

OTAY RANCH VILLAGE 14 and Planning Areas 16/19

FIRE SERVICES OPERATIONAL ASSESSMENT



Prepared for the San Diego County Fire Authority, by:



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The Project

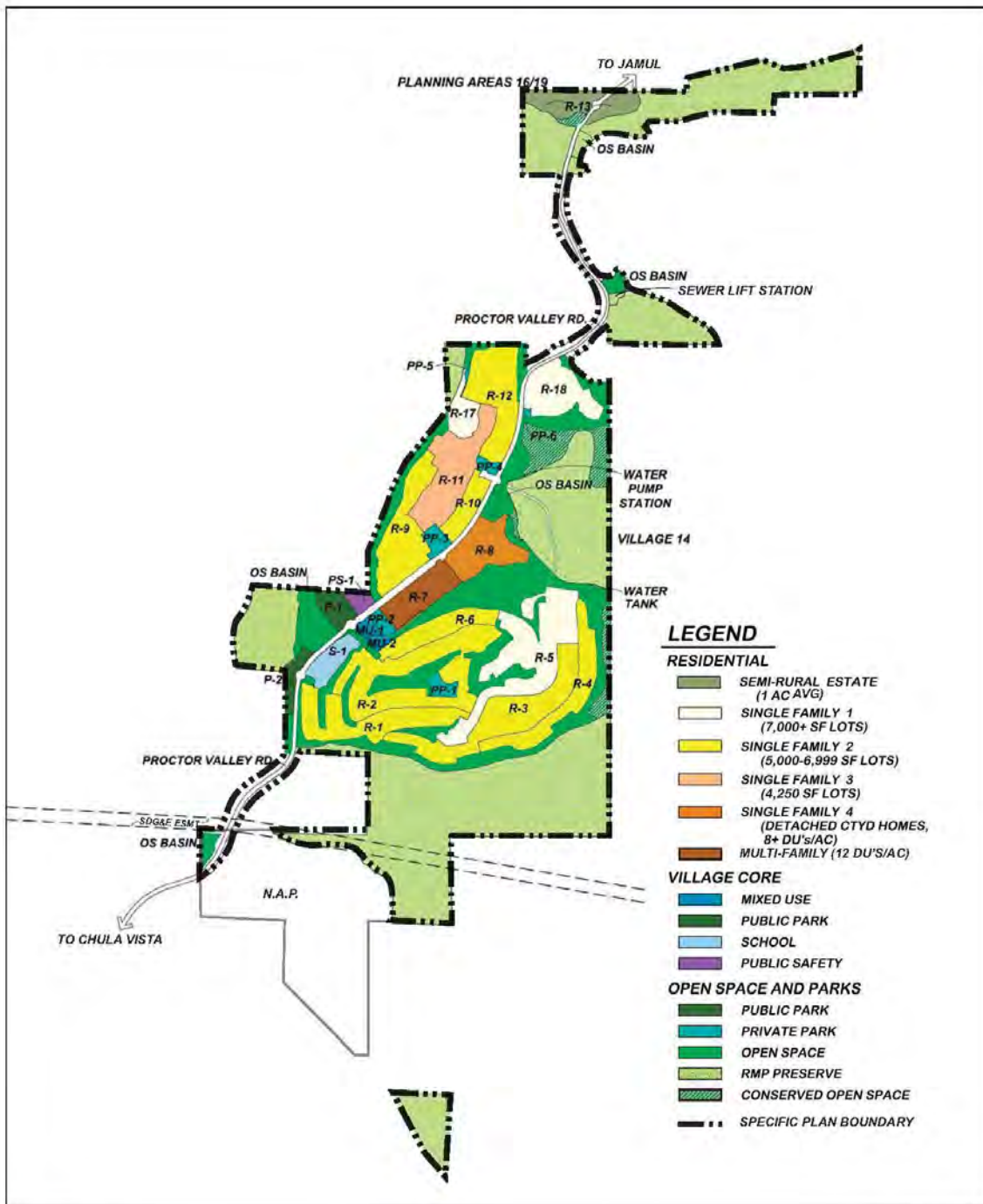
Otay Ranch Village 14 and Planning Areas 16/19 is a proposed planned community development in the upper Proctor Valley near Jamul and Chula Vista, California. The proposed development includes San Diego County Planning Areas 16 and 19, which are located immediately north-east of the core Village 14 area. Collectively, this development is referred to in this study as the “Project”. The proposed planned community includes 1,266 dwelling units, including 150 multi-family and 1,103 single family dwellings for approximately 4,177 residents on a 579-acre site, within a greater project area of 1,543 acres. Of the 1,266 project dwelling units, 1,253 dwelling units will be built in Village 14, and thirteen (13) one, two and three-acre estates will be built in Planning Area 16/19 (Dudek, 2020).

A development plan had been approved for the Project by the San Diego County Board of Supervisors on June 26, 2019. However, a revised Project has been proposed that has reduced the footprint for the planned community from previous approvals by 230-acres but increased the number of dwelling units by 147. A key development driving this revision is a land exchange between the Project and the California Department of Fish and Wildlife (CDFW) which transfers 339.7 acres of high-value habitat to the State in exchange for consolidation of the development footprint into disturbed habitat rangelands on the Proctor Valley floor. In comparison to previous development planning, development in Planning areas 16/19 is significantly reduced, and the most eastern, highest elevation site and higher value habitat sites are transferred to CDFW ownership.

The Village 14 Core will include a 9.9-acre elementary school, a 2.3-acre public safety site which will include a San Diego County Fire Authority fire station, 2.7 acres of mixed use, and 10,000 square feet of commercial development. 10.2 acres of public parks will be included in the project, including the 6.2-acre village green and a 3.9-acre scenic park. 298 acres of open space are also incorporated within the Project.

Concurrent development is also occurring within the legacy Otay Ranch property proximal to this project but sponsored by other developers. These include a project occurring within the City of Chula Vista in the “Inverted L” development area. The “Inverted L” is not included within this study as it is subject to a separate planning process by the City of Chula Vista. Another project further south, Otay Ranch Village 13, or the Otay Lakes Resort is also the subject of a separate report.

Structural fire and emergency medical services are provided to the area by the San Diego County Fire Authority (SDCFA). Wildland fire protection is provided by the California Department of Forestry and Fire Protection (CAL FIRE), who also contracts as the operational service provider for the SDCFA. Rohde & Associates has been retained by the SDCFA to conduct an operational review of the Project.



