Appendix J1

Alpine County Park Project Fire Protection Memorandum

Fire Protection Memorandum

Alpine County Park Project

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1 Introduction

Dudek was retained by HELIX Environmental Planning, Inc. to respond to and provide additional analysis pursuant to a court order regarding the Alpine County Park Project (project) in the Community of Alpine in San Diego County. This technical memorandum serves as an addendum to the 2021 Fire and Emergency Operation Assessment report (FEOA) prepared for the project by Rohde & Associates to comply with a court order related to Wildfire impacts in the Writ of Mandate issued on January 23, 2026, for CASE NO: 37-2024-00000536-CU-WM-CTL (Writ), and as further detailed in the Minute Order issued on June 9, 2025 in the same proceeding (Minute Order). The court determined that the Environmental Impact Report (State Clearinghouse #2021030196, County of San Diego [County] 2023) (EIR) required further analysis related to Wildfire impacts to separately analyze the significant impact of the fire risk and its baseline conditions before proposing mitigation measures. To address the court order, this technical memorandum provides fire behavior modeling that separately establishes fire risk for baseline existing conditions and two project conditions: the project with an active park, including only the fire prevention measures required by code, and 2) the project with an active park, including both the required measures and additional fire protection measures selected by the County. The three conditions provide an analysis of the effectiveness of the project's proposed fire prevention measures in reducing fire behavior intensity and fire ignitions. Additionally, this technical memorandum provides an analysis of the project's alignment with the Attorney General's Guidance for Best Practices for Analyzing and Mitigating Wildfire Impacts of Development Projects Under the California Environmental Quality Act, which had not been issued when the EIR and associated technical reports were originally prepared.

The intent of this technical memorandum is to provide the information necessary to update the appropriate sections of the Recirculated Draft EIR, including updates to the existing conditions and regulatory setting, methodology, and wildfire impact analyses presented in Sections 4.09 Hazards and 4.20 Wildfire.

2 Project Description

The project proposes the development of an approximately 25-acre active park within 96.6 acres of undeveloped land within the unincorporated community of Alpine. The project would conserve approximately 70 acres of the property as open space and/or preserve. The project is located adjacent to the Back Country Land Trust's Wright's Field Preserve, north of South Grade Road, east of Tavern Road, and south of Alpine Boulevard. The project would develop an active park with amenities that include multi-use turf areas, a baseball field, an all-wheel area, bike skills area, recreational courts (i.e., basketball, pickleball, game table plaza), fitness stations, leash-free dog area, restroom facilities, an administrative facility/ranger station, equestrian staging and a corral, nature play area, community garden, a volunteer pad, picnic areas with shade structures, picnic tables, and multi-use trails. A parking area would accommodate up to 240 single vehicle spaces. The parking lots along the eastern portion of the project site would be built with an earthen berm between the parking lots and South Grade Road. By developing the park, the project will remove existing hazardous vegetation fuels and provide irrigated, fire-resistant landscaping common for a park that will result in creating defensible space and vegetation fuel modification and management required by the Alpine Fire Protection District (AFPD), the fire agency with jurisdiction for the project site, for projects in a State Responsibility Area Very High Fire Hazard Severity Zone.

3 Court Order

3.1 Writ

The language in the Writ regarding Wildfire is included below:

> *Wildfire Impacts: Respondent shall separately analyze the significant impacts of the fire risk and its baseline existing conditions before proposing mitigation measures, and shall provide information on how it analyzed the effectiveness of the proposed measures.*

3.2 Minute Order

The language in the Minute Order regarding Wildfire, which provides further background regarding the Writ's directive, is included below:

> *Petitioners argue the EIR does not contain analysis of the significance of the Project's wildfire impacts without the mitigation measures. OB at p.22. They argue that instead, the EIR improperly treated mitigation measures as Project components, which impermissibility treats the analysis of impacts and mitigation measures as one issue. OB at p.21, citing Lotus v. Department of Transportation (2014) 223 Cal.App.4th 645, 653; People ex rel. Bonta v. County of Lake (2024) 105 Cal.App.5th at 1235-36 ("[F]ailure to separately identify and analyze the significant impacts of the fire risk to the Project area and its baseline existing conditions before proposing mitigation measures violates CEQA.)"*
>
> *The County argues the EIR includes a wildfire impact analysis in Section 4.9, section 4.20, and Appendix J, K, and L. Oppo. at p.21 citing AR 2695 et seq. (Fire and Emergency Operation Assessment prepared that identified wildfire risks at the Project site, including ignition risks), 2881 et seq. (Project site is in a "Very High Fire Hazard Severity Zone;" and discussing together the ignition risks and recommended fire prevention measures such as creating buffer zones along the parcel, developing the land and considering undergrounding electric utility services, placing developed park features to contain wildfire, providing improved fire-safe parking, adding on-site volunteer, maintenance staff and a park ranger, and clearing vegetation), 2310 et seq. (discussing expected wildfire behavior, site development risk factors, and discussing risks and measures together); 2340 et seq. (fire evacuation analysis and assumptions), and 2374 et seq. (defensible space requirements letter).*
>
> *Here, the EIR states the measures will reduce wildfire risk to less than significant levels. Importantly, though, the EIR is missing information on how it analyzed the effectiveness of the proposed measures. There is no analysis of how ignition rates will be reduced by the proposed wildfire measures. Reply at p.18, citing Bonta, supra,105 Cal.App.5th at 1233 (an adequate analysis may include the number of ignitions that occur and how that rate has reduced with the proposed wildfire safety measures). Because the EIR does not separately analyze the significant impacts of the fire risk and its baseline existing conditions before it proposed mitigation measures but instead treats the impacts analysis and mitigation measures as one issue, the EIR's wildfire analysis is deficient under CEQA.*

4 Response to the Court's Order

To respond to the Court's order, this technical memorandum has been prepared to provide:

1. A summary of the prior analysis and additional details on consistency analysis with applicable fire regulations
2. Additional analysis to respond to the Court's order, including:
   - A description of the existing baseline wildfire risks at the project site under existing environmental conditions;
   - An analysis of the wildfire risks associated with implementation of the project in the absence of mitigation, assuming the project complies with all applicable provisions of the San Diego County Code of Regulatory Ordinance and the 2025 California Building Standards Code, including wildland-urban interface, building, and fire code requirements for construction and fire prevention and protection[1]; and
   - An analysis of the wildfire risks associated with implementation of the project, when additional fire prevention measures are included.

4.1 Summary of Prior Analysis and Additional Details on Consistency Analysis with Applicable Fire Regulations

4.1.1 Review of the Fire and Emergency Operation Assessment Technical Report

The first step to determine the type of additional analysis needed to respond to the Court's order was to review the existing Fire and Emergency Operation Assessment (FEOA) for consistency and compliance with the requirements for such assessments. A commonly used term for the FEOA prepared for the project is fire protection plan (FPP). The San Diego County Fire Protection District (SDCFD) in cooperation with the County of San Diego Land Use and Environmental Group, Planning and Development Services (County of San Diego 2024) has developed Fire Protection Plan Guidelines for Consultants (Guidelines). These guidelines inform approved consultants as to the type, scope, and contents of the fire protection plan needed for a project based on established criteria. The guidelines note that a fire protection plan "is a document that describes the level of fire hazard that would affect or be caused by a proposed development and the methods proposed to minimize or mitigate that hazard" (Guidelines pg. 114). The guidelines further note that a fire protection plan "is also required by County Policy found in the Safety Element, Chapter 7 and is used to demonstrate fire safety compliance in accordance with requirements of the California Environmental Quality Act" (Guidelines pg. 114).

[1] This project is in a Very High Fire Hazard Severity Zone, so there is no scenario where the project could be legally built without building and fire code requirements in place. As such, it is not possible to separate the project from these code requirements, some of which also function as fire prevention measures. Because these compliance requirements are legally required and cannot be removed from the project design, they are not mitigation measures, and an analysis of the project's "pre-mitigation" wildfire risks therefore includes mandatory fire prevention measures. Additional fire prevention measures beyond code compliance would only be considered mitigation measures if they were necessary to reduce impacts to a less than significant level (i.e. if the impact would be significant in their absence).

An FPP can be one of two formats approved by SDCFD depending on the level of hazard of the project site. A Full Report FPP is required for projects located within areas designated by the State Fire Marshal as a High Fire Hazard Severity Zone (HFHSZ) or a Very High Fire Hazard Severity Zone (VHFHSZ). Projects with an occupant load of 100 or more and projects where the site has topographic, geographic, and/or combustible vegetation conditions that require detailed review and analysis, regardless of a fire hazard severity designation, also require a Full Report FPP. A Letter Report FPP is typically required "for infill projects with no wildlands in the immediate vicinity or low hazard commercial projects in Moderate Fire Hazard Severity Zones" (Guidelines pg. 115). In accordance with these guidelines and requirements, a Full Report FPP was prepared for the project in 2021 by Rhode & Associates.

A Full Report FPP is required by SDCFD to follow prescribed formatting and address all the following elements:

- Wildfire hazard and risk assessment
- Siting of development
- Housing density considerations
- Construction
- Access, egress, and evacuation planning
- Water sources for firefighting
- Subdivision landscaping and vegetation management
- Protection of critical infrastructure
- Emergency Services - Availability and Travel Time

A critical aspect of conducting a wildfire hazard and risk assessment, according to the guidelines, is completing a fire fuel assessment using a recognized fire behavior model to provide a wildfire behavior assessment (Guidelines pgs. 115 and 127). A wildfire behavior assessment is a "summary narrative of wildfire behavior [that] includes discussion of wind, spotting potential, fire trajectory, fuel beds, topographical influences, and major fire history for the site and nearby areas" (Guidelines pg. 155). The guidelines state that "modeling origins and trajectories must be specific to the development site, reflect average-worst-case wildfire behavior, [and include] results that report: fireline intensity, average and maximum rate of spread, ember spotting distance, wind direction, fuel type, slope, and fuel moisture" (Guidelines pgs. 155-156).

In reviewing the Full Report FPP prepared for the project, referenced herein as FEOA, Dudek determined that the FEOA contains all required elements, including a wildfire behavior assessment using a recognized fire behavior model. Therefore, it was determined that the FEOA does not need to be wholly updated. Rather, an analysis of the project's baseline existing conditions compared to the project with and without additional fire prevention measures that exceed code requirements is needed as a supplement to the FEOA to provide evidence of the effectiveness of the project's proposed fire prevention measures. This technical memorandum serves that purpose.

4.1.2 Review of the 2023 FEIR

Section 4.9, *Hazards and Hazardous Materials* of the 2023 FEIR addressed risk of loss, injury, or death due to wildfire under Threshold 7. The discussion was based on the FEOA prepared for the project, which identified wildfire and ignition risks at the project site and rules and project design features that would minimize those risks. Similarly, FEIR Section 4.20, *Wildfire*, analyzed wildfire risks under Threshold 2. The analysis described best management practices, rules, and project design features intended to manage potential ignition sources and fire spread. Several

commenters on the Draft and Recirculated Draft EIRs (including the California Department of Fish and Wildlife [Letter A4]; the San Diego Chapter of the California Native Plant Society, Sierra Club San Diego Chapter, and Environmental Center of San Diego [Letter O2]; Preserve Alpine's Heritage [Letter O8], and various individuals) expressed concerns about wildfire risk, including the project's proposed fuel modification, ignition potential, and analysis of project design features. The County concluded that the project's design features and wildfire controls would prevent significant wildfire impacts and no substantive revisions to the wildfire risk impact analysis or conclusions were made.

4.1.3 Review of California Office of the Attorney General Guidance

In 2022, the California Office of the Attorney General issued guidance outlining best practices for analyzing and mitigating wildfire impacts of development projects under the California Environmental Quality Act (CEQA). The guidance is not regulatory in nature and does not impose additional legal requirements on local governments, nor does it alter any applicable laws or regulations. Rather, it is intended to provide guidance on some of the issues, alternatives, and mitigation measures that should be considered during the environmental review process. This guidance is based on the Office of the Attorney General's experience reviewing, commenting on, and litigating CEQA documents for projects in high wildfire prone areas, and is intended to assist lead agencies with their planning and approval of future projects. Specifically, the Attorney General's guidance requires a description of baseline conditions; encourages an EIR to qualitatively assess wildfire hazard and risk variables through modeling, to the extent feasible; and provides potential project measures to reduce wildfire risk.

