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MEMORANDUM

To:	Mark Slovick, County of San Diego Planning and Development Services
From:	Michael Huff, Dudek
Subject:	Fire-Safety – Otay Ranch Village 14 and Planning Areas 16/19
Date:	February 26, 2020
cc:	Liz Jackson, Jackson Pendo Development Company (JPDC) Rob Cameron, JPDC David Hubbard, Gatzke Dillon & Ballance
Attachments:	Proposed Project Amendment Wildfire Evacuation Plan Village 14 and Planning Area 16/19 Fire Term Sheet

Introduction

Comments submitted in response to the Addendum expressed concerns regarding the Proposed Project Amendment's impacts on fire ignition risk and emergency evacuation procedures. This memorandum addresses those issues and seeks to clarify certain points regarding fire ignition, subdivision-specific evacuation planning and execution, the defensibility of modern subdivisions, and temporary refuge strategies. This memorandum does not address all fire protection measures, planning, design, monitoring and maintenance measures that would be provided by the Proposed Project Alternative, and should be read in conjunction with the project's collective fire and evacuation safety documentation, including that set forth in, and attached to, the Final EIR for the Approved Project, certified on June 26, 2019.[1]

1. New Development in the WUI and Fire Ignition Risk

- Data Do Not Support Assumption That New Development Increases Fire Ignition Risk: Some of the comments received suggested that placing new residential projects in the County's wildland-urban interface (WUI) will increase the risk of fire ignition. The data, however, do not support that conclusion. According to the available evidence, no large fires in San Diego County since 1990 were determined to have been started within a nearby master planned, ignition-resistant subdivision or neighborhood. Syphard and Keeley[2] (2015 - *Location, timing and extent of wildfire vary by cause of ignition*) summarized all wildfire ignitions included in the CAL FIRE Fire and Resource Assessment Program[3] database, dating back over 100 years. They found that in San Diego

[1] While this memorandum addresses the Proposed Project Amendment, the points raised in the memorandum apply equally to the Approved Project adopted by the County on June 26, 2019. When the memorandum makes a specific point regarding the Approved Project, it will use that specific term.

[2] Alexandra D. Syphard and Jon E. Keeley. 2015. Location, timing and extent of wildfire vary by cause of ignition. International Journal of Wildland Fire. 11 pp.

[3] Cal Fire Fire and Resource Assessment Program. https://frap.fire.ca.gov/

County, equipment-caused fires were by far the most numerous, and these also accounted for most of the area burned; power-line fires were a close second. Ignitions classified as equipment-caused frequently resulted from exhaust or sparks from power saws or other equipment with gas or electrical motors, such as lawn mowers, trimmers or tractors. These ignition sources are typically associated with *lower density* housing, not *higher density* housing such as that contemplated under the Proposed Project Amendment. It is noted that electrical transmission lines would be undergrounded to the project area consistent with the County of San Diego General Condition for undergrounding utility lines.

- Data Indicate That Lower-Density Housing Poses Greater Ignition Risk: In San Diego County, ignitions were more likely to occur close to roads and structures, and at intermediate structure densities. This likely because lower density housing creates a wildland urban *intermix* rather than an *interface*. The intermix places housing amongst unmaintained fuels, whereas higher density housing such as the Proposed Project Amendment converts all fuels within the footprint and provides a wide, managed fuel modification zone separating homes from unmaintained fuel. The lower density portion of the Approved Project (Planning Area 16) is different than contemplated in the Syphard and Keeley study in that it too will include perimeter FMZs as well as structure specific FMZs, setting back the nearest unmaintained fuels. Syphard and Keeley (2015 – see footnote 1) determined that "[t]he WUI, where housing density is low to intermediate, is an apparent influence in most ignition maps." This further enforces the notion that lower density housing is a larger ignition issue than higher density communities. Syphard and Keeley also state that "Development of low-density, exurban housing may also lead to more homes being destroyed by fire" (Syphard et al. 2013)[4]. However, neither of these findings considers the fire hazard and risk reduction associated with HOA managed FMZs and ignition resistant structures. In addition, the study found that frequent fires and lower density housing growth may lead to the expansion of highly flammable exotic grasses that can further increase the probability of ignitions (Keeley et al. 2012)[5]. This is not the case with the Proposed Project Amendment, where the landscapes are managed and maintained to remove exotic fuels that may become established over time. The PEP and FPP plant palette restrictions, combined with HOA maintenance and 3rd party review/inspections of FMZ would minimize the establishment and expansion of exotic plants, including grasses. Based on research of the relevant literature and extensive conversations with active and retired fire operations and prevention officers, there is no substantial evidence that new residential neighborhoods built to the requirements of San Diego County's Fire and Building Codes increase the risk of wildfire ignition. Rather, the data indicate that roadways, electrical distribution lines, and lower density residential projects (that do not have HOA enforced restrictions and annual inspections) are the primary causes of increased wildfire ignition. It is important to note that the Proposed Project Amendment will provide roadside fuel modification throughout the project area and on either side of Proctor Valley Road, and that the Proposed Project Amendment's electrical lines will be subterranean. Additionally, SDG&E[6] is considered the leading electrical utility in California regarding its fire prevention and fire safety practices.

