County of San Diego

MARK WARDLAW
DIRECTOR

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KATHLEEN A. FLANNERY
ASSISTANT DIRECTOR

June 12, 2020

TO: Planning Commission

FROM: Mark Wardlaw, Director
Planning & Development Services

SUBJECT: **Update on the Lilac Hills Ranch Project Fire Safety Issues**

REGULAR AGENDA ITEM NUMBER 1

Purpose

At the May 15, 2020 Planning Commission (Commission) Hearing, the Commission requested Planning & Development Services (PDS) add an item to the June 12, 2020 agenda regarding the formation of an ad hoc subcommittee for the Lilac Hills Ranch project (Project) related to fire safety. This report provides background on the Project and summarizes the fire safety determination.

Background

In 2015, the Planning Commission held three public hearings on the Project, including a field trip to the site and surrounding community, and recommended approval of the Project with additional modifications, including required road improvements on West Lilac Road, specific timing on the construction of the necessary sewer facilities, funding and construction of a turn-key school, and conditions related to easement rights and overburdening, which occurs when the traffic added to an existing road easement exceeds the amount of traffic the road was built to handle.

Prior to the Project moving forward to the Board of Supervisors (Board) in 2016, then-applicant Accretive Investments, Inc. placed a modified version of the Project on the 2016 countywide ballot as a voter initiative. The initiative did not incorporate staff's or the Planning Commission's recommendations and was not approved by the voters. After the election, the current applicant, Village Communities, LLC (Applicant), modified the Project to address the recommendations made by staff and the Planning Commission.

At the time the Planning Commission recommended approval in 2015, the Deer Springs Fire Protection District (DSFPD) had fire authority jurisdiction and accepted the Fire Protection Plan for the Project and confirmed it could provide fire service. Although the County Fire Authority did not have jurisdiction at the time, it also reviewed the Project and provided comments regarding fire safety, while recognizing the DSFPD had jurisdiction over the Project. Two significant changes have occurred since that time. First, in 2016, the County Fire Authority began providing fire prevention services on DSFPD's behalf, pursuant to an agreement. Second, California experienced the deadliest wildfires in the state's history. The wildfires in 2018 resulted in a focus on fuel modification along roads, additional fire safety regulations, and analysis of evacuation planning across the state.

Fire Safety Determination

The County reviewed the Project and identified fire safety concerns. The Project is located within a very high fire hazard severity zone and the surrounding areas have historically experienced large wildfires. Fuel concentrations and corridors in the immediately adjacent and nearby areas, if combined with certain weather conditions, could result in significant fire development. Of particular concern to the County was West Lilac Road an existing two-lane road with vegetation in close proximity to both sides of the road that serves as one of the primary evacuation routes for area residents. The County determined that additional traffic from the Project could exceed capacity on West Lilac Road during an evacuation, creating an entrapment hazard. The County engaged a consultant to perform an independent review of the Project, which corroborated the County's finding that the proposed use of West Lilac Road as an evacuation route is inadequate and presents risks of entrapment (Attachment C).

In a letter dated January 8, 2020, the County requested the Applicant secure 20-foot easements on both sides of West Lilac Road from Covey Lane to the northwestern Project entrance (Attachment A). The easements would be used to establish and annually maintain a fuel modification zone to enhance and ensure West Lilac Road's use as an evacuation route for area residents. To date, the Applicant has not provided any draft or recorded easements along West Lilac Road. There are approximately 50 properties along the evacuation route of West Lilac Road. The Applicant has provided nine letters from property owners along West Lilac Road agreeing to allow fuel modification, but the letters do not cover the entire length of West Lilac Road requested by the County, are not legally binding, and fail to ensure that the required fuel modification will occur in perpetuity.

The Applicant worked to resolve many of the County concerns, including proposing to remove gates within the Project and adding a private access road to the west along Nelson Way. However, after the Applicant provided additional information on Nelson Way, the County evaluated the road and determined it is an inadequate emergency evacuation route. Because Nelson Way is steep, narrow, and winding, it could accommodate only a small amount of traffic during an emergency evacuation, in an amount insufficient to relieve the demand on West Lilac Road. Even with the addition of Nelson Way as an access road, West Lilac Road would serve as a primary evacuation route for area residents.

Because the Project's proposed traffic improvements are insufficient to mitigate evacuation impacts, the Project presents a risk of entrapment along West Lilac Road for area residents evacuating during a wildfire. Due to both concerns with evacuation and the lack of easements, County staff has determined the Project is unsafe and is recommending denial of the Project, which will be presented to the Board of Supervisors on June 24, 2020.

The Commission may consider making recommendations to the Board regarding the staff recommendation to deny the Project.

All other relevant documents can be viewed on the following website: https://www.sandiegocounty.gov/content/sdc/pds/regulatory/docs/LILAC_HILLS_RANCH/draft-FEIR.html.

Attachments:

Attachment A	January 8, 2020 Letter to Applicant
Attachment B	May 6, 2020 Letter to Applicant
Attachment C	Lilac Hills Ranch Fire Services Operational Assessment and Applicant Documentation

Attachment A – January 8, 2020 Letter to Applicant

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KATHLEEN A. FLANNERY
ASSISTANT DIRECTOR

January 8, 2020

Jon Rilling
Ranch Capital, LLC
11452 El Camino Real, Suite 120
San Diego, CA 92130

Mr. Rilling,

This letter includes and incorporates the County's remaining comments on the Lilac Hills Ranch project, including the Lilac Hills Ranch Wildfire Safety Compendium submitted on December 9, 2019. In addition to the comments from the County Fire Authority (attached), Planning & Development Services and the Department of Public Works have reviewed the Lilac Hills Ranch Wildfire Safety Compendium and have the following comments:

1. Staff has provided specific changes on the proposed road cross-sections on West Lilac Road and Circle R Drive, including the addition of a minimum shoulder width of six feet. Please revise the requested road modification requests to address the request. Please also demonstrate that all improvements can be accommodated within existing right-of-way and if any additional road widening necessary. If additional road widening is required, revisions to the preliminary grading plan and technical studies may be required.

2. Please revise the Draft Final Environmental Impact Report (EIR) to include the requested changes from the County Fire Authority. Please include the changes in the list of project changes provided in the Recirculation Findings. Please note that staff has not made a final determination whether the EIR requires recirculation. Once all the requested changes have been incorporated, staff will determine whether the changes require recirculation.

3. Please provide documentation that the requested fire clearing can be provided as requested by the County Fire Authority. Please also confirm that the requested fire clearing is within the boundaries of the biological impacts identified in the December 19, 2019 biological memorandum provided by RECON. If the impacts were not included in the biological memorandum, revisions to the memorandum will likely be required.

Staff will evaluate the requested information and environmental documentation prior to updating the project conditions and formulating a recommendation on the proposed project.

If you have additional questions, please contact me at Mark.Slovick@sdcounty.ca.gov or at (858) 495-5172.

Sincerely,

MARK SLOVICK, Deputy Director
Planning & Development Services

Attachment: County Fire Authority Comments dated January 8, 2020

County of San Diego

HERMAN REDDICK
DIRECTOR
(858) 974-5999
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This letter includes the County Fire comments from the review of the December 9, 2019 submittal labeled as the Lilac Hills Ranch Wildfire Safety Compendium.

The submittal didn't include enough mitigation and details for County Fire Authority to determine that the fire and evacuation impacts are a less than significant. The following comments are an effort to substantially detail mitigation to result in a final determination:

1. Evacuation Routes: The addition of the 3rd middle ("contingency") lanes on West Lila Road (Old Highway 395 to Main Street) and Circle R Drive (Old Highway 395 to Circle R Court) have value to evacuate residents quicker. Please relabel as a median without cross hatching or straight arrows. These Road Modifications will require acceptance by the Department of Public Works. Colored circles shall be added at the key intersections to the figure to better explain the two-way exit points as well as a chart with the existing and proposed evacuation trips on all routes (Circle R, West Lilac, Nelson Way and Old Highway 395.

2. Nelson Way: This access route has value and shall be improved to private road standards prior to occupancy of the first occupancy of Phase 1. Since Phase 1 will utilize the Miller Station, a road connecting Nelson Way to the Miller Station shall also be required prior to the first occupancy of Phase 1. A graphic shall be added to show the improvements and clearing of Nelson Way and the connecting road.

3. Blind Curves: Please include a graphic showing the locations and a detail of each of the 3 blind curves that will be improved to meet the road standards.

4. Fuel Modification: Although several segment examples were provided to show the edge of the right-of-way (ROW) in relation to the edge of pavement, it is still unclear if enough road clearing can occur. A complete West Lilac aerial is required showing the edge of pavement in relation to the edge of the ROW from Covey Lane to the proposed northwesterly. Also include the property lines of the adjacent properties and the APN's. The amount of clearing that can be accommodated within the ROW is crucial to determine the safety of the project because private property owners' permissions to allow clearing are not assured. Without 20 feet to clear within the ROW beyond the pavement or an easement from the private property owners on the northeast side of West Lilac Road between Covey Lane northwesterly to the proposed project boundary, an alternative an off-site fuel break easement is required that parallels West Lilac, behind the adjacent residences (see attached).

5. Clearing Payment: An initial payment of $250,000 and more for each subsequent occupancy was offered (up to $2 million) to pay for clearing and hardening adjacent residences to Deer Springs Fire Protection District (DSFPD). The payment should be equal to the work proposed. Please complete and submit an appraisal of brush clearance work along the off-site roadways. This will help determine the appropriate assessment. County Fire may require a developer agreement to collect annual (not per occupancy) funds and administer the program. The details will be worked out once the appraisal is submitted.

6. Miller Station: Since the permanent Deer Springs Station construction is not scheduled until Phase 2, improvements to the Miller Station are required prior to first occupancy. Improvements include hooking up to sewer, a storage shed, resurfaced driveway/ parking area, a 3-bay garage facility, enclosing the current garage, and interior improvements.

7. Temporary Safe Refuge: Please add to the writeup that the project will be conditioned to register the park with the County's Department of Animal Services to handle evacuating large animals during an emergency.

8. Gate Access: In addition to providing a 24-hour guard at the Mountain Ridge Road gate, the gate at Nelson Way should be able to be controlled by this guard.

9. Weather Station: The applicant proposed an SDG&E weather station. A condition will require a "RAWS" weather station at the Miller Fire Station.

10. Cell Tower: The applicant proposed a hardened cell tower with battery backup. This will be required prior to first occupancy and will provide a significant benefit for WEA alerting and first responders.

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12. Underground Utilities: Please add when each undergrounding would occur by

expanding the list on pages 36 and 37.

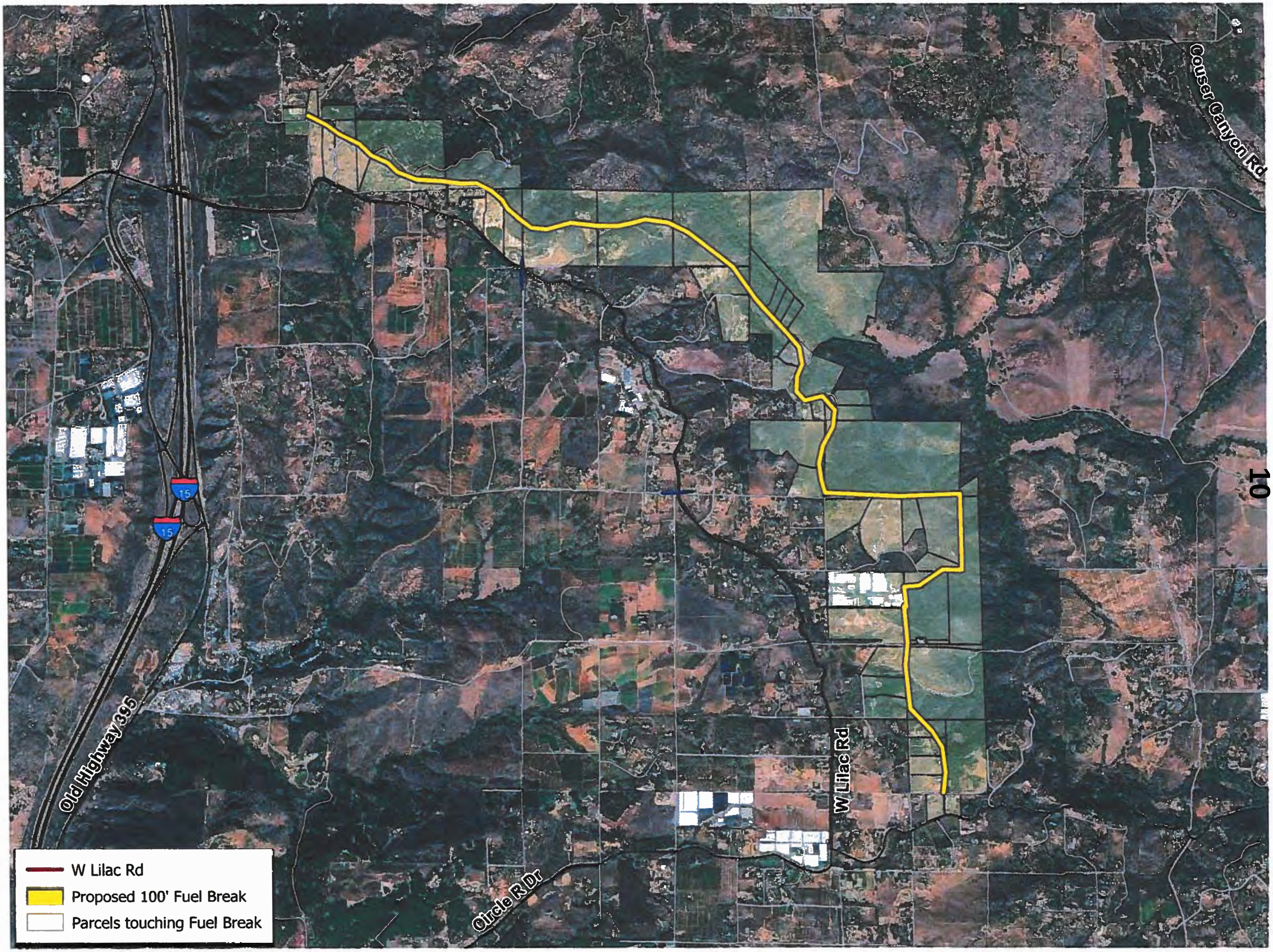
13. On-Site Walls & Fuel Modification Zones: The applicant proposed to add walls adjacent to internal native fuels as well as increasing the fuel modification zones. These are acceptable to County Fire.

Coordination shall also occur with the DSFPD on these project revisions. County Fire also strongly encourages the applicants to finalize the Fire Service Agreement as soon as possible.

For any questions or to set up a meeting to further understand the comments, please contact David Sibbet at david.sibbet@sdcounty.ca.gov or by phone at (858) 974-5921.

Thanks

DAVE NISSEN, Deputy Chief
SAN DIEGO COUNTY FIRE AUTHORITY


Couser Canyon Rd
W Lilac Rd
Old Highway 395
Circle R Dr
15
15
W Lilac Rd
Proposed 100' Fuel Break
Parcels touching Fuel Break

Attachment B – May 6, 2020 Letter to Applicant

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KATHLEEN A. FLANNERY
ASSISTANT DIRECTOR

May 6, 2020

Mr. Jon Rilling
11452 El Camino Real, Ste 120
San Diego, CA 92130
jon@lilachillsranch.com

Dear Mr. Rilling,

Thank you for providing the additional information on Lilac Hills Ranch (Project) related to the clearing of vegetation along West Lilac Road for fire safety and evacuation protection. We also received the letter from your attorney, Ann Moore, concerning this issue. We appreciate your efforts to investigate the feasibility of providing easements along West Lilac Road from Covey Lane to the northwest project boundary.

Planning & Development Services (PDS), in consultation with County Fire Authority and County Counsel, has reviewed the information you provided and determined the Project is unsafe as designed and continues to present significant wildfire safety and evacuation risks to the surrounding community as well as potential future Project residents. The information provided does not satisfy the County's request to provide easements along West Lilac Road, as outlined in our January 8, 2020 letter (attached), to ensure ongoing fire clearing along West Lilac Road. Without these easements, the County lacks assurances clearing will be conducted annually to address the public safety risks presented by the Project.

The information you provided indicates the Project will not negatively impact evacuation, based on an evacuation study conducted by your consultants. County Fire Authority disagrees with many of the assumptions relied upon by the study, including that intersections will be traffic-controlled and non-essential traffic will be diverted from the area. In addition, the County has determined Nelson Way will not eliminate Project impacts on West Lilac Road. For these reasons, among others, the County's position is evacuation will be impacted by the Project and therefore, the easements for fire clearing on West Lilac Road are critical.

The County lacks independent authority to require clearing on West Lilac Road. The Project is located within the Deer Springs Fire Protection District (DSFPD), making DSFPD the fire authority having jurisdiction. The County Fire Authority provides fire prevention services on behalf of the DSFPD through an agreement that can be terminated by the DSFPD with a 90-day notice and expires, at the latest, in 2026. If the agreement is terminated, the County Fire Authority will have no legal authority to require fire clearing along West Lilac Road.

Even if it had independent authority, the County has no guarantee the necessary fire clearing along West Lilac Road will occur without easements. Through the County's abatement process, the County would need to issue written notices on a yearly basis to each of the approximately 50 properties requiring clearing. The property owners and/or tenants could appeal the notices through an administrative process, but the County would have no ability to determine the outcome of those proceedings. In addition, after the administrative process is complete, the property owners and/or tenants could challenge the County's decision in court. Given the number of properties and need for annual clearing, over the life of the Project some properties would likely seek administrative and judicial review. With no ability to determine the outcome of these proceedings, it is possible the necessary fire clearing would not occur and the significant fire risk along West Lilac Road would still exist.

Since our letter to you on January 8, 2020, staff has not received evidence that fire clearing along West Lilac Road will continue throughout the life of the Project. Without the legal assurance of easements, the fire risk to the area remains unaddressed. Due to the time that has passed since our letter and lack of progress to provide the required easements, staff requests you withdraw your permit applications by May 20, 2020. If we do not receive a request to withdraw the permit applications, staff will take the Project forward to the Board of Supervisors (Board) on June 24, 2020 with a recommendation of denial due to the significant fire safety concerns.

In the event the Board does not approve the recommendation of denial and refers the Project to staff for further analysis, the Environmental Impact Report for the Project will need to be revised and recirculated for public review under the California Environmental Quality Act.

If you have any other questions related to this matter, please contact Mark Slovick, Deputy Director, at (858) 495-5172 or mark.slovick@sdcounty.ca.gov.

Sincerely,

Mark Wardlaw

MARK WARDLAW, Director
Planning & Development Services

Attachment: January 8, 2020 Letter

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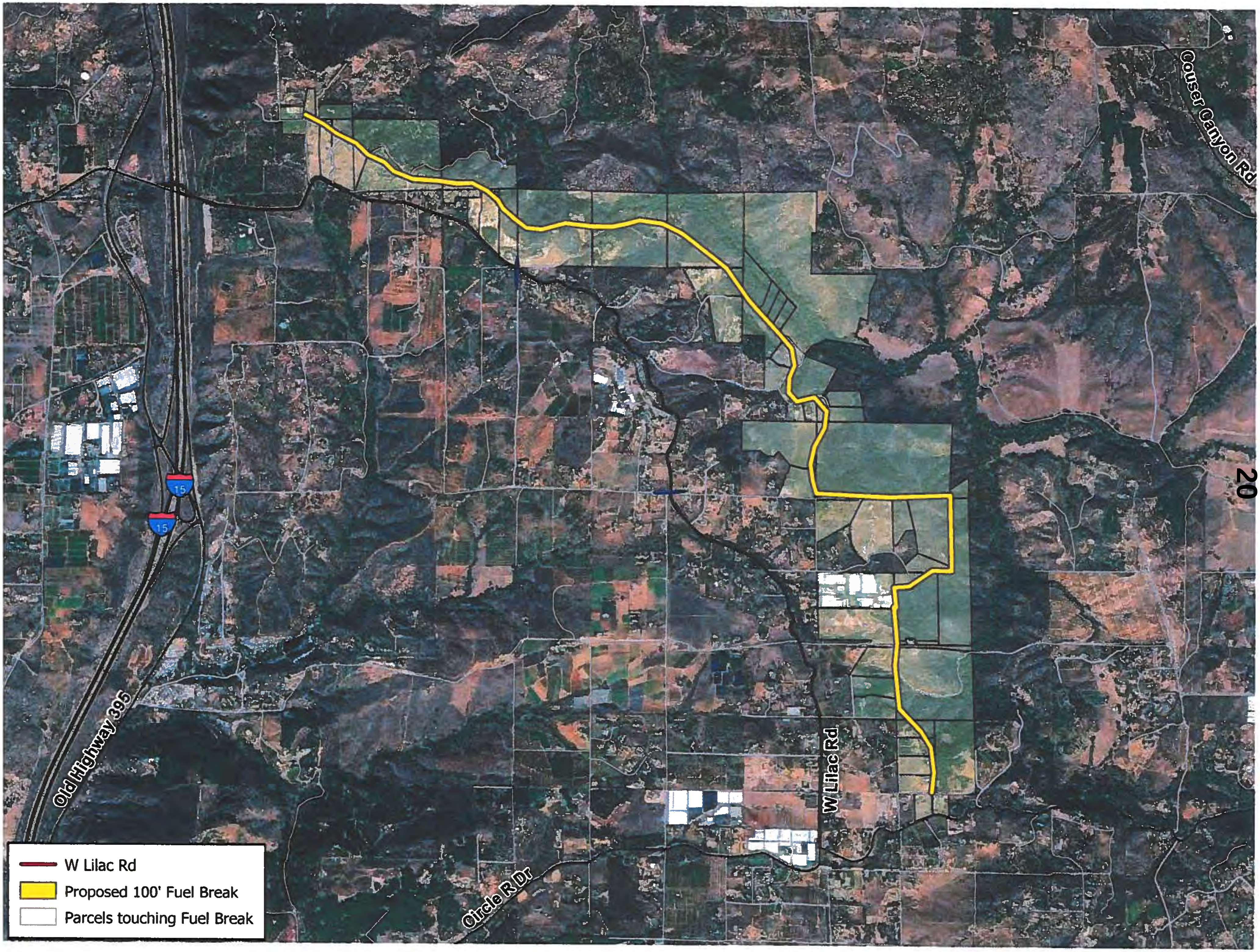
SAN DIEGO COUNTY FIRE AUTHORITY



Couser Canyon Rd
W Lilac Rd
Old Highway 395
Circle R Dr
15
15
W Lilac Rd
Proposed 100' Fuel Break
Parcels touching Fuel Break

20

Attachment C – Lilac Hills Ranch Fire Services Operational Assessment and Applicant Documentation

LILAC HILLS RANCH

FIRE SERVICES OPERATIONAL ASSESSMENT

Lilac Hills Ranch proposed development site

Prepared for the Deer Springs Fire Protection District and San Diego County Fire Authority, by:

ROHDE & ASSOCIATES LLC

EMERGENCY MANAGEMENT

May 6, 2020

CONTENTS PAGE

The Project

Lilac Hills Ranch (LHR) is a proposed community development in the Valley Center area of north-central San Diego County, California. The proposed community includes 1,746 dwelling units for approximately 5,063 residents on a 608-acre site. 90,000 square feet of commercial/retail space are included in a 20.6-acre Town Center portion of the development. Also, a 12-acre school site and a new fire station are proposed for the community. The development is proposed in five phases, generally progressing from the north near West Lilac Rd., progressing south. A system of community parks and open space is included in the proposal, conserving over 104 acres of sensitive habitat within the community footprint.

Structural fire and emergency medical services are provided to the area by the Deer Springs Fire Protection District (DSFPD). Wildland fire protection is provided by the California Department of Forestry and Fire Protection (CAL FIRE), which also contracts as the operational service provider for the DSFPD. The San Diego County Fire Authority (SDCFA) has been retained by the DSFPD to provide fire prevention services. The author of this report, Rohde & Associates, has been retained by the SDCFA to conduct an operational review of the LHR proposal.

Analysis Approach

Rohde and Associates has assigned 3 staff members to this project who have over 125 years of collective fire service experience in Southern California, including a nationally recognized wildfire behavior analyst. This team conducted an analysis in two parts. First, we developed a Fire Services Operational Review for the greater LHR proposed community. Second, we created a Wildland-Urban Interface (WUI) Fire Emergency Plan for the current site, using the countywide standard assessment process and planning tools. This WUI Fire Emergency Plan is known as the “West Lilac” plan.

The approach to this project is similar to four other major development projects analyzed by Rohde & Associates for the San Diego County Fire Authority in the last several years, and focuses on assessment of the project’s fire and building code compliance, site hazard analysis and mitigation using industry standard models and methods, fire operational concerns, and current wildfire science. This report however is specific to the Lilac Hills Ranch project.

While we are aware that additional draft ideas or verbal proposals may have been discussed between the LHR proponent and San Diego County that might affect this study, however they were not considered in this study unless formally presented or detailed sufficiently to allow evaluation.

Since wildfire has been determined 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, prepared on behalf of the project proponent by Firewise 2000 Inc. of Escondido, CA. June 6, 2014.

b. Wildfire Evacuation Plan, prepared on behalf of the project proponent by Firewise 2000 of Escondido, CA. May 2014 and June 2015.

c. County of San Diego High/Very High Fire Severity Zone data.

d. San Diego County fuels and topographic mapping.

e. State of California Forest Resource and Protection Program (FRAP) data.

f. Fire history map data for the LHR planned development region.

g. Potential Fire behavior data produced by BehavePlus, FlamMap, and LANDFIRE applications.

h. Wildland-Urban Interface Fire Emergency Response Plans, San Diego County Fire Chiefs Association, Hidden Meadows plan, Sept. 2014

i. Project proponent provided handouts, PowerPoints, and presentations

j. Traffic Studies: Fehr and Peers Memorandum (2019), and Dudek (2019)

k. Lilac Hills Ranch Wildfire Risk Assessment, C. Dicus (Undated)

l. Proposed Modifications to Road Standards and Traffic Study Appendices

<u>Site inspection and Review</u>

Two site reviews were performed in February and March 2019, including a team visit on Feb. 20, 2019.

<u>Previous Proponent Studies</u>

This report analyzed and validated portions of two studies developed by the project proponent providing fire protection and evacuation planning for the proposed development site (Firewise 2000, 2015). Additionally, this study reviewed the findings of a traffic study conducted by Fehr and Peers (2019) and Dudek, (2019), and a Lilac Hills Ranch Wildfire Risk Assessment (undated) developed by Christopher Dicus, PhD. This study agrees with most of the fire behavior and fuels assessment conclusions contained within these documents. However, we are in significant disagreement with some of the findings regarding risk assessment, traffic studies related to evacuation planning, proposed fuels management, and related fire prevention mitigations. Our findings and observations are detailed within this report.

Site Characteristics

The 608-acre project site is in rural, unincorporated San Diego County, east of Interstate

15 (I-15), south and west of West Lilac Road, and north of Circle R Drive. The site is several miles north of the community of Hidden Meadows, 10 miles west of the community of Valley Center, and 15 miles north of the City of Escondido. The site varies in elevation, ranging from approximately 590-960 ft. The site includes sloping topography covered in many locations by heavy old-age class chaparral, with interspersed agricultural abandoned and active orchard development. The main access to the proposed development is to the north of the site from West Lilac Rd.

Approximately one mile north of the proposed development site is Keys Canyon, a major drainage of northwest to southeast orientation that is dominated by heavy chaparral fuels, consisting of elevations from 300-1400 feet. This canyon presents fire corridor characteristics for aiding fire trajectory from east to west, especially when fire is in alignment with easterly winds. While some rural properties are located between the LHR development site and the upper edge of Keys Canyon, heavy fuel continuity exists in many locations which would allow fire movement from Keys Canyon to the edge of the development and West Lilac Road.

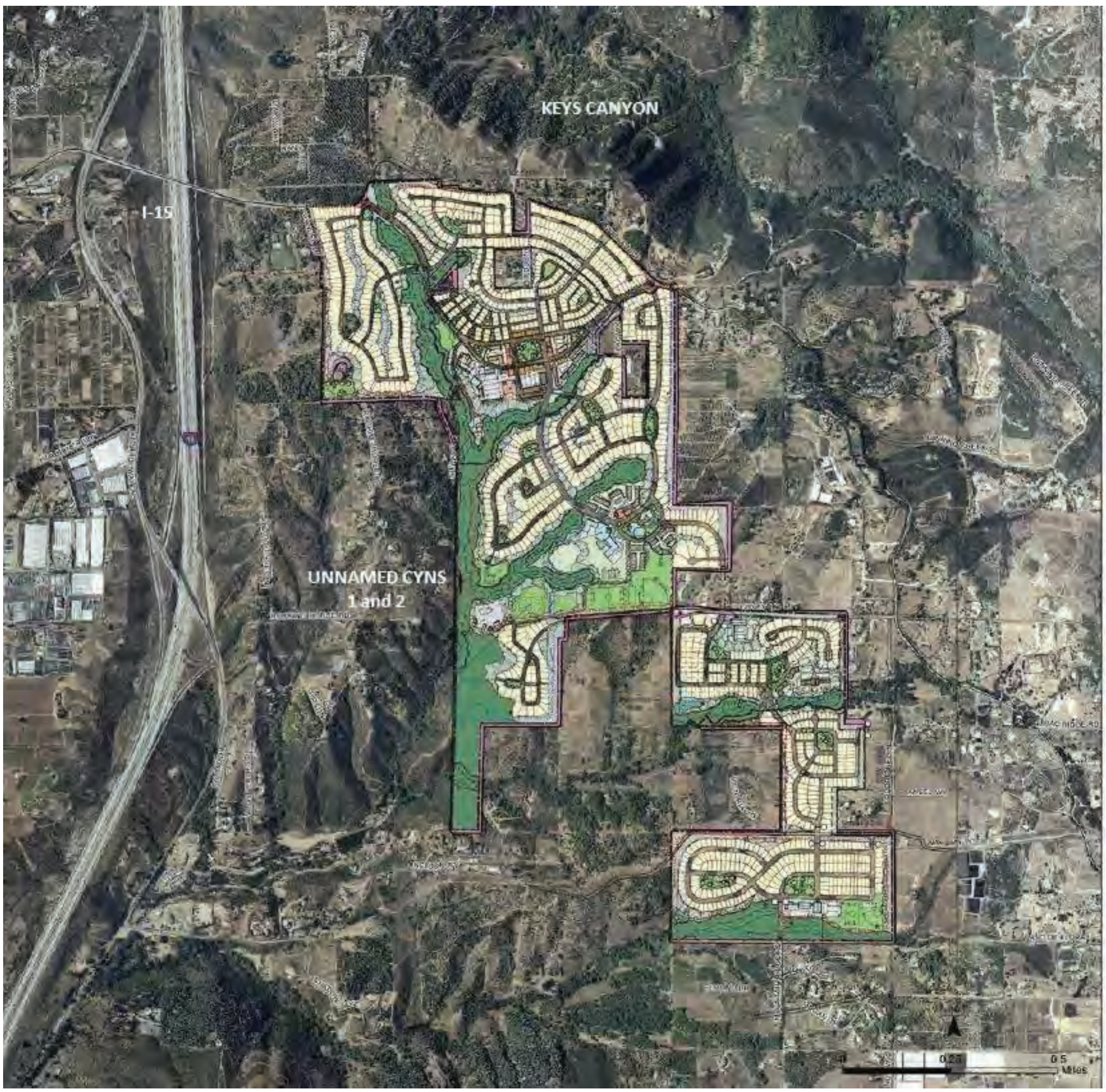
To the west, 0.25 to 1 mile distant, is the I-15 corridor, which is separated from the proposed development by a 300-foot ridge adjacent to the interstate and two small unnamed canyons. These locations are identified as wetlands in the proposed development plan. While the very bottom of these canyons may be accurately described as wetlands, the upland areas are more typical of inland dry canyons. Much of this area contains a mix of old-age class chaparral and coastal sage scrub. The west edges of the unnamed canyons are interspersed with rural homes and agricultural sites, especially off Old Hwy. 395 and east of I-15. Fuel continuity is available in some locations to allow fires originating along I-15 to move east and potentially threaten the LHR development, especially when aligned with strong on-shore winds. Topographic alignment of the unnamed canyons may also aid such trajectory. Expansion of fuel modification for the planned community may be necessary on its west aspect from the proposed 100 feet to 150 feet to ensure community safety and fire protection from this risk.

South of the LHR development site are several scattered rural homes and agricultural developments with primary access off Circle R Drive. This street runs approximately 0.5 mile to the south of the LHR development. Currently, no permanent access is provided from the proposed community south to Circle R Drive. Fuel continuity is sufficient in some areas to pose significant burn over or entrapment potential to populations using this route during wildfire evacuation.

Immediately east of the proposed development are more rural homes, ranches, and agricultural developments primarily accessed off West Lilac Road. These homes and developments will help to buffer the proposed LHR development from wildfire approaching from the east. Fuel continuity presents entrapment potential to populations using West Lilac Road as an evacuation route, especially where fuel beds rise-up from the Keys Canyon drainage.

Five to seven miles further east of the proposed development is the Lilac community, an enclave of intermixed rural homes and ranches. Ultimately Lilac Rd. terminates in the community of Valley Center. This area is dominated by heavy chaparral fuels and could be subjected to fire trajectory originating in the Valley Center area, burning through this area and ultimately affecting the LHR development as fire continues west under Santa Ana east wind conditions. This factor is important since Valley Center and Lilac area populations may be required to utilize the same evacuation routes as the proposed LHR development.

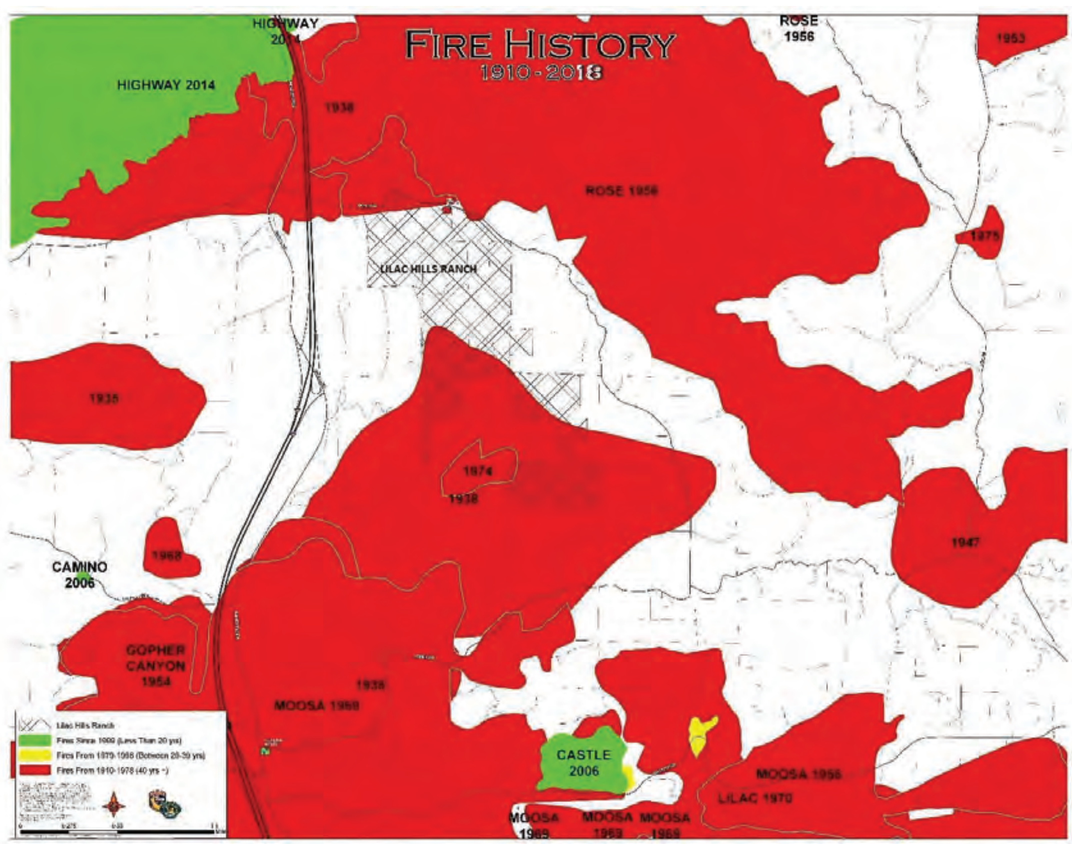
The development site includes Very High Fire Hazard Severity Zone designation by San Diego County.



The Lilac Hills Ranch Development Footprint

Site Assessment
The Rohde & Associates assessment of the LHR project site confirmed the site characterization of the project proponent's study (Firewise 2000, 2015) in that the area is largely composed of vegetation typical of Southern California coastal and interior chaparral communities. Firewise studies also reported that the site has experienced limited fire history with no large fires on the project site within the last 50 years. We concur with this assessment but note that large fires occurred within the region before and after the Firewise 2000, 2015 survey period. It is noted that fuel concentrations of heavy mixed chaparral on the project site exceed 50 years of age, a critical fuels factor. Small areas of riparian vegetation and coast live oak woodland also exist on the LHR site. Topography is generally sloping and rugged, with the proposed development concentrated on the northern and upland portions of the site. Much of the structural development proposed for the northwest, west and southwest sides of the proposed development is located adjacent to heavy mixed chaparral and coastal sage scrub fuels.

<u>Fire History</u>
In the past, large fires have frequented the region, especially under Santa Ana wind/extreme fire behavior conditions. The proponent's Fire Protection Report cites that no fires have occurred on the development site within 50 years. However, large fires have occurred historically both north and south of the project site. In our study, 3 prominent large fires are noted, one of which has occurred since the Firewise reports were prepared. The largest area fire cited by Firewise was the



Fire History Map for the Lilac Hills Ranch Proposed Development Site

2007 Rice Fire, which burned 11 miles north near Fallbrook, destroying 248 structures and burning 9,472 acres.

The three fire events of importance identified by this study include:

a. Rose Fire (1956): This fire points to the importance of Keys Canyon as an historic fire corridor under Santa Ana winds. The Rose fire, which was supported by Santa Ana winds, closely followed canyon terrain in its trajectory with a roughly east-west path. This fire is believed to have occurred during the same wind event that drove the fatal Inaja Fire in the San Diego River watershed that year. This fire behavior suggests that evacuation routing identified by the project proponent on unimproved Lancaster Creek Road within the Keyes Canyon drainage would be dangerous to travel during Santa Ana wind driven wildfire. Fire under such conditions would also threaten West Lilac Road and potentially compromise its use as an evacuation route.

b. Unnamed Fire (1938): The importance of geographic influence of the two unnamed canyons on the southwest side of the proposed development is demonstrated by a fire occurring in 1938. While we cannot ascertain the exact dates of the 1938 fire, it would appear this fire may have ascended these canyons during up-canyon, onshore wind-driven conditions. This fire behavior suggests that under similar conditions these canyons may once again channel wildfires to the proposed south and west boundaries of the development.

c. Lilac Fire (2017): Wind-driven, extreme fire behavior occurred in fuels similar to LHR adjacency and ran with high rates of spread and long-range spotting during the Lilac Fire, which occurred immediately across the I-15 freeway and a few miles west of the proposed LHR development on Dec. 7, 2017. This fire burned 4,100 acres, destroyed 157 structures and forced the evacuation of 10,000 people. This was a significant wildfire characterized by entrapped populations, compromised evacuation routes and significant structural loss.

This study suggests that these fire events can be specifically referenced with respect to the proposed LHR development due to their geographic proximity, similarity and continuity of fuels, fire weather influences, topography and similar rural siting of development. Significant areas of no recorded fire history also exist for some portions of the proposed LHR site and these islands of old-age class chaparral will be proximal to new homes in post development. These fuel beds have a potential for high thermal outputs, long-range spotting, extreme fire behavior, and both weather and topographic driven burning conditions.

Critical Fire Weather: Offshore Winds

The LHR site is subject to seasonal Santa Ana winds, a foehn wind type which characteristically dries native vegetation to critical fuel moisture levels, develops high wind speeds and low relative humidity, and drives historic wildfires in the region. Critical fire weather episodes are typically associated with Santa Ana wind events. The proponent's Fire Protection Plan cites the nearby 2007 Rice fire as an example of potential fire behavior. Winds during the Rice Fire were cited at 41 MPH, with gusts to 100 MPH. 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 February period. Santa Ana winds are influenced significantly by local terrain, which funnels through canyon topography and intensifies wind speeds. During Santa Ana wind events, the following average weather conditions have been recorded affecting the proposed development site:

Max. Temp.-offshore winds	Min. Relative Humidity (RH)-offshore winds	Average offshore wind speed	Average offshore gusts	Spotting Distance	Wind Azimuth
100-108 degrees F.	3-5%	25-35 MPH	35-60 MPH	1.5 miles+	36-90 degrees

* Source: Valley Center RAWS

The 2017 Lilac Fire immediately west of the project site was typical of such events. For planning purposes, the proponent's Fire Protection Plan considered a 60 MPH Santa Ana wind as a worst-case event. This study agrees with this finding. Fires originating in the Valley Center area and west will be of significant concern during these episodes, and under Red Flag fire warning conditions can spread fire rapidly to affect the LHR project site. The Keys Canyon drainage will significantly impact fire trajectory, should wildfire become established in this corridor.

<u>Critical Fire Weather: Onshore Winds</u>
The site is subject to a Mediterranean climate, with dry, warm summers and brief, wet winters. This results in summer critical fire weather, especially in the late summer months from July through September. Summertime critical fire weather events are frequently associated with prolonged periods of high temperatures, low relative humidity, low fuel moistures associated with seasonal drought, and moderate diurnal/onshore winds. While fire behavior can be extreme under these conditions, wind speeds are typically less severe than during Santa Ana wind events. The typical weather pattern for these conditions is diurnal flow, onshore/up canyon winds during the day, peaking in the afternoon and lighter offshore/down canyon winds at night. For planning purposes, the proponent's Fire Protection Plan considered a 35 MPH onshore wind as worst-case event. This study agrees with this finding. The following average onshore wind conditions have been recorded for the late summer period:

Max. Temp.-Onshore winds	Min. Relative Humidity (RH)-onshore winds	Average onshore wind speed	Average onshore gusts	Spotting Distance	Wind Azimuth
80-90 degrees F.	<10%	7 MPH	12 MPH	¼ mile	270 deg.

* Source: Valley Center RAWS

This record suggests that fires originating along the I-15, especially between Old Highway 395 and State Route 76 may become aligned with wind, topography and fuels to then threaten the proposed LHR development under onshore wind conditions during critical fire weather episodes.

Effect of fuels

The heavy accumulations of old-age class chaparral and coastal sage scrub exceeds 50 years in many locations, adjacent to the proposed community site. This is a stage at which these fuels reach maximum thermal output potential. Some pockets of live oak riparian woodland also exist but are generally confined to canyon bottoms and along water courses. Fuel continuity exists in a number of locations along primary roads (see map p.16), which could allow for significant fire development and compromise of travel/escape routes. The Fire Protection Plan (Firewise 2000, 2015) report cites the most significant LHR community risk will occur on the northwest, west and south portions of the proposed development. While this study concurs with this observation, we also note that areas adjacent to West Lilac Road, to the north of the proposed development, also carry a high fire spread potential and may burn with sufficient intensity to obstruct escape on West Lilac Rd. and pose a civilian entrapment threat. These specific areas have direct exposure to fire burning in Keys Canyon and are outside of the specific development footprint.

Areas of agricultural or structural development offer breaks in native fuel continuity and, while insufficient to obstruct all large fire growth, may offer opportunities for temporary safe refuge or limit wildfire growth under less intense fire behavior conditions. Areas of native fuels have been proposed for inclusion within the LHR planned development as interior fuel islands and, since area fire behavior has determined spotting potential of 1.5 miles or more, these sites may pose concern for ignition through spotting from adjacent large fires.

Sample of old-age class chaparral fuels on Lilac Hills Ranch development site

Fuel-Driven Fire Behavior

The second threat from the old-age class fuels is the potential for development of plume-dominated/fuel-driven wildfire behavior. This phenomenon occurs when high energy outputs from heavy, burning old-age class fuels creates an intense thermal column. This column develops dynamics similar in many ways to thunderstorm development, with severe in-flow and out-flow winds which are column dynamics driven rather than controlled by ambient wind conditions. Additionally, the uplift provided by the column dynamics lifts burning materials high into the column, where they later fall-out ahead of the fire causing extreme and long-range spotting. Extreme conditions such as fire whirl development are also commonly associated with this phenomenon. While this is generally associated with large fire behavior, the process is thought to begin with fires as little as 40-50 acres in size and requires heavy fuel beds and very high to extreme burning conditions as contributors. Spotting distances achieve maximum downwind firebrand distribution potential under these burning conditions, estimated by our Fire Behavior Analyst for this site as far as 1.5 miles or more ahead of the main fire.

A significant concern here is that fire protection infrastructure such as ember resistant walls have been proposed to serve to reduce ember cast into developed areas. Such infrastructure may be defeated by firebrands developed by fuel-driven, extreme fire behavior and should not be relied upon alone for structural ignition resistance.

Our assessment indicates the potential for development of plume-dominated/fuel-driven fire conditions during extreme fire weather/behavior adjacent to the development site. Specific areas include the northwest, west and southwest portions of the project, due to adjacency to heavy fuel beds, and from ember cast for fires moving in Keys Canyon. Concern also exists for heavy fuels which may be isolated within the community as native vegetation islands, which may be subject to ember-driven ignition. This finding will accentuate the need to harden LHR structures and interior open spaces against burning firebrands and ensure significant defensible space/fuel modification presence. While this assessment is specific to this project site, such a finding could also be applied to other proposed project sites with adjacency to heavy old age class fuels, and where historic fire behavior and trajectory patterns demonstrate that a proposed project is potentially

Plume-dominated/fuel-driven thermal column, Station Fire, LACo, 2009 subject to similar fire effects.

Long range spotting from these areas may also compromise evacuation routes at some distance from the LHR development, especially under episodes of rapid-fire movement, heavy spotting, or extreme fire behavior. This accentuates the need for early evacuation of the community, or temporary safe refuge in situations where early evacuation is not possible or too late to affect. In either case, community road access may be lost due to decreased visibility, fire impingement, or firebrands. A strong temporary safe refuge strategy for retention of populations within the community as a last resort is recommended.

National fire research by Cohen (2008) and Manzello (2014) have identified that firebrand casting is a large factor in ignition of structures in the Wildland-Urban Interface. Since the proposed project will likely be subjected to fire branding from adjacent wildfires, this consideration should cause developers to consider extensive protection from firebrands 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 other related actions. These conditions should include focus on attic vents, eaves, roofing materials, exterior fencing materials and ornamental vegetation restrictions.

Effect of slope

Most of the proposed development will be situated on or near sloping terrain. Nearly half of the proposed project, 141 acres, will be situated in terrain with 15-30% slopes, another 110 acres positioned on 0-10% slopes, and an additional 54 acres of the project will be situated on slopes exceeding 35%. These steepest slopes are not proposed for development and are generally located in the south and west portions of the project. Slope has the potential to accentuate fire spread rate by a multiplier of 3 to 5 times over that in flat terrain. For the portions of this project with steeper slopes, additional fuel modification may be necessary to cope with accentuated flame lengths and fire behavior. This is especially true on the northwest, west, and southwest portions of the project, or wherever final landscape grading may be 35-40%. Slopes also run north into Keys Canyon from locations along West Lilac Road with grades approaching 45%. The effect of slope on wildfire behavior is roughly to double the rate of spread and flame lengths for every 30% of slope added to level ground.

Fire Rate of Spread

The 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 worst case fire behavior conditions. Fifty years of historical weather, historical fire behavior from nearby wildfires and current fuel mapping have been calculated into this modeling. Results indicate that under critical fire weather and extreme fire behavior, rapid rates of spread may be expected, averaging 3-6 MPH for Santa Ana wind-driven conditions, a critical rate of spread. Additionally, rate of spread will be enhanced by spotting and firebrands ahead of the main fire front, which can be significant when fires burn in heavy, old-age class fuel beds.

Rate of spread was calculated in this study for the proposed development site. A range of findings is presented which represents study in both coastal sage scrub and mixed chaparral fuels. Results of this study found:

Wind direction	Average Rate of Spread	Worst Case Rate of Spread	Avg. Flame Lengths	Peak Flame Lengths
Offshore Wind	8,230-13,200 ft/hr.	13,200-18,489 ft./hr. *worst case 3.5 MPH	11-14 ft.	35-45 ft.
On-shore Wind	1,320-3,300 ft/hr.	3,300-4,620 ft./hr. *worst case <1MPH	4-8 ft.	20-32 ft.

Fire Behavior Studies and Implications

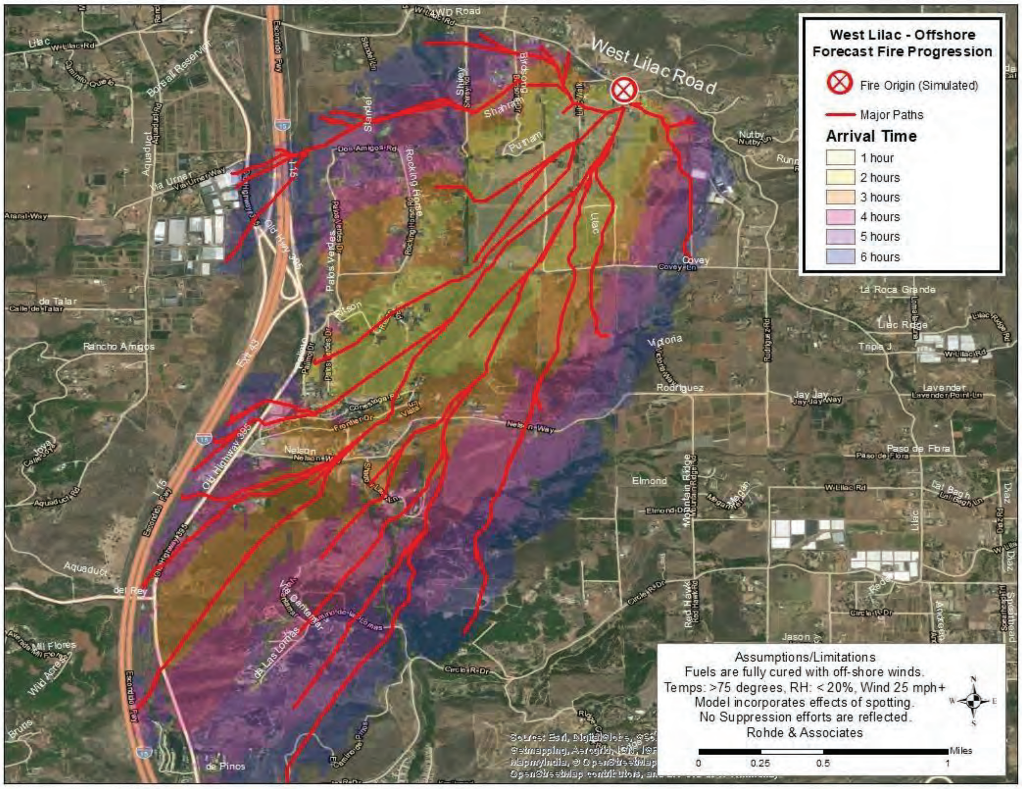
A comparison of this study and the proponent's Fire Protection Study (Firewise 2000, 2015) yielded small differences in fire behavior calculations. Equal peak flame lengths (45 feet) were determined in both studies, but there was a lower rate of spread (3.5 MPH in this study vs. 5.61 MPH in the proponent's study). These inconsistencies may be due to different geographic computation points and fuels, or fire behavior modeling techniques. Both studies however have identified a rate of spread in excess of 3 MPH, which meets National definition for an extreme rate of wildfire spread, which would correlate with potential for extreme fire behavior with high difficulty of control, therefore the studies are largely in agreement. More advanced fire behavior modeling systems were utilized in this study that historically yield higher resolution results due to the high-hazard nature of the proposed development site.

Fire Ignition Sources

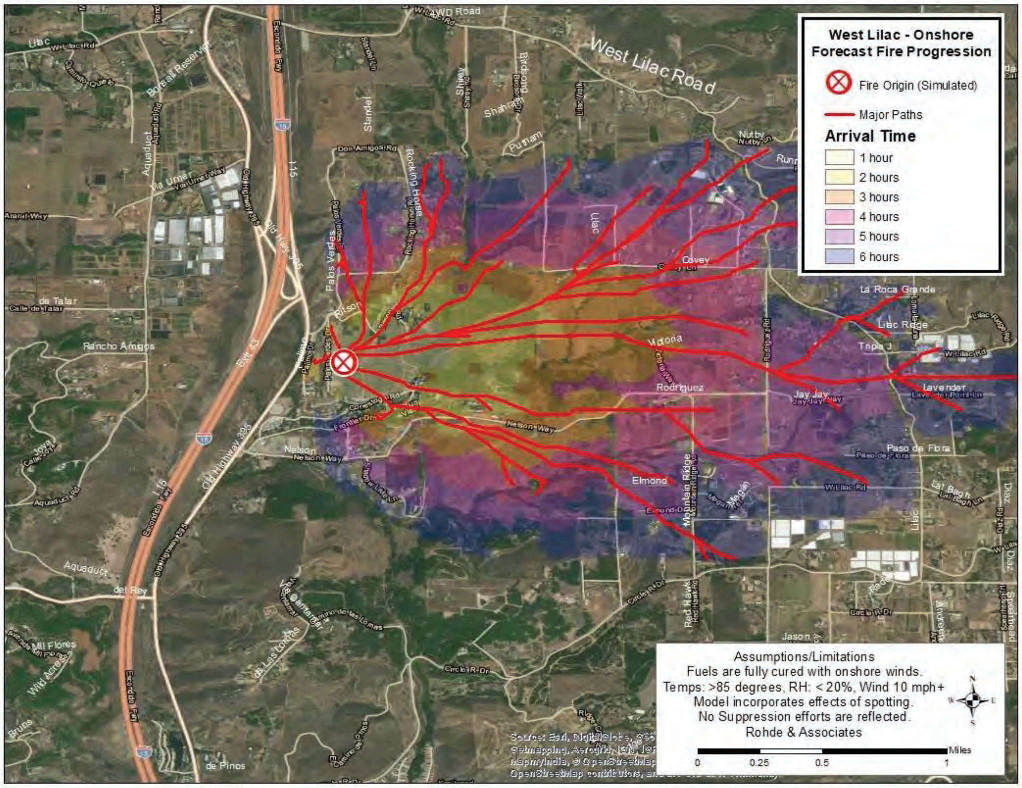
Numerous studies have identified that human caused wildfire is linked to population growth (CAL FIRE, Keeley, et. al.) and is an inescapable result of any development in the Wildland-Urban Interface. This is partially mitigated by adherence to robust fire and building codes during development, improved fire services, effective fuel modification and maintenance, and fire safety/evacuation planning. All of these have been proposed in this project. In Southern California, human caused ignition is the primary cause of wildfire. Additional studies have determined that major transportation corridors, such as the I-15 freeway, are a significant source of wildland fire ignitions. This factor is of concern given the proximity of the I-15 on the west side of the project.

Fire Behavior Mapping

The results of fire modeling for the proposed development area yields fire trajectory mapping which predicts how fire would move on the landscape. Two projections have been completed based on conditions at the LHR site as it is currently (pre- development). They illustrate the fire behavior that may be encountered by direct flame impingement on the LHR boundary and through spotting. One projection is for Santa Ana/offshore wind conditions. A second illustrates onshore wind conditions. Both calculations utilize worst-case weather and fuel conditions from a 50-year data base. Both projections calculate a 6 hour burn period. If the theoretical origin is moved to another location under similar conditions, the same fire progression would likely occur.



Off-shore wind-driven fire projection



On-shore wind-driven fire projection

Climate Change Impacts

Climate is currently changing for the region and disturbance has occurred in traditional Santa Ana wind periods, rainfall amounts and timing, summer peak temperatures and related factors. An example of this change was the occurrence of a rare, critical fire weather/Santa Ana wind period in May of 2014. This resulted in a wildfire series in San Diego County, in the surrounding area of this development location, and a multi-year critical drought episode. The ultimate final state of this change has not been determined, but available data suggests that drought and critical fire weather episodes will continue to occur during non-traditional periods. Climate change is likely also apparent in the dieback of native vegetation as a result of pest infestation, disease and drought effects, which contributes to potential fuel loading.

Evacuations

The project proponent has detailed an evacuation plan for wildfire for the proposed development. The project generally utilizes existing road infrastructure except for the addition of new streets within the proposed development itself. The LHR project calls for ignition and fire spread resistance hardening, for a portion of West Lilac Rd., where it has frontage on the proposed development. Approximately 5,063 residents are projected to occupy the new community at build-out. A traffic study by Fehr and Peers (March 2019) did not calculate a total time for evacuation of this population, however using Federal Emergency Management Agency guidelines, it is likely that such a population would require 1.5 hours or more for evacuation.

Historical evacuation experience during past San Diego County wildfires has found limited cooperation by large portions of communities to evacuation warnings. Many people hesitate to leave until late in the evacuation period, leading to traffic congestion during peak threat times. It will be important for LHR and public safety services to stress to residents the potential dangers associated with a delay of evacuation during community wildfire threats.

Evacuation Triggers

Our analysis highlights that early evacuation will be essential to the success of such an action. Given that a maximum rate of spread for Santa Ana wind-driven wildfires was calculated at 3-6 MPH, and for onshore winds at near 1 MPH, fire management action points can be established where nearby fires should trigger evacuation. In addition to fire rate of spread, an additional 30 minutes must be added as reflex time to effectively activate and broadcast emergency messaging. Given these calculations, the following management action points are recommended for the proposed LHR community:

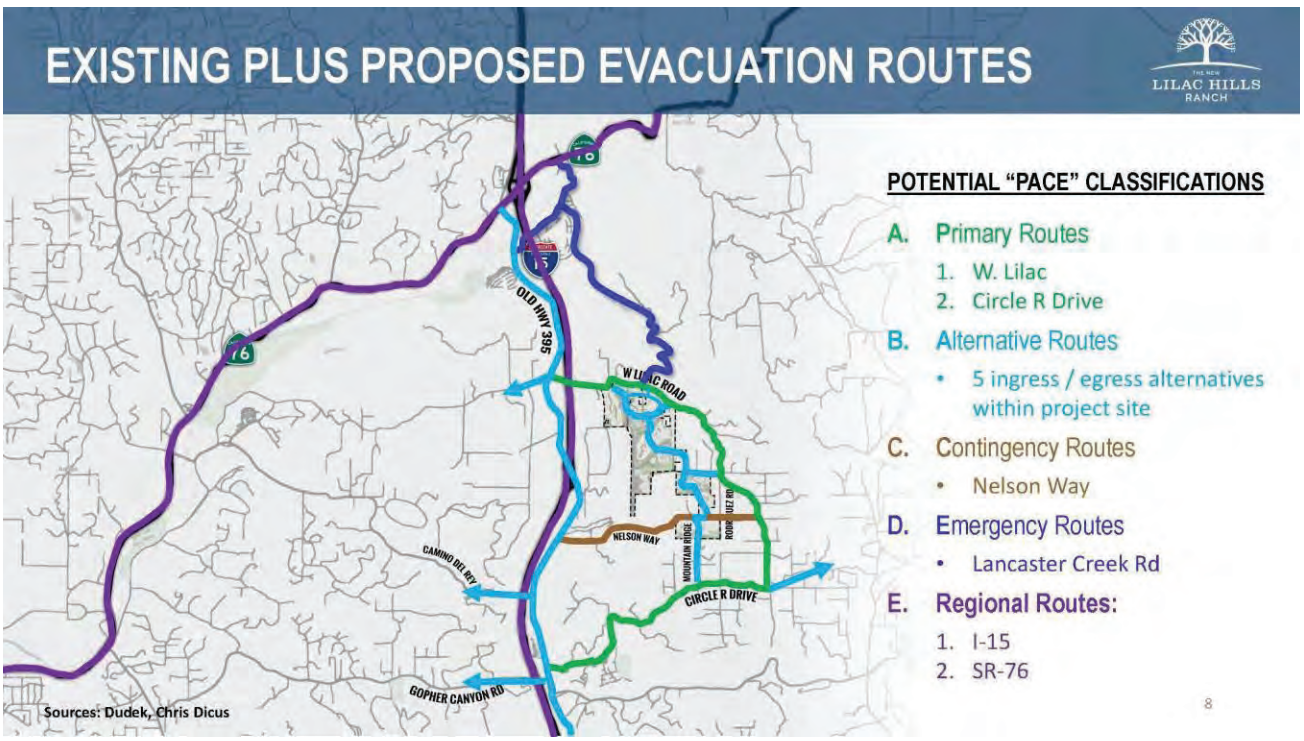
Evacuation Initiation:

a. Santa Ana wind-driven fire: Any significant wildfire approaching the project from the east from Valley Center, moving west of Cole Grade Road. Or moving southwest of the Community of Pala/State Hwy 76, cresting the ridge south of Pala and entering the community of Lilac. Evacuation should be halted when the fire moves west of Couser Canyon Rd. and/or Lilac Rd. into Keys Canyon. A temporary safe refuge strategy should then be employed.

b. Onshore wind-driven fire: A significant fire aggressively approaching the community moving east of the I-15, between Old Castle Road and State Route 76. Evacuation should be halted when well established fires east of I-15 move east or north of Circle R Drive from Moosa Canyon or near the proposed LHR community across Palos Verdes Drive. A temporary safe refuge strategy should then be employed.