The Attorney General had not yet issued the guidance when the FEOA and EIR sections were originally prepared. Attachment 3, Analysis of Attorney General's Guidance, provides a summary of the guidance and an analysis of the EIR's compliance with the applicable points of guidance. It is included in this technical memorandum to further demonstrate that the EIR and its supporting technical documents have considered all potential impacts related to wildfire.

4.2 Additional Analysis to Respond to Court's Order

4.2.1 Methodology

This technical memorandum provides a supplemental analysis to demonstrate the effectiveness of the project's proposed fire prevention measures by comparing the project site's baseline existing conditions to two project conditions: 1) the project with an active park, including only the fire prevention measures required by code, and 2) the project with an active park, including both the required measures and additional measures selected by the County. In other words, this analysis explains why the project, including its proposed fire prevention measures, would effectively reduce wildfire hazards compared to the existing baseline condition.

As described in the following sections, the project includes vegetation fuel modification fire prevention measures (such as vegetation clearing) and human activity fire prevention measures (such as the prohibition of smoking and open flames) to reduce the risk of wildfire ignition and spread. This two-pronged approach to fire prevention requires a two-pronged analysis, as fire behavior can be quantitatively predicted and modeled, while human behavior cannot. The resulting approach to the quantitative and qualitative analyses are described further below.

4.2.1.1 Vegetation Fuel Modification

The three major components of fire environment are topography, vegetation (fuels), and climate. The condition of each of these components and their interactions with each other determine the potential characteristics and behavior of a fire at any given moment. Wildland fire may transition to urban fire if structures are receptive to ignition. Inversely, under extreme conditions, it is possible for structure fires to transition into wildland fires. This is more likely to occur when multiple structures are burning simultaneously and in close proximity to receptive wildland fuels.

- Regarding topography, the proposed project site is primarily flat, while adjacent Wright's Field Preserve lands are more sloping and contoured. The proposed project would not change the topography of the site, which would remain primarily flat and similar to existing conditions in all three project analysis sections (Sections 4.2.2 through 4.2.4): existing baseline condition, project with required fire prevention measures, and project with additional fire prevention measures.
- Regarding vegetation (fuels), 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 under dry conditions and produce lower intensity, higher spread rate fires. In comparison, sage scrub and chaparral vegetation communities can produce higher heat intensity and higher flame lengths under strong, dry wind patterns, but do not typically ignite or spread as quickly as light, flashy grass fuels. Unlike wildfires in shrub and forest vegetation, grass fires are generally more easily contained and require fewer resources and planning to achieve fire containment. While grassland fires may spread rapidly and are influenced heavily by wind, fires in shrub and forest vegetation involve higher intensity fire behavior, present greater risk to structures, and often more difficult control measures. Vegetation hazards are analyzed quantitatively in the three project analysis sections below: existing baseline condition, project with required fire prevention measures, and project with additional fire prevention measures.
- A rapidly warming climate is expected to impact California and the western United States directly and indirectly. The project is a park that would not result in significant climate emissions, so climate conditions in all three project analysis sections (existing baseline condition, project with required fire prevention measures, and project with additional fire prevention measures) remain relatively consistent.

As indicated above, there would be no change in topography or climate change as a result of the project, and vegetation is the only fire environment component that differs among the three project analysis scenarios. Therefore, each section includes an analysis of vegetation (fuels). An overview of research related to the effectiveness of vegetation fuel modification is provided below.

4.2.1.1.1 Vegetation Fuel Modification Research

While the original intent of implementing vegetation fuel modification was to protect natural resources from fires originating in developed areas, vegetation fuel modification has since evolved to protect communities and structures from wildfire post-ignition. Vegetation fuel modification, like that proposed by the project, reduces the fire risk on a landscape by altering the interaction between fire, fuels, and weather (Cochrane et al. 2012). Vegetation fuel modification typically targets surface fires but can also reduce the likelihood of canopy fires, lower ember cast, and have an ancillary effect on the untreated landscape by lowering the probability of burning and the potential fire size (Cochrane et al. 2012) if ignited. Project-specific vegetation fuel modification zones are crucial as the strategic design and placement of fuels treatments can disrupt or slow fire spread, reduce fire intensity, and facilitate fire suppression (Braziunas et al. 2021). When fuel modification zones are designed properly, they protect homes as well as the surrounding environment.

For example, when the Tahoe Basin experienced the Angora Fire in 2007, fuel treatments had the dual effect of saving homes and increasing forest survival (Safford et al. 2009). In areas where fuel management had been conducted prior to the Angora Fire, home loss was substantially reduced in the adjacent community and 85% of the trees survived, as compared to the 22% tree survival rate in untreated areas (Safford et al. 2009). More recently, the Insurance Institute for Business and Home Safety (IBHS) conducted a post-event damage investigation into the 2025 Palisades and Eaton fires in Los Angeles County. The research found that reducing hazardous vegetation through the use of fuel modification zones helps limit fire spread (IBHS 2025).

However, converting natural vegetation to managed landscaping and defensible space does not entirely reduce the potential for ignitions. Instead, defensible space landscaping reduces the risk and likelihood of an on-site ignition becoming an off-site wildfire by reducing the fire intensity and rate of spread by replacing dense, fire-prone, volatile natural vegetation with managed landscaping and vegetation fuel modification zones. Therefore, the risk of a wildfire resulting from an on-site ignition can also be reduced by a landscaping plan that converts hazardous, more easily ignited vegetation fuels to irrigated landscaping that consists of fire- and ignition-resistant plants strategically located to reduce fire spread.

4.2.1.1.2 Vegetation Fuel Modification Code Requirements

The FEOA documents the requirements for vegetation fuel reduction and the establishment of fuel modification zones, which are identified in the FEOA as Fuel Modification Zone A and Fuel Modification Zone B. The requirements for Zone A and Zone B at the time the FEOA was prepared were:

> Fuel Modification Zone A – Code-compliant fuel modification around the Alpine Park facility per fire and building code requirements, with the goal of 100 percent fire exclusion from the project site. The objective of landscape replacement in Zone A will be to eliminate the potential for wildfire occurrence through establishment of a fire-resistive landscape around principal park facilities and structures at the minimum distances required by code. This has been designed through the proposed landscape around sports fields and buildings, subject to AFPD Fire Marshal review and approval during the permitting process (Rohde and Associates 2021).
>
> Fuel Modification Zone B – Fuel reduction shall occur adjacent to Zone A along property lines, where practical, and around key public facilities such as the parking areas, equestrian staging areas, and similar locations. Fuel modification in Zone B should be designed to achieve fire

> prevention goals while maintaining viable habitat and preserving ecological values. The objective of fuel treatment in Zone B is to achieve at least a 75 percent reduction in fire-line intensity from a wildfire moving from native fuels into a constructed fuel modification zone. The County will implement a 100-foot fuel reduction area extending from the volunteer pad under Zone A and Zone B compliance (Rhode and Associates 2021).

Subsequent to the approval of the FEOA, San Diego County adopted and amended the 2025 California Wildland-Urban Interface Code that designates fuel modification Zones 0, 1, and 2, which are the fuel modification zones currently required. The requirements for those fuel modification zones include:

> Zone 0 “Immediate Zone” 0-5 feet - Meaning from exterior wall surface or patio, deck or attachment to building or structure extending 5 feet on a horizontal plane. This zone shall be constructed of continuous hardscape or non-combustible materials. Removal of combustible materials surrounding the exterior wall area and maintaining area free and clear of combustible materials. The use of mulch and other combustible materials shall be prohibited.
>
> Zone 1 “Intermediate Zone” from Zone 0 to 50 feet - Meaning from the immediate edge of Zone 0 extending out in a horizontal plane. This zone shall consist of planting of low growth, drought tolerant and fire resistive plant species. The height of the plants in this zone starts at 6” adjacent to Zone 0 and extending in a linear fashion up to a maximum of 18” at intersection with Zone 2. Vegetation in this zone shall be irrigated and not exceed 6’ in height and shall be moderate in nature as per Sec. 603.4. Firewood inside this zone shall be piled a minimum of 30’ away from all buildings and structures. Cords of firewood shall also be maintained at least 10’ from property lines and not stacked under tree canopies drip lines.
>
> Zone 2 “Extended Zone” from Zone 1 to 100 feet - Meaning from the immediate edge of Zone 1 extending out in a horizontal plane for 50’. This zone consists of planting of drought tolerant and fire resistive plant species of moderate height. Brush and plants shall be limbed up off the ground, so the lowest branches are 1/3 height of bush/tree/plant or up to 6’ off the ground on mature trees. This area would be considered selective clearing of natural vegetation and dense chaparral by removing a minimum of 50% of the square footage of this area.

4.2.1.1.3 Vegetation Fuel Modification Analysis Approach

The below analysis is presented in three sections: existing site conditions and management strategies already in place that would remain with or without the project (Existing Baseline Condition); project with fire prevention/ management strategies required per building and fire code requirements, which are mandatory features that the project cannot legally exclude (Project With Required Fire Prevention Measures), and project with additional fire prevention measures proposed by the County (Project With Additional Fire Prevention Measures).

The fire behavior analysis for this project used the BEHAVE fire behavior modeling software, which was developed by the U. S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. The BEHAVE fire behavior modeling software has become the most widely used and industry-standard model for predicting fire behavior on a given landscape. Since its inception, the model has undergone continued research, improvements, and refinement. BehavePlus the current iteration of the software, was used to model fire behavior for this project.

Dudek modeled four fire behavior scenarios for the existing baseline condition, as discussed in Section 4.2.2. While the modeling software does not predict future wildfire ignition locations or causes, the selected scenarios model likely ignition types and locations under specific circumstances, which are the model inputs, where an off-site wildfire burns onto the project site. Likely ignition types/causes and locations relevant to the project site were determined by analyzing data collected via fire investigation reports. The project site was then surveyed to determine the types of vegetation fuels that exist in those locations. Statistically significant ignition causes and locations were used to determine where a fire could start in or near the project site. BehavePlus then analyzes fuels along with weather inputs to predict fire behavior after an ignition.

Fire behavior was analyzed using the inputs required by SDCFD and AFPD. The previously referenced Guidelines state that users of the BehavePlus prediction system must be careful to input accurate data into the system so that accurate fire behavior forecasting is created. To ensure accuracy and consistency, SDCFD created charts that aggregated 20 years of average monthly weather data for San Diego County. The charts include temperature, relative humidity, and wind speed inputs that appropriate for fire behavior modeling in San Diego County using BehavePlus (Guidelines pgs. 159-163).

In addition to the existing baseline condition, fire behavior modeling of the four scenarios was also conducted with vegetation fuel modification and analyzed for two conditions in Sections 4.2.3 and 4.2.4, respectively: 1) the project if it were to include only the fire prevention measures required by the building and fire codes, including SDCFD and AFPD requirements and 2) the proposed project with the required measures and two additional measures, including a 20-foot vegetation buffer area adjacent to the existing 30-foot buffer along the park footprint and a 20-foot vegetation buffer area adjacent to the existing 30-foot buffer approximately 100 feet south of the northeast corner of the County's parcel. This analysis provides the information necessary to compare existing baseline and with-project wildfire behavior conditions and determine whether the two additional buffers not required by existing regulations are necessary to support the less-than-significant wildfire impact conclusion (i.e. if the buffers are mitigation measures, or if they are simply features of the project that would further reduce wildfire risk but are not mandatory to achieve a less-than-significant determination under CEQA). All of the fire prevention measures, including the code requirements and the additional buffers, are proposed components of the project's design.

The BehavePlus modeling software determines fire behavior given a specific vegetation fuel under specific weather conditions. For example, it can calculate expected flame lengths in non-native grassland in winds of 10 miles per hour. However, BehavePlus does not analyze fire progression over time and across various vegetation fuels; for example, it does not calculate how the fire would change if it moved from non-native grassland to oak woodland. The project's proposed buffers involve vegetation modification that would trim or thin existing vegetation but would not remove the vegetation entirely (i.e. the vegetation fuel type within the buffer is the same with or without the fuel modification). The analysis of the vegetation modification within the additional buffer areas (which exceeds code requirements) compares fire behavior in the existing buffer vegetation to fire behavior in vegetation that is trimmed, thinned, or removed/replaced through management as a buffer zone fire prevention measure as proposed for the project. This allows for a comparison of wildfire hazard and risk for both conditions, which are described in Section 4.2.3 (implementing only the fire prevention measures required by code and leaving the existing natural vegetation cover within the additional buffer areas as it currently exists) and Section 4.2.4 (exceeding code requirements to modify the vegetation fuels in the additional buffer areas as proposed for the project).

