDG. 5
BLDG. 6
BLDG. 1
BLDG. 2
OTAY MESA RD
HARVEST RD
SANYO AVE
125

SOURCE: AERIAL- ESRI IMAGERY; DEVELOPMENT - PBLA ENGINEERING 2023

DUDEK

0 205 410 Feet

FIGURE 4

Fuel Modification Plan

Fire Protection Plan Majestic Otay Project

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6 Wildfire Education Program

The business owner(s) of the Majestic Otay Project will be provided a proactive educational component disclosing the potential wildfire risk and this report's requirements. This educational information must include maintaining the landscape and structural components according to the appropriate standards and embracing a "Ready, Set, Go[6]" stance on evacuation.

[6] https://www.readysandiego.org/content/dam/oesready/en/Resources/wildfire_preparedness_guide.pdf

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7 Conclusion

This FPP for the Majestic Otay Project provides guidance for vegetation maintenance for the proposed FMZs and landscaped areas on the site. As described, vegetation maintenance measures will be provided on all sides of the proposed development. The requirements and recommendations provided in this FPP have been designed specifically for the Majestic Otay Project. This analysis and its fire protection justifications are supported by fire science research, results from previous wildfire incidents, and fire agencies that have approved these concepts.

Ultimately, it is the intent of this FPP to guide the fire protection efforts for the Majestic Otay Project in a comprehensive manner. Implementation of the measures detailed in this FPP will reduce the risk of wildfire at this site and will improve the ability of firefighters to fight fires on the properties and protect property and neighboring resources, irrespective of the cause or location of ignition.

It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions and minimizing actions identified in this report are designed to reduce the likelihood that fire will impinge upon Majestic Otay Project assets or threaten its visitors. Additionally, there are no guarantees that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property. Implementation of the required enhanced construction features provided by the applicable codes and the fuel modification requirements provided in this FPP will reduce the site's vulnerability to wildfire. It will also help accomplish the goal of this FPP to assist firefighters in their efforts to defend structures.

It is recommended that Majestic Otay Project maintain 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. This Project is not to be considered a shelter-in-place development. However, the fire agencies and/or law enforcement officials may, during an emergency, as they would for any new development providing the layers of fire protection as Majestic Otay Project, determine that it is safer to temporarily refuge employees or visitors on the site. When an evacuation is ordered, it will 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. Fire is a dynamic and somewhat unpredictable occurrence and it is important for anyone living at the WUI to educate themselves on practices that will improve safety.

In summary, the mitigating measures implemented within the Majestic Otay Project, listed below, accomplish two complimentary primary objectives. These measures simultaneously protect the development from incoming wildfire while reducing the present wildfire risk to the community observed today by removing a large quantity of fuels and reducing potential ignition points that are existing at the project location, meaning the project does not substantially contribute to greater risk to the existing community. Implementation of the FPP's detailed wildfire mitigation measures will result in a less than significant impact with regards to fire hazards. Among the mitigation measure are:

- Project buildings will be constructed of ignition resistant[7] construction materials and include automatic fire sprinkler systems based on the latest adopted Building and Fire Codes for occupancy types.

[7] A type of building material that resists ignition or sustained flaming combustion sufficiently to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with wildfire exposure of burning embers and small flames, as prescribed in CBC, Chapter 7A and State Fire Marshal Standard 12-7A-5, Ignition-Resistant Materials.

- Fuel Modification will be provided as needed around the proposed structure, as required by SDCFA and will be 100 feet wide. All proposed buildings have at least 100 feet to the Property Line, meaning that implementation will not be impeded by lack of ownership.
- Landscape plantings will not utilize prohibited plants that have been found to be highly flammable and more prone to ignition.
- Maintenance would occur as needed, and the Property Owner would annually hire a third party, SDCFA-approved, FMZ inspector to provide annual certification that it meets the requirements of this FPP.
- Fire apparatus access roads (i.e., public and private streets) will be provided throughout the development and will vary in width and configuration, but will all provide at least the minimum required unobstructed travel lanes, lengths, turnouts, turnarounds, and clearances required by applicable codes. Primary access and internal circulation will comply with the requirements of the SDCFA.
- Buildings will be equipped with automatic commercial fire sprinkler systems meeting SDCFA requirements.
- Water capacity and delivery provide for a reliable water source for operations and during emergencies requiring extended fire flow.
- The Property Owner or Property Management Company will provide informational brochures at time of occupancy, which will include an outreach and educational role to ensure fire safety measures detailed in this FPP have been implemented and development-wide "Ready, Set, Go!" plans prepared.[8]

[8] https://www.readysandiego.org/content/dam/oesready/en/Resources/wildfire_preparedness_guide.pdf

8 List of Preparers

Project Manager

Michael Huff
Senior Fire Protection Planner
Dudek

Fire Protection Plan Preparer

Austin Ott
Fire Protection Planner
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Noah Stamm
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Lesley Terry
CADD Specialist
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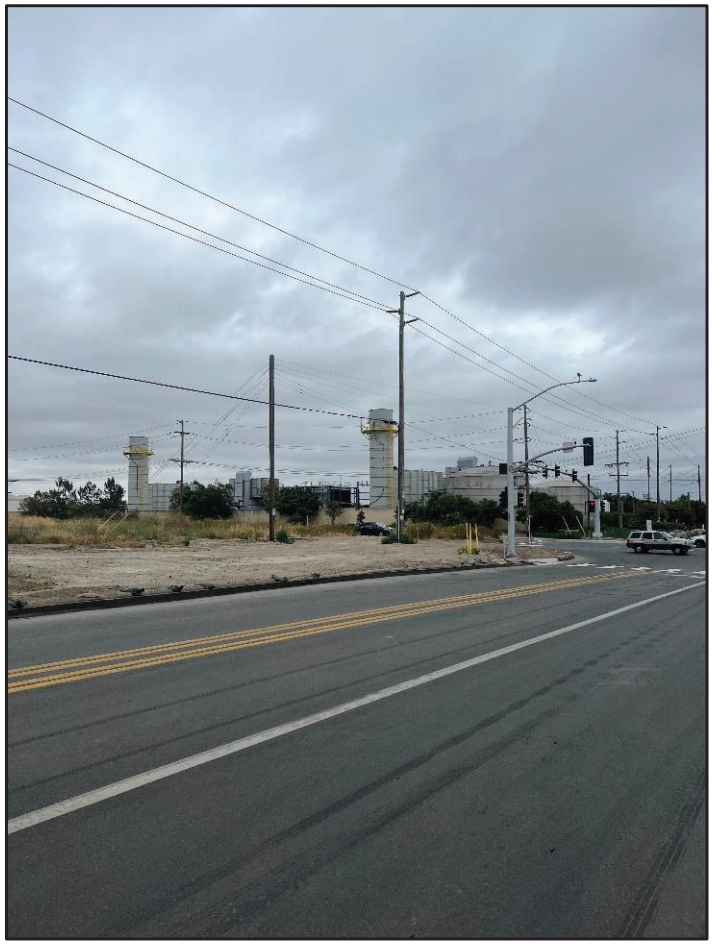
Appendix A
Photograph Log