Use of these geographic points for initiation of evacuation should provide the community best opportunities for successful relocation. Threatening fires starting closer than these points will require public safety professionals to consider whether time is still available to complete civilian evacuation safely. If travel on roadways is not safe, temporary safe refuge options should be utilized.

<u>Evacuation Routing</u>



Evacuation routing proposed by the project proponent

The project proponent has identified several potential routes of evacuation from the proposed development. Key to this proposal is the identification of four classes of routing:

a. Primary Routes: Including West Lilac Road and Circle R Drive.

b. Alternate Routes: Including most proposed streets within the development, Lilac Road east to Valley Center, Mountain Ridge Road, and Old Hwy. 395
c. Contingency Routes: Including improvement of Nelson Way to primary route status.
d. Emergency Routes: Including Lancaster Creek Road.
e. Regional Routes: Including I-15 and SR76

The project proposes to modify landscaping along West Lilac Road commensurate with a development boundary only. This effort is undertaken in part with the intent to reduce ignition and fire spread potential from or across West Lilac Road.

Traffic and Evacuation Concerns
This study carefully considered routing proposed by the project proponent and does not agree with the safety of many of the routes identified by the project proponent. During field analysis, all the proposed routes were evaluated. While gating was originally proposed for all project entries, later proponent offers have included gate removal to increase vehicle access and improve emergency response times. This proposal however needs to be confirmed by the project if it is still in effect.

The findings of this study include:

a. Primary Routes: Both West Lilac Road and Circle R Drive are two-lane roads which are subject to compromise by fire movement at various locations. This creates entrapment potential and may block evacuation efforts. One of the proponent's traffic studies (Fehr and Peers, 2019) initially assumed only a limited number of additional existing residences (66) adjacent to the proposed development might utilize the routes for evacuation. However, it is likely that the greater Lilac Road community, with a population near 10,000, east of the proposed development between the LHR site and Valley Center, would also likely use either West Lilac Road or Circle R Drive to attempt evacuation from a Santa Ana wind-driven wildfire originating near or moving west of Valley Center-Pauma Valley. Road capacity is estimated in both the Fehr and Peers and Dudek (2019) traffic studies. This research has identified that traffic demand near the project site would exceed road capacity without traffic improvements.

   Both traffic studies identified a requirement for two out-bound traffic lanes on West Lilac Road to meet evacuation needs. Traffic capacity on this section of West Lilac Road is limited to between 1,330 vehicles per hour (Fehr and Peers, 2019) or 1,270 vehicles per hour per lane per the Dudek study (2019). These same studies have estimated a traffic demand between 2,660 vehicles (Fehr and Peers, 2019) to 2858 vehicles (Dudek, 2019) per hour during evacuation of the proposed LHR development. The results of either study congest the available single traffic lane, and this is without consideration of any additional impact of regional evacuee traffic. Estimates using a single traffic lane are that it may require as much as 3 hours to evacuate the project area and greater Lilac region. In contrast, projected fire behavior and rates of spread would likely exceed this ability significantly and likely pose entrapment risks. The fire behavior projection includes the ability of a fire to move the entire distance from the area west of Valley Center to the I-15 in 3 hours during critical burning conditions, burning at a rate of 3.5 to 5.5 MPH.

The Fehr and Peers study (2019) proposed to accomplish evacuation without traffic lane improvements using “contraflow”, which requires the use of all available lanes outbound, both east and west bound lanes. The second Dudek (2019) study suggests conversion of existing lanes to eliminate available road shoulders and create an uncontrolled 14-foot median lane which potentially could be used passively during evacuation. Analysis of both proposals yields area of concern. Contraflow has been viewed by the SDCFA as unworkable given the limited capacity of regional law enforcement to conduct both rescue, evacuation, and simultaneous traffic management of this area. A significant expanse of roadway would need traffic controls to safely implement contraflow. Contraflow would also compromise the ability of emergency responders to access the area. In the 2018 Camp Fire in Paradise, California; traffic contraflow was attempted on Skyway Road, a main evacuation route to Chico. Lack of law enforcement availability to manage chokepoints and intersections caused an 8-mile traffic gridlock, leading some civilians to become trapped in their vehicles or causing them to flee vehicles on foot. A number of deaths have been attributed to this condition. This finding conflicts with the finding of the Dicus report, *Lilac Hills Ranch Wildfire Risk Assessment* (undated) where the author rejects similarity between the 2018 Camp Fire in Paradise, CA and the proposed project.

The proposed median uncontrolled lane would likely also require traffic controls to affect safe use. Secondly, to physically create this lane, existing primary lane widths would be reduced from 20 to 18 feet, eliminating shoulder areas. This design would eliminate the ability of traffic to yield to emergency vehicles and compromise movement of fire apparatus and other large vehicles given reduced road width. The median lane would be of insufficient width to accommodate most large vehicles including some fire apparatus. Both proposals would modify traffic lanes for a limited distance from the project boundary west to I-15.

In the opinion of this study, both proposals fail to permanently or effectively mitigate the single traffic lane constraints identified within the proponent’s traffic studies. Development related traffic impacts suggest that evacuation traffic could vastly exceed capacity and congest this road. This study concludes that the currently proposed traffic improvements are insufficient to mitigate development related evacuation demand and would likely degrade regional evacuation potential.

Additionally, the project has proposed use of traffic circles for intersection control which may further reduce capacity for large vehicles and fire apparatus. Large agricultural vehicles and horse trailer traffic are common on West Lilac Road.

b. Alternate Routes: Mountain Ridge Road is currently a private road and the developer had proposed limited access only to proposed assisted living housing rather than the community at large, except by emergency gated access. Full community access would not routinely be allowed via this route. Should this route not be secured for LHR general use, the proposed development will only have a single primary route of access/egress to the north to West Lilac Road. This condition, unless mitigated effectively, will complicate evacuation, emergency access and response routes and times, and likely not meet County Consolidated Fire Code requirements for emergency access. As it is in its current state, this dirt road is narrow with tight 90 degree turns and is unsuitable for either fire apparatus access or safe evacuation from the community. An additional route, Covey Lane may connect with West Lilac Road and offer access. Both Mountain Ridge and Covey Lane configurations will likely impact Fire service response times in the currently proposed configuration, and the issue of gating of these access points remains undetermined.

In the northern part of the proposed development, the project has proposed an alternative "Belly road" within the project for transport of evacuation traffic around West Lilac Road. This proposal would shield some traffic movement from potential fire behavior originating from Keys Canyon by placing it interior to the community for a short distance. However, the road would reconnect with West Lilac Road at the project boundary and transfer the point of congestion ¾ mile west from the originally proposed intersection. Ultimately, the Belly road does not relieve traffic congestion during evacuation on West Lilac Road.

c. Contingency Route: Nelson Way has been identified as an emergency evacuation route that will be gated and prohibited from public use under normal conditions. In its current state, it is currently a partially paved single lane road secured by an iron gate owned by the local water district. The road travels in close proximity to heavy native vegetation fuel beds offsite of the LHR project where fire entrapment could be a threat. The project has considered improvement of Nelson Way to 28-foot width County standards, along with conduct of appropriate fuel modification, and extension of the road from the community to I-15 on the west. This proposal has merit for reduction of traffic congestion impacts on West Lilac Road, estimated at 20% reduction by project traffic studies (Dudek, 2019). This route could create an alternative for evacuation for a portion of the proposed development to Old Hwy. 395/I-15, however needed road design and related information necessary for full analysis has not yet been provided by the project to allow full consideration by the County, and concern exists for how the public might access or use an unfamiliar route during time of emergency.

d. Emergency Route: Lancaster Creek Road had been identified in early traffic studies as an emergency escape route. This unimproved narrow, single lane dirt road travels north from West Lilac Road and descends into Keys Canyon to the area just east of I-15. This road transcends a deep canyon and historic fire corridor that would be subject to dangerous and lethal entrapment conditions during wildfire movement. On the day the road was field surveyed, washouts, slides and storm damage were apparent that would inhibit travel. No maintenance or improvement of this road is proposed by the development. Due to these hazards, it is unreasonable to consider this road for evacuation purposes.

e. Regional Routes: While I-15 and SR 76 are designated as primary regional routes for evacuation, it should be noted and considered in evacuation planning that both routes are historically heavily congested during past wildfire emergencies. This factor may affect success of planned evacuations from the LHR community.

Roadway Fuels Management

With regard to the primary evacuation routes, 19 locations have been identified where fire movement across either West Lilac Road or Circle R Drive is likely, presenting a significant civilian entrapment potential. Eight of these locations are on West Lilac Road north of the intersection with Circle R Drive, outside of, but adjacent to the development footprint. Keys Canyon drops steeply north from West Lilac Road. At these noted locations, flame lengths of up to 40 to 60 feet could be expected and could move over West Lilac Road, compromising its use for escape and potentially entrapping motorists. In the 2003 Cedar Fire, such occurrences led to multiple civilian fatalities in the Lakeside area of the Barona Indian Reservation near Wildcat Canyon Road. As such, the SDCFA proposed that West Lilac Road receive project sponsored fuel modification treatments to ensure safe evacuation of vehicles. The SDCFA proposal called for 20 feet of fuel modification on either side of the 20-foot roadbed, with the project arranging for permanent easements and financing.

X: Potential locations of fire movement across primary evacuation routes

In our review of this proposed mitigation, the cumulative 60 feet of clearance was found to be inadequate to reduce fire impacts on West Lilac Road. Wildfire rising up and out of Keys Canyon could cross this barrier and directly impinge flames on traffic. The proposed 60-foot mitigation would minimally provide protection for homes on the south side of the road but not include effective protection of the roadbed itself. In reference, other areas of the project are required to provide 100 feet of fuels clearance to protect homes. This study concludes that a minimum of 50 feet clearance is required for traffic safety, especially on the downhill side of the 8 identified locations with entrapment potential north of Circle R Drive.

Several areas within the proposed development are identified by the project as temporary safe refuge for LHR residents during wildfire. These include:

a. A 20.6-acre Town Center with 90,000 square feet of commercial development
b. A 12-acre school site
c. A church site and community center (size yet to be defined)
d. 10 acres of small parks in 10 sites

These areas serve as a refuge of last resort during wildfire and should not be considered as a better option in lieu of evacuation if the roadways are safe to travel. These sites may still be exposed to heavy smoke concentrations, ember cast and other fire effects, but will likely offer survivable space during wildfire movement. While this study is in general agreement with this concept, the project has not identified the size, structural configuration, or specific location of several of these facilities and full determination for their resistance to wildfire is awaiting this information.

An elder care/assisted living facility is included in the proposed development. This site offers additional complexity for evacuation due to the presence of potentially non-ambulatory populations. Movement of non-ambulatory populations requires more preparation time, vehicles and logistics to accomplish evacuation safely. This issue is not addressed in the project's evacuation plan. Recent wildfire experience in Paradise, California during the 2018 Camp Fire showed severe fire damage to such a facility, despite being built to high building standards. This demonstrates a need for additional consideration of fire resistiveness of such facilities and for development of facility specific evacuation plans.

<u>Protection of In-Situ Populations</u>

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. While such action is incorporated within the project's Fire Protection Plan, additional emphasis is needed to define how stranded populations will be protected in place. Recommendations should be added to the evacuation plan calling for specific deployment to protect stranded populations and infrastructure development at these sites which resist wildfire ignition and spread.

Evacuation Summary

LHR traffic studies have confirmed that existing routes of access and egress to the proposed community and the greater region may be insufficient in the ability to manage traffic demands during wildfire evacuation. The LHR proponent's proposed primary evacuation routes also have many points of potential fire movement across them, creating entrapment and blockage concerns. Since most primary road improvements are limited to the development frontage itself, and travel of some distance is required for evacuees to reach safety, additional improvements on these primary roads distant from the LHR development would likely be necessary to guarantee safe travel for the community during wildfire. The project's proposal to improve Nelson Way as a primary evacuation route is significant as has potential to mitigate many traffic concerns, however traffic studies and related information has not yet been provided to the County for consideration.

Additional constraints exist for the lack of dedication of access for Mountain Ridge Road. It is unclear if there is ample space to make the necessary improvements to this road to make it a viable route for evacuation and emergency apparatus access. This condition may also not be compliant with San Diego County development standards, as the lack of access to this route will leave the community with only one way in and out.

Traffic congestion as the Cedar Fire crosses the I-15, 2003.

Some proposed contingency evacuation routes are dismissed by this study as unreasonable due to potential gridlock, fire entrapment or dangerous conditions for use. Road improvements that are currently offered by the LHR project do not effectively alleviate travel impacts. Additional planning effort should also be directed for non-ambulatory populations within the LHR community, especially in assisted living housing. Additional detail should be provided by the project to better define temporary safe refuge options within the proposed LHR project.

The project proponent has included the development of a Ready-Set-Go plan and Firesafe Council to communicate evacuation planning.

Given the limitations for effective fire evacuation and access, additional hardening may be necessary within the proposed LHR community for structure fire resistance. Additional measures for landscaping/defensible space, areas of safe refuge, attic and related structural ember resistance, and treatment of native vegetation islands left within the community are all issues needing to be addressed.

Fire Protection

The proponent has considered fire service emergency response times and services in their reports (Firewise 2000, 2015). Response time analysis has been conducted with the proponent's finding of a 5-minute response time (from the time an apparatus departs the Fire Station to the time it reaches the dispatched address) to the entire community. Fire sprinklers have been proposed for all occupied structural development, as well as permanent fire station construction for a Deer Springs Fire Protection District station within the project.

At the time of this study, potential consolidation of the CAL FIRE Miller Fire Station 15 (9127 West Lilac Road) into a new fire station facility within the LHR development was an active proposal. A second proposal would leave the CAL FIRE facility as a separate entity at its existing location, with the construction of a separate Deer Springs Fire District facility within the development.

The Deer Springs Fire Protection District currently maintains 3 fire stations and CAL FIRE operates the fourth facility (Miller Station 15) within the District. This State facility is staffed year-round by local County agreement and provides local responsibility coverage. Current response activity within the District is 3.74 calls per day. (Firewise 2000, 2015). Potential call loading from the LHR community is projected at 3.9 additional calls per day at build-out. Since the nearest Fire Station to the development, the CAL FIRE Miller Station, currently experiences 1.22 calls per day, this increase in demand should be within the capacity of the currently available staffing.

The project's Fire Protection Plan (Firewise 2000, 2015) indicates that the current Miller Station will be 4.5 minutes from the furthest structure in the LHR development; however, relocation to a new fire station facility within the development may shorten this response time. Backup service for fire response from other existing District Fire Stations is required for structural or wildland fire response, or backup response, should the closest fire crew be committed. The District's entire standard structural fire response will be able to arrive within 10 minutes, meeting the District's standard according to the Firewise 2000 report. The District also maintains a response standard for 6 minutes for the first due paramedic engine.

At the time of this study, the original project had been proposed with numerous locked emergency access gates that would restrict regular road access to much of the community. This proposal would delay access by fire and emergency resources. The project proponent, however, has recently indicated that 5 or 6 gates might be removed. Further detail has yet to be provided by the proponent that would allow full evaluation of this concept. This study raised concerned for timely response by backup stations given lack of access due to gating or road connectivity which cannot be answered at this time.

In the absence of this detail, firm conclusions regarding development response times are not yet achievable. Given the proximity of the CAL FIRE Miller Station, the proponent's verbal proposal of emergency locked gate removal within the development, and the assumption that response times would at least be met by the Miller Station existing location, this study believes that the proposed development's response travel time may likely meet District response standards. Concern still exists for the extreme south-end of the project, off Mountain Ridge Road, where a proposed assisted living facility would likely generate high call volume but be furthest from the Community's fire station. Full analysis was confounded in this study by the lack of current agreement on final fire station location and the yet to be defined final status of road gating.

Detailed tract mapping indicating street design, fire flow/water systems, and housing type (retirement/multi-family, single family, etc.) has not been provided by the proponent for this study; nor has a detailed analysis been conducted on these characteristics. The proponent's plan has called for fire hydrant distribution meeting suburban development standards. These aspects will need to be considered as part of fire services assessment for this proposed development. However, proposed mitigations, along with fire and building code compliance, fuels management and other proposals included in the Firewise 2000 study (2015) are typical for such code-compliant community development and are generally reasonable mitigations in comparison to similar projects elsewhere in Southern California. The project proponent has proposed full compliance with Building Code Chapter 7A, the current codified practice in California relative to Wildland-Urban Interface fire resistance. No occupied buildings taller than 35 feet are proposed for the development, however a single non-habitable structure may exceed 35 feet.

Defensible Space

The majority of homes in the proposed development will have a 100-foot fuel modification zone. As an alternate, LHR proposes that this 100-foot space may be accomplished by irrigated agriculture or orchard. An area of 50 feet nearest structures (Zone A) will be clear of all non-fire-resistant vegetation and irrigated. An additional non-irrigated area outside of Zone A will have a 50% reduction in native fuels, with removal of dead and downed material, and will be known as Zone B. Trees in Zone B would be limbed and pruned to a fire resistive state. Maintenance of this condition is proposed for assumption by the homeowner's association. All ornamental landscaping would be per San Diego County fire resistive plant pallet standards. Structures will have setbacks from property lines in accordance with fire code requirements. Roadways within the project will be treated with 10 feet of clearance on each side to ensure fire resistiveness and safe travel. Restrictions on back yard storage, landscaping, construction and maintenance have been proposed to promote structural fire defense.

Fire Protection Exceptions

Exceptions to the 100-foot fuel modification zone have been proposed for the northeast and southwest corners of the property. The project has, over the course of negotiations, modified some exceptions and agreed to 100 feet clearance around the entire development. However, this offer has been made and rescinded several times and the current status of this proposal is unknown. Additionally, ember trapping attic vent installation had been proposed for structures adjacent to the heavy fuel beds and later modified to include the entire project. Similar to fuels management, this proposal has been made and rescinded over the course of negotiations between the County and the proponent. The project's Fire Protection Plan does not detail the specific location of any sites where compromises to fuel modification or building construction methods may occur, other than to state "a few areas" may have reduced fuel modification width or "use alternate means and methods such as ember resistant walls". The lack of final commitment to these strategies by the project, or substantive detail concerning the application of such exemptions has provided insufficient information from which to determine the adequacy or sufficiency of such treatments. It is recommended that the project be required to provide a final list of proposed exceptions and locations so that these may be adequately evaluated for mitigation of fire and life safety concerns.

Given the nature of old-age class fuel beds adjacent to portions of the property, fuel modification width may need to be increased overall to provide adequate protection against wildfire. This is especially true of the LHR perimeter homes on the northwest, west, and southwest areas of the development. Interior fuel islands should also be treated with fuel modification to reduce fuel loading next to structures and roads. Proposed Zone A/B standards should apply to interior fuel islands in the same manner as on the community perimeter. Once the project provides detailed development plans for specific sites that includes construction design, setbacks, and related information, the adequacy of the minimum 100-foot fuel modification requirement should be re-considered if adequate on a site-by-site basis considering potential fire behavior of adjacent fuel beds. Fuel modification may need to be extended to 150 feet where heavy fuels or a combination of slope may accentuate fire behavior.

Implications for Fire Operations

Structural wildfire defense and evacuation of the LHR Community will be a dynamic and a significant challenge for emergency services, but typical of challenges faced by many modern communities of San Diego County. Community fire resistive features including building construction, fuel modification, fire sprinklers and water systems, and related improvements will significantly reduce the potential risk to both civilians and public safety responders. In many respects, developed areas of the community, especially in the community center away from development perimeters, should be safer for people than surrounding roads or wildlands during fire movement.

Among perimeter streets and homes, active firefighting structural defense will be necessary. Where adequate defensible space is provided and maintained, the chief risk will be from flame impingement from adjacent burning houses in close proximity, or from flying embers and spot fires developing among old fuel beds and ornamental vegetation. Left unchecked, these can contribute to significant structural loss. The chief concern will be for perimeter homes at the head of the fire and for homes perched above canyons or drainages.

Estimated Potential Worst-Case Loss

Worst case wildfire conditions include severe Santa Ana winds, critical fire weather and extreme fire behavior. The estimated total structure 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 built to Building Code Chapter 7A standards, could range from 2-7%. Structural loss would likely be concentrated on the community perimeters due to fire intensity, proximity to heavy fuels, or firebrands, and among a limited number of homes in the community interior presenting spot fire targets due to over-developed ornamental vegetation, yard storage conditions, and related factors. Once structures become involved, extension of fire to surrounding and exposed structures often results in a group loss in this community type, due to structural density.

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

Potential structure loss calculation assumes that all fire and building codes are met, fuel modification, and effective/approved alternate methods are in place.

Potential Structural Loss to CA Building Code Chapter 7A compliant structures:
Total number of homes = 1,746
Total number of perimeter homes: Approximately 200
Loss of 7% of perimeter homes (worst case fire condition) = 14 Loss of 2% of perimeter homes (worst case fire condition) = 4

* Homes on the northwest, west, and south west flanks of the development will be at highest risk due to adjacent heavy fuels

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

Study Summary and Recommendations

Wildfire Risk

1. Significant wildfire risk exists for the LHR planned community, especially from exposure to heavy, old-age fuels on the northwest, west, and southwest sides of the project. According to fire behavior studies, additional risk from large fire ember cast exists from fuels 1.5 - 2 miles from the project site, especially from fires traveling in Keys Canyon.

Recommendation: The entire project is subject to long-range ember cast as disclosed by both the LHR proponent's and this report's fire behavior studies. All structures within the LHR community should be hardened against such risks, including fitting of ember capturing/fire resistive roof vents, building with fire safe construction materials, limitation of landscaping and yard structures for fire resistiveness, or similar conditions at the Fire Marshal's discretion.

2. Inadequate information is presented in the project's Fire Protection Plan to determine the location of areas where the LHR developer has indicated less than standard fuel modification of 100 feet will be provided. However, the developer has indicated that some sites will be proposed on the southwest corner of the property adjacent to heavy, old-age class fuels and that ember resistant attic venting is proposed for adjacent development. This issue lacks definition, and additional detail, mapping, and explanation is needed to enable evaluation by the Fire Marshal of this risk and LHR's proposed mitigation.

Recommendation: The LHR project proponent needs to specify the location of each proposed building site where fuel modification is proposed for less than 100 feet, and detail what fuel modification will be provided, and what alternate means and methods will be used to mitigate risks for specific lots. It is important to note that while attic vents are a deterrent from fire spread from ember cast, they do not mitigate all forms of heat transfer possible from inadequate fuel modification. Therefore, attic vents alone may not suffice in protecting a home from fire where the defensible space is reduced below County standards.

Other alternate mitigations such as construction of ember resistant fire walls, structural lot setbacks, or other means may be considered and evaluated by the County Fire Marshall where appropriate and sufficient in reducing risk. However, the LHR project should identify where specific compromises are located, specify risks present at those sites, and propose effective mitigations.

In our assessment, fuel modification distances may require increased depth from 100 feet to 150 feet to prevent fire and ember exposure where the project is proximal to old-age class fuel beds on the project's northwest, west, and southwest aspects to provide effective separation of homes from this risk, as detailed earlier in this report.

3. Inadequate information is presented in the proponent's Fire Protection Plan to determine how alternate means and methods might be applied to the project to reduce fire risk. While construction features including ember resistant walls and fire resistive attic venting have been named as potential alternate compliance means in the Fire Protection Plan, no specific application or site is identified for applied use. Additional detail, mapping, and explanation is needed from the LHR project proponent to understand any identified risk, its

siting, any departures proposed in fire or building code compliance, and proposed mitigations before a determination be made by the Fire Marshal that application of alternate means would be effective or successful.

Recommendation: The LHR project's Fire Protection Plan should be updated to identify specific sites where fire or building code may not be met by standard means and describe site specific alternate mitigations for achieving required protection. In the absence of this information, the Fire Marshal likely has insufficient data to make a conclusive finding or acceptance of alternate means.

4. The project proposes construction per California Building Code Chapter 7A, Wildland-Urban Interface requirements, and proposes to sprinkler all structures. This is appropriate given the building site's wildfire risk.

Recommendation: This is an appropriate measure for fire risk mitigation given the Wildland-Urban Interface nature of the LHR project site.

5. This study has identified significant wildfire history of importance to the project that was not previously identified. Both this study and the project proponent's Fire Protection Plan assessed that the site is subject to critical fire weather and burning conditions, extreme fire behavior, long range spotting, critically rapid rates of spread, and large wildfires. Both studies confirmed offshore and onshore wind driven fire trajectory concerns and potential paths of fire spread into the LHR planned community.

Recommendation: The LHR project proponent should consider the fire behavior and history information provided in this study and react to these conditions in their planning process, especially with regard to building construction, fuel modification, evacuations, and temporary safe refuge planning.

6. Fire Services within the Deer Springs Fire Protection District appear to have the capacity to meet the call loads and emergency demands of the project. New timed response studies are needed, however, given recent LHR proponent proposals regarding community gating that require finalization. Specific concerns exist for the impact to response times presented by numerous emergency- access only gating. A project proposal has been offered to remove gates but has not been formalized with written or substantiated proposals. The use of gates as originally proposed affects both backup response from area fire stations for structure fire and medical response, as well as evacuations. Similarly, discussions continue related to new fire station construction and staffing. These proposals need to be finalized to allow final response studies and a determination by the Fire Marshal for adequacy.

Recommendation: The LHR project proponent and County need to finalize negotiations regarding fire station construction, staffing, and placement, and gate/street access for the project. Response time studies that have been completed cannot be counted upon for accuracy in the absence of these decisions. There also remains concern for the impact of gating to response times both for primary and secondary fire apparatus response. It is recommended that once negotiations are complete for both fire station location and gating that the LHR project proponent recalculate both evacuation and response time studies and submit the revised data to the County Fire Marshall for consideration.

7. Development of ungated community access via Mountain Ridge Road to the greater LHR community is critical for emergency response coverage and evacuation, and such access needs to be secured. Currently, the route is accessing a proposed assisted living facility only, with emergency gating between this use and the greater LHR community. This design compromises emergency response times to this high-call load facility from the closest fire station, as well as compromises emergency and evacuation access for the greater community. The LHR project may not comply with response time standards without this critical access/egress route.

Recommendation: The LHR project needs to secure ungated road access to this route and recalculate evacuation and response time studies based upon this access.

Evacuation and Temporary Safe Refuge

8. The project proposes one main entrance located off West Lilac Road on the northern edge of the project. Additional street access has been proposed but not solidified by the project, and the question of road gating remains outstanding. The current limitation on road access likely does not meet Code required response time or access requirements

Recommendation: Secure 24/7 public access to additional roads leading into the LHR Development site and remove all emergency gating to ensure emergency response access and unobstructed evacuation egress.

9. Evacuation routes identified by the proponent were significantly challenged by the findings of this study. All developer identified alternate, contingency, and emergency routes were found to be inadequate, and under certain circumstances even dangerous. Primary access routes were also determined to have significant issues of potential entrapment during evacuation. Additional road improvements outside of the immediate project area are likely needed to ensure safe evacuation.

Recommendation: Eliminate consideration of all routes for evacuation except for those with primary road characteristics of guaranteed, non-gated public access. These roads include West Lilac Road and Circle R Drive. Consider improvements on West Lilac Road and Nelson Way to Old Highway 395 to accommodate public daily access and for use as a primary evacuation route. Increase road capacity to meet increased traffic demand, do not reduce existing road capacity for large vehicle and fire apparatus movement. Consider improvement of Nelson Way as an alternate evacuation route.

10. Areas of temporary safe refuge within the community were identified in the LHR Fire Protection plan, however no actual size or capacity of church or community center facilities were identified, therefore a conclusion could not be reached as to capacity for temporary safe refuge use by these facilities. Given evacuation routing concerns, and risks along evacuation routes, temporary safe refuge becomes a critical issue for the LHR development.

Recommendation: The LHR proponent should provide greater detail as to the location, size, and construction features of the proposed temporary safe refuge facilities so that they can be assessed by the County Fire Marshall for meeting this need. Temporary safe refuge capacity should exist for community residents within the community to provide refuge of last resort if evacuation cannot be accomplished within available timeframes.

11. This study has identified a likely 1.5-hour timeframe for LHR community evacuation and recommended management action points for evacuation initiation. However, this does not reconcile with traffic studies or road capacity improvements proposed by the project

Recommendation: The LHR project proponent should propose road improvements that will ensure evacuation of the proposed development without degradation of the existing road capacity for regional evacuation. Traffic studies should be conducted for any route considered as essential for community evacuation, including Nelson Way.

12. This study has identified a need for the project proponent to further define how elder and non-ambulatory populations may either be evacuated or protected in place as part of the community evacuation plan.

Recommendation: The LHR project proponent should indicate how non- ambulatory populations can be adequately sheltered-in-place, and/or develop a contingency for evacuating this population successfully. This reference needs not only in the proposed Assisted Living Facility, but for the greater community as well. It is important to note that adequate time and logistics to fully evacuate non- ambulatory populations from such a facility in this community during extreme fire conditions is unfeasible and inherently dangerous.

13. The use of traffic circles on West Lilac Road, a main evacuation route, has been proposed by the LHR project. Additional traffic studies are needed to show the impact such infrastructure would provide to large truck or horse trailer traffic, especially during an evacuation. The overall safety of a proposed “contingency traffic lane” in the road median needs to be outlined for how it would be marked or improved to allow emergency use and maintain traffic safety.

Recommendations: Traffic intersections must be wide enough to manage large freight trucks, large horse trailer, and emergency vehicle traffic on a daily basis and provide for unobstructed travel during emergency evacuation. Any roundabout (traffic circle) should not include a physical central concrete barrier that could impede large vehicles from moving through it. Any central island to direct traffic slow through the roundabout should be merely painted on the pavement. Additional traffic studies are needed and must confirm the ability of the proposed infrastructure to accommodate such traffic.

14. The traffic study by Fehr and Peers and Dudek (2019) includes assumptions for contraflow which are likely unreasonable for a large wildfire occurring in this region. Traffic management assumptions likely exceed law enforcement capacity for implementation given competing wildfire priorities and duties, and the large area of traffic management involved. Importantly, proposed contra-flow and reduced lane widths could be severely detrimental to emergency vehicle access.

Recommendations: The use of contraflow as an evacuation method should be eliminated from consideration by the project. Use of traffic roundabouts should be of sufficient size to guarantee large truck and emergency vehicle access. Roadways should be of sufficient size and design to allow for emergency vehicle access under evacuation conditions.

References

1. Draft Fire Protection Plan, prepared on behalf of Lilac Hills Ranch Firewise 2000 Consultants, Escondido, CA. July 2015.

2. Wildfire Evacuation Plan, prepared on behalf of Lilac Hills Ranch Firewise 2000 Consultants, Escondido, CA. July 2015.

3. Wildland-Urban Interface Fire Emergency Response Plans, San Diego County Fire Chiefs Association, 2014 (Hidden Meadows plan), by Rohde & Associates, Rancho Santa Margarita, CA

4. "The Wildland Urban Interface Fire Problem", Jack Cohen, Forest History Today, Fall, 2008

5. Manzello, S.L., 2014. Investigation of Structure Vulnerabilities to Wind-Driven Firebrand Showers in Wildland-Urban Interface (WUI) Fires. Fire Safe Sci. 11 IBHS, 2014

6. "Fire Management of California Scrubland Landscapes", Kelley, J.E., Environmental Management, Vol. 29, March 2002

7. A Case Study of a Community Affected by the Witch and Guejito Fires, National Institute of Standards and Technology, Alexander Maranghides, William E. Mell, April 2009

8. Mountain Meteorology, Fundamentals and Applications, C. David Whitman, Oxford University Press, 2000

9. Schroeder M.J and Buck, C.C., Fire Weather-Agricultural Handbook #360, U.S. Department of Agriculture, Forest Service, May 1970

10. Fire Resources and Assessment Program (FRAP), State of California, Department of Forestry and Fire Protection (CAL FIRE), online resource, frap.fire.ca.gov

11. May 2014 San Diego County Wildfires-After Action Report, County of San Diego Office of Emergency Services, June 2014

12. Memorandum, Final Lilac Ranch Evacuation Roadway Capacity and Travel Time Analysis, Mar. 6, 2019, M. Wallace and K. Cole, Fehr and Peers Transportation Consultants

13. Lilac Hills Ranch Wildfire Risk Assessment, Christopher Dicus, PhD (Undated)

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California Department of Forestry and Fire Protection: Page 7
Orange County Fire Authority: Page 11
San Diego Union-Tribune: Pages 22, 26

July 1, 2015

FINAL REPORT
FIRE PROTECTION PLAN

Lilac Hills Ranch
GPA 3800-12-001; SP 3810-12-001; TM5571 RPL5;TM 5572 RPL5
REZ 3600-12-003; MUP 3300-12-005; STP 3500-12-018

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Date: July 1, 2015

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EXECUTIVE SUMMARY

This Fire Protection Plan (FPP) for the proposed Lilac Hills Ranch development has been prepared to evaluate the level of potential fire hazard affecting or resulting from the proposed project and the methods and measures proposed to minimize that hazard. The FPP identifies and prioritizes the measures necessary to adequately reduce the fire risks of the project. The FPP also evaluated the consistency of the proposed project with applicable fire protection regulations. The FPP has considered the property location, topography, geology, combustible vegetation (fuel types), climatic conditions, and fire history. It considers water supply, access, structure ignitability, fire resistive building materials for residential structures, technical guidance for protection of commercial structures, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management.

The proposed Lilac Hills Ranch community is a 608 acre mixed use pedestrian oriented sustainable community, comprised of 59 contiguous properties within the northern unincorporated area of San Diego County approximately one quarter mile from the Interstate 15 corridor on the east side with freeway access off the Old Hwy 395 interchange. The project site is located to the south and west of West Lilac Road with State Route 76 to the north, downtown Valley Center 10 miles to the east, downtown Escondido 16 miles to the south, and Interstate 15 and Old Highway 395 to the west (see Figure 1). The Lilac Hills Ranch project is located entirely in the Escondido zip code (92026) and primarily within the westernmost portion of the Valley Center Community Planning Area (CPA), although a small portion is within the Bonsall Subregional Plan Area. From the northwest project corner, West Lilac Road serves as the northern and eastern boundary of the project site, while Circle R Drive is less than a 1/2 mile south of the project Boundary. From the southwest project corner, the western boundary of the project runs along Shirey Road and extends to Standel Lane, which serves as the northwestern project boundary. The project is within Township 10 South, Range 3 West, Section 24, and Township 10 South, Range 2 West, Sections 19 and 30, on the USGS 7.5' Pala and Bonsall quadrangles.

The proposed Specific Plan includes a residential component consisting of 1,746 homes with an overall density of less than 2.9 dwelling units per acre (du/ac). This project is planned to be constructed in five phases. Agreements for emergency service are based on phasing, occupied units, and call volume demand thresholds. Planned phasing and land use categories are presented in APPENDIX ‘I’. The proposed Specific Plan includes varying lot sizes, a neighborhood-serving commercial village center, an active park/village green, retail uses, and a school site. Also, proposed on-site are a recycling and buy back facility; a water reclamation facility; active orchards and other supporting infrastructure. A rezone is proposed to implement the Specific Plan by changing the existing Use Regulations, Development Regulations, and Special Residential Land Use Designation and the A70 (Limited Agricultural) Zoning. The project would also include the submittal of a Master Tentative Map, Implementing Tentative Map, Site Plan (s) and/or Major Use Permit(s).

The Deer Springs Fire Protection District (DSFPD) encompasses the entire site within its boundaries, and the applicant will work with the nearby fire agencies, including DSFPD and CAL FIRE to provide fire service for the project. This FPP must be submitted to the Deer Springs Fire Protection District (DSFPD) and the San Diego County Department of Planning and Land Use (DPLU) for review and comments. It provides a proposed menu of fire protection requirements which would be imposed when each lot within a phase is developed, and recommends standards that will guide detailed design for each phase of development and each lot within each phase.

This plan is consistent with DSFPD‘s Ordinance No. 2010-01 (District Standards) and County guidance and referenced material in the 2014 San Diego County Consolidated Fire Code, the 2010 Guidelines for Determining Significance and Report Format Content Requirements-Wildland Fire and Fire Protection, and applicable State of California requirements. All detailed phase plans shall comply with the requirements of the County Consolidated Fire and Building Codes. The Valley Center Municipal Water District will serve the water needs for this general commercial and residential project. This water supply will meet the requirements of the County Consolidated Fire Code and the County of San Diego Fire Code (Fire Code) for a commercial/business/residential development.

In addition, this FPP provides fuel modification requirements to mitigate the exposure of people or structures to a significant risk of loss, injury or death from wildland fires. Fuel modification will be achieved by removing, clearing, or modifying combustible vegetation and other flammable materials from the edge outward from all structures in accordance with the County Consolidated Fire Code and with approval of DSFPD. Where the standard 100 feet of fuel modification cannot be met entirely within the boundary of the project or where adjacent to preserved interior native fuels, alternative measures that achieve the same level of protection as fuel modification are proposed, as allowed underthe fire code, including, but not limited to: 1) utilization of adjacent irrigated and managed agricultural crops (orchards, commercial flower fields, etc.) as a dual-purpose fuel modification/crop production area; 2) customized fuel modification zones based on site-specific fire behavior modeling and fire environment analysis (i.e., areas with flat terrain, grass or other light fuels, justify reduced fuel modification areas); 3) enhanced ignition-resistant construction methods and the use of other non-combustible features, i.e., parking lots, sidewalks, concrete patios, decorative rock, natural boulders on-site, and similar landscape features; and 4) fire-barrier walls where structures face off-site native flammable fuels along the northeast, northwest, and southwest boundary.

Ignition-resistant construction required by the 2013 State of California Building Code, Chapter 7A for all structures, will provide significant protection in this very high fire hazard zone. Ignition-resistant construction requirements provide critical structure improvements for surviving a worst case scenario fire. Also, the FPP requires that ignition-resistant construction would apply to mitigate the ignitability of all future proposed structures and projections (exterior balconies, carports, decks, patio covers, unenclosed roofs and floors).

Lastly, plant species used in the landscape must follow those listed in the approved plant list in APPENDIX ‘A’ – San Diego County Approved Plant List For High Fire Hazard Areas. Highly flammable, non-fire resistive vegetation will be removed and prohibited from being replanted within the fuel modification areas. Three specific non-fire resistive plants that will not be permitted to grow in the Fuel Management Zones, even as specimen plants, because of their flammability, are as follows:

- California sagebrush, *Artemisia californica;*
- Flat-topped buckwheat, *Eriogonum fasciculatum*; and
- Black sage, *Salvia mellifera.*

FIRE PROTECTION PLAN

Lilac Hills Ranch Project
GPA 3800-12-001; SP 3810-12-001; TM5571 RPL5;TM 5572 RPL5
REZ 3600-12-003; MUP 3300-12-005; STP 3500-12-018

1.0 INTRODUCTION

This Fire Protection Plan (FPP) has been prepared for the Lilac Hills Ranch Community (hereafter referred to as Community). The purpose of the FPP is to evaluate the Project location's potential fire hazard and the potential fire risk resulting from the proposed project. Further, this FPP details the methods proposed to minimize potential fire risk. This FPP also evaluated the consistency of the proposed project with applicable fire protection regulations. As part of the assessment, the plan has considered the property location, topography, geology, combustible vegetation (fuel types), climatic conditions, and fire history. The plan addresses water supply, access (including secondary/emergency access where applicable), structural ignitability and ignition resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management. The plan identifies areas for hazardous fuel reduction treatments and recommends the types and methods of such treatment. The plan recommends measures that property owners will take to reduce the probability of ignition of structures throughout the development addressed by this plan.

An initial field visit was conducted on August 31, 2011, to evaluate lot layout, primary and secondary access road locations, hazardous fuels and topography. Additional field evaluations occurred by the project's fire protection planning team throughout 2011 and 2012 as necessary to collect information and familiarize with the site.

1.1 Project Location

The proposed Lilac Hills Ranch community is a 608 acre mixed use pedestrian oriented sustainable community, comprised of 59 contiguous properties within northern unincorporated San Diego County approximately one-quarter mile from the Interstate 15 corridor on the east side with freeway access off the Old Hwy 395 Interchange. The project site is located to the south and west of West Lilac Road with State Route 76 to the north, downtown Valley Center 10 miles to the east, downtown Escondido 16 miles to the south, and Interstate 15 and Old Highway 395 to the west (see Figure 1). The Lilac Hills Ranch project is located entirely in the Escondido zip code (92026) and primarily within the westernmost portion of the Valley Center Community Planning Area (CPA), although a small portion is within the Bonsall Subregional Plan Area. From the northwest project corner, West Lilac Road serves as the northern and eastern boundary of the project site, while Circle R Drive is less than a one-half mile south of the project Boundary. From the southwest project corner, the western boundary of the project runs along Shirey Road and extends to Standel Lane, which serves as the northwestern project boundary. The project is within Township 10 South, Range 3 West, Section 24, and Township 10 South, Range 2 West, Sections 19 and 30, on the USGS 7.5' Pala and Bonsall quadrangles.

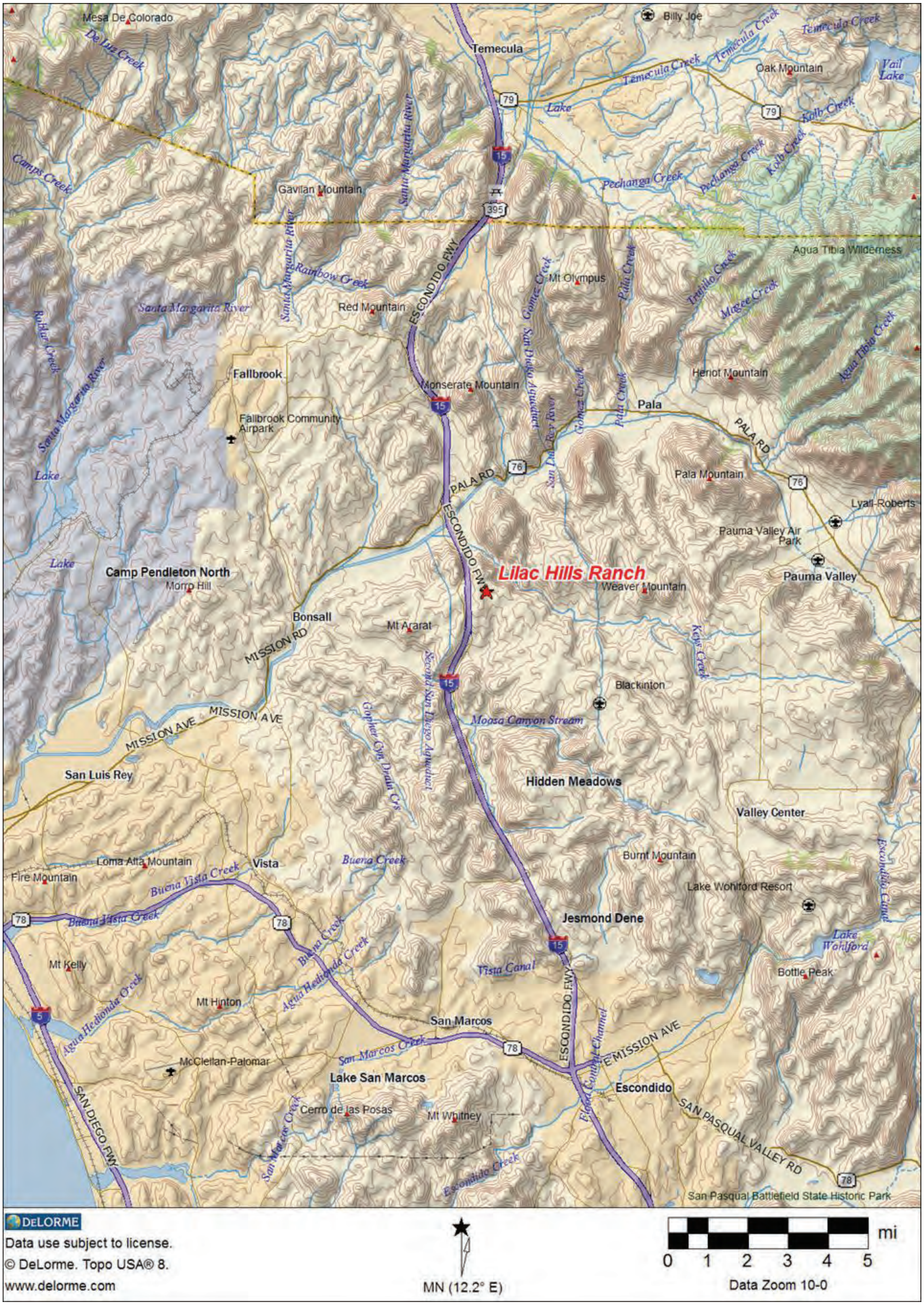


Figure 1 - Vicinity Map

1.2 Project Description

The proposed Specific Plan includes a residential component consisting of 1,746 homes with an overall density of approximately 2.9 dwelling units per acre (du/ac). However, the project is planned to be constructed in five phases. Thus, the delivery of emergency service is based on phasing, occupied units, and/or call volume demand thresholds. Planned phasing and Roadway Circulation are presented in APPENDIX ‘G’ – Phasing Exhibit and Roadway Circulation.

Phase 1 would include construction of approximately 352 dwelling units along with parks and roadways. Completion of Phase 1 would result in an estimated 995 persons living in the community. Phase 2 includes 466 dwelling units along with commercial, retail, office, civic center, information center and a 50-room Country Inn. Estimated population increase for residents is 1,384 persons. Phase 3 would include 460 dwelling units and a recreational facility, commercial, water reclamation, and a school. Estimated population of residents is 1,352 persons. Phase 4 includes construction of 171 dwelling units, single family senior, group care, and a senior center. Estimated resident population is 818 persons. Phase 5 includes 297 single family senior housing dwelling units with an estimated population of 549 persons. Total estimated number of residents is 5,098 persons.

The highest density is located in the Town Center (Phase 2). The Specific Plan includes a Town Center and two smaller Neighborhood Centers permitting 90,000 square feet of retail, commercial and office uses, a 174-acre Senior Citizen neighborhood component (Phases 4 and 5) which includes: market rate residential housing (a total of 468 du included in the 1,746 du above), and Group Residential and Group Care living facilities (Phase 4).

The Community also includes a park system with one public park and multiple private parks, public trails, and a K-8 school site. Also, proposed within the Community are a Recycling Facility; a Water Reclamation Facility; and other supporting infrastructure (varying phases). The Community’s open space system is proposed to retain some of the existing citrus and avocado groves within the disturbed areas, along with 104.1 acres of sensitive biological/wetland habitat.

The project proposes a 20.6-acre mixed-use commercial Town Center, near the center of the Community (Phase 2). The Community also proposes two Neighborhood Centers and a 12-acre school site is proposed within the Specific Plan project area (Phase 3). A Recycling Facility will be provided on-site per Section 6970-b of the Zoning Ordinance and an on-site Water Reclamation Facility are planned (Phase 3).

The Lilac Hills Ranch Specific Plan Map shows the Community divided into multiple Planning Areas (excluding areas designated for open space, roads, common areas, slopes, etc) with 19 types of land uses ranging from Single Family Detached to Manufactured Slopes. The Phasing Map (APPENDIX ‘G’ - Phasing Plan with Roadway Circulation) shows how the Community has been divided into five phases with Phase 1 at the north and Phase 5 in the southeast corner of the Community. The following table shows the Land Use Summary by Phase provides a detailed breakdown by Phase, for each of the land use types, including acreage numbers and, where appropriate, number of dwelling units.

1.3 General Land Use Designations, Land Uses and Site Improvements.

The project is located entirely within the Deer Springs Fire Protection District (DSFPD) and DSFPD is the Fire Authority Having Jurisdiction (FAHJ). This FPP was submitted to DSFPD and the San Diego County Department of Planning and Land Use (DPLU), in accordance with the San Diego County requirements. The FPP describes the requirements and standards that will be imposed on the development. This plan is consistent with County guidance and referenced material in the 2014 San Diego County Consolidated Fire Code, the 2010 Guidelines for Determining Significance Significance and Report Format Content Requirements-Wildland Fire and Fire Protection, and applicable State of California requirements. All detailed phase plans shall comply with the then-current requirements of the County Fire and Building Codes at the time they are submitted. Detailed site plans for each lot shall reference and include the recommendations and standards in this plan as may be modified to address the actual proposed development. All detailed site plans shall comply with the then-current requirements of the District and County Fire and Building Codes at the time they are submitted.

The Community is located entirely within the boundaries of the Valley Center Municipal Water District (VCMWD). Imported water and sewer service would be provided by the Valley Center Municipal Water District. In order to provide sewer service, the project may complete one of the following: construct a new water reclamation facility on-site, or use the existing Lower Moosa Canyon Water Reclamation Facility (P73-018) located south of the project site off Circle R Drive. The extension of sewer and water utilities will be required by the project.

1.4 Environmental Setting

The project vicinity includes larger parcel (1 acre and larger) single family residences in a rural/semi-rural area dominated by small agricultural operations. The area's native fuel beds have been largely converted to irrigated agriculture with remnant native fuels in a patchy mosaic across the landscape. In general terms, the Community and adjoining properties are similar in topography, and dominated by irrigated and maintained agricultural vegetation, including floricultural species, avocado, citrus, and small amounts of other agricultural resources, orchards and small riparian woodland. The area is best categorized as a wildland urban intermix (structures are intermixed with wildland fuels) where no consistent interface is present. Most of the area includes landscapes that support low to highly flammable vegetation. The following sections discuss the surrounding land use, topography, climate, vegetation, and fire history.

TABLE "3"
SPECIFIC PLAN - LANDUSE DISTRIBUTION

PHASE 1			
AREA	LAND USE	ACRES	DU'S
SFD1	SINGLE FAMILY DETACHED	31.2	175
SFD2	SINGLE FAMILY DETACHED	14.4	89
SFD3	SINGLE FAMILY DETACHED	15.1	88
P1	PARK - HOA	1.6	N/A
P2	PARK - HOA	0.5	N/A
P3	PARK - HOA	0.3	N/A
P4	PARK - HOA	1.9	N/A
P5	PARK - HOA	0.2	N/A
OS1	BIOLOGICAL OPEN SPACE	1.4	N/A
OS2	BIOLOGICAL OPEN SPACE	3.2	N/A
OS3	BIOLOGICAL OPEN SPACE	1.3	N/A
OS4	BIOLOGICAL OPEN SPACE	0.7	N/A
OS5	BIOLOGICAL OPEN SPACE	0.1	N/A
OS6	BIOLOGICAL OPEN SPACE	8.9	N/A
	NON-CIRCULATING ROAD	13.7	N/A
	CIRCULATING ROAD	7.7	N/A
	COMMON AREAS/AG	6.2	N/A
	MANUFACTURED SLOPES	13.1	N/A
SUBTOTAL		121.5	352

PHASE 2			
AREA	LAND USE	ACRES	DU'S
SFD4	SINGLE FAMILY DETACHED	18.3	196
SFA1	SINGLE FAMILY ATTACHED	3.0	47
SFA2	SINGLE FAMILY ATTACHED	0.6	12
C1	COMMERCIAL/MIXED USE	10.1	121
C2	COMMERCIAL/MIXED USE	2.3	46
C3	COMMERCIAL/MIXED USE	2.0	44
RF	RF/TRAILHEAD	0.6	N/A
C4	COMMERICAL/MIXED USE	2.0	N/A
P6	PARK - HOA	0.8	N/A
OS7	BIOLOGICAL OPEN SPACE	9.0	N/A
OS9	BIOLOGICAL OPEN SPACE	3.6	N/A
	NON-CIRCULATING ROAD	8.0	N/A
	CIRCULATING ROAD	13.6	N/A
	COMMON AREAS/AG	0.8	N/A
	MANUFACTURED SLOPES	14.9	N/A
SUBTOTAL		89.6	466

PHASE 3			
AREA	LAND USE	ACRES	DU'S
SFD5	SINGLE FAMILY DETACHED	16.1	95
SFD6	SINGLE FAMILY DETACHED	51.0	242
SFD7	SINGLE FAMILY DETACHED	5.0	10
SFD8	SINGLE FAMILY DETACHED	5.8	8
SFA3	SINGLE FAMILY ATTACHED	4.3	105
C5	COMMERICAL/MIXED USE	0.5	0
WR	WATER RECLAIMATION	2.4	N/A
DB	DETENTION BASIN	5.1	N/A
WWS	WET WEATHER STORAGE	8.1	N/A
S	SCHOOL	12.0	N/A
CPF	COMMUNITY PURPOSE FACILITY	2.0	N/A
P7	PARK - DEDICATED TO COUNTY	13.5	N/A
OS8	BIOLOGICAL OPEN SPACE	44.2	N/A
OS10	BIOLOGICAL OPEN SPACE	4.8	N/A
	NON-CIRCULATING ROAD	8.2	N/A
	CIRCULATING ROAD	8.7	N/A
	COMMON AREAS/AG	3.3	N/A
	MANUFACTURED SLOPES	28.0	N/A
SUBTOTAL		223.0	460

PHASE 2	SPECIALTY COMMERCIAL	55,000	sq. ft.
	OFFICE	25,000	sq. ft.
	COUNTRY INN	50	units

PHASE 3	COMMUNITY PURPOSE FACILITY	40,000	sq. ft.
	SPECIALTY COMMERCIAL	4,000	sq. ft.
	OFFICE	3,500	sq. ft.

PHASE 4	GROUP RESIDENTIAL/CARE	200	units
PHASE 5	SPECIALTY COMMERCIAL	2,500	sq. ft.

PHASE 4			
AREA	LAND USE	ACRES	DU'S
SFS1	SINGLE FAMILY - SENIOR	12.1	81
SFS2	SINGLE FAMILY - SENIOR	17.8	90
GR	GROUP RESIDENTIAL/CARE	6.5	N/A
DB	DETENTION BASIN	1.0	N/A
P8	Park - HOA SENIOR CENTER	3.3	N/A
P9	PARK - HOA	0.4	N/A
OS11	BIOLOGICAL OPEN SPACE	5.3	N/A
OS12	BIOLOGICAL OPEN SPACE	4.3	N/A
	NON-CIRCULATING ROAD	2.8	N/A
	CIRCULATING ROAD	3.0	N/A
	COMMON AREAS/AG	1.3	N/A
	MANUFACTURED SLOPES	3.7	N/A
	SUBTOTAL	61.5	171

PHASE 5			
AREA	LAND USE	ACRES	DU'S
SFS3	SINGLE FAMILY - SENIOR	10.6	72
SFS4	SINGLE FAMILY - SENIOR	6.9	38
SFS5	SINGLE FAMILY - SENIOR	16.0	128
SFS6	SINGLE FAMILY - SENIOR	13.5	59
C6	COMMERICAL/MIXED USE	0.4	0
I	INSTITUTIONAL	10.0	N/A
DB	DETENTION BASIN	1.8	N/A
P10	PARK - HOA	0.1	N/A
P11	PARK - HOA	1.0	N/A
OS13	BIOLOGICAL OPEN SPACE	10.8	N/A
OS14	BIOLOGICAL OPEN SPACE	0.3	N/A
OS15	BIOLOGICAL OPEN SPACE	6.2	N/A
	NON-CIRCULATING ROAD	13.0	N/A
	CIRCULATING ROAD	4.6	N/A
	COMMON AREAS/AG	8.7	N/A
	MANUFACTURED SLOPES	8.5	N/A
	SUBTOTAL	112.4	297

OVERALL			
AREA	LAND USE	ACRES	DU'S
SFD	SINGLE FAMILY DETACHED	156.9	903
SFS	SINGLE FAMILY - SENIOR	76.9	468
SFA	SINGLE FAMILY ATTACHED	7.9	164
C	COMMERICAL/MIXED USE	17.3	211
WRF	WATER RECLAIMATION	2.4	N/A
RF	RECYCLE FACIL/TRAIL HEAD	0.6	N/A
DB	DETENTION BASIN	7.9	N/A
WWS	WET WEATHER STORAGE	8.1	N/A
S	SCHOOL	12.0	N/A
CPF	COMMUNITY PURPOSE FACILITY	2.0	N/A
GR	GROUP RESIDENTIAL/CARE	6.5	N/A
I	INSTITUTIONAL	10.0	N/A
P	PARK - HOA	10.1	N/A
P	PARK - DEDICATED TO COUNTY	13.5	N/A
OS	BIOLOGICAL OPEN SPACE	104.1	N/A
	NON-CIRCULATING ROAD	45.70	N/A
	CIRCULATING ROAD	37.6	N/A
	COMMON AREAS/AG	20.3	N/A
	MANUFACTURED SLOPES	68.2	N/A
TOTAL		608	1746

EXISTING DWELLING UNITS TO REMAIN

128-280-27	9151 W. Lilac Rd.
128-290-07	9153 W. Lilac Rd.
128-440-02	32444 Birdsong Dr
128-290-74	32236 Shirey Rd.
128-280-42	9007 West Lilac Road
128-290-69	9419 West Lilac Road
128-440-14	9553 Lilac Walk
128-440-06	9383 West Lilac Road
128-280-37	9307 West Lilac Road
128-440-05	9381 West Lilac Road
128-440-22	9435 West Lilac Road
128-280-10	9167 West Lilac Road
127-072-38	8709 West Lilac Road
128-290-09	9431 West Lilac Road
129-010-68	9883 West Lilac Road
129-300-09	00000 Rodriguez Road

1.4.1 Topography and Uses

The topography of the area consists of a series of rolling hills dissected by drainage courses and a valley bottom that drain primarily to the south and southwest. Elevations across the site range from 960 feet MSL at the highest to 590 feet MSL at the lowest. The drainage courses on the site convey storm water and urban/agricultural runoff. Both intermittent and ephemeral drainages occur on the site.

The major drainage courses (wetlands) and steeper slopes will be placed into open space easements with each phase of development. The largest of the drainage courses are located primarily along the western boundary and involve phases 1, 2 and 3 of the development. Two other major drainages are within Phases 4, and 5. See APPENDIX ‘I’ – Specific Plan-Site Plan for the location of the proposed open space on-site. Terrain affects fire behavior and the types of fire protection features that will be required. For example, the steeper slope areas allow faster combustion of fuel in the upslope direction. As a general rule with other factors constant, it can be assumed that the steeper slopes on-site would contribute to faster fire speed.

1.4.2 Climate

The County is divided into five climate zones from the coast to the desert: Maritime, Coastal, Transitional, Interior, and Desert (Climate Zones in San Diego County, Guidelines for Determining Significance, Wildland Fire and Fire Protection). These climate zones are determined by several factors: proximity to the ocean, terrain, elevation, and latitude. Southern California has a Mediterranean climate, characterized by mild, sometimes wet winters and warm, very dry summers. The Mediterranean climate includes all coastal areas, valleys and foot hills. Annual precipitation amounts increase gradually from the coast to the mountain crests, then drop dramatically into the deserts. Most precipitation comes from winter storms between November and March. The Lilac Hills Ranch site is located in the transitional climate zone. The Valley Center RAWS station is the nearest RAWS station within the Transitional climate zone.

The following chart represents the typical weather of a hot summer day in the Transitional Climate Zone, Santa Ana and “peak” (or worst case fire weather/climate conditions) elements for this Fire Protection Plan:

Period	Temperature	Relative Humidity	Sustained Wind Speed	Burning Index (99%)
Summer	90-109°F	10-14%	19 mph	119
Santa Ana	90-109°F	5-9%	28 mph	145
Peak	90-109°F	5-9%	41 mph	

The BehavePlus 4.0.0 Fire Modeling Program (to be discussed later in this plan) utilizes fuel moisture levels in both live and dead vegetation, projected wind, topography and vegetation type to determine fire behavior. Temperature is not an input. Large fires may occur at much lower temperatures than shown above. Relative humidity of less than 5 percent may also occur.

The Burning Index listed above is an indicator of the relative difficulty of fire control and is part of the National Fire Danger Rating Program. The higher the number, the more intense and severe a wildfire would be burning under the weather conditions described.

Mean precipitation for the Lilac Hills Ranch site is 11.38 inches per year and the mean average air temperature for the site for a year is approximately 63 degrees. The mean maximum wind gusts are 41 mph, with gusts of 100 mph recorded during the 2007 Rice Fire. Wind gusts, precipitation and temperature, particularly in a regional context, will significantly impact wildland fire.

The most critical fire weather wind pattern in the project area would be an off-shore wind from the north/northeast, typically referred to as a Santa Ana wind. Such wind conditions are usually associated with strong (> 60-MPH), hot, dry winds with very low (<15%) relative humidity. Santa Ana winds are caused by high-pressure weather systems and can occur any time of the year. However, they generally occur in the late fall (September through November). This is also when non-irrigated vegetation is at its lowest moisture content.