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4 Syphard AD, Bar Massada A, Butsic V, Keeley JE (2013) Land use planning and wildfire: development policies influence future probability of housing joss. PLoS ONE 8(8), e71708. doi:10.1371/JOURNAL. PONE.0071708

5 Syphard AD, Keeley JE, Bar Massada A, Brennan TJ, Radeloff VC (2012) Housing arrangement and location determine the likelihood of housing loss due to wildfire. PLoS ONE 7(3), e33954. doi:10.1371/JOURNAL. PONE.0033954

6 https://www.bing.com/videos/search?q=san+diego+gas+and+electric+weather+system&&view=detail&mid=40AB6A3DD81DE981EE7D40AB6A3DD81DE981EE7D&&FORM=VRDGAR&ru=%2Fvideos%2Fsearch%3Fq%3Dsan%2Bdiego%2Bgas%2Band%2Belectric%2Bweather%2Bsystem%26FORM%3DHDRSC4

SDG&E has invested heavily in developing a robust weather monitoring system with fire detection capabilities, fire hardening of its system, and fire awareness and outreach.

2. Evacuation Planning and Execution in San Diego County

The subdivision-specific Wildland Fire Evacuation Plan was prepared based on the Unified San Diego County Emergency Services Organization and County of San Diego Operational Area (OA) Emergency Operations Plan (EOP)[7] – Evacuation Annex. It also incorporates key information from the JCPP (Jamul Disaster Team 2006), Evacuation Plan Appendix.

- Evacuation Planning Begins with the County Office of Emergency Services (OES): To establish a framework for implementing well-coordinated evacuations, the County of San Diego OES developed an Evacuation Annex as part of the area EOP (County of San Diego 2014 – see footnote 6). Large-scale evacuations are complex, multijurisdictional efforts that require coordination between many agencies and organizations. Emergency services and other public safety organizations play key roles in ensuring that an evacuation is effective, efficient, and safe.

  Evacuation during a wildfire is not necessarily directed by the fire agency, except in specific areas where fire personnel may enact evacuations on scene. The San Diego County Sheriff's Department, California Highway Patrol (CHP), and other cooperating law enforcement agencies have primary responsibility for evacuations. These agencies work closely within the unified Incident Commander (IC) system, with the county OES, and responding fire department personnel who assess fire behavior and spread, which should ultimately guide evacuation decisions. To that end, San Diego County Fire Authority (SDCFA), law enforcement, Public Works, Planning, Emergency Services Departments, and California Department of Transportation (Caltrans), amongst others, have worked with a county pre-fire mitigation task force to address wildland fire evacuation planning for San Diego County.

  If the emergency only impacts a local jurisdiction, the decision to evacuate will be made at the local jurisdiction level with regional collaboration considerations. Based on the information gathered, local jurisdictions will generally make the determination on whether to evacuate communities as the need arises, on a case-by-case scenario basis. Technological advancements in emergency notification capabilities has resulted in the ability of emergency managers to evacuate targeted areas vs the mass evacuations that occurred during 2003 and 2007 wildfires. Targeted evacuations allow better management of traffic congestion and focus on evacuating populations on a threat-level priority basis.
- Evacuation Scenarios Vary and Often Change in Response to the Fire: Every evacuation scenario includes unique challenges, constraints, and fluid conditions that require interpretation, fast decision making, and alternatives. For example, given a distant wildfire driven by Santa Ana winds, emergency managers may have several hours or more to evacuate communities with less urgency and the ability to spread traffic surges out over a long timeframe. In a scenario where a fire is much closer, less time is available and a more strategic approach may be necessary. Optionality is important in case unforeseen issues arise that require short-term or long-term changes to the evacuation process. In general, risk is considered highest when evacuees are

[7] https://www.sandiegocounty.gov/content/dam/sdc/oes/emergency_management/plans/op-area-plan/2018/2018-Annex-Q-Evacuation.pdf

evacuating late and fire encroachment is imminent. The Proposed Project Amendment provides the option of contingency on-site temporary refuge in designated buildings to address this scenario.