SOURCE: Hunsaker 2019

FIGURE 2

Site Utilization Plan

Otay Ranch Village 14 and Planning Areas 16/19 Proposed Project Amendment

DUDEK

The Site

The greater Project area is located in unincorporated San Diego County area, north-east of the City of Chula Vista and south of the Community of Jamul. The site is south and west of State Route 94. Proctor Valley Road adjoins the project immediately west and provides for primary Project access. Otay Lakes and the City of Chula Vista are several miles to the south and west, and the Project rises into the Jamul Mountains on the east. The site is currently rural to undeveloped in nature, and includes adjacency to U.S. Fish and Wildlife Service lands of the San Diego National Wildlife Refuge, public lands of the U.S. Department of the Interior, Bureau of Land Management, conservancy lands managed by the City of San Diego and California Department of Fish and Wildlife, and tribal lands of the Jamul Indian Village, a Kumeyaay Nation. The Indian Village lands are dominated by the presence of a large casino north of the Project. The Project site is characterized by vegetation types consisting of disturbed grasslands with a history of grazing, native grasslands, coastal sage scrub, mixed chaparral and limited riparian areas. The majority of the development proposed for the Project will occur at lower elevation sites along the valley floor, although some development on the eastern edge and especially in Planning Areas 16/19 will occur on ridgelines and on slopes at higher elevations

Analysis Approach

Rohde and Associates has assigned 3 staff members to this project with over 110 years of collective fire service experience in Southern California, including a nationally recognized wildfire behavior analyst. This team conducted an analysis in two parts: development of a Fire Services Operational Review for the greater Otay Village 14-Planning Areas 16/16 area. A Wildland-Urban Interface Fire Emergency Plan (Proctor Valley-North) was initially developed in 2018 but has also been revised and updated during this study. On-site reviews were performed by the team in September 2018 and January-February 2020.

Since wildfire has been determined by agencies to be the predominant fire risk to the development site, the consultants have been tasked to conduct a wildland fire-centric study. The analysis of related data has included:

- a. Fire Protection Plan (and appendices), prepared on behalf of the project proponent by Dudek of Encinitas, CA. 2018, and updated in December 2019.
- b. Specific Plan Amendment and appendices, prepared by the project proponent for the County of San Diego, December 2019.
- c. Wildland Fire Evacuation Plan, Otay Ranch Village 14 and Planning Area 16/19, Dudek, Feb. 2018
- d. Traffic Technical Memorandum, Chen Ryan Associates, Dec. 2, 2019
- e. Transportation Impact Study, Otay Ranch Village 14 and Planning Areas 16 and 19, Chen Ryan Associates for Jackson Pendo Development, Jan. 28, 2019

- f. County of San Diego High/Very High Fire Severity Zone data.
- g. San Diego County fuels and topographic mapping.
- h. State of California Forest Resource and Protection Program (FRAP) data.
- i. Fire history map data for the Proctor Valley/Jamul region.
- j. Potential Fire behavior data produced by BehavePlus, FlamMap, and LANDFIRE applications.
- k. Wildland-Urban Interface Fire Emergency Response Plans, San Diego County Fire Chiefs Association, 2015- 2018 (Jamul West, Proctor Valley, Proctor Valley North Plans).

Site Characterization and Fire Behavior

The Rohde & Associates assessment of the Project site is generally in concurrence with the site characterization of the Project proponent's Fire Protection Plan (Dudek, 2019). The project is wholly included within the Very High Fire Hazard Severity Zone as designated by the County of San Diego.

Climate

The site is subject to a Mediterranean Climate with dry, warm summers, and brief, wet winters. This historically results in summer and fall critical fire weather on the project site. Critical fire weather periods have occurred in every month of the year, although a fall through winter foehn wind condition, the Santa Ana winds, historically leads to the most critical fire-weather episodes. Climate change has caused uncertainty with historical fire weather patterns, and periods of prolonged drought has increased fire severity, total burned acreage, and extended a seasonal fire condition to a "year-round" risk.

Fire History

The proposed project lies on the western edge of an historical fire corridor subject to repeated occurrence of north-easterly Santa Ana wind-driven wildfires. Additionally, smaller fires affected by diurnal conditions are not uncommon within the area. Diurnal conditions are characterized by onshore/up-canyon winds during the day and lower intensity down-canyon winds at night. While the proposed development footprint will aid in developing ignition and spread resistance to some fires, the community's position within the historic fire corridor will ensure its exposure over time to large fires. Examples of past large fires include the Laguna Fire of 1970, which burned nearby, and the Harris Fire of 2007, which burned 100% of the project site. The proponent's initial Fire Protection Plan (Dudek, 2018) identified that 17 fires had occurred within the project footprint and 68 fires within 5 miles within the last 105 years.

The most significant fire in contemporary times was the 2007 Harris Fire. The fire started on Oct. 21 and was contained on Nov. 7, 2007. It burned under strong Santa Ana wind

conditions, ultimately burning 90,440 acres, 253 residences, and killing 8. Proctor Valley Road, adjacent to the project site, was the location of a major containment effort, including placement of dozer lines and backfires. According to fire officials familiar with this deployment, this specific location was selected due to the change in fuels offered there from chaparral and sage to grass, the ability to “anchor” fire line with the road, the wind sheltering effect of the Jamul Mountains, and the ebb of the Santa Ana wind condition.