4.2.1.2 Human Activity

As described under the Vegetation Fuel Modification section above, Dudek modeled four fire behavior scenarios for both existing conditions and vegetation modification conditions. Statistically significant ignition causes and locations were used to determine where a fire could start in or near the project site. However, as with other fire behavior modeling programs, BehavePlus does not *predict* wildfire ignition locations or causes, which are elements of human behavior. Therefore, the scenarios modeled cannot predict fire ignition caused by human activity. Because human activity related risks cannot be predicted and quantified by the modeling software, additional research was undertaken to assess effective means of reducing human related ignition risk. Proposed project fire prevention measures were then analyzed qualitatively to demonstrate effectiveness of the measures.

4.2.1.2.1 Human Activity Research

Humans and human-related activities are responsible for the majority of California wildfires (Syphard et al. 2007, 2008; Romero-Calcerrada et al. 2008). Recent research has determined that approximately 84% of wildfires in the United States are human caused (Balch et al. 2017). Urban interfaces with shrubland-dominated vegetation were found to be more fire-prone than those with grasslands or other natural spaces (Elia et al., 2019). Common ignition sources in Southern California are related to powerlines and vehicles (Keeley & Syphard 2018). Powerline-based ignitions are a concern with respect to off-site ignitions that could result in a wildfire progressing onto the project site. Certain everyday human activities often result in sparks, flames, or heat that may ignite vegetative fuels without proper prevention measures in place. These ignitions predominantly occur as accidents, but may also be purposeful, such as in the case of arson. While there is a relationship between population and fire ignitions, there is not a direct per capita correlation between population and fire ignitions. Research by Bistinas, et. al. (2013) shows that overall, the relationship between population density and wildfires does not have a consistent increase or decrease. Burned area initially increases with population density and then decreases when population density exceeds a threshold.

The US Forest Service asserts that the prevalence of human-caused ignitions, combined with the percentage of ignitions arising from discretionary behaviors such as recreational fires, use of open flames for outdoor cooking or ceremonial purposes, and smoking, point to opportunities for wildfire prevention and education efforts to reduce the risk of wildfires resulting from discretionary ignitions (USFS 2025). Research conducted by Edgeley, et al (2025) supports the position of the US Forest Service by documenting best practices that have resulted in fewer fire ignitions. Edgeley summarizes the research by finding that, “Effective interventions to prevent human-caused ignitions on public lands play a critical role in social and ecological adaption to wildfire.”

According to the research, one of the most effective means of reducing ignitions is to combine effective education with judicious enforcement (Edgeley, et al 2025). The research found that “scientists consistently underscore the interconnectivity between enforcement and education, often suggesting that enforcement should be a last resort in instances where education may resolve unwanted behaviors.” Among the recommended best practices for the use of education and enforcement in reducing fire ignitions are:

- Prioritizing educational outreach over enforcement to address illegal activities that result from a lack of knowledge or understanding.
- Increasing strategic patrolling, especially during periods of high fire risk, as patrolling is often connected to a meaningful decrease in illegal ignitions.

- Leveraging enforcement interactions as educational opportunities when issuing tickets, fines, or otherwise making contact with members of the public engaged in prohibited activities that can result in unwanted ignitions.
- Communicating the difference between law enforcement officers and park rangers to improve public relationships with residents and park patrons.
- Providing explicit messaging about what is and is not allowed to reduce confusion that may arise from public agency terminology.

4.2.1.2.2 Human Activity Code Requirements

In addition to the vegetation fuel modification code requirements described above, the project would be required to comply with the requirements in the San Diego County Code of Regulatory Ordinances, which contains enforceable regulations governing activities within the County's jurisdiction. The following sections regulate human activity that could result in fire ignition:

SEC. 41.117. WEAPONS AND FIREWORKS.

(a) It shall be unlawful for a person to possess any of the following in a County park: "explosives," as defined in Health and Safety Code section 12000, "fireworks," as defined in Health and Safety Code section 12511, a "firearm" as defined in Penal Code section 12001, an air gun, bow or crossbow, slingshot, paintball gun, blowgun or throwing knife.

(b) The Department may, however, grant written authorization:

(1) To a group to practice archery in a designated area of a County park.

(2) To allow bows and arrows to be carried during an historical reenactment.

(3) To allow "antique firearms," as defined in 18 U.S.C. section 921(a)(16), to be carried and discharged using blank ammunition, during an historical reenactment, upon satisfactory proof that all State and federal firearms regulations have been and will be complied with.

(4) To allow a mentored, juniors-only turkey hunt for up to 20 juniors and their mentors, using shotguns or bows and arrows, at Santa Ysabel East Preserve for a maximum of two days per year during a State-established juniors-only turkey hunting season, subject to all applicable State and federal laws and regulations.

(5) To allow the possession and use of a firearm or any other weapon listed in subsection (a) above to control any invasive, non-native animal in a County park that the Director determines is causing significant damage to the environment including, but not limited to, native plants and/or animals, provided the authorization complies with all applicable federal and state law. The authorization may include conditions to ensure the safety of the public, including, but not limited to a limit on the time when and/or the area where the person may possess and use the firearm, and specification of the type of firearm or weapon that may be used. Before granting an authorization, the department shall consider the environmental resources in the area where the animal is likely to be found. The authorization shall include conditions to protect any significant environmental resources, including sensitive plants or animals, in that area.

(c) The prohibition on the possession and use of a firearm in subdivision (a) above does not apply to the following persons when acting in the course and scope of their employment: any peace officer as defined

by state law, any federal law enforcement officer including, but not limited to, an employee of U.S. Customs and Border Patrol, or any other governmental employee or his or her agent who is authorized to carry a firearm.

SEC. 41.118. FIRE HAZARDS.

It shall be unlawful for any person in a County park to:

(a) Ignite a fire, except in a designated campfire ring or barbecue provided by the County when campfires or cooking are allowed by park rules or as specifically authorized by a park ranger.

(b) Ignite a fire when the County has given the person notice that the geographic area in which the park is located is subject to a red flag warning issued by the National Weather Service or the Director of Parks and Recreation has determined that it is not safe to start a fire.

(c) Discard any lighted tobacco product or any burning or combustible material or other thing that could set fire to grass, shrubs, buildings or any other combustible substance.

SEC. 41.118.5. SMOKING.

It shall be unlawful for any person in a County park to carry a lighted pipe, cigar, or cigarette; to use an electronic smoking device or other smoking device, containing tobacco or any other substance; or to light, smoke, activate, or in any way use a pipe, cigar, cigarette, or electronic smoking device or other smoking device, containing tobacco or any other substance.

4.2.1.2.3 Human Activity Analysis Approach

Along with the vegetation fuel modification analysis, an analysis of fire risks associated with human activity is presented in the three sections below: existing management strategies already in place that would remain with or without the project (Existing Baseline Condition; Section 4.2.2); project with fire prevention/management strategies required per code requirements, which are mandatory features that the project cannot legally exclude (Project With Required Fire Prevention Measures; Section 4.2.3), and project with additional fire prevention measures proposed by the County (Project With Additional Fire Prevention Measures; Section 4.2.4).

In Sections 4.2.2 through 4.2.4 below, the effectiveness of the human activity fire prevention measures is assessed qualitatively based on site-specific conditions, code requirements, and the research presented above. The analysis in Section 4.2.2 below considers the existing human activity measures in place on the project site. The analysis in Section 4.2.3 assumes the implementation of the code requirements listed above, while the analysis in Section 4.2.4 also includes additional site-specific human activity measures selected by the County.

4.2.2 Existing Baseline Condition

This section establishes the existing conditions on the project site to provide a baseline for comparison with the analyses presented in Sections 4.2.3 (project with required fire prevention measures) and 4.2.4 (project with additional fire prevention measures).

4.2.2.1 Fire Prevention Measures

This analysis considers the following vegetation fuel modification and human activity related activities currently occurring on site to monitor and minimize wildfire risks.

4.2.2.1.1 Vegetation Fuel Modification Measures

- EXISTING: Continued maintenance of an existing 30-foot buffer where vegetation has been cleared adjacent to the roadside along the County property, which has been historically cleared and is required by AFPD, and is not part of this project.
- EXISTING: Continued maintenance of a historically cleared and existing 100-foot buffer where vegetation has been cleared where there are adjoining properties along the northern boundary of the County-owned parcel, which is required by AFPD and is not part of this project.

4.2.2.1.2 Human Activity Measures

- EXISTING: Small swing gate as a vehicle control barrier.
- EXISTING: Weekly checks of the project site by rangers.

4.2.2.2 Analysis

4.2.2.2.1 Vegetation Fuel Modification Measures

Per the Court order and Attorney General Guidance, the following analysis addresses existing fire behavior in the project vicinity in the baseline condition. Four wildfire scenarios were modeled to analyze fire behavior in existing conditions, as described in Section 4.2.1 above. Table 1, Existing Vegetation Baseline Conditions Fuel Model Characteristics, describes the fuel types currently existing on the project site, which are used in the analysis below. A full analysis of the modeling is included in the Fire Behavior Modeling Summary in Attachment 1. Below is a summary of the results of each scenario.

Table 1. Existing Vegetation Baseline Conditions Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet) [1]
GR2	Short, sparse dry climate grass	Represents the annual grasslands on and off the project site	0.4 ft
GS1	Low load dry climate grass- shrub	Represents the grass and sparse shrubs on the hillside in the off-site run to the west.	0.9 ft
GS2	Moderate load dry climate grass- shrub	Represents the vegetation in the areas in the northern portion of the project site.	1.5 ft
SH2	Moderate load dry climate shrub	Represents the shrub-brush in the northern portion of the project site and on the hillside in the off-site run to the west.	1 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005).

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 14.9 feet, have a fireline intensity of up to 2,029 BTU/feet/second, have a rate of spread of up to 4.1 mph, and produce ember spotting up to 1.0 mile.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the southwestern boundary to the northeastern boundary of the project site during an average summer onshore wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 5.9 feet, have a fireline intensity of up to 266 BTU/feet/second, have a rate of spread of up to 0.8 mph, and produce ember spotting up to 0.3 miles.

Scenario 3. Fire flaming front burning through grass-shrubs in the wash in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds advancing the fire in a southwesterly direction.

Results: Expected to produce flame lengths up to 18.1 feet, have a fireline intensity of up to 3,071 BTU/feet/second, have a rate of spread of up to 6.2 mph, and produce ember spotting up to 1.1 miles.

Scenario 4. Fire flaming front approaching the project site from the west, burning through grass-shrubs in the off-site open space west of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 7.1 feet, have a fireline intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

4.2.2.2.2 Human Activity Measures

The small swing gate currently restricts vehicle access to the project site at that location, reducing the potential for ignitions resulting from vehicle activity in vegetation fuels. However, there is no daily on-site enforcement presence to ensure that unrestricted pedestrian or vehicle access to the site is not occurring elsewhere. As described in Section 4.2.1, vehicles and associated human presence are a common ignition source in vegetation fuels. Vehicle malfunctions that result in sparks and/or exhaust system components contacting vegetation can result in vegetation fires.

As described in Section 4.2.1, patrolling is known to reduce illegal activities and presents an opportunity for education about wildfire risk and reduction. It can be concluded that weekly ranger checks currently reduce illegal activity, such as smoking, that has potential to cause ignitions. However, as described above, there is no daily on-site educational or enforcement presence to ensure that illegal activities are not conducted on the project site when rangers are not patrolling.

4.2.2.3 Conclusion

Under existing conditions, the project site and adjacent off-site areas consist primarily of annual grasslands and grass-shrub vegetation, which are highly receptive to ignition and rapid fire spread, particularly during offshore Santa Ana wind events. As described above, four wildfire scenarios were modeled, including on-site and off-site ignitions under both extreme offshore and average onshore wind conditions. Modeling results demonstrate that, under existing conditions, wildfire behavior could be severe.

During average onshore summer weather with 19-mph sustained winds, fires are expected to produce flame lengths of up to approximately 7.1 feet, fireline intensities of up to 402 BTU/feet/second, rates of spread of up to 1.2 miles per hour, and ember spotting distances of up to 0.3 miles. During extreme offshore Santa Ana wind events with 28-mph sustained winds and 41-mph wind gusts, fire behavior is substantially more extreme, with modeled flame lengths of up to approximately 18.1 feet, fireline intensities up to 3,071 BTU/feet/second, rates of spread up to 6.2 miles per hour, and ember spotting distances of up to 1.1 miles.

As noted in the FEOA, the project site is currently subject to occasional unauthorized vehicular and pedestrian public access to and within hazardous vegetation fuels, making it vulnerable to potential smoking, vehicle, or other ignition hazards that increase wildfire risk. The current use of the undeveloped land, including occasional unauthorized access, places the project area at risk for fire ignitions associated with both natural events and human activities.