Photo log

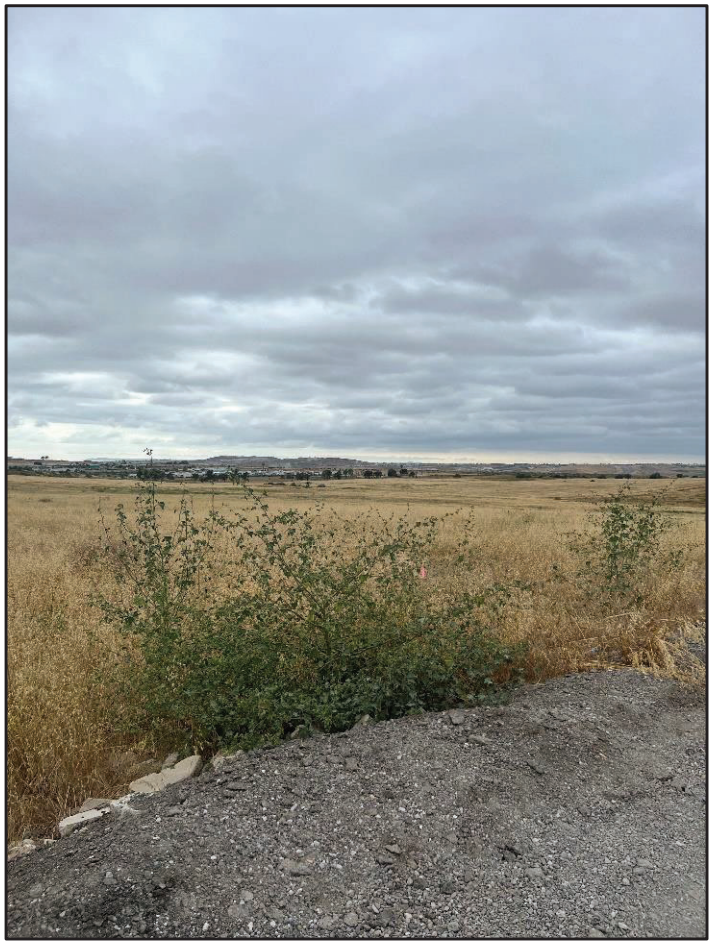
Majestic Otay Project



Photograph 1. View facing southeast toward intersection of Harvest Road and Otay Mesa Road, standing along Harvest Road.

Photograph 2. View facing southwest towards the western portion of the project site standing along Harvest Road. Note the newly constructed warehouse structure located south/southwest of the proposed project.

Photograph 3. View facing west towards the western portion of the project site standing along Harvest Road. Note the newly constructed warehouse structure located south/southwest of the proposed project.



Photograph 4. View facing northwest towards the northwestern portion of the project site standing along Harvest Road.

Photograph 5. View facing north/northwest towards the northwestern portion of the project site along the west side of Harvest road.

Photograph 6. View facing south/southeast towards the south/southeast portion of the project site along the east side of Harvest Road.

Photograph 7. View facing north/northeast towards the north/northeast portion of the project site along the east side of Harvest Road.

Photograph 8. View facing west standing along a dirt roadway within the center of the project site, east of Harvest Road.

Photograph 9. View facing south standing along a dirt roadway within the center of the project site, east of Harvest Road.

Photograph 10. View facing east standing along a dirt roadway within the center of the project site looking out towards the east/southeast portion of the project site, east of Harvest Road.

Photograph 11. View facing east standing along the east side of Harvest Road towards the northeast portion of the project site.

Photograph 12. View facing south down Harvest Road standing near the norther property boundary.

Photograph 13. View facing southwest towards the northwest portion of the project site, standing in the center Harvest Road near the norther property boundary.

Photograph 14. View facing west towards the northwest portion of the project site, standing in the center Harvest Road near the norther property boundary.

Photograph 15. View facing north at the existing vegetation north of the project site, standing in the center Harvest Road near the norther property boundary.

Photograph 16. View facing southwest towards Otay Mesa Road standing along the eastern property boundary near the southeast portion of the project site.

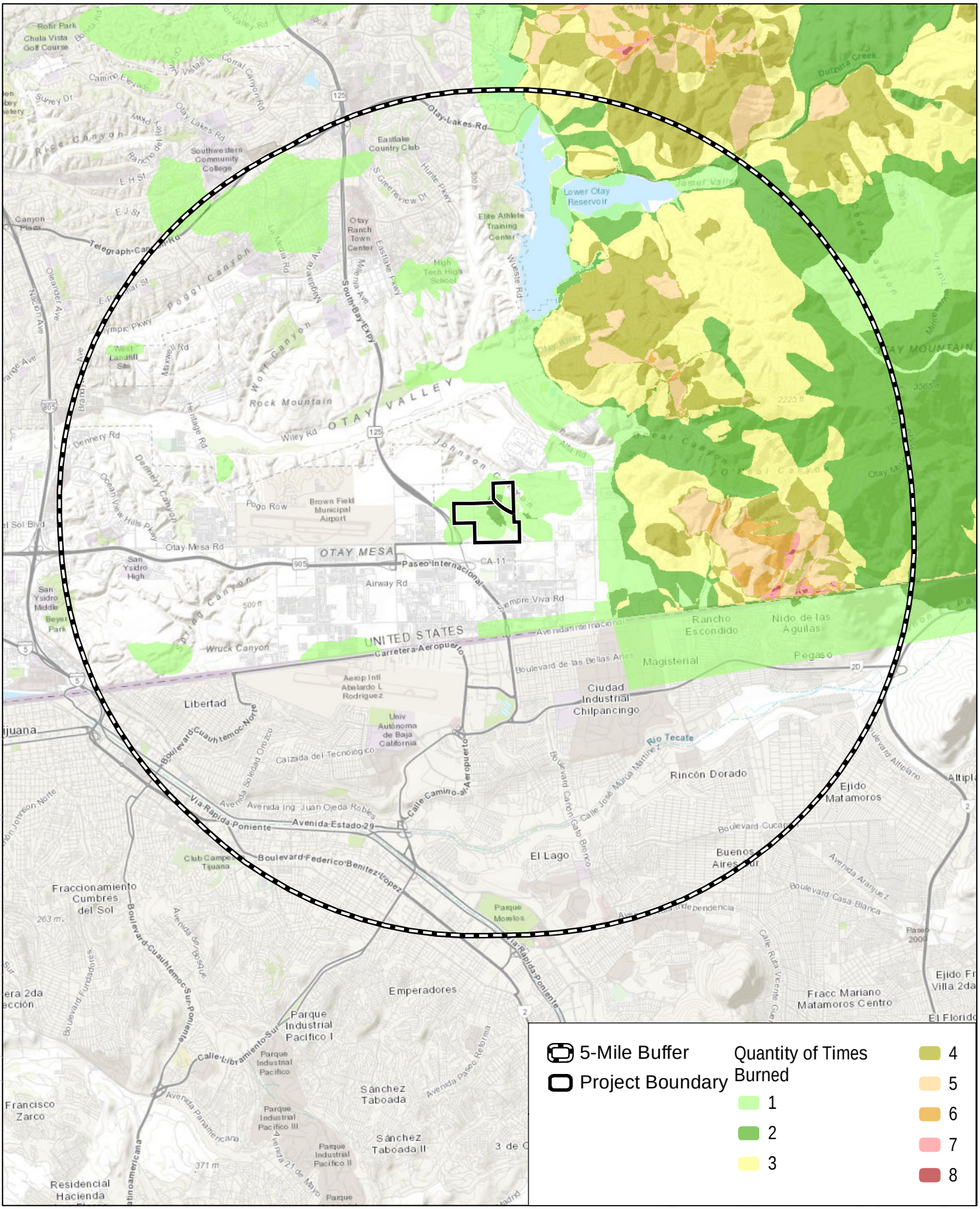
Photograph 17. View facing north along the eastern property boundary standing in a dirt road near the southeast portion of the project site.

Photograph 18. View facing northwest along the eastern property boundary standing in a dirt road near the southeast portion of the project site.