The typical prevailing summer time wind pattern is out of the south or southwest and normally is of a much lower velocity (5-19 MPH with occasional gusts to 30-MPH). It is associated with higher relative humidity readings (> 30% and frequently more than 60%) due to a moist air on-shore flow from the ocean.

All other (northwest, south, west) wind directions may be occasionally strong and gusty. However, they are generally associated with cooler, moist air and often have higher relative humidity (> 40%). They are considered a serious wildland fire weather condition when wind speeds reach > 20 MPH.

1.4.3 Fire History

This general area has a history of burning from wildland fires, as does most of the County. A fire history map was created by utilizing the California Fire Planning and Mapping Tools, available from the California Fire Alliance web site at http://cafirealliance.org/ (See Figure 3). This map only contains large (100+ acres) wildfires unless there were unusual circumstances. This information helps determine the frequency of wildfire and the likely vegetation cover during such events. For fire behavior planning purposes, climax vegetation (Fuel Model SCAL18 & FM sh7) is utilized for worst case scenarios. ***FIREWISE* 2000, Inc.** did not find that any large fires burned the project area in the last 50 years. The data indicates that in the last 50 years, there have been several large fires around the project site to the north, east and south (see Figure 3). For example, the Rice Fire of 2007 burned 9,472 acres during a worst case wildfire scenario.

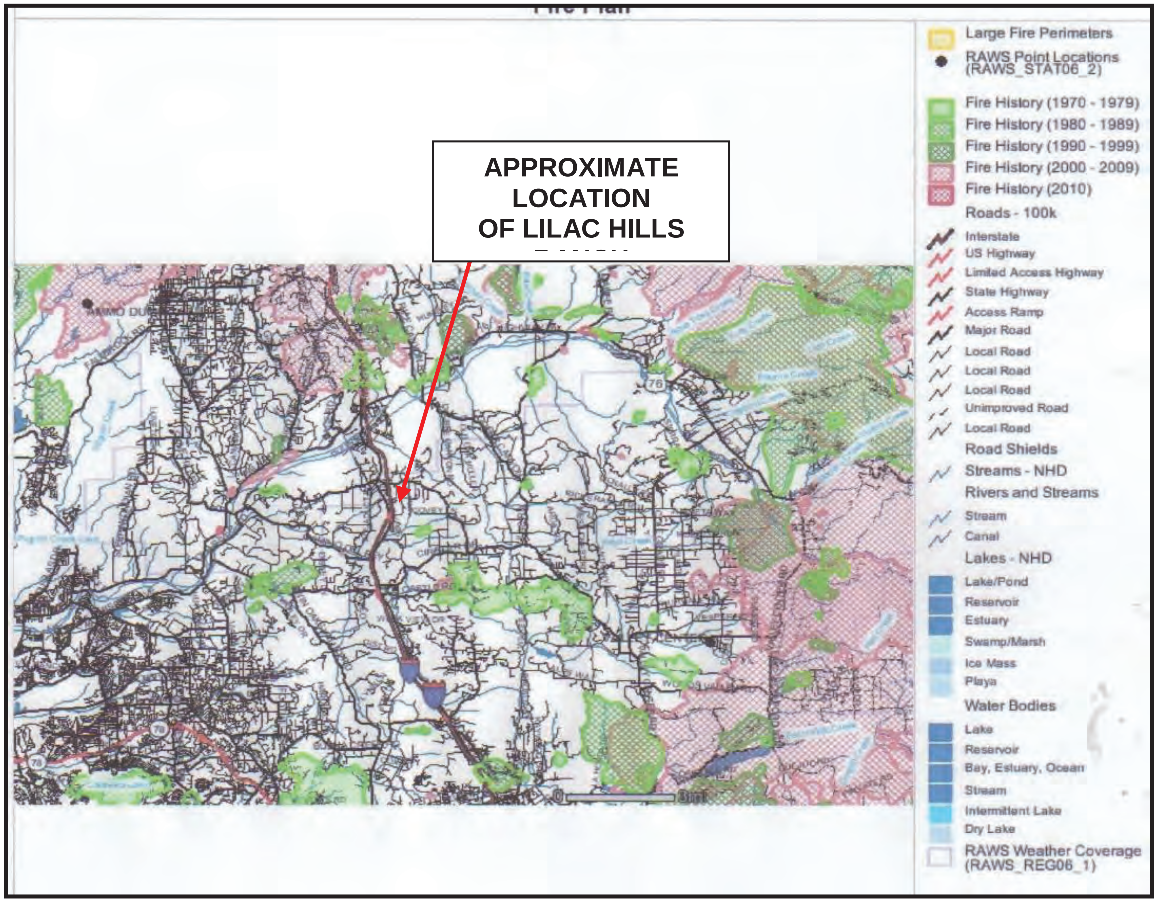


Figure 2 - Fire History Map

The wind factor is a key to the spread of wildfires in southern California. Embers from fires driven by high winds (Santa Ana winds) can start new spot fires up to 1.5 miles away from the 'front' of the original fire. The maximum distance of '1.5 miles' is the canonical wisdom; it apparently is larger in some cases. A home on Queenston Drive in Escondido burned 22 October 2007 when an ember from 2 miles away landed on its wood shake roof. This is a minimum distance, since the fire never burned closer than two miles to this house (San Diego Union Tribune, 1 November 2007, NI-1). Spot fires spread in the direction of the wind, and in turn can start new spot fires in whatever direction the wind is blowing.

In summary, any wind or topography driven wildfire burning under a northeast (Santa Ana) wind pattern creates a very high wildland fire hazard, especially for wildland fires starting off-site north and northeast of the project. The primary threat during this scenario would be flying fire brands. In addition, a typical fire day with a southwest wind will create a high wildland fire hazard. Fuel treatment and setback will all but eliminate direct fire impingement and radiant heat from around the perimeter of the structures. Strict building code standards will similarly minimize the likelihood that embers ignite the project's ignition resistant structures.

Fire ecology research has shown that the natural fire regime for the shrub lands and forests in San Diego County is one of frequent small fires and occasional large fires. However, over the last 100 years the natural fire process has changed due to fire suppression policies, the introduction of invasive plant species that burn readily (i.e., eucalyptus and palm trees), and the increasing human ignition sources from associated with building and living within the wildland-urban interface areas. Thus, fires may occur at any time and in most areas of San Diego County, are occurring at higher frequencies than historically. However, fire readiness and response capabilities have at least maintained pace if not exceeded this rate, as evidenced by CAL FIRE's 95% success rate at keeping wildfires under 10 acres in size.

2.0 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

This FPP evaluates the fire hazard of the area and its potential affect on the project as well as the potential increased hazard that may result from the proposed project. In addition, this FPP evaluates the methods proposed to minimize potential hazard. This FPP also evaluates the consistency of the proposed project with applicable fire protection regulations. As part of the assessment, the plan has considered the property location, topography, geology, combustible vegetation (fuel types), climatic conditions, and fire history. The plan addresses water supply, access (including secondary/emergency access where applicable), solar structural ignitability, protection systems and equipment, impacts to existing emergency services, and vegetation management.

The FPP will consider factors such as; the modification of fuels, fire access, water supply, the use of ignition-resistant construction to protect people and structures from exposure to wildfire events, and the fire service response capacity and response time. The FPP was prepared in accordance with the County of San Diego Guidelines for Determining Significance for Wildfire and Fire Protection.

2.1 People and Structures Exposure to Fire

This FPP evaluates the proposed community and its survivability in a worst case scenario of northeast winds with gusts of 60 MPH (Santa Ana winds) and 'rare event' 30-MPH southwest winds during a wildland wildfire event in the area. It also documents fuel modification requirements in combination with the non-combustible construction materials and other fire protections systems for the protection of life and property within this proposed community.

2.2 Fire Apparatus Access Roads

The primary fire apparatus access roads to the Lilac Hills Ranch project will be via two ingress/egress points to an upgraded West Lilac Road on the north side of the development. West Lilac Road connects to Old Highway 395 to the west of the Community and continues eastward and southward where it intersects with Circle R Drive. Each of these roads will be improved to Fire District Standards and the County Consolidated Fire Code, complying with travel lane width, grade, surface, radius, and other requirements.

The interior project road circulation will be will also be constructed to the Fire District Standards and the County Consolidated Fire Code, which will provide unimpeded fire apparatus access throughout the project.

An additional emergency ingress/egress road is provided to/from the southern portion of the project via existing Mountain Ridge Road and Rodriguez Road. Mountain Ridge Road is accessed from Circle R Drive, and Rodriguez Road is accessed via Covey Lane. All proposed roads are designed in accordance with the County of San Diego Consolidated Fire Code. All roads will meet or exceed the 28 feet driveway minimum horizontal radius with a minimum proposed horizontal radius of 100 feet. All proposed roads will meet or exceed the 20 percent allowable grade and meet or exceed the minimum paved width requirement of 24 feet (14 feet lanes on roads with medians). See APPENDIX "P" for road comparison matrix.

2.3 Water Supply

The Valley Center Municipal Water District has agreed to serve the water needs for this general commercial and residential project. Therefore, the water supply meets fire emergency water needs, including water sprinkler system (and meters) for all facilities on the project site. Hydrants will be installed for each Phase prior to the allowance of combustibles on the active project site.

2.4 Ignition Resistant Construction and Fire Protection Systems.

This FPP evaluates ignition-resistant construction related to protecting new structures from an approaching wildfire. These construction standards provide a high level of protection to structures built in the wildland/urban interface area when completed in combination with other fire protections systems within this proposed development.

3.0 ANTICIPATED FIRE BEHAVIOR IN THE VICINITY

As statutorily designated, fire severity is zoned as "Very High" Fire Severity for some portions of the project vicinity, and "Moderate" for the remainder. These designations indicate that there is not a consistent fuel bed and current land uses have interrupted and converted native fuels to lower flammability/intensity land uses. Several scenarios were evaluated to determine the potential fire behavior of a wildland fire that might occur in the vicinity of the Lilac Hills Ranch Project. Fire Behavior calculations were used to assist in the determination of suitable fuel modification requirements and adequate vegetation treatment and maintenance widths.

3.1 On-Site Vegetation

Historic. The historic vegetation on the majority of the proposed development boundaries includes Coastal sage scrub, Southern coast live oak riparian woodland and southern mixed chaparral. These vegetation types are characterized as high and very high load, dry climate brush. In these vegetation types, a high percentage of dead material is typical in mature stands. This is due to the effects of the local Mediterranean climate where warm wet winters promote new growth followed by long, hot and very dry summer seasons which significantly affects plant moisture. Periodically, multi-year droughts cause significant parts of these plants to die back. Though these plants are adapted to survive hot dry summer seasons and extended drought, significant parts of these plants die back. All of these plants are adapted to the intense wildfires for species regeneration, but the on-site, wildland fire threat is largely is significant. With the development of the project and the conversion of lower flammable vegetative fuels, the wildfire risk is significantly reduced. The fuels adjacent to the onsite fuels near developed sites are a primary focus for fuel modification. These interior site native and agricultural vegetated areas shall be mitigated with implementation of required fuel modification and fire protection features outlined in this FPP.

For fire modeling purposes, these historic and dominant plant communities best characterize the predominant fuel types that would tend to result in fire spread and were used for conservative-based fire modeling purposes.

Existing. The existing condition is a result of disturbance from decades of agricultural activity. The primary agricultural activities found in the immediate area include orchards, vineyards, row crops, and nursery operations.

Photo 1 –Example of Native Vegetation in Project area

The Biological Resources Report for Lilac Hills Ranch by RECON Environmental states that existing vegetation on the site is a mosaic of native habitat patches and agricultural uses. Most native habitat occurs primarily along the drainage courses where riparian type communities (significantly invaded by non-native species) and on some of the steeper terrain on the western and southwestern portions of the Community where remnant native coastal sage scrub and/or chaparral persist. For fire modeling purposes, the historic and dominant plant communities are best characterized as coastal sage scrub (SCAL18) and southern mixed chaparral (sh7 FM – very heavy load, dry climate shrub).

A total of sixteen primary habitat types and vegetation communities were identified by the project's biological resources technical report. The largest areas of native habitat is southern mixed chaparral, with southern coast live oak riparian woodland, southern willow riparian woodland, and southern willow scrub occurring within the drainages. The developed areas consist primarily of scattered rural residences with ornamental landscaping. Roughly 75% of the property is mapped as agriculture, developed or disturbed.

The vegetation communities identified by the RECON survey identifies the vegetation on the project site at present. In an undisturbed environment, the historic native vegetative communities would predominately have been coastal sage scrub, southern coast live oak riparian woodland and mixed southern chaparral. Therefore, in the absence of ongoing manipulations, these vegetation communities would return over time. The anticipated exposure to natural fuels by the project will remain in the planned open space areas within and adjacent the development. These open space corridors will have the potential to result in fire spread, however, the project will restore some of the open space areas to remove flammable non-native species (peppers, eucalyptus, palms, arrundo, etc), will include higher fuel moistures due to drainage locations, and will include a maintenance agreement to remove dead and dying vegetation as well as non-native species that may establish over time. In addition, Fuel Management Zones (FMZs) supplemented by required fire protection features would create acceptable wildfire protection for all structures within this development.

In summary, wind or topography driven wildfires burning under a northeastern (Santa Ana) wind pattern from the north, northeast or east creates a moderate to high wildland fire hazard, especially for wildland fires starting north and/or east of the project site. Also, a “rare event” 30 MPH southwest wind will create a low to moderate wildland fire hazard. However, the vegetation on the north and eastern exposure of the development are lighter fuels and adjacent to small rural residential parcels and agricultural crops, resulting in reduced fire intensity and slower rates of spread. The worst case on-site fuel loading scenario is found in the northwest, west, and southwest exposure. These exposures are from planned fuel loads and steeper slopes. However, with the proposed fuel modification treatments, fire protection features, “*firewise*” landscaping, and the use of ignition resistive building construction standards, the wildfire threat will be mitigated to less than significant levels. As a result, the potential loss of any structure due to direct flame impingement, wind driven embers, or radiant heat around the perimeter of any planned inhabitable building is extremely low. Although this project is not considered a shelter-in-place community, and the state-adopted “Ready, Set, Go” policy for early evacuation will be thoroughly supported and promoted to all residents, visitors and guests, there will be opportunities for residents to safely remain in their homes or another on-site building/location should evacuation be considered too dangerous

3.2 Off-Site Vegetation

Historic. The historic vegetation communities listed as the dominant fuel loads would be similar to the historic on-site vegetation. In a wildland fire the native vegetation provides the fuel, which usually includes both living and dead vegetation. However, wildfire in the wildland urban intermix areas is spread through both native and non-native vegetation as well as other combustible objects, including older, vulnerable homes, outbuildings, and debris. Land uses and resulting vegetation on adjacent properties consist of similar agricultural uses as those found on the majority of the project site.

Existing. The off-site area surrounding the Lilac Hills Ranch presently consists of residential communities with agricultural crops (orchards, vineyards, row crops, and nursery operations), and interspersed islands of native vegetation.

Northern Boundary. There is a large area of native vegetation north of West Lilac Road located in the Draft MSCP Pre-Approved Mitigation Area, single family dwellings, orchards, and other agricultural activities. The fuel modification and hazard abatement associated with the existing single family dwellings, agricultural activities, and a County maintained road provide significant protection from wildfires along this boundary. The greatest risk from this exposure would be firebrands generated from the area of native vegetation and/or the fuels associated with the existing single family dwelling parcels to the north of West Lilac Road during a worst case scenario of late fire season northeast Santa Ana Winds. As previously mentioned, firebrands/embers can be carried a long distance (potentially one mile or more) by fire drafts or strong Santa Ana winds and may ignite the on-site open space fuels or other combustible materials that are receptive to burning.

Eastern Boundary. The vegetation on the eastern exposure of the development has much lighter fuels. Also, the eastern boundary of the development is adjacent to single family dwellings and with a large portion contiguous to roads and road easements, and existing agriculture crops and activities (orchards, commercial flower field and other agricultural activities). The road and managed and irrigated agriculture provides significant fuel modification that results in less ignition prone vegetation and reduced fire intensity and spread rates, resulting in sufficient mitigation from wildfires along this boundary exposure.

Southern Boundary. The exposure along the eastern side of the southern boundary is part of a narrow strip of disturbed southern willow scrub which occurs along a drainage course. On-site agricultural activities, the placement of a church and attendant facilities, access roads, and adequate space to provide fuel modification, will provide fire protection for this part of the southern boundary exposure.

Western Boundary. A riparian woodland vegetation community occurs along most of the western border of the main project area and along tributary east-west drainages in the central portions of the site. Also, southern mixed chaparral vegetation occurs as large, relatively undisturbed patches in the northwest, central, and southern portions of the project area on the western-facing slopes. Dominant plant species for the southern mixed chaparral vegetation include chamise, mission manzanita, hoary-leafed ceanothus, black sage, California buckwheat, and laurel sumac. A wildland fire threat for the development would be from a fire approaching from the south, southwest or west exposures in off-site and on-site highly flammable native and non-native vegetation along these exposures. This threat would be the greatest during a typical late fire season with above average 30 MPH southwest wind conditions. Fuel modification zones meeting code requirements, a non-combustible wall, roadways and a maintained park facility will be applied along this boundary to provide the fire buffer required to protect ignition-resistant structures along this exposure from late fire season wildfires during 30 MPH southwest wind conditions.

As state above, the agricultural related land uses and structural hazard abatement practices provide significant fuel modification and fire protection buffers around the perimeter of the Lilac Hills Ranch property and have been considered as part of the overall wildfire risk and need for full fuel modification zones, consistent with San Diego County's Guidelines for Determining Significance – Wildland Fire and Fire Protection (2010). Figure 3 below illustrates the significance of fire buffers which are provided by these adjacent and contiguous land uses along the north and northeast boundary. This is particularly significant for fire protection during strong winds (Santa Ana Winds) which occur in the late fire season.

3.3 Wildland Fire Behavior Assessment

3.3.1 Fuel Modeling

The minute by minute movement of a wildland fire is never totally predictable, and is certainly not predictable from weather conditions forecast many hours before the fire. Nevertheless, practice and experienced judgment in assessing the fire environment, coupled with a systematic method of calculating fire behavior, yields surprisingly good results (Rothermel, 1983).

The primary driving force in the fire behavior calculations is the dead fuel, less than one-fourth inch in diameter. These are the fine fuels that carry the fire. Fuels larger than 1/4-inch contribute to fire intensity, but not necessarily to fire spread. The BehavePlus 4.0.0 fire model describes a wildfire spreading through surface fuels, which are the burnable materials within six (6') feet of the ground and contiguous to the ground.

Fuels larger than three (3") inches in diameter are not included in the calculations (Andrews 1986). Regardless of the limitations expressed, experienced wildland fire managers can use the BehavePlus 4.0.0 modeling system to project the expected fire intensity (expressed as Btu/ft/sec), rate-of-spread (feet/minute) and flame lengths (feet) with a reasonable degree of certainty for use in Fire Protection Planning purposes. Of these three fire behavior projected flame length is the most critical in determining structure protection requirements.

Figure 3 – Aerial Photo Illustrating Adjacent and Contiguous Off-Site Land Uses on Northeast Corner of Property

The BehavePlus 4.0.0 Fire Behavior Prediction and Fuel Modeling System by Patricia L. Andrews and Collin D. Bevins is one of the best systematic methods for predicting wildland fire behavior. The BehavePlus 4 0.0 fire behavior computer modeling system was developed by USDA–Forest Service research scientists at the Intermountain Forest Fire Laboratory, Missoula, Montana, and is utilized by wildland fire experts nationwide. Because the model was designed to predict the spread of a fire, the fire model describes the fire behavior only within the flaming front. The results of the modeling calculations are summarized in APPENDIX 'E'.

The BehavePlus 4.0.0 Fire Modeling System has been used to predict the wildland fire behavior (rate-of-spread, and flame length) for the northern and western boundary vegetative fuels. The BEHAVE: Fire Behavior Prediction and Fuel Modeling System–Burn Subsystem, Part 1 by Patricia L. Andrews, is one of the best systematic methods for predicting wildland fire behavior. The BEHAVE fire behavior computer modeling system was developed by USDA–Forest Service research scientists at the Intermountain Forest Fire Laboratory, Missoula, Montana, and is utilized by wildland fire experts nationwide. Since the model was designed to predict the spread of a fire, the fire model describes the fire behavior only within the flaming front.

The ***FIREWISE* 2000, Inc.** evaluation team used the computer based BehavePlus 4.0.0 Fire Behavior Prediction Model to make the fire behavior assessments and projections for the hazardous vegetative fuels on the areas in proximity to the proposed site for the Lilac Hills Ranch facility (see APPENDIX 'E' for actual calculations). Four (4) worst case fire scenarios are displayed based on 'worst case' fire weather assumptions for the project area. Each fire scenario displays the expected Rate of Fire Spread (expressed in feet per minute), Fire Line Intensity (expressed in BTU's/foot/sec, and Flame Length (expressed in feet). These fire behavior parameters are calculated for the following scenarios: 1) untreated fuels in a worst case scenario northeast Santa Ana winds in coastal sage scrub fuel model, 2) treated fuels in late fire season northeast Santa Ana winds, 3) untreated fuels in above average 30 MPH southwest wind conditions in southern mixed chaparral, 4) treated fuels in above average 30 MPH southwest winds, 5) untreated fuels two in a worst case scenario for northeast Santa Ana winds in southern mixed chaparral fuel model, and 6) treated fuels in northeast Santa Ana winds, 7) untreated fuels in southwest 30 MPH southwest winds, and 8) treated fuels in 30 MPH southwest winds. The Tables below include the calculation inputs used in the BEHAVE Plus program which were obtained from project site observations and fuel levels typically observed during the local fire season.

In order to provide wildland fire protection measures for this project, fire behavior parameters were calculated for the hazardous native vegetation/fuels historically located on- and off-site. These calculations will be the basis for recommended fuel modifications for the project site development. The existing on-site and off-site fuels will also be considered in evaluating the wildfire threat to this proposed development.

Normal weather conditions consist of an onshore flow from the southwest. This condition has a lower temperature and higher humidity then does a Santa Ana condition. A fire under normal conditions is typically a fuel driven fire. However, wind will also contribute to the rate of spread. A summer fire coming from the southwest would be burning uphill and as a result would get a run on the project site. The late fire season strong non-typical southwest winds and the late fire season northeast winds (Santa Ana winds) create the dangerous and severe conditions for wildfires. Modification and/or elimination of hazardous fuels and the reduction of fuel loading are key to "*firewise*" planning.

In order to project the fire behavior benefit for the proposed fuel modifications for the project, worst-case scenarios were used in the modeling system to project fire behavior variables. Scenario 1 is a 60-MPH northeast wind (Santa Ana winds) in the SCAL18 Fuel Model historic fuels and then expected fire behavior in fuels that have been modified (treated) for favorable fire behavior variables within this fuel load. Scenario 2 is a late fire season, strong, non-typical (30-MPH) southwest winds in the SCAL 18 Fuel Model and the expected fire behavior after they have been modified (treated) for favorable fire behavior variables within this this fuel load. Scenario 3 is a 60 MPH northeast wind in the southern mixed chaparral fuel model and the expected fire behavior after fuel modification (treated) in this fuel load. And, Scenario 4 is 30-MPH southwest wind in mixed chaparral fuel model and the expected fire behavior after fuel modification in this fuel load.

The worst-case climate parameters and assumptions used for the fire behavior modeling process were as follows:

1. 1-Hour Fine Fuel Moisture 2%
2. 10-Hour Fuel Moisture 3%

3. 100-Hour Fuel Moisture 5%
4. Live Herbaceous Fuel Moisture 30%
5. Live Fuel Moisture 50%

Other site characteristics used for Fire Behavior modeling are as follow:

Slopes. The existing slopes for the majority (approximately 91.2 percent) of the entire site range from 0 to 30 percent. This range of slopes includes 110 acres between 0 and 10 percent, 141.1 acres between 10 and 15 percent, and 306.4 acres between 15 and 30 percent. There are also 54.5 acres that are 30+ percent and are the steeper and more gullied locations generally in the west and southwest area of the site (from *Slope Analysis* by Landmark Consulting). These steeper locations would not be developed but would create an overall concern and fire threat to the development.

The range of on-site site slopes will change when the final grading is completed for the development. The representative slope used with the fire behavior model for the slopes prior to development is 20 percent. The fire behavior model representative slope used for the final grading landscape is 10 percent. The exception is that the slopes on the western perimeter area is estimated to average 40 percent. The analysis in fire scenario 5 utilized this slope percentage.

Fuel Model. The majority of the on-site and off-site fuels is coastal sage scrub (SCAL 18) and southern mixed chaparral, and will be used to represent the brush land vegetation predominately and historically found on-site and off-site. The historic native fuels on the project site have been modified significantly by past agricultural activity. However, for purposes of evaluating worst case scenario it was assumed that the disturbance to the site were discontinued and the site would revert quickly to some form of a disturbed coastal sage scrub community. In the majority of the areas used for agricultural purposes over several decades, the vegetation would likely revert to disturbed lands or non-native grassland.

3.3.2 Fire Behavior Modeling Summary

The following tables summarize the expected wildland fire behavior for the fuel model found within and adjacent to the proposed LHR development under the worst case scenarios. Tables 2 thru 5 display the expected Rate of Fire Spread (expressed in feet per minute), Fireline Intensity (Btu/ft/sec) and Flame length (feet) for four different BehavePlus 4.0.0 – Fire Behavior Prediction and Fuel Modeling System fuel model computer calculations. All of these calculations are based on forecast vegetation conditions of a typical SCAL 18 Fuel Model-Coastal Sage Scrub and Fuel Model sh7 (very heavy fuel load, dry climate Fuel Model). Variables were slope, projected wind speed, and anticipated weather.

Four (4) different fire scenarios are presented based on "worst case" fire weather assumptions for the project area. Each fire scenario displays the expected Rate of Fire Spread (expressed in feet per minute), Fireline Intensity (expressed in British Thermal Units per foot per second) and Flame Length (expressed in feet). For the longest flame lengths along the north and south exposures, separate BehavePlus 4.0.0 predications were made for the treated fuels following the completion of the required fuel modification work. The tables also include the calculation inputs used in the BehavePlus 4.0.0 program which were obtained from project site observations and fuel moisture levels typically observed during the local fire season.

Fire Behavior Summary Tables. The four worst case fire scenario behavior calculations are summarized in table 6 thru 9, including the reduction in flame length that fuel treatment in Thinning Zone B will provide.

Table 1 – Fire Scenario 1 Summary

Fire Scenario 1–60 MPH Northeast Wind, in coastal sage scrub (SCAL18) North and Northeast Exposures		
Prior to Fuel Treatment	VS.	After Fuel Treatment
Rate of Spread: 1,104 ft. /min		Rate of Spread: 79 ft. /min
Fire line Intensity: 22,467 BTU/ft./sec		Fire line Intensity: 934 BTU/ft./sec
Flame Length: **44.1 Feet**		Flame Length: **15.6 Feet**

Table 2 – Fire Scenario 2 Summary

Fire Scenario 2–30 MPH Southwest Wind, in coastal sage scrub (SCAL18) Southwest and West Exposures		
Prior to Fuel Treatment	VS.	After Fuel Treatment
Rate of Spread: 104 ft. /min		Rate of Spread: 79 ft. /min
Fire line Intensity: 22,467 BTU/ft./sec		Fire line Intensity: 934 BTU/ft./sec
Flame Length: **32.1 Feet**		Flame Length: **8.6 Feet**

Table 3– Fire Scenario 3 Summary

Fire Scenario 3–60 MPH Northeast Wind, in southern mixed chaparral (sh7) North and Northeast Exposures		
Prior to Fuel Treatment	VS.	After Fuel Treatment
Rate of Spread: 494.8 ft. /min		Rate of Spread: 60.9 ft. /min
Fire line Intensity: 22905 BTU/ft./sec		Fire line Intensity: 891 BTU/ft./sec
Flame Length: **45.6 Feet**		Flame Length: **10.2 Feet**

Table 4 – Fire Scenario 4 Summary

Fire Scenario 4–30 MPH Southwest Wind, in southern mixed chaparral (sh7) North and Northeast Exposures		
Prior to Fuel Treatment	VS.	After Fuel Treatment
Rate of Spread: 223.1 ft. /min		Rate of Spread: 26.8 ft. /min
Fire line Intensity: 10327 BTU/ft./sec		Fire line Intensity: 324 BTU/ft./sec
Flame Length: **31.6 Feet**		Flame Length: **6.4 Feet**

Table 5 – Fire Scenario 5 Summary

Fire Scenario 5–30 MPH Southwest Wind, in southern mixed chaparral (sh7) North and Northeast Exposures		
Prior to Fuel Treatment	VS.	After Fuel Treatment
Rate of Spread: 236.2 ft. /min		Rate of Spread: 28.0 ft. /min
Fire line Intensity: 10936 BTU/ft./sec		Fire line Intensity: 342 BTU/ft./sec
Flame Length: **32.4 Feet**		Flame Length: **6.6 Feet**

In addition to BehavePlus fire behavior modeling for this project, Dudek's fire protection planners completed a FlamMap Fire Behavior Modeling for the proposed development. FlamMap provides the ability to model the anticipated fire behavior across a landscape based on site-specific data whereas BehavePlus provides fire behavior predictions at specific point locations. Dudek's analysis states that wildfire behavior in chaparral fuel beds on and adjacent the Project site is expected to be of moderate to high intensity during extreme, Santa Ana weather conditions with maximum sustained wind speeds of 56 mph and low fuel moistures. Based on the observed fuel beds east of the project site, a relatively high-intensity fire can be expected during extreme weather conditions, with flame lengths reaching approximately 43 feet and peak intensity of over 20,000 Btu/ft/s. The report then states this type of fire would be relatively short-duration as vegetative fuels are consumed rapidly, and there would not be a sustained source of heat and or flame associated with site-adjacent wildland fuels. The analysis further notes that the site's fuels would be converted and reduced to ground cover on most of the Project area, resulting in proportionately reduced fire behavior. The post-project fuel modification areas would provide a significant reduction in the potential for fire ignition as well as the flame length, spread rate, and intensity of fires should ignition occur (See APPENDIX 'J' – FlamMap Analysis – Dudek 2013). [1]

4.0 MITIGATION MEASURES AND DESIGN CONSIDERATIONS

The Lilac Hills Ranch development is planned to be completed in 5 phases (See APPENDIX 'G' – Phasing Exhibit). For each implementing Tentative Map, defined as a map containing individual lots that will be developed with structures that is submitted to the County for approval, will provide mitigation measures and design considerations for those Implementing Tentative Map(s). For example, the Implementing Tentative Maps for Phase 1 and 4 may be approved prior to implementation of Phases 2, 3 and 5. The timing of construction for phases 2, 3 and 5 will be determined at a later time but those Implementing Maps will then be submitted to the County for approval of the mitigation measures and design considerations.

[1] Dudek and Hunt Research Corporation were commissioned to conduct an assessment of the fire and emergency response capabilities of Deer Springs Fire Protection District (DSFPD) and California Department of Forestry and Fire Protection (CAL FIRE) by Accretive Investments, Inc. This Assessment (*Lilac Hills Ranch Fire Services Response Capabilities Assessment*, March 2014; attached as appendix to the Specific Plan), is referenced and used to support throughout this FPP.

4.1 Adequate Emergency Services

The Deer Springs Fire Protection District (DSFPD) is the Fire Authority Having Jurisdiction (FAHJ) for the Project. The DSFPD was established pursuant to state law to provide an effective level of fire protection and emergency medical services for the preservation of life and property within the District in which Lilac Hills Ranch is located. The District covers an area of approximately 47 square miles and serves a population estimated at 13,000. The District is funded through special District assessments, County fees, and tax allocations and supplemented by State and Federal grants. There are four fire stations located in the DSFPD; Station 11 (District Headquarters) at 8709 Circle R Drive, Escondido, CA 92026, Station 12 at 1321 Deer Springs Road, San Marcos, CA 92069 , Station 13 at 10308 Meadow Glen Way East Escondido, CA 92026 and CAL FIRE Station 15 (Miller Station) at 9127 West Lilac Road, Escondido, CA 92026. Station 15 is the closest fire station, surrounded on three sides by the project. Station 11 is the next closes fire station.

Firefighting services for the District are provided via contract by CAL FIRE (California Department of Forestry and Fire Protection). DSFPD utilizes generated fire fees and assessments to contract with CAL FIRE for staffing of its engines. In addition, DSFPD receives funding from the County to staff a third firefighter position on two of its engines. Furthermore, the County provides funding to CAL FIRE as part of the Amador Agreement to provide fire services during the offseason. APPENDIX 'M' provides the Automatic Aid Agreement between Deer Springs Fire Protection District and North County Fire Protection District and APPENDIX 'N' is the County of San Diego-Department of Purchasing and Contracting Contract 515388 Amendment no. 2 – Deer Springs Fire Protection District for Use of Fire Protection Funds.

DSFPD Preparedness and Firefighting Capability Provided by the Deer Springs Fire Protection District. Initial response to all fire, medical and associated emergencies within the District, including the 14-mile stretch of Interstate 15, is the responsibility of the Deer Springs Fire Protection District. The District currently provides staffing for the following resources within the District:

A. 3-Type 1 Front Line Engines (one at Station 11, two at Station 13, and 1 at Station 12); two reserve Type I engines (unstaffed, with one at Station 11, and one at Station 13)

B. 2-Type 3 Wildland Brush Engines (one located at Station 12 (not staffed) and one at CAL FIRE Station 15 (Miller)

C. 1-Paramedic ALS (Advanced Life Support) ambulance is staffed and housed at DSFPD Station 11under contract with Mercy Ambulance Service, Inc.

D. 23 Full-Time Firefighters

E. 1 District Administrative Employee

F. 1 Fire Prevention Specialist

G. 1 Chief

Following is a summary of DSFPD's record of responses and call volumes for all fire stations (including CAL FIRE's Miller Station) within the District for 2005 thru 2011:

Table 6 - 2005 – 2011 Response Data Summary for Deer Springs Fire Protection District
(Table Developed From Data Provided By Deer Springs Fire Protection District)

CY	Summary of Data For CY 2005 Thru 2011				TOTAL FOR YEAR
	STATION 11	STATION 12	STATION 13 ***	MILLER	
2005	602	590	---	452	1644
2006 *	58	58	---	47	163
2007	705	691	---	403	1799
2008	610	453	307	483	1853
2009	667	495	302	527	1991
2010 **	98	81	42	56	277
2011	615	443	404	373	1835
Station Total Responses For CY 2005-2011	**3355**	**2811**	**1055**	**2341**	**9562**
Calls per 24-Hr Shift For CY 2005-2011	**1.74**	**1.46**	**0.91**	**1.22**	**3.74**

*** Analysis Reflects Data Only For Month of December**
**** Analysis Reflects Data Only For Months of January and February**
***** Analysis Reflects Data Collected After Station Was Opened**

The response data in Table 6 above indicates that DSFPD averages 3.74 calls per 24-hour shift for all stations (including the CAL FIRE Miller Station). The data is for seven years and thereby does show the variation of responses over a longer period of time. The data also indicates that a very large volume of responses for DSFPD is for medical aid (37%), traffic collisions (11%), and cancelled calls (17%). Based on this data, and the information presented in the District Capabilities Assessment (Dudek & Hunt 2014) it is evident that DSFPD would have the existing capacity to respond to expected calls from the proposed Lilac Hills Ranch project (see APPENDIX 'K' - 2005–2011 Response Data for Deer Springs Fire Protection District).

The call volume and call type data provided by the District, and presented in the District Capabilities Assessment (Dudek & Hunt 2014), indicates that the closest responding units (Station 15 and Station 11) will not be overloaded with incidents due to the build out of the Lilac Hills Ranch Project. As the table below indicates, in comparison with other north County fire agencies, DSFPD will be able to absorb anticipated call loads and remain the North County Fire Agency with the fewest persons served per station and among the few districts that average less than two calls per station per day.

The additional response to Lilac Hills Ranch could result in an increase from 2.0 calls per day to 3.9 calls per day at build out. Based on the analysis presented in the District Capabilities Assessment (Dudek & Hunt 2014), even though the call volume would be doubled, the Stations would be able to absorb the additional calls generated by the Lilac Hills Ranch at build out.[2]

[2] For perspective, a busy urban fire station may respond to 10 or more calls per day while an average station would respond to 5 calls per day. Rural stations respond to fewer calls, but are likely to have longer response times. Therefore, a busy rural station may respond to 5 or 6 calls per day. Urban fire companies are not considered overloaded until about 10 or more calls per day and rural stations may be considered busy with a slightly lower number of average daily calls than 10. On average, a Fire Station in an urban area can be expected to respond about 5 times per day or more. District Capabilities Assessment (Dudek & Hunt 2014),

DSFPD's Response Projection Post-Construction of Phase 1 and 2 of Lilac Hills Ranch Compared to Other High Performing Fire Agencies/Stations

Fire Department/Stations	Average Call Volume*	Average Persons** Served/Station
DSFPD – 4 stations: Existing Condition	Average 1.4/day	3,250
DSFPD – 4 stations: Existing Condition + LHR Phases 1 and 2	Average 1.5/day	3,880
DSFPD – 4 stations: Existing Condition + LHR Project Build Out	1.8/day	5,350
Vista Fire Protection District – 6 stations	Average 4.8/day	19,000
City of San Marcos Fire – 4 stations	Average 4.8/day	23,750
City of Escondido Fire – 6 stations	Average 4.8 /day	20,857
Rancho Santa Fe Fire Protection District – 4 stations	Average 1.7/day	6,750
City of Oceanside Fire Department – 8 stations	Average 5.3/day	21,250
North County Fire Protection District – 6 stations	Average 1.9/day	8,333
Valley Center Fire Protection District	1.4/day	9,200

*Average call volume calculated by dividing the total number of annual calls by the number of fire stations serving those calls.
**Average persons served per fire station calculated by dividing total population by the number of fire stations within agency.

Fire Station Under General Plan Standard

Emergency Response Requirement and Initial Emergency Travel Times for DSFPD and CAL FIRE. The emergency response objective is identified in the Safety Element of the County General Plan. Lilac Hills Ranch must demonstrate that fire services can be provided that meet the minimum travel time identified in the Safety Element. Travel time is defined as the estimated time it will take for the "closest fire station" to reach the furthest structure in a proposed development project. These standards are intended to (1) help ensure development occurs in areas with adequate fire protection and/or (2) help improve fire services in areas with inadequate coverage by requiring mitigation (Policy S-6.4) Travel time is determined by measuring the most direct reliable route with consideration given to safe operating speeds for heavy fire apparatus. Travel time does not include reflex or reaction time, or on-scene size-up and set-up prior to attacking the fire, all of which are critical precursors of actual fire fighting. The emergency travel times for fire stations in the immediate area are based on NFPA 1142, Standard on Water Supplies for Suburban and Rural Fire Fighting; 2007 Edition Table C.11 (b).

An accepted provision of fire protection services for all calls is to attain the following response time goals (or provide a level of fire protection functionally equivalent to that provided by such response times):

1. Total response time for deployment and arrival of the first-in engine company for a fire suppression incident should be within 5 minutes. Add one minute for turnout time and one minute for dispatch time.
2. Total response time for deployment and arrival of the full first alarm assignment for a fire suppression incident should be within 8 minutes. Add one minute for turnout time and one minute for dispatch time.

The “closest” fire station to Lilac Hills Ranch Project is CAL FIRE’s Station 15 (Miller Station) at 9127 West Lilac Road, located adjacent to the development and approximately 2.3 miles from the furthest structure when the development is fully constructed. Miller Station consists of a 3,000 square foot station located on a 2-acre parcel and is staffed by a three member crew. This station receives District funding from the County of San Diego, for extension of its use during the non-fire season under and Amador contract (see APPENDIX N – County of San Diego and CAL FIRE Fire Protection Reimbursement Agreement Amendment, No. 3CA77059, dated April 15, 2011). The travel time from this station to the furthest structure when all phases of the proposed development are completed would be approximately 4.5 minutes, below the 5 minutes travel time requirement (see Figure 5 below).

Primary Fire Station Listed in Project Facility Availability Form

The Project Facility Availability Form (PFAF) from DSFPD (see APPENDIX E) indicates that Station 11, located at 8709 Circle R Drive, Escondido, CA, would be the “primary” station to serve Lilac Hills Ranch Project. Station 11 is located at Old Highway 395 and West Lilac Road and is approximately 4 miles from the northwest access point of the development and 2.6 miles from the southern access point via the Circle R Drive-Mountain Ridge Road emergency service route.

The Dudek and Hunt Capabilities Assessment (Attached as an Appendix Item to the Specific Plan) states: the existing four fire stations in the DSFPD (including one CAL FIRE station) are currently located where they can respond to the highest population density areas in an efficient manner. The existing DSFPD Station 11 is located to the south of the proposed project on Circle R Drive. The project includes a potentially gated emergency access along Covey Lane and Rodriguez Road from the east and a gated private road for additional ingress/egress off of Circle R Drive at Mountain Ridge Road for a portion of Phase 5. Station 11 does not currently meet the time standards identified by the County General Plan (Dudek and Hunt 2014). Using Covey Lane or Mountain Ridge Road, Station 11 cannot reach the entire project site within a 5- minute travel time. Engines from Station 11 can reach the southern portion of the Project within a roughly 7.5- minute travel time (including gates). Should Mountain Ridge Road be designated a public roadway and proposed gates not be utilized, roughly 7 lots can be reached within 5 minutes from Station 11. Engines from Station 11 can reach the northern portion of the Project (via I-15 to Old 395 to W. Lilac Road) within 6 minutes travel (to most remote point) or less, with 71 units reachable within 5 minutes travel. A total of 85% of Phase 1 of the Lilac Hills Ranch Project can be reached by Station 11 within 5 minutes 50 seconds travel and up to 70% of Phase 2 can be reached by Station 11 within 6 minutes travel.

The Assessment states that the existing Station 15 is located directly adjacent to the proposed development and can service 95% or more of the development within a 4-minute (NFPA 1710) and 100% of the project within a 5- minute (SD County General Plan) travel time. The location of Station 15, regardless of association with DSFPD, is a critical point for emergency service (medical emergencies, vehicle accidents, and structure and wildland fires) in this portion of San Diego County and historical call volume indicates they do respond to these calls within the District. Station 15 is an Amador Station – The Amador contract continues CDF staffing and station coverage through the winter “off season,” resulting in year-round staffing of this facility. Amador contract funding is provided by San Diego County.

DSFPD also has two other stations, Station 12 at 1321 Deer Springs Road, San Marcos, CA and Station 13 at 10308 Meadow Glen Way East, Escondido, CA, which are within approximately 17 and 20 minutes travel time, respectively. In addition, the DSFPD has established several mutual and automatic aid agreements with surrounding fire departments such as CAL FIRE, North County Fire Protection District, and Valley Center Fire Protection District. The North County Fire Protection District, Station 4, located at 4375 Pala Mesa Drive, Fallbrook, CA, is 3.8 miles and approximately 7.1 minutes travel time to the project (See APPENDIX N - County of San Diego-Department of Purchasing and Contracting Contract 515388 Amendment no. 2 – Deer Springs Fire Protection District for Use of Fire Protection Funds). In addition, the closest unit/drop boundary agreement, with automatic vehicle locators on every engine, enables dispatch to locate and send the closest unit, regardless of agency. Table 7 illustrates that the project has three fully staffed stations within 10-minutes of the furthest structure. The proposed development has five phases of construction (See Exhibit G - Phasing Exhibit with Road Circulation Plan). The construction of Phases 1 and 2 is projected to begin in 2014, but the timeline beyond these phases is to be determined. This FPP evaluates the adequacy of emergency service routes for phases 1 and 2 and through build out. Table 8 below provides emergency travel distances and times under the travel time standard set forth in the General Plan (from the closest fire station-Miller Station) and from the primary response fire station described in the Project Facility Availability Form (Station 11) by phases of development. It should be noted that the chart shows alternate emergency service routes for phases 3 and 4.

Table 7 – Proposed Emergency Travel Distance and Times Summary

STATION	PHASE (Sequence of Proposed Construction & Emergency Service Route Based on Phase of Development)	EMERGENCY ACCESS ROUTE 1/ 2/	DISTANCE TO FURTHEST STRUCTURE (miles)	TRAVEL TIME Minute(s)
Cal Fire Station 15 (Miller)	1 & 2	Via West Lilac Road-interior Circulation Roadways	0.6	1.7
	3	West Lilac Drive-Interior Circulation Roadways	1.2	2.7
	4	West Lilac Drive-Interior Circulation Roadways	1.9	3.9
	5	Via West Lilac Drive-Interior Circulation Roadways	2.3	4.5
DSFPD Station 11	5	Via Circle R Drive-Mountain Ridge Road	2.9	5.6
	4	Via Circle R Drive-Mountain Ridge Road	5.1	9.3
	3	Via Circle R Drive-W Lilac Road-Covey Lane	4.5	8.35
	1 & 2	Via Old Hwy 395 and West Lilac Rd	4.7	8.6
	4	Via Circle R Drive-W Lilac Road-Covey Lane	5.2	9.4
	3	Via Old Hwy 395 and West Lilac Rd	5.25	9.5
North County Fire Protection District Station 4	1 & 2	Via Old Hwy 395 and West Lilac Rd	4.2	7.8
	3	Via Old Hwy 395 and West Lilac Rd	4.75	8.7
	4	Via Old Hwy 395 and West Lilac Rd	5.3	9.7
	5	Via Old Hwy 395 and West Lilac Rd	5.65	10.3

1/ Preferred Emergency Access Route Based on Construction Phase of Development
2/ Distance and time to the furthest structure within the development or phase of development

Table 7 illustrates that after the initial construction of phases 1 and 2, the construction of successive development phases will provide additional improved emergency routes/access points, and improved on-site roadway circulation for fire apparatus.

The Dudek and Hunt's Capability Assessment, states that using Covey Lane or Mountain Ridge Road, Station 11 cannot reach the project site within a 4- or 5- minute travel time, but that engines from Station 11 can reach the southern portion of the Project within a roughly 7.5- minute travel time (including gates). It further states that should Mountain Ridge Road be designated a public roadway and proposed gates not be utilized, roughly 7 lots can be reached within 5 minutes from Station 11. It also states that engines from Station 11 can reach the northern portion of the Project (via I-15 to Old 395 to W. Lilac Road) within 6 minutes travel (to most remote point) or less, with 71 units reachable within 5 minutes travel time. It further states that a total of 75% of Phase 1 of the Lilac Hills Ranch Project can be reached by Station 11 within 5 minutes 50 seconds travel time, and up to 70% of Phase 2 can be reached by Station 11 within 6 minutes travel time.

The project will incorporate a number of Project features that augment the Project's fire safety:

1. Ignition resistant structures built to code that have proven to perform extremely well in wildfires;

2. Fire sprinklers in all structures which effectively extinguish interior fires over 98% of the time and extend the time of "flash-over", resulting in more time for responding firefighters;

3. Fuel modification for every structure;

4. Roadside fuel modification;

5. Automatic aid “drop boundary” agreements in place enable closest unit to respond, even if from neighboring district/agency;

6. Roads and access meeting the County Consolidated Fire minimum road standards and the Deer Springs Fire Protection Districts minimum road standards;

7. Long-term agriculture areas adjacent the site (reduced, irrigated fuels not native brush);

8. No buildings 35 feet or taller, and no buildings requiring 3,500 gpm fire flow, minimizing or eliminating the need for a ladder truck, without the approval of the Fire District;

9. Redundant water supply of district water, recycled water, grey water and well water; and,

10. Automated External Defibrillator’s (AED’s) installed in any high occupancy uses with staffing for use by trained administrators.

Summary

Response times from Miller station to the furthest structure of the project when all phases of the proposed development are completed would be approximately 4.5 minutes, well below the 5 minutes travel time standard set forth in the General Plan. Miller station is located 2.3 miles from the furthest structure when the development is fully constructed. It is a publicly supported facility, fully staffed 24 hours a day, seven days a week, and includes three firefighting personnel per shift. Miller station is committed to responding to emergency alarms through an Amador Contract with the County of San Diego pursuant to Public Resources Code Section 4143.

DSFPD identified Fire Station 11 as the “primary” fire station for the project in the Project Facility Availability Form (DPLU J-399F Form). Although response times from Station 11 do not meet the time standards identified by the County General Plan, it has been determined as acceptable to the District because pursuant to the County’s Guidelines for Determining Significance a finding can be made that sufficient mitigating factors associated with fire protection would be available for the project for the following reasons:

1. The District can augment response with ALS capable equipment to the entire project within 7-9 minutes, which is an acceptable District Standard travel time and would ensure adequate fire services to protect health, safety and the general welfare of the community;

2. The analysis shows that the DSFPD has existing capability and capacity to respond to fire emergency incidents on the project;

3. The project will pay statutory mitigation fees and annual assessments that will be provided to the District, which can be used by the District to upgrade and provide new facilities if necessary, as determined by the District;

4. The project can be provided with fire services from three fire stations within 10-minutes to the furthest structure and nearby fire departments pursuant to mutual aid agreements,

5. Sufficient mitigation measures (as set forth in the FPP) that minimize fire hazards are included in the project, such as fire resistant construction methods and fuel modification zones;

6. Travel time from the closest fully staffed fire station - Miller Station to the furthest structure within the project would meet the travel time identified by the County General Plan;

7. The project's water supply meets the requirements of the San Diego County's Consolidated Fire Code and the Fire Code for a commercial/business/residential development; and,

8. Fire access to the project will meet the requirements of the County and Deer Springs Fire Protection District.

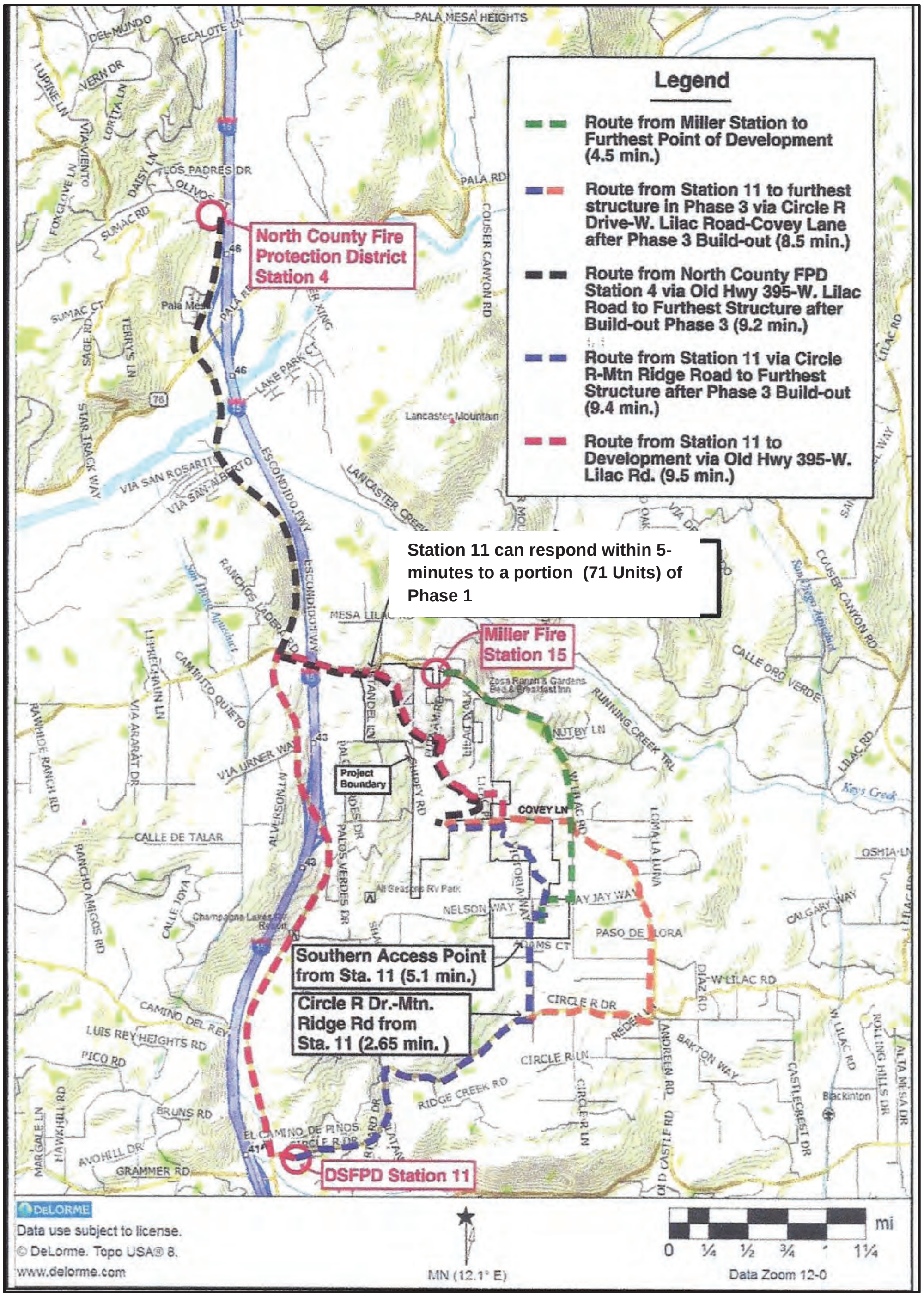


Figure 4 - Emergency Service Routes Map

4.2 Fire Apparatus Access

A comprehensive circulation plan provides access to the Lilac Hills Ranch Community and improves vehicular circulation in the vicinity of the project area in accordance with County standards and guidelines. Within Lilac Hills Ranch, private streets will provide multiple access routes (See Exhibit G – Phasing Exhibit With Roadway Circulation). West Lilac Road is designed to comply with County Mobility Element standards for public streets with certain exceptions that may be approved by the County as a part of the Project and our more thoroughly addressed in the EIR. All other streets within the Community are private, and will be designed and developed per the special standards established by the specific plan to reflect the traditional character and rural theme of the Community. The Community street system in Phases 1 through 3 will generally be available to the public traveling from the adjacent public road system. The Community street system in Phases 4 and 5 is proposed to be gated and not open to the public except during emergencies and in accordance with the County Consolidated Fire Code.

To minimize impediments to fire apparatus access, the circulation network shall be designed according to the Fire District Standards and the County Consolidated Fire Code see APPENDIX ‘G’ - Phasing Exhibit, Project Internal Circulation Map and Access Exhibit Map). The needs of truck traffic and loading activities for proposed commercial structures and fire apparatus shall be incorporated in the design of the roadways.

The primary access to the Lilac Hills Ranch project will be via two ingress and egress points from West Lilac Road, an existing public road located along the north boundary of the project site (See APPENDIX ‘G’ - Phasing Exhibit, Project Internal Circulation and Access Exhibit). The initial development of Phases 1 and 2 will include two ingress and egress points to West Lilac Road connecting to internal roads for access throughout the development. Development of phases 3 thru 5 will also include internal roads and will include one additional fire apparatus access point via Covey Lane and an additional gated emergency ingress/egress private roads via Rodriques Road and Mountain Ridge Road. All proposed roads are designed in accordance with the Fire District Standards and the County Consolidated Fire Code. Following are specific requirements (not all inclusive) outlined for fire apparatus access:

Fire apparatus access roads shall have an unobstructed improved width of not less than 24 feet, except for single-family residential driveways, serving no more than two single-family dwellings, shall be a minimum of 16 feet of unobstructed improved width. Fire apparatus access roads will not be obstructed in any manner, including the parking of vehicles. Specific interior roadways will be designated ‘fire access roadways’ or ‘fire lanes’. All standards for apparatus access roads will follow APPENDIX ‘D’ of the California Fire Code. The fire code official shall have the authority to require an increase in the minimum access road widths where determined the minimum are inadequate for fire or rescue operations.

4.2.1 Roadway infrastructure for each Phase (first and/or second pavement lift) will be installed prior to the allowance of combustibles on the project site.

4.2.2 One-way fire apparatus access roads, roadways with gated entrances, guard stations, or center medians are allowed, provided each lane is not less than 14 feet wide.

4.2.3 All fire apparatus access roads and driveways shall have an unobstructed vertical clearance of not less than 13 feet 6 inches, unless in the opinion of the fire code official that the width shall be increased if not adequate to provide fire apparatus access. The fire code official shall have the authority to require an increase the minimum access road widths where the fire code official determines the minimum are inadequate for fire or rescue operations. This same authority by the fire code official may reduce the vertical clearance

4.2.4 or road width requirement if it does not impair access for fire apparatus, and includes approved signs installed and maintained indicating the amount of vertical clearance.

Access points to pockets of islands of open space/flammable vegetation shall be provided and identified for fire and emergency service apparatus (See APPENDIX G – Project Internal Circulation, Figure 24).

4.2.5 Emergency access to the extensive trail system will be provided at numerous points throughout the community.

4.2.6 Emergency vehicle turnarounds shall be provided on 'fire lanes' exceeding 150 feet in length. In this development, turnarounds must be approved by the DSFPD, especially for aerial ladder trucks if multiple story structures are proposed (see APPENDIX 'K' - lot configurations and conceptual layouts). NOTE: no buildings 35 feet or taller are proposed for this project, without approval of DSFPD).

4.2.7 Fire apparatus access road shall extend within 150 feet of all portions of a structure and all portions of the exterior walls of the first story of the building as measured by a route around the exterior of every building in the development.

4.2.8 Gates proposed for this development shall be in compliance with DSFPD guidelines and County Consolidated Fire Code, Section 503.6. A gate across a fire access roadway shall be equipped with an approved design feature for opening the gate for access by the fire department or law enforcement. Specifically, The Project proposes to include gates controlling public access to Phases 4 and 5, which will be developed as a Senior Citizen Neighborhood. Private streets with gates are features of a number of major developments approved by the County of San Diego, some of which are still undergoing development, including the Rancho Cielo, Castle Creek, Montecito Ranch, Woods Valley Ranch, and The Crosby Specific Plans, as documented in the Dudek and Hunt 2013 Assessment.

Any gate or barrier across a fire access roadway shall have specific plans reviewed and approved by DSFPD, and receive Specific Plan approval prior to installation.

All automatic gates across fire access roadways and driveways shall be equipped with approved emergency key-operated switches overriding all command functions and opening the gate(s).

Per the DSFPD conditions attached and part of the Project Availability Form (Form DPLU-399F), gates accessing more than four residences or residential lots, or gates accessing hazardous institutional, educational or assembly occupancy group structures, shall also be equipped with approved emergency traffic control-activating strobe light sensor(s), or other devices approved by the fire code official, which will activate the gate on the approach of emergency apparatus with a battery back-up or manual mechanical disconnect in case of power failure. In addition, all automatic gates are required to have a Knox key switch override system along with an approved emergency traffic control-activating strobe light sensor(s); e.g., Opticom.

<u>Other optional features for automatic gates may include:</u>

1. Backup (battery) or solar power

2. Access control motors that accept and interface with various third party accessories

3. Design provisions to open if bumped by a fire engine, and a hidden “break glass” manual release

4. Gates programmed to remain open in the event of power outage

It is estimated that it takes about one minute to stop the fire engine, operate a KNOX key switch on a gate, get back in the engine, and go through gate. So the response to the gated areas, if using a KNOX key switch, would be delayed at maximum by 1 minute per gate. However, automated gates (recommended), will require less time, roughly 1/4 to 1/3 the time to open and proceed through the gate as the gate can be triggered remotely by siren or radio and results in minimal delay related to the time for the gate to move from closed to open.

The road and street grade standard for fire apparatus shall not exceed 20 percent, and any roadway over 15 percent shall be a concrete surface with a deep broom finish perpendicular to the direction of travel to enhance traction. The angle of departure and the angle of approach shall not exceed 12 percent or as approved by the fire code official.

The turning radius of a fire apparatus access road shall comply with the Fire District Standards and the County Consolidated Fire Code public and private road standards approved by the Board of Supervisor. The turning radius for a private residential driveway shall be a minimum of 28 feet, as measured on the inside edge of the improved width or as approved by the fire code official.

Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus of not less than 75,000 pounds (unless approved by the DSFPD) and will be provided with an approved surface such as asphalt, concrete or pavers so as to provide all-weather driving capabilities. In addition, all roads shall be provided with an approved driving surface for all phases of development prior to building permit issuance, construction and/or bringing combustible building products onto each parcel.

Secondary Access and Dead End Roadways. The development in combination with designated and marked ‘fire lanes’ shall provide adequate secondary access. There will be two public access points on the northwest corner of the project and one in the northeast area, both off West Lilac Road. Successive proposed phases of development will include two access points via Covey Lane and an additional gated emergency ingress/egress via Mountain Ridge Road. <u>The maximum length of a dead-end road, including all dead-end roads accessed from that dead-end road, shall not exceed 800 feet.</u> Also, all dead-end fire access in excess of 150 feet in length shall be provided with approved provisions for turning around emergency apparatus. Hammerheads do not serve as a desirable turnaround design for DSFPD.