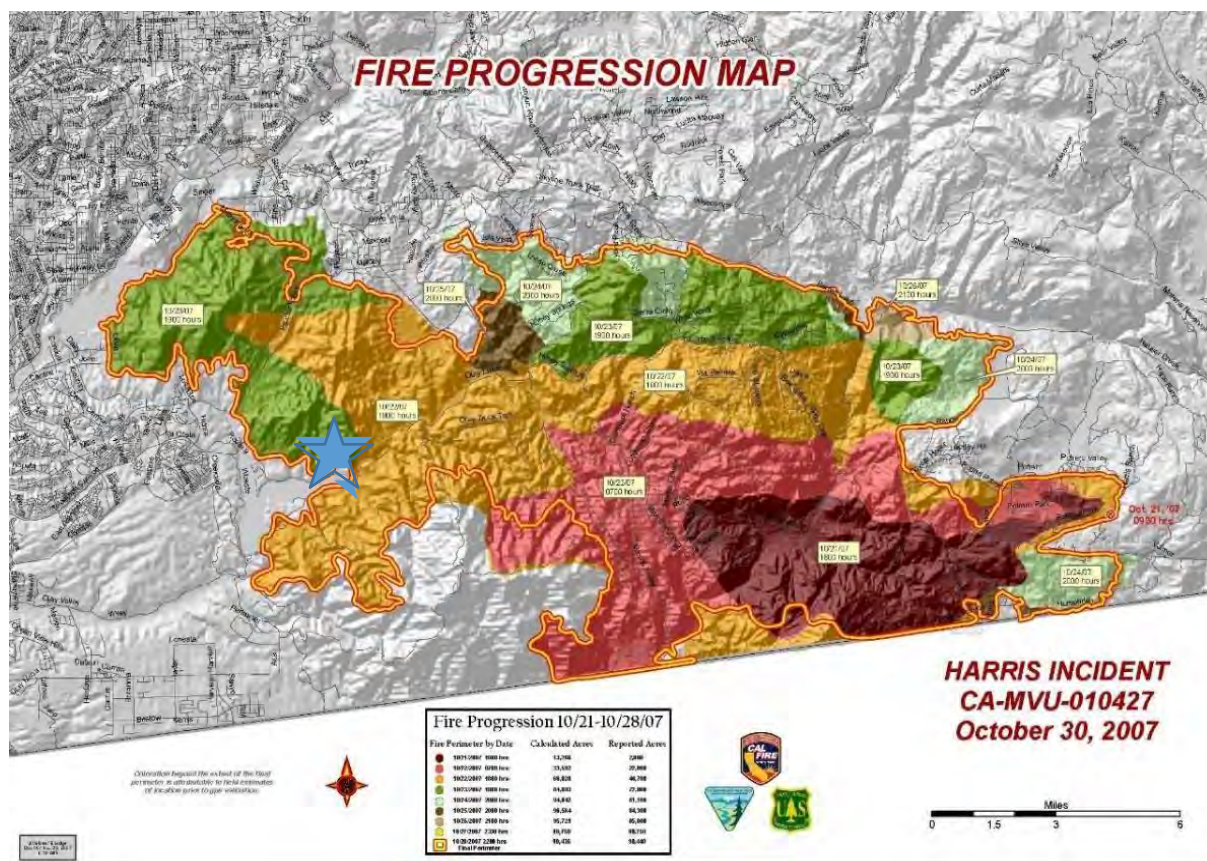
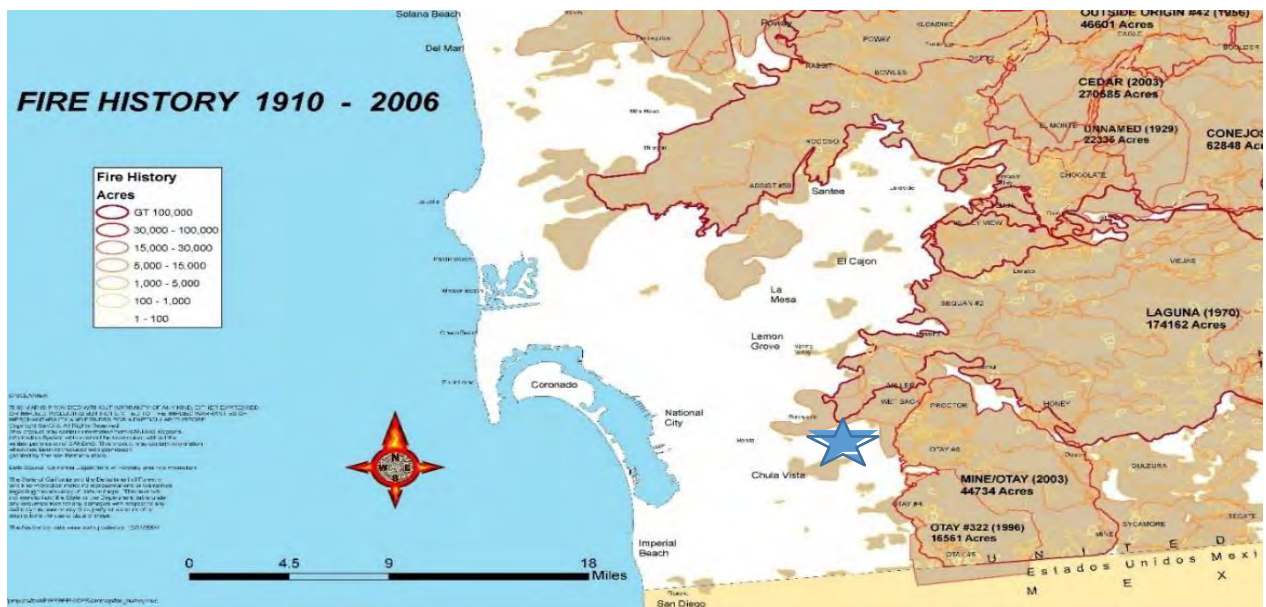
The Harris Fire on Mt. San Miguel from El Cajon, Oct. 2007



The Laguna Fire started on Sept. 22 and was contained on November 4, 1970. At the time, it was one of the largest fires in California history. Burning under strong Santa Ana wind conditions, it consumed 175,425 acres, 382 buildings, and killed 16. This fire burned on Mt. San Miguel, west of the project area, and on the north side of Jamul, a few miles north and west of the project area, but did not burn within the project site. The following fire history maps depict fire history prior to 2006 and the Harris fire footprint of 2007.

Fire Weather

The site is subject to seasonal Santa Ana winds, a foehn wind type which characteristically critically dries vegetation, develops high wind speeds and low relative humidity, and spawns historic wildfires in the region. Annually, the most critical fire weather episodes are typically associated with Santa Ana wind events. Santa Ana winds flow in an offshore, east or northeast pattern and have occurred in every month of the year but are characteristic of the September through April period. Santa Ana winds are influenced significantly by terrain, which locally funnels and intensifies winds. Peak burning conditions occurring with Santa Anas often include high thermal outputs, long-range spotting in excess of 1-mile, high rates of spread, and other extreme fire behavior



Offshore winds

Average Santa Ana wind speeds within the project may range from 25-35 MPH, with gusts to 60 MPH on exposed sites. Within the project area, Proctor Valley may be topographically aligned with Santa Ana wind patterns with a north-east wind vector, accentuating fire or wind effects in the Project area. Other Santa Ana wind vectors, particularly with eastern orientation may be geographically obstructed by the Jamul Mountains on the east. When a north-easterly pattern is present, Proctor Valley may feel the full effects of Santa Ana winds within the Project site. In the case of obstructed, more easterly winds, lower elevation sites may be sheltered from direct exposure by the adjacent Jamul Mountains, causing surface winds to be turbulent and eddied, or diminished along the valley floor adjacent to Proctor Valley Road. However, higher elevation sites within the project, especially those within Planning Areas 16 and 19 have exposed ridgeline positions and can be expected to receive the full Santa Ana impact. This alignment has the potential to produce maximum fire intensity and cause fire trajectory to be channeled to exposed home sites. As such additional mitigations may be necessary for these sites for fire safety.