Appendix B

Majestic Otay

Project Vicinity Fire History Map



SOURCE: BASE MAP- ESRI MAPPING SERVICE; FIRE DATA-CALFIRE 2021

APPENDIX B

DUDEK

0 1 2 Miles

Fire History Map

Fire Protection Plan for the Majestic Otay Project

Appendix C

BehavePlus Fire Behavior Analysis

1 BehavePlus Fire Behavior Modeling History

Fire behavior modeling has been used by researchers for approximately 50+ years to predict how a fire will move through a given landscape (Linn 2003). The models have had varied complexities and applications throughout the years. One model has become the most widely used as the industry standard for predicting fire behavior on a given landscape. That model, known as "BEHAVE", was developed by the U. S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. Since that time, it has undergone continued research, improvements, and refinement. The current version, BehavePlus 6.0, includes the latest updates incorporating years of research and testing. Numerous studies have been completed testing the validity of the fire behavior models' ability to predict fire behavior given site specific inputs. One of the most successful ways the model has been improved has been through post-wildfire modeling (Brown 1972, Lawson 1972, Sneeuwjagt and Frandsen 1977, Andrews 1980, Brown 1982, Rothermel and Rinehart 1983, Bushey 1985, McAlpine and Xanthopoulos 1989, Grabner, et. al. 1994, Marsden-Smedley and Catchpole 1995, Grabner 1996, Alexander 1998, Grabner et al. 2001, Arca et al. 2005). In this type of study, Behave is used to model fire behavior based on pre-fire conditions in an area that recently burned. Real-world fire behavior, documented during the wildfire, can then be compared to the prediction results of Behave and refinements to the fuel models incorporated, retested, and so on.

Fire behavior modeling conducted on this site includes a relatively high-level of detail and analysis which results in reasonably accurate representations of how wildfire may move through available fuels on and adjacent the property. Fire behavior calculations are based on site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths, spread rates, and fireline intensities, this analysis incorporated predominant fuel characteristics, slope percentages, and representative fuel models observed on site. The BehavePlus fire behavior modeling system was used to analyze anticipated fire behavior within and adjacent to key areas just outside of the proposed lots. Predicting wildland fire behavior is not an exact science. As such, the movement of a fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire prevention planning information. To be used effectively, the basic assumptions and limitations of BehavePlus must be understood.

- First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is dead fuels less than one-quarter inch in diameter. These are the fine fuels that carry fire. Fuels greater than one inch have little effect while fuels greater than three inches have no effect on fire behavior.
- Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within six feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
- Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.

- Fourth, the BehavePlus fire behavior computer modeling system was not intended for determining sufficient fuel modification zone/defensible space widths. However, it does provide the average length of the flames, which is a key element for determining "defensible space" distances for minimizing structure ignition.

Although BehavePlus has some limitations, it can still provide valuable fire behavior predictions which can be used as a tool in the decision-making process. In order to make reliable estimates of fire behavior, one must understand the relationship of fuels to the fire environment and be able to recognize the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur on a site. The type and quantity will depend upon the soil, climate, geographic features, and the fire history of the site. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

The seven fuel characteristics help define the 13 standard fire behavior fuel models[1] and the five custom fuel models developed for Southern California[2]. According to the model classifications, fuel models used in BehavePlus have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface to volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in BehavePlus. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models:

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

In addition, the aforementioned fuel characteristics were utilized in the recent development of 40 new fire behavior fuel models[3] developed for use in BehavePlus modeling efforts. These new models attempt to improve the accuracy of the standard 13 fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the new 40 fuel models:

- Grass Models GR1 through GR9
- Grass-shrub Models GS1 through GS4
- Shrub Models SH1 through SH9

1 Anderson, Hal E. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. USDA Forest Service Gen. Tech. Report INT-122. Intermountain Forest and Range Experiment Station, Ogden, UT.

2 Weise, D.R. and J. Regelbrugge. 1997. Recent chaparral fuel modeling efforts. Prescribed Fire and Effects Research Unit, Riverside Fire Laboratory, Pacific Southwest Research Station. 5p.

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

- Timber-understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4

BehavePlus software was used in the development of the Majestic Otay Project's (Proposed Project) Fire Protection Plan (FPP) in order to evaluate potential fire behavior for the Project site. Existing site conditions were evaluated, and local weather data was incorporated into the BehavePlus modeling runs.

2 Fuel Models

Dudek utilized the BehavePlus software package to analyze fire behavior potential for the Proposed Project site in San Diego County. As is customary for this type of analysis, five scenarios were evaluated, including two summer, onshore weather condition (north/northwest and west/southwest of the project site) and three extreme fall, offshore weather condition (north/northeast, east, and southeast of the project site). The project site is surrounded by an industrial building under construction to the south/southwest, existing industrial buildings and Otay Mesa Road to the south, open space with grass dominated vegetation to the north, and east, and CA-125 freeway to the west. With that said, fuels and terrain within and adjacent to the project development area could produce flying embers that may affect the project, but defenses have been built into the structures to prevent ember penetration and to extinguish fires that may result from ember penetration. It is the fuels directly adjacent to and within fuel modification zones 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, however, the development will include up to 100 feet of fuel modification and non-combustible parking areas. BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The output variables used in this analysis include flame length (feet), rate of spread (feet/minute), fireline intensity (BTU/feet/second), and spotting distance (miles). The following provides a description of the input variables used in processing the BehavePlus models for the Proposed Project site. In addition, data sources are cited and any assumptions made during the modeling process are described.

2.1 Vegetation (Fuels)

To support the fire behavior modeling efforts conducted for this FPP, the different vegetation types observed within the project areas and adjacent to the project site were classified into the aforementioned numeric fuel models. 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 non-native grasslands, are adjacent to the proposed project development site. These fuel types can produce flying embers that may affect the project, but defenses will have been built into the structures to prevent ember penetration. Table 1 provides a description of the three fuel models observed in the vicinity of the site that were subsequently used in the analysis for this project. Modeled areas include low and moderate load grassland ground fuels (Fuel Models: FM1, Gr2, and Gr4) found throughout and adjacent to the project site. A total of five fire modeling scenarios were completed for the site. 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, 3, and 4) and an on-shore weather pattern (fire scenarios 1 and 5). Dudek also conducted modeling of the site for post-Fuel Modification

Zones' (FMZ) recommendations for this project (Refer to Table 2 for post-FMZ fuel model descriptions). Fuel modification includes establishment of irrigated and thinned zones on the periphery of the Industrial building(s) as well as interior landscape requirements. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified as non-burnable for the non-combustible parking areas and for FMZs 1 and 2 (Fuel Model 8) and FMZ 3 (Fuel Model Gr1) as applicable.

Table 1. Existing Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
FM1	Short Grasses	Represented throughout the adjacent areas surrounding the Project	>1.0 ft.
Gr2	Low Load Dry Climate Grass	Represented throughout the adjacent areas surrounding the Project.	<2.0 ft.
Gr4	Moderate Load, Dry Climate Grass	Represented throughout the adjacent areas surrounding the Project	>3.0 ft.

Table 2. Post-development Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
NB1	Non-burnable	Non-combustible parking lot areas	0 ft.
8	Compact litter	Fuel Modification Zone 1 and 2: irrigated landscape	<1.0 ft.
Gr1	Sparse, Sparse Load, Dry Climate Grass	Fuel Modification Zone 3: 50% thinning of grasses	>1.0 ft.

2.2 Topography

Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or downhill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. Natural slope values ranging from 1% to 7% were measured around the perimeter of the Project site from U.S. Geological Survey (USGS) topographic maps. Slope gradients for landscape areas are assumed to be flat (3%) as presented on the project's site plan.