Roadway design features (speed bumps, speed humps, speed control dips, traffic calming devices, etc.) which may interfere with emergency apparatus responses shall not be installed on fire access roadways, unless they meet design criteria approved by DSFPD.

Approved signs or other approved notices shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. Signs or notices shall be maintained in a clean and legible condition at all times. All public roads and private roads serving four or more parcels shall be named. Road names signs shall comply with County of San Diego Department of Public Works Design Standard #DS-13.

To ensure fire apparatus access, the fire code official may designate existing roadways as fire access roadways as provided by Vehicle Code Section 22500.1 (public) and (private).

The fire code official is authorized to require more than one fire apparatus access road on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

4.3 Water Supply

Water supply will meet the water supply requirements of the San Diego County's Consolidated Fire Code and the Fire Code for a commercial/business/residential development. Following are specific requirements.

All fire hydrants shall be installed and serviceable by all acceptable code standards prior to delivery of combustibles for each development phase(s).

For single-family dwellings, fire hydrants shall be installed at intersections, at the beginning radius of cul-de-sacs, and every 300 feet from structures, regardless of parcel size. In multi-family, commercial and industrial zones, fire hydrants shall be installed at intersections, at the beginning radius of cul-de-sacs and every 300 feet from structures, regardless of parcel size.

An approved fire hydrant/water supply system shall be capable of supplying 2500 gallons per minute fire flow for 2 hours (California Fire Code and the Consolidated Fire Code for the County of San Diego). Waterlines for fire control must be capable of supplying this required demand through the hydrants, plus the largest fire sprinkler demand, plus any domestic use supplied from that line.

When an on-site waterline serves more than two hydrants, the line must be looped, providing two hydraulically remote points of connection with the water district lines. The interior loop must have isolation valving, such that not more than two hydrants and/or sprinkler systems are between isolation points. If the onsite fire water system for a building is a private loop, the two points of connection are needed to the public supply and appropriate fire department connections.

Fire hydrants shall be located along 'fire lanes' and all structures and other improvements shall be reached with a maximum hose pull of 150 feet, or as approved by the DSFPD.

Each hydrant for this development shall have one 4-inch and one 2-1/2-inch outlets. In some instances DSFPD may require a fire hydrant to have other combinations of 4 inch and 2½ inch outlets. All fire hydrants will be of bronze construction, including all internal parts except seats. Fire protection systems service meters shall be a minimum of one inch (1") and separate from the domestic supply.

The DSFPD approval shall be required for on-site hydrant and fire service waterline based on the final building construction location, type and largest building size. A waterline extension for the purpose of installing a fire hydrant if the water main is 1,500 feet or less from the property line may be required by the fire code official.

All hydrants shall be located along an access roadway and shall not be closer than 50 feet from structures.

Fire hydrants shall be located with blue reflective raised pavement markers at approved locations for each hydrant

All buildings shall be fully protected with automatic fire sprinkler systems. The installation of the sprinkler systems shall meet NFPA 13 and 13D Standards. The 2010 California Building Standards Code published July 1, 2010, with an effective date of January 1, 2011, requires automatic fire sprinkler systems for all new one-and two-family dwellings and townhouse construction statewide.

4.4 Defensible Space and Vegetation Management

Fire resistant landscape management is the act of converting native vegetative fuels from a highly flammable and high fire intensity state to a more fire resistant and low fire intensity condition. Fire resistant landscaping has been proven to be very effective treatment for minimizing structure losses due to wildland fire radiant heat.

The County's Consolidated Fire Code and the California Fire Code require a Fuel Management Zone (FMZ), within 100 feet of structures, to the extent possible, for each Implementing Tentative Map that is submitted to the County for approval. Implementing the following measures for the management of flammable vegetation would provide acceptable management of flammable vegetation for wildfire protection of structures within each phase of this development:

4.4.1 Implement and maintain a standard to provide an irrigated Zone A (low fuel volume/defensible space) and a selectively thinned non-irrigated Zone B around each residential and commercial structure, and along roadways as described herein.

4.4.2 A long-term interior open space fuel modification treatment plan and fire resistant landscaping criteria to be deployed around all planned structures as described herein.

4.4.3 For the benefit of the community, the fuel modification and maintenance of common areas would be under the control of a homeowners association or other common ownership, established in perpetuity.

4.4.4 Alternative measures that achieve the same level of protection may be used, including 1) additional ignition-resistant construction methods and other non-combustible features, i.e., parking lots, sidewalks, concrete patios, decorative rock, natural boulders on-site, and similar landscape features; 2) fire-barrier walls; and, 3) condition for focused fire protection plan for any area with a reduced fuel modification zone should off-site fuels (which are currently agriculture) convert to native shrub land.

4.4.5 A wildland fire hazard rating assessment and calculations of the expected fire behavior, in the event a wildland fire should occur within the off-site and on-site native and non-native vegetation.

4.5 Fuel Modification Zone(s) for This Development

On-site, a minimum Fuel Management Zone (FMZ) of 100 foot will apply throughout the entire project in accordance with the specification of County Consolidated Fire Code, Section 96.1.4907.2. Additional clearance may be required as necessary as necessary depending on specific conditions on site up to 100-foot . The perimeter buffer and on-site FMZs would consist of a 50-foot irrigated zone, or in some cases, the FMZ may be 100 feet of actively managed irrigated agricultural crops/orchard, per the fuel management plan. The area 50 feet from the edge of all structures in the development would be cleared of all vegetation that is not fire resistant and re-planted with irrigated fire-resistant landscaping. The actively managed irrigated agricultural crops/orchards, presently located within the development may also be integrated into the zone. This would be defined as Zone A.

In the area between 50 to 100 feet from the edge of structure, all dead and dying vegetation shall be removed (in some areas, this zone may also be the actively managed irrigated agricultural crops/orchards. Maintenance of fuel treatment zones is highly important. Latham (1989) found that ember ignitions were primarily a function of ground fuels, especially litter depth. Also imporant to ignition of a ground fuel is moisture content, size of the litter material as well as the mineral content of the dead vegetation. To the benefit of the eventual homeowners, ground fires burn with less intensity than an aerial fuel. However, a ground fire may carry to adjacent aerial fuels which is a concern.

Most of the fuel modification zone includes an 8 feet wide trail located roughly in the middle of the fuel modification area that will be maintained free of vegetation. This vegetation free area provides an enhanced “fire break within a fuel break”, resulting in decreased flame length and heat reduction, particularly for non-wind driven fires.

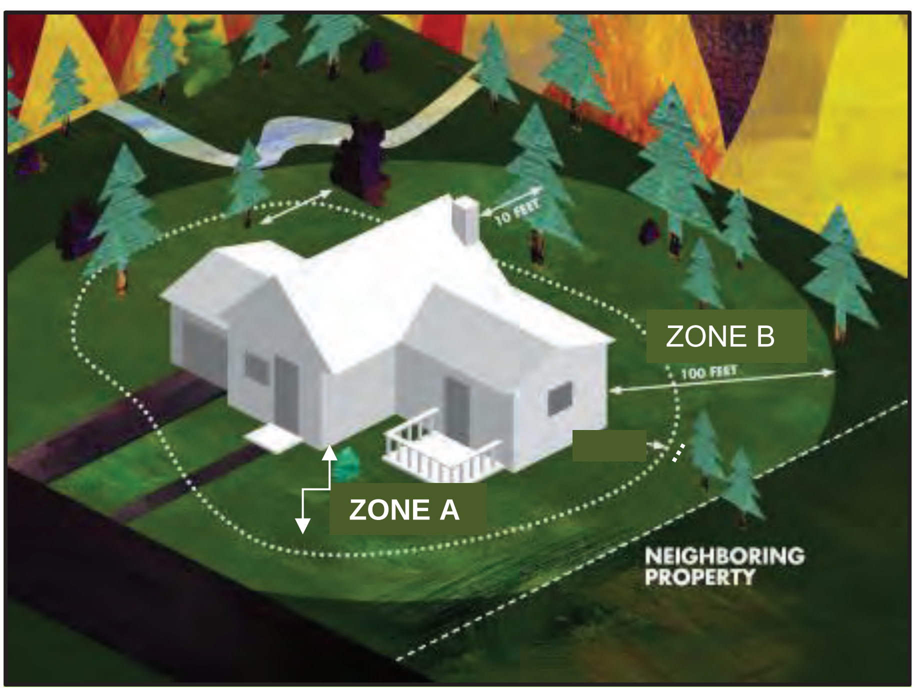


Figure 5 - Illustration of Defensible Space Zones

Where native vegetation does exist adjacent to this zone, native vegetation may remain provided that the vegetation is modified so that combustible vegetation does not occupy more than 50 percent of the square footage of this area. This would be defined as Zone B (see Figure 6 – Illustration of Defensible Space Zones).

As stated above, the FMZ shall be a minimum of a 100-foot area in all directions from all structures, in which flammable vegetation or other combustible growth is cleared away or modified, except for:

1. Single specimens of trees or other vegetation which are well-pruned and maintained.
2. Grass and other vegetation located more than 50 feet from the structure and less than 18 inches in height above the ground.
3. All ornamental landscaping that is consistent with San Diego County Wildland Urban Interface plant list (see APPENDIX ‘A’).
4. Identified areas where reduced fuel modification zones have been established based on site-specific fire behavior modeling in addition to off-site fuel beds (primarily agriculture) and where additional fire protection features to harden structures will be employed.
5. Irrigated agriculture

Buildings or structures in a hazardous fire area must be set back 100 feet from the property line and shall meet the requirements in the above paragraph, to the extent possible. Enhanced fire-resistive construction measures shall be used to mitigate fire, including the elimination of vents and skylights on structures facing natural fuel and open space areas on-site and off-site native flammable fuels. Roadways, parking lots, sidewalks, concrete patios, decorative rock, natural boulders on-site, and similar landscape features may be included as objects that will not support fire. Other alternative measures that achieve the same level of required protection may be used, including, but not limited to one of the following: 1) utilize adjacent irrigated and managed agricultural crops (orchards, commercial flower fields, etc.); 2) fuel modification and hazard abatement required and completed around structures by adjacent landowners to meet fire code on their property and which is contiguous with the development; 3) DSFPD hazard abatement requirements for fuel modification and hazardous abatement 50 feet along the perimeter of adjacent properties, 4) additional ignition-resistant construction methods, non-combustible features, i.e., roadways and right-of-way modified fuels, parking lots, sidewalks, etc.; 5) fire-barrier/deflection walls; or, 6) a recorded easement acquired from adjacent landowners for the purpose of maintaining required fuel modification (there is no off-site clearing proposed). However, if off-site clearing is proposed in the future, the easements must be provided before the project can move forward).

The proposed project shall also provide fuel modification on either side of public roadways, pursuant to_the County’s Consolidated Fire Code and the California Fire Code for clearance of brush and vegetative growth from roadways. This requirement shall modify combustible vegetation in the area within 10 feet from each side of a road or driveway to establish a fuel modification zone on fire apparatus access roads and driveways. This requirement for modified fuel combustible vegetation shall also apply to off-site private ingress and egress roadways.

FMZ's for the Lilac Hills Ranch Development will be determined as a part of the site plan review for the development of each phase. If the level of development within the overall project increases, these zones would be revisited at the time of site plan review to determine if less strigent requirements may be more appropriate due to these circumstances. When the final FPP for the development is completed, a detailed Fuel Treatment Location Map will illustrate the placement of the zones for each developmental phase.

4.5.1 Fuel Modification Zone A - Irrigated

The following specific requirements are outlined, but not all inclusive, for Zone A.

4.5.1.1 This Zone shall be irrigated (micro-irrigation acceptable when overhead irrigation may cause erosion). It includes all manufactured slopes. Landscaping material from the approved plant list (see APPENDIX 'A') required or in an approved landscape plan and approved by the Fire Marshal.

4.5.1.2 All undesirable non-native vegetation (see APPENDIX 'B') shall be removed. Also, no plants on the California Exotic Pest Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California as of October 1999" or more recent version shall be planted.

4.5.1.3 Vegetation may include single or cluster (no more than two to three plants/tree) of trimmed fire resistant native and ornamental plants.

4.5.1.4 Dense plant masses adjacent to the structures and at bases of trees and tree clusters shall not be placed in this Zone. Vegetation must be low growing, fire resistive, deep rooted, drought tolerant plantings to maintain erosion control and soil stability, especially on manufactured slopes.

4.5.1.5 Active irrigated agriculture and native or ornamental trees can be retained within this fuel modification zone. They shall be pruned to maintain a vertical separation of approximately 10 feet above underlying shrubs or groundcover. Pruning of the shrubs will minimize the impact of the tree pruning. Trees may be planted and/or maintained as individual specimens, or clustered. Groups should be two to three trees maximum, with mature foliage of any group separated horizontally by at least 10 feet, if planted on less than 20 percent slope, and 20 feet, if planted on greater than 20 percent slope.

4.5.1.6 Tree canopies shall not be allowed to overhang the roof of any structure; the outer edge of the canopies of mature trees will be a minimum of 10 feet from the building eaves, and free of all dead or dying parts. All the dead material must be pruned out of all vegetation on a regular basis. Trees and vegetation should not be planted in areas where fire truck access is impaired, should not impair or obstruct the use of fire department ladders.

4.5.1.7 Mulches, chips and other small multi-cuttings (cut to less than two inches in diameter and four inches in length) shall be evenly spread over the area no more than 4 inches, at least 50 feet from structures. This can be used to maintain soil moisture and prevent grass and weed encroachments within the treated areas. Regular maintenance, vegetation pruning, and irrigation to establish drought tolerant, fire-resistive landscaping are very important in this Zone.

4.5.1.8 Construction materials, firewood, and other combustible materials shall not be stored in unenclosed spaces beneath buildings or structures, or on decks or under eaves, canopies or other projections or overhangs. Storage may occur in the defensible space located a minimum of 30 feet from structures and separated from the crown of trees by a minimum of 10 feet, measured horizontally.

4.5.1.9 Ornamental plants will not be planted or allowed to become established within this Zone, unless shown in the Recommended Plant Lists in APPENDIX 'A' (or in an approved landscape plan and approved by the Fire Marshal).

4.5.1.10 Plants in this Zone will not include any pyrophytes that are high in oils and resins. Exception: All non- fire resistive trees, including conifers, pepper trees, eucalyptus and acacia species shall be planted and maintained so that the tree's drip line at maturity is a minimum of 50 feet from any combustible structure.

4.5.1.11 Ornamental plants will not be planted or allowed to become established within this Zone, unless fire resistive trees, including conifers, pepper trees, eucalyptus and acacia species shall be planted and maintained so that the trees drip line at maturity is a minimum of 50 feet from any combustible structure.

4.5.1.12 Non-flammable patios, walkways, rock, driveways, and gravel can be used to break up fuel continuity within this Zone.

4.5.1.13 If shrubs are located underneath a tree's drip line, the lowest branch will be at least three times as high as the understory shrubs or 10 feet, whichever is greater.

4.5.1.14 Trees may be planted and/or maintained as individual specimens, or clustered with 2 to 3 trees in a single cluster; crowns of mature trees shall maintain a minimum horizontal clearance of 10 feet for fire resistant trees and 30 feet for non-fire resistive trees; and avoid planting trees directly uphill or one another. The following table 4907.3.1 from the County Consolidated Fire Code defines the distance between mature tree canopies by percent slope.

TABLE 4907.3.1
DISTANCE BETWEEN TREE CANOPIES

Distance between Tree Canopies by Percent Slope	
Percent of Slope	**Required Distances Between Edge of Mature Tree Canopies (1)**
0 to 20	10 feet
21 to 40	20 feet
41 plus	30 feet

4.5.2 Zone B Fuel Modification – Non-Irrigated

Zone B is the remaining 50 feet of fuel management adjacent to flammable vegetation. Roads and other "non-structure" improvements are allowed in this zone. Zone B fuel management shall be applied to all roadways, including private controlled access roadways; i.e., Covey Lane and Mountain

Ridge Road (Lilac Hills Ranch would be responsible for these two private roadways only where the development is adjacent to these private roadways and DSFPD would enforce the minimum fuel modification requirements on the other private properties being serviced by the private roads). Zone B can either be cleared in conformance with Zone A above, or selectively cleared and modified as described below.

4.5.2.1 Zone B is an area 50 to 100 feet (or more) away from any structure where the fuel volume will be removed or thinned by 50 percent, including the removal of undesirable species.

4.5.2.2 Irrigation will be used only if needed to establish and maintain fire-resistive landscaping.

4.5.2.3 As the native vegetation cover in Zone B is reduced, there is a very high probability that the openings will be dominated with non-native weed or grass species. Therefore, all grasses and weeds are to be mowed or weed-whipped to a 4-inch stubble height by June 1st of each year or when the fuels become cured, whichever occurs first.

4.5.2.4 Any vegetative biomass (debris and trimmings) produced by thinning and pruning shall be removed from the site or converted to mulch by chipping and evenly distributed to a maximum depth of four (4) inches. This mulching concept helps to maintain soil moisture for the designated plants, reduces the growth of annual grass and minimizes soil erosion.

4.5.2.5 The area on each side of the improved width of highways, private roads, and driveways shall comply with the requirements of a fuel modification zone. For newly constructed roads, the vegetation shall be modified/reduced by 50 percent for 20 feet on either side of the road.

4.5.2.6 The following native species will not be permitted to grow in this zone even as specimen plants because of their flammability:

- California sagebrush, Artemisia californica;
- Flat-topped buckwheat, *Eriogonum fasciculatum;* and,
- Black sage, Salvia mellifera.

4.5.3 Fuel Maintenance

Maintenance within the zones shall be performed year-round and include the following:

4.5.3.1 Prune and thin trees around structures to decrease fuel volume, retain succulent growth and to provide adequate clearance between structures and plants, as required in the County Consolidated Fire Code.

4.5.3.2 Tree branches overhanging roofs shall be removed.

4.5.3.3 Trash and combustible debris shall be cleared from around structures, and removed from roofs and rain gutters.

4.5.3.4 Irrigation systems will be maintained to ensure that they function properly and plantings are watered sufficiently to maintain succulent growth.

4.5.3.5 The responsibility for the fuel modification maintenance defined below shall remain with each lot owner and any subsequent owners, and a maintenance agreement through a Home

Owner Association to remove dead and dying vegetation, non-native species that may establish over time, and general compliance with the fuel modification requirements the common areas.

Fuel Modification Zones Analysis – DUDEK

Dudek conducted an analysis of fuel modification zones which analyzed the fire behavior across the project site and compared it against the proposed development footprint, product type and proposed structure setbacks (See APPENDIX J – Fuel Modification Zones Analysis – DUDEK). This analysis was used to support the analysis of Section 4.4 – Defensible Space and Vegetation Management in this FPP.

4.6 Ignition Resistant Construction and Fire Protection -Residential

Ignition-resistant construction for all structures will provide significant protection in this very high fire hazard zone. Ignition-resistant construction requirements will provide critical improvements to all types of structures for them to survive a worst case scenario fire storm in this area. Another significant requirement will be that maintenance and repair of these proposed structures will be with the same ignition-resistant materials and construction features. Also, the FPP requires that ignition-resistant construction will apply to mitigate the ignitability of all future proposed residential structures and projections (exterior balconies, carports, decks, patio covers, unenclosed roofs and floors).

All structures within a wildland-urban interface as defined in the County Building Code must be built using ignition-resistive construction methods (Building Code (Title 9, Division 2, Chapter 1 of the San Diego County Code of Regulatory Ordinances). Construction requirements must meet all then-current County and State of California Building Codes (Chapter 7A) requirements for construction in wildland areas. Ignition-resistant building requirements found in the County Building Code (more restrictive than the California Building Code) will significantly reduce the threat of wildfire for this development, especially the flying embers entering a structure, landing on a receptive fuel and starting a new fire.

Following are specific fire-resistive building features that shall be applied to all structure construction that will be implemented at the site plan or building permit stage:

4.6.1 All structures within the Lilac Hills Ranch project shall be built with a Class A roof assembly, including a Class A roof covering (per CBC Chapter 7A). It should be noted that recent testing has found that solar panels mounted within about 5 inches of a Class A roof assembly may nullify the Class A rating of the assembly.

4.6.2 All exterior walls on all sides of the buildings shall be constructed with one-hour fire resistant building materials, and protected with two-inch nominal solid blocking between rafters at all roof overhangs and under the exterior wall covering. Wood siding of 3/8-inch plywood or 3/4-inch drop siding is permitted, but must have an underlayment of ½-inch fire-rated gypsum sheathing that is tightly butted or taped and mudded, or other ignition-resistive materials approved by the Fire Authority Having Jurisdiction (FAHJ) and/or the Planning Authority Having Jurisdiction (PAHJ).

4.6.3 All vents (roof, foundation, combustion-air, etc.) shall resist the intrusion of flames and embers or shall be protected by louvers and 1/8" non-combustible, corrosion-resistant mesh. Turbine attic vents shall be equipped to allow rotation in only one direction (County Building Code 704A.2.1). Attic ventilation shall also comply with the requirements of the California Fire Code.

Exception: Where a 100-foot fuel modification zone from a structure to the project site boundary cannot be met in the northeast and southwest corner of the property, all vents shall provide ventilation while trapping flames and embers before they enter the home (e.g., use of vents produced by Vulcan or Brandguard or any simiular vents).

4.6.4 Attic ventilation openings or ventilation louvers will not be permitted in soffits, in eave overhangs, between rafters at eaves, or in other similar exterior overhanging areas in this wildland/urban interface area.

Exception: Where a 100-foot fuel modification zone from a structure to the project site boundary cannot be met in the northeast and southwest corner of the property, all vents shall provide ventilation while trapping flames and embers before they enter the home (e.g., use of vents produced by Vulcan or Brandguard).

4.6.5 All eaves of roof overhangs shall be enclosed (boxed eaves) on all sides with non combustible materials or constructed with heavy timber such as 2x starter board and 3x6 rafter tails.

Structure openings: Louvers, ventilators, or openings in walls, roofs, attics, and underfloor areas having headroom less than four (4) feet in height which are not fitted with sash or doors shall be covered with wire screen. The screen covering of such openings will be of corrosion-resistant metal or other approved material that offers equivalent protection, and will have a maximum mesh of one-eighth (1/8) inch.

4.6.6 All projections (exterior balconies, stairs, covers, unenclosed roofs and floors, and similar architectural appendages and projections) shall be of non-combustible construction, one-hour ignition resistive construction on the underside, or heavy timber construction. When such appendages and projections are attached to exterior fire-resistive walls, they shall be constructed to maintain the fire-resistive integrity of the wall.

4.6.7 All glass or other transparent, translucent or opaque glazing materials, including skylights, shall be constructed of tempered glass or a dual glazed windows with minimally one pane of tempered glass.

4.6.8 Fences and other structures less than 5 feet from a building shall be non-combustible construction, heavy timber or fire retardant pressure treated wood.

4.6.9 All rain gutters, down spouts and gutter hardware shall be constructed from metal or other noncombustible material to prevent wildfire ignition along eave assemblies.

4.6.10 Gutters shall be designed to reduce the accumulation of leaf litter and debris that contribute to roof edge ignition.

4.6.11 Exterior door assemblies will conform to the performance requirements of standard SFM 12-7A-1 or will be of approved non-combustible construction, or solid core wood having stiles and rails not less than 1 3/8 inches thick with interior field panel thickness no less than 1 1/4 inches thick, or will have a fire-resistance rating of not less than 20 minutes when tested according to ASTME 2074.

4.6.12 All windows to be screened shall be provided with mesh metal or similar non-combustible window screens to prevent embers from entering the structure during high wind condition.

4.6.13 Any damaged or replacement window, siding, roof coverings, and specific non-combustible wall shall meet or exceed the original intent of the fire protection discussed in this Plan.

4.6.14 Buildings and structures will be set back a minimum of 30 feet from property lines and open space easements unless the County Zoning Ordinance requires a greater minimum. When the property line abuts a roadway the setback will be measured from the centerline of the roadway.

4.6.15 Fire protection tactical operations for proposed two-story residential structures will be based on structures less than 35 feet in height, unless approved by the fire district.

4.7 Protection of Commercial and Civic Structures, School, Senior Citizen Neighborhood and Other Facilities and Emergency Trail Access

The proposed project includes commercial, civic structures, schools, and senior citizen neighborhood within the development. Three-story structures are proposed but will not exceed 35 feet in height, with access to the third floor from the second floor. Based on maximum height of structures, none of the structures would be required to meet mid-rise structure fire code requirements there are applicable fire protection requirements that shall be required to ensure that proposed and future buildings on this site meet specific construction features. Guidance to mitigate fire protection measures and to mitigate structural firefighting risks for individual commercial/structure and other public facilities will be established in accordance with the requirements of the 2014 County Consolidated Fire Code and the 2013 California Building Code. The County of San Diego and the DSFPD will review all proposed buildng plans for compliance with the requirements of fire codes and this Fire Protection Plan.

Following are specific requirements, not all inclusive, for commercial, industrial, school, age-restricted community, and other public facilities structures on this development:

4.7.1 Buildings shall be protected throughout by an automatic fire sprinkler system designed and installed in conformance with the latest edition of NFPA 13.

4.7.2 A shut-off valve and a water flow alarm shall be provided for each floor of structures. Each shut-off valve and water flow alarm shall be electronically supervised.

4.7.3 Smoke detectors shall be connected to an automatic fire alarm system and shall be installed in accordance with the latest edition of NFPA 72.

4.7.4 An approved and listed, automatic and manual, fully addressable and electronically-supervised fire alarm system shall be provided in conformance with the California Building Code.

4.7.5 Stairway enclosures shall be continuous and shall fully enclose all portions of the stairway. Exit enclosures shall exit directly to the exterior of the building or include an exit passageway on the ground floor leading to the exterior of the building. Each exit enclosure shall extend completely through the roof and be provided with a door that leads onto the roof.

4.7.6 School grounds may be fenced and gates therein may be equipped with locks, provided that safe dispersal areas based on three square feet per occupant are located between the school and the fence. Such required safe dispersal areas shall not be located less than 50 feet from school buildings.

4.7.7 The project's extensive trail system is accessible by emergency responders via numerous access points throughout the Lilac Hills Ranch community. The largest distance to a roadway access point from any point along the proposed trail is 765 feet in Phase 1. Access points are called out in the Trail Plan for Phase 1. The trail system has not been designed for the latter phases of the development. However, similar access point spacing will be provided (See APPENDIX 'P' – Trails Plan-Phase 1 Access Points).

The following checklist for design concepts may be utilized to ensure that future commercial buildings meet specific performance standards requried by the DSFPD that may exceed what is normally required by standard California building codes. This list is provided to memorialize the requirement or design measure, to help mitigate the structural firefighting risk, and to notify the applicant, engineer, architect, and future lot owners, what will be required in these future buildings.

A. Applicable fire protection and building construction related codes and standards for commercial, industrial, and public facilities

B. Maximum allowable height of buildings for existing fire apparatus capability

C. On-site fire protection water system, required fire flow, on site hydrants, and fire sprinkler systems

D. Sprinkler risers and flow alarms and signals

E. Fire detection and fire alarm systems where required by CFC and where needed in large buildings to provide early detection

F. Fire department sprinkler connection locations

G. Wet standpipes where needed in large buildings based on travel distances exceeding 150 feet from doors

H. Site access and on-site fire access roads

I. Identification of onsite fire lanes and provision of signage

J. Clear paved setbacks from property lines to allow fire engine and fire truck operations

K. Protection for trash chutes and trash storage

L. Heating Ventilation and Air Conditioning (HVAC) System controls for firefighter use

M. High piled stock requirements

N. Firefighter access doors for high piled stock

O. Firefighter foot access around buildings

P. Roof access for firefighters through parapets and mansards

Q. Addressing and identification of buildings

R. Geographical directories

S. Smoke removal provisions

T. Private or public motor fuel dispensing, if applicable

U. Hazardous materials storage, use and handling; interior and exterior, if applicable

V. Maximum allowable quantities for hazardous materials (define/discuss CFC requirement in general, and threshold for becoming an 'H' occupancy)

W. Exterior storage, and interior storage

X. Fire alarms, water flow alarms and monitoring

Y. Exits and emergency/standby power

Z. Portable extinguishers

AA. Combustible decorations, displays and combustible storage

BB. No smoking signs

CC. Signs on exterior doors to electrical panel rooms, riser rooms, etc. NFPA hazard signals

DD. Solar panels on roofs

EE. Natural gas shutoffs

FF. Emergency plan and equipment

GG. Fire prevention program

HH. Construction fire safety

II. Fire command center in larger buildings (CFC Section 508)

JJ. Pre-emptive traffic devices at signalized intersections

KK. Emergency responder radio coverage in buildings (CFC section 510)

LL. Special requirements for vehicles operating in buildings

The following fire protection and building construction related codes are listed so that architects, engineers, contractors, and owners are aware of their potential applicability.

A. 2013 California Fire Code (CFC) including but not limited to Chapter 9 for Fire Protection Systems, Chapter 23 for High Piled Stock; Chapter 27 for Hazardous Materials; and, Chapter 34 for Flammable and Combustible Liquids.

B. 2013 California Building Code

C. Local County Building Codes

D. Fire District and County Fire Codes

E. National Fire Protection Association (NFPA) standards as may be applicable including:

1) NFPA 10-- Fire extinguishers
2) NFPA 13--Fire sprinkler systems
3) NFPA 14 – Standpipes
4) NFPA 20--Fire Pumps (if needed but doubtful due to high water system pressures)
5) NFPA 70--National Electrical Code

6) NFPA 72--Fire Alarms

7) NFPA 90A--Air Conditioning and Ventilation Systems

8) NFPA 110--Emergency and Standby Power Systems

4.8 Additional Requirements

4.8.1 Single-story structures shall be setback a minimum 15 feet horizontally from top of a slope to the farthest projection from a roof. A single-story structure shall be less than 12 feet above grade. A two-story structure shall be setback a minimum of 30 feet horizontally from top of slope to the farthest projection from a roof.

4.8.2 Where a bridge or an elevated surface is part of a fire apparatus access road, the bridge shall be constructed and maintained in accordance with AASHTO HB-17. Bridges and elevated surfaces shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. Vehicle load limits and clearance limitations shall be posted at both entrances to bridges when required by the fire code official.

4.8.3 Brush and other flammable vegetation will be removed prior to commencing any construction activity. During construction at least 50 feet of clearance around the structures will be kept free of all flammable vegetation as an interim fuel modification zone during construction of structures.

4.8.4 A lighted directory of the development noting building numbers, solar panel designations (if applicable), etc. shall be installed near the entrance with approval from the DSFPD.

4.8.5 Any disputes of individual yard landscaping with regard to interpretation of this Fire Protection Plan (FPP) shall be decided by DSPD's Fire Chief and Fire Marshal. The Fire Marshal's decision shall be final and binding for the development.

4.8.6 This plan and its recommendations should be incorporated by reference into the final project Supplemental Environmental Impact Report.

4.8.7 Separate from the conditions in this FPP, the DSFPD will require a Memorandum of Agreement to be settled prior to the initial phase of the development. The conditions of the agreement will not set aside or alter the conditions with the FPP.

4.9 Fuel Treatment Location Map

Each developmental phase will include a Fuel Treatment Location Map which will show the location of all proposed fuel modification treatment locations and other mitigation measures for the known locations of structures within the development. For this FPP, Exhibit 1 illustrates the recommended fuel modification treatment locations to provide adequate fuel modification requirements for the development.

5.0 CONCLUSIONS

This FPP evaluated the adverse environmental effects that the proposed Lilac Hills Ranch residential and commercial development may have from wildland fire and to properly mitigate those impacts to ensure that this development does not unnecessarily expose people or structures to a significant risk of loss, injury or death involving wildland fires.

5.1 Emergency Response

Lilac Hills Ranch must demonstrate that fire services can be provided that meet the minimum travel time identified in Polcy S-6.4. Travel time is defined as the estimated time it will take for the "closest fire station" to reach the furthest structure in a proposed development project. (Policy S-6.4).

The "closest" fire station to Lilac Hills Ranch is CAL FIRE's Miller Station at 9127 West Lilac Road, located adjacent to the development and approximately 2.3 miles from the furthest structure when the development is fully construct. The travel time from this station to the furthest structure when all phases of the proposed development are completed would be approximately 4.5 minutes, below the 5 minutes travel time requirement (see Figure 5).

DSFPD identified Fire Station 11 as the "primary" fire station for the project in the Project Facility Availability Form (DPLU J-399F Form).

The analysis in this FPP along with the analysis and findings in DUDEK and Hunt's Capabilities Assessment for Lilac Hils Ranch project was referenced and used to recommend options for emergency services. The analysis and Assessment indicates that certain improvements/options to the existing fire response system would provide fire and emergency medical services that would be within the travel times identified in the General Plan.

5.2 Emergency Road Access

The emergency road access (Fire Apparatus Access Roads) requirements for this project shall be adequate and fire code compliant in terms of access and construction standards for roadways. The Fire District Standards and the County Consolidated Fire Code will apply to roadway improvements along West Lilac Road and a portion of Covey Lane and to all interior roads.

In addition, emergency access to the extensive trail system will be provided at numerous points throughout the community.

5.3 Fire-Resistive Building Materials

The required 2014 San Diego County Consolidate Fire Codes ignition-resistant construction for all structures will provide significant protection in this very high fire hazard zone. The ignition-resistant construction requirements provide critical improvements to structures for minimizing ember penetration and resisting potential heat exposure, resulting in a very high survival rate during a worst case scenario fire storm in this rural area. In addition, the FPP requires that ignition-resistant construction will apply to mitigate the ignitability of all future proposed structures and projections (casitas, storage sheds, exterior balconies, carports, decks, patio covers, unenclosed roofs and floors, etc.).

5.4 Fuel Management Zones

The requirements of this FPP provide the fuel modification standards which mitigate the exposure of people to a significant risk of loss, injury or death. The setback area and fuel modification criteria prescribed provide a defensible space zone for fire suppression forces and will protect structures from radiant and convective heat. The project includes a few areas where fuel modification zones are less than 100 feet wide. However, the project is provided with customized fuel modification based on site specific fire behavior modeling and risk assessments. In these areas, off-site, adjacent land uses and overall fuel densities and terrain justify less than 100 feet of fuel modification zone, but will also be subject to other compensating measures (FireWise2000, Inc.'s Fire Protection Plan 2015), which have been evaluated to be sufficient based on adjacent flame lengths and heat intensity.

The project demonstrates compliance with applicable fire regulations, including but not limited to the California Fire Code, California Code of Regulations, County Fire Code, or the County Consolidated Fire Code.

5.5 Cumulative Impact Analysis

Cumulative impacts from multiple projects within DSFPD can cause fire response service to decline and must be analyzed. The Lilac Hills Ranch Project represents a significant development that would increase the existing District population by 5,135 people. The resulting impact on fire services has been analyzed in detail within this report and despite the large population increase, the existing fire service delivery system is considered underutilized on a call volume basis but may need to be augmented by DSFPD to respond to the type of District population change (as discussed in *the Deer Springs Fire Protection District Capability Assessment by DUDEK and Hunt Research Corp, September 2013*). The DSFPD Capability Assessment further states that besides the Lilac Hills Ranch project: The most significant foreseeable DSFPD project is in the southern/central portion of the District in the Merriam Mountains area. There is no current application for this area. However, the San Diego County Board of Supervisors, in June 2012, approved the project owner specific request of 1,200 units. Based on the size, substantial one-time fire mitigation fees and on-going property tax fire availability and suppression fees would be generated by a potential project, similar to the Lilac Hills Ranch Project, DSFPD Station 12 is located in close proximity to the southern end of this project and would be the first responder for fire and emergency medical calls. Based on the currently low call volume at Station 12 and the proximity and low call volumes associated with Stations 13 and 11, the area may be able to be serviced by existing stations, depending on the northerly extents of any development on the Merriam Mountains property and the type and size of the Project that may impact the ability to respond within 4 or 5 minute travel times for first-due and 8 minutes for second-due.

The Capability Assessment also found that no other significant, large master planned communities were identified as reasonably foreseeable. However, just north of the DSFPD and within Station 15's 8 minute travel time response area, a large master planned community is being constructed in the North County Fire Protection District at the corner of I-15 and SR-76. Certain portions of this community have been approved while others are still being entitled. This project includes several components including:

A. Meadowood – 900 units, commercial, school
B. Campus Park – 751 units
C. Campus Park West – 355 unit Palomar College Campus – up to 5,000 students

The "closest" fire station to Lilac Hills Ranch is CAL FIRE's Miller Station at 9127 West Lilac Road located adjacent to the development and approximately 2.3 miles from the furthest structure when the development is fully constructed. The travel time from the Miller Station site to the furthest structure when all phases of the proposed development are completed would be approximately 4.5 minutes, which is below the 5 minutes travel time requirement (see Figure 5). DSFPD identified Fire Station 11 as the "primary" fire station for the project in the Project Facility Availability Form (DPLU J-399F Form). Response times from Station 11 can be found in Table 8 and in Dudek and Hunt's DSFPD Capabilities Assessment, and do not meet the time standards identified by the County General Plan. The analysis provided by this FPP and the Deer Springs Fire Protection District Capability Assessment, the options listed above in section 4.1 would ensure that the project would meet the County's travel time and fire service requirements (*from Deer Springs Fire Protection District Capability Assessment by Dudek and Hunt Research Corp, June 2013*).

The Assessment focused on the DSFPD's current configuration including stations, staffing, apparatus, and response efficiency and considered the potential fire service impacts that the Project, and other foreseeable projects in the DSFPD.

If the recommendations in this Plan are implemented, this development will not expose people or habitable structures to a significant risk of loss, injury or death. Following the recommendations would also decrease the risk of loss for surrounding existing uses. As proposed, the project is not anticipated to contribute to a significant cumulative impact relative to wildland fire risk.

6.0 LIST OF PREPARERS, PERSONS, AND ORGANIZATIONS CONTACTED

6.1 List of Preparers

The principal author and preparer of this Deer Springs Fire Protection Plan is C. Douglas Pumphrey, Senior Wildland Fire Associate of ***FIREWISE* 2000, Inc**. and certified by David C. Bacon, President of ***FIREWISE* 2000, Inc.** and a San Diego County DPLU certified wildland fire consultant.

6.2 List of Persons Contacted During the Course of this Project

Randy Goodson, CEO, Accretive Investment, Inc.
Jon Rilling, President, Accretive Investment, Inc.
Ann Moore, Esquire, Norton Moore and Adams
Chris Amestoy, Fire Chief, Deer Springs Fire Protection District
Cathey Michna, Fire Marshal, Deer Springs Fire Protection District
Mark Brencick, Landmark Consulting
Gerald Scheid, Senior Biologist, RECON
Monique Chen, Chen Ryan Associates
Rikki Schroeder, RMA Consultants
Michael Huff, Dudek

APPENDICES

APPENDIX A

County of San Diego
Acceptable Plants For Defensible Space
In Fire Prone Areas

ALL NATIVE PLANTS ON THE FOLLOWING LIST are considered to be drought-tolerant in the particular climate zone they are found. Those that grow best in riparian areas, as indicated by the "R," are generally the least drought-tolerant plants on the list.

SPECIAL NOTE: When planting, it is necessary to water deeply to encourage the plant roots to seek natural moisture in the soil. This watering should continue for at least three years to allow the plants to naturalize. More water should be provided in summer and less (if any) in the winter. These plants should be weaned off the supplemental irrigation and become less dependent on it over the establishment period.

No plant is totally fire resistant. The plants listed were chosen due to their high water content, minimum amount of flammable resins and/or low fuel volume.

Definitions:

Defensible Space: The area around a structure, where material capable of causing fire has been cleared, reduced or changed, to act as a barrier between an advancing fire and the structure.

Drought-Tolerant Plant Materials: Trees, shrubs, groundcovers, and other vegetation capable of sustained growth and reproduction with only natural moisture. Occasional supplemental irrigation is necessary only in extreme drought situations.

Establishment Period: The time it takes for a plant to become drought-resistant. This is usually a period of three years and is the time when supplemental irrigation is necessary.

Native or Naturalizing Plant Species: Plant species native to the region or introduced which, once established, are capable of sustaining growth and reproduction under local climatic conditions without supplemental irrigation.

***FIREWISE* 2000, Inc. Note:** The plant list which follows was developed using the plants found on the San Diego County approved plant list. This list was then compared to those plants which are suitable for the climatic zone in which the project is located. Only those plants suitable for the project area listed below. The list is therefore shorter than that provided by the County. By providing this custom list, plants that are likely to be killed or seriously damaged by frost or will not perform in hot dry conditions have been eliminated. ***FIREWISE* 2000, Inc.** believes that the planting species suited to the site is essential to fire management goals and is an environmentally sound practice.

July 1, 2015

Customized Acceptable Plant List
For the Lilac Hills Ranch Project

Type	Genus	Species	Common Name
Annual	Lupinus spp.	nanus	Lupine
Groundcover	Achillea	millefolium	Yarrow
Groundcover	Arctostaphylos spp.		Manzanita
Groundcover	Cerastium	tomentosum	Snow-in-Summer
Groundcover	Coprosma	kirkii	Creeping Coprosma
Groundcover	Cotoneaster spp.		Redberry
Groundcover	Drosanthemum	hispidum	Rosea Ice Plant
Groundcover	Dudleya	virens	Island Live-Forever
Groundcover	Eschscholzia	californica	California Poppy
Groundcover	Ferocactus	viridescens	Coast Barrel Cactus
Groundcover	Gaillardia	grandiflora	Blanket Flower
Groundcover	Gazania spp.		Gazania
Groundcover	Helianthemum spp.		Sunrose
Groundcover	Lantana spp.		Lantana
Groundcover	Lasthenia	californica	Common Goldfields
Groundcover	Lasthenia	glabrata	Coastal Goldfields
Groundcover	Lupinus spp.		Lupine
Groundcover	Pyracantha spp.		Firethorn
Groundcover	Rosmarinus	officinalis	Rosemary
Groundcover	Santolina	chamaecyparissus	Lavender Cotton
Groundcover	Trifolium	frageriferum	O'Connor's Legume
Groundcover	Verbena	rigida	Verbena
Groundcover	Viguiera	laciniata	San Diego Sunflower
Groundcover	Vinca	major	Periwinkle
Groundcover	Vinca	minor	Dwarf Periwinkle
Perennial	Coreopsis	grandiflora	Coreopsis
Perennial	Coreopsis	maritima	Sea Dahlia
Perennial	Coreopsis	verticillata	Coreopsis
Perennial	Heuchera	maxima	Island Coral Bells
Perennial	Iris	douglasiana	Douglas Iris
Perennial	Kniphofia	uvaria	Red-Hot Poker
Perennial	Lavandula spp.		Lavender
Perennial	Penstemon spp.		Penstemon
Perennial	Satureja	douglasii	Yerba Buena
Perennial	Sisyrinchium	bellum	Blue-Eyed Grass
Perennial	Sisyrinchium	californicum	Golden-Eyed Grass
Perennial	Solanum	xantii	Purple Nightshade
Perennial	Zauschneria	'Catalina'	Catalina Fuschia
Perennial	Zauschneria	californica	California Fuschia
Perennial	Zauschneria	cana	Hoary California Fuschia
Shrub	Agave	americana	Desert Century Plant
Shrub	Agave	Amorpha fruticosa	False Indigobush
Shrub	Agave	deserti	Shaw's Century Plant
Shrub	Agave	shawii	NCN
Shrub	Agave		Century Plant
Shrub	Arbutus	menziesii	Madrone
Shrub	Arctostaphylos spp.		Manzanita
Shrub	Atriplex	canescens	Hoary Saltbush
Shrub	Atriplex	lentiformis	Quail Saltbush

Shrub	Baccharis	pilularis	Coyote Bush
Shrub	Baccharis	salicifolia	Mule Fat "R"
Shrub	Carissa	macrocarpa	Natal Plum
Shrub	Ceanothus spp.		California Lilac
Shrub	Cistus spp.		Rockrose
Shrub	Cneoridium	dumosum	Bush rue
Shrub	Comarostaphylis	diversifolia	Summer Holly
Shrub	Convolvulus	cneorum	Bush Morning Glory
Shrub	Elaeagnus	pungens	Silverberry
Shrub	Encelia	californica	Coast Sunflower
Shrub	Encelia	farinosa	White Brittlebush
Shrub	Eriobotrya	deflexa	Bronze Loquat
Shrub	Eriophyllum	confertiflorum	Golden Yarrow
Shrub	Escallonia spp.		Escallonia
Shrub	Feijoa	sellowiana	Pineapple Guava
Shrub	Fouqueria	splendens	Ocotillo
Shrub	Fremontodendron	californicum	Flannelbush
Shrub	Fremontodendron	mexicanum	Southern Flannelbush
Shrub	Galvezia	juncea	Baja Bush-Snapdragon
Shrub	Galvezia	speciosa	Island Bush-Snapdragon
Shrub	Garrya	elliptica	Coast Silktassel
Shrub	Garrya	flavescens	Ashy Silktassel
Shrub	Heteromeles	arbutifolia	Toyon
Shrub	Lantana spp.		Lantana
Shrub	Lotus	scoparius	Deerweed
Shrub	Mahonia spp.		Barberry
Shrub	Malacothamnus	clementinus	San Clemente Island Bush
Shrub	Malacothamnus	fasciculatus	Mesa Bushmallow
Shrub	Melaleuca spp.		Melaleuca
Shrub	Mimulus spp.		Monkeyflower
Shrub	Nolina	parryi	Parry’s Nolina
Shrub	Photinia spp.		Photinia
Shrub	Pittosporum	rhombifolium	Queensland Pittosporum
Shrub	Pittosporum	tobira ‘Wheeleri’	Wheeler’s Dwarf
Shrub	Plumbago	auriculata	Cape Plumbago
Shrub	Prunus	caroliniana	Carolina Laurel Cherry
Shrub	Prunus	ilicifolia	Hollyleaf Cherry
Shrub	Prunus	lyonii	Catalina Cherry
Shrub	Puncia	granatum	Pomegranate
Shrub	Pyracantha spp.		Firethorn
Shrub	Rhamus	alaternus	Italian Buckthorn
Shrub	Rhamus	californica	Coffeeberry
Shrub	Rhaphiolepis spp.		Rhaphiolepis
Shrub	Rhus	continus	Smoke Tree
Shrub	Rhus	ovata	Sugarbush
Shrub	Rhus	trilobata	Squawbush
Shrub	Romneya	coulteri	Matilija Poppy
Shrub	Rosa	californica	California Wild Rose
Shrub	Rosa	minutifolia	Baja California Wild Rose
Shrub	Salvia spp.		Sage
Shrub	Sambucus spp.		Elderberry
Shrub	Symphoricarpos	mollis	Creeping Snowberry
Shrub	Syringa	vulgaris	Lilac

Shrub	Teucrium	fruticans	Bush Germander
Shrub	Verbena	lilacina	Lilac Verbena
Shrub	Xylosma	congestum	Shiny Xylosma
Shrub	Yucca	schidigera	Mojave Yucca
Shrub	Yucca	whipplei	Foothill Yucca
Tree	Acer	macrophyllum	Big Leaf Maple
Tree	Acer	saccarum	Sugar Maple
Tree	Acer	saccharinum	Silver Maple
Tree	Alnus	rhombifolia	White Alder "R"
Tree	Arbutus	unedo	Strawberry Tree
Tree	Brahea	edulis	Guadalupe Palm
Tree	Ceratonia	siliqua	Carob
Tree	Cercis	occidentalis	Western Redbud
Tree	Cerdidium	floridum	Blue Palo Verde
Tree	Cornus	nuttallii	Mountain Dogwood
Tree	Cornus	stolonifera	Redtwig Dogwood
Tree	Elaeagnus	angustifolia	Russian Olive
Tree	Eriobotrya	japonica	Loquat
Tree	Gingko	biloba "Fairmount"	Fairmount Maidenhair Tree
Tree	Gleditisia	triacanthos	Honey Locust
Tree	Juglans	californica	California Walnut
Tree	Juglans	hindsii	California Black Walnut
Tree	Lagerstroemia	indica	Crape Myrtle
Tree	Ligustrum	lucidum	Glossy Privet
Tree	Liquidambar	styraciflua	Sweet Gum
Tree	Liriodendron	tulipifera	Tulip Tree
Tree	Melaleuca spp.		Melaleuca
Tree	Nerium	oleander	Oleander
Tree	Parkinsonia	aculeata	Mexican Palo Verde
Tree	Pistacia	chinensis	Chinese Pistache
Tree	Pistacia	vera	Pistachio Nut
Tree	Pittosporum	phillyreoides	Willow Pittosporum
Tree	Platanus	acerifolia	London Plane Tree
Tree	Platanus	racemosa	California Sycamore "R"
Tree	Populus	alba	White Poplar
Tree	Populus	fremontii	Western Cottonwood "R"
Tree	Populus	trichocarpa	Black Cottonwood "R"
Tree	Prunus	caroliniana	Carolina Laurel Cherry
Tree	Prunus	cersifera 'Newport'	Newport Purple-Leaf Plum
Tree	Prunus	ilicifolia	Hollyleaf Cherry
Tree	Prunus	lyonii	Catalina Cherry
Tree	Prunus	serrulata 'Kwanzan'	Flowering Cherry
Tree	Prunus	xblireiana	Flowering Plum
Tree	Prunus	yedoensis 'Akebono'	Akebono Flowering Cherry
Tree	Quercus	agrifolia	Coast Live Oak
Tree	Quercus	engelmannii	Engelmann Oak
Tree	Quercus	suber	Cork Oak
Tree	Rhus	lancea	African Sumac
Tree	Salix spp.		Willow "R"
Tree	Ulmus	parvifolia	Chinese Elm
Tree	Ulmus	pumila	Siberian Elm
Tree	Umbellularia	californica	California Bay Laurel "R"
Vine	Antigonon	leptopus	San Miguel Coral Vine

Vine	Distictis	buccinatoria	Blood-Red Trumpet Vine
Vine	Keckiella	cordifolia	Heart-Leaved Penstemon
Vine	Lonicera	japonica 'Halliana'	Hall's Honeysuckle
Vine	Lonicera	subspicata	Chaparral Honeysuckle
Vine	Solanum	jasminoides	Potato Vine

APPENDIX B

Undesirable Plant List

March 26, 2012

The following species are highly flammable and should be avoided when planting within the first 50 feet adjacent to a structure. The plants listed below are more susceptible to burning, due to rough or peeling bark, production of large amounts of litter, vegetation that contains oils, resin, wax, or pitch, large amounts of dead material in the plant, or plantings with a high dead to live fuel ratio. Many of these species, if existing on the property and adequately maintained (pruning, thinning, irrigation, litter removal, and weeding), may remain as long as the potential for spreading a fire has been reduced or eliminated.

BOTANICAL NAME	COMMON NAME
Abies species	Fir Trees
Acacia species	Acacia (trees, shrubs, groundcovers)
Adenostoma sparsifolium**	Red Shanks
Adenostoma fasciculatum**	Chamise
Agonis juniperina	Juniper Myrtle
Araucaria species	Monkey Puzzle, Norfolk Island Pine
Artemesia californica**	California Sagebrush
Bambusa species	Bamboo
Cedrus species	Cedar
Chamaecyparis species	False Cypress
Coprosma pumila	Prostrate Coprosma
Cryptomeria japonica	Japanese Cryptomeria
Cupressocyparis leylandii	Leylandii Cypress
Cupressus forbesii**	Tecate Cypress
Cupressus glabra	Arizona Cypress
Cupressus sempervirens	Italian Cypress
Dodonea viscosa	Hopseed Bush
Eriogonum fasciculatum**	Common Buckwheat
Eucalyptus species	Eucalyptus
Heterotheca grandiflora**	Telegraph Plant
Juniperus species	Junipers
Larix species	Larch
Lonicera japonica	Japanese Honeysuckle
Miscanthus species	Eulalia Grass
Muehlenbergia species**	Deer Grass
Palmae species	Palms
Picea species	Spruce Trees
Pickeringia Montana**	Chaparral Pea
Pinus species	Pines
Podocarpus species	Fern Pine
Pseudotsuga menziesii	Douglas Fir
Rosmarinus species	Rosemary
Salvia mellifera**	Black Sage
Taxodium species	Cypress
Taxus species	Yew
Thuja species	Arborvitae
Tsuga species	Hemlock
Urtica urens**	Burning Nettle

** San Diego County native species

APPENDIX C

Literature Referenced in this FPP

Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model, General Technical Report RMRS-GTR-153. June 2005. Joe H. Scott, Robert E. Burgan, United States Department of Agriculture - Forest Service, Rocky Mountain Research Station, Missoula, Montana

Andrews, Patricia L.; Bevins, Collin D.; Seli, Robert C. 2004. *BehavePlus Fire Modeling System, version 4.0.0: User's Guide. Gen. Tech. Rep. RMRS-GTR-106WWW.* Ogden, UT: Department of Agriculture, Forest Service, Rocky Mountain Research Station. 132p

Andrews, Patricia L. 1986. *BEHAVE: Fire Behavior Prediction and Fuel Modeling System Burn Subsystem, Part 1.* Gen Tech. Rep. INT-194. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 130 pages.

ANSI A-300 - *Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices. A series of maintenance and management practices.* Tree Care Industry Association. Londonderry, NH 03053.

County of San Diego, Consolidated Fire Code, October 2011

County of San Diego. *Plant List and Acceptable Plants for a Defensible Space in Fire Prone Areas.* Department of Planning and Land Use, December, 1998

County of San Diego. *Guidelines for Determining Significance and Report Format and Content Requirement.* Wildland Fire and Fire Protection Land Use and Environment Group Department of Planning and Land Use, Department of Public Works, December 19, 2008

California Code of Regulations [CCR] Title [T] – 24 part 2 Article 86 (8601 & International Urban – Wildland Interface Code, 2003, 2003 edition, Ordinance 2004-003.

County of San Diego. *Consolidated Fire Code.* Created on October 14, 2009 with passage of County Ordinance 10013. County Health and Safety Code Section §*13869.7.*

County of San Diego. *Guidelines for Determining Significance and Report Format and Content Requirements Wildland Fire and Fire Protection Land Use and Environment Group Department of Planning and Land Use, Department of Public Works, March 19, 2007*.

County of San Diego Ordinance No. 101146 – *An Ordinance Amending Appendix II-A of the County Fire Code Relating to Wildland/Urban Interface Standards*.

County of San Diego. *Plant List and Acceptable Plants for a Defensible Space in Fire Prone Areas.* Department of Planning and Land Use, December 15, 1998.

County of San Diego. *Standards for Private Roads."* Department of Public Works, Adopted June 30, 1999.

Deer Springs Fire Protection District, Ordinance 2010-01; an ordinance of the Deer Springs Fire Protection District which adopts the California fire code, 2010 edition, and 2009 international fire code with certain amendments, additions, and deletions.

DUDEK Environmental Consultants and Civil Engineers. Flammap Fire Behavior Modeling – Lilac Hills Master Planned Community. August 15, 2012

DUDEK and Hunt Research Corporation. Lilac Hills Ranch Fire Services Response Capabilities Assessment, December 2013

DUDEK Environmental Consultants and Civil Engineers. Fuel Modification Zones Analysis. September 2012

Fire Planning and Mapping Tools. California Fire Alliance. Web site is available at: http://wildfire.cr.usgs.gov/fireplanning/

Guidance Document Ignition Resistant Eave Construction. County of San Diego, Department of Planning and Land Use, Building Division, DPLU # 198 (3-21-2005).

How to Predict the Spread and Intensity of Forest and Range Fires. General Technical Report INT-143. June 1983. Richard C. Rothermel. United States Department of Agriculture - Forest Service, Intermountain Station, Ogden, Utah 84401

Latham, D. J. and J. A. Schleiter. (1989) *Ignition Probabilities of Wildland Fuels Based on Simulated Lightning Discharges*. USDA Forest Service General Technical Report INT-411, Ogden, UT. (6,497 KB; 20 pages)

National Fire Protection Association - *NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire* (2008 Edition). 30 pages.

National Fire Protection Association - *NFPA 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting,* 2007 Edition. 64 pages.

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

The Biological Resources Report for Lilac Hills Ranch by RECON. 2012

Western Garden Book 2001 Edition. Editor: Kathleen Norris Brenzel. ISBN-0376039175 Sunset Publishing Corporation. Menlo Park, CA. 768 pages.

Western Region Climate Center. *Historic Climate Data from Remote Automated Weather Stations.* RAWS USA Climate Archive. Reno, NV. Data for all Remote Automated Weather Stations is available at: http://www.raws.dri.edu/index.html.

Wildland/Urban Interface Development Standards. San Diego County Fire Chief's Association, originally Developed by Orange County Wildland/Urban Interface Task Force Subcommittee on Open Space Management, July, 1994, Modified by the San Diego County Wildland/Urban Interface Task Force, November, 1995, Revised August, 1997.

APPENDIX D

Behaveplus Version 4.0.0
Fire Behavior Calculations

July 1, 2015

BehavePlus 4.0.0 (Build 276)

LHR 60 MPH-sh7FM-Untreated
Tue, Jul 31, 2012 at 11:31:53

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		sh7
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	24
Terrain		
Slope Steepness	%	20

Run Option Notes

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fire line intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	507.9	ft./min
Heat per Unit Area	2778	Btu/ft2
Fire line Intensity	23515	Btu/ft./s
Flame Length	45.6	ft.

BehavePlus 4.0.0 (Build 276)

July 1, 2015

LHR_30MPH-sh7FM_Untreated
Sun, Mar 25, 2012 at 23:00:08

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		sh7
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	12
Terrain		
Slope Steepness	%	20

Run Option Notes
Results

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fire line intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Output Variable	Value	Units
Surface Rate of Spread (maximum)	223.1	ft./min
Heat per Unit Area	2778	Btu/ft2
Fire line Intensity	10327	Btu/ft./
Flame Length	31.6	Ft

July 1, 2015

BehavePlus 4.0.0 (Build 276)

LHR_30MPH-tl6(50%)+gr1(50%)FMs_Treated

Sun, Mar 25, 2012 at 23:10:27

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
First Fuel Model		tl6
Second Fuel Model		gr1
First Fuel Model Coverage	%	50
Fuel Model Type		S
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	12
Terrain		
Slope Steepness	%	20

Run Option Notes

Two fuel model weighting method: two-dimensional spread [SURFACE].

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fire line intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	26.8	ft./min
Heat per Unit Area	580	Btu/ft2
Fire line Intensity	324	Btu/ft./s
Flame Length	6.6	ft.

July 1, 2015

LHR 30 MPH-sh7FM-Untreated
Tue, Jul 31, 2012 at 11:34:56

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
Fuel Model		sh7
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	12
Terrain		
Slope Steepness	%	40

Run Option Notes

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fire line intensity, flame length, and spread distance are always for the direction of the spread

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	236.2	ft./min
Heat per Unit Area	2778	Btu/ft2
Fire line Intensity	10936	Btu/ft./s
Flame Length	32.4	

July 1, 2015

BehavePlus 4.0.0 (Build 276)

LHR 30 MPH-tl6(50%)&gr1(50%)-Treated
Tue, Jul 31, 2012 at 11:48:26

Input Worksheet

Inputs: SURFACE

Input Variables	Units	Input Value(s)
Fuel/Vegetation, Surface/Understory		
First Fuel Model		tl6
Second Fuel Model		gr1
First Fuel Model Coverage	%	50
Fuel Model Type		S
Fuel Moisture		
1-h Moisture	%	2
10-h Moisture	%	3
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50
Weather		
Midflame Wind Speed (upslope)	mi/h	12
Terrain		
Slope Steepness	%	40

Run Option Notes

Two fuel model weighting method: two-dimensional spread [SURFACE].

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fire line intensity, flame length, and spread distance are always for the direction of the spread

Wind is blowing upslope [SURFACE].

Results

Output Variable	Value	Units
Surface Rate of Spread (maximum)	28.0	ft./min
Heat per Unit Area	580	Btu/ft2
Fire line Intensity	342	Btu/ft./s
Flame Length	6.6	ft.