Village 14 Site average- Santa Ana wind conditions- 50-year record

Max. Temp.- offshore winds	Min. Relative Humidity (RH)- offshore winds	Average offshore wind speed	Average offshore gusts	Wind Azimuth
90-108 degrees F.	<10%	25-35 MPH	35-60 MPH	36-90 degrees

Onshore Winds

During normal diurnal conditions, onshore winds of low to moderate intensity will likely affect the Project site daily, beginning with solar heating early in the day, with onshore/up-canyon winds diminishing after sunset. Light, down-canyon winds will be the routine condition after dark. Summertime critical fire weather events can occur and are frequently associated with prolonged periods of hot temperatures, low relative humidity, low fuel moistures associated with seasonal drought, strong/dominant high pressure and moderate diurnal/onshore winds. While fire behavior can be critical under these conditions, wind speeds are typically less severe than during Santa Ana wind events. The following average onshore wind conditions have been recorded for the late summer period:

Village 14 Site average- peak summer diurnal wind conditions- 50-year record

Max. Temp.- Onshore winds	Min. Relative Humidity (RH)- onshore winds	Average onshore wind speed	Average onshore gusts	Wind Azimuth
90-105 degrees F.	<30%	7 MPH	12 MPH	270 degrees

Fuel Conditions

The project area is largely composed of vegetation typical of Southern California coastal and interior chaparral communities. In addition to chaparral and Coastal Sage Scrub, small areas of riparian vegetation, coast live oak woodland, eucalyptus, and both native and non-native grasslands exist on and near the site. Grazing has been common on lower elevation grass dominated sites. The spatial area of each habitat type is adequately reflected in maps included within the proponent's initial Fire Protection Plan. (Dudek), Grass and Coastal Sage Scrub dominate the lower elevations, and Coastal Sage Scrub and mixed chaparral dominate higher elevation sites. Vegetative cover within the project area was nearly completely burned in 2007 and is recovering. Fuel loading for the project site is estimated to be .4-.5 tons per acre for grass and 8-9 tons per acre for Coastal Sage Scrub and mixed chaparral.

Effect of fuels

Current fuel conditions are of moderate age class, recovering from the effects of the 2007 Harris Fire. This sub-climax condition will support wildfires and may support large wildfires under wind-driven or extreme burning conditions. As fuel conditions continue to age and mature, large fire energy release potential and spotting fire behavior may be expected to increase. These fuel beds should achieve climax conditions within 25-30 years post-fire.

The chief effect in fire behavior given the current sub-climax fuel condition is the potential reduction from climax fire line intensity as demonstrated by flame length production. This is an important factor which relates to difficulty to control, potential for direct flame impingement upon structures, or for fire obstruction of roadways used for evacuations. Given the sub climax condition present, flame lengths may be reduced by up to 1/3 or more that of climax fuels potential in this area. We forecast that at climax, shrub fuels directly adjacent to structural development may generate flame lengths of 30-35 feet. This generally agrees with the proponent's initial Fire Protection Plan (Dudek, 2018) finding of a maximum of 34 feet for shrub fuels and 12 feet for short grass. Under climax fuel conditions, flame lengths may increase to as much as 40-50 feet during peak burning conditions.

Rates of spread are likely to be higher in the sub-climax fuel condition due to the higher percentiles of small woody and grass-like fuel structure present. Rates of spread for the current fuel condition was calculated using area historically average Santa Ana winds. This calculation resulted in an average wildfire Rate of Spread for shrub fuels of 3-4 MPH, although peak rates of spread have been observed on area fires at near twice that rate, especially in locations where wind, topography, and fuels were in alignment, or where a heavier grass components were present. The Dudek report agrees with these worst-case calculations.

Project area typical upland fuels- Jamul Mountains within the project site



As shrub fuel conditions reach post fire climax, under critical burning conditions the risk for spotting will increase and fire intensities may increase with the availability of heavier fuels. Spotting may become particularly problematic near ridgelines where fires may loft burning materials up and over. This issue suggests that ember cast from Santa Ana wind driven fires into the Project will become an increasing risk as fuels continue to recover from the 2007 burn condition. Spotting may become particularly problematic downwind from heavier fuel beds as they mature.

National fire research by Cohen (2008) and Manzello (2014) have identified that fire brand casting is a principal factor in ignition of structures in the Wildland-Urban Interface. This consideration should cause planners to consider extensive protection from fire branding for the proposed development in structural design, use and placement of ornamental vegetation, placement and design of structural features such as decks, gazebos and external structures, structural setbacks from vegetation, modification of native fuels in internal community islands, and related actions to reduce ignition by fire branding. These conditions should include focus on attic vents, eaves, roofing materials, exterior fencing materials, and ornamental vegetation restrictions. Such actions are all required by fire and building codes for the area and are recognized in the Proponent's Fire Protection Plan (Dudek, 2018).

Looking east from Mt. San Miguel towards the Proctor Valley, the Jamul Mountains, and the Project site



Topography

Elevations range within the Project from near 600 feet on the southern end of the proposed development along Proctor Valley Road, to 1,200 feet between Planning Area 16 and 19 along ridgelines of the Jamul Mountains. The area includes rugged topography of steep mountains interspersed with inland valleys. Rugged canyons with slopes approaching 40% are common and descend from the ridges to the valley floors. The Jamul Mountains rise within the project's east aspect to a maximum elevation near 1,900 feet. Mt. San Miguel rises to the west of the project to an elevation of 2,567 feet. Terrain has the potential to accentuate fire behavior potential, especially in the Planning area 16/19 portions of the project. Here, in the north-east corner of the development site, homes will be placed on ridgelines above canyons. This position may align wildfires with fuels, topography, and wind, which can accentuate fire behavior near ridgeline homes to its maximum potential.

The Highway 94 corridor north-east of the Project is a known location of human caused ignitions, which suggests fire starts during critical fire weather may have an origin here and achieve trajectory towards the project and approach home sites with extreme fire behavior. Development mitigations must especially be applied in these ridgeline areas to promote fire safety and structural survival during wildfire.