- Evacuation and Early Warning Systems: As demonstrated during large and localized evacuations occurring throughout San Diego County over the last 15 years, an important component to successful evacuation is early assessment of the situation and early notification via managed evacuation declarations. San Diego County utilizes early warning and informational programs to help with these important factors. The weather system developed by SDG&E is considered to be one of the most robust systems in the country. This system enables the detection of changing weather that may favor wildfire ignition and spread and can predict these changes with 24 to 72 hours' notice, allowing time to prepare fire response resources and provide resident warnings. Similarly, there are numerous fire detection assets positioned in San Diego County's open space areas, resulting in more time availability for the evacuation process to begin while a wildfire is still in its early stages. Among the methods available to citizens for emergency information are Reverse 911/Alert San Diego[8], radio, television, social media/internet, neighborhood patrol car, and Aerial Support to Regional Enforcement Agencies helicopter (as available) and public address notifications.
- The Proposed Project Amendment's Subdivision-Specific Evacuation Plan is Consistent with County Protocols: The Proposed Project Amendment's subdivision-specific Wildland Fire Evacuation Plan incorporates concepts and protocols practiced throughout San Diego County. The San Diego County Evacuation Annex follows basic protocols set forth in the County's Operation Area EOP and the California Master Mutual Aid Agreement, which dictate who is responsible for an evacuation effort and how regional resources will be requested and coordinated. In addition, the Proposed Project Amendment's subdivision-specific Wildland Fire Evacuation Plan is consistent with JCPP Evacuation Plan and San Diego County evacuation planning standards and can be integrated into a regional evacuation plan when and if the area officials and stakeholders (California Department of Forestry and Fire Protection (CAL FIRE), SDCFA, OES, San Diego County Sheriff's Department (SDCSD), and others) complete one. The Proposed Project Amendment's subdivision-specific Evacuation Plan has been reviewed by San Diego County Fire Authority and San Diego County Sheriff's Department (SDCSD). The Wildland Fire Evacuation Plan has been updated for the Proposed Project Amendment, and is included as Attachment 1 to this Memo.
- Law Enforcement Takes Lead on Evacuations: The SDCSD is the lead agency for evacuations of the unincorporated areas of San Diego County, including the Proposed Project Amendment. The SDCSD, as part of a Unified Command, assesses and evaluates the need for evacuations, and orders evacuations according to established procedures. Additionally, as part of the Unified Command, the SDCSD identifies available and appropriate evacuation routes and coordinate evacuation traffic management with the California Department of Transportation (Caltrans), the California Highway Patrol (CHP), other supporting agencies, and jurisdictions. The following process describes how emergency evacuation decisions are coordinated, allowing emergency managers and other supporting response organizations to make collaborative decisions.

3. Evacuation Routes

- Fire Agencies and Law Enforcement Determine Evacuation Routes: Evacuation routes are determined by 1) jointly prepared pre-wildfire plans (Rhode & Associates[9], SDCFA, Cal Fire, and others) that indicate the

[8] https://www.readysandiego.org/alertsandiego/
[9] http://www.rohdeassociates.net/wui-fire-plans

likely fire scenario, and how traffic can be moved from an area and 2) in real time data reflecting fire location, movement and projected path considering downstream traffic and most vulnerable populations. As indicated above, real time evacuations in San Diego County are primarily managed by the Sheriff's Department (or local law enforcement in cities). SDCSD relies on input and situational awareness provided by the Incident Command. SDCSD coordinates with CAL TRANS and CHP for road management during evacuations. The pre-prepared evacuation plans, such as the Approved Project's subdivision-specific Wildland Fire Evacuation Plan, are guidance documents only. San Diego County OES has separately prepared regional wildfire response plans that guide emergency responses and evacuation procedures. Actual field conditions supersede prepared subdivision-specific evacuation plans, but these plans may provide valuable information that helps inform the moment by moment decision making at the Incident Commander (IC) level, as well as educating local residents about what to expect in an evacuation scenario.