4.2.3 Project with Required Fire Prevention Measures

This section analyzes wildfire impacts of building the project with only the fire prevention measures required by the relevant codes, including applicable wildfire, building, and fire codes and the County Code of Regulatory Ordinances. Each of these code requirements is described in detail in Section 4.2.1. These are the minimum requirements to obtain approvals to build that the project cannot legally exclude. There is no scenario where the project could be built without incorporating these mandatory fire prevention measures.

4.2.3.1 Fire Prevention Measures

This analysis considers the following vegetation fuel modification and human activity related activities currently occurring on site to monitor and minimize wildfire risks as well as the measures that would be implemented to meet minimum code requirements:

4.2.3.1.1 Vegetation Fuel Modification Measures

- REQUIRED BY CODE: Creating a 100-foot vegetation buffer, as part of the project, that would extend outward in all directions from the volunteer pad.
- EXISTING: Continued maintenance of an existing 30-foot buffer where vegetation has been cleared adjacent to the roadside along the County property, which has been historically cleared and is required by AFPD, and is not part of this project.
- EXISTING: Continued maintenance of a historically cleared and existing 100-foot buffer where vegetation has been cleared where there are adjoining properties along the northern boundary of the County-owned parcel, which is required by AFPD and is not part of this project.

4.2.3.1.2 Human Activity Measures

The project site is currently open space owned by the County but is not a designated park, preserve, or other public amenity with authorized public access. The project would turn the project site into a park, implementing and enforcing applicable County Code of Regulatory Ordinances on the project site.

- REQUIRED BY CODE: Prohibit the use of barbecues when a Red Flag Warning has been issued (County Code of Regulatory Ordinances Section 41.118).
- REQUIRED BY CODE: Prohibit smoking (County Code of Regulatory Ordinances Section 41.118.5).
- REQUIRED BY CODE: Prohibit the use, transport, carrying, firing, or discharging any fireworks, firearm, weapon, air gun, archery device, slingshot, or explosive of any kind across, in, or into the park except as authorized under Section 41.117 of the County Code of Regulatory Ordinances (County Code of Regulatory Ordinances Section 41.117).
- EXISTING: Small swing gate as a vehicle control barrier.
- EXISTING: Weekly checks of the project site by rangers.

4.2.3.2 Analysis

4.2.3.2.1 Vegetation Fuel Modification Measures

The same four wildfire scenarios were re-analyzed for the project with vegetation fuel modification applied as required by SDCFD and AFPD. The vegetation fuel modification in the additional 20-foot buffer areas proposed by the County is excluded from this analysis by assuming the vegetation in the buffers remains unmaintained flat-topped buckwheat (GR2) in Table 2, Project Vegetation with Required Fire Prevention Measures Fuel Model Characteristics. The below results are for a hypothetical situation in which the project is developed with only the required fire prevention measures, which do not include the project's proposed vegetation fuel modification in the additional 20-foot buffer areas.

Table 2 presents the fuel modification assignments assumed in the analysis. A full analysis of the modeling is included in the Fire Behavior Modeling Summary in Attachment 1. Below is a summary of the results of each scenario.

Table 2. Project Vegetation with Required Fire Prevention Measures Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)[1]
GR2	Short, sparse dry climate grass	Represents the annual grasslands on and off the project site	0.4 ft
FM8	Compact Litter	On-site Zone 1 and 2 fuel modification	0.2 ft.
NB	Non-burnable	Paved areas throughout the proposed project site.	0 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005).

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 2.9 feet, have a fire intensity of up to 57 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.3 miles.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 1.3 feet, have a fire intensity of up to 9 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.1 miles.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation and low-load, dry climate grass in the additional 20-foot buffer areas in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Results: Expected to produce flame lengths up to 18 feet, have a fire intensity of up to 3,037 BTU/feet/second, have a rate of spread of up to 6.2 mph, and produce ember spotting up to 1.1 miles.

Scenario 4. The vegetation in this scenario will not change with development of the project with the required fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Results: Expected to produce flame lengths up to 7.1 feet, have a fire intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

The scenarios above model a condition in which existing hazardous vegetation fuels are converted to maintained landscaping and vegetation fuel modification zones that meet code requirements. As described above, this condition does not include vegetation modification in the 20-foot buffer areas, which is not required by code. The fire behavior modeling for this section shows a reduction in expected flame length, fire intensity, spread rate, and ember spotting within the project site when compared to the existing conditions fire behavior modeling. Flame lengths, fire intensity, rate of spread, and ember spotting distance in the additional buffer areas (included in Scenario 3) would remain 18 feet; 3,037 BTU/feet/second; 6.2 mph; and 1.1 miles, respectively, the same as the existing condition. Flame lengths in areas with vegetation modification would be reduced by approximately 4.6 to 12 feet depending on the location. Similarly, fire intensity in the fuel modification areas would be reduced by up to 3,008 BTU/feet/second; rate of spread would be reduced by up to 4 mph; and ember spotting distance would be reduced by up to 0.8 miles. Therefore, the modeled vegetation fuel modification scenarios show the project with required fire prevention measures reduce flame length, fireline intensity, spread rate, and ember spotting distance when compared to existing baseline conditions.

4.2.3.2.2 Human Activity Measures

As described above, the project would turn the project site into a park introducing more human activity at the site but also implementing and enforcing applicable County Code of Regulatory Ordinances on the project site. The project is estimated to have 300-500 visitors per day at full facility build-out. This usage could increase to 1,000 visitors per day on weekends and up to 2,000 per day during special events.

With the required vegetation fuel modification measures proposed to be in place prior to increasing human activity to the area, less fuel would be available for human activity related ignition risks. Additionally, the code required measures, including prohibition of smoking (County Code of Regulatory Ordinances Section 41.118.5), barbecues during Red Flag Warnings (County Code of Regulatory Ordinances Section 41.118), and fireworks, firearm, weapon, air gun, archery device, slingshot, or explosive of any kind (County Code of Regulatory Ordinances Section 41.117), would reduce the potential for human caused ignitions on the project site. Enforcement would be supported by the weekly ranger visits already occurring on the project site and on-site signage, which provide opportunities for visitor education about wildfire risk. However, weekly visits are not expected to be able to prevent occasional unauthorized public use. While the project proposes live-on staff, it is assumed that under this hypothetical analysis condition, there would be no daily on-site enforcement presence to ensure that education and enforcement of rules regarding smoking and barbecues would be consistently implemented. This is an unlikely condition and not consistent with management practices for typical County parks. However, the condition is provided to disclose the project's fire risks prior to proposing additional fire prevention measures.

As described in Section 4.2.1, one of the most effective means of reducing ignitions is to combine effective education with judicious enforcement. On-site signage would inform visitors about the prohibited activities on the project site, and continued weekly ranger visits would result in interactions with an increased number of visitors, creating opportunities for rangers to educate more visitors about the fire dangers associated with prohibited activities. The effectiveness of these continued and code required human activity measures is corroborated by the research conducted in Section 4.2.1 above.

4.2.3.3 Conclusion

Overall, the modeling results above show that building the project results in a reduction of potential fire activity and fire risk within the project site compared to existing baseline conditions. This is primarily because the existing baseline conditions include more fire prone grassland habitat compared to this project with required fire prevention measures condition, which will change the habitat type from fire prone vegetation to developed areas.

While the potential wildfire activity within the project site is reduced with the project compared to existing baseline conditions, the project is anticipated to lead to additional human presence at the site, which could increase fire risk by introducing additional opportunities for human-caused fire ignitions. However, the project would be subject to the restrictions in the County Code of Regulatory Ordinances, which prohibits ignition sources such as smoking or fireworks. On-site signage would inform visitors about the prohibited activities on the project site. The existing weekly ranger checks would enforce these prohibitions using clear communication and direct verbal warnings, which would also present opportunities for education about fire dangers. Ongoing enforcement, education, and signage would increase public awareness about the restrictions on the project site, minimizing ignition potential even when rangers are not present.

Through the combined vegetation fuel modification conditions and human activity measures required to implement the project, the project will reduce the risk of ignition for the nearby homes and provide an area of decreased fire behavior that will make fire containment and suppression more manageable for firefighters than the existing baseline conditions. The project would implement all defensible space and vegetation fuel modification required by the applicable codes and regulations, and the project's impact with regard to wildfire risk would be less than significant with no mitigation required.

4.2.4 Project with Additional Fire Prevention Measures

This section analyzes wildfire impacts of building the project with additional vegetation fuel modification and human activity fire prevention measures proposed by the County that exceed code requirements. Like Section 4.2.3 above, this analysis assumes the project complies with all applicable wildfire, building, and fire code requirements that would be needed to obtain approvals to build.

4.2.4.1 Fire Prevention Measures

This analysis considers the following vegetation fuel modification and human activity related activities currently occurring on site to monitor and minimize wildfire risks, measures that would need to be implemented to meet minimum code requirements, and additional vegetation fuel modification and human activity measures proposed by the County to minimize fire risk and management.

4.2.4.1.1 Vegetation Fuel Modification Measures

- ADDITIONAL MEASURE: An additional 20-foot buffer adjacent to the existing 30-foot buffer along the park footprint for a total of 50 feet of reduced vegetation cover.
- ADDITIONAL MEASURE: An additional 20-foot buffer adjacent to the existing 30-foot buffer approximately 100 feet south of the northeast corner of the County's parcel.
- REQUIRED BY CODE: Creating a 100-foot vegetation buffer, as part of the project, that would extend outward in all directions from the volunteer pad.
- EXISTING: Continued maintenance of an existing 30-foot buffer where vegetation has been cleared adjacent to the roadside along the County property, which has been historically cleared and is required by AFPD, and is not part of this project.
- EXISTING: Continued maintenance of a historically cleared and existing 100-foot buffer where vegetation has been cleared where there are adjoining properties along the northern boundary of the County-owned parcel, which is required by AFPD and is not part of this project.

4.2.4.1.2 Human Activity Measures

The existing human activity measures (small swing gate and weekly ranger checks) would be replaced by the additional measures below, which provide enhanced vehicle control barriers and a more regular enforcement presence.

- ADDITIONAL MEASURE FOR PROJECT: Strengthening the vehicle control barriers and providing improved fire-safe parking.

- ADDITIONAL MEASURE FOR PROJECT: A live-on volunteer, maintenance staff, and a park ranger to help with maintenance and management of the property.
- ADDITIONAL MEASURE FOR PROJECT: Prohibit campfires and open flames.
- ADDITIONAL MEASURE FOR PROJECT: Prohibit overnight use of the park.
- REQUIRED BY CODE: Prohibit the use of barbecues when a Red Flag Warning has been issued (County Code of Regulatory Ordinances Section 41.118).
- REQUIRED BY CODE: Prohibit smoking (County Code of Regulatory Ordinances Section 41.118.5).
- REQUIRED BY CODE: Prohibit the use, transport, carrying, firing, or discharging any fireworks, firearm, weapon, air gun, archery device, slingshot, or explosive of any kind across, in, or into the park except as authorized under Section 41.117 of the County Code of Regulatory Ordinances (County Code of Regulatory Ordinances Section 41.117).

4.2.4.2 Analysis

4.2.4.2.1 Vegetation Fuel Modification Measures

The same four existing condition fire scenarios were re-analyzed for the project with the code-required fire prevention measures *and* the additional measures proposed by the County, including a 20-foot vegetation buffer area adjacent to the existing 30-foot buffer along the park footprint and a 20-foot vegetation buffer area adjacent to the existing 30-foot buffer approximately 100 feet south of the northeast corner of the County's parcel. As shown in Table 3, Project Vegetation with Additional Fire Prevention Measures Fuel Model Characteristics, the GR2 fuels associated with the buffer area have been converted to code-compliant vegetation fuel modification. A full analysis of the modeling is included in the Fire Behavior Modeling Summary in Attachment 1. Below is a summary of the results of each scenario associated with the project as proposed.

Table 3. Project Vegetation with Additional Fire Prevention Measures Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)[1]
FM8	Compact Litter	On-site Zone 1 and 2 fuel modification	0.2 ft.
NB	Non-burnable	Paved areas throughout the proposed project site.	0 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005).

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 2.9 feet, have a fire intensity of up to 57 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.3 miles.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 1.3 feet, have a fire intensity of up to 9 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.1 miles.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Results: Expected to produce flame lengths up to 3 feet, have a fire intensity of up to 63 BTU/feet/second, have a rate of spread of up to 0.2 mph, and produce ember spotting up to 0.3 miles.