Ridgeline roll-eddy effects on spotting may also be significant in the upper portions of the project. (Schroeder & Buck, 1970). As ridge top winds along the Jamul Mountains may form horizontal roll vortices on the lee side of ridges. Spot fires which occur in this region may be driven by eddy winds, causing fires to threaten ridgeline homes with force from both the wind facing side of the slope, as well as the lee side.



Large roll eddies are typical on the lee side of ridges perpendicular to winds

Most of the proposed Project's homes will be situated to the west of the Jamul Mountains. As such, worst case fire scenarios include fire trajectory across the Jamul Mountains or southwest along Proctor Valley Road under Santa Ana winds to affect the development or travel northwest along Proctor Valley during diurnal wind conditions out of the southwest. Fires originating from areas to the east along SR94 will be significantly accentuated by topographic conditions of elevation gain and fire growth as fire climbs the Jamul Mountains before reaching the Project site. Fires from the south and west may be less severe due to less impact from topographic effects, lower wind speeds, and diurnal wind patterns. Fires nearer the Village 14 development may utilize adjacent slopes to threaten community fringe areas as fires climb in elevation and flank the community. Slopes within the community vary from near 0% on the Proctor Valley floor to 40% on Jamul Mountain slopes. The proponent's Fire Protection Plan (Dudek, 2018) has utilized a community average slope of 19.5% in calculating potential fire behavior. A closer inspection of this finding would indicate a risk of over-prediction of fire behavior for portions of the project near Proctor Valley Road and an under-prediction for those areas of greater slope. The Dudek report has also calculated and reported maximal flame lengths expected in higher slope areas using average slope of 27% for reference.

Rate of Spread

Wildfire rate of spread has been modeled in this study using BehavePlus, LANDFIRE, and FlamMap fire behavior prediction programs. Mapping from this modeling has been included in the Wildland-Urban Interface fire plan for this site (attached) that depicts both onshore and offshore wind scenarios under average-worst case fire behavior conditions. Fifty years of historical weather and current fuel mapping have been calculated into this modeling. Results indicate that under critical fire weather, extreme fire behavior including rapid rates of spread may be expected. Average Santa Ana winds in the area may be expected to develop 3-4 MPH rates of spread in shrub fuels, including Coastal Sage

Scrub and mixed chaparral. Higher rates of spread may be expected in grass fuels, and in locations where fuel, topography and winds are in alignment. This rate of spread may also be accentuated 3x-5x on slopes. Additionally, spread will be enhanced by spotting and fire branding ahead of the main fire front, which can be significant when fires burn heavy, old-age class fuel beds.

Fire Ignition Sources

Numerous studies have identified that human wildfire ignition is directly tied to population growth (CAL FIRE, Keeley, et. al.) and is an inescapable result of any development in the Wildland-Urban Interface. Additional studies have determined that major transportation corridors, such as State Route 94, are a significant source of wildland fire ignitions. This factor is of concern, given the position of the SR94 to the north-east of the project, in a valley where wildfire ignitions may be driven by Santa Ana winds into the Project area.

Compaction of Development

Through the County's development approval process, an alternative was offered in the original Village 14 Project for consolidation of development to achieve environmental and habitat preservation benefits. That alternative has been exercised in the current Project plan. Fire protection benefits have also been achieved from the compaction of the development footprint and will contribute to improved efficiency of fire services through improved response times and improved strategic and tactical options for deployment of community wildfire protection during a major wildfire. Previously proposed development patterns were more dispersed and would have resulted in longer response times to outer areas, and the more dispersed community would have created difficulties to deploy and protect homes over a broader and less contiguous area during large fires. The revised Project also is more concentrated on the valley floor which is dominated by lighter fuel types posing lessened wildfire intensity, and flatter terrain with less topographic challenges, both which will serve to reduce wildfire threats.

Evacuations

The updated evacuation plan has not yet been prepared by the Project, however a strategy is proposed within this study and attached in the Proctor Valley-North Wildland Urban Interface Fire Emergency Response Plan. Evacuation of the community relies on one primary route, Proctor Valley Road. This road leads south-west into Chula Vista roughly 3 miles to intersect with State Route 125, or north-east to the Community of Jamul and State Route 94. Given past fire history and fire behavior conditions, the safest route of egress under either Santa Ana wind or onshore wind driven fires will likely be south into Chula Vista, although safety of this condition will rely on public safety officer assessment during the time of need. North-bound evacuations into Jamul may be confounded by topographic conditions, wind-driven fire trajectory, and proximity to heavier fuels which may pose civilian entrapment risk. If travel on Proctor Valley Road may be compromised, it may be much safer to utilize temporary safe refuge areas within the Project development as a temporary population protection measure.

Proctor Valley Road is proposed to be upgraded to a two-lane paved condition of minimum 24-foot width and equipped with traffic circles for at least two entrances to each of the 3 villages within the development. The roadway is proposed for fuels modification to provide ignition resistance and fire hardening for a distance of 20 feet on either side of the roadway, with the intent of maintenance of evacuation travel during fire emergency. While the fuels modification should adequately mitigate direct fire impacts on the roadway, there will be continuing potential for temporary obstruction due to smoke or fire branding as the fire moves proximal to the road. This may be particularly problematic for night-time evacuations. Connector roads between Planning Areas 16 and 19 will also have 50-foot fuel management zones to provide similar protection. On the north, Proctor Valley Road will have two means of access into the Community of Jamul, either through continuance along the primary route or via Melody Road.

If evacuation from the Community of Jamul is directed along Proctor Valley Road to the southwest, traffic congestion should be expected. This route should not be used by Jamul residents except as an emergency, last contingency evacuation route due to the potential for fire to compromise this route at locations north of the Project, given existing fuel and topographic conditions.

Potential evacuation route obstruction amplifies the need to potentially shelter-in-place affected populations within the community during wildfire. The availability of community parks, schools, development footprint, and related community features, in addition to building construction and fuel modification around homes provides adequate capacity within the community to shelter-in-place as an emergency measure. Nearly 4,200 residents will live within the community at build-out. The proponent indicates that with effective notice and cooperation by residents, the community can be evacuated in approximately 1.5 hours (Dudek 2018). Our studies agree with this finding.

This finding is also consistent with estimates published for urban areas by the Federal Emergency Management Agency. Historical evacuation experience during past San Diego County wildfires has found limited participation by large percentiles of affected populations to evacuation warnings until late in evacuation periods, leading to traffic congestion during peak threat times. It will be important to stress the dangers associated with delay of evacuation in emergency messaging and public outreach. A wildfire prevention and Ready-Set-Go public education outreach has been proposed by the project proponent for the community.