- Factors Affecting Evacuation Timing and Routes: The main factors affecting the timing and routing of evacuations are those related to the nature of the wildfire. For example, is the fire uncontrollable and does it have the capability of affecting a wide area? How will its movement and projected path play into evacuation route decisions? A key component of evacuations is the weather. On non-windy days and days with higher humidity, it is far less likely for a vegetation ignition to burn out of control and therefore, evacuation notifications are not typical. Windy, low humidity days (Red Flag Warning days) are far more prone to result in vegetation ignition escape and spread, resulting in far more sensitive evacuation trigger thresholds.

  Evacuation routes that are considered acceptable when a wildfire is distant may be considered unsafe when a wildfire is in closer proximity. Having alternative routes offers flexibility for decision makers and having the contingency option of being able to temporarily refuge citizens within fire hardened structures offers yet another option in an environment where optionality is extremely valuable. Changes in wildfire behavior and traffic flow do alter how evacuation orders are implemented. Evacuation orders are based on a great deal of input, contemplation, situational awareness, and pre-planning. Evacuations may be altered to focus on controlling downstream intersections so that a population that is at highest risk can be moved before other populations that are considered at lower risk are allowed passage. This occurs often during wildfires. As weather conditions change and influence wildfire movement, evacuation orders will also shift, typically including larger areas. San Diego County Fire Agencies and related partners have a robust ability to rationally predict wildfire movement. This is accomplished through pre-fire planning and fire behavior modeling, working with UCSD's WIFIRE lab advanced wildfire behavior projection technology, and SDG&E's weather system network. More than 500 million dollars has been invested to enhance the county's fire prevention, detection, response, suppression and recovery capabilities since the 2003 Cedar Fire[10]. These efforts have proven effective in successfully managing wildfire events, such as was accomplished during the successfully managed 2018 Lilac Fire.
- Fire Agencies and Law Enforcement Do Not Use Subdivision-Specific Evacuation Plans: Agencies involved in implementing an evacuation order would not rely on a residential subdivision evacuation plan. Individual residential subdivision evacuation plans prepared in San Diego County have been prepared as a tool to help residents be aware of wildfire evacuations, their potential evacuation routes, and the fact that they may be directed to stay in their homes in lieu of evacuating. Further, ICs and law enforcement are not bound by subdivision-specific evacuation plans. Instead, evacuation managers would rely on situation awareness that dictates decision making and where possible, on wildfire pre-plans, which have been or are in the

[10] https://www.sandiegocounty.gov/content/dam/sdc/sdcfa/documents/prevention/2019-Wildfire-update-5-6-2019.pdf

process of being prepared for every portion of San Diego County by Rohde and Associates, under contract to SDCFA. The wildfire pre-plans are an operational tool provided to emergency responders that provide high-level fire environment, assets at risk, preferred evacuation approaches, and other safety information to responding personnel.

- Modeling Evacuation Scenarios: Modeling potential traffic impacts during an evacuation would include assumptions for the following variables (at a minimum): number of existing vehicles (various methods), number of project vehicles (various methods), roadway capacities (maximum lane capacity discounted or provided a premium if enhancements are provided – i.e., extra lanes, lane widening, signaling intersections, etc., total intersections, final destination, targeted evacuation area, total mobilization time, and others. Every fire scenario would include different assumptions. But the assumptions would change, depending on how a fire spreads, spots, and new fires start and impact routes being relied upon. Wildfire pre-plans that are going to be relied upon for evacuation in San Diego County include information without attempting to model evacuation traffic because the results would be unreliable. There are wildfire categories: Extreme fire weather, fire weather, and typical (and within each of these categories, there could be a wide variety of conditions related to high wind/low humidity vs. low wind/low humidity vs. high wind/high humidity vs low wind/high humidity, etc.). Then there would be variations based on the vegetation communities and terrain. Spot fires are difficult to predict without real-time weather conditions (wind direction and intensity, relative moisture level/humidity, etc.,) and can affect fire spread rates and evacuation routes. There would also be many variations depending on where the ignition occurred. Simply put, there would be hundreds of scenarios and the results would be limited because it is a model that would not be relied upon during an evacuation event.