FIRE BEHAVIOR MODELING SUMMARY BY FIRE SCENARIO

***Fire Scenario #1 – Fire Approaching from the North and East** (Late Fire Season With 60 MPH North, Northeast And East Wind Conditions in SCAL 18 Fuel Model)*	
Fire Behavior Calculation Input Data • *20 percent slope* • *60 mph wind speed* • *225^o aspect from north* • *45^o wind direction from north*	**Anticipated Fuel Moistures** • *1-Hour Fine Fuel Moisture ……………..2%* • *10-Hour Fuel Moisture ……………………3%* • *100-Hour Fuel Moisture ……………………5%* • *Live Herbaceous Fuel Moisture ………30%* • Live Woody Fuel Moisture ……………50%
Expected Fire Behavior *Fuel Model SCAL 18 – Coastal Sage Scrub*	
Rate of Spread - *294 feet/minute*	
Fire line Intensity - *21,329BTU's/foot/second*	
Flame Length - *44.1 feet in length*	
Expected Fire Behavior in Treated Fuels *Combined Fuel Model - [tl6 – Very High Load Broadleaf Litter 50% and gs1 - Short, Sparse Dry Climate Grass 50%]*	
Rate of Spread - *79.5 feet/minute*	
Flame Length – 15.6 *feet in length*	

***Fire Scenario #2 – Fire Approaching from the southwest** (Late Fire Season With 30 MPH Wind Conditions in SCAL 18 Fuel Model)*	
Fire Behavior Calculation Input Data • *20 percent slope* • *30 mph wind speed* • *45^o aspect from north* • *225^o wind direction from north*	**Anticipated Fuel Moistures** • *1-Hour Fine Fuel Moisture ……………..2%* • *10-Hour Fuel Moisture ……………………3%* • *100-Hour Fuel Moisture ……………………5%* • *Live Herbaceous Fuel Moisture ……….30%* • *Live Woody Fuel Moisture ………………50%*
Expected Fire Behavior *Fuel Model SCAL 18 – Coastal Sage Scrub*	
Rate of Spread - *147 feet/minute*	
Fire line Intensity - *10695 foot/second*	
Flame Length - *32.1 feet in length*	
Expected Fire Behavior in Treated Fuels *Combined Fuel Model - [tl6 – Very High Load Broadleaf Litter 50% and gs1 - Short, Sparse Dry Climate Grass 50%]*	
Rate of Spread - *25.1 feet/minute*	
Fire line Intensity - *612 BTU's/foot/second*	
Flame Length – 8.6 *feet in length*	

Fire Scenario #3 – Fire Approaching from the North and East (Late Fire Season Santa Ana Wind Event With 60 MPH North, Northeast And East Wind Conditions in southern mixed chaparral, sh7 Fuel Model)	
Fire Behavior Calculation Input Data *20 percent slope* *60 mph wind speed* *225° aspect from north* *45° wind direction from north*	**Anticipated Fuel Moistures** *1-Hour Fine Fuel Moisture ……………..2%* *10-Hour Fuel Moisture …………………3%* *100-Hour Fuel Moisture ………………5%* *Live Herbaceous Fuel Moisture ………30%* *Live Woody Fuel Moisture …………….50%*
Expected Fire Behavior *Fuel Model SCAL 18 – Coastal Sage Scrub*	
Rate of Spread - *495 feet/minute*	
Fire line Intensity - *22905 BTU's/foot/second*	
Flame Length - *45.6 feet in length*	
Expected Fire Behavior in Treated Fuels *Combined Fuel Model - [tl6 – Very High Load Broadleaf Litter 50% and gs1 - Short, Sparse Dry Climate Grass 50%]*	
Rate of Spread - *60.9 feet/minute*	
Fire line Intensity - 890 BTU's/foot/second	
Flame Length – 10.2 *feet in length*	

Fire Scenario #4 – Fire Approaching from the south and southwest (Late Fire Season "Rare Event" With 30 MPH Wind Conditions in southern mixed chaparral, sh7 Fuel Model)	
Fire Behavior Calculation Input Data *20 percent slope* *30 mph wind speed* *45° aspect from north* *225° wind direction from north*	**Anticipated Fuel Moistures** *1-Hour Fine Fuel Moisture ……………..2%* *10-Hour Fuel Moisture …………………3%* *100-Hour Fuel Moisture ………………5%* *Live Herbaceous Fuel Moisture …………30%* *Live Woody Fuel Moisture ………………50%*
Expected Fire Behavior *Fuel Model SCAL 18 – Coastal Sage Scrub*	
Rate of Spread - *223 feet/minute*	
Fire line Intensity - *10327 foot/second*	
Flame Length - *31.6 feet in length*	
Expected Fire Behavior in Treated Fuels *Combined Fuel Model - [tl6 – Very High Load Broadleaf Litter 50% and gs1 - Short, Sparse Dry Climate Grass 50%]*	
Rate of Spread - *26.8 feet/minute*	
Fire line Intensity - *324 BTU's/foot/second*	
Flame Length – 6.4 *feet in length*	

Fire Scenario #5 – Fire Approaching from the south and southwest (Late Fire Season "Rare Event" With 30 MPH Wind Conditions in southern mixed chaparral, sh7 Fuel Model)	
Fire Behavior Calculation Input Data *40 percent slope* *30 mph wind speed* *45^{o} aspect from north* *225^{o} wind direction from north*	**Anticipated Fuel Moistures** *1-Hour Fine Fuel Moisture ……………..2%* *10-Hour Fuel Moisture …………………..3%* *100-Hour Fuel Moisture …………………5%* *Live Herbaceous Fuel Moisture ………..30%* *Live Woody Fuel Moisture ……………..50%*
Expected Fire Behavior *Fuel Model SCAL 18 – Coastal Sage Scrub*	
Rate of Spread - *236.2 feet/minute*	
Fire line Intensity - *10936 foot/second*	
Flame Length - *32.4 feet in length*	
Expected Fire Behavior in Treated Fuels *Combined Fuel Model - [tl6 – Very High Load Broadleaf Litter 50% and gs1 - Short, Sparse Dry Climate Grass 50%]*	
Rate of Spread - *28.0 feet/minute*	
Fire line Intensity - *342 BTU's/foot/second*	
Flame Length – *6.6 feet in length*	

APPENDIX E

Project Facility Availability Forms (Fire and Water)

The Attached Project Facility Availability Form (DPLU-399F) Dated 2/14/2014, Documents Deer Springs Fire Protection District's Requirements to Comply and Adhere to Any and All Current Fire Codes, Building Codes and County Codes Applicable At the Time of Project Start

Separate From the Conditions Outlined in The Project Availability Form (PFAF), The Deer Springs Fire Protection District Will Require a Memorandum of Agreement To Settle Prior To The Initial Phase of the Development. The Conditions of the Agreement Will Not Set Aside or Alter The Conditions In The Attached PFAF.

COUNTY OF SAN DIEGO
DEPARTMENT OF PLANNING AND LAND USE: Zoning
PROJECT FACILITY AVAILABILITY FORM, Fire

Please type or use pen

Accretive Investments, Inc. — 858-546-0700
Owner's Name — Phone

12275 El Camino Real, Suite 110
Owner's Mailing Address — Street

San Diego — CA — 92130
City — State — Zip

ORG____ ACCT____ ACT____ TASK____ DATE____ AMT $____

DISTRICT CASHIER'S USE ONLY

F

SECTION 1. PROJECT DESCRIPTION — **TO BE COMPLETED BY APPLICANT**

A. [X] Major Subdivision (TM) [X] Specific Plan or Specific Plan Amendment
[ ] Minor Subdivision (TPM) [ ] Certificate of Compliance:____
[ ] Boundary Adjustment
[X] Rezone (Reclassification) from A-70 & RR to RU & C34 zone.
[X] Major Use Permit (MUP), purpose: water reclamation
[ ] Time Extension...Case No.____
[ ] Expired Map...Case No.____
[X] Other____

B. [X] Residential . . . . . . Total number of dwelling units 1,746
[X] Commercial . . . . . Gross floor area 90,000
[ ] Industrial . . . . Gross floor area____
[X] Other . . . . Gross floor area____

C. Total Project acreage 608 Total lots 1,746 Smallest proposed lot n/a

Assessor's Parcel Number(s)
(Add extra if necessary)

See Attached	

Thomas Bros. Page ____ Grid ____

32444 Birdsong Drive, Escondido
Project address — Street

Bonsall & Valley Center — 92026
Community Planning Area/Subregion — Zip

OWNER/APPLICANT AGREES TO COMPLETE ALL CONDITIONS REQUIRED BY THE DISTRICT.

Applicant's Signature: [signature] Date: 12/18/13

Address: 12275 El Camino Real, Suite 110 Phone: 858-546-0700

(On completion of above, present to the district that provides fire protection to complete Section 2 and 3 below.)

SECTION 2: FACILITY AVAILABILITY — **TO BE COMPLETED BY DISTRICT**

District name Deer Springs Fire Protection District

Indicate the location and distance of the primary fire station that will serve the proposed project: DSFPD Station 1, 8709 Circle "R" Drive, Escondido CA 92026 — 5 miles to primary access to project

A. [X] Project is in the District and eligible for service.
[ ] Project is not in the District but is within its Sphere of Influence boundary, owner must apply for annexation.
[ ] Project is not in the District and not within its Sphere of Influence boundary.
[ ] Project is not located entirely within the District and a potential boundary issue exists with the ____ District.

B. [X] Based on the capacity and capability of the District's existing and planned facilities, fire protection facilities are currently adequate or will be adequate to serve the proposed project. The expected emergency travel time to the proposed project is 7 minutes.
[ ] Fire protection facilities are not expected to be adequate to serve the proposed development within the next five years.

C. [X] District conditions are attached. Number of sheets attached: 4
[ ] District will submit conditions at a later date.

SECTION 3. FUELBREAK REQUIREMENTS

Note: The fuelbreak requirements prescribed by the fire district for the proposed project do not authorize any clearing prior to project approval by the Department of Planning and Land Use.

[ ] Within the proposed project ____ feet of clearing will be required around all structures.
[X] The proposed project is located in a hazardous wildland fire area, and additional fuelbreak requirements may apply. Environmental mitigation requirements should be coordinated with the fire district to ensure that these requirements will not pose fire hazards.

This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted.

[signature] — Chris Amestoy, Fire Chief — (760)749-8001 — 2/12/14
Authorized signature — *Print name and title* — *Phone* — *Date*

On completion of Section 2 and 3 by the District, applicant is to submit this form with application to:
Zoning Counter, Department of Planning and Land Use, 5201 Ruffin Road, Suite B, San Diego, CA 92123

DPLU-399F (12/09)

Deer Springs Fire Protection District

8709 Circle R Drive • Escondido, CA 92026 • *tel* 760-749-8001 • *fax* 760-749-6572

February 12, 2014

Dear Applicant,

In review of the project proposal, the Deer Springs Fire Protection District has determined that the following conditions shall apply to your development:

The DSFPD requires that this site will comply with the following and adhere to any and all current Fire codes, Building codes and County codes applicable at the time of Project start:

Fire Apparatus Access Roads. A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term that includes, but is not limited to a fire lane, public street, private street, driveway, and parking lot lane and access roadway.

Dimensions.- (a) Fire apparatus access roads shall have an unobstructed improved width of not less than 24 feet, except for single-family residential driveways; serving no more than two single-family dwellings, shall have a minimum of 16 feet of unobstructed improved width. Any of the following, which have separated lanes of one-way traffic: gated entrances with card readers, guard stations or center medians, are allowed, provided that each lane is not less than 14 feet wide.

(b) All fire apparatus access roads and driveways shall have an unobstructed vertical clearance of not less than 13 feet 6 inches. Vertical clearances or width shall be increased when, in the opinion of the fire code official, vertical clearances or road widths are not adequate to provide fire apparatus access.

Exception:

1. Upon approval by the fire code official, vertical clearances or road width may be reduced, as long as the reduction does not impair access by fire apparatus. In cases where the vertical clearance has been reduced approved signs shall be installed and maintained indicating the amount of vertical clearance.

Roadways are to be completed prior to the allowance of combustibles onsite.

One way streets are a fire department access issue.

Additional access- The fire code official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

Authority to increase minimums- The fire code official shall have the authority to require an increase in the minimum access road widths where the fire code official determines the minimum are inadequate for fire or rescue operations.

Surface- Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus not less than 75,000 lbs. (unless authorized by the FAHJ) and shall be provided with an approved paved surface so as to provide all-weather driving capabilities.

Turning Radius- The turning radius of a fire apparatus access road shall comply with the County public and private road standards approved by the Board of Supervisors. The turning radius for a private residential driveway shall be a minimum of 28 feet, as measured on the inside edge of the improvement width or as approved by the fire code official.

Grade- The gradient for a fire apparatus access roadway shall not exceed 20.0%. Grades exceeding 15% shall not be allowed without mitigation measures. The fire code official may require additional mitigation measures where he deems appropriate. The angle of departure and the angle of approach of a fire access roadway shall not exceed 7 degrees (12 percent) or as approved by the fire code official.

Marking- When required by the fire code official, approved signs or other approved notices shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. Signs or notices shall be maintained in a clean and legible condition at all times and is replaced or repaired when necessary to provide adequate visibility. All new public roads, all private roads within major subdivisions, and all private easements serving four or more parcels shall be named. Road name signs shall comply with County of San Diego Department of Public Works Design Standard #DS-13.

Fire Lane Designation- Where the fire code official determines that it is necessary to ensure fire access, the fire code official may designate existing roadways as fire access roadways as provided by Vehicle Code Section 22500.1(public) or 22658 (private).

Roadway Design Features- Roadway design features (speed bumps, speed humps, speed control dips, etc.), which may interfere with emergency apparatus responses shall not be installed on fire access roadways, unless they meet design criteria approved by the fire code official.

Dead ends- All dead-end fire access roads in excess of 150 feet in length shall be provided with approved provisions for turning around emergency apparatus. Hammerheads do not serve as a desirable turnaround design for DSFPD.

Gates- All gates or other structures or devices which could obstruct fire access roadways or otherwise hinder emergency operations are prohibited unless they meet standards approved by the fire code official, and receive Specific Plan approval.

All automatic gates across fire access roadways and driveways shall be equipped with approved emergency key-operated switches overriding all command functions and opening the gate(s).

Gates accessing more than four residences or residential lots, or gates accessing hazardous institutional, educational or assembly occupancy group structures, shall also be equipped with approved emergency traffic control-activating strobe light sensor(s), or other devices approved by the fire code official, which will activate the gate on the approach of emergency apparatus with a battery back-up or manual mechanical disconnect in case of power failure. All automatic gates located within the development are required to have a Knox© key switch override system along with an approved emergency traffic control-activating strobe light sensor(s), i.e.; Opticom.

Fuel Modification- 100 foot fuel modification **minimum** will apply throughout entire project in accordance with the specification of County Consolidated Fire Code *§96.1.4907.2.* Additional clearance may be required as necessary depending on specific conditions on site.

Fuel Modification of combustible vegetation from sides of roadway- Combustible vegetation will be modified 20 feet from each side of the road or driveway to establish a fuel modification zone.

Required Installations- The location, type and number of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided on the public or private street, or on the site of the premises to be protected, or both, as required and approved by the fire code official. Fire hydrants shall be accessible to the fire department apparatus by roads meeting the requirements of Section 503. For fire safety during the construction, alteration or demolition of a building, see Section 1412.1.

Fire Hydrants- Fire hydrants shall be installed as required by the fire code official, using the following criteria and taking into consideration departmental operational needs. Hydrants shall be located at intersections, at the beginning radius of cul-de-sacs and at intervals identified in the following tables and criteria. Hydrants located across heavily traveled roadways shall be not considered as serving the subject property. All hydrants shall be installed and serviceable prior to the delivery of combustibles.

Waterline Extensions- The fire code official may require a waterline extension for the purpose of installing a fire hydrant if the water main is 1,500 feet or less from the property line.

Fire Sprinkler Systems- Approved automatic fire sprinkler systems will be required throughout all structures in this development.

Community Recreational Elements/Community Trail Network- With a proposed trail network of over 16 miles there needs to be several areas that will be accessible to the fire department for emergency incidents on the trails. Please add these access points to the plan for District approval.

Fire Protection Response Agreement: Separate from the above conditions, the District will require a memorandum of agreement to be settled prior to the initial phase of the development. The conditions of the agreement will not set aside or alter the above listed conditions.

Sincerely,

Chris Amestoy
Fire Chief
Deer Springs Fire Protection District

July 1, 2015

RECEIVED
MAR 08 2013
BY: [signature]

COUNTY OF SAN DIEGO
DEPARTMENT OF PLANNING AND LAND USE: Zoning
PROJECT FACILITY AVAILABILITY FORM, Water

Please type or use pen

Accretive Investments, Inc. — 858-546-0700
Owner's Name — Phone

12275 El Camino Real, Suite 110
Owner's Mailing Address — Street

San Diego — CA — 92130
City — State — Zip

ORG VCMWD
ACCT
ACT 01-4433.00
TASK
DATE 2-6-2013 AMT $ 50.00
DISTRICT CASHIER'S USE ONLY

W

SECTION 1. PROJECT DESCRIPTION — **TO BE COMPLETED BY APPLICANT**

A. ☒ Major Subdivision (TM) ☒ Specific Plan or Specific Plan Amendment
☐ Minor Subdivision (TPM) ☐ Certificate of Compliance:
☐ Boundary Adjustment
☒ Rezone (Reclassification) from A70 to RU & C34 zone.
☒ Major Use Permit (MUP), purpose: Water Reclamation Facility
☐ Time Extension...Case No.
☐ Expired Map...Case No.
☒ Other General Plan Amendment

B. ☒ Residential ...... Total number of dwelling units 1,746
☒ Commercial...... Gross floor area 90000 sf
☐ Industrial .... Gross floor area
☒ Other .... Gross floor area Civic, Res/Comm Mixed Use

C. ☒ Total Project acreage 608 Total number of lots 1,746

D. Is the project proposing the use of groundwater? ☒ Yes ☐ No
Is the project proposing the use of reclaimed water? ☒ Yes ☐ No

Assessor's Parcel Number(s)
(Add extra if necessary)

59 Parcels -	
See attached list	
dated 1-7-2013	Exhibit A

Thomas Bros. Page 1049 Grid B7

East of Old Hwy 395 & South of W. Lilac Road
Project address — Street

Bonsall & Valley Center — 92026
Community Planning Area/Subregion — Zip

Owner/Applicant agrees to pay all necessary construction costs, dedicate all district required easements to extend service to the project and COMPLETE ALL CONDITIONS REQUIRED BY THE DISTRICT

Applicant's Signature: [signature] Date: 1-24-2013

Address: 12275 El Camino Real, Suite 110, San Diego, CA 92130 Phone: 858-546-0700

(On completion of above, present to the district that provides water protection to complete Section 2 below.)

SECTION 2: FACILITY AVAILABILITY — **TO BE COMPLETED BY DISTRICT**

District Name: Valley Center Municipal Water District Service area county area of Valley Center

A. ☒ Project is in the district.
☐ Project is not in the district but is within its Sphere of Influence boundary, owner must apply for annexation.
☐ Project is not in the district and is not within its Sphere of Influence boundary.
☐ The project is not located entirely within the district and a potential boundary issue exists with the ______ District.

B. ☒ Facilities to serve the project ☒ ARE ☐ ARE NOT reasonably expected to be available within the next 5 years based on the capital facility plans of the district. Explain in space below or on attached 1 (Number of sheets) Exhibit B
☐ Project will not be served for the following reason(s):

C. ☒ **District conditions are attached. Number of sheets attached: 1 Exhibit B**
☐ **District has specific water reclamation conditions which are attached. Number of sheets attached:**
☐ **District will submit conditions at a later date.**

D. ☒ **How far will the pipeline(s) have to be extended to serve the project?** as required & to be determined

This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted.

Authorized signature: [signature] Print name Wally Grabbe

Print title District Engineer Phone (760) 735-4500 Date 3/6/2013

NOTE: THIS DOCUMENT IS NOT A COMMITMENT OF SERVICE OR FACILITIES BY THE DISTRICT
On completion of Section 2 by the district, applicant is to submit this form with application to:
Zoning Counter, Department of Planning and Land Use, 5201 Ruffin Road, San Diego, CA 92123

DPLU-399W (12/09)

July 1, 2015

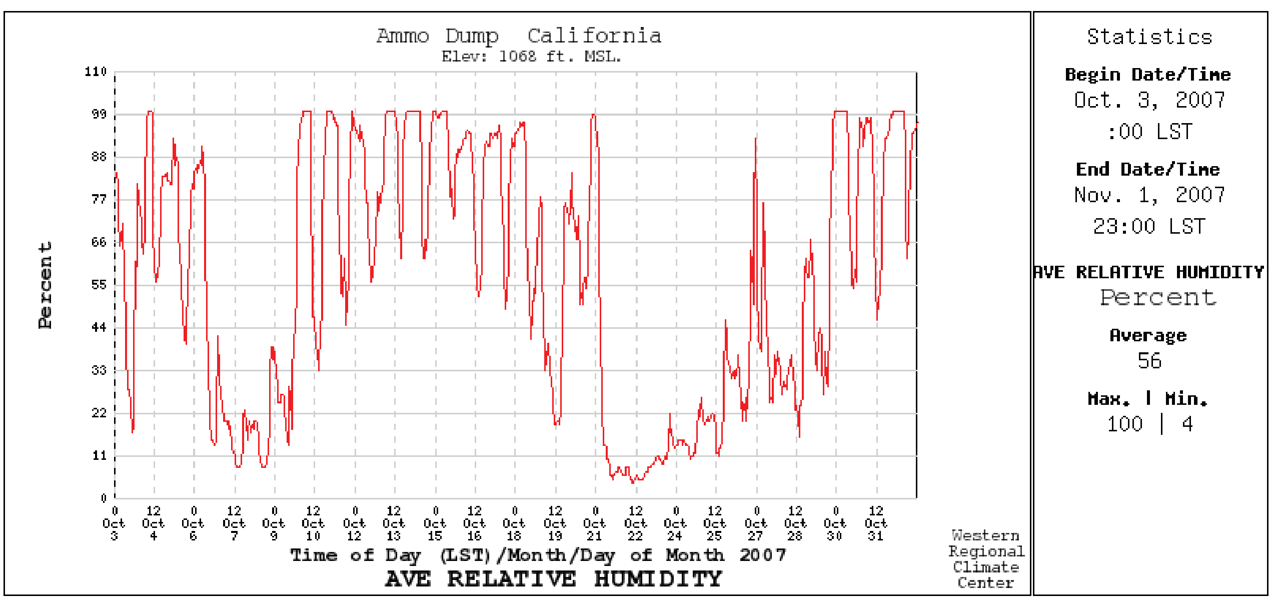
APPENDIX F

Weather Summary Charts

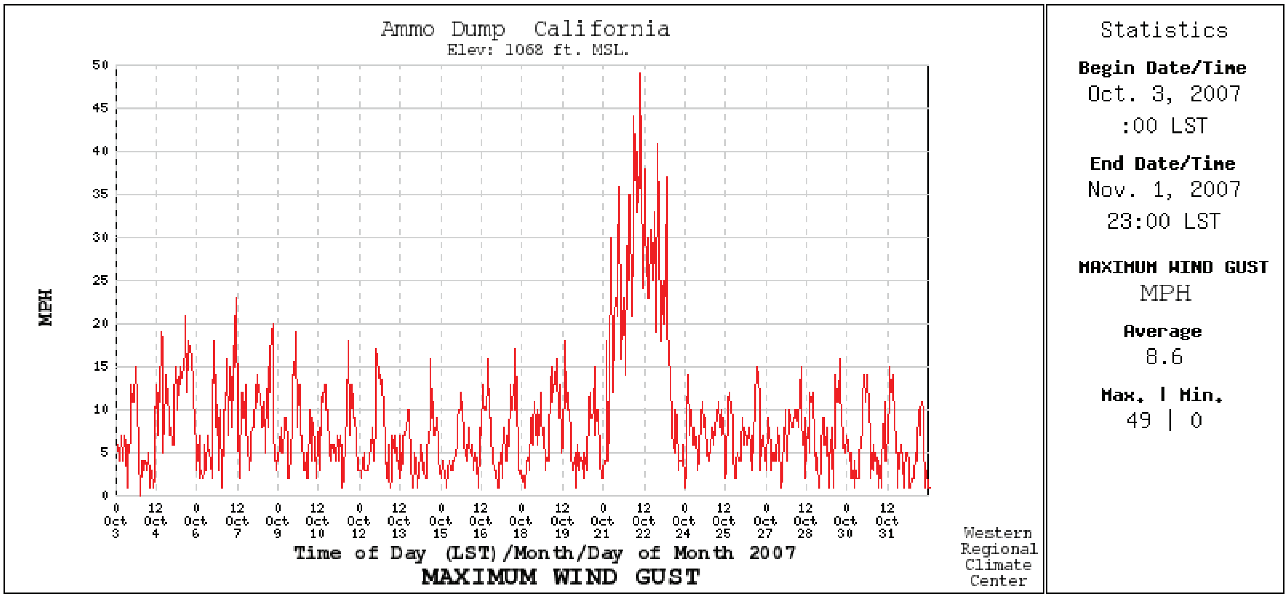
The key to how fast, how hot and at what intensity a wildland fire will burn is directly related to wind speed, wind direction, the age, composition, and condition of burnable vegetative fuel and amount of moisture in the atmosphere. Wind direction usually determines how dry or moist (expressed as relative humidity) the air will be in the wind pattern. Local weather conditions (wind speed and live and dead fuel moistures) still are the key ingredients in determining fire intensity and rate of spread.

The most critical wind pattern to the Lilac Hills Ranch is an off-shore wind coming out of the north/northeast, typically referred to as a Santa Ana wind. Such wind conditions are usually associated with strong (> 40-MPH), hot, dry winds with very low (< 15%) relative humidity.
Santa Ana winds originate over the dry desert land and can occur anytime of the year. However, they generally occur in the late fall (September through November). This is also when non-irrigated vegetation is at its lowest moisture content.

Fire agencies throughout the western United States rely on a sophisticated system of Remote Automated Weather Stations (RAWS) to monitor weather conditions and aid in the forecasting of fire danger. The data acquired from RAWS is important to modeling wildland fire behavior.
***FIREWISE* 2000, Inc.** determined that the Ammo Dump RAWS located at LATITUDE: 33.3814. LONGITUDE: 117.2856 is the closest station to the project and have been in continuous operation since June of 2001. It captured significant weather data during the major southern California fires of October 2003 and most recently the fires of 2007, shown in Figures 1 and 2 which follow:



↑ Figure 1: Ammo Dump RAWS Relative Humidity During the Fires of October, 2007. Note that the Rice Fire Started October 22, 2007. Humidity Was Recorded At 4 Percent That Day.



↑ Figure 2: Ammo Dump RAWS Wind Gusts During the Fires of October, 2007. Note The Peak Wind Gust Of 49 Miles Per Hour Occurred During A Very Dry Period That Is Shown In Figure 1.

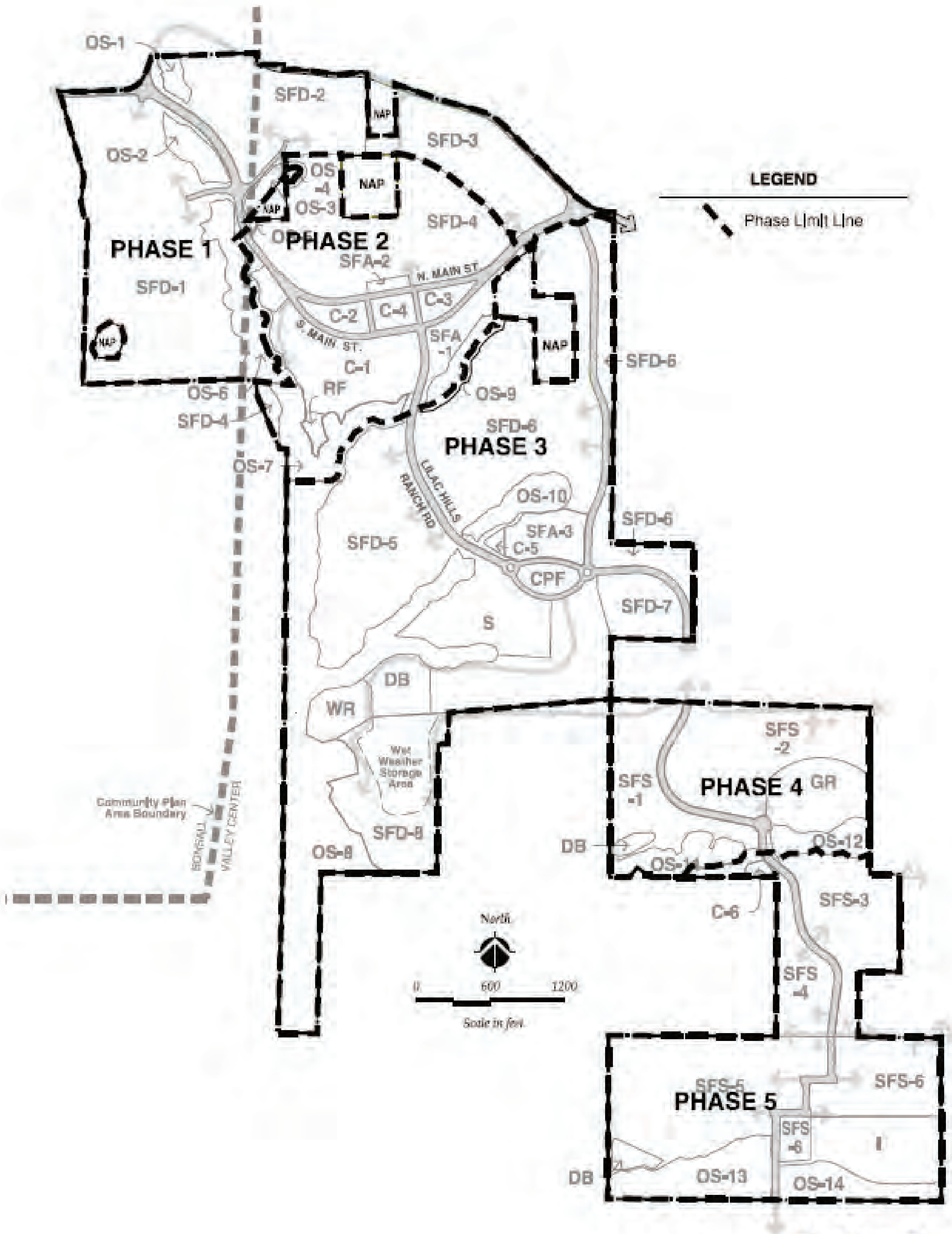
In reviewing the two figures above, note that in late October the wind gusts were very strong and relative humidity was very low, an indicator of a Santa Ana wind event. For planning purposes, ***FIREWISE* 2000, Inc.** utilized 60 MPH winds as the extreme or worst case wind likely at the Lilac Hills Ranch project during low relative humidity. Higher wind speeds may occur during winter storms when humidity is high. Such winds are not a wildfire concern.

The Ammo Dump RAWS is located approximately 12 miles to the northwest of the project at an elevation of 1,068 feet. Data for all RAWS is archived in the Western Region Climate Center in Reno, Nevada. Weather data for all of October 2007 for Ammo Dump RAWS is presented in APPENDIX ‘C’, as an example of extreme fire weather. This historic weather data was used to help determine the more extreme fuel moisture regimes found later in this plan.

APPENDIX G

Lilac Hills Ranch Phasing Plan
and
Lilac Hills Ranch Internal Circulation Map
and
Lilac Hills Ranch Access Exhibit

July 1, 2015



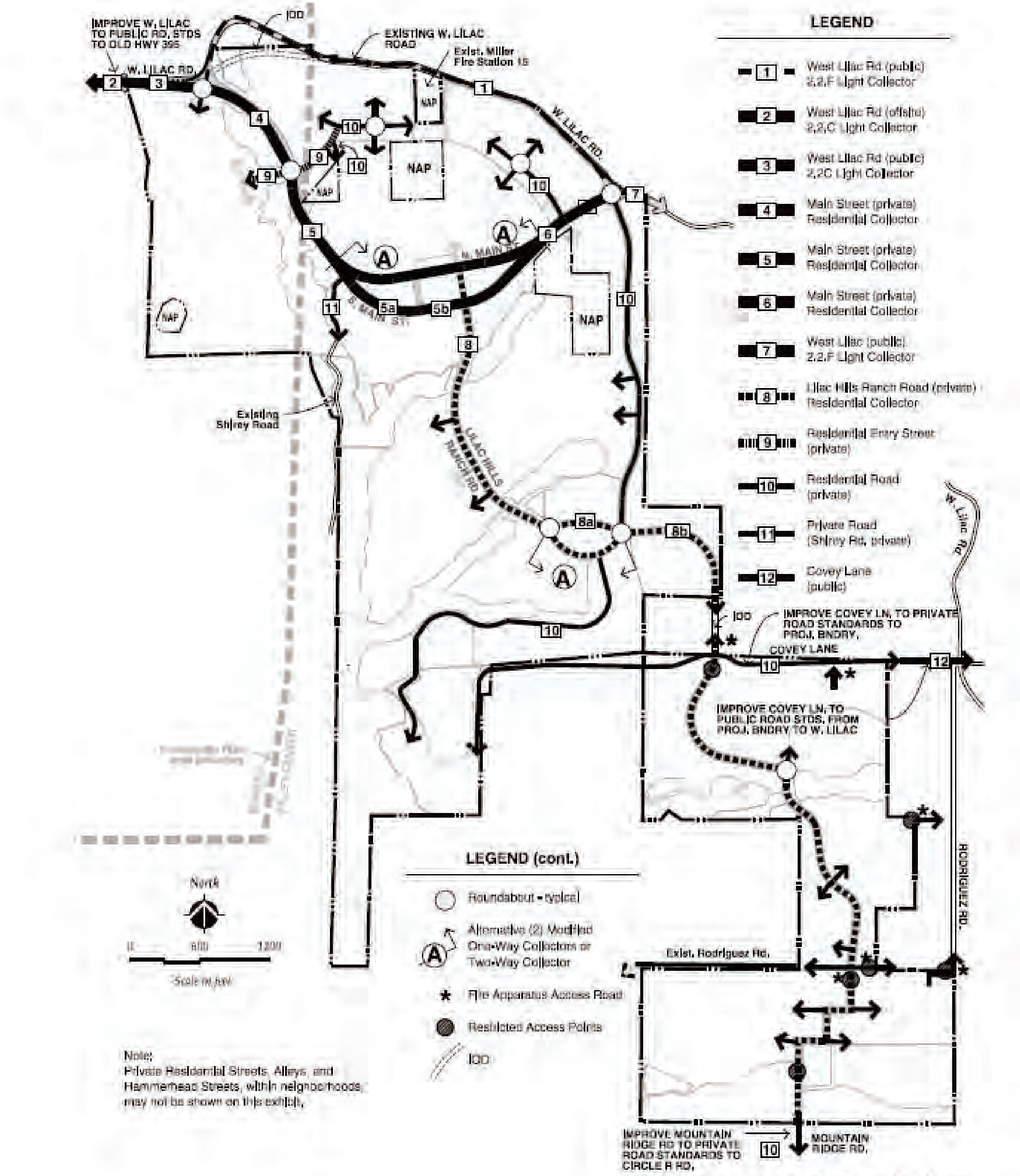
Phasing Plan

LILAC HILLS RANCH SPECIFIC PLAN

FIGURE 15a

DRAFT

July 1, 2015



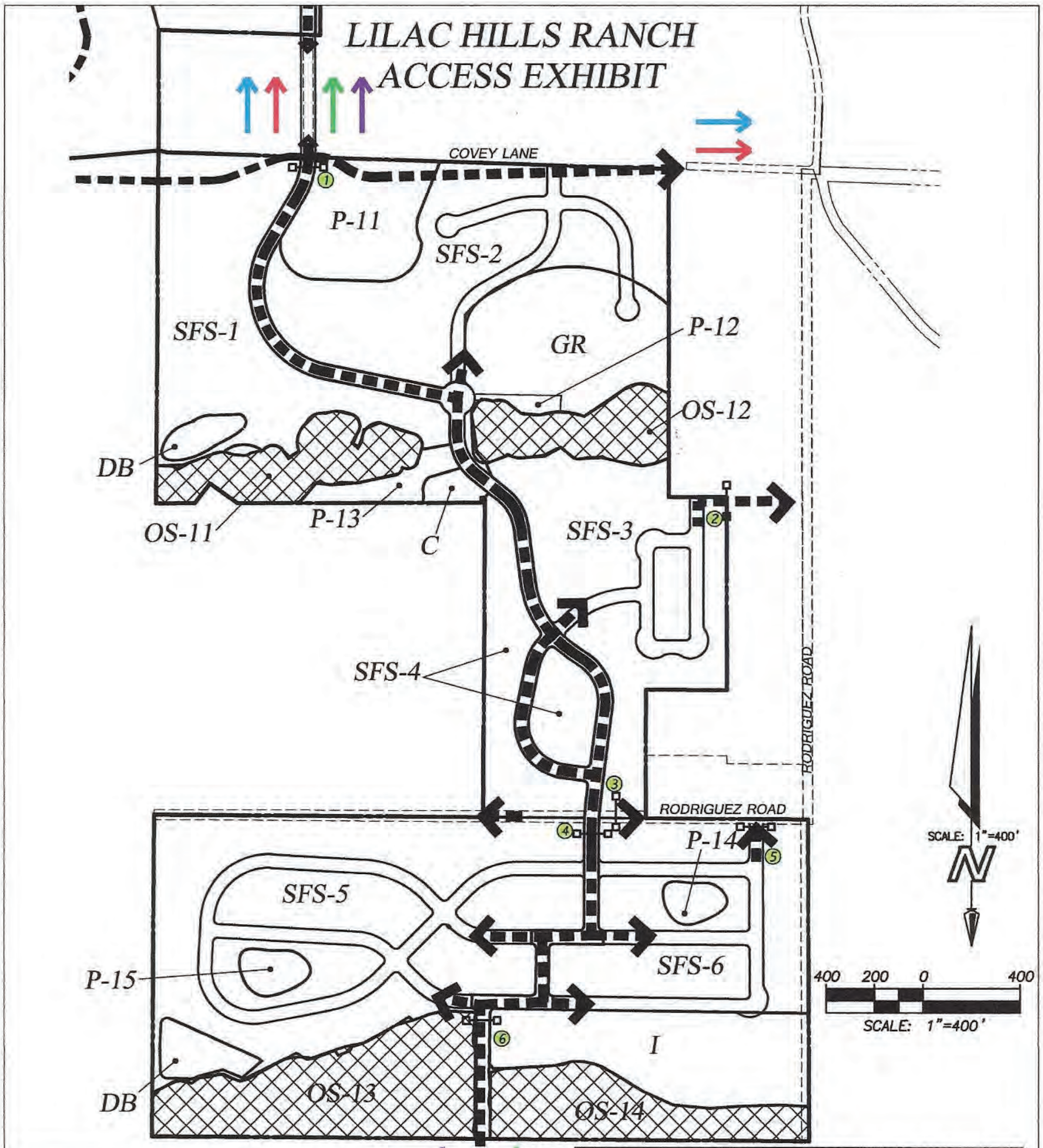
Project Internal Circulation

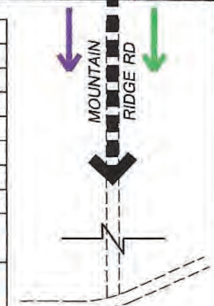
LILAC HILLS RANCH SPECIFIC PLAN

FIGURE 24

DRAFT

July 1, 2015



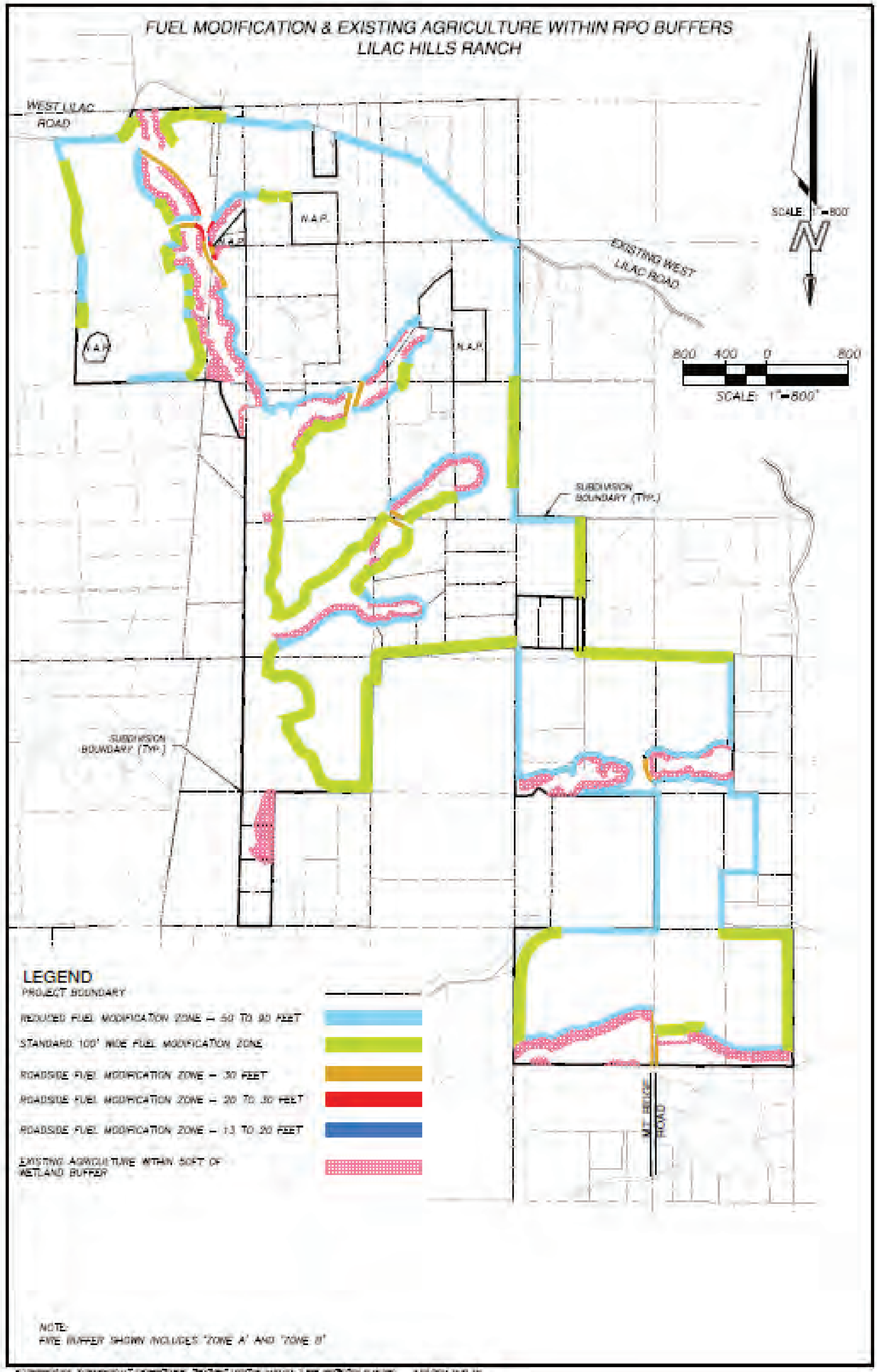


LEGEND	
SINGLE FAMILY SENIOR	SFS
COMMERCIAL/MIXED USE	C
DETENTION BASINS	DB
PARK	P
GROUP CARE/RESIDENTIAL	GR
INSTITUTIONAL/RELIGIOUS USE	I
CIRCULATION ROADS	▪ ▪ ▪ ▪
PRIMARY & SECONDARY ACCESS FOR SFS-1 & SFS-2	→ (red)
PRIMARY & SECONDARY ACCESS FOR SFS-3 & SFS-4	→ (blue)
PRIMARY & SECONDARY ACCESS FOR SFS-5 & SFS-6	→ (green)
PRIMARY & SECONDARY ACCESS FOR INSTITUTIONAL USE	→ (purple)
GATED ACCESS POINT NO. (SEE ATTACHED MEMO FOR DESCRIPTION)	①
FIRE APPARATUS ACCESS GATE	□—□

LILAC HILLS RANCH RESTRICTED ACCESS DESCRIPTION		
GATED ACCESS #	DESCRIPTION	PLANNING AREAS WITH GATE ACCESS RIGHTS
1	FIRE APPARATUS ACCESS GATE: MANNED GATE HOUSE, ALLOWING PERMANENT RESIDENTS AND GUESTS TO TRAVEL THROUGH	SFS-1, SFS-2, SFS-3, SFS-4, SFS-5, SFS-6, & INSTITUTIONAL
2	FIRE APPARATUS ACCESS GATE: RESTRICTED ACCESS GATES THAT OPEN DURING EMERGENCIES AND CAN BE ACTIVATED BY CODE, KNOX KEYS, OR COUNTY EMERGENCY RESPONSE CENTER	SFS-3 and SFS-4
3	FIRE APPARATUS ACCESS GATE: RESTRICTED ACCESS GATES THAT OPEN DURING EMERGENCIES AND CAN BE ACTIVATED BY CODE, KNOX KEYS, OR COUNTY EMERGENCY RESPONSE CENTER, AND AUTOMATIC ACCESS GATE FOR RESIDENTS ALONG RODRIGUEZ ROAD WITH A KEY FOB OR ACCESS CODE.	SFS-3, SFS-4, SFS-5, & SFS-6
4	FIRE APPARATUS ACCESS GATE AND AUTOMATIC ACCESS GATE FOR RESIDENTS WITH A KEY FOB OR ACCESS CODE	SFS-5 and SFS-6
5	FIRE APPARATUS ACCESS GATE: RESTRICTED ACCESS GATES THAT OPEN DURING EMERGENCIES AND CAN BE ACTIVATED BY CODE, KNOX KEYS, OR COUNTY EMERGENCY RESPONSE CENTER	SFS-5 and SFS-6
6	FIRE APPARATUS ACCESS GATE AND AUTOMATIC ACCESS GATE FOR RESIDENTS WITH A KEY FOB OR ACCESS CODE	SFS-5, SFS-6, & INSTITUTIONAL

APPENDIX H

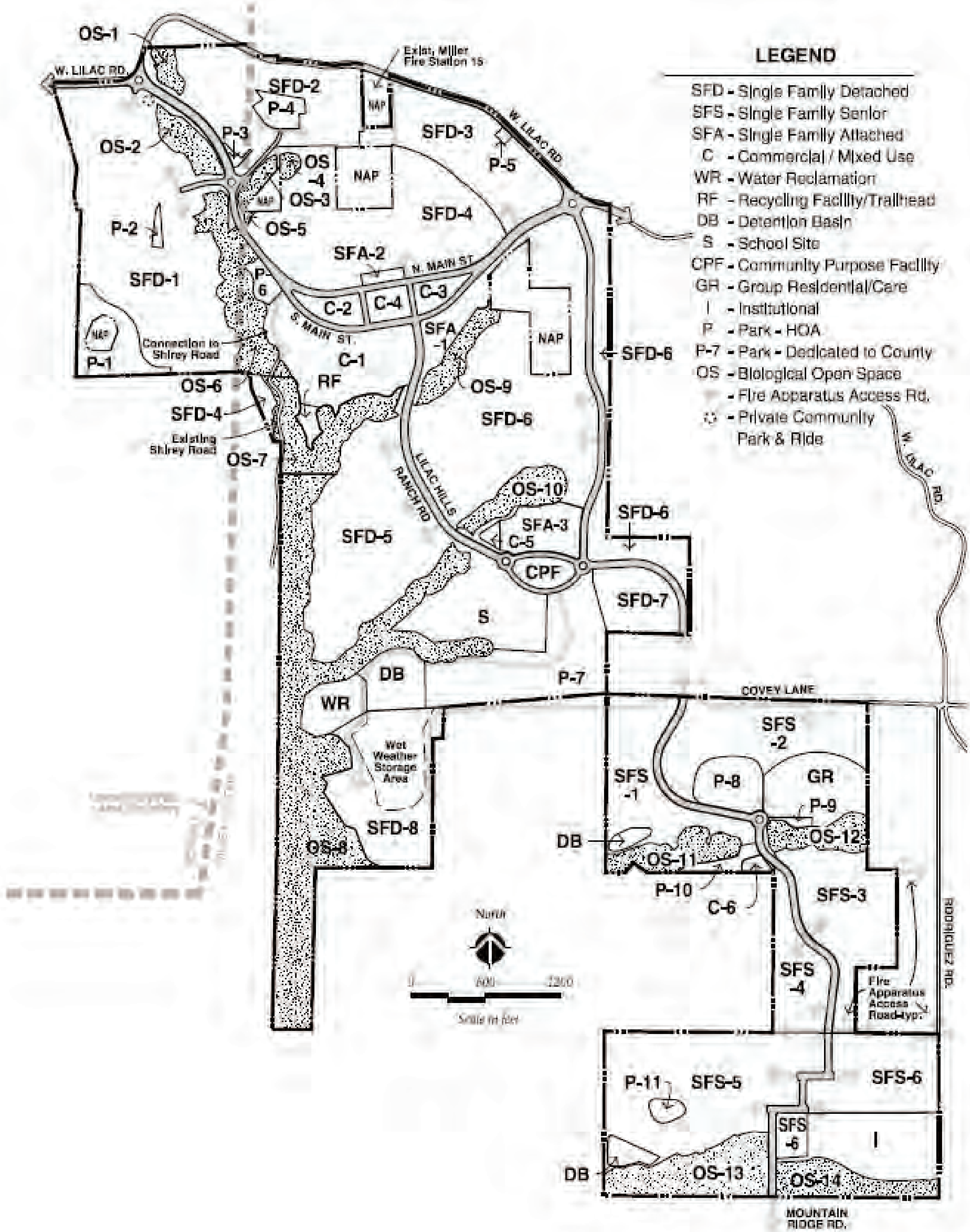
Fuel Modification and Agriculture Within RPO Wetland Or Wetland Buffer


FUEL MODIFICATION & EXISTING AGRICULTURE WITHIN RPO BUFFERS
LILAC HILLS RANCH
WEST LILAC ROAD
N.A.P.
EXISTING WEST LILAC ROAD
SCALE: 1"=800'
800 400 0 800
SUBDIVISION BOUNDARY (TYP.)
MT. REIGE ROAD
LEGEND
PROJECT BOUNDARY
REDUCED FUEL MODIFICATION ZONE – 50 TO 90 FEET
STANDARD 100' WIDE FUEL MODIFICATION ZONE
ROADSIDE FUEL MODIFICATION ZONE – 30 FEET
ROADSIDE FUEL MODIFICATION ZONE – 20 TO 30 FEET
ROADSIDE FUEL MODIFICATION ZONE – 13 TO 20 FEET
EXISTING AGRICULTURE WITHIN 50FT OF WETLAND BUFFER
NOTE:
FIRE BUFFER SHOWN INCLUDES 'ZONE A' AND 'ZONE B'

APPENDIX I

Specific Plan – Site Plan

July 1, 2015



Specific Plan Map

LILAC HILLS RANCH SPECIFIC PLAN

FIGURE 14

DRAFT

APPENDIX J

Flammap Analysis - Dudek

DUDEK

31878 CAMINO CAPISTRANO, SUITE
SAN JUAN CAPISTRANO, CALIFORNIA 92675
T 949.450.2525 F 949.830.2626

August 15, 2012 7449-01

Mr. Jon Rilling
The Accretive Group of Companies
12275 El Camino Real, Ste. 110
San Diego, CA 92130

Subject: ***FlamMap Fire Behavior Modeling – Lilac Hills Master Planned Community***

Dear Mr. Rilling:

This letter report summarizes Dudek's evaluation of potential fire behavior at the Lilac Master Planned Community site using FlamMap fire behavior modeling software. Modeling for the project location was conducted using site-specific fuels and topography data, and was consistent with the BehavePlus fire behavior modeling efforts prepared for the project's Draft Fire Protection Plan (Firewise 2000, April 26, 2012). FlamMap software utilizes weather, fuels, and topography data within a geographic information system (GIS) in order to graphically depict potential fire behavior across the project site. This letter summarizes our modeling inputs, modeling assumptions, and provides a graphical representation of expected fire behavior outputs for two different weather scenarios for existing and planned site conditions (Attachment 1 - Figures 1 and 2).

Prior to fire behavior modeling efforts, Dudek fire protection planners conducted a site evaluation to confirm existing fuel conditions, which informed the overall fire modeling effort. Following field evaluations, site data was compiled and processed for inclusion in the FlamMap model. Fire behavior modeling was conducted to document flame length values (a standard measure for fire behavior used by fire agency personnel) that would be expected on and adjacent the Lilac Hills site given its topography, vegetation, and weather. A discussion of modeling inputs and results is provided herein and results are provided in Figures 1 and 2.

FlamMap Fire Behavior Modeling

Predicting wildland fire behavior is not an exact science due to the many variables that must be considered. 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 and the weather that is often "created" by firestorms. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire information.[1]

To be used effectively, the basic assumptions and limitations of fire behavior modeling applications 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 the dead fuels less than 0.25 inches in diameter. These are the fine fuels that carry fire. Fuels greater than 1 inch have little effect, while fuels greater than 3 inches have no effect on fire behavior.
- Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within 6 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, creating their own weather, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.
- Fourth, fire behavior computer modeling systems are 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 FlamMap has 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 in a particular landscape. The type and quantity will depend upon soil, climate, geographic features, and fire history. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

The seven fuel characteristics help define the 13 standard fire behavior fuel models[2] and the more recent custom fuel models developed for Southern California[3]. According to the model

[1] Rothermel, Richard C. 1983. How to predict the spread and intensity of forest and range fires. GTR INT-143. Ogden, Utah: USDA Forest Service Intermountain Research Station, GTR-INT-143. 161 p.

classifications, fuel models used for fire behavior modeling (BehavePlus, FlamMap, FARSITE) have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface-to-volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in modeling efforts. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models:

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

In addition, the aforementioned fuel characteristics were utilized in the recent development of 40 new fire behavior fuel models[4] developed for use in the BehavePlus, FlamMap, and FARSITE modeling systems. These new models attempt to improve the accuracy of the 13 standard 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 40 new fuel models:

- Non-burnable – Models NB1, NB2, NB3, NB8, NB9
- 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.

Table 1 provides a description of 10 fuel models (including one non-burnable model) coded for the site that were subsequently used in the FlamMap analysis for this project.

Table 1. Fuel Model Characteristics

Fuel Model	Description	Land Cover Classification	Canopy Cover Value
0	Non-burnable	Developed	0
3	Tall grass	Marsh, wetland	0

[2] Anderson, Hal E. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. USDA Forest Service Gen. Tech. Report INT-122. Intermountain Forest and Range Experiment Station, Ogden, UT.
[3] Weise, D.R. and J. Regelbrugge. 1997. Recent chaparral fuel modeling efforts. Prescribed Fire and Effects Research Unit. Riverside Fire Laboratory, Pacific Southwest Research Station. 5p.
[4] Scott, Joe H. and Robert E. Burgan. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

Fuel Model	Description	Land Cover Classification	Canopy Cover Value
9	Hardwood litter	Riparian cover, woodlands	3
GR1	Short, Sparse Dry Climate Grass	Orchards, vineyards	0
GR2	Low Load, Dry Climate Grass	Disturbed areas	0
GS1	Low Load, Dry Climate Grass-Shrub	Fuel Treatment Zones (Post-development)	0
SCAL 18	Coastal sage scrub	Coastal scrub	0
SH3	Moderate Load, Humid Climate Shrub	Mulefat scrub	0
SH7	Very High Load, Dry Climate Shrub	Chaparral	0
TU5	Very High Load, Dry Climate Timber-Shrub	Eucalyptus understory	3

FlamMap Analysis

FlamMap software was utilized to graphically depict fire-modeling results for the project site and the area within 200 feet of the project boundary. FlamMap utilizes the same fire spread equations built into the BehavePlus software package, but allows for a geographical presentation of fire behavior outputs as it applies the calculations to each pixel in the associated GIS landscape[5]. Both summer weather conditions (on-shore flow) and more extreme fall weather conditions (off-shore, Santa Ana conditions) were modeled for both the existing site condition and the proposed post-development site condition.

FlamMap software requires a minimum of five (5) separate input files that represent field conditions in the analysis area, including elevation, slope, aspect, fuel model, and canopy cover. Each of these files was created as a raster GIS file using ArcGIS 10.0 software, exported as an ASCII grid file, then utilized in creating a FARSITE Landscape file that served as the base for the FlamMap runs. The resolution of each grid file and associated ASCII file that was used in the models described herein is 10 meters, based on digital terrain data available from the San Diego Association of Governments (SANDAG). In addition to the Landscape file, wind and weather data are incorporated into the model inputs. The output fire behavior variable chosen for each of the modeling runs was flame length, measured in feet.

The following paragraphs provide descriptions of the input and output variables used in processing the FlamMap models. In addition, data sources are cited and any assumptions made during the modeling process are described.

<u>Elevation</u>

Elevation data were derived from digital terrain data publicly available from SANDAG, projected in North American Datum 1983, California State Plane, Zone 6 with units in feet. The resolution of the file was 10 meters and elevation within the analysis area ranges from 473 feet

[5] Finney, M.A. 1998. FARSITE: Fire Area Simulator—model development and evaluation. Res. Pap. RMRS-RP-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 47 p.

to 964 feet above mean sea level (AMSL). These data were utilized to create an elevation grid file, using units of feet above sea level. The elevation data are a required input file for FlamMap runs and are necessary for adiabatic adjustment of temperature and humidity and for conversion of fire spread between horizontal and slope distances.

Slope

Using ArcGIS Spatial Analyst tools, a slope grid file was generated from the elevation grid file described above. Slope measurements utilized values in percent of inclination from horizontal. Slope values in the analysis area range from 0% to 50%. The slope input file is necessary for computing slope effects on fire spread and solar radiance.

Aspect

Using ArcGIS Spatial Analyst tools, an aspect grid file was generated from the elevation grid file described above. The aspect values utilized were azimuth degrees. Aspect values are important in determining the solar exposure of grid cells.

Fuel Model

Vegetation coverage data in the form of a GIS shapefile were used in this analysis to create a fuel model file for existing conditions, which was derived from vegetative cover data mapped for the analysis area (on-site and within 100 feet of the project boundary) and edited based on field observations to include an area within 200 feet of the project boundary (from 100 to 200 feet from the project boundary). Vegetation mapping data was utilized in field efforts to classify vegetation cover type with an appropriate fuel model.

To analyze post-development fire behavior, a separate fuel model shapefile was created using the existing vegetation coverage and reclassifying fuels based on location within the proposed development. All fuels within proposed developed areas were reclassified as Fuel Model "0" to represent developed, non-combustible land uses. All fuels within the proposed fuel treatment areas were reclassified as Fuel Model "GS1". This fuel model was selected based on the fire behavior analysis prepared for the project's Draft Fire Protection Plan (Firewise 2000). The Draft Fire Protection Plan utilized a combined fuel model (50% TL6 and 50% GS1) to represent treated fuels within the proposed fuel treatment areas. However, only GS1 was used for this analysis as flame length was selected for the model output value. When utilizing combined fuel models, flame length values are derived from the higher of the calculated values for the two fuel models[6]. In this case, GS1 presents higher flame length values and was therefore used in this analysis.

[6] BehavePlus On-Line Documentation, March 16, 2010

The result includes 10 separate fuel models utilized for the analysis area, of which, one is a non-combustible classification (e.g., developed areas). Once fuel model values were assigned to general vegetation types, the vector-based vegetation data files (existing and proposed) were converted to grid files for inclusion in FlamMap modeling. The unique fuel model assignments are presented in Table 1.

Canopy Cover

Canopy Cover is a required raster file for FlamMap operations. It is necessary for computing shading and wind reduction factors for all fuel models. Canopy cover is measured as the horizontal fraction of the ground that is covered directly overhead by tree canopy. Crown closure refers to the ecological condition of relative tree crown density. Stands can be said to be "closed" to recruitment of canopy trees but still only have 40% or 50% canopy cover. Coverage units can be categories (0–4) or percentage values (0–100).

For the purposes of the FlamMap analysis, Dudek utilized vegetation type classifications to determine canopy cover assignments. For the purposes of this analysis, tree-dominated vegetation types (e.g., woodlands and riparian areas) were assigned a value of "3," while non-tree vegetation types were assigned a value of "0." Canopy classifications by vegetation type are presented in Table 1.

Weather

Weather and fuel moisture inputs incorporated into fire behavior modeling for the site were determined by utilizing the guidelines and standards presented by the County of San Diego, Department of Planning and Land Use. These guidelines identify acceptable fire weather inputs for extreme fire conditions during summer months and Santa Ana fire weather patterns. The County analyzed and processed fire weather from 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.

To determine fuel moisture values for the analysis area, Dudek utilized the Fine Dead Fuel Moisture tool within the BehavePlus (v. 5.0.2) fire behavior modeling software package. The temperature, relative humidity, and wind speed data for the Transitional weather zone were utilized for this analysis based on the project location. Reference fuel moistures were calculated in BehavePlus and were based on site-specific topographic data inputs.

Table 2 presents the weather and fuel moisture input variables used for fire behavior modeling efforts.

Table 2. Fire Behavior Weather and Fuel Moisture Inputs

Model Variable	Summer (Onshore Flow)	Peak (Offshore/Santa Ana conditions)
1 h fuel moisture	3%	2%
10 h fuel moisture	5%	3%
100 h fuel moisture	7%	5%
Live herbaceous moisture	60%	30%
Live woody moisture	90%	50%
20-ft. wind speed (mph)	19 mph	41 mph
Wind direction	225°	45°

FlamMap Fuel Model Outputs

One output grid files was generated for each of the four FlamMap runs, and represents flame length (feet) in existing and proposed site conditions during Summer and Peak weather scenarios. 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[7]. It is a somewhat subjective and non-scientific measure of fire behavior, but is extremely important to fireline personnel in evaluating fireline intensity and is worth considering as an important fire variable[8]. The information in Table 3 presents an interpretation of flame length and its relationship to fireline intensity.