2.3 Weather Analysis

Historical weather data for the Southern San Diego region was utilized in determining appropriate fire behavior modeling inputs for the Project area. 50th and 97th percentile moisture values were derived from Remote Automated

Weather Station (RAWS) and utilized in the fire behavior modeling efforts conducted in support of this report. Weather data sets from the San Miguel Station RAWS (ID number 045737)[4] were utilized in the fire modeling runs.

RAWS fuel moisture and wind speed data were processed utilizing the Fire Family Plus software package to determine atypical (97th percentile) and typical (50th percentile) weather conditions. Data from the RAWS was evaluated from August 1 through November 30 for each year between 2002 and 2021 (extent of available data record) for 97th percentile weather conditions and from June 1 through September 30 for each year between 2002 and 2021 for 50th percentile weather conditions.

Following analysis in Fire Family Plus, fuel moisture information was incorporated into the Initial Fuel Moisture file used as an input in BehavePlus. Wind speed data resulting from the Fire Family Plus analysis was also determined. Initial wind direction and wind speed values for the five BehavePlus runs were manually entered during the data input phase. The input wind speed and direction is roughly an average surface wind at 20 feet above the vegetation over the analysis area. Table 3 summarizes the wind and weather input variables used in the Fire BehavePlus modeling efforts.

Table 3: Variables Used for Fire Behavior Modeling

Model Variable	Summer Weather (50th Percentile)	Peak Weather (97th Percentile)
Fuel Models	FM1, Gr2, and Gr4	FM1, Gr2, and Gr4
1 h fuel moisture	8%	2%
10 h fuel moisture	9%	3%
100 h fuel moisture	15%	8%
Live herbaceous moisture	59%	30%
Live woody moisture	118%	60%
20 ft. wind speed	12 mph (sustained winds)	16 mph (sustained winds); wind gusts of 50 mph
Wind Directions from north (degrees)	220 and 300	20, 90, and 150
Wind adjustment factor	0.4	0.4
Slope (uphill)	1 to 2%	3 to 7%

3 Fire Behavior Modeling Efforts

As mentioned, the BehavePlus fire behavior modeling software package was utilized in evaluating anticipated fire behavior adjacent to the Proposed Project site. Five 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 northwest, north/northeast, east, southeast, and west/southwest. 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

[4] San Miguel RAWS Station Latitude and Longitude: 32.686321, -116.977819

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 four 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 low to moderate-load grass dominated vegetation located northwest of the project site. The terrain is flat (approximately 1% to 2% slope) with potential ignition sources from a car fire along CA-125 or a wildland fire north/northwest of the property. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.
- **Scenario 2:** A fall, off-shore fire (97th percentile weather condition) burning in low to moderate-load grass dominated vegetation located north of the project site. The terrain is relatively flat (approximately 7% slope) with potential ignition sources from a structure/facility fire or wildland fire from the north/northeast of the proposed property. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.
- **Scenario 3:** A fall, off-shore fire (97th percentile weather condition) burning in low to moderate-load grass dominated vegetation located north/northeast of the project site. The terrain is flat (approximately 5% slope) with potential ignition sources from a structure/facility fire or car fire east of the proposed property. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.
- **Scenario 4:** A fall, off-shore fire (97th percentile weather condition) burning in low to moderate-load grass dominated vegetation located southeast of the project site. The terrain is flat (approximately 3% slope) with potential ignition sources from a structure/facility fire or car fire from the east and/or south of the proposed property. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.
- **Scenario 5:** A summer, on-shore fire (50th percentile weather condition) burning in low to moderate-load grass dominated vegetation located northwest of the project site. The terrain is flat (approximately 2% slope) with potential ignition sources from a car fire along Otay Mesa Road. This type of fire would typically spread moderately fast through the grass dominated vegetation before reaching the developed portion of the project site.

4 Fire Behavior Modeling Results

The results presented in Tables 4 and 5 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.

As presented in Table 4, wildfire behavior on the Project site is expected to be primarily of low to moderate intensity throughout the non-maintained surface grass dominated fuels throughout the perimeter areas of the project site. Worst-case fire behavior is expected in untreated, surface grass vegetation under peak weather conditions (represented by Fall Weather, Scenario 2). The fire is anticipated to be a wind-driven fire from the north/northeast during the fall. Under such conditions, expected surface flame length is expected to be significantly lower in the areas where fuel modification occurs, with flames lengths reaching approximately 33 feet with wind speeds of 50+ mph. Under this scenario, fireline intensities reach 11,574 BTU/feet/second with moderate spread rates of 14.0 mph and could have a spotting distance up to 2.0 miles away.

Wildfire behavior in non-maintained grasslands, modeled as FM1, Gr2, and Gr4 fuel models being fanned by 12 mph sustained, on-shore winds Fires burning from the west/northwest and pushed by ocean breezes typically exhibit less severe fire behavior due to lower wind speeds and higher humidity. Under typical onshore weather conditions, a low-load grass/grass-shrub vegetation fire could have flame lengths between approximately 4 feet and 8 feet in height and spread rates between 0.4 and 0.9 mph. Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 0.2 to 0.3 miles.

As depicted in Table 5, the FMZ areas experience a significant reduction in flame length and intensity. The 12.7- to 33.3-foot flame lengths predicted for non-maintained grassland habitats during pre-treatment modeling for fire scenarios 2, 3, and 4 are reduced to approximately 3.1 feet at the outer edges of the FMZ (Zone 3) and to 2.6 feet by the time the inner portions of the FMZ (Zones 1 and 2) are reached. During on-shore weather conditions, a fire approaching from the west towards the development footprint would be reduced from approximately 9-foot tall flames to less than 1.1-foot tall for Zones 1, 2, and 1.7 with low fire intensity and spotting distances due to the higher live and dead fuel moisture contents. These reduction of flame lengths and intensities are assumed to occur within the 100 feet of fuel modification that is achieved for most of the site (a combination of Zones 1, 2, and 3).

Table 4: RAWS BehavePlus Fire Behavior Model Results – Existing Conditions

Fire Scenario	Flame Length (feet)	Spread Rate (mph)[5]	Fireline Intensity (Btu/ft./sec)	Spot Fire (Miles) [6]
Scenario 1: 1% slope, Summer on-shore wind from the NW, 12 mph sustained winds (Current conditions)				
Low-load grasses (Gr2)	4.3'	0.4	132	0.2
Moderate-load grasses (Gr4)	8.0'	0.8	522	0.3
Short grasses (FM1)	4.0'	0.9	115	0.2
Scenario 2: 7% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Low-load grasses (Gr2)	8.4' (14.1')	1.4 (4.2)	580 (1,791)	0.3 (1.1)
Moderate-load grasses (Gr4)	15.7' (33.3')	2.7 (14.0)	2,259 (11,574)	0.5 (2.0)
Short grasses (FM1)	7.8' (12.7')	2.9 (8.3)	489 (1,415)	0.3 (1.0)
Scenario 3: 5% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Low-load grasses (Gr2)	8.4' (14.1')	1.4 (4.2)	577 (1,791)	0.3 (1.1)
Moderate-load grasses (Gr4)	15.7' (33.3')	2.7 (13.9)	2,249 (11,563)	0.5 (2.0)
Short grasses (FM1)	7.8' (12.7')	2.9 (8.3)	487 (1,415)	0.3 (1.0)
Scenario 4: 3% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Low-load grasses (Gr2)	8.4' (14.1')	1.4 (4.2)	577 (1,791)	0.3 (1.1)
Moderate-load grasses (Gr4)	15.7' (33.3')	2.7 (13.9)	2,249 (11,563)	0.5 (2.0)
Short grasses (FM1)	7.8' (12.7')	2.9 (8.3)	487 (1,415)	0.3 (1.0)
Scenario 5: 5% slope, Summer, On-shore wind from the W/SW, 12 mph sustained winds (Current conditions)				
Low-load grasses (Gr2)	4.3'	0.4	132	0.2
Moderate-load grasses (Gr4)	8.0'	0.8	522	0.3
Short grasses (FM1)	4.0'	0.9	115	0.2

[5] mph = miles per hour
[6] Spotting distance from a wind driven surface fire; it should be noted that the wind mph in parenthesis represent peak gusts of 50 mph.