Scenario 4. The vegetation in this scenario will not change with development of the project with the additional fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Results: Expected to produce flame lengths up to 7.1 feet, have a fire intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

In addition to the vegetation fuel modification required by code, the modeling above includes vegetation fuel modification within the additional 20-foot buffer areas (included in Scenario 3) that exceeds code requirements. Consistent with Section 4.2.3, the fire behavior modeling in this section shows a reduction in expected flame length, fire intensity, spread rate, and ember spotting within the project site when compared to the existing conditions fire behavior modeling. Additionally, as shown under Scenario 3 above, modifying the vegetation within the additional 20-foot buffers would further reduce wildfire risk beyond the risk reduction achieved by incorporating only the required fuel prevention measures. The proposed project would result in a reduction in buffer area flame lengths (3 feet compared to 18 feet in Section 4.2.3), fire intensity (up to 63 BTU/feet/second compared to up to 3,037 BTU/feet/second in Section 4.2.3), rate of spread (0.2 mph compared to up to 6.2 mph in Section 4.2.3), and ember spotting (up to 0.3 miles compared to up to 1.1 miles in Section 4.2.3).

As described in Section 4.2.3, vegetation fuel modification within the additional 20-foot buffers is not required to achieve a less than significant wildfire risk impact. As described in Section 4.2.1, vegetation fuel modification has been demonstrated to limit fire spread. Defensible space landscaping reduces the risk and likelihood of an on-site ignition becoming an off-site wildfire by reducing the fire intensity and rate of spread by replacing dense, fire-prone, volatile natural vegetation with managed landscaping and vegetation fuel modification zones. The required vegetation fuel modification would reduce flame lengths, fire intensity, rate of spread, and ember spotting compared to existing conditions. As demonstrated through the research and modeling above, additional vegetation fuel modification within the 20-foot buffer areas would further reduce potential fire activity on the project site. The additional vegetation fuel modification features are not required to reduce impacts to less than significant and are therefore not mitigation measures.

4.2.4.2.2 Human Activity Measures

The project proposes additional human activity fire prevention measures beyond what is included in Sections 4.2.2 and 4.2.3.

Strengthening the vehicle control barriers and providing improved fire-safe parking would more comprehensively minimize the occasional unauthorized vehicle access to the site, preventing vehicle-caused ignition in vegetation fuels. Improved fire-safe parking would minimize ignition risk in designated parking areas by using non-burnable materials compared to existing conditions which include fire prone vegetation. As described in Section 4.2.1, vehicles are a common ignition source in vegetation fuels. Vehicle malfunctions that result in sparks and/or exhaust system components contacting vegetation can result in vegetation fires.

A live-on volunteer, maintenance staff, and a park ranger to help with maintenance and management of the property would play a key role in enforcement and education, the benefits of which are described in Section 4.2.1 above. A more active enforcement presence would ensure that visitors comply with the other human activity measures through verbal warnings or request removal of individuals who do not comply with park regulations. Additional site presence also presents opportunities for rangers to educate visitors about the fire risks associated with prohibited activities. Having multiple individuals on-site and responsible for enforcement ensures a higher level of enforcement.

Prohibiting campfires and open flames would directly reduce opportunities for ignition within the park, especially during high wind events. The enforcement and education conducted by the live-on staff, maintenance workers, and park rangers would reinforce the effectiveness of this measure. This enforcement would be supplemented with signage on site clarifying prohibited activities.

Prohibiting overnight use of the park would minimize opportunities for visitors to cause ignitions within the park through illegal activities such as lighting campfires or smoking. The enforcement and education conducted by the live-on staff, maintenance works, and park rangers would reinforce the effectiveness of this measure. This enforcement would be supplemented with signage on site clarifying prohibited activities.

4.2.4.3 Conclusion

As shown above, converting the fuels within the additional 20-foot buffer to code-compliant vegetation fuel modification would further reduce fire behavior within the project site. Consistent with Section 4.2.3, the fire behavior modeling in this section shows a reduction in expected flame length, fire intensity, spread rate, and ember spotting within the project site when compared to the existing conditions fire behavior modeling.

The fire prevention measures proposed for the park implement the applicable sections of the San Diego County Code of Regulatory Ordinances and additional human activity measures that closely align with the best practices found in fire prevention literature described in Section 4.2.1 above. These fire prevention measures will be enforced through on-site signage, a live-on volunteer, and additional staffing to increase ranger patrols to the area compared to existing conditions. Overnight use will be prohibited through these enforcement mechanisms in addition to a gate at the access point of the park which will only allow access during park hours (sunrise to sunset). As a code requirement, roadside vegetation management would further reduce the risk of vehicle-related ignitions relative to existing unmanaged roadside conditions. By implementing the proposed fire prevention measures, the project would reduce ignition risk associated with increased human use of the site through active site management,

regulated public use, and implementation of defensible space principles. Further, vegetation fuel modification implemented as a project fire prevention measure would reduce hazardous fuels within the project site and alter the interaction between fuels, weather, and fire behavior. Adopting and enforcing the applicable San Diego County Code of Regulatory Ordinances section policies governing the use of the project site through the proposed fire prevention measures would reduce the likelihood of fires being ignited by known human causes. Impacts would be less than significant without mitigation.

5 Impact Summary and Conclusion

As described in Section 3 above, the purpose of this document is to address the deficiencies in the EIR's wildfire analysis as identified by the Court's Writ (Section 3.1) and Minute Order (Section 3.2). To respond to the Court's order, a review of the previous FEOA, the 2023 FEIR, and the California Office of the Attorney General Guidance was conducted to determine the scope of the analysis required in this document. It was determined that as a supplement to the prior analyses, an analysis of the project's baseline existing conditions compared to the project with only those fire prevention measures required by code and a separate analysis with the proposed additional fire prevention measures that exceed code requirements is needed. Specifically, the analysis presented above addresses the effectiveness of the project's fire prevention measures by analyzing the project with required measures only (i.e., "pre-mitigation" per the Court's Writ and Minute Order) then analyzing the project with the additional fire prevention measures proposed by the project. Fire prevention measures beyond code compliance would only be considered mitigation measures if they were necessary to reduce impacts to a less than significant level (i.e., if the impact would be significant in their absence).

The project includes two categories of fire prevention measures: vegetation fuel modification fire prevention measures and human activity fire prevention measures. Fire activity in various vegetation types can be quantitatively modeled and analyzed, while human activity is unpredictable and cannot be quantitatively modeled. As such, the analysis relies on both quantitative fire behavior modeling using the BehavePlus program and qualitative research from industry experts to assess the effectiveness of the project's vegetation fuel modification fire prevention measures (such as vegetation clearing) and human activity fire prevention measures (such as the prohibition of smoking and open flames) for the following three conditions:

- The existing baseline wildfire risks at the project site under existing environmental conditions (Section 4.2.2);
- The wildfire risks associated with implementation of the project in the absence of mitigation, assuming the project complies with all applicable provisions of the San Diego County Code of Regulatory Ordinance and the 2025 California Building Standards Code, including wildland-urban interface, building, and fire code requirements for construction and fire prevention and protection (Section 4.2.3) without which the project could not be permitted or built; and
- The wildfire risks associated with implementation of the project, when additional fire prevention measures are included, beyond those required by code (Section 4.2.4).

Existing Baseline Condition

As described in Section 4.2.2, under existing conditions, the project site and adjacent off-site areas consist primarily of annual grasslands and grass-shrub vegetation, which are highly receptive to ignition and rapid fire spread, particularly during offshore Santa Ana wind events. Four wildfire scenarios were modeled, including on-site and off-

site ignitions under both extreme offshore and average onshore wind conditions. Modeling results demonstrate that, during a Santa Ana wind event, wildfire behavior in existing vegetation could be severe, with 28-mph sustained winds and 41-mph wind gusts, modeled flame lengths of up to approximately 18.1 feet, fireline intensities up to 3,071 BTU/feet/second, rates of spread up to 6.2 miles per hour, and ember spotting distances of up to 1.1 miles. Regarding human activity and ignition, the project site is currently subject to occasional unauthorized vehicular and pedestrian public access to and within hazardous vegetation fuels, making it vulnerable to potential smoking, vehicle, or other ignition hazards that increase wildfire risk. The current use of the undeveloped land, including occasional unauthorized access, places the project area at risk for fire ignitions associated with both natural events and human activities.

Project with Required Fire Prevention Measures

As described in Section 4.2.3, the project would be required to implement certain fire prevention measures mandated by building and fire codes, which would convert existing hazardous vegetation fuels to maintained landscaping and vegetation fuel modification zones that meet code requirements. There is no scenario in which the project could be constructed without these required fire prevention measures in place, as these features are legally required and cannot be removed from the project design. An analysis of the project with the required fire prevention measures thus represents a “pre-mitigation” condition that can be used to assess project impacts in the absence of mitigation. The same four wildfire scenarios were modeled for the project with the required vegetation fuel modification fire prevention measures listed in Section 4.2.3.1. The only vegetation fuel modification measure that is not required by the relevant codes is vegetation modification within two 20-foot additional buffer areas adjacent to two existing 30-foot buffer areas maintained by the County. The analysis for the project condition with the required fire prevention measures assumes that the vegetation (and fire activity) in the additional 20-foot buffer areas would remain the same as the existing condition.

Modeling results demonstrate that in the project with the required vegetation fuel modification measures condition, flame lengths in areas with vegetation modification would be reduced by approximately 4.6 feet to 12 feet depending on the location, compared to the existing condition. Similarly, fire intensity in the fuel modification areas would be reduced by up to 3,008 BTU/feet/second; rate of spread would be reduced by up to 4 mph; and ember spotting distanced would be reduced by up to 0.8 miles compared to the existing condition.

Regarding ignition and human activity, the project is anticipated to lead to additional human presence at the site, which could increase fire risk by introducing additional opportunities for human-caused fire ignitions. However, the project would be subject to the restrictions in the County Code of Regulatory Ordinances, which prohibits ignition sources such as smoking or fireworks. On-site signage would inform visitors about the prohibited activities on the project site. The existing weekly ranger checks would enforce these prohibitions using clear communication and direct verbal warnings, which would also present opportunities for education about fire dangers. Ongoing enforcement, education, and signage would increase public awareness about the restrictions on the project site, minimizing ignition potential even when rangers are not present. Still, due to the lack of a daily enforcement presence, the occasional unauthorized access of the project site is not expected to be meaningfully reduced for the project with required fire prevention measures condition, meaning some ignition potential would still exist for this hypothetical condition. However, the irrigated and managed landscaping proposed for the project reduces the risk of an on-site ignition becoming an off-site wildfire by replacing a nearly continuous field of hazardous, easily ignited vegetation with ignition-resistant landscaping arranged in accordance with defensible space and fuel modification requirements. Through the combined vegetation fuel modification conditions and human activity measures required

to implement the project, the project will reduce the risk of ignition for the nearby homes and provide an area of decreased fire behavior that will make fire containment and suppression more manageable for firefighters than the existing baseline conditions. The project would implement all defensible space and vegetation fuel modification required by the applicable codes and regulations, and the project's impact with regard to wildfire risk would be less than significant with no mitigation required.

Project with Additional Fire Prevention Measures

As described in Section 4.2.4, the only vegetation fuel modification fire prevention measure that exceeds code requirements are the additional 20-foot buffer areas. These buffer areas would further reduce fire activity on the project site by providing more area with maintained landscaping and irrigation. The proposed project would result in a reduction in buffer area flame lengths (3 feet compared to 18 feet in Section 4.2.3), fire intensity (up to 63 BTU/feet/second compared to up to 3,037 BTU/feet/second in Section 4.2.3), rate of spread 0.2 mph compared to up to 6.2 mph in Section 4.2.3), and ember spotting (up to 0.3 miles compared to up to 1.1 miles in Section 4.2.3) compared to existing conditions.

Regarding ignition and human activity, the project includes fire prevention measures that exceed the requirements of the County Code of Regulatory Ordinances; the proposed human activity measures are listed in Section 4.2.4.1. Additional measures include a live-on volunteer, maintenance staff, and a park ranger to help with maintenance and management of the property; strengthened vehicle control barriers and fire-safe parking; and the prohibition of campfires and overnight use of the park. As described in Section 4.2.1 above, one of the most effective means of reducing ignitions is to combine effective education with judicious enforcement. Pairing restrictions (such as the prohibition of smoking) with on-site enforcement personnel establishes a comprehensive compliance framework by providing the legal authority necessary to support enforcement actions and penalties for violations; active monitoring and enforcement capacity to identify noncompliance and request compliance or summoning assistance from law enforcement; and direct public education and outreach that promotes awareness of regulations and reduces the likelihood of future violations. With the additional vegetation fuel modification and human activity fire prevention measures, impacts related to wildfire would continue to be less than significant. As impacts were less than significant without the additional measures, and the additional measures would further minimize wildfire risk, the additional fire prevention measures proposed by the County are not mitigation measures necessary to reduce impacts to a less than significant level.