Potential for traffic congestion of Proctor Valley Road may be an important traffic management issue given that both evacuation and emergency vehicle access must both utilize this route. Law enforcement traffic control must be implemented early to facilitate order and prevent area entry by non-residents. Use by Jamul residents to evacuate south west to Chula Vista should only be conducted under emergency conditions.

The Project's Wildland Fire Evacuation Plan (Dudek, 2018) calls for four primary Shelter Assembly Areas including SDCFA Fire Station 36 in Jamul, Jamul Primary School, Rancho San Diego Shopping Center parking lot, and Thousand Trails. This report does not agree with these recommendations given that some of the sites require traversing hazardous

terrain where wildland fire entrapment is possible or utilized public facilities like Fire Station 36 that will be tasked with public safety command and control functions. Safer facilities for public assembly are available, including large urban parks just inside the City of El Cajon, and large public schools and shopping facilities within the planned community.

The Project intends to widen the existing Proctor Valley Road from 2 lanes to 4 lanes (2 each direction) divided by a two way left turn land. This will meet County of San Diego Class 1 Collector condition. Initial traffic studies conducted by the Project suggest that peak road capacities for Proctor Valley Road, considering key chokepoints) are 1,900 vehicles per hour using two traffic lanes (Dudek, 2018, table 1). However, the Project has also calculated that if 100% of evacuees travel south bound on Proctor Valley Road, 2,462 vehicles per hour are likely to utilize this method. The Project estimates community evacuation times closer to 2.5-3 hours under this scenario. This suggests a potentially congested traffic condition for mass community evacuation.

The traffic study suggests the use of contra-flow or all vehicles outbound to increase capacity to 4,700 vehicles per hour as an aid to evacuation. These traffic studies did not consider potential impacts from evacuation of neighboring Jamul residents who might also contribute to south bound traffic demands on Proctor Valley Road. Contra-flow is difficult to manage from a law enforcement and traffic management perspective during an emergency. During the 2018 Camp Fire in Paradise, California, contra-flow was attempted but generated a significant log jam of traffic between the communities of Chico and Paradise, leading to civilian burn-overs.

Traffic studies were updated to reflect the change in project in 2019 (Chen Ryan memo) but only calculated average daily trips for Proctor Valley Road and not peak road capacity. This study did suggest however a slight increase in traffic (195 additional daily trips) reflective of the slightly higher number of dwelling units in the revised Project.

Evacuation triggers

Our analysis highlights that early notice and evacuation will be essential to the success of such a tactic. In a meeting of local fire professionals to review site risks, consensus was developed for “trigger points” (aka: “Management Action Points”) as indicators for initiation of evacuation of the Project. These Management Action Points include:

Evacuation Initiation

- a. Santa Ana wind-driven fire: Fire escaping initial attack south and west of Highway 94, approaching the Project from the east. Evacuate the Project into Chula Vista.
- b. Major wildfire driven by Santa Ana winds in the Harris Fire footprint, moving west from Honey Springs Road, or moving west from the Dulzura area. Evacuate the Project into Chula Vista.
- c. Onshore wind-driven fire: Significant fire approaching the Project from the east side of the City of Chula Vista or Otay Lakes. Evacuate homes on community perimeter facing the involved canyon/drainage. Move into the community interior or into Chula Vista depending on time available and fire trajectory. Evacuate in Jamul if

time permits and fire trajectory does not threaten evacuation routes.

These Management Action Points have been recommended to provide sufficient time necessary to evacuate prior to wildfire arrival within the community. Additional points have been established below for discontinuing evacuation and initiation of shelter-in-place actions, necessitated by potential fire conditions that may threaten road travel and safe evacuation, or apply to stranded populations that failed to heed evacuation orders. Fire behavior analysis for critical fire weather patterns and ignitions occurring along SR94 would indicate that this could occur during the fire's first hour of a Santa Ana wind driven wildfire.

During fire movement, significantly greater risk may exist for entrapment on Proctor Valley Road then within safer locations within the community. If travel on this road is or may be obstructed by fire movement, populations should discontinue community evacuation and seek shelter away from structures located immediately on the community's perimeter with wildlands, and retreat into large commercial areas, interior community streets, developed parks, school grounds, or similar locations. Management Action Points for halting evacuation and seeking shelter-in-place include:

Evacuation Cessation Trigger Points

- a. Santa Ana wind-driven fires are impacting the upper edge of the Project along the ridgelines of the Jamul Mountains, or is established within the community of Jamul south of I-8 and continuing westward trajectory. Cease evacuation of the community and shelter-in-place.
- b. When expanding fires or spot fires threaten Proctor Valley Road and egress from the community. Stop traffic and divert to safe locations within the community such as parks, schools, and commercial centers. Seek shelter away from the community perimeter.

Emergency Messaging

Detailed but succinct evacuation information should be broadcast to the media and via the Alert SD reverse 911 system and the County's Wireless Emergency Alert (WEA) network. Evacuations should be directed to facilities distant enough from the fire area to ensure complete removal of threat, as well as promote freedom of access by emergency responders. Evacuation information should include both human and large animal evacuation guidance.

Fire Protection

The proponent has considered fire service emergency response times and services in its report (Dudek 2018/2020). Response time analysis has been conducted with the proponent's finding of a 5-minute response time (from the time the apparatus departs the Fire Station) to the majority of the community, with some portions of Planning Area 16 and 19 falling outside of the time standard.. Fire sprinklers have been proposed for all occupied structural development, and permanent fire station construction is proposed for the Village 14 Core.

The San Diego County Fire Authority, and its contractor CAL-FIRE, currently maintains 4 fire stations, Fire Stations 36 (Jamul), 37 (Deerhorn), 38 (Otay), and 30 (Dulzura) in the region, and will add a fifth, Fire Station 34, within Village 14. An additional fire station will ultimately be constructed within 5-years in nearby Otay Lakes/Village 13. The City of Chula Vista also maintains Fire Station 8 in east Chula Vista's Proctor Valley community. The County Fire Authority and City of Chula Vista maintain agreements for joint service and closest resource response in the area.