Table 5: RAWS BehavePlus Fire Behavior Model Results – Post Project Conditions

Fire Scenario	Flame Length (feet)	Spread Rate (mph)[7]	Fireline Intensity (Btu/ft./sec)	Spot Fire (Miles)[8]
Scenario 1: 1% slope, Summer on-shore wind from the NW, 12 mph sustained winds (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.0’	0.0	5	0.1
FMZ Zone 3 (Gr1)	1.7’	0.2	18	0.1
Scenario 2: 7% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.7’ (2.6’)	0.1 (0.1)	19 (45)	0.1 (0.3)
FMZ Zone 3 (Gr1)	3.1’ (3.1’)	0.5 (0.5)	67 (67)	0.2 (0.4)
Scenario 3: 5% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.7’ (2.6’)	0.1 (0.1)	19 (45)	0.1 (0.3)
FMZ Zone 3 (Gr1)	3.1’ (3.1’)	0.5 (0.5)	67 (67)	0.2 (0.4)
Scenario 4: 3% slope, Fall, Off-shore wind from the N, 16 mph sustained winds with 50 mph wind gusts (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.7’ (2.6’)	0.1 (0.1)	19 (45)	0.1 (0.3)
FMZ Zone 3 (Gr1)	3.1’ (3.1’)	0.5 (0.5)	67 (67)	0.2 (0.4)
Scenario 5: 5% slope, Summer, On-shore wind from the W/SW, 12 mph sustained winds (Current conditions)				
Non-combustible (NB1)	0	0	0	0
FMZ Zone 1 and 2 (FM8)	1.0’	0.0	5	0.1
FMZ Zone 3 (Gr1)	1.7’	0.2	18	0.1

The following describes the fire behavior variables (Heisch and Andrews 2010) as presented in Tables 3 and 4:

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.

[7] mph = miles per hour
[8] Spotting distance from a wind driven surface fire; it should be noted that the wind mph in parenthesis represent peak gusts of 45 mph.

- 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 6 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 4 and 5. Identification of modeling run locations is presented graphically in Figure 3 of the FPP.

Table 6: 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.

Appendix D
Plant Lists

Undesirable Plant List
For Fuel Modification Projects in San Diego, Riverside, and Orange Counties

	Botanical Name	Common Name	Plant Form
1.	Acacia species •	Acacia	Shrub/Tree
2.	Adenostoma fasciculatum	Chamise	Shrub
3.	Adenostoma sparsifolium	Red Shank	Shrub/Tree
4.	Artemisia californica	California Sagebrush	Shrub
5.	Bamboos	Bamboo	Shrub
6.	Cedrus species	Cedar	Tree
7.	Cupressus species	Cypress	Tree
8.	Eriogonum fasciculatum	Common Buckwheat	Shrub
9.	Eucalyptus species	Eucalyptus	Shrub/Tree
10.	Juniperus species	Junipers	Succulent
11.	Pennisetum	Fountain Grass	Ground cover
12.	Pinus species	Pines	Tree
13.	Rosmarinus species	Rosemary	Shrub
14.	Salvia species • •	Sage	Shrub

- • Except:
  Acacia redolens desert carpet (Desert Carpet ground cover)
- • • Except:
  Salvia colubariae (chia)
  Salvia sonomensis (Creeping Sage)

Recommended Plant List
For Fuel Modification Projects in San Diego, Riverside, and Orange Counties

	Code	Botanical Name	Common Name	Plant Form
1.	**W**	Abelia x grandiflora	Glossy Abelia	Shrub
2.	□	Acacia redolens desert carpet	Desert Carpet	Shrub
3.	□	Acer macrophyllum	Big Leaf Maple	Tree
4.	**X**	Achillea millefolium	Common Yarrow	Low shrub
5.	**W**	Achillea tomentosa	Wooly Yarrow	Low shrub
6.	**X**	Aeonium decorum	Aeonium	Ground cover
7.	**X**	Aeonium simsii	ncn	Ground cover
8.	**W**	Agave attenuata	Century Plant	Succulent
9.	**W**	Agave shawii	Shaw's Century Plant	Succulent
10.	**N**	Agave victoriae-reginae	ncn	Ground cover
11.	**X**	Ajuga reptans	Carpet Bugle	Ground cover
12.	**W**	Alnus cordata	Italian Alder	Tree
13.	□	Alnus rhombifolia	White Alder	Tree
14.	**N**	Aloe aborescens	Tree Aloe	Shrub
15.	**N**	Aloe aristata	ncn	Ground cover
16.	**N**	Aloe brevifolia	ncn	Ground cover
17.	**W**	Aloe vera	Medicinal Aloe	Succulent
18.	**W**	Alyogyne huegelii	Blue Hibiscus	Shrub
19.	□	Ambrosia chamissonis	Beach Bur-Sage	Perennial
20.	□	Amorpha fruticosa	Western False Indigobush	Shrub
21.	**W**	Anigozanthus flavidus	Kangaroo Paw	Perennial accent
22.	□	Antirrhinum nuttalianum ssp. nuttalianum	ncn	Subshrub
23.	**X**	Aptenia cordifolia x 'Red Apple'	Red Apple Aptenia	Ground cover
24.	**W**	Arbutus unedo	Strawberry Tree	Tree
25.	**W**	Arctostaphylos 'Pacific Mist'	Pacific Mist Manzanita	Ground cover
26.	**W**	Arctostaphylos edmundsii	Little Sur Manzanita	Ground cover
27.	□	Arctostaphylos glandulosa ssp.glandulosa	Eastwood Manzanita	Shrub
28.	**W**	Arctostaphylos hookeri 'Monterey Carpet'	Monterey Carpet Manzanita	Low shrub

X = Plant species prohibited in wet and dry fuel modification zones adjacent to native open space lands. Acceptable on all other fuel modification locations and zones.

W = Plant species appropriate for use in wet fuel modification zones adjacent to native open space lands. Acceptable in all other wet and irrigated dry (manufactured slopes) fuel modification locations and zones.

= Plant species native to Riverside, Orange and San Diego Counties. Acceptable in all fuel modification (wet or dry zones) in all locations.

N = Plant species acceptable on a limited basis (maximum 30% of the area at time of planting) in wet fuel modification zones adjacent to native open space reserve lands. Acceptable in all other fuel modification locations and zones.

• If seed collected from local seed source.

• • Not native plant species but can be used in all fuel modification zones.

= Plant species acceptable on a limited use basis. Refer to qualification requirements starting on page 14.