Table 3. Fire Suppression Interpretation

Flame Length (feet)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4	Under 100	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 to 8	100 to 500	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 to 11	500 to 1,000	Fires may present serious control problems—torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11	Over 1,000	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

SOURCE: BehavePlus 3.0.2 fire behavior modeling program (Andrews, Bevins, and Seli 2004)

[7] Andrews, Patricia L., Collin D. Bevins, and Robert C. Seli. 2004. BehavePlus fire modeling system, version 3.0: User's Guide. Gen. Tech. Rep. RMRS-GTR-106 Ogden, UT: Department of Agriculture, Forest Service, Rocky Mountain Research Station. 132p.
[8] Rothermel, Richard C. 1991. Predicting behavior and size of crown fires in the northern Rocky Mountains. Research Paper INT-438. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.

Maps depicting flame length values for the Summer and Peak weather scenarios are included in Figures 1 and 2. The fire behavior modeling results for the analysis area vary depending on topography and fuel type. As FlamMap utilizes site-specific digital terrain data (including slope, vegetation, aspect, and elevation data) slight variations in predicted flame length values can be observed based on fluctuations of these attributes across the landscape. As presented, wildfire behavior in each of the fuel types varies depending on weather conditions.

Modeling outputs generated during this analysis present similar fire behavior in some areas during Summer and Peak (Santa Ana) weather scenarios. These similarities are explained through further analysis of available site data, fuel model classification, and the calculations conducted in the FlamMap software. For this analysis, fuel models were assigned to each previously-mapped vegetation type for the site. The available vegetation mapping data classified large areas of the site as either orchard or vineyard (43% of the site) or chaparral (12% of the site), which are the areas representing little change between Summer and Peak weather scenarios. First, vegetation mapping for the site was focused on habitat-based classifications and less on fuel type. When classifying vegetation types into fuel models, efforts were made to most accurately represent the fuel type observed. However, the scale at which the vegetation mapping was conducted did not allow for small-scale fuel mapping within a larger vegetation type classification. For example, small pockets of tall grass or scrub within a larger area classified as orchard were not separated for this analysis. Second, the fuel model selected to represent orchards and vineyards was Fuel Model GR1, which represents short, dry climate grass. This model was selected as it was assumed that orchards and vineyards would be actively managed and that surface fuels would be maintained to represent the conditions found in Fuel Model GR1. This model assignment assumes no transition to a crown fire based on assumed higher fuel moisture content in irrigated orchard trees and the extent of roads, landings, irrigated vegetation, flower fields, and other bare areas which serve to fragment the orchards and vineyards and isolate them from adjacent fuel beds. Lastly, the maximum flame length attainable via analysis in FlamMap and BehavePlus software for Fuel Model GR1 is 3.1 feet. The flame length outputs for a Summer fire and for a Peak fire may be similar, therefore, differentiation may be difficult as depicted in Figures 1 and 2. Additionally, those areas classified as Fuel Model SH7 (chaparral) in the south-western portion of the site had flame length values in excess of 20 feet for both Summer and Peak fires. Since these results are classified in the same flame length range for Summer and Peak fires, visual differences of the change are not discernible.

Fire Potential

Given the climatic, vegetation, and topographic characteristics of the analysis area, along with the fire behavior modeling results discussed herein, the project site is considered potentially vulnerable to wildfire starting in, burning onto, or spotting onto the site. The fire behavior results described herein depict values based on inputs to the FlamMap software. Localized changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis, but assumed across the landscape based on the available data resolution. Further, this modeling analysis assumes a correlation between the available vegetation data and fuel model characteristics. Wildfire activity may temporarily alter fuel beds, but fire behavior modeling efforts conducted for this site assume natural succession of burned areas to more mature stand conditions, resulting in a conservative (near worst-case) estimate of fire behavior. Since fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns, modeling results are applicable as a basis for planning, but need to be considered in context with other site variables.

Fire Behavior and Associated Fuel Modification Zones

Dudek conducted analysis of the fire behavior across the site and compared it against the proposed development footprint, product type, and proposed structure setbacks. In some instances, based on a variety of factors including the ignition resistant construction materials and methods, the anticipated wind alignment, off-site land use and vegetation type, and fire behavior, the justification for a reduced fuel modification zone is evident. There are few areas that will not be provided a full 100 feet of fuel modification zones on the site, which in many cases, is more than would be necessary given the fire-hardened structures and low projected flame lengths. Although fire behavior modeling software systems are not specifically intended for determining sufficient fuel modification zone/defensible space widths, they do provide the average length of the flames, which is a key element for determining defensible space distances for minimizing structure ignition. When coupled with experienced evaluation of the fire environment, site-specific landscape features and characteristics, development type and construction, and potential fire risk, the models do help substantiate where the most aggressive fuel modification is necessary and where it may be possible to provide reduced fuel modification zones.

Fuel modification on the site includes a variety of types (Attachment 3 – Lilac Hills Fuel Modification Zone Plan):

1. Standard 100 feet wide fuel modification zone
2. Standard 100 feet wide fuel modification zone with off-site easement
3. Partially Modified 100 feet wide fuel modification zone
4. Modified 100 feet wide fuel modification zone
5. Reduced Fuel Modification Zone

Standard 100 Feet Wide Fuel Modification Zones

Standard zones, including the version requiring off-site easements, will include two 50 foot wide zones with the first 50 feet starting at the structure. These areas include two 50 feet wide zones to break up fuel continuity and reduce spread rates and fire intensity. The first 50 feet will be irrigated, but will include plant species that are drought tolerant to minimize water use.

The outer 50 foot wide zone will be a reduced fuel zone where the most flammable species will be removed and the remaining fuel will be maintained at densities of less than 50 percent of field conditions with minimal fuel continuity. One area is proposed for 100 feet of fuel modification to include 50 feet of off-site fuel modification under a FMZ off-site easement. This FMZ will be consistent with the requirements of the full zone.

Partially Modified and Modified Fuel Modification Zones

Modified fuel modification zones are zones that include a minimum of 50 feet (Partially Modified) or all 100 feet (Modified) of the zone overlapping a wetland buffer. Buffers around wetland features are required and will provide a dual role of development set back and fuel modification. These zones are 100 feet in width except at very limited points where due to terrain or other factors, the zones deviate by 10 to 20 feet from the 100 foot total. 1. These areas provide the equivalent fuel reduction as a standard zone

Reduced Fuel Modification Zones

Reduced fuel modification zones are limited on the site. A few areas include less than 100 feet of fuel medication zone, ranging from 50 to 70 feet wide. These areas, due to the adjacent land uses and landscape cover types, produce low flame lengths and fire intensity and function consistently with a full 100 foot FMZ. Where reduced fuel modification zones are proposed, the project will condition these areas to future inspection and analysis. If, at any point, the off-site fuels should convert to a shrub dominated fuel type, then the project's HOA will be required to provide a focused fire protection plan for that specific area that analyzes the risk and offers implementable fire protection features to mitigate the potential risk, to the approval of the fire authority having jurisdiction.

SUMMARY

As presented, wildfire behavior in chaparral fuel beds on and adjacent the Project site is expected to be of moderate to high intensity during extreme, Santa Ana weather conditions with maximum sustained wind speeds of 56 mph and low fuel moistures. Chaparral fuels are predominant on site and in the area immediately surrounding the project site, which would be the fuels affecting the constructed Project. Based on the observed fuel beds east of the project site, a relatively high-intensity fire can be expected during extreme weather conditions, with flame lengths reaching approximately 43 feet and peak intensity of over 20,000 Btu/ft/s.

This type of fire would be relatively short-duration as vegetative fuels are consumed rapidly. As such, there would not be a sustained source of heat and or flame associated with site-adjacent wildland fuels. Further, the site's fuels would be converted and reduced to ground cover on most of the Project area. The post-project fuel modification areas would provide a significant reduction in the potential for fire ignition as well as the flame length, spread rate, and intensity of fires should ignition occur. A wildfire corridor occurs to the northeast of this area and extends into San Diego County's backcountry. The latest fire code requirements, including ignition resistant construction, interior sprinklers, and fuel modification will result in a defensible community that provides fire protection benefits for the existing residences to the south/southwest. This Project site may be compared to a large fuel break once completed. Adjacent native and undisturbed fuels would readily carry fire, especially during portions of the year where vegetation moisture content falls and warm temperatures, low humidity and high winds become common. However, fires approaching the Lilac Hills project would burn into the project's fuel modification zones and with little fuel, would be extinguishable. Embers produced from a wind driven fire would likewise find few receptive fuel beds within the Lilac Hills project. The site will be largely free of combustible vegetation with only a ground cover of maintained vegetation adjacent and beneath the solar trackers.

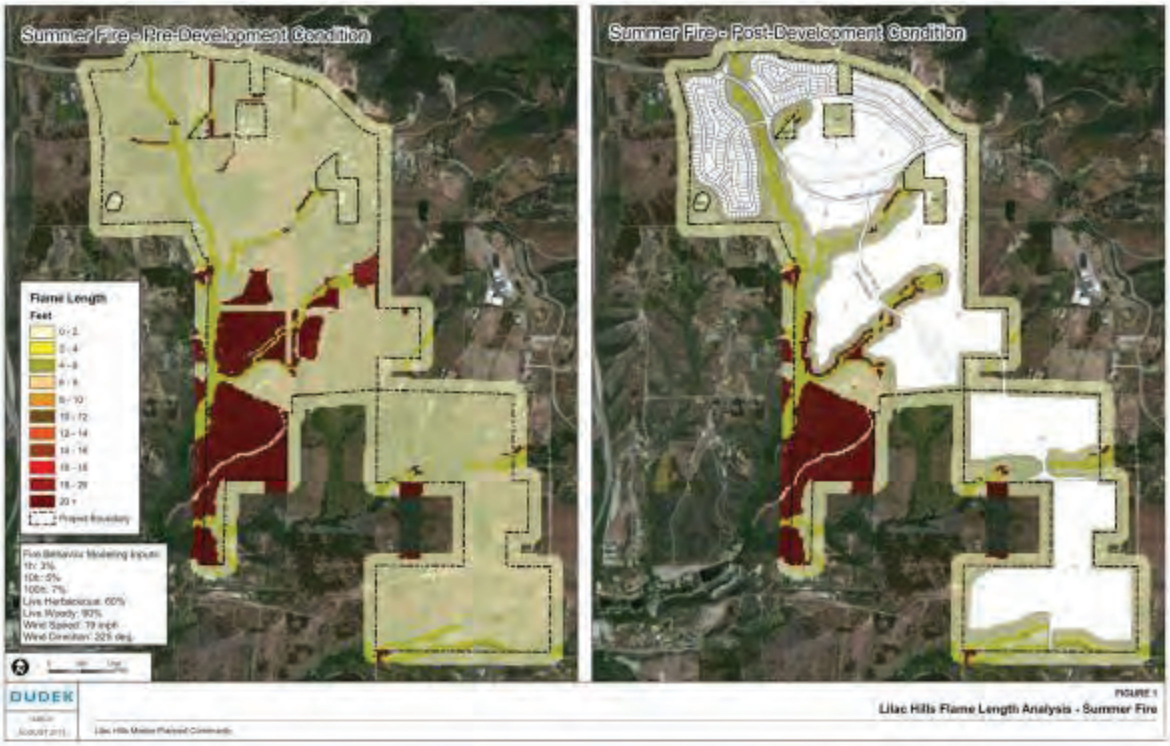
Flying embers from off-site fire may inundate the Project area during wind-driven fire events. The fuel modification zones and construction type and materials for all project features will resist ignition from ember showers. Ignition of the ground cover could result in a fast moving, but lower intensity fire that burns in a patchy manner on the site due to the highly compartmentalized fuel modification areas beneath the CPV trackers.

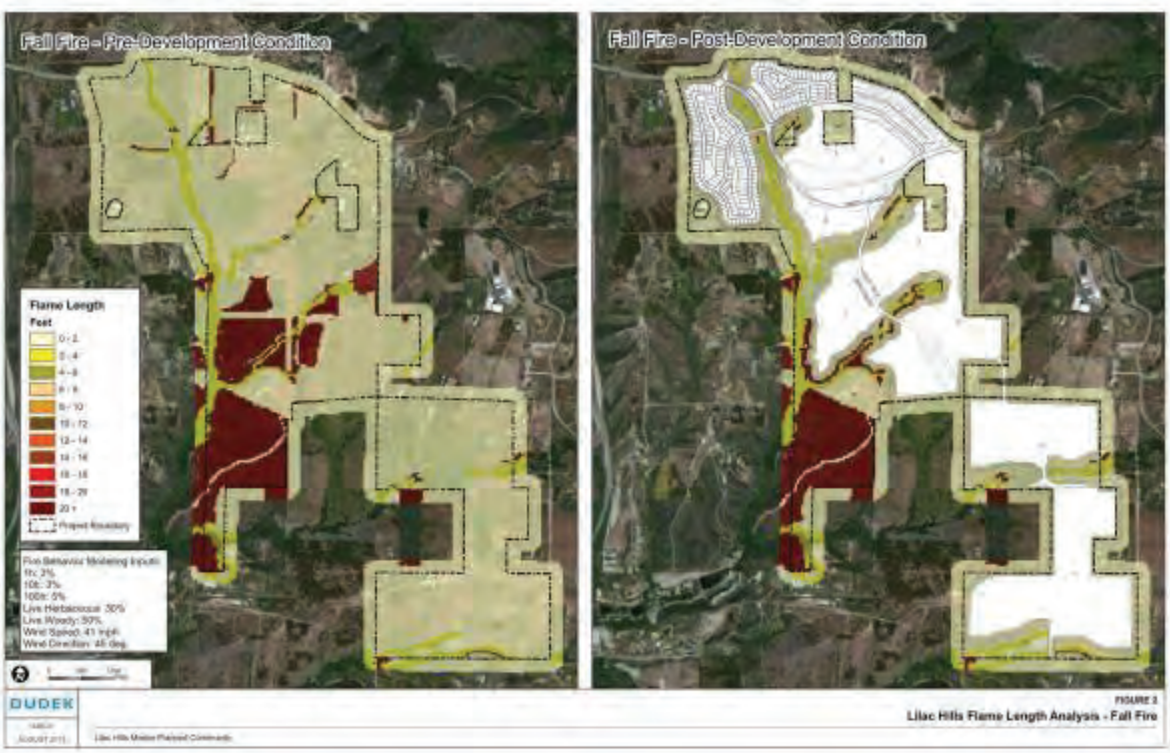
Sincerely,

Michael Huff

Michael Huff, Practice Manager
Urban Forestry + Fire Protection Planning

Att: Figures 1 and 2


Summer Fire - Pre-Development Condition
Summer Fire - Post-Development Condition
Flame Length
Feet
DUDEK
FIGURE 1
Lilac Hills Flame Length Analysis - Summer Fire


Fall Fire - Pre-Development Condition
Fall Fire - Post-Development Condition
Flame Length
Feet
DUDEK
FIGURE 2
Lilac Hills Flame Length Analysis - Fall Fire

APPENDIX K

2005 – 2011 Response Data for Deer Springs Fire Protection District

(Tables Developed From Data Provided By Deer Springs Fire Protection District)

RESPONSE within IA	CY 2005				TOTAL FOR YEAR
	STATION 11	STATION 12	STATION 13	MILLER	
Medical Aid (MU)	258	230	Station Not In Service	19	507
Traffic Collision (TC)	73	76		30	179
Vehicle Fire (VF)	9	16		2	27
Vegetation Fire (VEG)	6	7		6	19
Structure Fire (STR)	4	2		2	8
Hazardous Material Response	1	40		21	62
False Alarm (FA)	9	2		0	11
Cancel = CA	52	19		25	96
Illegal Burn (IB)	4	8		8	20
Smoke Check (SC)	4	10		3	17
PSA	18	33		5	56
Mutual Aid/Assist Out of District (MUT)	33	6		145	184
Assist to other DSFPD Units	131	141		186	458
Burn Permit Inspections	---	---		---	0
Station Total Responses	**602**	**590**		**452**	**1644**
Calls per 24-Hr Shift	**1.65**	**1.62**		**1.24**	**4.50**

RESPONSE within IA	CY 2006 *				TOTAL FOR YEAR
	STATION 11	STATION 12	STATION 13	MILLER	
Medical Aid (MU)	30	24	Station Not In Service	7	61
Traffic Collision (TC)	6	5		9	20
Vehicle Fire (VF)	0	0		4	4
Vegetation Fire (VEG)	0	1		9	10
Structure Fire (STR)	0	0		0	0
Hazardous Material Response	0	1		0	1
False Alarm (FA)	7	5		11	23
Illegal Burn (IB)	0	0		3	3
Smoke Check (SC)	0	4			4
PSA	4	1		0	5
Mutual Aid/Assist Out of District (MUT)	0	0		4	4
Assist to other DSFPD Units	10	16		0	26
Burn Permit Inspections	---	---		---	0
Station Total Responses	**58**	**58**		**47**	**163**
Calls per 24-Hr Shift	**1.90**	**1.90**		**1.55**	**5.36**

*** Data Only Available For The Month Of December**

RESPONSE within IA	CY 2007				TOTAL FOR YEAR
	STATION 11	STATION 12	STATION 13	MILLER	
Medical Aid (MU)	290	278	Station Not In Service	29	
Traffic Collision (TC)	83	78		25	
Vehicle Fire (VF)	12	22		**11**	

Vegetation Fire (VEG)	4	11		15	
Structure Fire (STR)	5	13		9	
Hazardous Material Response	3	3		1	
False Alarm (FA)	44	53		23	
Cancel (CA)	115	62		65	
Illegal Burn (IB)	4	6		3	
Smoke Check (SC)	9	16		7	
PSA	29	37		4	
Mutual Aid/Assist Out of District (MUT)	15	12	Station Not In Service	54	
Assist to other DSFPD Units	92	100		157	
Burn Permit Inspections	---	---		---	0
Station Total Responses	**705**	**691**		**403**	**1799**
Calls per 24-Hr Shift	**1.93**	**1.89**		**1.10**	**4.93**

RESPONSE within IA	**CY 2008**				**TOTAL FOR YEAR**
	STATION 11	**STATION 12**	**STATION 13**	**MILLER**	
Medical Aid (MU)	284	150	116	35	585
Traffic Collision (TC)	68	42	12	24	161
Vehicle Fire (VF)	12	19	2	7	40
Vegetation Fire (VEG)	11	6	2	15	75
Structure Fire (STR)	3	2	2	1	8
Hazardous Material Response	0	1	0	1	2
False Alarm (FA)	38	27	20	14	99
Cancel (CA)	69	70	56	166	
Illegal Burn (IB)	4	7	5	7	23
Smoke Check (SC)	8	9	6	17	40
PSA	38	14	26	3	81
Mutual Aid/Assist Out of District (MUT)	30	12	6	112	160
Assist to other DSFPD Units	45	94	54	81	283
Burn Permit Inspections	---	---		---	0
Station Total Responses	**610**	**453**	**307**	**483**	**1853**
Calls per 24-Hr Shift	**1.67**	**1.24**	**0.84**	**1.32**	**5.08**

RESPONSE within IA	**CY 2009**				**TOTAL FOR YEAR**
	STATION 11	**STATION 12**	**STATION 13**	**MILLER**	
Medical Aid (MU)	307	170	141	46	664
Traffic Collision (TC)	79	64	33	25	201
Vehicle Fire (VF)	16	21	7	11	55
Vegetation Fire (VEG)	7	4	8	25	44
Structure Fire (STR)	6	4	4	2	16
Hazardous Material Response	2	1	1	0	4
False Alarm (FA)	46	36	31	11	124
Cancel (CA)	61	105	22	239	427
Illegal Burn (IB)	6	3	1	8	18
Smoke Check (SC)	21	10	16	13	60
PSA	43	17	19	2	81
Mutual Aid/Assist Out of District (MUT)	31	1	4	78	114
Assist to other DSFPD Units	42	59	15	69	185
Burn Permit Inspections	---	---	---	---	0
Station Total Responses	**667**	**495**	**302**	**527**	**1991**
Calls per 24-Hr Shift	**1.83**	**1.36**	**0.83**	**1.44**	**5.45**

RESPONSE within IA	**CY 2010 ***				**TOTAL FOR YEAR**
	STATION 11	**STATION 12**	**STATION 13**	**MILLER**	
Medical Aid (MU)	51	27	18	5	101

Traffic Collision (TC)	14	8	3	5	30
Vehicle Fire (VF)	6	2	2	0	10
Vegetation Fire (VEG)	0	0	0	1	1
Structure Fire (STR)	1	2	3	0	6
Hazardous Material Response	0	1	0	0	1
False Alarm (FA)	4	13	4	6	27
Cancel (CA)	6	18	6	33	63
Illegal Burn (IB)	0	2	0	1	3
Smoke Check (SC)	3	3	4	0	10
PSA	7	2	2	3	14
Mutual Aid/Assist Out of District (MUT)	2	0	0	0	2
Assist to other DSFPD Units	4	3	0	2	9
Burn Permit Inspections	6	4	0	0	10
Station Total Responses	**98**	**81**	**42**	**56**	**277**
Calls per 24-Hr Shift	**1.63**	**1.35**	**0.7**	**0.93**	**4.62**

*** CY 2010 Data Available Only For the Months of January & February**

RESPONSE within IA	CY 2011 *				TOTAL FOR YEAR
	STATION 11	STATION 12	STATION 13	MILLER	
Medical Aid (MU)	27	10	13	3	666
Traffic Collision (TC)	6	6	1	7	192
Vehicle Fire (VF)	1	1	0	0	45
Vegetation Fire (VEG)	0	0	0	2	51
Structure Fire (STR)	0	0	1	1	14
Hazardous Material Response	0	1	0	0	5
False Alarm (FA)	9	2	1	0	124
Cancel (CA)	9	0	4	0	303
Illegal Burn (IB)	0	0	0	0	5
Smoke Check (SC)	0	0	0	4	40
PSA	2	2	0	0	93
Mutual Aid/Assist Out of District (MUT)	1	0	0	7	86
Assist to other DSFPD Units	1	10	6	5	211
Month Total Responses	47	32	22	29	
Station Total Responses	**615**	**443**	**404**	**373**	**1835**
Calls per 24-Hr Shift	**1.68**	**1.21**	**1.11**	**1.02**	**5.03**

*** CY 2011 Data Only From the Month of December, 2011**

APPENDIX L

Automatic Aid Agreement Between Deer Springs Fire Protection District and North County Fire Protection District

AUTOMATIC AID AGREEMENT
between
DEER SPRINGS FIRE PROTECTION DISTRICT
and
NORTH COUNTY FIRE PROTECTION DISTRICT

THIS AGREEMENT, made and entered into this 24[th] day of April, 26, 2011, by and between the North County Fire Protection District, a special district, hereinafter referred to as "**NORTH COUNTY**" and the Deer Springs Fire Protection District, a special district, hereinafter referred to as '**DEER SPRINGS**."

WITNESSETH

WHEREAS, both **DEER SPRINGS** and **NORTH COUNTY** maintain, an organized and equipped Fire Department, charged with the duty of fire protection and rescue within the jurisdictional limits of each of said fire districts; and

WHEREAS, investigation has disclosed it would be to the benefit of each party hereto, that the services of each Fire Department be, in certain circumstances, extended outside of the jurisdictional boundaries of each party hereto and into the jurisdictional boundaries of the other party hereto; and

WHEREAS, the parties hereto recognize that in certain circumstances, it is advantageous to utilize the nearest available fire suppression and rescue forces to provide the most effective response to emergency alarms regardless of jurisdictional boundaries; and

WHEREAS, the parties hereto both desire that in some circumstances the Fire Department of **NORTH COUNTY** will respond to fires and rescue incidents within the jurisdictional boundaries of **DEER SPRINGS** and that in some circumstances **DEER SPRINGS** will respond to fires and rescue incidents within the jurisdictional boundaries of **NORTH COUNTY**.

NOW, THEREFORE, FOR AND IN CONSIDERATION OF THE MUTUAL PROMISE, COVENANTS AND CONDITIONS HEREINAFTER SET FORTH, THE PARTIES HERETO AGREE AS FOLLOWS:

1. That, pursuant to the authority granted by Section 55632 of the Government Code, the parties hereto agree to respond to emergency fire alarms outside of its jurisdictional boundaries and into the jurisdictional boundaries of the other in accordance with the terms and conditions hereinafter set forth.

2. That the specific details of the services to be provided under this agreement shall be determined by the respective Fire Chief of each jurisdiction. It is understood that all plans which deal with emergency response shall adhere as closely as practical to the "nearest unit's" concept of first alarm response which forms the basis for this agreement. Upon the mutual consent of the Fire Chief of the parties hereto, modifications may be made, due to changing conditions, to the Automatic Aid territories.

3. That each of the parties will provide fire apparatus to jurisdictional boundaries of the other party. That within the **DEER SPRINGS/NORTH COUNTY** area, upon receipt of a verified fire alarm report, fire or rescue, the **DEER SPRINGS/NORTH COUNTY** will dispatch at least one engine company upon request and other support equipment as needed.

4. That **NORTH COUNTY** agrees to indemnify and hold **DEER SPRINGS** harmless from loss, liability, claim, suit or judgment resulting from obligations of **NORTH**

COUNTY for work or acts done or omitted by which are or may be done, or required by, or pursuant to this agreement.

DEER SPRINGS, agrees to indemnify and hold **NORTH COUNTY** harmless from any loss, liability, claim, suit or judgment resulting from obligations of **DEER SPRINGS** for work or acts done, or omitted by **NORTH COUNTY**, which are or may be done, or required by, or pursuant to this agreement. These provisions are included in accordance with Government Code, Section 895.4, and are applied to all parties herein.

5. That each party hereto shall maintain Worker's Compensation Insurance covering its own employees without cost to the other party, and each party shall pay its own personnel without cost to the other party.

6. That each of the parties hereto shall be fully responsible for all repairs, maintenance and upkeep, including fuel, oil, lubrication, parts replacement and repair of casualty damage, of all of its own equipment used pursuant to this agreement while said equipment is outside of its jurisdictional boundaries.

7. That the costs necessary to develop and provide for the necessary telephone and/or radio inter-tie between communications systems of the parties hereto shall be shared by them equally.

8. That the extraterritorial services to be rendered pursuant to this agreement shall

consist of providing first alarm fire suppression and/or rescue services. The parties shall make every effort to make available the equipment, personnel and services described in this document; however, it is understood by the parties that circumstances may arise which cause a responding party to be unable to make available part or all of the equipment, services and personnel described. The equipment, personnel and services actually made available to the requesting party shall be pursuant to the best efforts of the responding party.

9. That each party warrants and represents that it has sufficient equipment to handle normal involvements which it shall be responsible under this agreement, but neither party shall be expected to respond pursuant to this agreement with special equipment in any territory of the other party, and each party shall furnish its own special equipment for any involvement within its jurisdictional boundaries.

10. That the Fire Chief of each party hereto, shall have joint authority and responsibility for the administration of this **AGREEMENT** which they may delegate to their agents or employees in their respective Fire Departments.

11. That each party hereto shall furnish to the other in writing, the name and rank of all participating officers.

12. That no payment of any kind shall be made between the parties hereto as compensation for any services performed pursuant to this agreement except that the responding party's ALS provider may charge its authorized transport and

related fees to the patient for ALS services performed.

13. That this agreement does not conflict with or supersede an existing "Mutual Aid Agreement between the Parties Hereto."

14. That this agreement shall be effective as of the date and year hereinabove written and continue until terminated by either party by giving notice, in writing, of its intention to terminate not less than ninety (90) days from and after the date of said notice.

IN WITNESS WHEREOF, the parties hereto have executed this **AGREEMENT** the day and year above written.

DEER SPRINGS FIRE PROTECTION DISTRICT	NORTH COUNTY FIRE PROTECTION DISTRICT
Chris Amestoy, Fire Chief	William R. Metcalf, Fire Chief/CEO
Authorized Signer Name/Title	Authorized Signer Name/Title
Signature	Signature
Approved for Form and Content:	Approved for Form and Content:
	Robert H. James, District Counsel North County Fire Protection District

APPENDIX M

County of San Diego-Department of Purchasing and Contracting — Contract 515388

Amendment No. 2 – Deer Springs Fire Protection District For Use of Fire Protection Funds

[illegible]

COUNTY OF SAN DIEGO – DEPARTMENT OF PURCHASING AND CONTRACTING
CONTRACT NO. 515388 AMENDMENT NO. 2

To **Deer Springs Fire Protection District**, Contractor. Pursuant to the changes clause, you are directed to make the changes described herein to the Contract or do the following described work not included in the previous agreed on Statement of Work.

Title of Contract, Project, or Program: **Deer Springs Fire Protection District for use of Fire Protection Funds**

Effective Date: **July 1, 2010**

Description of Contract Change(s) and/or Work To Be Done:

1. In RECITALS.

   A. WHEREAS: In the first sentence **Insert** "and" after the word "fire protection" then **Delete** the word "provide" after the word "fire protection".

   B. WHEREAS: In the third line of the sentence after the "California Department of Forestry" **Insert** the following "(CDF/CAL FIRE)"

   C. WHEREAS: In the second line of the sentence after "California State Department of Forestry and Fire Protection" **Insert** the following "(CDF/CAL FIRE)"

   E. WHEREAS: At the end of the sentences after "CDF" **Insert** the following "/CAL FIRE",

2. Article 1 entitled "PROVISION OF COUNTY FUNDS". **Delete** in its entirety and **Replace** to read as follows:

   1. PROVISION OF COUNTY FUNDS: Upon execution of this Agreement, COUNTY agrees to provide County funds to ENTITY to supplement ENTITY's costs for a CDF/CALFIRE Schedule A 4142 Agreement. Supplemental costs shall be $721,972 for FY 2007/2008; $747,241 for FY 2008/09; $773,394 for FY 2009/2010; $654,349 for FY 2010/2011; $654,349 for FY 2011/2012 and $673,979 for FY 2012/2013. Under no circumstances shall COUNTY be obligated to pay ENTITY any more funds than the amount specified herein. COUNTY will pay in arrears for actual costs for staffing as stated in Section 2 below. Staffing may be adjusted with prior written agreement between ENTITY and COUNTY COTR.

3. Article 2 entitled "<u>ENTITY'S PROJECT</u>", is amended as follows:

   Section 2.1: In the first sentence **Replace** "CDF" with "CDF/CAL FIRE" and **Delete** "and 4144 (Amador)".

   Section 2.2: **Delete** in its entirety and **Replace** to read as follows:

   2.2 "This agreement is contingent upon ENTITY entering and maintaining a CDF/CAL FIRE Schedule A 4142 agreement for the amended term of the agreement ending June 30, 2013. Failure to maintain a CDF/CAL FIRE Schedule A 4142 agreement shall be considered a material breach of contract and grounds for immediate termination of this agreement by County."

   Section 2.3: **Delete** in its entirety and **Replace** to read as follows:

   2.3 "Within five (5) working days after receipt of a CDF/CAL FIRE Schedule A 4142 contract invoice, ENTITY will provide a complete copy of the CDF/CAL FIRE invoice to COUNTY along with an invoice from ENTITY requesting payment for actual costs (up to the amount specified in this contract), for staffing as stated in 2.6 below. Payment shall be set as "immediate" from receipt and approval of invoice unless otherwise stated. Within ten (10) working days after receipt of COUNTY payment for Schedule A 4142 services, ENTITY shall provide COUNTY with proof that ENTITY has paid the CDF/CAL FIRE invoice."

   2.4 In this section **Replace** "CDF" with "CDF/CAL FIRE" and the word "three" with "seven"; **Delete** "and 4144 (Amador) and the "s" after word agreements.

   2.5 In this section **Replace** "CDF" with "CDF/CAL FIRE" and **Delete** "and 4144 (Amador)" and the "s" after the word agreements.

   2.6 Staffing Shall be as follows: **Delete** items "a" and "b" in their entirety and **Replace** to read as follows:

      a. CDF/CAL FIRE Schedule A 4142 staffing per fire engine will consist of not less than three persons, from CDF/CAL FIRE.

      b. Staffing considered for reimbursement under this contract shall consist of five (5) Firefighter II and one-half Battalion Chief.

   2.7 No Changes

Amendment 2, Contract 515388 - Agreement Between The County Of San Diego And Deer Springs Fire Protection District For Use Of Fire Protection Funds

2.8 Entity will:

a. In this item Delete in its entirety and **Replace** to read as follows:

"Contract with CDF/CAL FIRE for two fire stations: Deer Springs Station 1 and Deer Springs Station 2 (Schedule A 4142)."

b. In this item **Replace** "CDF" with "CDF/CAL FIRE"; **Delete** "and 4144 (Amador)".

c. In this item after the word "costs" **Insert** a period and **Delete** the following ", with the exception of "d" below".

d. **Delete** in its entirety and designate as [Reserved]

e. **Delete** the following from the second sentence as follows:

"or committed funds as shown as reserved in the new year approved budget;"

2.9 Missing – missed numbered in original agreement designate as "Reserved"

2.10 No Change

2.11 No Changes

5. Section 3 USE OF FUNDS: **Delete** the second sentence in its entirety.

6. Section 4 AVAILABILITY OF FUNDS: In the third sentence after "proportionately upon" **Replace** "ninety (90)" with "one-hundred twenty (120)".

7. Section 5 TERM: **Replace** "2012" with "2013"

8. Section 16 CONTRACT ADMINISTRATION: **Delete** "Director, Department of Planning and Land Use" and **Replace** with "Deputy Chief Administrative Officer, Public Safety Group, or his/her designee

9. Section 18 NOTICE: DEER SPRINGS FIRE PROTECTION DISTRICT ADMINISTRATOR In the first line **Delete** "Administrator" and **Replace** with "Fire Chief" and in the last line **Delete** "Neil.nickerson1@fire.ca.gov" and **Replace** with "Ernest.marugg@fire.ca.gov".

Under COUNTY: In this section **Delete** in its entirety and **Replace** to read as follows:

"Raymond A. Fernandez, Deputy Chief Administrative Officer
County of San Diego Public Safety Group
534 W. Beech Street, Suite 301
San Diego CA 92101-2441
Tel: (619) 531-4535
Fax: (619) 232-2436
Email: Raymond.Fernandez@sdcounty.ca.gov"

10. **A strikeout copy of the changes in the contract is attached hereto for reference purposes only.**

7/15/10 | 2 of 3 | C/N 515388 – AMD 2

Amendment 2, Contract 515388 - Agreement Between The County Of San Diego And Deer Springs Fire Protection District For Use Of Fire Protection Funds

All other Terms and Conditions remain in effect.

IN WITNESS WHEREOF, County and Contractor have executed this Amendment effective as of the date first set forth above:

We, the undersigned Contractor, have given careful consideration to the change proposed and hereby agree, if this proposed change is approved, that we will provide all equipment, furnish all materials, except as may otherwise be noted above, and perform all services necessary for the work specified and will accept as full payment: **$654,349.00** for FY 2010-11 and FY 2011-12; and **$673,979.00** for FY 2012-13.

Contract term is adjusted as amended.

Cumulative Contract Total Price: **$4,225,284.00**

By: Ernest L Maggi Jr. Date: 9/27/10

Print Name: Ernest L Marugg Jr

Deer Springs Fire Protection District
8709 Circle "R" Drive, Escondido, California 92026
Phone: 760-749-8001
Fax: 760-749-6572

THIS AMENDMENT IS NOT VALID UNLESS APPROVED BY THE DIRECTOR, DEPARTMENT OF PURCHASING AND CONTRACTING.

DEPARTMENT REVIEW AND RECOMMENDED APPROVAL:

By: Raymond A. Fernandez Date: 10-6-10

RAYMOND A. FERNANDEZ
Deputy Chief Administrative Officer
Public Safety Group

APPROVED AS TO FORM AND LEGALITY:

By: [signature] Date: 10/5/10

Senior Deputy
County Counsel

APPROVED:

By: Bruce R. Pryne Date: 10-15-10

WINSTON F. MCCOLL, Director
Department of Purchasing and Contracting

SECOND AMENDMENT TO THE
AGREEMENT BETWEEN THE COUNTY OF SAN DIEGO AND
DEER SPRINGS FIRE PROTECTION DISTRICT
FOR USE OF FIRE PROTECTION FUNDS

County Contract No. 515385

This Agreement is entered into on ________, ________, 2010 by and between the County of San Diego (COUNTY), a political subdivision of the State of California with its administrative headquarters at 1600 Pacific Highway, San Diego, California 92101, and Deer Springs Fire Protection District (ENTITY), with headquarters located at 8709 Circle "R" Drive, Escondido, California 92026.

RECITIALS:

A. WHEREAS, fire protection districts provide fire protection and important health and safety services to the residents and their property in certain unincorporated areas of San Diego County;

B. WHEREAS, the County, by action of the Board of Supervisors on June 21, 2006, Minute Order No. 2, authorized the Director of Purchasing and Contracting to negotiate new contracts and amend existing contracts and enter into contracts of no less than three years with the California Department of Forestry (CDF/CAL FIRE), Fire Protection Districts, County Service Areas and additional Volunteer Fire Companies to improve fire protection and emergency response services in their areas; and

C. WHEREAS, ENTITY has entered into Cooperative Agreements for fire protection service with California State Department of Forestry and Fire Protection (CDF/CAL FIRE) to provide fire protection services, and

D. WHEREAS, the County is authorized to support ENTITY's efforts in providing fire protection services.

E. WHEREAS, COUNTY and ENTITY desire to set forth the terms and conditions on which COUNTY will provide funds to ENTITY.

F. WHEREAS, the Agreement shall consist of this pro forma Agreement and Exhibit A, ENTITY's contract with CDF/CAL FIRE.

NOW, THEREFORE, for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree as follows:

1. PROVISION OF COUNTY FUNDS: Upon execution of this Agreement, COUNTY agrees to provide County funds to ENTITY to supplement ENTITY's costs for a CDF/CAL FIRE Schedule A 4142 Agreement. Supplemental costs shall be $721,972 for FY 2007/2008; $747,241 for FY 2008/2009; $773,394 for FY 2009/2010; $654,349 for FY 2010/2011; $654,349 for FY 2011/2012 and $673,979 for FY 2012/2013. Under no circumstances shall COUNTY be obligated to pay ENTITY any more funds than the amount specified herein. COUNTY will pay in arrears for actual costs for staffing as stated in Section 2 below. Staffing may be adjusted with prior written agreement between ENTITY and COUNTY COTR.

2. ENTITY'S PROJECT: ENTITY shall use County Funds solely for the following public purpose:

2.1 California Forestry Department (CDF/CAL FIRE) Schedule A 4142 contract services (attached Exhibit A).

2.2 This agreement is contingent upon ENTITY entering and maintaining a CDF/CAL FIRE Schedule A 4142 agreement per the amended term of the agreement ending June 30, 2013. Failure to maintain a CDF/CAL FIRE Schedule A 4142 agreement shall be considered a material breach of contract and grounds for immediate termination of this agreement by County

2.3 Within five (5) working days after receipt of a CDF/CAL FIRE Schedule A 4142 contract invoice, ENTITY will provide a complete copy of the CDF/CAL FIRE invoice to COUNTY along with an invoice from ENTITY requesting payment for actual costs (up to the amount specified in this contract), for staffing as stated in 2.6 below. Payment shall be set as "immediate" from receipt and approval of invoice unless otherwise stated. Within ten (10) working days after receipt of COUNTY payment for Schedule A 4142 services. ENTITY shall provide COUNTY with proof that ENTITY has paid the CDF/CAL FIRE invoice.

2.4 The effective date of both agreements will be for Fiscal Year 2006/2007 at the time CDF/CAL FIRE begins the first of seven years of the Schedule A 4142 agreement with ENTITY.

2.5 ENTITY through CDF/CAL FIRE Schedule A 4142 agreement will maximize mutual aid and automatic aid agreements to improve emergency response within the affected districts.

2.6 Staffing shall be as follows:

a. CDF/CAL FIRE Schedule A 4142 staffing per fire engine will consist of not less than three persons, from CDF/CAL FIRE.

b. Staffing considered for reimbursement under this contract shall consist of five (5) FFII and one-half Battalion Chief.

2.7 ENTITY will provide all requested information pertaining to water sources, mains and hydrants as requested.

2.8 ENTITY will:

a. Contract with CDF/CAL FIRE for two fire stations: Deer Springs Station 11 and Deer Springs Station 12 (Schedule A 4142).

b. If the CDF/CAL FIRE Schedule A 4142 costs exceed the County contribution, ENTITY is responsible to pay those excess amounts.

c. Pay all ongoing operating costs, equipment/apparatus replacement, and fleet maintenance costs.

d. [Reserved]

e. Annual Funding report -The Entity shall provide a funding report on or before August 31st of each fiscal year. The report shall contain appropriate documentation evidencing that the funds were spent in accordance with the contract. The County at its sole discretion may disallow any funds it deems improperly spent or committed and reduce future funds by the disallowed amount. The County shall notify the Entity within 30 days of receipt of any report of disallowances.

At the end of the contract term, if the County disallows any funds improperly spent or committed, the Entity shall return any disallowed funds to the County within 30 days of receiving notification.

2.9 [Reserved]

2.10 ENTITY agrees to meet and resolve any conflict with County to a satisfactory and mutually acceptable solution.

2.11 ENTITY will work with County as requested to improve Insurance Services Office ratings for insurance purposes and improved Emergency Medical Services response with approval of the Chief Officer of the District.

3. USE OF FUNDS: ENTITY shall use all COUNTY funds provided by this contract for the purpose specified in Paragraph 2 of this Agreement.

4. AVAILABILITY OF FUNDS. COUNTY's obligation for payment of any Agreement beyond the current fiscal year is contingent upon the availability of funding from which payment can be made. No legal liability on the part of the COUNTY shall arise for payment beyond June 30 of the calendar year unless funds are designated by the COUNTY and are made available for such performance. COUNTY shall have the right to terminate this Agreement or reduce compensation and service levels proportionately upon one-hundred-twenty (120) days' written notice to Contractor in the event that Federal, State or COUNTY funding for this Agreement ceases or is reduced prior to the ordinary expiration of the term of this Agreement. In the event of reduction of funding for the Agreement, COUNTY and ENTITY shall meet within ten (10) days of written notice to renegotiate this Agreement based upon the modified level of funding. In this case if no agreement is reached between COUNTY and ENTITY within 10 days of the first meeting, either party shall have the right to terminate this Agreement within ten (10) days written notice of termination.

5. COMPLIANCE WITH ALL LAWS AND REGULATIONS. In using County Funds, ENTITY shall comply with all applicable federal, state and local laws and regulations including, but not limited to, the California Environmental Quality Act (CEQA)

6. TERM. This Agreement shall expire on June 30, 2013.

7. TERMINATION FOR CAUSE. Upon ENTITY'S breach of this Agreement, COUNTY may terminate this Agreement by giving ENTITY written notice of such termination and specifying the effective date thereof, at least five days before the effective date of such termination. As of the effective date of termination, COUNTY shall have no obligation to make any further payments to ENTITY

irrespective of the amount of expenditures made by ENTITY. In no event shall ENTITY be entitled to any loss of profits on the portion of this Agreement so terminated, or to any other consequential damages, compensation, benefits, reimbursements or ancillary services other than as herein expressly provided. ENTITY shall refund all unexpended County Funds and submit all supporting written documentation (as described in Paragraph 4, above) within thirty days of written notice of termination.

8. TERMINATION FOR CONVENIENCE. Either party may terminate this Agreement by giving 120 days' written notice to the other party.

9. PARAGRAPHS THAT SURVIVE TERMINATION. If this Agreement is terminated for any reason pursuant to Paragraphs 8 or 9 or after the Term expires, the following Paragraphs shall survive and remain in effect: 3, 4, 5, 12, 13 and 16.

10. NO ASSIGNMENT. ENTITY shall not assign or transfer any interest in this Agreement without the prior written consent of COUNTY.

11. AUDIT AND INSPECTION OF RECORDS. ENTITY shall maintain such records and make such reports as required by COUNTY'S Contract Administrator to enable COUNTY to determine whether ENTITY is using County Funds properly. At any time during normal business hours and as often as COUNTY may deem necessary, ENTITY shall make available to COUNTY for examination all of its records with respect to all matters related to this Agreement and shall permit COUNTY to audit, examine, copy and make excerpts or transcripts from such records, and make audits of all invoices, materials, payrolls, records of personnel and other data regarding all matters related to this Agreement. Unless otherwise specified by COUNTY, ENTITY'S records shall be made available for examination in San Diego County. ENTITY shall maintain such records in an accessible location and condition for a period of not less than four years following receipt of County Funds under this Agreement unless COUNTY agrees in writing to an earlier disposition. The State of California and any federal ENTITY having an interest in the use of County Funds shall have the same rights as those conferred on COUNTY by this Agreement.

12. INDEPENDENT CONTRACTOR. COUNTY'S interest is that ENTITY use County Funds for the purpose specified in Paragraph 2. ENTITY'S performance under this Agreement shall be as an independent contractor with sole control of the means and manner for using County Funds provided under this Agreement. ENTITY shall complete this Agreement according to ENTITY'S own means and methods of work which shall be in the exclusive charge and control of ENTITY and shall not be subject to control or supervision of COUNTY except as to the purpose for which County Funds are used. ENTITY is, for all purposes arising out of this Agreement, an independent contractor, and neither ENTITY nor ENTITY'S employees shall be deemed to be COUNTY employees. In no event shall ENTITY or ENTITY'S employees be entitled to any benefits to which COUNTY employees are entitled, including but not limited to, overtime, any retirement benefits, workmen's compensation benefits, and injury leave or other leave benefits.

13. GOVERNING LAW. This Agreement shall be construed and interpreted according to the laws of the State of California.

14. AUDIT COSTS. ENTITY shall reimburse COUNTY for all costs incurred to investigate and audit ENTITY'S performance under this Agreement if ENTITY is subsequently found to have violated the terms of this Agreement. Reimbursement shall include all direct and indirect expenditures to conduct the investigation or audit. COUNTY may deduct all such costs from any amounts not yet paid ENTITY under this Agreement.

15. ENTIRE AGREEMENT. This Agreement constitutes the entire agreement between the parties and supersedes all previous oral or written understandings, representations or agreements related to the subject matter of this Agreement. This Agreement may not be changed except by written amendment signed by both parties.

16. CONTRACT ADMINISTRATION. The Deputy Chief Administrative Officer, Public Safety Group, or his/her designee shall administer this Agreement on behalf of COUNTY. The General Manager shall administer this Agreement on behalf of ENTITY. The parties may change their contract administrator by giving prior written notice to the other party of the name and address of the new contract administrator.

17. NO WAIVER. No failure, inaction, neglect or delay by COUNTY in exercising any of its rights under this Agreement shall operate as a waiver, forfeiture or abandonment of such rights or any other rights under this Agreement.

18. NOTICE. Any notice or notices required or permitted to be given pursuant to this Agreement shall be personally served by the party giving notice or shall be served by certified mail. Notices shall be sufficient if personally served on or if sent by certified mail, postage prepaid, addressed to:

DEER SPRINGS FIRE PROTECTION DISTRICT, ADMINISTRATOR:

District Fire Chief, Deer Springs Fire Protection District
8709 Circle "R" Drive
Escondido, California 92026
Tel: (760) 749-8001
Fax: (760) 749-6572
ernest.marugg@fire.ca.gov

COUNTY:

Raymond A. Fernandez, Deputy Chief Administrative Officer
County of San Diego Public Safety Group
734 W. Beech Street, Suite 301
San Diego CA 92101-2441
Tel: (619) 534-4535
Fax: (619) 232-2436
Email: Raymond.Fernandez@sdcounty.ca.gov

19. ACKNOWLEDGEMENT OF FUNDING. ENTITY shall identify the COUNTY as the source of funding or, if applicable, one of the sources of funding in any public announcements that are made regarding ENTITY'S project. Acknowledgement of COUNTY'S funding role, for example, should be included in publicity materials related to the project. In addition, ENTITY shall apprise COUNTY of any future special events related to ENTITY'S project for which ENTITY used County funds provided under this Agreement so that COUNTY can determine what, if any, role it should play in the special event.

20. COUNTY EMPLOYEES. ENTITY shall not hire any COUNTY employee to implement any part of the project for which COUNTY is providing funds without the prior written approval of COUNTY.

Amendment 2 Agreement Between The County Of San Diego And Deer Springs Fire Protection District For Use Of Fire Protection Funds

IN WITNESS HEREOF, the parties have executed this Agreement on the date first written above.

DEER SPRINGS FIRE PROTECTION DISTRICT	**COUNTY OF SAN DIEGO**
By: Deer Springs Fire Protection District 5709 Circle "R" Drive Escondido, California 92026	By: WINSTON F. McCOLL, Director Department of Purchasing and Contracting
Date 9/27/10	Date 10-15-10

APPROVED AS TO FORM AND LEGALITY

By: Senior Deputy County Counsel

Date: 10/15/10

6

APPENDIX N

FUEL MODIFICATION ZONES ANALYSIS – DUDEK

Fuel Modification Zones

Fire Behavior and Associated Fuel Modification Zones

Dudek conducted analysis of the fire behavior across the site and compared it against the proposed development footprint, product type, and proposed structure setbacks. In some instances, based on a variety of factors including the ignition resistant construction materials and methods, the anticipated wind alignment, off-site land use and vegetation type, or favorable terrain and fire behavior, the justification for a reduced fuel modification zone is evident. Most of the site will be provided a full 100 feet of fuel modification zone. Where not possible, the reduced fuel modification is considered more than would be necessary for fire protection given the fire-hardened structures, favorable terrain, light fuels and low projected flame lengths. Although fire behavior modeling software systems are not specifically intended for determining sufficient fuel modification zone/defensible space widths, they do provide the average length of the flames, which is a key element for determining defensible space distances for minimizing structure ignition. When coupled with experienced evaluation of the fire environment, site-specific landscape features and characteristics, development type and construction, and potential fire risk, the models do help substantiate where the most aggressive fuel modification is necessary and where it may be possible to provide reduced fuel modification zones.

Fuel modification on the site includes a variety of types (Attachment 1 – Lilac Hills Fuel Modification Zone Plan):

1. Standard 100 feet wide fuel modification zone
2. Agriculture-adjacent fuel modification zone (varying width adjacent to irrigated agriculture lands)
3. Reduced Fuel Modification Zone – 50 to 90 feet
4. Roadside Fuel Modification Zone – 20 feet (exception where sensitive wetland vegetation, which is typically high moisture content vegetation, constrains achievement of 20 feet)

Although there are several fuel modification zone types, each will be permanently marked in the field so that annual maintenance is facilitated. Hard and electronic copies of the fuel modification zones and their required maintenance and final plant palettes and densities will be provided by the community HOA or similar entity to all fuel maintenance contractors and successful contract completion will be based on these plans.

The following descriptions provide summaries of the site's fuel modification zones as well as site characteristics that provide justification for reductions from the standard 100 feet. Please refer to the associated Lilac Hills Ranch Fuel Modification Zone exhibit for location of each fuel modification zone type and Fire Protection Plan *Appendix J* for FlamMap fire behavior modeling and relation to reduced fuel modification areas.

Standard 100 Feet Wide Fuel Modification Zones

Standard zones will include two 50 foot wide zones with the first 50 feet starting at the structure. These areas include two 50 feet wide zones to break up fuel continuity and reduce spread rates and fire intensity. The first 50 feet will be irrigated, but will include plant species that are drought tolerant to minimize water use. The outer 50 foot wide zone will be a reduced fuel zone where the most flammable species will be removed and the remaining fuel will be maintained at densities of less than 50 percent of field conditions with minimal fuel continuity. Some of these areas overlap LBZs fully or partially.

Reduced Fuel Modification Zones

Reduced fuel modification zones are limited on the site. A few areas include less than 100 feet of fuel medication zone, ranging from 50 to 90 feet wide. These areas, due to the adjacent land uses and landscape cover types, produce low flame lengths and fire intensity and function consistently with a full 100 foot FMZ. In one instance, the extreme northwest portion of the project, terrain and wind alignment justifies a reduced fuel modification zone and a non-combustible landscape wall will be placed at the top of slope as an additional fire protection measure. Where reduced fuel modification zones are proposed, the project will condition these areas to future inspection and analysis. If, at any point, the off-site fuels should convert to a shrub dominated fuel type, then the project's HOA will be required to provide a focused fire protection plan for that specific area that analyzes the risk and offers implementable fire protection features to mitigate the potential risk, to the approval of the fire authority having jurisdiction.

Agriculture-Adjacent Fuel Modification Zones

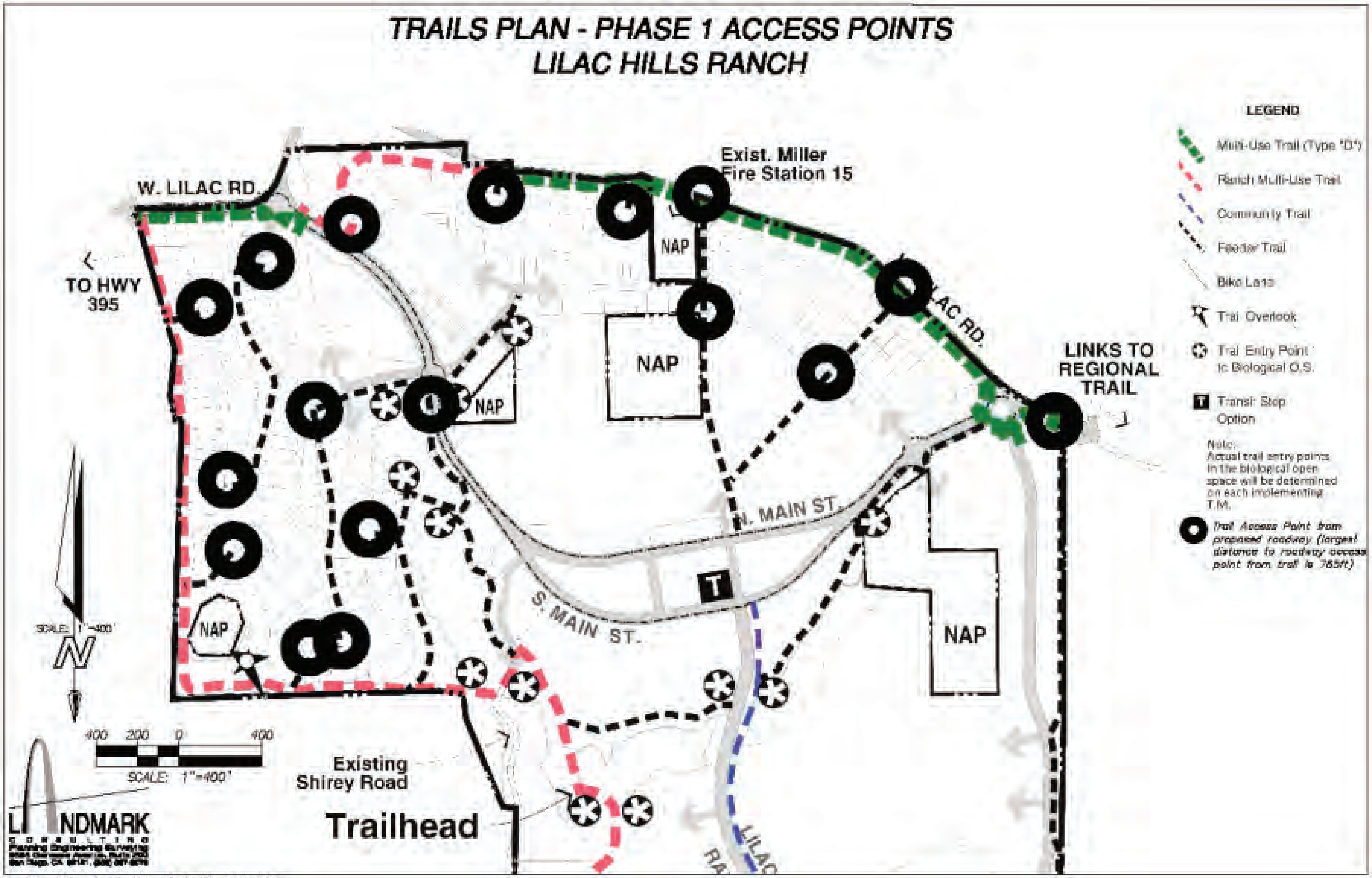
Agriculture-adjacent fuel modification zones vary from 30 feet to 100 feet wide and include irrigated agriculture at the outer edge of the zone, in most cases associated with a wetland buffer. The irrigated agriculture areas vary from roughly 50 to over 100 feet in width. In no case are the irrigated agriculture lands relied on as the only fuel modification. These areas augment provided fuel modification zones. The combined fuel modification zones and adjacent irrigated agriculture areas perform in substantial conformance with a standard 100 feet wide fuel modification zone due to the fuel types, irrigation throughout the zone and agriculture, and ongoing maintenance.

Roadside Fuel Modification Zones

Roadside fuel modification zones throughout the site where adjacent to unmaintained, developed landscapes will be at least 30 feet wide on each side and in some cases, will be adjacent to irrigated agriculture areas. Roadside fuel modification areas are commonly 20 feet wide (County Consolidated Fire Code) so the project exceeds the standard.