County Fire Station 34 will be staffed with a Type 1 engine with a crew of 3. This crew will include 2 permanent firefighters, one which will be a Paramedic, and a reserve firefighter. Nearest Truck service will be provided from County Fire Station 36 in Jamul. Fire Station 34 will be activated in a temporary facility at a point near 650 homes under development. Ultimately Fire Station 34 will transition to a permanent facility in the Village 14 core. Fire stations proximal to the Project include:

Project Area Fire Stations and response time to Village 14 core

SDCoFA FS 34 3 firefighters	Village 14 Core-To be built <5 minutes/30 hms. 6min.	Type 1 Paramedic Engine
Chula Vista FS8 3 firefighters	1180 Woods Dr, Chula Vista 3.9 miles/11 minutes	Type 1 PM engine
SDCoFA FS 36 8 firefighters 2 EMT contract ambulance	14024 Peaceful Valley Rd., Jamul 4.8 miles/15 minutes (Planning Area 16/19: 6 minutes)	Type 1 medic Engine, Medic Truck/Quint. Patrol, Battalion Chief, Ambulance
SDCoFA/CAL FIRE FS 30 6 firefighters	17304 Hwy. 94, Dulzura 11.9 miles/20 minutes	2 Type 3 engines
SDCoFA FS 37 2 firefighters	2383 Honey Springs Rd., Jamul (Deerhorn Station) 13.2 miles/22 minutes	Type 1 medic Engine
SDCoFA FS 38 4 firefighters Contract 2 EMT ambulance	446 Alta Rd., Bld, 32, San Diego (Temp. at SDFD FS 43) 16.3 miles/27 min.	Medic Truck/Quint, (Type 1 & 3 cross staffed Engines)

Response Times

Fire services response times have been studied in the project proponent's Fire Protection Plan (Dudek, 2018/2020) and determined that 100% of the proposed project falls within a 5-minute travel time, as defined from the time fire services departs the station enroute to a reported incident. The 5-minute urban standard is met, according to the Dudek report, from either proposed Fire Station 34 in the Village 14 Core or for 1% of the Project area by Fire Station 36 in Jamul. Other fire stations within the region will provide for augmented response to multi-company calls but will not achieve response within

the 5- minute response standard for the first-due company. The entire project will achieve fire services response in accordance with the SDCFA standard for rural area response of the entire first alarm for a structural fire arriving within 30 minutes.

The SDCFA response standard:

Response Type	Urban/Suburban Area	Rural Area
First Due Unit on-scene	5 min.	10 min.
Full First Alarm on-scene	19 min.	30 min.
Truck first due (where available)	8 min.	16 min.
First Alarm- Structure Fire Response (all areas): 4 engines, 1 truck (if available), 1 medic unit, 1 chief officer. Add 2 water tenders for rural areas		

We have validated Dudek's response times study and believe the reported times to be an accurate calculation. The project estimates a call load for the Village 14 fire station using San Diego County standards at 338 calls per year or .9 calls/day which is well within National Standards for response by the proposed level of staffing.

In addition to structural fire and rescue response, CAL FIRE maintains a robust inventory of wildland fire resources within San Diego County that would serve the Project during wildfire occurrence. This additional resource includes 3 dozers, 12 hand crews from 4 fire camps, two air tankers, 2 medium helicopters, and air-attack command aircraft. Additional wildfire resources are also available under aid agreements with the USDA-Forest Service-Cleveland National Forest, U.S. Fish and Wildlife Service-San Diego National Wildlife Refuge, San Diego Gas and Electric, and other agencies. The nearest Air Attack base in Ramona, the base location for all State aircraft, maintains a flight response time to the area of under 15 minutes.

Water Systems

The proponent's Fire Protection Plan (Dudek, 2018) identifies fire hydrant distribution, water delivery systems, pump stations, and elevated reservoir capacity meeting suburban development standards recommended by the California Fire and Building Code. Fire hydrant spacing will be 350 feet and each hydrant will offer a 2.5 inch and 4-inch outlet and be marked by a street blue dot. The system will be capable of 2,500 GPM from fire mains. It is recommended that the pump stations be hardened for fire resistance and resiliency during wildfire. Minimum water storage for duration of flow in the system shall be 2 hours capacity. Village 14 will be served by the Otay Water District who has indicated their ability to provide water per code and Fire Protection Plan demands. Water lift stations and critical infrastructure should be composed of fire resistive construction in all cases.

Development Mitigations

Fire risk mitigations have been proposed by the project proponent that are commensurate with the current San Diego County Consolidated Fire Code, including Chapter 7-A (which includes the amended 2016 California Building Code) within the San Diego County Fire and Building Code. Chapter 7-A addresses ember and flame impingement resistance from wildfire in high fire hazard areas. The San Diego County code has recently been enhanced in Wildland-Urban Interface specific areas of concern and is currently the most stringent in the State of California.

Proposed development mitigations include:

- Annually maintained defensible space/fuel modification of 100 feet surrounding development (see two exceptions).
- Automatic fire sprinkler systems in all structures (NFPA 13 compliant systems)
- Heat deflecting walls for 27 lots at the top of slopes
- Ignition and ember resistant structural roofs and attic vents
- Construction setback limitations
- Limited building zones on lot perimeters controlling positions of ignitable yard features and landscape
- 20 feet of fuel modification on each side of 2 lane Proctor Valley Road, in addition to 28 feet of paved width
- Non-combustible roofs and exterior walls
- Multi-pane tempered glass windows
- 50-foot fuel management zones for connector roads between Planning Areas 16 and 19.
- Wildfire Evacuation Plan using Ready-Set-Go model and public outreach
- Ornamental plans to be consistent with County approved fire resistive plant lists and planting specifications.
- Overhanging decks, turbine roof ventilators, and other construction features of concern are prohibited.
- Yard structures must meet fire safe code restrictions and setback requirements

Alternative Means

Additional mitigation is proposed in the Fire Protection Plan (Dudek 2019) for 27 lots in Planning Area 16/19 where home sites may be subjected to higher intensity wildfire due to slope and fuel configuration. In these sites, 100-feet of fuel modification is provided, and an additional 6-foot masonry ember resistance wall will be installed to further mitigate potential fire behavior from specific slopes. This additional mitigation measure reduces the need to conduct additional fuel modification in these areas.

Assessment of proposed mitigations

The Project's proposed mitigations have been reviewed by SDCFA and found to be acceptable. This includes fuel modification and setbacks for more exposed homes within Planning Areas 16/19. In previous review, this study had recommended additional fuel

modification to 150-feet given exposure of these homesites to topographic, fuel, and wind conditions. The proponent has proposed alternate means including 100-foot fuel modification for the entire project, strategic use of ember resistant walls at 27 sites construction setbacks, and construction features to mitigate SDCFA's concerns. The current San Diego County Fire and Building Code will require compliance not only with the State of California Chapter 7-A's Wildland-Urban Interface fire standards, but also enhanced San Diego County standards which are currently the most restrictive in the State of California.