	Code	Botanical Name	Common Name	Plant Form
29.	**N**	Arctostaphylos pungens	ncn	Shrub
30.	**N**	Arctostaphylos refugioensis	Refugio Manzanita	Shrub
31.	**W**	Arctostaphylos uva-ursi	Bearberry	Ground cover
32.	**W**	Arctostaphylos x 'Greensphere'	Greensphere Manzanita	Shrub
33.	**N**	Artemisia caucasica	Caucasian Artemisia	Ground cover
34.	**X**	Artemisia pycnocephaia	Beach Sagewort	Perennial
35.	**X**	Atriplex canescens	Four-Wing Saltbush	Shrub
36.	**X**	Atriplex lentiformis ssp. Breweri	Brewer Saltbush	Shrub
37.	□	Baccharis emoryi	Emory Baccharis	Shrub
38.	**W** □	Baccharis pilularis ssp. Consanguinea	Chaparral Bloom	Shrub
39.	**X**	Baccharis pilularis var. pilularis "Twin Peaks #2'	Twin Peaks	Ground cover
40.	□	Baccharis salicifolia	Mulefat	Shrub
41.	**N**	Baileya multiradiata	Desert Marigold	Ground cover
42.	**W**	Beaucarnea recurvata	Bottle Palm	Shrub/Small tree
43.	**N** □	Bougainvillea spectabilis	Bougainvillea	Shrub
44.	**N** □	Brahea armata	Mexican Blue Palm, Blue Hesper Palm	Palm
45.	**N** □	Brahea brandegeei	San Jose Hesper Palm	Palm
46.	**N** □	Brahea edulis	Guadalupe Palm	Palm
47.	□	Brickellia californica	ncn	Subshrub
48.	**W** □	Bromus carinatus	California Brome	Grass
49.	□	Camissonia cheiranthifolia	Beach Evening Primrose	Perennial subshrub
50.	**N**	Carissa macrocarpa	Green Carpet Natal Plum	Ground cover/Shrub
51.	**X**	Carpobrotus chilensis	Sea Fig Ice Plant	Ground cover
52.	**W**	Ceanothus gloriosus 'Point Reyes'	Point Reyes Ceanothus	Shrub

X = Plant species prohibited in wet and dry fuel modification zones adjacent to native open space lands. Acceptable on all other fuel modification locations and zones.

W = Plant species appropriate for use in wet fuel modification zones adjacent to native open space lands. Acceptable in all other wet and irrigated dry (manufactured slopes) fuel modification locations and zones.

= Plant species native to Riverside, Orange and San Diego Counties. Acceptable in all fuel modification (wet or dry zones) in all locations.

N = Plant species acceptable on a limited basis (maximum 30% of the area at time of planting) in wet fuel modification zones adjacent to native open space reserve lands. Acceptable in all other fuel modification locations and zones.

• If seed collected from local seed source.

•• Not native plant species but can be used in all fuel modification zones.

= Plant species acceptable on a limited use basis. Refer to qualification requirements starting on page 14.

	Code	Botanical Name	Common Name	Plant Form
53.	**W**	Ceanothus griseus "Louis Edmunds'	Louis Edmunds Ceanothus	Shrub
54.	**W**	Ceanothus griseus horizontalis	Yankee Point	Ground Cover
55.	**W**	Ceanothus griseus var. horizontalis	Carmel Creeper Ceanothus	Shrub
56.	**W**	Ceanothus griseus var. horizontalis "Yankee Point"	Yankee Point Ceanothus	Shrub
57.	□	Ceanothus megacarpus	Big Pod Ceanothus	Shrub
58.	**W**	Ceanothus prostratus	Squaw carpet ceanothus	Shrub
59.	□	Ceanothus spinosus	Green bark ceanothus	Shrub
60.	**W**	Ceanothus verrucosus	Wart-Stem Ceanothus	Shrub
61.	**W**	Cerastium tomentosum	Snow-in-summer	Ground cover/shrub
62.	**W**	Ceratonia siliqua	Carob	Tree
63.	**W**	Cercis occidentalis	Western Redbud	Tree/shrub
64.	**X**	Chrysanthemum leucanthemum	Oxeye Daisy	Groundcover
65.	**W**	Cistus crispus	ncn	Shrub
66.	**W**	Cistus hybridus	White Rockrose	Shrub
67.	**W**	Cistus incanus	ncn	Shrub
68.	**W**	Cistus incanus ssp. corsicus	ncn	Shrub
69.	**W**	Cistus salviifolis	Sageleaf Rockrose	Shrub
70.	**W**	Cistus x purpureus	Orchid Rockrose	Shrub
71.	**W**	Citrus species	Citrus	Tree
72.	□	Clarkia bottae	Showy Fairwell to Spring	Annual
73.	□	Cneoridium dumosum	Bushrue	Shrub
74.	□	Collinsia heterophylla	Chinese Houses	Annual
75.	**W** □	Comarostaphylis diversifolia	Summer Holly	Shrub
76.	**N**	Convolvulus cneorum	Bush Morning Glory	Shrub

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77.	**W**	Coprosma kirkii	Creeping Coprosma	Ground cover/Shrub
78.	**W**	Coprosma pumila	Prostrate Coprosma	Low Shrub
79.	□	Coreopsis californica	California Coreopsis	Annual
80.	**W**	Coreopsis lanceolata	Coreopsis	Ground cover
81.	**N**	Correa pulchella	Australian Fuchsia	Ground cover
82.	**W**	Cotoneaster buxifolius	ncn	Shrub
83.	**W**	Cotoneaster congestus 'Likiang'	Likiang Cotoneaster	Ground cover/Vine
84.	**W**	Cotoneaster parneyi	ncn	Shrub
85.	**X**	Crassula lactea	ncn	Ground cover
86.	**X**	Crassula multicava	ncn	Ground cover
87.	**X**	Crassula ovata	Jade Tree	Shrub
88.	**X**	Crassula tetragona	ncn	Ground cover
89.	**W** □	Croton californicus	California Croton	Ground cover
90.	**X**	Delosperma 'alba'	White Trailing Ice Plant	Ground cover
91.	□	Dendromecon rigida	Bush Poppy	Shrub
92.	□	Dichelostemma capitatum	Blue Dicks	Herb
93.	**N**	Distictis buccinatoria	Blood-Red Trumpet Vine	Vine/Climbing vine
94.	**N**	Dodonaea viscosa	Hopseed Bush	Shrub
95.	**X**	Drosanthemum floribundum	Rosea Ice Plant	Ground cover
96.	**X**	Drosanthemum hispidum	ncn	Ground cover
97.	**X**	Drosanthemum speciosum	Dewflower	Ground cover
98.	□	Dudleya lanceolata	Lance-leaved Dudleya	Succulent
99.	□	Dudleya pulverulenta	Chalk Dudleya	Succulent
100.	**W**	Elaeagnus pungens	Silverberry	Shrub
101	□	Encelia californica	California Encelia	Small shrub

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102.	□ ●	Epilobium canum [Zauschneria californica]	Hoary California Fuchsia	Shrub
103.	□	Eriastrum sapphirinum	Mojave Wooly Star	Annual
104.	**N**	Eriobotrya japonica	Loquat	Tree
105.	□	Eriodictycon crassifolium	Thick-Leaf Yerba Santa	Shrub
106.	□	Eriodictycon trichocalyx	Yerba Santa	Shrub
107.	**W** □	Eriophyllum confertiflorum	ncn	Shrub
108.	**W**	Erythrina species	Coral Tree	Tree
109.	**N**	Escallonia species	Several varieties	Shrub
110.	**W** □	Eschscholzia californica	California Poppy	Flower
111.	**X**	Eschscholzia mexicana	Mexican Poppy	Herb
112.	**N**	Euonymus fortunei	Winter Creeper Euonymus	Ground cover
113.	**N**	Feijoa sellowiana	Pineapple Guava	Shrub/Tree
114.	**N**	Fragaria chiloensis	Wild Strawberry/ Sand Strawberry	Ground cover
115.	□	Frankenia salina	Alkali Heath	Ground cover
116.	**W**	Fremontodendron californicum	California Flannelbush	Shrub
117.	**X**	Gaillardia x grandiflora	Blanketflower	Ground cover
118.	**W**	Galvezia speciosa	Bush Snapdragon	Shrub
119	**W**	Garrya ellipta	Silktassel	Shrub
120.	**X**	Gazania hybrids	South African Daisy	Ground cover
121.	**X**	Gazania rigens leucolaena	Trailing Gazania	Ground cover
122.	□	Gilia capitata	Globe Gilia	Perennial
123.	**W**	Gilia lepthantha	Showy Gilia	Perennial
124.	**W**	Gilia tricolor	Bird's Eyes	Perennial
125.	**W**	Ginkgo biloba	Maidenhair Tree	Tree
126.	□	Gnaphalium californicum	California Everlasting	Annual
127.	**W**	Grewia occidentalis	Starflower	Shrub
128.	□	Grindelia stricta	Gum Plant	Ground cover