  Dudek has also prepared a Wildland Fire Evacuation Plan for the Proposed Project Amendment. This updated evacuation plan indicates that, in an wildfire scenario, there are two likely evacuation scenarios; one where all traffic flows southwesterly on Proctor Valley Road through the City of Chula Vista and one where project traffic would be evacuated in both directions (southwesterly and northeasterly).

  Under the Proposed Project Amendment, an additional 147 units would be built compared to the Approved Project. Assuming two cars per unit, this would add approximately 294 vehicles on the road in an evacuation, although this may not occur simultaneously. This represents an increase of approximately 13% compared to the Approved Project and would reasonably be expected to result in somewhat increased evacuation times if every resident and vehicle attempted to evacuate in the same direction at the same time. However, the Incident Command would monitor the wildfire and evacuation efforts and make decisions on which areas to evacuate, and in which direction, in real time.

  Because the Proposed Project Amendment would be constructed to stringent ignition resistant requirements that were designed to allow development within fire hazard severity zones, the Proposed Project Amendment would be capable of temporarily refuging residents, guests, and firefighters within the project area, and because the Proposed Project Amendment would consolidate development closer to Proctor Valley Road and thus reduce potential lead times for certain neighborhoods to evacuate through open space/Preserve areas, the Proposed Project Amendment would not interfere with existing evacuation plans.

  San Diego County Sherriff's Department is on record indicating that they are confident they can evacuate projects like the Proposed Project Amendment and have a successful track record over the last 20+ years.

4. Fire Defensibility of Modern Residential Subdivisions

- The Role Fuel Management Zones (FMZs) Play in Fire Protection: FMZs provide managed and maintained separation between structures and infrastructure and the unmaintained wildland fuels. This setback is considered defensible space because it enables firefighters to safely position themselves at the development edge and begin tactical protection efforts. The FMZ's essentially starve advancing wildfire of fuel through the outer thinning zones (where native fuels are reduced so that no more than 50% of the ground is covered by plant canopy and includes removal of the highest flammability species), then an inner irrigated zone removes all native plants and replaces them with fire resistive species that are kept irrigated and with high internal moisture, which results in more difficult ignition. Fire behavior is affected as a wildfire burns into the thinned zone. Flame lengths drop, spread rates are reduced, and intensity decreases. This process continues as fire burns into the irrigated zone where flame lengths, spread rates and intensity are reduced substantially and wildfires become spotty. FMZs or "brush management" was initially made part of the Public Resources Code 4290 and 4291 to protect natural resources from fires originating in neighboring developed areas. The Proposed Project Amendment's FMZs are provided access for maintenance and for firefighting efforts at regularly spaced intervals. FMZs have since become focused on protecting communities and structures, but they continue to have the same benefit of buffering preserved open space areas from accidental ignitions within communities. Positioning the low plant density, irrigated zone directly adjacent to the structures provides a significant buffer between a house or other landscape fire and native vegetation. The same way that FMZs setback a wildland fire from structures, the FMZs setback a structure fire from the more burnable native plants. Embers can be generated by a structure fire and can be blown over the FMZs into native fuels, but the inclusion of automatic sprinklers in every building combined with the presence of staffed fire stations with fast response significantly reduces the potential for a structure fire to reach a size that would produce significant. The highest likelihood of vegetation ignitions would be related to roadways, which are provided roadside FMZ throughout the project area and along both sides of Proctor Valley Road.
- Modern Subdivisions Are Easier to Defend Than Neighborhoods with Older Homes: Modern subdivision are easier to defend than older subdivisions. San Diego County Fire Authority, Rancho Santa Fe Fire Protection District, and many other fire agencies (personal communications with Dudek and at Public Hearings between 2016 and 2019) have indicated that communities built to the standards required in San Diego County and maintained on an ongoing basis enable them to allocate resources where they are needed *most* — i.e., in the older communities — while defending the newer communities with significantly fewer engines. Deploying fire fighters in new communities offers safe refuge due to the wide FMZs and ignition resistant structures. The requirements for ignition resistant structures and landscapes that are maintained in ignition resistant conditions are designed to minimize impacts on fire agencies. These requirements have become part of the fire and building codes because they were found as a result of after fire save and loss assessments to be important for protection structures from ignition. This is the same reason newer communities can be considered for contingency temporary refuge. Modern residential subdivisions in San Diego County are built to very strict requirements that have evolved over the last approximately 20 years to include a focus on ignition resistance. Following the 2003, 2007, and 2010 wildfires, assessment teams were formed to evaluate every home that was damaged or lost as well as for the first time, homes that were saved. The resulting data, revealed that lost homes were almost always lost because embers penetrated the attic or other openings and ignited fires within the buildings or the homes were situated amongst heavy, unmaintained landscape fuels. Saved homes were strongly linked to newer, more resistant construction