APPENDIX O

Trails Plan - Phase 1 Access Points Map


TRAILS PLAN - PHASE 1 ACCESS POINTS
LILAC HILLS RANCH
LEGEND
Multi-Use Trail (Type "D")
Ranch Multi-Use Trail
Community Trail
Feeder Trail
Bike Lane
Trail Overlook
Trail Entry Point to Biological O.S.
Transit Stop Option
Note: Actual trail entry points in the biological open space will be determined on each implementing T.M.
Trail Access Point from proposed roadway (largest distance to roadway access point from trail is 765ft)
W. LILAC RD.
TO HWY 395
Exist. Miller Fire Station 15
NAP
NAP
NAP
NAP
NAP
LILAC RD.
LINKS TO REGIONAL TRAIL
N. MAIN ST.
S. MAIN ST.
T
Existing Shirey Road
Trailhead
SCALE: 1"=400'
400 200 0 400
SCALE: 1"=400'
N
LANDMARK

July 1, 2015

APPENDIX P

Lilac Hills Ranch
Road Standard Comparison Matrix

Lilac Hills Ranch
Road Standard Comparison Matrix

Road Name	Graded Width (min)	Road Surfacing Width (min)	Horizontal Radius (min)	Design Speed	Maximum Grade	Sidewalk	Parking	Tangent Between Curves (min)	Intersecting Road Separation (min)	Paved Shldr Width (min)²	Maximum/Acceptable Capacity (ADT)	Projected ADT
Main Street (before couplet)												8480
Proposed	64ft	40ft	500ft	30mph	7.2%	1 or both sides	See Note 3	94ft (Horizontal)/140ft (Vertical)	770ft	5'	9500	
Private Road Standard	28ft	24ft	200ft	30mph	20.0%	none	none	N/A	N/A	N/A	2500	
Public Road Standard (2.2C)	64ft-72ft	40ft-54ft	500ft	40mph	9.0%	both sides	both sides	400ft	300ft	8ft	9500	
Consolidated Fire Standards		24ft (ea lane 14'min wide if median)	28' (dwys)		20.0%							
Main Street (from couplet eastward)												2980
Proposed	51ft	40ft	500ft	30mph	8.5%	1 or both sides	See Note 3	180ft (Horizontal)/100ft (Vertical)	449ft	5'	7800	
Private Road Standard	28ft	24ft	200ft	30mph	20.0%	none	none	N/A	N/A	N/A	2500	
Public Road Standard (2.2F)	52ft	28ft	500ft	40mph	9.0%	both sides	both sides	400ft	300ft	2ft	7800	
Consolidated Fire Standards		24ft (ea lane 14'min wide if median)	28' (dwys)		20.0%							
Lilac Hills Ranch Road												4540
Proposed	29.5ft - 64ft	23ft - 42ft	300ft	30mph	10.0%	1 or both sides	See Note 3	N/A	232ft	none	10900	
Private Road Standard	28ft	24ft	200ft	30mph	20.0%	none	none	N/A	N/A	N/A	2500	
Public Road Standard (Res. Collector)	60ft	40ft	300ft	30mph	12.0%	both sides	both sides	N/A	200ft	8ft	4500	
Consolidated Fire Standards		24ft (ea lane 14'min wide if median)	28' (dwys)		20.0%							
Shirey Road												0
Proposed	28ft	24ft	100ft	20mph	18.2%	none	See Note 3	N/A	605ft	none	100	
Private Road Standard	28ft	24ft	100ft	20mph	20.0%	none	none	N/A	N/A	N/A	100	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	8ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Covey Lane												1110
Proposed	42ft	24ft	200ft	30mph	13.0%	none	See Note 4	N/A	206ft	none	1500	
Private Road Standard	28ft	24ft	200ft	30mph	20.0%	none	none	N/A	N/A	N/A	2500	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	8ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Mountain Ridge Road												2220
Proposed	28ft	25ft	200ft	15mph	16.4%	none	See Note 4	N/A	470ft	none	2500	
Private Road Standard	28ft	24ft	200ft	30mph	20.0%	none	none	N/A	N/A	N/A	2500	
Public Road Standard (Res. Collector)	60ft	40ft	300ft	30mph	12.0%	both sides	both sides	N/A	200ft	8ft	4500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "O"												620
Proposed	31ft	23ft	200ft	30mph	10.1%	1 side	See Note 3	N/A	200ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	8ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "NN"												640
Proposed	31ft	23ft	200ft	30mph	6.0%	1 side	See Note 3	N/A	561ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	8ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "ZZ"												700
Proposed	34ft	25ft	500ft	30mph	10.5%	side (trail other side)	See Note 4	N/A	471ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	8ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "Z" (west of Street "C")												730
Proposed	31ft	25ft	200ft	25mph	9.3%	1 side	See Note 4	N/A	585ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	

April 8, 2013

July 1, 2015

Lilac Hills Ranch
Road Standard Comparison Matrix

Road Name	Graded Width (min)	Road Surfacing Width (min)	Horizontal Radius (min)	Design Speed	Maximum Grade	Sidewalk	Parking	Tangent Between Curves (min)	Intersecting Road Separation (min)	Paved Shldr Width (min)[2]	Maximum/Acceptable Capacity (ADT)	Projected ADT
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "Z" (east of Street "C")												1580
Proposed	33ft	25ft	200ft	30mph	7.3%	1 side	See Note 3	N/A	358ft	none	2500	
Private Road Standard	28ft	24ft	200ft	30mph	20.0%	none	none	N/A	N/A	N/A	2500	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "T"												230
Proposed	34ft	25ft	500ft	30mph	4.3%	2 sides	See Note 3	N/A	308ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "S"												130
Proposed	33ft	25ft	480ft	30mph	7.9%	1 side	See Note 3	N/A	619ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "C"												1230
Proposed	28ft	25ft	200ft	20mph	13.1%	1 side	See Note 3	N/A	348ft	none	2500	
Private Road Standard	28ft	24ft	200ft	30mph	20.0%	none	none	N/A	N/A	N/A	2500	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "V"												140
Proposed	33ft	25ft	200ft	30mph	2.0%	1 side	See Note 3	N/A	270ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "U"												330
Proposed	28ft	25ft	200ft	25mph	6.0%	none	See Note 3	N/A	282ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "E"												470
Proposed	34ft	25ft	200ft	20mph	14.0%	side (trail other sid	See Note 3	N/A	301ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "H"												470
Proposed	33ft	25ft	250ft	30mph	5.1%	1 side	See Note 3	N/A	995ft	none	750	
Private Road Standard	28ft	24ft	150ft	25mph	20.0%	none	none	N/A	N/A	N/A	750	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "B" (Dawson)												0
Proposed	28ft	24ft	N/A	15mph	14.4%	none	See Note 3	N/A	408ft	none	100	
Private Road Standard	28ft	24ft	100ft	20mph	20.0%	none	none	N/A	N/A	N/A	100	
Public Road Standard (Res. Road)	56ft	36ft	200ft	30mph	15.0%	both sides	both sides	N/A	200ft	6ft	1500	
Consolidated Fire Standards		24ft	28' (dwys)		20.0%							
Street "Y"												2030

April 8, 2013

Lilac Hills Ranch
Road Standard Comparison Matrix

Road Name	Graded Width (min)	Road Surfacing Width (min)	Horizontal Radius (min)	Design Speed	Maximum Grade	Sidewalk	Parking	Tangent Between Curves (min)	Intersecting Road Separation (min)	Paved Shldr Width (min)[5]	Maximum/Acceptable Capacity (ADT)	Projected ADT
Proposed	34ft	25ft	400ft	5mph/30mi[illegible]	11.3%	1 side	See Note 3	N/A	326ft	none	2500	
Private Road Standard	28ft	24ft	200ft	30mph	20.0%	none	none	N/A	N/A	N/A	2500	
Public Road Standard (Res. Collector)	60ft	40ft	300ft	30mph	12.0%	both sides	both sides	N/A	200ft	3ft	4500	
Consolidated Fire Standards		24ft	28' (clMin)		20.0%							

NOTES:

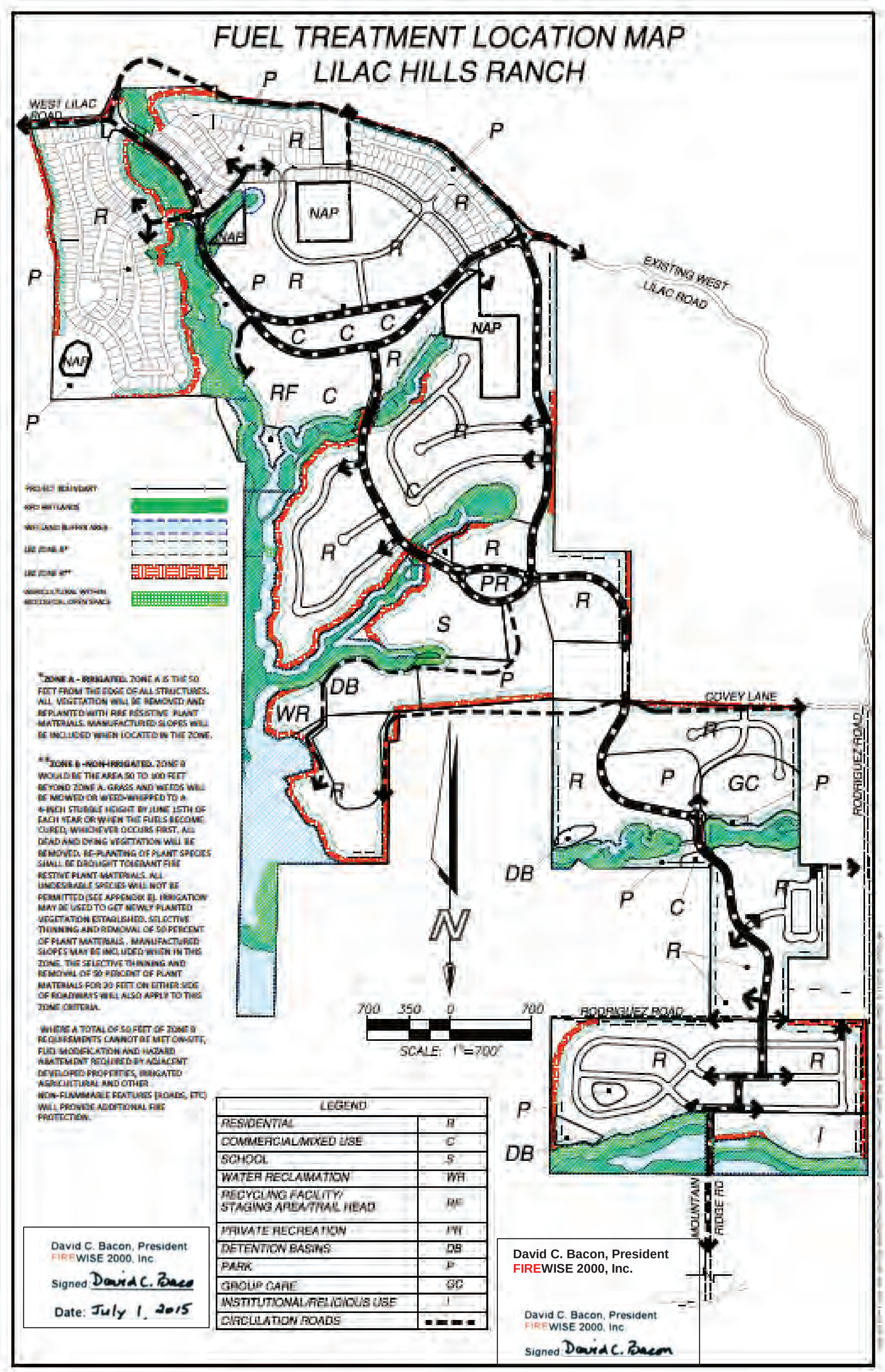
1. All proposed intersections satisfy standards for corner sight distance requirements
2. All Public Drainage standards are met except that culvert accommodations only provided on circulation roads
3. Parking only provided along housing frontages (please see attached Parking Analysis Exhibit for locations of proposed parking)
4. Public Lighting standards are met
5. Paved shoulder width is inclusive of bike lanes

April 3, 2015

EXHIBIT 1

FUEL TREATMENT LOCATION MAP

July 1, 2015


FUEL TREATMENT LOCATION MAP
LILAC HILLS RANCH
WEST LILAC ROAD
EXISTING WEST LILAC ROAD
COVEY LANE
RODRIGUEZ ROAD
MOUNTAIN RIDGE RD
NAP
R
P
C
RF
PR
S
DB
WR
GC
I
N
700 350 0 700
SCALE: 1"=700'
*ZONE A - IRRIGATED. ZONE A IS THE 50 FEET FROM THE EDGE OF ALL STRUCTURES. ALL VEGETATION WILL BE REMOVED AND REPLANTED WITH FIRE RESISTIVE PLANT MATERIALS. MANUFACTURED SLOPES WILL BE INCLUDED WHEN LOCATED IN THE ZONE.
**ZONE B -NON-IRRIGATED. ZONE B WOULD BE THE AREA 50 TO 100 FEET BEYOND ZONE A. GRASS AND WEEDS WILL BE MOWED OR WEED-WHIPPED TO A 4-INCH STUBBLE HEIGHT BY JUNE 15TH OF EACH YEAR OR WHEN THE FUELS BECOME CURED, WHICHEVER OCCURS FIRST. ALL DEAD AND DYING VEGETATION WILL BE REMOVED. RE-PLANTING OF PLANT SPECIES SHALL BE DROUGHT TOLERANT FIRE RESTIVE PLANT MATERIALS. ALL UNDESIRABLE SPECIES WILL NOT BE PERMITTED (SEE APPENDIX E). IRRIGATION MAY BE USED TO GET NEWLY PLANTED VEGETATION ESTABLISHED. SELECTIVE THINNING AND REMOVAL OF 50 PERCENT OF PLANT MATERIALS . MANUFACTURED SLOPES MAY BE INCLUDED WHEN IN THIS ZONE. THE SELECTIVE THINNING AND REMOVAL OF 50 PERCENT OF PLANT MATERIALS FOR 20 FEET ON EITHER SIDE OF ROADWAYS WILL ALSO APPLY TO THIS ZONE CRITERIA.
WHERE A TOTAL OF 50 FEET OF ZONE B REQUIREMENTS CANNOT BE MET ON-SITE, FUEL MODIFICATION AND HAZARD ABATEMENT REQUIRED BY ADJACENT DEVELOPED PROPERTIES, IRRIGATED AGRICULTURAL AND OTHER NON-FLAMMABLE FEATURES (ROADS, ETC) WILL PROVIDE ADDITIONAL FIRE PROTECTION.
LEGEND
RESIDENTIAL R
COMMERCIAL/MIXED USE C
SCHOOL S
WATER RECLAMATION WR
RECYCLING FACILITY/ STAGING AREA/TRAIL HEAD RF
PRIVATE RECREATION PR
DETENTION BASINS DB
PARK P
GROUP CARE GC
INSTITUTIONAL/RELIGIOUS USE I
CIRCULATION ROADS
David C. Bacon, President
FIREWISE 2000, Inc.
Signed David C. Bacon
Date: July 1, 2015
David C. Bacon, President
FIREWISE 2000, Inc.
David C. Bacon, President
FIREWISE 2000, Inc.
Signed David C. Bacon

FEHR & PEERS

DRAFT MEMORANDUM

Date: March 6, 2019

To: Jon Rilling, Village Communities, LLC

From: Mike Wallace and Katy Cole

Subject: DRAFT Lilac Ranch Evacuation Roadway Capacity and Travel Time Analysis

SD18-0295

This memorandum provides Fehr & Peers' evaluation of roadway capacity and travel time for an evacuation of the Lilac Ranch Project ("Project") and the existing residences in the Project's vicinity. Fehr & Peers calculated the evacuation travel time in two primary cases:

1. Existing Condition Case: Travel times based on existing homes and road conditions, with no Project development or roadway modifications.
2. Project Case: Travel times based on home counts and road conditions that will exist given Project development (including existing surrounding residences)

The average evacuation travel time in the Project Case is the same as the Existing Condition Case for 3 of the 4 development areas identified in the Study Area and in no instance greater than 60 minutes. The similar travel times found across both scenarios is a function of the vehicle capacity of the roads in each scenario relative to the projected vehicle demand. A detailed explanation of the evacuation vehicle generation and allocation to the roadways along with the industry standard volume-to-capacity (V\C) methodology resulting in these findings follows hereinafter.

The table below shows the average travel time in minutes from each of the study development areas to evacuate the study area to I-15 north of Highway 76 or I-15 south of Old Castle Road.

RESULTS SUMMARY

	Average Travel Time (in minutes) by Development Area			
	West Lilac Corridor	Project	South Corridor	East Corridor
Existing Condition Case	30	30	15	30
Project Case (Exist+Project)	30	30	15	60

Source: Fehr & Peers.

STUDY AREA AND EVACUATION ROUTES

The Study Area consists of the 4 geographic regions shaded in Figure 1 below (West Lilac Corridor, Project Corridor, South Corridor, and East Corridor).

The routes associated with the Study Area were evaluated and measured for capacity at the following locations:

A. West Lilac Road: Old Highway 395 to Project Entry
B. West Lilac Road: Project Entry to Covey Lane
C. West Lilac Road: Covey Lane to Circle R Drive
D. Circle R Drive: West Lilac Road to Old Highway 395
E. Old Highway 395: Gopher Canyon to Circle R Drive
F. Old Highway 395: State Route 76 to West Lilac Road

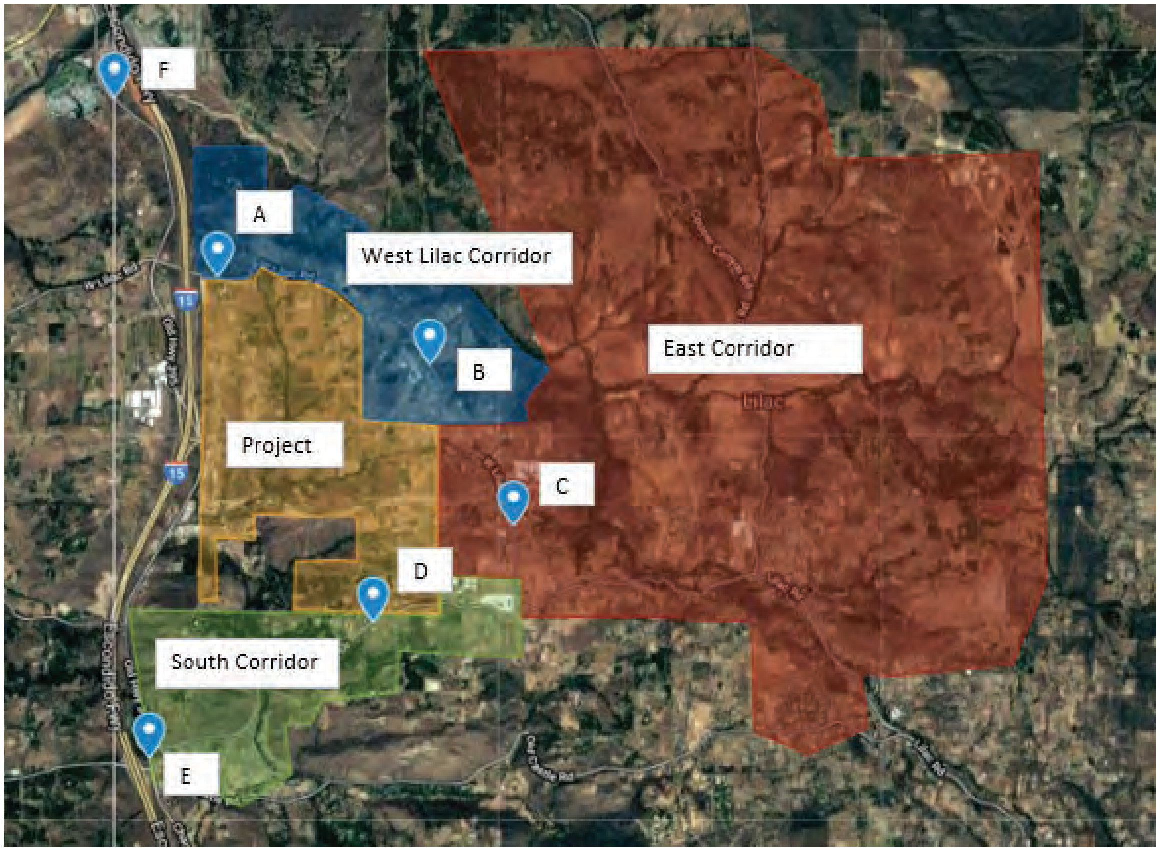


Figure 1: Study Vicinity

VEHICLE DEMAND

The first step to calculate evacuation travel time for the Study Area is to determine the number of outbound vehicle trips made in an evacuation event. To most conservatively capture the highest potential outbound trip generation, residents are assumed to be present in every home located in the Study Area when evacuation notice is given. The number of vehicles that each household is assumed to use during an evacuation is shown in **Table 1.** It is conservatively assumed that none of these vehicles leave in advance of the evacuation notice. This vehicle count breakdown is applied to the total homes count in each region to capture the total vehicle evacuation trips from the Study Area (see **Table 2**).

TABLE 1 VEHICLE UTILZATION RATES

Vehicles Used to Evacuate	Percentage of Households
1	46%
2	38%
3	11%
4	5%

Source: Santa Rosa CA Post-Fire Survey, 2018.

TABLE 2 EVACUATING VEHICLE TRIP GENERATION BY AREA

Residential Area	Development	Vehicle Trips
West Lilac Corridor	81 RU	142
South Corridor	290 RU	508
East Corridor	614 RU	1,075
Existing Residential	**985 RU**	**1,725**
Project Buildout Residential	1,746 RU	3,056
Existing Plus Project	**2,441 RU, 200 ALR**	**4, 781**

Notes: Residential Units (RU) and Assisted Living Rooms (ALR) Source: Chicago Title Company
Source: Calculations by Fehr & Peers.

VEHICLE ROUTE ASSIGNMENT

The vehicle trips generated are assigned to the existing roadway network towards I-15 based on the most efficient route. In both the Existing Condition Case and the Project Case, the route allocation is based on homes' proximity to the road segments that lead to I-15. Thus, relatively northern homes in the Study Area utilize road segments in the northern portion of the Study Area to evacuate. Southern homes are allocated to the Southern road segments leading toward I-15. The specific allocation of evacuation vehicle trips for the Existing Condition Case and the Project Case are shown in **Table 3A** and **Table 3B,** respectively.

TABLE 3A: VEHICLE TRIP ASSIGNMENT (EXISITING CONDITION CASE)

Study Segment	West Lilac Corridor	South Corridor	East Corridor
A. W Lilac Road: Old Highway 395 to Project Entry	50%	0%	10%
B. W Lilac Road: Project Entry to Covey Lane	50%	0%	10%
C. W Lilac Road: Covey Lane to Circle R Drive	30%	0%	25%
D. Circle R Drive: W Lilac Road to Old Highway 395	30%	20%	35%
E. Old Highway 395: Gopher Canyon to Circle R Drive	15%	80%	18%
F. Old Highway 395: SR 76 to W Lilac Road	25%	0%	8%

Source: Fehr & Peers.

TABLE 3B: VEHICLE TRIP ASSIGNMENT (PROJECT CASE)

Study Segment	West Lilac Corridor	Project Corridor	South Corridor	East Corridor
A. W Lilac Road: Old Highway 395 to Project Entry	50%	40%	0%	10%
B. W Lilac Road: Project Entry to Covey Lane	50%	30%	0%	10%
C. W Lilac Road: Covey Lane to Circle R Drive	30%	20%	0%	25%
D. Circle R Drive: W Lilac Road to Old Highway 395	30%	30%	20%	35%
E. Old Highway 395: Gopher Canyon to Circle R Drive	15%	15%	80%	18%
F. Old Highway 395: SR 76 to W Lilac Road	25%	20%	0%	8%

Source: Fehr & Peers.

ROADWAY CAPACITY

During emergency evacuation conditions, several factors limit the standard hourly vehicle capacity, such as smoke and increased animal trailer usage. Accounting for limiting factors like these present in an evacuation scenario, and also taking into account the geographical characteristics of the Study Area, Fehr & Peers reduced roadway capacity by 30% from standard operating capacity to calculate evacuation travel time (see **Table 4)**.

TABLE 4 VEHICLE LANE CAPACITY

Factor	Capacity (hourly per lane)
Maximum Capacity	1,900
Total Capacity Reductions	-30%
Evacuation Capacity (per hour per lane)	**1,330**

Source: Fehr & Peers.

The actual existing count of roadway lanes was used to determine the count of evacuation lanes available in the Existing Condition Case. For the Project Case, Fehr & Peers utilized input from the developer regarding future roadway conditions to determine the count of evacuation lanes available. With the addition of the Project, some of the study segments are modified to widen or add two-way left turn lanes relative to existing conditions. The number of lanes and the resulting evacuation capacity for both Cases are shown in **Table 5**.

Regarding roadway movements, Fehr & Peers takes as given that roadways and intersections will operate in an emergency condition. Specifically,

- All travel lanes in the evacuation direction (i.e. through lanes and two-way left turn lanes).
- Intersection traffic control operates in an emergency condition.
- All non-essential traffic is being diverted away from the area. Since this is not an evacuation plan, there is no designation of the type of traffic control plan (automated or with the use of law enforcement) included in the analysis.

TABLE 5 TRAVEL LANES AND CAPACITY BY SEGMENT AND SCENARIO

Study Segment	Existing		With Project	
	Lanes	Evac Capacity	Lanes	Evac Capacity
A. W Lilac Road: Old Highway 395 to Project Entry	2	2,660	2	2,660
B. W Lilac Road: Project Entry to Covey Lane	2	2,660	2	2,660
C. W Lilac Road: Covey Lane to Circle R Drive	2	2,660	2	2,660
D. Circle R Drive: W Lilac Road to Old Highway 395	2	2,660	2	2,660
E. Old Highway 395: Gopher Canyon to Circle R Drive	2	2,660	2	2,660
F. Old Highway 395: SR 76 to W Lilac Road	2	2,660	2	2,660

Note: Capacities noted in vehicles per hour.
Source: Fehr & Peers.

CAPACITY RELATIVE TO EVACUATION VOLUME

The per lane evacuation capacity in Table 4 was multiplied by the number of lanes for each scenario at the locations identified in Table 5 to obtain the evacuation capacity. The evacuation volume and evacuation capacity were compared to determine if there was sufficient capacity to accommodate the number of vehicles using a volume-to-capacity (V\C) analysis method. **Table 6A** and **Table 6B** summarize the volume, capacity, and V\C for each of the study segments.

TABLE 6A: EVACUATION VOLUMES AND CAPACITY (EXISTING CONDITION CASE)

Study Segment	Evacuation Volume	Evacuation Capacity	V\C
A. W Lilac Road: Old Highway 395 to Project Entry	178	2,660	0.07
B. W Lilac Road: Project Entry to Covey Lane	178	2,660	0.07
C. W Lilac Road: Covey Lane to Circle R Drive	311	2,660	0.12
D. Circle R Drive: W Lilac Road to Old Highway 395	419	2,660	0.16
E. Old Highway 395: Gopher Canyon to Circle R Drive	209	2,660	0.08
F. Old Highway 395: SR 76 to W Lilac Road	121	2,660	0.05

Source: Fehr & Peers.

TABLE 6B: EVACUATION VOLUMES AND CAPACITY (PROJECT CASE)

Study Segment	Evacuation Volume	Evacuation Capacity	V\C
A. W Lilac Road: Old Highway 395 to Project Entry	1,401	2,660	0.55
B. W Lilac Road: Project Entry to Covey Lane	1,095	2,660	0.43
C. W Lilac Road: Covey Lane to Circle R Drive	922	2,660	0.35
D. Circle R Drive: W Lilac Road to Old Highway 395	1,335	2,660	0.50
E. Old Highway 395: Gopher Canyon to Circle R Drive	668	2,660	0.25
F. Old Highway 395: SR 76 to W Lilac Road	732	2,660	0.28

Source: Fehr & Peers.

When the V\C ratio is under 1.0, the road segment can successfully operate at evacuation capacity. If the V\C exceeds 1.0, the result is vehicle slowing which result in relatively longer travel times. However, in both cases the V\C ratio is significantly under 1.0.

RESULTS

Weather in the Existing Conditions Case or the Project Case, the average evacuation time from the Study Area is 30 minutes for 3 of the 4 designated regions and in no instance is the average evacuation travel time over 60 minutes. The capacity of the existing roadways, plus road improvements made the Project result in the ability to add the addition residential units to the Study area with the following average evacuation travel times:

RESULTS SUMMARY

	Average Travel Time (in minutes) by Development Area			
	West Lilac Corridor	**Project Corridor**	**South Corridor**	**East Corridor**
Existing Condition Case	30	30	15	30
Project Case (Existing+Project)	30	30	15	60

Source: Fehr & Peers.

NOTES

This study is not intended to be an Evacuation Plan and does not purport to include elements and measurements typically found in an Evacuation Plan. The sole purpose of this analysis is to focus on the vehicle travel times in an evacuation event.

In addition to the residential homes, vehicle trips were included to account for the 200-room assisted living facility. The school in the Project would not generate additional trips since the children would travel with one of the vehicles already accounted for in the vehicle utilization rates.

LILAC HILLS RANCH WILDFIRE RISK ASSESSMENT

Christopher A. Dicus, PhD
cdicus@calpoly.edu

Prepared by

2019-March-7

Christopher A. Dicus, PhD **Date**

Executive Summary

Recent wildfires throughout California have resulted in heightened scrutiny of San Diego County development projects. This white paper will address differences between fire ecology, factors that influence wildland fire behavior, building requirements, fire mitigation and preparedness measures, and other factors that differentiate communities devastated in the recent wildfires in northern California from the proposed LHR community in San Diego County.

While both LHR and Paradise reside in a State-designated Very High Fire Hazard Severity Zone, the proposed LHR development will be significantly safer than areas that were recently burned in northern California due to the myriad of mitigation factors being included in LHR. It is these fire safe features within LHR that will even make the existing neighborhoods that currently border LHR safer than they currently are today. For the reasons that follow in this report, LHR will minimize risk to life and property.

First, changes to the fuels in LHR will be safer at multiple scales than in recently destroyed communities in northern California. At the community-level scale, the lands in and around LHR are dissected by irrigated agricultural lands that will impede active fire spread; further, at the boundaries of LHR, an irrigated fuel management zone will extend up to 100 ft around the community. At the smaller parcel-level scale, defensible space is designed around all structures will be rigorously enforced and funded by the LHR Home Owners Association (HOA). In contrast, the community of Paradise had contiguous fuels that surrounded the community and lacked any appreciable defensible space around buildings and did not have an HOA to enforce and fund ongoing fuel reduction and defensible space.

Of greatest importance to risk reduction, the buildings in LHR will be built to stringent building codes that require ignition-resistant construction of vulnerable components, including standards for roofing, siding, windows, vents, decks, and others. In contrast, because Paradise was largely comprised of fire-prone buildings that were constructed 40 or more years before wildfires were considered in building codes, homes in Paradise easily ignited via burning embers and subsequent house-to-house spread (even though the trees on many burned properties were largely unscathed).

LHR is also designed to maximize efficiency of fire suppression efforts. LHR has proposed a new fully-staffed 24/7 fire station with a type 1 fire engine, which in combination with the existing CAL FIRE station at the northern border of the community will enable a 5-minute response time throughout the community. Further, an improved public water supply system including placement of fire hydrants throughout the community at strategic locations exceeds current fire code standards.

LHR residents (and the surrounding community) will also benefit from a previously tested fire notification system, which has been employed with great success during other large fires in San Diego County. Further, changes to the road infrastructure in and around the community will enable rapid and orderly evacuation of its residents in conjunction with nearby existing neighborhoods that abut the LHR development (e.g., LHR will make improvements to 45 different local road segments and intersections *outside* the community), which will improve road safety and traffic flow. As an alternative contingency, the community will also be designed so as to enable a passive shelter-in-place approach for residents and neighbors should evacuation be phased, halted or precluded entirely. Contrast that with Paradise, where authorities were unprepared to evacuate the entire town simultaneously, leading to confusion on when residents were to leave, long traffic delays in perilous conditions, and subsequent multiple fatalities during evacuation.

After visits to the proposed LHR development and review of its fire safety characteristics, it is my determination that the LHR development would provide a safe area for its residents that would simultaneously benefit nearby neighborhoods with reduced fire risk via improved evacuation routes and contingency refuge areas, increased fire response and emergency facilities, and a significant investment in fire safety education, prevention and protection.

Additionally, LHR is not like Paradise or other communities that were built before current fire standards. The LHR project includes a multi-layered fire protection system that is based on ignition resistant buildings and landscapes, adherence to stringent codes, fire-fighting water availability, swift emergency response, and a sound evacuation planning that includes a contingency option for residents who may be directed to temporarily shelter within the community during a wildfire evacuation. LHR, like other new, master-planned communities, should not be compared with older, less restrictive communities that were not built to the latest codes and ongoing maintenance. Other new, nearby communities have performed extremely well during wildfires and given the LHR's location, surrounding fire environment, and proposed fire protection plans, it is anticipated that the project will represent lowered risk to both LHR residents and nearby neighboring communities.

Table of Contents

1. Introduction

As a result of recent wildfires in northern California, there has been heightened scrutiny of development of new communities in San Diego County, specifically those proposed in wildland-urban interface (WUI) areas that have the potential for the built environment to be exposed to wildfire. This white paper will address differences between fire ecology, factors that influence wildland fire behavior, building requirements, fire mitigation and preparedness measures, and other factors that differentiate communities devastated in the recent wildfires in northern California from the proposed LHR community in San Diego County.

The proposed Lilac Hills Ranch (LHR) development is a compact mixed-use village on 608 acres located less than one mile from the I-15 transportation corridor in the northern unincorporated County of San Diego, California. The LHR community will consist of 1,746 homes, including 903 single-family dwellings, 468 age-qualified homes, 211 mixed-use homes, and 164 townhomes. This document investigates potential wildfire risk on LHR and offers further potential measures that could be implemented over and above the already high level of fire-safe design.

2. Fire Ecology

The vegetation, ecology, and general landscapes in and around Paradise are very different than in San Diego County. In general, areas in northern California affected by wildfire have historically consisted of open, park-like stands of mature, mixed-conifer forests, which were maintained by frequent, low-intensity surface fires that significantly reduced vegetative fuel loading and continuity. Northern San Diego County, however, has historically consisted of coastal sage scrub and chaparral characterized by less frequent, but more intense wildfires than those found in northern California.

The native landscapes in both regions, however, have significantly changed over time from their historic conditions, which has drastically influenced the likely types of fires that could occur in both locales. For example, fire exclusion (largely via fire suppression activities) has caused the mixed-conifer forests in northern California to miss many successive intervals of normally low-intensity fire. In the absence of these small, mostly benign surface fires, the vegetation there grew and greatly increased surface fuel loading and continuity, traits that foster high-intensity crown fires.

The landscape around LHR has also changed, but potential fire intensity has seemingly *decreased* due to clearing of the native shrublands to facilitate agricultural operations. While an increasing population in the region certainly increases the potential for man-made ignitions, the landscape no longer consists of large, contiguous, fire-prone shrublands. While these agricultural lands do have the potential to burn (especially under hot and dry Santa Ana wind conditions), the irrigated, sparse landscape around the proposed LHR development would retard the spread and intensity of wildfires in and around the community.

The greatest change to fuels in both locales is due to the building of homes and other structures in the landscape. As will be discussed, the homes in Paradise were built before building codes were adopted to make homes resistant to ignition during a wildfire. In comparison, homes in LHR will be built to meet (and in some cases exceed) stringent County of San Diego Consolidated Fire Code that have been specifically enacted to resist ignition during a wildfire, including County Building Code (Title 9, Division 2, Chapter 1 of the San Diego County Code of Regulatory Ordinances) and Chapter 7A of the California Building Code. While older buildings in Paradise exacerbated an ecosystem that was well outside its historically normal range of fire size and intensity, the ignition-resistant buildings in LHR should be expected to actually impede spread of wildfire in a landscape that has already converted in many parts to low-hazard agriculture practices.

3. Fire Hazard

Fire hazard is a factor of the probability of a wildfire occurring in a given area and its likely fire behavior (i.e., fire intensity, ember cast, etc.) as it moves across a given landscape. The State has created Fire Hazard Severity Zones, which as will be shown does not necessarily convey the potential for structural loss. Fuels, weather, and topography (the primary factors that drive wildland fire behavior) vary greatly between LHR and the communities in northern California that were recently impacted from wildfires and each of these factors will be discussed in turn.

Fire Hazard Severity Zones

CAL FIRE designates all areas in which it has primary fire protection responsibilities into one of three Fire Hazard Severity Zone (FHSZ) designations, including (1) Moderate, (2) High, and (3) Very High. Local jurisdictions can also choose (or choose not) to adopt a State-recommended Very High FHSZ designation for its local area. The State bases these designations on likely fire behavior to be experienced in a given area (a factor of extreme weather conditions, mature vegetation, and slope steepness) and the probability of fire occurrence (a factor of previous fire history in the area).

Both LHR and Paradise are located in areas that the State has designated as a Very High FHSZ (Figures 1-2), but this identical designation does NOT convey the same risk potential between the sites. By design, the State purposefully looks to the likely mature (and untreated) vegetation of a given area because it assumes a worst-case posture in which the landscape is never treated to mitigate potential fire behavior. Indeed, mitigation activities have no bearing on the designated FHSZ classification for a given area.

To put this into perspective, an estimated 70% of San Diego County falls within a “High” to “Very High” Fire Severity Zone (Figure 1) due to the County residing in a Mediterranean climate, having a patchwork of combustible fuels in steep terrain, and the potential for dry Santa Ana winds throughout the year. While fire hazard assessment is an important consideration for development projects within the wildland urban interface, the State-designated zones are not created to restrict development.

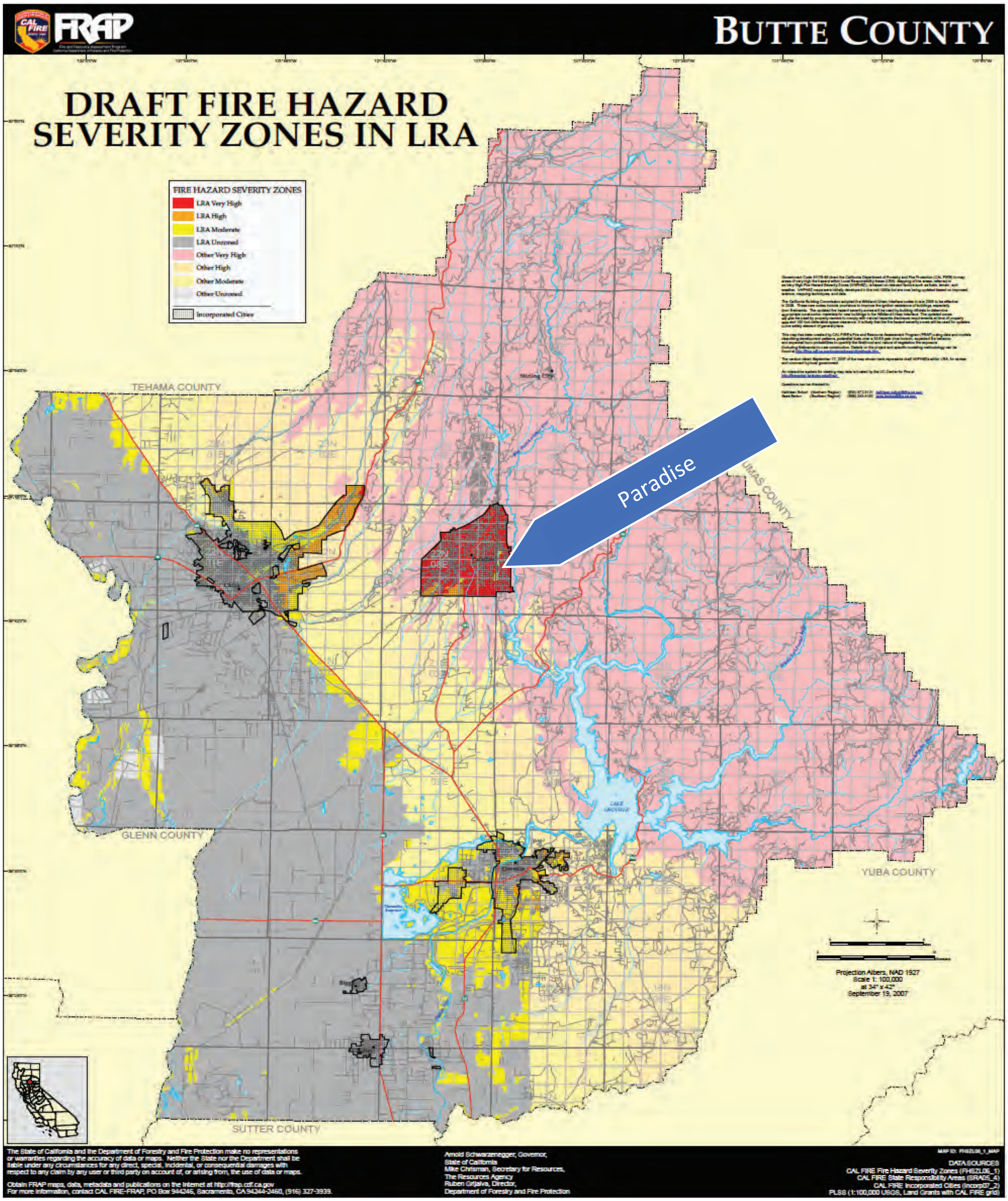


Figure 1. Fire Hazard Severity Zones in Butte County, California. Arrow points to Paradise, which illustrates it lying in a Very High Fire Hazard

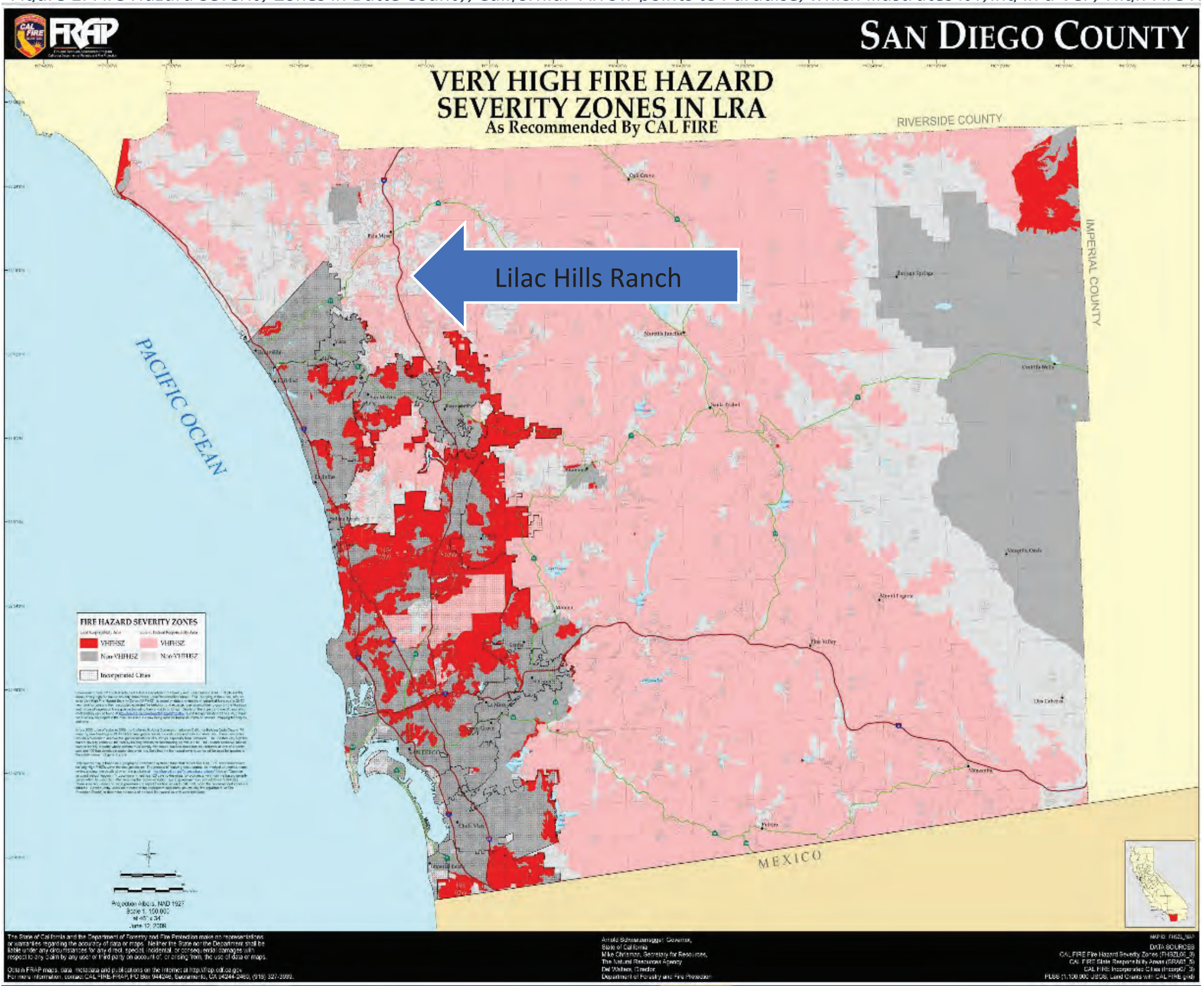


Figure 2. Fire Hazard Severity Zones in San Diego County, California, indicating roughly 70% of the County is designated as lying in a Very High Fire Hazard Severity Zone. Arrow points to Lilac Hills Ranch.

Although LHR is located in a Very High FHSZ, it will have a significantly lower potential of actual loss than other older communities (such as Paradise) that are also located in a Very High FHSZ. This is based upon the distinction between HAZARD (which the State categorizes) and RISK (which the state does not quantify).

HAZARD is the potential fire behavior (i.e., flame length, crown fire occurrence, capacity to generate embers) in the predicted mature vegetation of the area. RISK, however, is the potential for structural loss from said fire. Thus, even if there is a potential low fire hazard in a given area (expected low flame lengths), a home might still be at high risk of ignition if the physical characteristics of the property would facilitate structural ignition (e.g., flammable vegetation next to a home with wood siding).

Conversely (and more applicable to LHR), a home might be in a high-hazard area (potential exposure to high flame lengths and ember generation), but may actually be at low risk of ignition if the house is built with ignition-resistant construction materials and adequate defensible space is provided around the home.

This is especially true in planned communities where fuel modification can be provided over large areas and includes a perimeter fuel modification zone. Recent research[1] indicates that scenarios with lower housing density, large lots (ranchettes) and larger numbers of small, isolated clusters of development resulted in higher predicted fire risk. By way of comparison to the low-density General Plan land use patterns, the proposed LHR land use density would not only be safer for the residents within LHR, but the LHR community itself would act as a large irrigated fire break that would be expected to impede fire spread by inhibiting large-scale wildland fires from spreading across the project site.

Fuels

The fuel types and loadings vary significantly between LHR and the areas devastated by wildfire in northern California, which is readily apparent at multiple scales. At the largest landscape-scale, native vegetation in and around LHR consists of fire-prone shrubs, which could potentially burn with high intensity. However, unlike Paradise, continuity of these fuels is broken up by irrigated agricultural fields and orchards (Figure 3). While these agricultural operations can potentially ignite during a wildfire, especially under Santa Ana wind conditions, they burn with much lower intensity and rates of spread than in continuous native vegetation, thereby buffering the community from a uniform fire front.

A planned 70-100 ft wide fuel modification zone (FMZ) around the perimeter of the LHR development will further reduce potential exposure of the community to flames and radiant/convective heat. The outer 50 ft portion of the FMZ consists of a thinned zone that removes the highest flammability fuels and then thins remaining vegetation to a minimum 50% ground cover. The inner 50 ft of the FMZ (nearest the community) calls for complete removal of existing vegetation and replanting with ignition-resistant species at low densities. Where the FMZ is less than 100 ft, additional mitigations will be employed, including a 6 ft heat-deflecting wall, extended irrigated zones, and/or upgraded hardening of given residences. Per the LHR Fire Protection Plan, there are only a few areas where creating a new 100 ft FMZ is considered necessary due to the presence of off-site land uses (e.g., orchards) that mimic the features of an FMZ.

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[1] Syphard AD, Bar Massada A, Butsic V, Keeley JE (2013) Land Use Planning and Wildfire: Development Policies Influence Future Probability of Housing Loss. PLoS ONE 8(8): e71708. doi:10.1371/journal.pone.0071708

A few small areas of contiguous native vegetation will exist within the boundaries of LHR, but are largely confined to riparian areas, which generally burn with lower intensity; as one proceeds out of the riparian area of some canyons, vegetation converts to native shrublands. In the small portions of the development where homes are to be built above these types of canyons, significant reduction of fuels will be provided via the described FMZs and ongoing agriculture operations.

In contrast, unlike LHR and surrounding areas, the landscape-level vegetation in and around the Paradise area (Figure 4), consisted primarily of (1) mature mixed-conifer forests with a high degree of both horizontal and vertical continuity, and (2) high loads of contiguous grasses in areas that were burned a decade ago. These fuel types facilitated rapid fire spread and intensity in the wildland areas that surrounded Paradise, and also caused an enormous storm of embers to be cast onto individual parcels. While some of the surrounding areas near Paradise were burned in a fire in 2008, the high grass levels (fostered by late spring rains) was continuous and facilitated rapid spread into the community.

Figure 3. Land use surrounding proposed Lilac Hills Ranch development are segmented across the landscape with agricultural conversion of native landscapes resulting in lower fuel densities.

Figure 4. Land use in Paradise illustrates homogenous landscape of homes intermixed with contiguous forest.

LHR will be required by the Deer Springs Fire Protection District (DSFPD) to provide ignition-resistant landscaping around homes and other buildings, along roads, and in the FMZ that surrounds the community. Landscaping plants on individual parcels must adhere to the County of San Diego Acceptable Plants for Defensible Space in Fire Prone Areas, with some fire-prone species being explicitly precluded, including fire-prone California sagebrush (*Artemesia californica*), flat-topped buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), and palms (*Palmae* sp.). This ignition-resistant landscaping will be strictly managed via a funded HOA, (via HOA fees) and enforced by the DSFPD. The DSFPD will also enforce regulations related to the placement of ornamental vegetation, which will significantly reduce radiant heat and direct flame exposure to the structures in LHR.

Although Paradise had nearly identical defensible space regulations as LHR (minus restricted plants), local authorities there did not seem to regularly enforce these regulations (Figure 5), which is unfortunately common in areas that do not have a funded HOA and in areas where the fire agency does not have the capacity to enforce defensible space regulations. The high degree of near-structure vegetation in Paradise, which was prevalent throughout the community before the 2018 Camp Fire, would have readily ignited the adjacent structures once they started burning.

All that said, the most granular level of fuels to consider (the homes themselves) served as the most important fuel that led to the mass devastation in Paradise. Indeed, throughout that community, home after home was destroyed, but the adjacent vegetation was left largely untouched (Figure 6). I have personally witnessed this phenomenon in multiple large, destructive fires, including the 2007 Witch Creek Fire in San Diego County, the 2009 Black Saturday Fires in Victoria, Australia, the 2017 Tubbs Fire in Santa Rosa, and the 2018 Woolsey Fire in Los Angeles County. In all cases, mass destruction in many parts of the fire boundary was largely related to homes igniting via an ember storm, which burned many homes from the inside out following embers entering the structure via vents, windows, under doors, etc.

Figure 5. Lack of defensible space in Paradise, which was typical throughout the community.

Figure 6. Post-fire destruction in Paradise, California. Note that while all homes are destroyed, the adjacent trees are relatively unscathed. Photo: Getty.

Structures in LHR have been designed to prevent ember intrusion through application of the latest building codes. In the most simplistic perspective possible, if a home does not ignite, it will not burn. To combat structural ignition, the State and County of San Diego have enacted stringent building codes to resist ignition during a wildfire, including County Building Code (Title 9, Division 2, Chapter 1 of the San Diego County Code of Regulatory Ordinances) and Chapter 7A of the California Building Code. These standards address structural features susceptible to ignition, including:

1. Roofs
2. Exterior walls
3. Vents
4. Eaves
5. Projections such as decks, exterior balconies, etc.
6. Windows and other transparent openings such as a sun roof
7. Fences within 5-ft of the structure
8. Rain gutters
9. Exterior doors
10. Window screening
11. Setbacks of structures from slopes

All homes in LHR will adhere to the stringent County Building Codes, thus restricting structural features that are susceptible to ignition. The vast majority of homes in Paradise, however, were built before 1970, almost 40 years before California enacted building codes to resist ignition during a wildfire. A non-technical observation from one UC researcher indicated that the very few homes left standing in Paradise were of newer construction, built to the new ignition-resistant building standards that resist both radiant heat and (perhaps more importantly) exposure to embers[2].

It should be noted that burning homes also serve as a catalyst to ignite other nearby structures due to their enormous heat output coupled with long periods of active burning that can last for hours (which differs greatly from vegetation fires in which the threshold radiant heat energy needed to ignite a building generally only lasts 5-10 minutes before the vegetative fine fuels are consumed and the fire spreads elsewhere). Indeed, a large percentage of homes in both Paradise and Santa Rosa apparently burned via house-to-house spread. This was particularly acute in Santa Rosa where 1,300+ homes burned in the Coffey Park development, even though virtually no one considered the area to be at risk to wildfire.

Specific to San Diego County, one study[3] found that the three greatest factors determining home survival in Ramona and Rancho Santa Fe during the 2007 Witch Creek Fire were age of construction (which influences the potential for ignition-resistant building materials), presence of vegetation within 5' of a given building (which influences potential for flame impingement on the structure), and distance from native vegetation (which influences the potential amount of ember exposure). Pertinent to LHR, the study demonstrated that development of ignition-resistant homes with proper defensible space can actually reduce the potential loss of older, interior homes because they begin to shelter the older, ignition-prone homes from exposure to flames, heat, and embers.

Climate/Weather

While climate (particularly annual precipitation) varies significantly between LHR and Paradise (leading to differing types of vegetative fuels and fuel loading), similar types of hot, dry winds should be expected in both locales during late fall, which readily leads to elevated fire hazard. What exacerbated the destruction in the 2017 fires in Santa Rosa and the 2018 fire in Paradise was the absence of precipitation that would normally precede the fall winds and subsequently greatly reduce the potential for active fire spread. Some believe that the delay in precipitation that northern California has experienced may be related to long-term climate change, which is anticipated to have greater effects in northern California than in southern California.

Climate in LHR is Mediterranean and is located in the County's Transitional climatic zone. The majority of the 11.4 inches of average annual precipitation falls during the mild winter months. Periods of up to 7 months without precipitation regularly occur and generally last until November. This low rainfall and periods of annual drought limit the production of vegetative fuels (which is largely drought-tolerant shrubs), but also serves to significantly reduce moisture content to critically low levels, subsequently making the plants more conducive to active

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[2] Y. Valachovic, University of California Cooperative Extension. What can we learn from the 14,000 homes lost during the Camp Fire? <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=29026>

[3] Morais, N.C., C.A. Dicus, and D. Sapsis. *In review*. Changing fire risk over time across three communities in southern California.

combustion. As noted, however, native shrubs in and immediately around the community are commonly noncontiguous due to the presence of ongoing irrigated agricultural operations.

Due to higher rainfall levels where the recent northern California fires occurred (e.g., Paradise receives >58 inches of annual precipitation), vegetative production and subsequent vegetative fuel loads were much higher there than would be found in San Diego County. Further, late spring rains in 2018 caused elevated grass loads, which when cured, served to quickly bring the wildfire into the community of Paradise.

The highest period of fire hazard in San Diego County occurs during Santa Ana wind conditions, which usually occurs in late fall after the region's normal period of annual drought, but may occur in other parts of the year. These winds, estimated in San Diego County to have sustained wind speeds of ~30 mph (with gusts exceeding 40 mph) and critically low relative humidity levels of 5%-9% (which dries vegetation and makes it easier to ignite), can facilitate intense and rapidly moving wildfires. Indeed, the vast majority of the most destructive fires in San Diego County (including the Cedar Fire, Witch Creek Fire, Harris Fire and others) occurred during Santa Ana wind conditions. It should be noted again, however, that the irrigated agriculture throughout the LHR vicinity and the ignition resistant landscapes of LHR would mitigate fire spread and intensity in and around the development. Further, the proposed community fire protection features in LHR were specifically designed based on "worst-case" weather conditions.

The recent destructive fires in Paradise and Santa Rosa also occurred under wind conditions similar in nature to Santa Ana winds. The winds that drove the wildfire into Paradise were especially strong because they were directionally aligned with steep canyons that bounded the western and eastern edges of the community; these canyons then served to funnel and accelerate the winds before they entered the town.

Topography

The topography in LHR also significantly varies from that in Paradise. Elevations in LHR range from 590 ft to 960 ft and occur in generally rolling hills, which sometimes includes small canyons that contain native fuels that are directionally aligned with the normal direction of Santa Ana winds. While this should be of some concern, dead and dying vegetation will be removed in these areas and these sites will be maintained to reduce ladder fuels. Further, as previously noted, most of the small canyons consist of riparian vegetation, which while certainly capable of burning, is generally moister and therefore less conducive to high intensity fires that would threaten any homes above them.

While the community of Paradise is relatively flat, this can be deceiving because it is bounded by steep canyons that range from 2000 ft to 2800 ft below the ridgetop in which it resides. As noted, these extremely deep, sheer canyons were directionally aligned with the strong winds, slamming the homes at the edge of the slopes and causing an ember storm that fell far within the community (subsequently facilitating house-to-house spread).

Previous fire history

LHR resides in a region that has experienced many large wildfires, particularly in the last 20 years due to increased population that subsequently leads to more human-induced ignitions (Figure 7). Local fire authorities are extremely adept at suppressing ignitions under average weather conditions, suppressing the vast majority of wildfires during initial attack operations. It is during extreme weather events (normally induced by Santa Ana wind conditions) that homes are most likely to burn.

San Diego County learned some hard lessons during the destructive 2003 fire season, which burned over 5,000 structures. In those fires, homes that were built under 2001 building codes survived at a rate three times greater than homes built before the codes were strengthened[4]. Following the 2003 fires, the County has enacted a series of even more restrictive building codes meant to protect a home during a wildfire.

The County is at the cutting edge of fire protection, a position that it was forced to pursue following devastating wildfires in 2003 (Cedar Fire) and 2007 (Witch Creek Fire), along with other smaller, yet important wildfires. Following the Cedar Fire, the County began a multi-pronged approach to fire protection that included significant investments in firefighting resources (air attack, apparatus, staffing, facilities, emergency alert system, and pre-planning), but equally as important, the County conducted post-fire save and loss assessments. These assessments were vital to understanding the factors leading to home survivability.

Additionally, the County created a comprehensive fire protection planning approach that requires each project to be evaluated by a qualified fire protection planner/firm, to document the project's code compliance, to disclose if any condition is not code compliant, and provide appropriate mitigations that meet the intent of the code. The County has spent in excess of $100 million toward fire suppression, fuel reduction, planning, and emergency response, and has had multiple, successfully managed wildfire events to engage the pre-plans, learn from the process, and adjust practices. Although the wildfire threat remains, particularly where old homes abut natural vegetation, the County is far safer today than it was 20 years ago because newer structures and planned communities (built to the latest codes) are designed to resist ignition, even during significant wildfire threats.

Major fires in San Diego County since 2003 are listed in Table 1. These fires, all of which were human-caused, generally coincided with normal Santa Ana wind conditions, which subsequently led to heavy structural losses. However, it should be noted that the degree of devastation in any of those given fires was not uniform, but instead varied community-to-community based upon the age of the homes, the home construction standards in the development, and the degree of defensible space employed in a given community. For example, the 2007 Witch Creek Fire burned 501 (mostly older) homes in Ramona, but left newer developments in Rancho Santa Fe that were specifically designed to reduce fire risk completely unscathed.

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[4] County of San Diego, Planning & Development Services, Wildland -Urban Interface Building Division <https://www.sandiegocounty.gov/pds/docs/pds664.pdf>

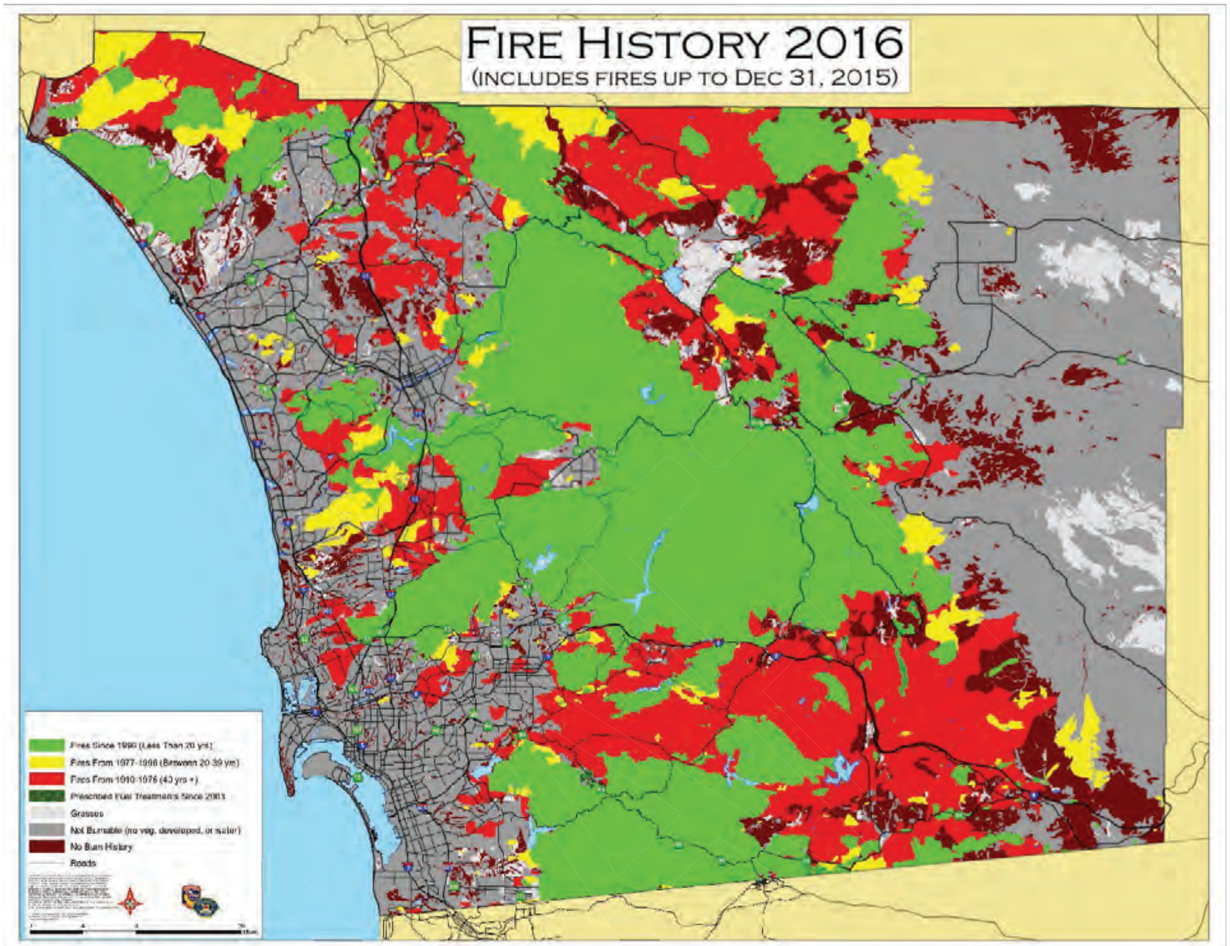

Figure 7. Fire history of San Diego County.

Table 1. List of recent, devastating wildfires in San Diego County.

Fire	Date	Acres Burned	Structures Destroyed	Structures Damaged	Deaths
Cedar Fire	October 2003	280,278	5,171	63	14
Paradise Fire	October 2003	57,000	415	15	2
Otay Fire	October 2003	46,291	6	0	0
Witch Creek Fire	October 2007	197,990	1,125	77	2
Harris Fire	October 2007	90,440	255	12	5
Poomacha Fire	October 2007	49,410	139	Not Available	0
Rice Fire	October 2007	9,472	208	Not Available	0
Bernardo, Poinsettia & Cocos Fires	May 2014	26,000	65	19	0
Lilac Fire	December 2017	4,100	157	64	0

Other developments in southern California that have been designed to resist wildfires have shown similar rates of significantly lowered loss when exposed to wildfire, including the 4S Ranch in San Diego County, Stevenson's Ranch in Santa Clarita, Serrano Heights in Orange County, and others. All of these communities were built with heightened requirements for fire safety, including hardened buildings, protected roofs, vent protections, maintained fuel modification zones, and others, all of which will be employed by LHR.