As described in Sections 4.2.2 through 4.2.4, the modeling demonstrates that building the project, both with required fire prevention measures only and with the additional fire prevention measures as proposed, would substantially reduce wildfire behavior within the project site compared to existing baseline conditions, with the proposed project (Section 4.2.4) providing the greatest reduction in wildfire risk. Based on the results of the fire behavior modeling, the proposed vegetation fuel management and operational control fire prevention measures, and accepted research into human activity and behavior, the project (with or without the additional fire prevention measures) would not exacerbate wildfire hazards. Instead, it would result in a net reduction in wildfire intensity, spread, and suppression difficulty compared to existing conditions. The project would reduce the risk of wildfire impacts to nearby residences, create a safer area for public use, and provide ancillary benefits by improving fire containment opportunities for emergency responders. Accordingly, the project will have a less than significant impact and would not substantially impair an adopted emergency response plan or emergency evacuation plan; exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire due to slope, prevailing winds, and other factors; require the installation or

maintenance of associated infrastructure, such as roads, fuel breaks, emergency water sources, power lines, or other utilities, that may exacerbate fire risks or result in temporary or ongoing impacts on the environment; or expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. **Impacts related to wildfire hazards would be less than significant with no mitigation required. Compared to existing conditions, the project would result in an overall reduction in wildfire risk.**

6 References

Includes references in the Fire Behavior Modeling Summary attachment.

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Attachment 1

Fire Behavior Modeling Summary

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. 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, Marsden-Smedley and Catchpole 1995, Grabner et. al. 1997, Alexander 1998, Grabner et al. 2001, Arca et al. 2007). 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 to 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 in key areas within and adjacent to the proposed project site. 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 or other disturbance 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.

It is important to note that BehavePlus models fire behavior after ignition in specific vegetation fuels and under specific weather conditions. BehavePlus was not intended to, nor is it capable of, predicting ignition locations and causes of ignitions. Locations and causes of ignition are generally associated with human behavior, which is the underlying cause of the majority of California wildfires (Syphard et al. 2007; Romero-Calcerrada et al. 2008). Common locations and causes of ignition are determined from data obtained from fire investigation reports. A background knowledge of locations and causes of fire ignitions, and the associated human behavior, assists with informing the locations within and adjacent to a project site that potential fires should be modeled.

2 Modeling Inputs

Dudek utilized the BehavePlus software package to analyze fire behavior potential for the proposed development site in Alpine, San Diego County, California. For this analysis, four existing conditions scenarios were evaluated, including two average summer weather conditions (on-site and in the open space to the west of the project site) and two extreme weather offshore wind conditions (both on-site). Additionally, all of the on-site scenarios were modeled for vegetation modification conditions (one average and two extreme weather conditions respectively). The project site currently is undeveloped, largely vegetated by grassland, some native shrubs and oak trees on the project site. The majority of the on-site topography is relatively flat, with a hill in the northeast portion of the project site, and a drainage/wash running east-west along the northern border of the site. With that said, fuels and terrain in proximity to the development area could produce embers that may affect the project, but the majority of the site will be irrigated vegetation or paved hardscapes, and defenses will be built into the limited on-site structures to reduce the risk of ember penetration and to contain fires that may result from ember penetration. It is the fuels to the west and northwest of the project site that could have the potential to affect the project's structures from a radiant and convective heat perspective; however, the ignition-resistant structures would be surrounded by irrigated landscape and hardscape areas.

BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The outputs produced by this analysis include flame length measured in feet, rate of spread measured in miles/hour, fireline intensity measured in BTU/feet/second, and ember spotting distance measured in miles. The following provides a description of the input variables used in processing the BehavePlus models for the project site. In addition, data sources are cited and any assumptions made during the modeling process are described.

2.1 Vegetation (Fuels)

The seven fuel characteristics help define the 13 standard fire behavior fuel models and the five custom fuel models developed for Southern California (Anderson 1982; Weise & Regelbrugge 1997). 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 at the project 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 development of 40 more fire behavior fuel models developed for use in BehavePlus modeling efforts (Scott & Burgan 2005). 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
- Timber-understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4

To support the fire behavior modeling efforts conducted for the project, a Dudek Fire Protection Planner analyzed the different vegetation types observed on and adjacent to the site and they were subsequently classified into the aforementioned fuel models. As is customary for this type of analysis, the terrain and fuels directly adjacent to the site and proposed fuel modification zones (FMZ) are used for determining flame lengths and fire spread. Fuel model attributes are summarized in Table 1, Existing Baseline Conditions Fuel Model Characteristics; Table 2, Project Vegetation with Required Fire Prevention Measures Fuel Model Characteristics; and Table 3, Project Vegetation with Additional Fire Prevention Measures Fuel Model Characteristics.

Continued

Table 1. Existing Vegetation Baseline Conditions Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet) [1]
GR2	Short, sparse dry climate grass	Represents the annual grasslands on and off the project site	0.4 ft
GS1	Low load dry climate grass- shrub	Represents the grass and sparse shrubs on the hillside in the off-site run to the west.	0.9 ft
GS2	Moderate load dry climate grass- shrub	Represents the vegetation in the areas in the northern portion of the project site.	1.5 ft
SH2	Moderate load dry climate shrub	Represents the shrub-brush in the northern portion of the project site and on the hillside in the off-site run to the west.	1 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005).

Table 2. Project Vegetation with Required Fire Prevention Measures Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)[1]
GR2	Short, sparse dry climate grass	Represents the annual grasslands on and off the project site	0.4 ft
FM8	Compact Litter	On-site Zone 1 and 2 fuel modification	0.2 ft.
NB	Non-burnable	Paved areas throughout the proposed project site.	0 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005

Table 3. Project Vegetation with Additional Fire Prevention Measures Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)[1]
FM8	Compact Litter	On-site Zone 1 and 2 fuel modification	0.2 ft.
NB	Non-burnable	Paved areas throughout the proposed project site.	0 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005

2.2 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 site for the proposed Alpine County Park is primarily flat grasslands

with coastal sage in its northern-most segment. Adjacent Back Country Land Trust preserve lands are more sloping and contoured. While some areas are dominated by grass, most are mainly covered with a mix of sage scrub and chapparal with some oak woodlands. The combined 315 acres of the preserve and park lands include a range of elevation from 1900 to 2150 feet (Rhode & Associates, 2021).

2.3 Weather Analysis

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and to objectively predict flame lengths (feet), fireline intensities (BTU/feet/second), rate of spread (feet/minute), and spotting distance (miles) for four modeling scenarios. Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent the site. These fire scenarios incorporated observed fuel types representing the dominant on-site and off-site vegetation to the west, and in addition to measured slope gradients, and wind and fuel moisture values derived from Remote Automated Weather Stations (RAWS) weather data sets for both the 50th percentile weather (summer, on-shore winds) and the 97th percentile weather (fall, off-shore winds). Weather and wind inputs for fire behavior modeling conducted in support of this FPP utilized the guidelines and standards presented by the County of San Diego, Department of Planning and Land Use (County of San Diego 2022a). These guidelines identify acceptable fire weather inputs for fire conditions during summer months and Santa Ana fire weather patterns. The County analyzed and processed 44 years of fire weather data from fire stations and Remote Automated Weather Stations (RAWS) between April 15 to December 31 in order to represent the general limits of the fire season. Data provided by the County's analysis included temperature, relative humidity, and sustained wind speed and is categorized by weather zone, including Maritime, Coastal, Transitional, Interior, and Desert.

As identified in the County's guidelines, Dudek utilized the Fine Dead Fuel Moisture (FDFM) tool within BehavePlus fire behavior modeling software package to determine fuel moisture. The temperature, relative humidity, and wind speed data for the Transitional weather zone were utilized based on the project's location. Reference fuel moistures were calculated in the FDFM tool and were based on site-specific topographic data inputs. Table 4, BehavePlus Fine Dead Fuel Moisture Calculation, summarizes the FDFM inputs and the resulting fine dead fuel moisture values. Table 5, Fuel Moisture and Wind Inputs, presents the fuel moisture and wind speed inputs for the fire behavior modeling efforts conducted for this analysis.

Table 4. BehavePlus Fine Dead Fuel Moisture Calculation

Variable	50th Percentile Summer Weather	97th Percentile Peak Weather (Santa Ana)
Dry Bulb Temperature	90–109 deg. F	90–109 deg. F
Relative Humidity	10–14 %	0–4 %
Reference Fuel Moisture	2 %	1 %
Month	May June July	May June July
Time of Day	12:00–13:59	12:00–13:59
Elevation Difference	Level (within 1,000 ft.)	Level (within 1,000 ft.)
Slope	0–30%	0–30%
Aspect	South/East	South/East
Fuel Shading	Exposed (< 50% shading)	Exposed (< 50% shading)
Fuel Moisture Correction	0%	0%
Fine Dead Fuel Moisture	2%	1%

Historical weather data for Alpine was utilized in determining appropriate fire behavior modeling inputs for the project area. Average, onshore weather conditions were derived from Remote Automated Weather Stations (RAWS) and utilized in the fire behavior modeling efforts conducted in support of this report. The Sweetwater RAWS Station (RAWS ID 045744) was utilized to find average and extreme weather values for the project area. The station is approximately 5 miles east of the project site and adequately approximates project site weather conditions. Data from fire seasons dating back to 2005 and up through 2025 were included in the analysis.

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 December 31 for each year between 2005 and 2025 for 97th percentile weather conditions and from June 1 through September 30 for each year between 2005 and 2025 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 are an average surface wind at 20 feet above the vegetation over the analysis area.

Table 5. Fuel Moisture and Wind Inputs

Model Variable	Summer Weather (50th Percentile) Onshore Wind	Peak Weather (97th Percentile) Offshore Wind
Fuel Models	GR2, GS1, SH2	GR2, GS2, SH2
1 h fuel moisture	5%	1%
10 h fuel moisture	6%	2%
100 h fuel moisture	9%	4%
Live herbaceous moisture	33%	30%
Live woody moisture	75%	59%
20 ft. wind speed	19 mph (sustained winds)	28 mph (sustained winds) wind gusts of 41 mph
Wind Directions from north (degrees)	240	95
Wind adjustment factor	0.4	0.4
Slope	3-20%	3-7%

Note: Wind speed was obtained from Table 1, County of San Diego Fire Protection Plan Guidelines for Staff

3 Fire Behavior Modeling Scenarios

Four focused scenarios were completed for existing fuels conditions, and three scenarios were completed for the post-development conditions. The results of the modeling include anticipated values for surface fires, which include flame length, rate of spread, fireline intensity, and ember spotting distance. 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 existing conditions and three post-development fire modeling scenario locations were selected to better understand the different fire behaviors that may be experienced on or adjacent to the site based on slope and fuel conditions; these fire scenarios are explained in more detail below.

Fire Scenario Locations and Descriptions:

Existing Conditions On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the southwestern boundary to the northeastern boundary of the project site during an average summer onshore wind event with 19 mph sustained winds.

Scenario 3. Fire flaming front burning through grass-shrubs in the wash in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds advancing the fire in a southwesterly direction.

Scenario 4. Fire flaming front approaching the project site from the west, burning through grass-shrubs in the off-site open space west of the project site during an average onshore summer wind event with 19 mph sustained winds.

Project with Required Fire Prevention Measures On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation and low-load, dry climate grass in the additional 20-foot-wide buffer areas in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Scenario 4. The vegetation in this scenario will not change with development of the project with the required fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Project with Additional Fire Prevention Measures On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Scenario 4. The vegetation in this scenario will not change with development of the project with the additional fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

4 Fire Behavior Modeling Results

The fire behavior modeling results presented herein 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; rather, the models provide a worst-case wildfire behavior condition as part of a conservative approach. 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.

Existing Conditions On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

> **Results:** Expected to produce flame lengths up to 14.9 feet, have a fireline intensity of up to 2,029 BTU/feet/second, have a rate of spread of up to 4.1 mph, and produce ember spotting up to 1.0 mile.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the southwestern boundary to the northeastern boundary of the project site during an average summer onshore wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 5.9 feet, have a fireline intensity of up to 266 BTU/feet/second, have a rate of spread of up to 0.8 mph, and produce ember spotting up to 0.3 miles.