The primary evacuation route, Proctor Valley Road, will have a combined roadway width and fuel modification zone exceeding 60 feet. Connector roads in Planning Areas 16 and 19 will include 50-foot fuel modification zones. This will provide a reasonable deterrent to direct flame impingement under most conditions and offer a control point for fire suppression. Smoke may hinder driving from nearby fires, and may pose difficulty for road navigation, especially at night. The potential for traffic congestion during an emergency will require immediate control of this roadway by law enforcement to promote maximum use by both evacuees and emergency responders.

Potential use of public facilities within the community as shelter-in-place locations is a reasonable alternative to evacuations when fires occur of short-notice or remnant populations are still within the community as fire approaches. Sheltering in place is likely a safer option than movement on Proctor Valley Road during heavy fire conditions, especially under strong Santa Ana winds. Concern is high for potential evacuation routing to the north into the community of Jamul during Santa Anas due to higher fire behavior potential here. Potential shelter-in-place facilities include public parks, school grounds, community interior urban streets, and commercial centers.

Critical water system infrastructure must also be hardened to resist fire and ember instruction. This is particularly true of pump stations which ensure appropriate fire flow delivery to elevated areas within the project.

Implications for Fire Operations

Structural defense and evacuation of the Otay Ranch Village 14/Planning Area 16/19 community from wildfire will be a dynamic and significant challenge for emergency services, but typical of challenges faced by many modern communities within San Diego County. Community fire resistive features including building construction style, fuel modification, fire sprinklers and water systems, and related improvements will significantly reduce the potential risk to both civilians and public safety responders.

Among perimeter streets and homes, active structural defense will be necessary. Where adequate defensible space is provided and maintained, the chief risk will be from flying embers and spot fires developing among combustible yard improvements or ornamental vegetation. Left unchecked, such sources can contribute to significant structural loss. Chief concern will be for homes at the head of the fire, and for homes on the community perimeter above canyons or drainages. Lots with compromised fuel modification or limited

building zones may offer increased vulnerability to ignition.

It is anticipated that residential streets will generally offer Temporary Safe Refuge for firefighters involved in structural defense, and that withdrawal to these streets during assault by heat pulses from wildfire will be a successful alternative for responder safety. Following safety withdrawal, rapid reengagement or fire front following as heat pulses subside would be a critical tactic to keep structural loss to a minimum.

Proctor Valley Road, the primary escape route, will have to be used concurrently for both civilian evacuation and emergency responder access,

Estimated Potential Fire Loss

Worst-case wildfire conditions for the Project include severe Santa Ana winds, critical fire weather, and extreme fire behavior. The estimated loss from a short notice, worst case wildfire condition, based upon loss experience during the 2007 Witch and Guejito Fires (Maranghides & Mell, 2009), and 2014 Poinsettia Fire (San Diego Co. OES, 2014) in similar modern San Diego County communities could range from 3-7%. Structural loss would likely be concentrated on the community perimeters due to proximity to fire and fuels or fire branding. Sites with compromised or diminished defensible space may be at higher risk for fire ignition.

Community interior spot fires may develop in ornamental vegetation, yard storage, or within structures. Once structures become involved, extension of fire to surrounding and exposed structures often results in a group loss in this community type.

In this worst-case scenario, fire resources may not achieve desired deployment levels due to reflex time or due to regional resource drawdowns due to multiple fires. Lesser fire conditions, or availability of adequate emergency mass resources may alleviate worst case potential loss, especially where defensible space is robust.

Estimated Potential Structural Loss

Total number of homes = 1,266

Total number of perimeter homes: Approximately 225

Loss of 5% of perimeter homes (worst case fire condition) = 12

Loss of 2% of perimeter homes (worst case fire condition) = 5

- * County average for similar fire-resistive community loss during catastrophic wildfire = 2%-4% (Dudek, 2015)

Modern, fire resistive home burning, Witch Fire, Rancho Bernardo, CA 2007



Protection of In-Situ Populations

Under extreme fire behavior conditions, responders should prioritize protection of populations seeking shelter in large community spaces such as developed parks, churches, and commercial centers.

Summary of Findings

1. Significant wildfire risk mitigations have been proposed for the Project including code compliant building construction, structural setbacks, fuel modification, and related features that meet state-of-the-art for community resistance to wildfire. These mitigations should serve to significantly reduce the potential for structural loss during wildfire. Structural risk mitigations should be extended to all critical facilities whenever possible, including water pump/lift stations, cell phone facilities, and related assets.
2. Special mitigations are provided for 27 lots with enhanced wildfire exposure. For these lots, 100-feet of fuel modification is accomplished, and an additional fire resistive wall is proposed. This should significantly reduce wildfire risk in these locations.
3. Significant potential is developed by construction patterns, community parklands, developed commercial and institutional space offering strong opportunity for temporary safe refuge of the Project's population should evacuation be limited or impossible during large wildfires.
4. Evacuation via Proctor Valley Road is the principal means available for evacuation of the community. The road paved width with proposed fuel modification should substantially enhance the resistance of this evacuation route to compromise by wildfire. However, under high-fire intensity conditions, fire trajectory may temporarily obstruct access to this route, and public safety officials will need to manage this roadway as fire conditions dictate. This route should not be utilized except as a last resort evacuation by the Community of Jamul. Such use would likely lead to significant congestion on this roadway. Potential wildfire entrapment risks due to terrain and fuels also exist on the roadway north of the Project.
5. Using the proponent's traffic studies, this study has identified that congestion is likely on Proctor Valley Road during major community evacuation using two traffic lanes outbound. Further, the proponent's traffic studies have not calculated potential impacts from evacuation traffic from nearby Jamul. Traffic studies have suggested that all four available traffic lanes be utilized for outbound traffic (contra-flow), however this requires substantial law enforcement and traffic control commitment to be safe or successful.
6. Response time needs for emergency services require the development of a fire station facility within the Project. SDCFA should ensure the Station is opened commensurate with early community occupancy to ensure adequacy of response and public safety.
7. Wildfire is a frequent visitor to the Project site and will likely return on a frequent return interval in the future. This will demand that community fire prevention measures and fire service readiness be maintained at designed levels for the project into perpetuity. The consolidation of the development footprint achieved by this project revision will assist in community wildfire protection due to diminished dispersed risk and consolidation of development within less hazardous building sites.

8. The Project's Wildfire Evacuation Plan public assembly areas should be updated to reflect safer and more logical locations as recommended by this study

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APPENDIX “A”: Proctor Valley-North Wildland-Urban Interface Fire Emergency Response Plan, 3/1/2020