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129.	**N □**	Hakea suaveolens	Sweet Hakea	Shrub
130.	**W**	Hardenbergia comptoniana	Lilac Vine	Shrub
131.	**N**	Helianthemum mutabile	Sunrose	Ground cover/Shrub
132.	□	Helianthemum scoparium	Rush Rose	Shrub
133.	□	Heliotropium curassavicum	Salt Heliotrope	Ground cover
134.	**X**	Helix canariensis	English Ivy	Ground cover
135.	**W**	Hesperaloe parviflora	Red Yucca	Perennial
136.	□ □	Heteromeles arbutifolia	Toyon	Shrub
137.	**X**	Hypericum calycinum	Aaron's-Beard	Shrub
138.	**N**	Iberis sempervirens	Edging Caandytuft	Ground cover
139.	**N**	Iberis umbellatum	Globe Candytuft	Ground cover
140.	□	Isocoma menziesii	Coastal Goldenbush	Small shrub
141.	□	Isomeris arborea	Bladderpod	Shrub
142.	**W**	Iva hayesiana	Poverty Weed	Ground cover
143.	**N**	Juglans californica	California Black Walnut	Tree
144.	□	Juncus acutus	Spiny Rush	Perennial
145.	□	Keckiella antirrhinoides	Yellow Bush Penstemon	Subshrub
146.	□	Keckiella cordifolia	Heart Leaved Penstemon	Subshrub
147.	□	Keckiella ternata	Blue Stemmed Bush Penstemon	Subshrub
148.	**W**	Kniphofia uvaria	Red Hot Poker	Perennial
149.	**W**	Lagerstroemia indica	Crape Myrtel	Tree
150.	**W**	Lagunaria patersonii	Primrose Tree	Tree
151.	**X**	Lampranthus aurantiacus	Bush Ice Plant	Ground cover
152.	**X**	Lampranthus filicaulis	Redondo Creeper	Ground cover
153.	**X**	Lampranthus spectabilis	Trailing Ice Plant	Ground cover
154.	**W**	Lantana camara cultivars	Yellow Sage	Shrub
155.	**W**	Lantana montevidensis	Trailing Lantana	Shrub
156.	□	Lasthenia californica	Dwarf Goldfields	Annual

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157.	**W**	Lavandula dentata	French Lavendar	Shrub
158.	**W**	Leptospermum laevigatum	Australian Tea Tree	Shrub
159.	**W**	Leucophyllum frutescens	Texas Ranger	Shrub
160.	□	Leymus condensatus	Giant Wild Rye	Large grass
161.	**N**	Ligustrum japonicum	Texas Privet	Shrub
162.	**X**	Limonium pectinatum	ncn	Ground cover
163.	**X**	Limonium perezii	Sea Lavender	Shrub
164.	**W** □	Liquidambar styraciflua	American Sweet Gum	Tree
165.	**W**	Liriodendron tulipifera	Tulip Tree	Tree
166.	**X**	Lonicera japonica 'Halliana'	Hall's Japanese Honeysuckle	Vining shrub
167.	□	Lonicera subspicata	Wild Honeysuckle	Vining shrub
168.	**X**	Lotus corniculatus	Bird's Foot Trefoil	Ground cover
169.	□	Lotus heermannii	Northern Woolly Lotus	Perennial
170.	□	Lotus scoparius	Deerweed	Shrub
171.	**W**	Lupinus arizonicus	Desert Lupine	Annual
172.	**W**	Lupinus benthamii	Spider Lupine	Annual
173.	□	Lupinus bicolor	Sky Lupine	Flowering annual
174.	□	Lupinus sparsiflorus	Loosely Flowered Annual Lupini/Coulter's Lupine	Annual
175.	**W**	Lyonothamnus floribundus ssp. asplenifolius	Fernleaf Ironwood	Tree
176.	**W**	Macadamia Integrifolia	Macadamia Nut	Tree
177.	**W**	Mahonia aquifolium 'Golden Abundance'	Golden Abundance Oregon Grape	Shrub

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178.	**W**	Mahonia nevinii	Nevin Mahonia	Shrub
179.	□	Malacothamnus fasciculatus	Chaparral Mallow	Shrub
180.	**X**	Malephora luteola	Trailing Ice Plant	Ground cover
181.	**W**	Maytenus boaria	Mayten Tree	Tree
182.	**W**	Melaleuca nesophila	Pink Melaleuca	Shrub
183.	**N**	Metrosideros excelsus	New Zealand Christmas Tree	Tree
184.	□ ●	Mimulus species	Monkeyflower	Flower
185.	□	Mirabilis californica	Wishbone Bush	Perennial
186.	**N**	Myoporum debile	ncn	Shrub
187.	**N**	Myoporum insulare	Boobyalla	Shrub
188.	**W**	Myoporum parvifolium	ncn	Ground cover
189.	**W**	Myoporum 'Pacificum'	ncn	Shrub
190.	□	Nassella [stipa] lepida	Foothill needlegrass	Ground cover
191.	□	Nassella [stipa] pulchra	Purple needlegrass	Ground cover
192.	□	Nemophila menziesii	Baby Blue Eyes	Annual
193.	**X**	Nerium oleander	Oleander	Shrub
197.	□	Oenothera hookeri	California Evening Primrose	Flower
198.	**W**	Oenothera speciosa	Showy Evening Primrose	Perennial
199.	**X**	Ophiopogon japonicus	Mondo Grass	Ground cover
200.	□ ●	Opuntia littoralis	Prickly Pear	Cactus
201.	□ ●	Opuntia oricola	Oracle Cactus	Cactus
202.	□ ●	Opuntia prolifera	Coast Cholla	Cactus
203.	**W**	Osmanthus fragrans	Sweet Olive	Shrub
204.	**X**	Osteospermum fruticosum	Trailing African Daisy	Ground cover
205.	**X**	Parkinsonia aculeata	Mexican Palo Verde	Tree
206.	**W**	Pelargonium peltatum	Ivy Geranium	Ground cover