Scenario 3. Fire flaming front burning through grass-shrubs in the wash in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds advancing the fire in a southwesterly direction.

Results: Expected to produce flame lengths up to 18.1 feet, have a fireline intensity of up to 3,071 BTU/feet/second, have a rate of spread of up to 6.2 mph, and produce ember spotting up to 1.1 miles.

Scenario 4. Fire flaming front approaching the project site from the west, burning through grass-shrubs in the off-site open space west of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 7.1 feet, have a fireline intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

Project with Required Fire Prevention Measures On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 2.9 feet, have a fire intensity of up to 57 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.3 miles.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 1.3 feet, have a fire intensity of up to 9 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.1 miles.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation and low-load, dry climate grass in the additional 20-foot-wide buffer areas in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Results: Expected to produce flame lengths up to 18 feet, have a fire intensity of up to 3,037 BTU/feet/second, have a rate of spread of up to 6.2 mph, and produce ember spotting up to 1.1 miles.

Scenario 4. The vegetation in this scenario will not change with development of the project with the required fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Results: Expected to produce flame lengths up to 7.1 feet, have a fire intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

Project with Additional Fire Prevention Measures On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 2.9 feet, have a fire intensity of up to 57 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.3 miles.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 1.3 feet, have a fire intensity of up to 9 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.1 miles.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Results: Expected to produce flame lengths up to 3 feet, have a fire intensity of up to 63 BTU/feet/second, have a rate of spread of up to 0.2 mph, and produce ember spotting up to 0.3 miles.

Scenario 4. The vegetation in this scenario will not change with development of the project with the additional fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Results: Expected to produce flame lengths up to 7.1 feet, have a fire intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

The results of fire behavior modeling for vegetation characteristics under existing conditions, project with required fire prevention measures, and project with additional fire prevention measures are presented in Table 6, Fire Behavior Model Results – Existing Conditions, Table 7, Fire Behavior Model Results – Project with Required Fire Prevention Measures, and Table 8, Fire Behavior Model Results – Project with Additional Fire Prevention Measures. The following describes the fire behavior outputs (Heisch and Andrews 2010) presented in the tables:

Surface Fire:

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

Fireline Intensity (Btu/ft/s): Fireline intensity is the heat energy release per unit time from a one-foot wide section of the fuel bed extending from the front to the rear of the flaming zone. Fireline intensity is a function of rate of

spread and heat per unit area and is directly related to flame length. Fireline intensity and the flame length are related to the heat felt by a person standing next to the flames.

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

Spotting Distance (mi): Spotting distance is the maximum distance at which potential spot fires may occur based on fire brands from a spreading wind-driven surface fire.

Table 6. Fire Behavior Model Results – Existing Conditions

Fire Scenarios	Flame Length[1,2] (feet)	Fireline Intensity[1,2] (BTU/feet/ second)	Spread Rate[1,2] (mph)	Spotting Distance[1, 2] (miles)
Scenario 1: 6% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on site.				
Low load, dry climate grass (GR2) (On-site)	11.6 (14.9)	1,175 (2,029)	2.4 (4.1)	0.6 (1.0)
Scenario 2: 12% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, on site.				
Low load, dry climate grass (GR2) (On-site)	5.9	266	0.8	0.3
Scenario 3: 7% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on site, northeast portion of the site				
Low load, dry climate grass (GR2) (On-site)	14.0 (18.0)	1,773 (3,037)	3.6 (6.2)	0.7 (1.1)
Moderate load dry climate grass- shrub (GS2) (On-site)	14.0 (18.1)	1,772 (3,071)	1.8 (3.2)	0.7 (1.1)
Moderate load dry climate shrub (SH2) (On-site)	11.2 (14.2)	1,075 (1,805)	0.5 (0.8)	0.6 (1.0)
Scenario 4: 8% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, off site to the west.				
Low load, dry climate grass (GR2) (Off-site)	7.1	402	1.2	0.3
Low load dry climate grass- shrub (GS1) (Off-site)	5.3	211	0.5	0.3
Moderate load dry climate shrub (SH2) (Off-site)	6.5	335	0.2	0.3

Note:
1 Wind-driven surface fire.
2 Values in parentheses represent the respective output in the presence of 41 mph gusts.

Table 7. Fire Behavior Model Results – Project with Required Fire Prevention Measures

Fire Scenarios	Flame Length[1,2] (feet)	Fireline Intensity[1,2] (BTU/feet/ second)	Spread Rate[1,2] (mph)	Spotting Distance[1,2] (miles)
Scenario 1: 6% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on-site.				
Compact Litter (FM8) (On-site)	2.3 (2.9)	33 (57)	0.1 (0.1)	0.2 (0.3)
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 2: 12% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, on-site.				
Compact Litter (FM8) (On-site)	1.3	9	0.1	0.1
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 3: 7% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on site, northeast portion of the site				
Low load, dry climate grass (GR2) (On-site)	14.0 (18.0)	1,773 (3,037)	3.6 (6.2)	0.7 (1.1)
Compact Litter (FM8) (On-site)	2.7 (3.0)	50 (63)	0.1 (0.2)	0.2 (0.3)
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 4: 8% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, off site to the west.				
Low load, dry climate grass (GR2) (Off-site)	7.1	402	1.2	0.3
Low load dry climate grass- shrub (GS1) (Off-site)	5.3	211	0.5	0.3
Moderate load dry climate shrub (SH2) (Off-site)	6.5	335	0.2	0.3

Note:
1 Wind-driven surface fire.
2 Values in parentheses represent the respective output in the presence of 41 mph gusts.

Table 8. Fire Behavior Model Results – Project with Additional Fire Prevention Measures

Fire Scenarios	Flame Length[1,2] (feet)	Fireline Intensity[1,2] (BTU/feet/ second)	Spread Rate[1,2] (mph)	Spotting Distance[1,2] (miles)
Scenario 1: 6% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on-site.				
Compact Litter (FM8) (On-site)	2.3 (2.9)	33 (57)	0.1 (0.1)	0.2 (0.3)
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A

Table 8. Fire Behavior Model Results – Project with Additional Fire Prevention Measures

Fire Scenarios	Flame Length[1,2] (feet)	Fireline Intensity[1,2] (BTU/feet/ second)	Spread Rate[1,2] (mph)	Spotting Distance[1,2] (miles)
Scenario 2: 12% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, on-site.				
Compact Litter (FM8) (On-site)	1.3	9	0.1	0.1
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 3: 7% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on site, northeast portion of the site				
Compact Litter (FM8) (On-site)	2.7 (3.0)	50 (63)	0.1 (0.2)	0.2 (0.3)
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 4: 8% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, off site to the west.				
Low load, dry climate grass (GR2) (Off-site)	7.1	402	1.2	0.3
Low load dry climate grass- shrub (GS1) (Off-site)	5.3	211	0.5	0.3
Moderate load dry climate shrub (SH2) (Off-site)	6.5	335	0.2	0.3

Note:
1 Wind-driven surface fire.
2 Values in parentheses represent the respective output in the presence of 41 mph gusts.

The information in Table 9, Fire Suppression Interpretation, presents an interpretation of the flame length and fireline intensity outputs as related to fire suppression efforts. Identification of modeling run locations is presented graphically in Figure 4 of the FPP.

Table 9. 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 with 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 with hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and 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.

5 Project Area Fire Risk Assessment

Wildfires are a common natural hazard in most of Southern California with a long and extensive history (Keeley & Syphard 2021). Southern California landscapes include a diverse range of plant communities, including vast tracts of shrublands and grasslands, like those found on and/or adjacent to the project development site. Wildfire in this Mediterranean-type ecosystem ultimately affects the structure and functions of vegetation communities (Keeley 1984) and will continue to have a substantial and recurring role (Keeley & Fotheringham 2003). Supporting this are the facts that native landscapes, from forest to grasslands, become highly flammable each fall. The climate of Southern California has been characterized by fire climatologists as the worst fire climate in the United States (Keeley 2004) with high winds occurring during autumn after a six-month drought period each year. Based on this research, the anticipated growing population expanding into WUI areas, and the regions' fire history, it can be anticipated that periodic wildfires may start on, burn onto, or spot into the site. The most common type of fire anticipated in the vicinity of the development area is a wind-driven fire from the northeast or southwest moving through the natural vegetation found on the adjacent lands.

With the conversion of the landscape to ignition-resistant development, wildfires may still encroach upon and drop embers on the site but would not be expected to burn through the development site or produce sustainable spot fires due to the lack of available fuels post-development. Vegetation fuel modification zones designed in accordance with California Wildland-Urban Interface Code are known to protect structures, landscaping, and the adjacent environment from the harmful effects of wildfire.

For example, when the Tahoe Basin experienced the Angora Fire in 2007, fuel treatments had the dual effect of saving homes and increasing forest survival (Safford et al. 2009). In areas where fuel management had been conducted prior to the Angora Fire, home loss was significantly reduced in the adjacent community and 85% of the trees survived, as compared to a 22% tree survival rate in untreated areas (Safford et al. 2009). Fuel management treatments also facilitated the ecological benefit of reduced fire severity, including higher post-fire soil litter cover, higher herbaceous plant cover, higher diversity, and lower levels of invasive beetles (Safford et al. 2009). At a minimum, managing defensible space can reduce the risk and impact of fire (Braziunas et al. 2021).

More recently, the Insurance Institute for Business and Home Safety (IBHS) conducted a post-event damage investigation into the 2025 Palisades and Eaton fires in Los Angeles County. The research found that "reducing combustible connective fuels between structures helps limit fire spread and ensures building materials serve as the last line of defense against ignition" (IBHS 2025). The IBHS analysis of the 5-foot-wide Zone 0 fuel modification zone around the perimeter of a structure showed the value of reducing or eliminating combustible materials adjacent to and near structures. IBHS reported that when Zone 0 fuel coverage exceeded 25% of the ground area, the likelihood of a structure being damaged or destroyed during a wildfire event was 87% to 100%. IBHS concluded that "Home hardening and a non-combustible Zone 0 are essential to remove the weak links fire looks to exploit" (IBHS 2025).

Studies indicate that wildfires declined steadily over time after development (Syphard, et. al. 2007 and 2013) and further, the acreage burned remained relatively constant, even though the number of ignitions temporarily increased. This is due to the conversion of landscapes to ignition-resistant, maintained areas, more people monitoring areas resulting in early fire detection and discouragement of arson, and more timely notification of the fire suppression resources that are located within these developing areas.