materials and methods such as ember resistant vents, boxed eaves, and other methods described in the Proposed Project Amendment's FPP along with maintained fuel buffers. Additionally, numerous newer master planned communities in Southern California have been subjected to wildfire and generally performed well. Examples include Cielo in Rancho Santa Fe, 4S Ranch in San Diego[11], Older communities throughout California continue to be the largest contributors to fire-destroyed homes, as occurred within Paradise during the Camp Fire (2018). Further evidence can be found in the Institute for Business and Home Safety *Mega Fires – The Case for Mitigation* (2007)[12] report which discusses findings from the 2007 Witch Creek Fire, and the National Institute of Standards and Technology publication NIST Technical Note 1796, *A Case Study of a Community Affected by the Witch and Guejito Fires: Report #2 – Evaluating the Effects of Hazard Mitigation Actions on Structure Ignitions[13].* This study focused on a particular Rancho Bernardo community and findings associated with the 2007 Witch Creek Fire.

- Amenities of the Proposed Project Amendment Improve Fire Response and Fire Safety: The Proposed Project Amendment includes various improvements and amenities that improve fire response and fire safety as detailed in Attachment 2, Village 14 and Planning Areas 16/19 Fire Term Sheet. The accepted Fire Protection Plan details the fire protection approach and the individual requirements that provide fire safety. Amongst these are:
    - *Improved Proctor Valley Road*: The Proposed Project Amendment would provide for full improvements of Proctor Valley Road to the County General Plan Mobility Element road classification specifications. This would provide for a paved two-lane road with a community pathway from the terminus of Proctor Valley Road at the City/County jurisdictional boundary to the community of Jamul, a distance of approximately 4.5 miles. Such an improvement would provide immediate additional access to/from the community of Jamul, which currently only has one option to evacuate easterly (i.e., typically in the direction of an on-coming fire) towards SR-94 and Campo Road.
    - *Secondary Access Roads:* The Proposed Project Amendment has two access routes, northbound through Jamul and southbound through Chula Vista, which is important from a fire response and fire safety perspective. Internal neighborhoods all meet access and secondary access requirements, per County acceptance of the Proposed Project Amendment's FPP. Access roads are crucial to communities, as they provide incoming access for emergency response and outgoing egress for evacuating citizens. Further, the concept for providing additional access is similar to providing more than one way out of a building. If the primary access point is not available due to fire or blockage, having another viable option is important for public safety.
    - *On-Site Fire Station:* Having a fully staffed fire station within a community with the ability to respond quickly to all emergencies, including fire ignitions is a benefit that increases fire safety and reduces fire risk. It has been a common fire industry estimate that most vegetation fire ignitions (estimated 90%)(Environmental Information Center 2020) occur during normal weather (non-extreme fire weather) and these fires account for approximately 10% of the total land area burned. This indicates that vegetation fires under normal weather conditions are controllable and fast response to these fires helps control them at small sizes. The 10% of fires that occur during extreme fire weather account for 90% of the burned area. These fires can quickly surpass efforts to control them and the need for a fast response to these types of vegetation fires is considerable if there is any likelihood of controlling/extinguishing

11 https://www.rsf-fire.org/shelter-in-place/
12 https://ibhs.org/wp-content/uploads/wpmembers/files/Mega-Fires-The-Case-for-Mitigation_IBHS.pdf
13 https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.1796.pdf

them when they are small. The presence of an on-site station provides for fast response. Additional "eyes and ears" of residents in the project area heightens the likelihood of quick detection and reporting, enabling a fast response to ignitions. Structural fire ignitions are similar in that fast responses will reduce the fire's ability to spread from the room of origin and limit the overall ability of a structural fire to result in a whole home loss, which would be the primary ember producing "fuel" within a new development. However, even though fast fire station response would be provided, a built-in protection that is designed to provide for safe egress from a house fire is the automatic fire sprinkler system. These systems have been shown to contain interior fires to the room of origin and literally begin the process of fire suppression before firefighters arrive.