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207.	**X**	Penstemon species	Beard Tongue	Shrub
208.	**W**	Photinia fraseri	ncn	Shrub
209.	**W**	Pistacia chinensis	Chinese Pistache	Tree
210.	**X**	Pittosporum undulatum	Victorian Box	Tree
211.	□	Plantago erecta	California Plantain	Annual
212.	● ●	Plantago insularis	Woolly Plantain	Annual
213.	**X**	Plantago sempervirens	Evergreen Plaintain	Ground cover
214.	**W**	Platanus racemosa	California Sycamore	Tree
215.	**W**	Plumbago auriculata	Plumbago Cape	Shrub
216.	□	Populus fremontii	Western Cottonwood	Tree
217.	**X**	Portulacaria afra	Elephant's Food	Shrub
218.	□	Potentilla glandulosa	Sticky Cinquefoil	Subshrub
219.	**X**	Potentilla tabernaemontanii	Spring Cinquefoil	Ground cover
220.	**X**	Prunus caroliniana	Carolina Cherry Laurel	Shrub/Tree
221.	□	Prunus ilicifolia ssp. ilicifolia	Holly Leaved Cherry	Shrub
222.	**X**	Prunus lyonii	Catalina Cherry	Shrub/Tree
223.	**N**	Punica granatum	Pomegranate	Shrub/Tree
224.	**W**	Puya species	Puya	Succulent/shrub
225.	**W**	Pyracantha species	Firethorn	Shrub
226.	□	Quercus agrifolia	Coast Live Oak	Shrub
227.	□ □ ●	Quercus berberdifolia	California Scrub Oak	Shrub
228.	□ □ ●	Quercus dumosa	Coastal Scrub Oak	Shrub
229.	**X**	Quercus engelmannii	Engelmann Oak	Tree

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230.	**X**	Quercus suber	Cork Oak	Tree
231.	**X**	Rhamnus alaternus	Italian Buckthorn	Shrub
232.	□	Rhamnus californica	California Coffee Berry	Shrub
233.	□	Rhamnus crocea	Redberry	Shrub
234.	□	Rhamnus crocea ssp. ilicifolia	Hollyleaf Redberry	Shrub
235.	**N**	Rhaphiolepis species	Indian Hawthorn	Shrub
236.	□	Rhus integrifolia	Lemonade Berry	Shrub
237.	**N**	Rhus lancea	African Sumac	Tree
238.	□ □	Rhus ovata	Sugarbush	Shrub
239.	□	Ribes aureum	Golden Currant	Shrub
240.	□	Ribes indecorum	White Flowering Currant	Shrub
241.	□	Ribes speciosum	Fuchsia Flowering Gooseberry	Shrub
242.	**W**	Ribes viburnifolium	Evergreen Currant	Shrub
243.	□ •	Romneya coulteri	Matilija Poppy	Shrub
244.	**X**	Romneya coulteri 'White Cloud'	White Cloud Matilija Poppy	Shrub
245.	**W** □	Rosmarinus officinalis	Rosemary	Shrub
246.	**W** □	Salvia greggii	Autumn Sage	Shrub
247.	**W** □	Salvia sonomensis	Creeping Sage	Ground cover
248.	□	Sambucus mexicana	Mexican Elderberry	Tree
249.	**W**	Santolina chamaecyparissus	Lavender Cotton	Ground cover
250.	**W**	Santolina virens	Green Lavender Cotton	Shrub
251.	□	Satureja chandleri	San Miguel Savory	Perennial
252.	□	Scirpus acutus	Hard-Stem Bulrush	Perennial
253.	□	Scirpus californicus	California Bulrush	Perennial

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254.	**X**	Sedum acre	Goldmoss Sedum	Ground cover
255.	**X**	Sedum album	Green Stonecrop	Ground cover
256.	**X**	Sedum confusum	ncn	Ground cover
257.	**X**	Sedum llineare	ncn	Ground cover
258.	**X**	Sedum x rubrotinctum	Pork and Beans	Ground cover
259.	**X**	Senecio serpens	ncn	Ground cover
260.	□	Sisyrinchium bellum	Blue-Eyed Grass	Ground cover
261.	□	Solanum douglasii	Douglas Nightshade	Shrub
262.	□	Solanum xantii	Purple Nightshade	Perennial
263.	**W**	Stenocarpus sinuatus	Firewheel Tree	Tree
264.	**W**	Strelitzia nicolai	Giant Bird of Paradise	Perennial
265.	**W**	Strelitzia reginae	Bird of Paradise	Perennial
266.	□	Symphoricarpos mollis	Creeping Snowberry	Shrub
267.	**W**	Tecoma stans [Stenolobium stans]	Yellow Bells	Shrub/Small tree
268.	**X**	Tecomaria capensis	Cape Honeysuckle	Ground cover
269.	**N**	Teucrium chamaedrys	Germander	Ground cover
270.	**N**	Thymus serpyllum	Lemon Thyme	Ground cover
271.	**N**	Trachelospermum jasminoides	Star Jasmine	Shrub
272.	□	Trichostema lanatum	Woolly Blue-Curls	Shrub
273.	**X**	Trifolium hirtum 'Hyron'	Hyron Rose Clover	Ground cover
274.	**X**	Trifolium fragiferum 'O'Connor's'	O'Connor's Legume	Ground cover
275.	□	Umbellularia californica	California Laurel	Tree
276.	□	Verbena lasiostachys	Western Vervain	Perennial

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277.	**N**	Verbena peruviana	ncn	Ground cover
278.	**X**	Verbena species	Verbena	Ground cover
279.	**X**	Vinca minor	Dwarf Periwinkle	Ground cover
280.	□	Vitis girdiana	Desert Wild Grape	Vine
281.	**X**	Vulpia myuros 'Zorro'	Zorro Annual Fescue	Grass
282.	**W**	Westringia fruticosa	ncn	Shrub
283.	**W**	Xanthorrhoea species	Grass Tree	Perennial accent/ Shrub
284.	**W**	Xylosma congestum	Shiny Xylosma	Shrub
285.	**X**	Yucca species	Yucca	Shrub
286.	□	Yucca whipplei	Yucca	Shrub

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QUALIFICATION STATEMENTS FOR SELECT PLANT SPECIES

□ = Plant species acceptable on a limited use basis:

2. Acacia redolens desert carpet

May be used in the upper 1/2 of fuel modification zone 2 (30 to 70 feet). The plants may be planted at 8 feet on center minimum spacing in meandering zones not to exceed a mature width of 24 feet or a mature height of 24 feet.

43. Bougainvillea spectabilis [procumbent varities]

Procumbent to mounding varieties may be used in the mid fuel modification zone 2 (30 to 70 feet). The plants may be planted in clusters at 6 feet once center spacing not to exceed 8 plants per cluster. Mature spacing between individual plants or clusters shall be 30 feet minimum.

44. Brahea armata
45. Brahea brandegeei
46. Brahea edulis

May be used in the upper and mid fuel modification zone 2 (30 to 70 feet). The plants shall be used as single specimens with mature spacing between palms of 30 feet minimum.

129. Hakea suaveolens

May be used in the mid fuel modification zone 2 (30-70 feet). The plants shall be used as single specimens with mature spacing between plants of 30 feet minimum.

136. Heteromeles arbutifolia

May be used in the mid to lower fuel modification zone 2 (30 to 70 feet). The plants may be planted in clusters of up to 3 plants per cluster. Mature spacing between individual plants or cluster shall be 30 feet minimum.

164. Liquidambar styraciflua

May be used in the mid to lower fuel modification zone 2 (30 to 70 feet). The plant shall be used as single specimens with mature spacing between trees at 30 feet minimum.

227. Quercus berberdifolia

228. Quercus dumosa

May be used in the mid to lower fuel modification zone 2 (30 to 70 feet). The plants may be planted in clusters of up to 3 plants per cluster. Mature spacing between individual plants or clusters shall be 30 feet minimum.

238. Rhus ovata

May be used in the mid to lower fuel modification zone 3 (30 to 70 feet) within inland areas only. The plants may be planted in clusters of up to 3 plants per cluster. Mature spacing between individual plants or clusters shall be 30 feet minimum.

245. Romarinus officinalis

246. Salvia greggii

247. Salvia sonomensis

May be used in the mid to upper fuel modification zone 2 (30 to 70 feet). The plants may be planted in clusters of up to 3 plants per cluster. Mature spacing between individual plants or clusters shall be 15 feet minimum.