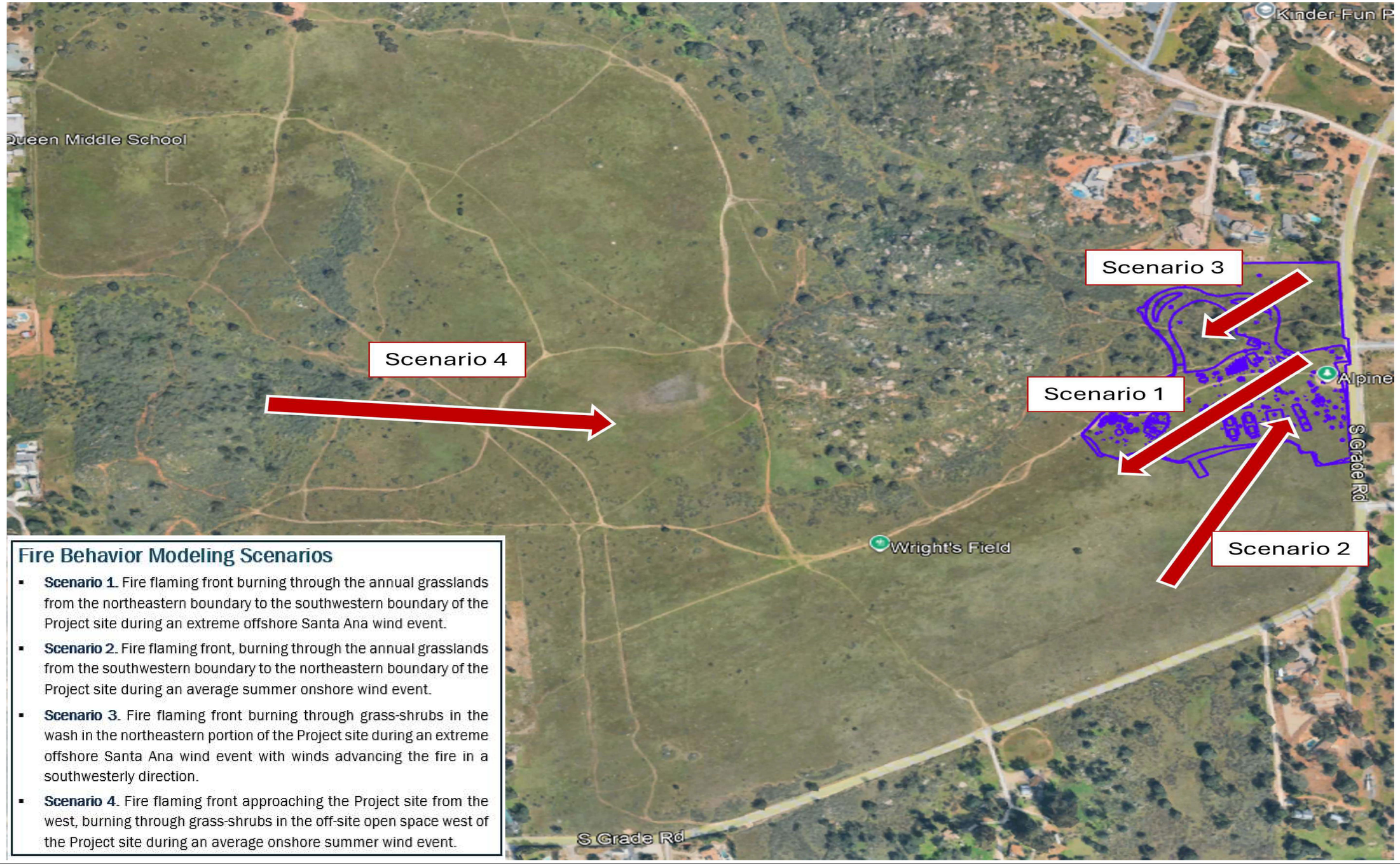
Therefore, it will be important that the latest fire protection technologies, developed through intensive research, real-world wildfire observations, and findings by fire professionals, for both ignition-resistant construction and for creating defensible space in the ever-expanding WUI areas, are implemented and enforced. The project, once developed, would not facilitate wildfire spread and would reduce projected flame lengths within the proposed fuel modification zones to levels that would be manageable by firefighting resources, especially given the ignition resistance of the structures and the planned ongoing maintenance of the landscaping throughout the project site. In addition, the project's FMZs are substantially wider than the longest calculated flame length for grass-shrub vegetation adjacent to the project site.

Given the climatic, vegetative, and topographic characteristics, along with the local fire history of the area, the project site, once developed, is anticipated to experience periodic wildfires that may start nearby and burn towards or spot into the development. The potential for off-site wildfire encroaching onto or showering embers into the site is considered low and the risk of ignition from such encroachments or ember showers is considered low given the ignition-resistant construction and landscaping, along with fire protection features that will be provided for the structures.

While it is true that humans are the cause of most fires in California, and it is anticipated that the project would increase the number of people using the project site, there is no data available that links increases in wildfires with the development of ignition-resistant communities or projects like the proposed project. The project will include fire prevention measures and policies that both reduce the risk of ignitions and prevent on-site fire from spreading to off-site vegetation.

Attachment 2

Fire Behavior Analysis Scenarios Figure



Fire Behavior Modeling Scenarios

- **Scenario 1.** Fire flaming front burning through the annual grasslands from the northeastern boundary to the southwestern boundary of the Project site during an extreme offshore Santa Ana wind event.
- **Scenario 2.** Fire flaming front, burning through the annual grasslands from the southwestern boundary to the northeastern boundary of the Project site during an average summer onshore wind event.
- **Scenario 3.** Fire flaming front burning through grass-shrubs in the wash in the northeastern portion of the Project site during an extreme offshore Santa Ana wind event with winds advancing the fire in a southwesterly direction.
- **Scenario 4.** Fire flaming front approaching the Project site from the west, burning through grass-shrubs in the off-site open space west of the Project site during an average onshore summer wind event.

Attachment 3

Analysis of Attorney General's Guidance

1 Background for Attorney General's Guidance on Best Practices for Analyzing and Mitigating Wildfire Impacts of Development Projects Under the California Environmental Quality Act

In 2022, the California Office of the Attorney General issued guidance outlining best practices for analyzing and mitigating wildfire impacts of development projects under the California Environmental Quality Act (CEQA). The guidance is not regulatory in nature and does not impose additional legal requirements on local governments, nor does it alter any applicable laws or regulations. Rather, it is intended to provide guidance on some of the issues, alternatives, and mitigation measures that should be considered during the environmental review process. This guidance is based on the Office of the Attorney General's experience reviewing, commenting on, and litigating CEQA documents for projects in high wildfire prone areas, and is intended to assist lead agencies with their planning and approval of future projects.

2 Summary and Analysis of Attorney General's Guidance Relevant to the Alpine Park Project

The following provides a summary of the guidance and an analysis of the project's compliance with the applicable points of guidance.

Attorney General Guidance for Analyzing Project's Impacts on Wildfire Risks

Baseline Conditions – The guidance states that an environmental impact report (EIR) is required to include a description of the physical environmental conditions in the vicinity of the project, at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced. This description establishes the baseline of existing environmental conditions and should include information about open space areas and habitats within the project area that may be fire prone, as well as a discussion of fire history and fuels on the project site. Including a discussion of existing available water supplies for firefighting is also critical. Providing details about existing environmental conditions at the project site that may exacerbate or minimize wildfire impacts will help ensure that the EIR fully considers the project's impacts on wildfire risk.

Project Analysis for Guidance on Baseline Conditions– Baseline conditions of the project site have been provided in the Alpine County Park Project Fire Protection Memorandum. The project description includes information about the existing use of the site, the existing wildfire hazards and risks, the existing vegetation cover, and the existing vegetation fuel modification required by AFPD and maintained by the County. Section 4.9.2.5 of the Hazards section and Section 4.20.2 of the Wildfire section also include a description of the baseline conditions relevant to wildfires.

Modeling – The guidance encourages an EIR to qualitatively assess wildfire hazard and risk variables and use fire behavior modeling and other spatial and statistical analyses to quantify the risks to the extent feasible. Modeling should include extreme weather conditions that exacerbate fire spread and should consist of a variety of different fire scenarios and include scenarios for fires that start in, near, and far from the project site. Modeling should include baseline conditions as well as post-development conditions with an analysis that provides lead agencies with sufficient data to quantify increased or decreased wildfire risks resulting from a project adding more people to wildfire prone areas and to assess the risks according to the threshold of significance.

Project Analysis for Guidance on Modeling– Fire behavior modeling has been completed for the project using the BehavePlus fire behavior modeling software, a state-of-the-art model originally developed in cooperation with the US Department of Agriculture. BehavePlus has become the industry standard and the most widely used model for predicting fire behavior on a given landscape. Fire behavior modeling for the project has been provided in the Alpine County Park Project Fire Protection Memorandum and includes modeling for baseline conditions and post-development conditions, which provides a clear comparison of the effectiveness of code-compliant vegetation fuel modification prescribed to reduce wildfire risks associated with development projects. The modeling for the project showed that vegetation fuel management and landscaping proposed for the project results in reductions in flame lengths, energy outputs, and ember spotting distances.

Project Density – The guidance notes that development density influences how likely a fire is to start or spread, and how likely it is that the development and its occupants will be in danger when a fire starts. Fire spread and structure loss is more likely to occur in low- to intermediate-density developments. The guidance encourages projects to utilize more concentrated, higher density development patterns that disrupt fire spread by removing or substantially fragmenting wildland vegetation.

Project Analysis for Guidance on Project Density – This general guidance is not applicable to the project because it is a park project and not a project that proposes to construct multiple buildings where development density and structure location are determining factors in wildfire risk reduction.

Location in the Landscape – The guidance reminds reviewing agencies that project placement in the landscape relative to fire history, topography and wind patterns also influences wildfire risk, and how a development project is planned within the landscape determines to what extent it will influence fire risk.

Project Analysis for Location in the Landscape – The project proposes a structure for use by volunteers who provide services to patrons of the park site. The structure is located well away from the edges of the project boundary and the adjacent natural vegetation fuels. The structure is located within the project boundary such that the required 100 feet of defensible space vegetation fuel medication can be provided on all sides of the structure.

Water Supply and Infrastructure – As part of evaluating a project's wildfire risk impacts, the guidance notes that an EIR should analyze the adequacy of water supplies and infrastructure to address firefighting within the project site.

This analysis should consider the potential loss of water pressure during a fire, which may decrease available water supply and the potential loss of power, which may eliminate the supply.

> Project Analysis for Water Supply and Infrastructure – As demonstrated in sections 4.15.4.3 and 4.19.4.3 of the FEIR, the project will be required to meet all code requirements related to fire flow and prove that the existing public water system is capable of providing water supply, including sufficient fire flow to control fires that might occur within the project site.

Evacuation – For projects located in high wildfire risk areas that present an increased risk of ignition and/or evacuation impacts, the guidance recommends that evacuation modeling and planning should be considered and developed at the time of project review and approval when there is greater flexibility to modify a project's design, density, siting, and configuration to address wildfire considerations rather than deferred to a later stage of the development process. The ultimate objective is to allow for informed decision-making that minimizes the environmental and public safety hazards associated with new developments that increase the risk of ignition and impede evacuation in high wildfire prone areas.

> Project Analysis for Evacuation – The project's original Fire and Emergency Operational Assessment (FEOA) noted that the San Diego County Wildland-Urban Interface Fire Emergency Response Plan has been updated for the Alpine South-East area as a part of the initial study for the project. It was noted that South Grade Road, which is adjacent to the project site, currently serves as a regional evacuation route. The FEOA encourages the County to plan for the project's special evacuation needs, which includes a plan to relocate large animals from the project's equestrian facilities and the presence of larger vehicles and livestock trailers on the evacuation routes.

Mitigating Wildfire Risk – Potential Measures

The guidance identifies "potential mitigation measures and design alternatives" (pg. 12) that may reduce a project's wildfire risk impacts, such as:

- Avoiding and minimizing low-density development patterns or leapfrog-type developments with undeveloped wildland between developed areas.
- Decreasing the extent and amount of "edge" or wildland interface area where development is adjacent to undeveloped wildlands.
- Creating buffer zones and defensible space measures within and adjacent to the project.
- Siting projects to maximize the role of low-flammability landscape features that may buffer the development from fire spread.
- Undergrounding power lines.
- Limiting development along steep slopes and amidst rugged terrain, so as to decrease exposure to rapid fire spread and increase accessibility for firefighting.
- Placement of development close to existing or planned ingress/egress and designated evacuation routes to efficiently evacuate the project population and the existing community population, consistent with evacuation plans, while simultaneously allowing emergency access.
- Providing additional points of ingress and egress and modification of evacuation routes to minimize or avoid increasing evacuation times or emergency access response times.

- Hardening structures and homes against fire by upgrading building materials and installation techniques to increase a structure's resistance to heat, flames, and embers.
- Requiring a water supply capable of meeting fire flow demand during a wildfire.
- Limiting on-street parking to ensure access and egress roads are not obstructed by parked vehicles.

Analysis – Most of the potential mitigation measures and design alternatives suggested by the Attorney General's guidance are focused on projects that include the construction of buildings and associated infrastructure. This project consists of converting previously undeveloped and undisturbed land into a multi-use community park. However, the Project has incorporated several of the Attorney General's recommendations, including:

- Creating buffer zones and defensible space measures within and adjacent to the project.
- Consideration of undergrounding power lines
- Placement of development close to existing or planned ingress/egress and designated evacuation routes to efficiently evacuate the project population and the existing community population, consistent with evacuation plans, while simultaneously allowing emergency access.
- Requiring a water supply capable of meeting fire flow demand during a wildfire.
- Planning the project design to decrease the extent and amount of "edge" or wildland interface area where development is adjacent to undeveloped wildlands.
- Limiting development along steep slopes and amidst rugged terrain, so as to decrease exposure to rapid fire spread and increase accessibility for firefighting. The project parcel contains areas of steep slopes, however, development of the project site was limited to areas with fewer slopes for greater accessibility.
- Limiting on-street parking to ensure access and egress roads are not obstructed by parked vehicles by providing dedicated parking for Park patrons.

3 Conclusion

A thorough analysis of the project finds that it would align with the Attorney General's guidance for reducing or mitigating impacts associated with wildfire and will provide code-compliant defensible space vegetation fuel modification and fire prevention measures that will reduce the impacts of locating the project in a fire hazard severity zone to less than significant.