- *Water Service for Fire Suppression:* Water is a key component to fighting wildfire and protecting structures. Providing water where it is not currently available, especially when it is provided in a protected environment like the ignition resistant landscapes of a new master planned community, enables firefighters to protect homes and work to control a wildfire's advancement. New communities are required to provide fire hydrants meeting flow, volume and duration specifications at intervals designed to assist in fighting structural fires. These hydrants provide opportunities for wildland fire engines to stage, fill engine tanks, set up dip tanks for helicopter firefighting efforts, and sustain a fire fight. The Proposed Project Amendment's location offers a large area of converted landscape, a fuel break, which offers opportunities for fighting and controlling wildfires before they encroach upon more urban areas. The Proposed Project Amendment changes fire behavior due to the lack of fuels and, combined with aerial fire-retardant drops, extent outward to slow or stop a fire's advancement.

5. Temporary Refuge as Contingency Option

- *Temporary Refuge Defined*: Temporary refuge is the practice of going or remaining indoors during or following an emergency event. This procedure is recommended if there is little time for the public to react to an incident and it is safer for the public to stay indoors for a short time rather than travel outdoors. Sheltering-in-place also has many advantages because it can be implemented immediately, allowing people to remain in their familiar surroundings and providing individuals with everyday necessities such as telephone, radio, television, food, and clothing. However, the amount of time people can stay sheltered-in-place is dependent upon availability of food, water, medical care, utilities, and access to accurate and reliable information.
- *Temporary Refuge Strategies*: The decision on whether to evacuate or temporarily refuge is carefully considered with the timing and nature of the incident (County of San Diego 2014). Sheltering in place is the preferred method of protection for people that are not in the direct path of a hazard. This reduces congestion and transportation demand on the major transportation routes for those that have been directed to evacuate by police or fire personnel. When a community is within the projected path of a wildfire, temporary refuge is a contingency option, but the preferred approach is to evacuate early. Like most new master planned communities incorporating ignition-resistant construction, wide FMZs, and providing defensibility throughout, responding fire and law enforcement personnel would be able to direct residents to temporarily refuge in their homes or within designated structures such as the school or community center if it is determined to be safer than evacuating, such as if an early evacuation is not possible.
- *Evacuation v. Temporary Refuge*: Temporarily refuging during a wildfire is not recommended or viable in all buildings or communities. Further, temporarily refuging from wildfire is not the planned approach or preferred approach by fire agencies, even in communities that are designed, constructed and maintained

to withstand significant wildfire. The planned and preferred approach, given the ability to do so, is to evacuate a community and evacuate it early, long before a fire is threatening. When this is not possible, however, such as when a fire ignites nearby or otherwise does not enable enough time to fully evacuate, then temporary refuge is an important contingency plan. Evidence supporting the viability of sheltering in protected buildings requires an understanding of the previously described after action reports and post-fire save and loss assessments. This information, coupled with the extensive research that goes into determining how fire and embers affect structures and how construction materials and methods can protect structures from ignitions, provides insight into how building can be ignition resistant. Ignition resistant structures set back from wildfire by appropriate fuel modification zones/defensible space buffers result in the ability to temporarily refuge as a contingency option. Rancho Santa Fe includes 4 communities designated as temporary refuge sites (Cielo, The Crosby, 4S Ranch and The Lakes). In addition, there are many examples of people sheltering in open-air spaces or in buildings during wildfires, including within the town of Paradise in 2018 where nearly 150 people sheltered in an open air parking lot that included buffers from adjacent fuels and others in a church. During the 2003 Cedar Fire, hundreds of people sheltered in the Barona Casino and hundreds of students were sheltered in the protected gymnasium in the Tea Fire on the Westmont College campus. Similarly, hundreds of students were sheltered on the Pepperdine Campus instead of evacuated during the 2018 Woolsey Fire.

Attachment A

Proposed Project Amendment Wildfire Evacuation Plan

Attachment B

Village 14 and Planning Area 16/19 Fire Term Sheet