In contrast to San Diego County, wildfires have also occurred in an around Paradise and Santa Rosa (sometimes reburning the exact same areas), but little was done to reduce risk of structural loss there. Indeed, the 2017 Tubbs Fire followed in almost exact same footprint as the 1964 Hanley Fire; what differed from 1964 and 2017 was the amount of fire-prone homes that were built in the area. Had these homes been built with fire-resistant materials such as required by Chapter 7A of the California Fire Code, it is highly unlikely that the level of devastation would have been the same. Similarly, 13 significant wildfires occurred in the last 20 years around the community of Paradise, yet there seemed to be little mitigation to reduce the risk there; when the 2018 Camp fire ignited under extreme weather conditions, a massive ember storm easily ignited older homes, which then caused a chain reaction of structure-to-structure ignitions.

While San Diego County has been incredibly progressive in their attempts to reduce wildfire losses (especially following the 2003 fire siege), the sites recently impacted in northern California did not seem to take their fire risk as seriously. For example, CAL FIRE reportedly warned Paradise as early as 2005 that the community was at risk of a devastating conflagration similar to that experienced in the 1991 Oakland Hills Fire, which killed 25 and destroyed 2,900 structures[5]. Butte County FireSafe Council had been awarded over $600k in grant funding for fuels reduction in Paradise, but did not have time to utilize these funds before the fire burned through the community; that said, given the nature of ember-driven ignitions and subsequent house-to-house spread (with little impact to the adjacent forest), it is unclear if the fuel reduction would have had any significant impacts to the level of destruction experienced during the Camp Fire. It is possible that utilizing these funds along with homeowner funds to retrofit older homes for ember resistance and structure hardening would have been more impactful.

Potential ignition sources

Wildfires in areas near LHR, and throughout San Diego County and California, are almost always human-induced. Efforts to reduce risk of ignition within LHR include undergrounding powerlines, which would effectively eliminate a potential ignition source. Further, roadside clearance is planned within the community, which will reduce the risk of wildfire ignition from vehicles (via glowing catalytic converter debris, sparks from dragging chains, etc.).

[5] St. John, P., J. Serna, and L. Rong-Gong II. 2018. Here's how Paradise ignored warnings and became a deathtrap. *Los Angeles Times,* 30-Dec.

Many of the destructive fires in the region (and also the recent devastating fires in Santa Rosa and Paradise) were ignited by powerlines. Of note, however, San Diego Gas & Electric has recently taken a very aggressive approach at restricting ignitions via their powerlines, becoming one of the most progressive utilities in the world at closely monitoring conditions that might facilitate ignitions and rapid fire spread, and then taking appropriate steps to minimize fire starts, including shutting down the electrical grid in areas deemed to be potentially vulnerable to ignition. Further, the California Public Utilities Commission, as of February 6, 2019, now requires all energy companies in California to prepare comprehensive Wildfire Mitigation Plans. These plans are detailed assessments and accountings of the risk drivers and the risk reduction measures that are being employed for each facility, including electrical transmission and distribution lines.

4. Mitigation in Lilac Hills Ranch

Certainly not all fires can be avoided and residents throughout Unincorporated San Diego County should therefore be prepared for wildfire. As noted previously, however, a potentially high fire hazard does not equate to high risk of structural loss if varying types of mitigation practices are employed to reduce said risk. This section explores various activities LHR will employ to improve safety and reduce risk to life and property of its residents.

Wildland fuels

Due to the normal easterly direction of Santa Ana winds (which causes the greatest potential for fire losses), areas of greatest concern to the community are on the northern and eastern portions of the development. Fortunately, much of the adjacent properties are agricultural in nature and buffer the community from an oncoming fire even under Santa Ana wind conditions. Further, an irrigated buffer will extend around the community to limit exposure of flames and radiant heat to the community.

Within the development, approximately 75% of the land is within areas that have been transformed into agricultural uses, thereby reducing potential for fire spread through the community. Existing vegetative fuels are largely relegated to riparian areas in the canyon bottoms and coastal sage scrub on slopes in the western edge of the development (the location of which would limit exposure of the development to high-intensity, wind-driven fires). To mitigate potential hazard caused by native vegetation, the Fire Protection Plan calls for certain actions in these open space areas, including:

- Eliminating flammable non-native species (peppers, eucalyptus, palms, etc.)
- Removal of dead and dying vegetation in riparian canyons
- Creation of fuel management zones in areas adjacent to structures

Landscaping fuels

Unlike in Paradise and Santa Rosa, where enforcement of existing defensible space regulations seemed minimal, defensible space will be created and strictly enforced per the Project's fire protection plan and per San Diego County Consolidated Fire Code Section 96.1.4907.2. This plan calls for zones of vegetative management around every single structure, and the project perimeter, including:

- 50' from structure (low fuel volume/defensible space zone): all non-fire-resistant plants to be removed and replaced with irrigated fire-resistant vegetation
- 50'-100' from structure (selectively thinned zone: removal of all dead and dying material with a maximum of 50% of the area consisting of native vegetation. These areas may include the agricultural lands in the development.

Construction materials

As noted previously, the homes themselves should be considered the most important fuel in which to manage. To that end, all structures in LHR will be built with fire-resistant construction materials and assembly methods that adhere to the stringent County Building Code (Title 9, Division 2, Chapter 1 of the San Diego County Code of Regulatory Ordinances), which protects the portions of a structure most vulnerable to ignition via radiant heat and ember cast, including:

- Roofs
- Exterior walls
- Vents
- Eaves
- Projections such as decks, exterior balconies, etc.
- Windows and other transparent openings such sun roofs
- Fences within 5' of the structure
- Rain gutters
- Exterior doors
- Window screening
- Setbacks of structures from slopes

Of special significance, all buildings in LHR will be fitted with interior sprinklers, which have been shown to be extremely effective at quickly extinguishing fires if they ignite via embers in the interior of the structure.

These and other standards in LHR will greatly curtail the potential risk of structural ignition and subsequent house-to-house spread during a wildfire, thus avoiding the type of conflagration experienced in Paradise and other older communities that were built well before current building standards were enacted.

5. Emergency Response Preparedness

In addition to mitigating potential home losses, a given community must prepare for the actual event, including having means for local fire agencies to quickly and adequately respond to a fire event and for residents to be able to either evacuate the area or be able to safely survive the fire event within the development if unable to leave the area due to unforeseen circumstances.

Suppression capabilities

The Deer Springs Fire Protection District is the Fire Authority Having Jurisdiction for the development and has contracted with CAL FIRE to provide fire protection services for the District. As proposed, LHR will essentially have three fire stations within 10-minutes of the community, including a new District fire station in the middle of the development, a District fire station to the south located on Circle R Drive, and a CAL FIRE station on its northern boundary (Miller Fire Station; Figure 8). If the project co-locates a new District Station within the Miller Fire Station site, there would be 2 Fire Stations within 5-10 minutes of all the homes. Further, there are 2 other stations in the Deer Springs Fire District (which serve an estimated populace of 13,000 current residents) and there are automatic aid agreements in place from other nearby fire districts that will respond if there is need.

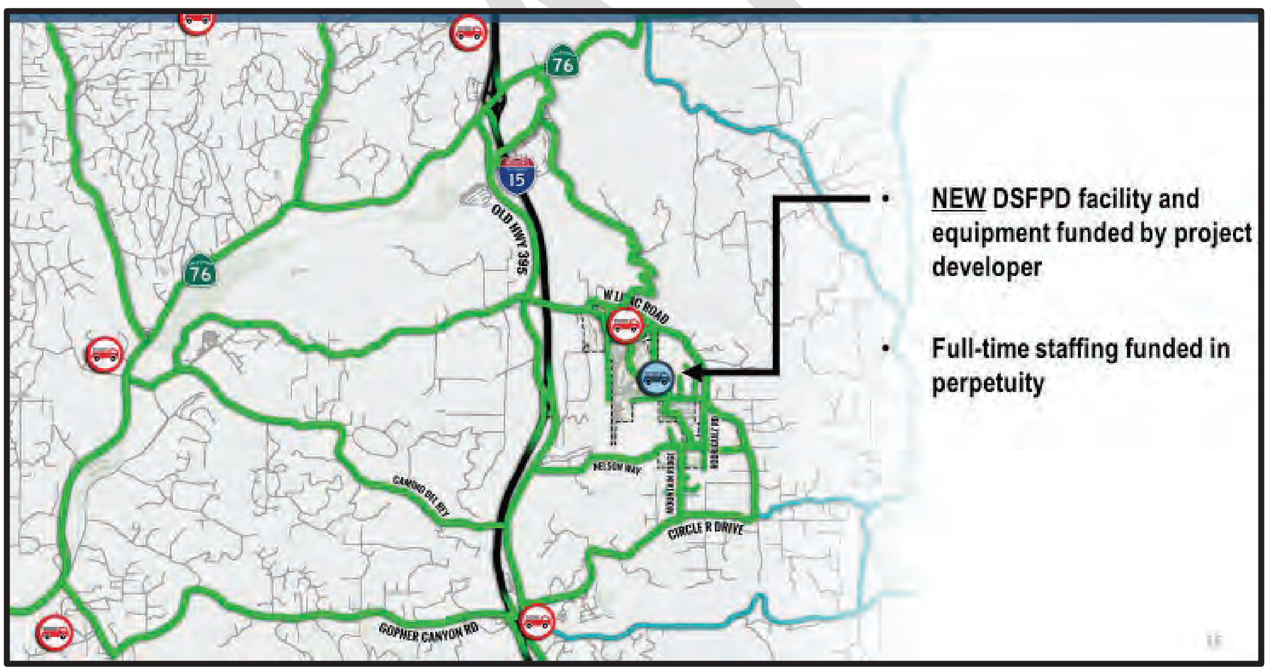

Figure 8. Location of fire stations in vicinity of Lilac Hills Ranch. Existing CAL FIRE station (on northern boundary) and new DSFPD station will allow response to every home in development within 5 minutes.

Water supply

The LHR community will have several sources of water supply for fire response capabilities, providing for supply requirements to meet the standards in the San Diego County's Consolidated Fire Code and the Fire Code for a commercial/business/residential development. Fire hydrants will be installed at all road intersections, the beginning radius of cul-de-sacs and within 300’ of every structure in the development. The water supply will capable of providing 2500 gallons/minute for 2 hours.

Road infrastructure

Road infrastructure to facilitate simultaneous ingress of firefighting equipment and egress of residents will be significantly better in the newly developed LHR than in the Paradise area. Proposed changes to existing road infrastructure will provide safety benefits to both LHR residents and to neighboring residents. For example, LHR will make improvements to 45 different local road segments and intersections outside of the community that will greatly enhance circulation, connectivity, mobility, evacuation capability, and ultimately public safety (Figure 9, Table 2). In addition, the LHR presents a temporary safe refuge for existing residents to the east (a total of approximately 65 residences) that would have at least two routes to reach LHR and its designated temporary refuge facilities (Figure 10).

Per the extensive LHR Evacuation Plan, ingress/egress from the project will include primary and secondary evacuation routes. Unlike the road network developed long ago in Paradise, these roads will be built to current San Diego County Public and Private Road Standards and will be in compliance with County of San Diego’s Consolidated Fire Code, which calls for specific standards for:

- Road width
- Grade
- Maximum distance of driveways

Further, roadside clearance of vegetation will be established and maintained, which will greatly improve conditions for any area residents that attempt to leave the development during the fire event.

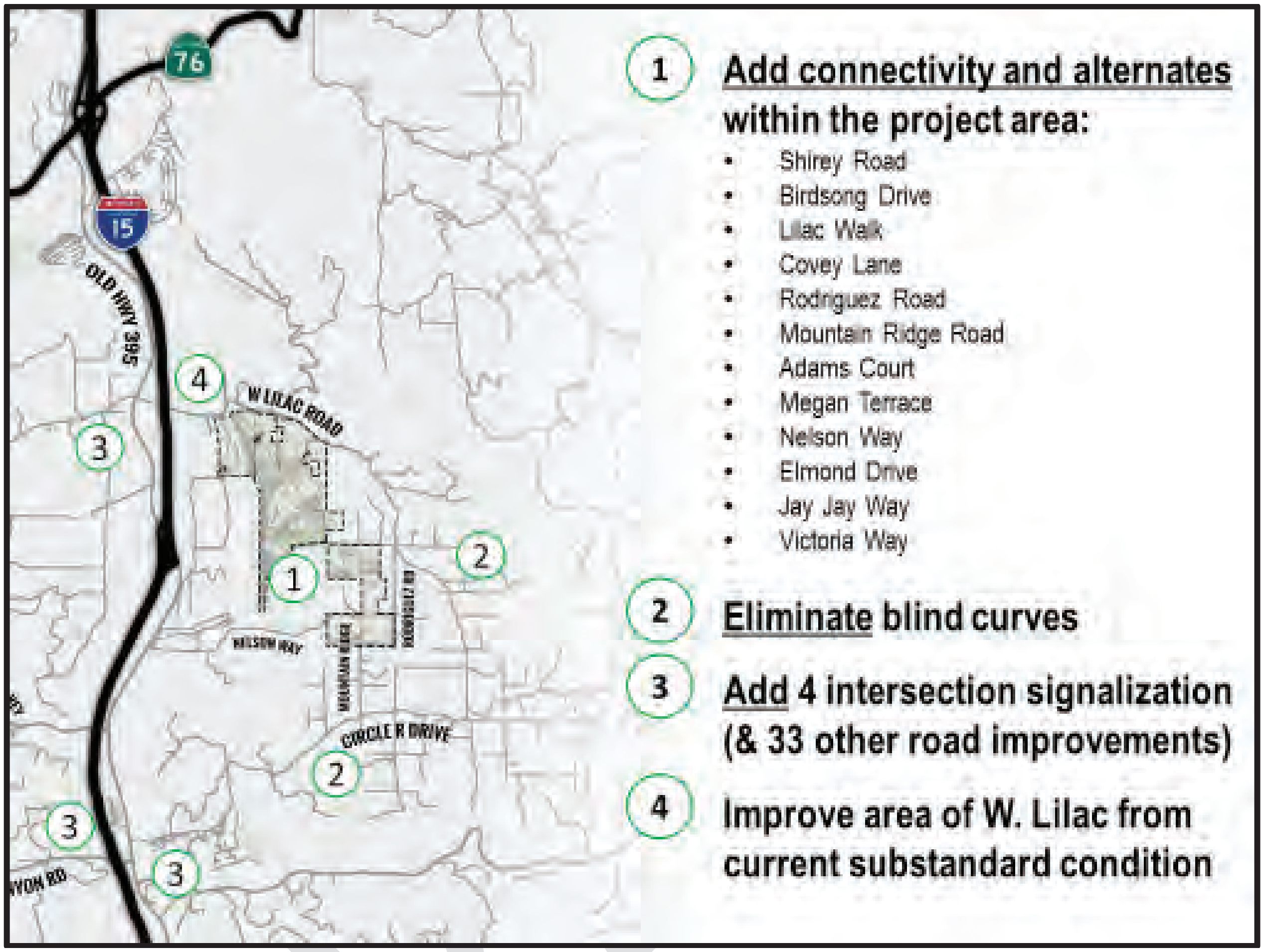

Figure 9. Planned road improvements to improve public safety near Lilac Hills Ranch.

Table 2. List of improved road segments and intersections planned near Lilac Hills Ranch.

SEGMENTS
1. Camino Del Rey, Old River Road to W. Lilac Road
2. W. Lilac Road, Old Highway 395 to Main Street
3. W. Lilac Road, Main Street to Street “F”
4. W. Lilac Road, Street “F” to Road 3
5. Old Highway 395, SR-76 to E. Dulin Road
6. Old Highway 395, E. Dulin Road to W. Lilac Road
7. Old Highway 395, W. Lilac Road to I-15 SB Ramps
8. Gopher Canyon Road, E. Vista Way to Little Gopher Canyon Road
9. Gopher Canyon Road, Little Canyon Road to I-15 SB Ramps
10. E. Vista Way, SR-76 to Gopher Canyon Road

11. E. Vista Way, Gopher Canyon Road to Osborne Street
12. Pankey Road, Pala Mesa Drive to SR-76
13. Lilac Road, Old Castle Road to Anthony Road
14. Lilac Road, New Road 19 (east of Betsworth Road) to Valley Center Road
15. Cole Grade Road, Fruitvale Road and Valley Center Road
16. Valley Center Road: Cole Grade Road to Vesper Road
17. Camino del Rey: SR 76 to Old River Road
18. Old Castle Road: Old Highway 395 to Old Lilac Road
19. Lilac Road: Anthony Road to Betsworth Road
20. Lilac Road: Betsworth Road to Valley Center Road
21. Valley Center Road: Woods Valley Road to Lilac Road
22. Valley Center Road: Lilac Road to Miller Road
23. Valley Center Road: Miller Road to Cole Grade Road
24. Old Highway 395: Circle R Road to Gopher Canyon Road
25. West Lilac Clear Space Easement
26. Circle R Clear Space Easement
INTERSECTIONS
27. E. Vista Way / Gopher Canyon Road
28. Old Highway 395 / SR-76
29. Pankey Road / SR-76
30. Old Highway 395 / E. Dulin Road
31. Old Highway 395 / W. Lilac Road
32. I-15 SB Ramps / Old Highway 395
33. I-15 NB Ramps / Old Highway 395
34. Old Highway 395 / Circle R Drive
35. I-15 SB Ramps / Gopher Canyon Road
36. I-15 NB Ramps / Gopher Canyon Road
37. Miller Road / Valley Center Road
38. SR 76 / Old River Road / E. Vista Way
39. SR 76 / Olive Hill Road / Camino Del Rey
40. Old River Road / Camino Del Rey
41. W. Lilac Road / Camino Del Rey
42. Old Highway 395 / Camino Del Rey

43.	Lilac Road / Old Castle Road
44.	Valley Center Road / Lilac Road
45.	Cole Grade Road / Valley Center Road

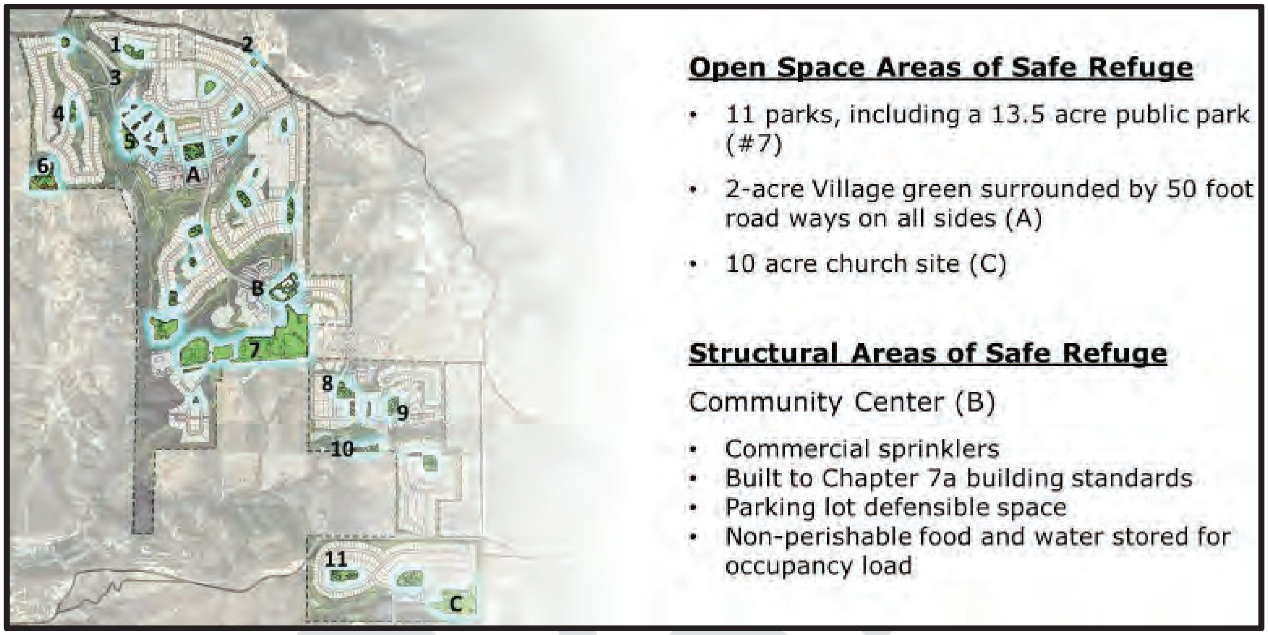

Figure 10. Temporary safe refuge areas within Lilac Hills Ranch.

Public notification

Public notification to LHR residents of a fire's approach is currently via a reverse-911 system, administered by the San Diego County Sheriff's Office, which provides a 15-second recorded message via landlines and cell phones. Further, the Office of Emergency Services operates the "Alert San Diego", which has the capacity to push out emergency notices to both land lines and cell phones. In both instances, residents must "opt-in" the program by registering individual phones.

In both the 2017 Tubbs Fire in Santa Rosa and the 2018 Camp Fire in Paradise, residential notification was largely lacking. This was due to a myriad of factors including fires quickly burning down cell towers, residents cancelling their landline services, timing of fire spread at night when many residents turn off their phones to facilitate sleep, lack of phone registration via residents not understanding the need to "opt in", visitors who were unaware of the service, and others.

Because fires may ignite at any time of the day and may move rapidly under Santa Ana wind conditions, LHR will provide ongoing fire awareness training and resources to its residents. The goal is to create a fire-aware community that understands the types of fire threats that may occur and what actions law enforcement or other officials may direct them to take.

While the 2003 Cedar Fire taught San Diego valuable lessons about fire preparedness and created an invaluable reverse-911 service to provide emergency notifications to the community, there were still large problems that were not realized until the 2007 Witch Creek Fire. During that fire, the result of the enhanced communication network and reverse-911 system led to the largest evacuation in state history. The County learned from that experience that the reverse-911 emergency system worked almost too well and caused significant evacuation traffic on the existing road ways, creating a potentially dangerous situation for evacuees that were stuck on congested roads.

Evacuation protocols and strategies have changed since 2007 and the County Sheriff's Department no longer orders mass evacuations, but is more precise and coordinated, as explained by the County Sheriff representatives and CAL FIRE representatives at a number of Board of Supervisors land use hearings in 2018. The use of technology, experience and situational awareness combine to provide a picture of the threat, its projected movement, and the communities that may be threatened. This information informs evacuation procedures and precisely targeted evacuation declarations are now made to pinpoint areas at highest threat for evacuation, followed by the next highest threat area, and so on.

While this methodology may seem similar to Paradise's phased evacuation strategy, emergency workers there did not plan for extreme wind events, which is a common factor in large wildfires in San Diego County. Unquestionably, this precision targeting technique was employed with great success in the recent rapidly-moving Lilac Fire.

Evacuation planning

The evacuation plan for LHR is extensive (including multiple egress points and evacuation routes; Figure 11) and to a higher standard than that in Paradise. Indeed, previous wildfires in San Diego County that caused large-scale evacuations has led to many "lessons learned" over the years, which have prepared first responders for significant fire events. Whereas Paradise planned for a smaller fire event during average weather conditions (which would enable a phased evacuation), LHR recognizes that local fires will likely burn under Santa Ana wind conditions and has planned accordingly.

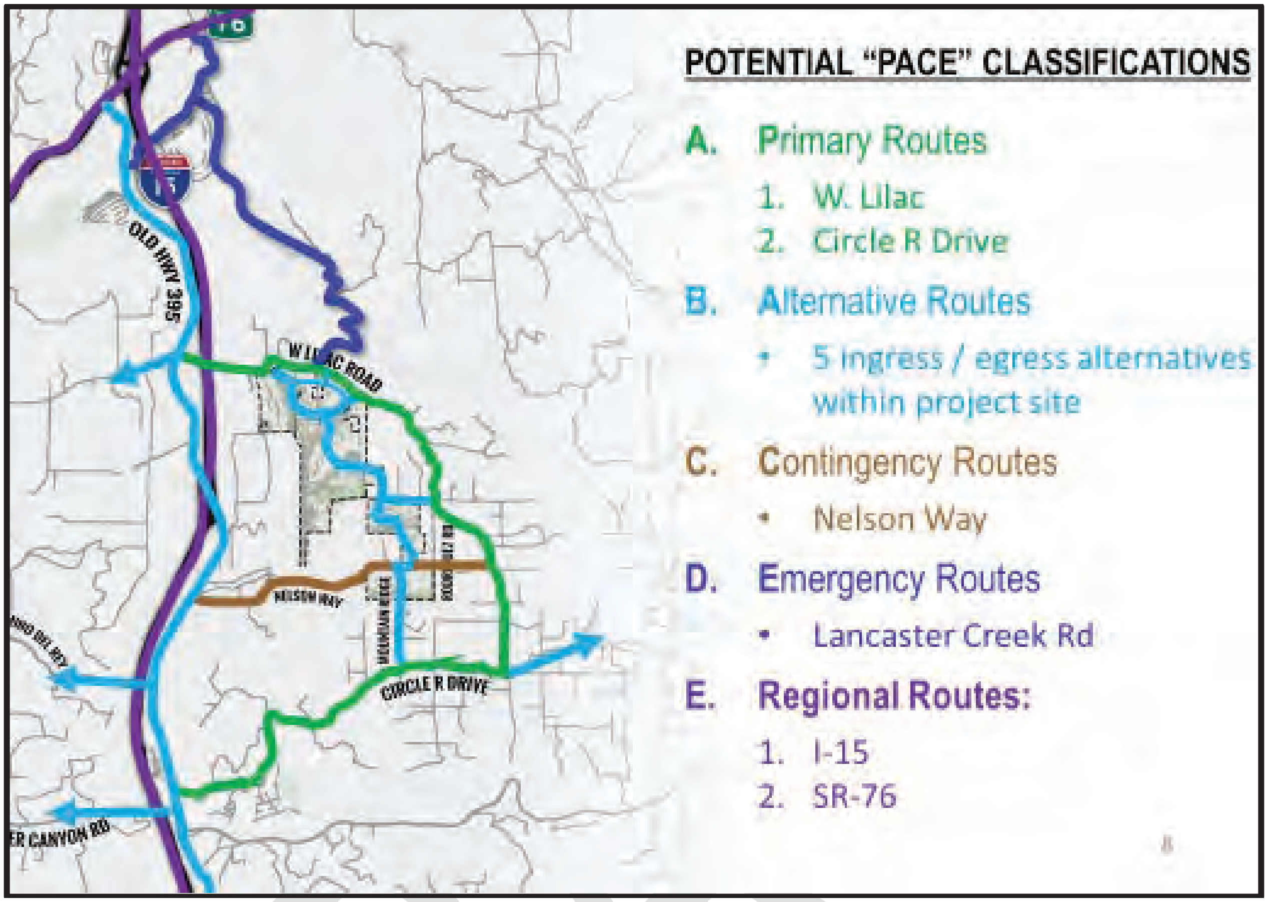

Figure 11. Evacuation routes in Lilac Hills Ranch.

San Diego County has successfully implemented phased evacuations using its advanced situational awareness tools and notification technology. While it is possible that a fire could ignite close to the LHR site with less time available to evacuate residents than the time needed for the fire to encroach upon the perimeter FMZ, the fire intensity and built-in protections at LHR provides emergency responders with the contingency option of ceasing evacuations and directing residents to temporarily shelter in their homes or other temporary safe refuge areas within the development. The objective of the ongoing training and fire awareness programs at LHR is to give residents understanding of the capabilities of their homes and the community.

LHR, the DSFPD and the County all incorporate the "Ready, Set, Go!" evacuation protocol. Part of this protocol is understanding when fire threat is at its peak. Red Flag Warnings declared by the National Weather Service provide emergency responders and residents with a warning that they should be prepared to take action if a wildfire develops. The focus of the "Ready, Set, Go!" program is on public awareness and preparedness, especially for those living in the wildland-urban interface. The program is designed to incorporate the local fire protection agency as part of the training and education process in order to ensure that evacuation preparedness information is disseminated to those subject to the potential impact from a wildfire. There are three components to the program:

“READY” – Preparing for the Fire Threat: Take personal responsibility and prepare long before the threat of a wildfire so you and your home are ready when a wildfire occurs. Create defensible space by clearing brush away from your home as detailed in the LHR FPP (FireWise 2000, Inc. 2014). Use only fire-resistant landscaping and maintain the ignition resistance of your home. Assemble emergency supplies and belongings in a safe spot. Confirm you are registered for Reverse 911, AlertSanDiego, and DSFPD alert system. Make sure all residents residing within the home understand the plan, procedures and escape routes.

“SET” – **Situational Awareness When a Fire Starts:** If a wildfire occurs and there is potential for it to threaten LHR, pack your vehicle with your emergency items. Stay aware of the latest news from local media and your local fire department for updated information on the fire. If you are uncomfortable, leave the area.

“GO!” – **Leave Early!** Following your Action Plan provides you with knowledge of the situation and how you will approach evacuation. Leaving early, well before a wildfire is threatening your community, provides you with the least delay and results in a situation where, if a majority of neighbors also leave early, firefighters are now able to better maneuver, protect and defend structures, evacuate other residents who couldn’t leave early, and focus on citizen safety.

“READY! SET! GO!” is predicated on the fact that being unprepared and attempting to flee an impending fire late (such as when the fire is physically close to your community) is dangerous and exacerbates an already confusing situation. This LHR Wildland Fire Evacuation Plan provides key information that can be integrated into the individual Action Plans, including the best available routes for them to use in the event of an emergency evacuation.

The County emergency management agencies will continue to evacuate people based upon a protocol that has proven safe and successful for the region. In addition, contingency options are included into their pre-plans so that in the instance an evacuation is considered unsafe, the County will have another option for protecting residents in place.

Under the “READY! SET! GO!” protocol, residents are expected to leave well before any wildfire might arrive into the community. That said, unforeseen conditions (and normal human nature of delaying evacuation to “see just how bad it’s going to get”) could potentially preclude safe evacuation of its residents. However, the very nature of the home construction and landscaping in Lilac Hills should enable emergency managers with the option to direct residents to passively shelter in their homes as a last resort. While certainly not the first choice to advance life/safety, it provides emergency managers/first responders with a contingency alternative that would be safer in instances where attempting to evacuate during a wildfire’s passage is not a preferred option.

Other communities in San Diego have successfully implemented this approach. For example, I personally spoke to multiple residents who lived in “Shelter in Place” subdivisions in Rancho

Santa Fe and safely stayed in their homes during the 2007 Witch Creek Fire after evacuation was precluded. Most stated that while staying in their home was not their preferred option, it was much safer than evacuating as the fire burned around them.

6. Future changes

Some have argued that climate change will greatly increase the potential for wildfires, but new research has shown that there will not be as significant of an impact on southern California shrublands than is anticipated in the coniferous forests of the Sierra Nevada and northern California[6]. Indeed, the researchers demonstrated that drier conditions in northern California's forests will certainly increase potential for large, severe fires there; in southern California shrublands, however, the impact will be significantly less, owing to the fact that the region already experiences a severe annual drought. Instead, southern California's increasing population will make it more likely that ignitions will occur, which could potentially cause large areas of chaparral to type-convert into grasslands.

Also, it should be noted that continued development has the potential to actually REDUCE the risk of ignition of older developments that were not built with today's construction standards and codes[7]. While this would certainly not be the case if new communities were developed with old building codes, expansion of new development (built to increasingly stringent codes) could buffer older fire-prone communities.

7. A Higher Standard for General Plan Amendments

In reviewing the LHR Fire Protection Plan and associated project features, the following are significant Project features and Public Benefits:

a. Meets San Diego County Consolidated Fire Code.
b. Meets California State Fire Code.
c. Meets State Title 14 (Fire Safe Regulations, SRA).
d. Fire Protection Plan has been approved by the Fire Authority Having Jurisdiction.
e. Undergrounds existing overhead powerlines.
f. Improves water supply system, versus the existing area which doesn't have these resources. Hydrants every 300 feet.
g. Irrigated buffer around project perimeter.

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[6] Keeley, J., and A. Syphard. 2016. Climate change and future fire regimes: examples from California. Geosciences 6:37. 14pp.

[7] Dicus, C.A., N.C. Leyshon, and D. Sapsis. 2014. Temporal changes to fire risk in disparate WUI communities in southern California, USA. Pgs. 969-978 *In* Viegas, D.X (Ed.). Advances in Forest Fire Research. University of Coimbra Press. ISBN 978-989-26-0884-6.

h. Roads are all built to County public and private road standards.
i. Defensible space around each house meeting code.
j. Clustered development versus existing areas where these parcels are very spread out and more difficult for first responders to defend those structures.
k. Areas of Safe Refuge designed into project that offer contingency for sheltering in place if full evacuation is not possible or delayed.
l. Funding offered for facilities is more than double what is statutorily required by County.
m. Funding offered for ongoing fire staffing significantly above what is statutorily required.
n. Community design creates large ignition resistant landscape/fuel break. Enables law enforcement and fire personnel options and flexibility for firefighting and evacuation or temporary refuge.
o. 45 improvements to local roads and intersections
p. Elimination of dead-end road segments
q. Multiple means (5) of ingress and egress from the project
r. Improved roadway connectivity for 12 different existing dead-end roads during emergencies
s. Improvement of blind curves along primary evacuation routes (West Lilac Road & Circle R Drive).

8. Potential Additional Mitigation Recommendations (over and above current standards)

In my review of many communities and projects that have been able to sustain a major wildfire event, a significant principle that I feel has made a difference between a successful plan and unsuccessful plans is the culture of the community. In combination with the other factors described previously, if the LHR project can effectively create a culture of fire safety, (i.e., engaging the community in maintaining defensible space, fostering automatic behaviors, and creating community educational programs), then the result will be a development with a high level of protection, prevention and preparedness that far exceeds many other communities in the area. That being said, the following list of recommendations are potential additional mitigation features that both the developer and the County can consider in addition to the already robust mitigation found in the Fire Protection Plan.

a. **Provide alternatives for Community Gates:**
   i. Instead of automatic gates, look at reducing the number of gates and consider Staffing a guardhouse for sole purpose of opening the gate in an evacuation scenario for the remaining gate(s);

b. **Provide Enhanced Safety Measures for Common and Privately-Owned Areas:**
   i. Inspect all common area defensible space areas annually.

ii. Maintenance to be conducted in defensible space areas, including not only maintaining clearance to native vegetation, but also ensuring that ornamental vegetation is not likely to transmit fire.
iii. Private certification delivered to District that District / CAL FIRE can then verify with its own inspectors
iv. Require HOA enforcement. HOA could issue a "notice of violation" concurrently with District / CAL FIRE inspectors
v. Provide annual report to the Fire Authority Having Jurisdiction, certifying that all common area defensible space is in compliance with state and local regulations.
vi. Enforcement of marked red curb, fire lane parking violations on private roads via agreement with tow company to ensure that roadways and fire hydrants are unobstructed.
vii. HOA to manage abatement of hazards on properties that are not in compliance with defensible space standards.

c. Designate Open Space Areas as Temporary Areas of Safe Refuge
i. 11 parks, including a 13.5-acre public park
ii. 2-acre Village green surrounded by 50-foot road ways on all sides
iii. 10-acre church site

d. Provide Structural Areas of Safe Refuge
i. Community Center (built to Chapter 7a building standards including commercial sprinklers)
- Add Non-perishable food and water stored for occupancy load

e. **Establish a Community Fire Safe Council (FSC):**
i. Provide continual fire safety and emergency evacuation education in the community.
ii. Establish specific program goals including (in coordination with HOA activities):
- Create a Defensible Space Assistance Program (DSAP)
- Brush and tree trimming/thinning
- Raking of dead vegetative matter (e.g., leaves, etc.)
- Chipping of removed vegetation
- Education about effective defensible space.
- Initial one-day defensible space clean up
- Maintaining vegetation along primary evacuation routes year-round

9. Conclusions

For all of the reasons discussed, visits to the proposed LHR development, and the information that I have reviewed, it is my determination that the LHR development would provide a safe area for its residents that would simultaneously benefit nearby neighborhoods with reduced fire risk via improved evacuation routes and contingency refuge areas, increased fire response and emergency facilities, and a significant investment in fire safety education, prevention and protection.

Finally, LHR is not like Paradise or other communities that were built before current fire standards. The LHR project includes a multi-layered fire protection system that is based on ignition resistant buildings and landscapes, adherence to stringent codes, fire-fighting water availability, swift emergency response, and a sound evacuation planning that includes a contingency option for residents who may be directed to temporarily shelter within the community during a wildfire evacuation. LHR, like other new, master-planned communities, should not be compared with older, less restrictive communities that were not built to the latest codes and ongoing maintenance. Other new, nearby communities have performed extremely well during wildfires and given the LHR's location, surrounding fire environment, and proposed fire protection plans, it is anticipated that the project will represent lowered risk to both LHR residents and nearby neighboring communities.

10. Christopher A. Dicus CV, select experience

EDUCATION

Louisiana State University: Doctor of Philosophy, Forestry [emphasizing Silviculture]
Utah State University: Master of Science, Forestry [emphasizing Fire Ecology]
Louisiana Tech University: Bachelor of Science (*Summa cum laude)*, Forestry-Wildlife

PROFESSIONAL EXPERIENCE

Professor, Wildland Fire & Fuels Management – California Polytechnic State University, San Luis Obispo, CA, September 2001-2013; September 2016-present.

Interim Associate Dean, Research & Graduate Programs – California Polytechnic State University, San Luis Obispo, CA, September 2015-August 2016.

Faculty Fellow to the Provost – Office of the Provost & Executive Vice President for Academic Affairs, California Polytechnic State University, San Luis Obispo, CA, Sept. 2013-September 2015.

AWARDS & HONORS

- Lead author on manuscript listed in "Best Papers 2005-2015", *Fire Ecology* journal (2015)
- College of Agriculture, Food & Environmental Sciences Outstanding Researcher Award (2011)

PROFESSIONAL LEADERSHIP

- **Association for Fire Ecology** (an international scientific society)
  - President (2018-present)
- **California Fire Science Consortium**
  - Coordinator, Wildland-urban Interface Module (2011-present)
- **San Luis Obispo County FireSafe Council**
  - Board of Directors (2002-present)

PUBLICATION/PRESENTATIONS

- Author of 26 peer-reviewed publications (8 via referees/editors, 18 via editorial boards), 21 non-reviewed scientific manuscripts and technical reports, and 19 invited editorials in various print periodicals.
- 92 oral presentations and 13 posters presented at international, national, regional, and local conferences. Invited talks include presentations in 9 foreign countries, including Australia (X5), Portugal, France (X2), Finland, Russia, Japan, China, Thailand, and El Salvador.

OTHER SIGNIFICANT PROFESSIONAL ACCOMPLISHMENTS:

- **Professional Certifications**
  - California Registered Professional Forester
  - Certified Senior Fire Ecologist
- **Honorary Research Associate**
  - Univ. of Tasmania School of Geography & Environmental Studies (Australia) – March-June 2009
- **Australian Black Saturday Bushfire Cooperative Research Center Research Task Force**
- **Fire Behavior Technical Specialist** on major wildland fires
- **Expert Witness in Wildland Fire Litigation on 3 continents**

CONCEPTUAL WILDLAND FIRE EVACUATION PLAN
for
Lilac Hills Ranch, San Diego County

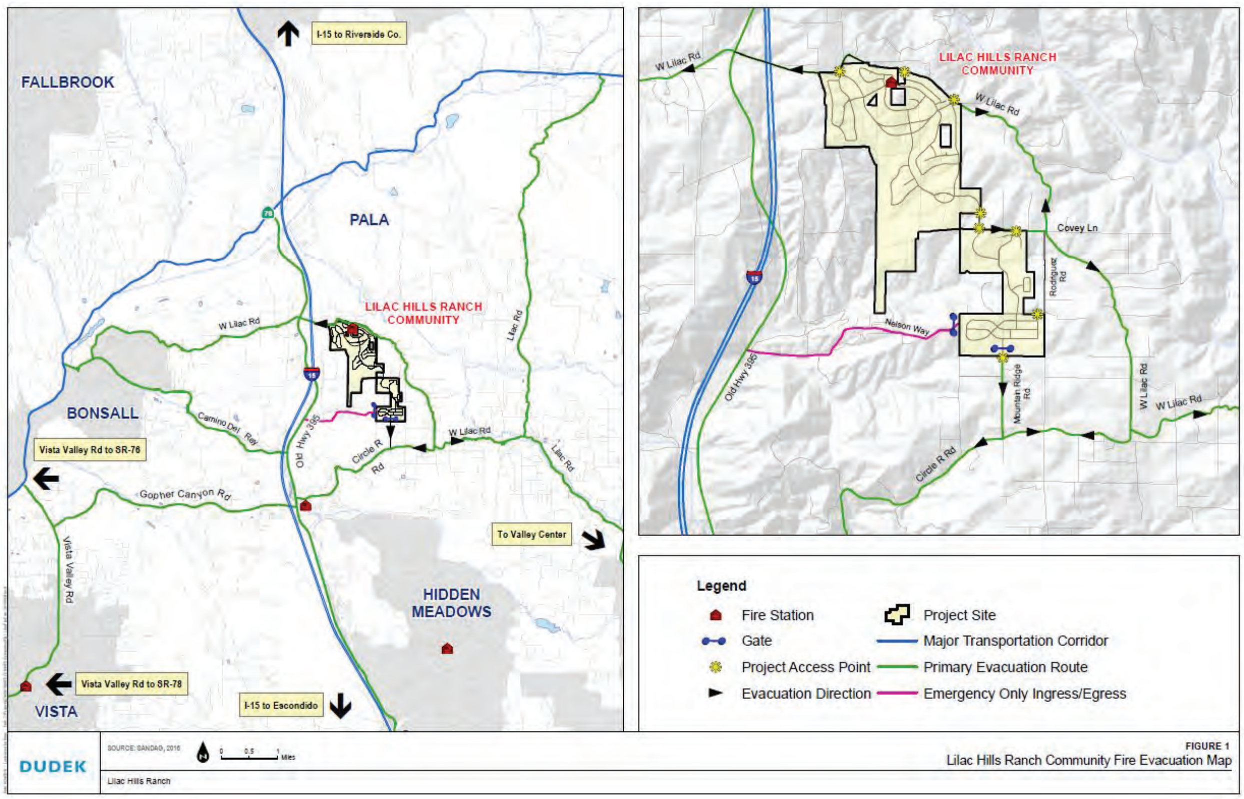

FIGURE 1
Lilac Hills Ranch Community Fire Evacuation Map

Prepared for:

Lilac Hills Ranch Residents
San Diego County, California

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024

SEPTEMBER 2019

Conceptual Wildland Fire Evacuation Plan
Lilac Hills Ranch

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APPENDICES

FIGURES

1 QUICK REFERENCE – WILDLAND FIRE EVACUATION PLAN

NOTE: Pages 1 through 10 are to be the focus of the homeowner evacuation educational outreach efforts. These pages will be available on the community's HOA Website. The remainder of this evacuation plan provides more detailed analysis and background information including this plan's consistency with standard San Diego County Office of Emergency Services evacuation planning.

This Draft Wildland Fire Evacuation Plan updates the information in the Lilac Hills Ranch Evacuation Plan (Firewise 2000, Inc. 2014), which will be provided to the Homeowners Association.

Evacuation is a process by which people are moved from a place where there is immediate or anticipated danger, to a safer place, and offered temporary shelter facilities. When the threat passes, evacuees are able to return to their normal activities, or to make suitable alternative arrangements.

Figure 1 indicates the Emergency Evacuation Routes available to the Lilac Hills Ranch Community. The exhibit highlights the community's interior roads along with primary access points, primary roads and major traffic corridors leading to nearby municipalities.

Figure 2 illustrates Deer Springs Fire Protection District's/Deer Springs Fire Safe Council's Emergency Evacuation Route map. This map provides a larger, District-wide view of primary evacuation routes, particularly to the east of I-15. This Lilac Hills Ranch Evacuation Plan focuses on evacuation routes for the Lilac Hills Ranch community during a wildfire scenario.

The available evacuation routes for the residents and guests of the Lilac Hills Ranch project are (See Figures 1 and 2):

1. **Egress to the east via W. Lilac Road** – This is the primary Lilac Hills Ranch access road and connects with the Project's Main Street at two locations in the northwest and northeast portions of the Project and with Birdsong Drive. W. Lilac Road offers travel options to the west to Old Highway 395 (less than ½ mile) where travel north to the SR-76, south to the I-15, or south on Old Highway 395 to Escondido is possible. Continuing west on W. Lilac road leads to Bonsall and the SR-76. **Likely neighborhoods using Main Street to W. Lilac Road during an evacuation include: neighborhoods in the northwest Project area**.
2. **Egress to the east/south via W. Lilac Road** – W. Lilac Road continues east of the Project and turns south approximately ¼ mile east of the eastern Main Street access, connecting with Circle R Drive within approximately 2.5 miles. Circle R Drive provides access easterly to Old Highway 395 and to the I-15 from there. W. Lilac Road continues west into Valley Center, offering access to Lilac Road and the SR-76 to the north and S6/Valley

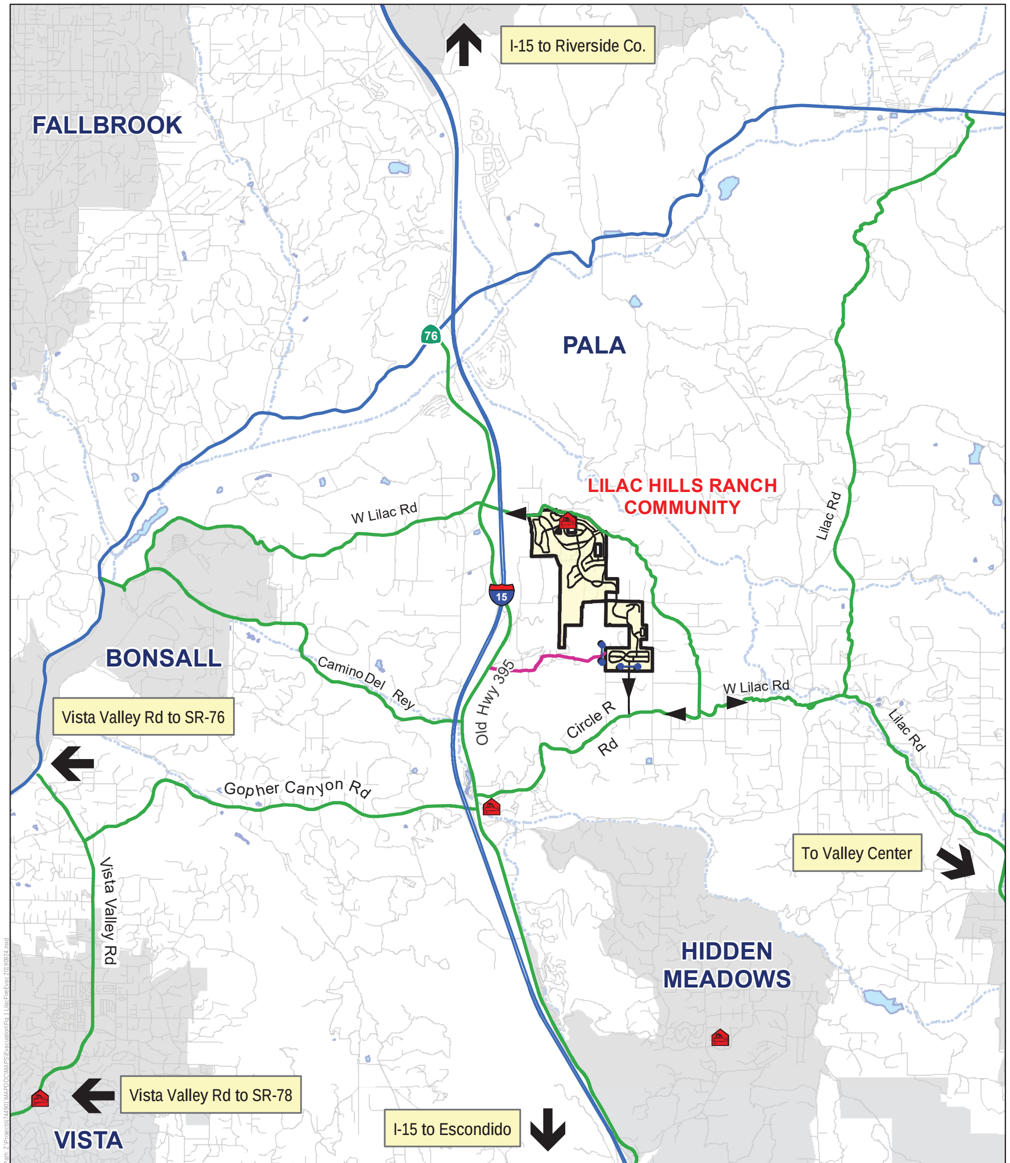
Center Road to the South. **Likely neighborhoods using this access road during an evacuation are: neighborhoods in the northeast Project area.**

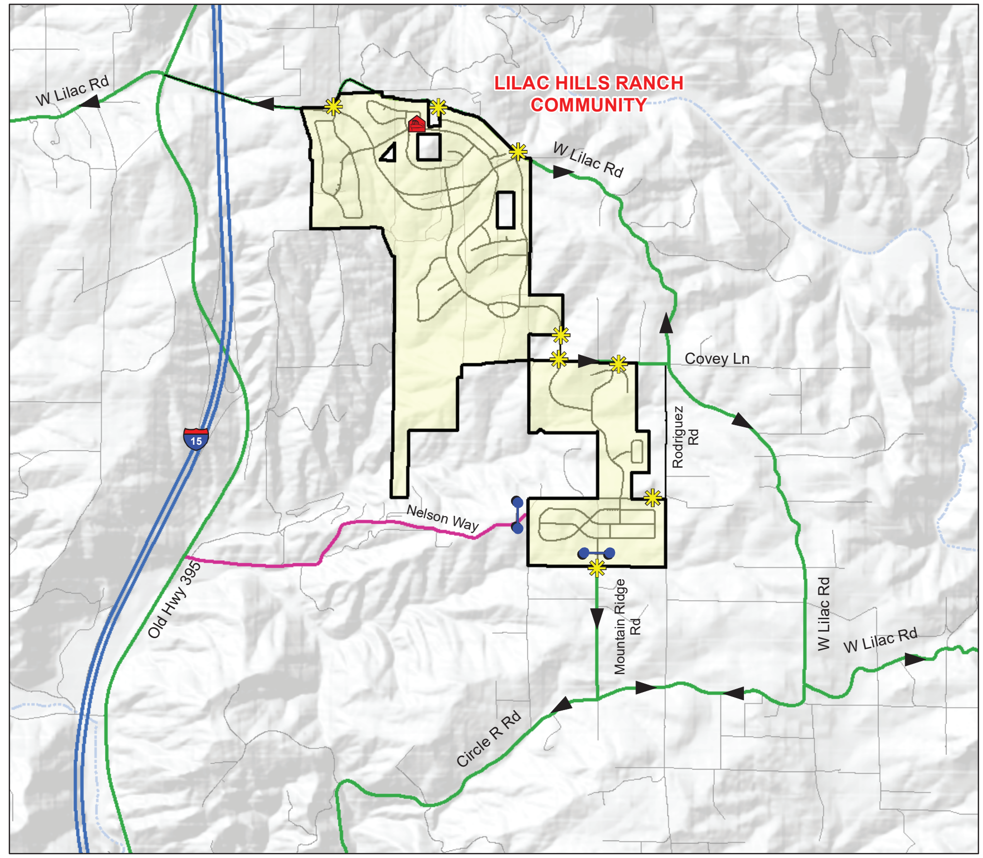
3. **Egress to the east via Covey Lane** – Covey Lane offers egress to the east to W. Lilac Road, which offers travel to the east or west, as described above. **Likely neighborhoods using this access road during an evacuation are: neighborhoods in the central and southern Project area.**
4. **Egress to the east via Rodriguez Road –** Rodriguez Road offers egress to the east to Rodriguez Road, which offers travel to the north to Covey Lane and eventually to W. Lilac Road or to the south, to Circle R Drive. **Likely neighborhoods using this access road during an evacuation are: neighborhoods in the southern Project area.**
5. **Egress to the south via Mountain Ridge Road** – Mountain Ridge Road provides egress to the south to Circle R Drive, which offers travel to the west toward the Old Highway 395 and I-15 or to the east, toward Lilac Road and Valley Center. **Likely neighborhoods using this access road during an evacuation are: neighborhoods in the southern Project area.**
6. **Egress to the west via Nelson Way –** Nelson Way provides emergency egress to the west to Old Highway 395, which offers travel to the north or south and eventual connection to the I-15 north or south. This route is gated and would be designated for use by responding law enforcement and fire agencies. **Likely neighborhoods using this access road during an evacuation are: neighborhoods in the project's southern half.**

The Lilac Hills Ranch community residents will be strongly encouraged to register with Reverse 911, Alert San Diego, and the local DSFPD message system. In addition, the community HOA will organize annual evacuation public outreach, engage directly with organizations such as Deer Springs Fire Safe Council, as well as maintain fire safety information on the community Web page, including this Emergency Evacuation Plan and links to important citizen preparedness information.

This evacuation plan is prepared specifically for the Lilac Hills Ranch Community and focuses on wildland fire evacuations, although many of the concepts and protocols will be applicable to other emergency situations. Ultimately, this plan will be used by the Lilac Hills Ranch Homeowner's Association to educate community residents as to their evacuation approach during wildfires and other similar emergencies.

It must be recognized that wildfire and other emergencies are often fluid events and that the need for evacuations are typically determined by on-scene first responders or by a collaboration between first responders and designated emergency response teams, including Office of Emergency Services and the Incident Command established for larger emergency events. As such, and consistent with all emergency evacuation plans, this Emergency Evacuation plan is to be considered a tool that supports existing pre-plans and provides for citizens who are familiar with the evacuation protocol, but is subservient to emergency event-specific directives provided by agencies managing the event.





Legend

- Fire Station
- Gate
- Project Access Point
- Evacuation Direction
- Project Site
- Major Transportation Corridor
- Primary Evacuation Route
- Emergency Only Ingress/Egress

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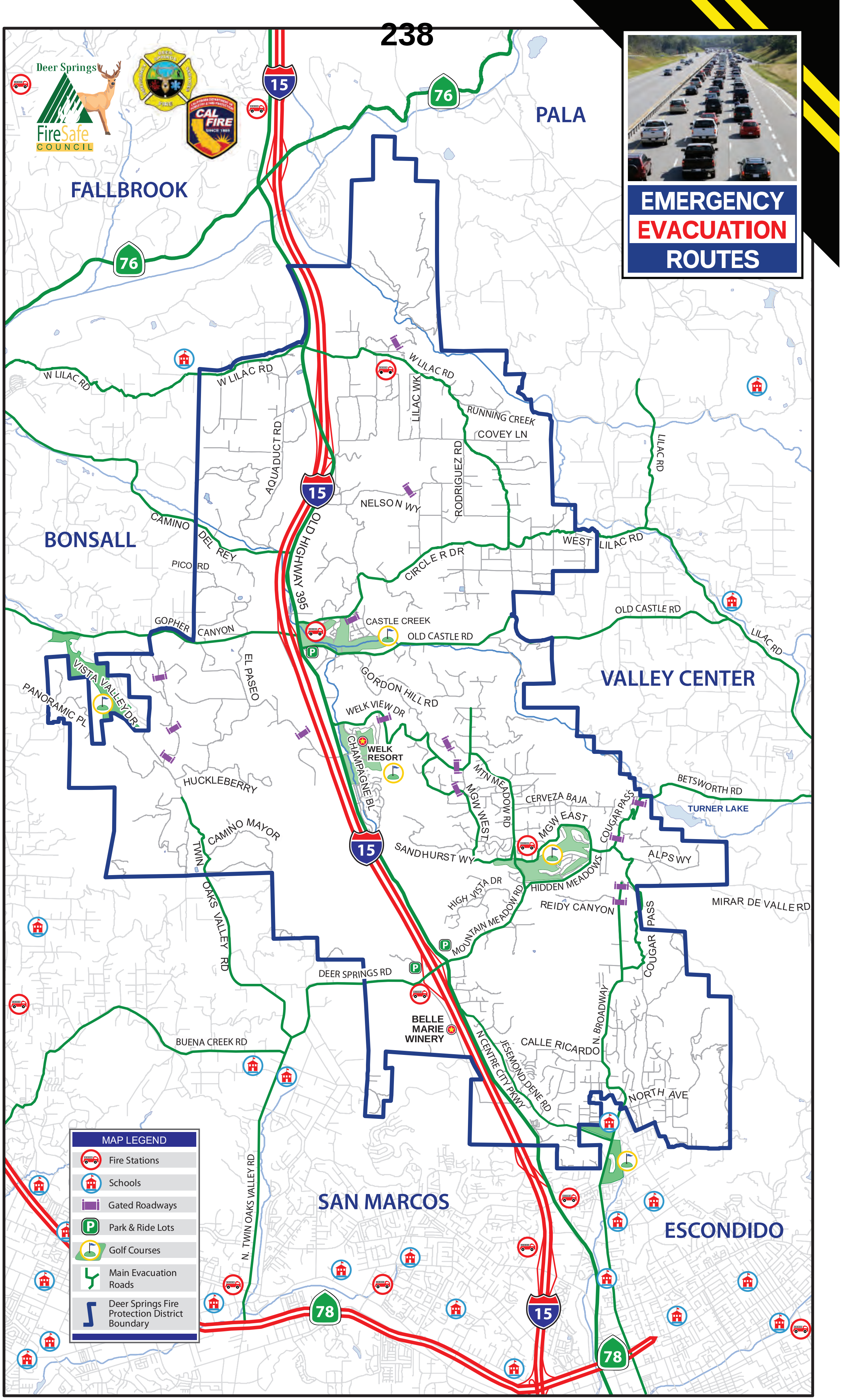
EMERGENCY
EVACUATION
ROUTES
Deer Springs
FireSafe COUNCIL
FALLBROOK
PALA
BONSALL
VALLEY CENTER
SAN MARCOS
ESCONDIDO
W LILAC RD
AQUADUCT RD
LILAC WK
RUNNING CREEK
COVEY LN
RODRIGUEZ RD
NELSON WY
OLD HIGHWAY 395
CAMINO DEL REY
PICO RD
GOPHER CANYON
CIRCLE R DR
WEST LILAC RD
LILAC RD
OLD CASTLE RD
CASTLE CREEK
EL PASEO
VISTA VALLEY DR
PANORAMIC PL
GORDON HILL RD
WELK VIEW DR
WELK RESORT
CHAMPAGNE BL
HUCKLEBERRY
CAMINO MAYOR
TWIN OAKS VALLEY RD
MTN MEADOW RD
MGW WEST
MGW EAST
CERVEZA BAJA
COUGAR PASS
BETSWORTH RD
TURNER LAKE
ALPS WY
SANDHURST WY
HIDDEN MEADOWS
REIDY CANYON
MIRAR DE VALLE RD
HIGH VISTA DR
MOUNTAIN MEADOW RD
DEER SPRINGS RD
BELLE MARIE WINERY
BUENA CREEK RD
N CENTRE CITY PKWY
JESEMOND DENE RD
CALLE RICARDO
N. BROADWAY
NORTH AVE
N. TWIN OAKS VALLEY RD
15
76
78
MAP LEGEND
Fire Stations
Schools
Gated Roadways
Park & Ride Lots
Golf Courses
Main Evacuation Roads
Deer Springs Fire Protection District Boundary

239

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1.1 Nearest Medical Facilities

Palomar Medical Center (16 miles)

2185 Citracado Parkway
Escondido, California 92029

Directions:

- W. Lilac Road (west) to I-15 (south)
- I-15 (south) to SR-78 (west)
- SR-78 (west) to Auto Park Way (south)
- Auto Park Way (south) to Citracado Parkway (south)
- Hospital on Right

Tri-City Medical Center (16 miles)

31700 Temecula Parkway
Temecula, California 92592

Directions:

- W. Lilac Road (west) to Old Highway 395 (north)
- Old Highway 395 (north) to SR-78 (east)
- SR-78 (east) to I-15 (north)
- I-15 (north) to SR-79 (east)
- Hospital on Left

See also Local Urgent Care facilities in Escondido, Fallbrook, and Temecula including:

U.S. HealthWorks Urgent Care
860 West Valley Parkway, Suite 150
Escondido, California 92025

Fallbrook Urgent Care
706 S. Main Avenue
Fallbrook, California 92028

Alliance Urgent Care
31150 Temecula Parkway, Suite 101
Temecula, California 92592

1.2 Register to Receive Emergency Alerts

The County of San Diego in partnership with Blackboard Connect Inc. utilizes AlertSanDiego for its Community Emergency Notification System. AlertSanDiego is a countywide standard system that is managed as a regional asset by the County of San Diego Office of Emergency Services. In the event of a wildfire within the proximity of the Lilac Hills Ranch Community, the Incident Commander (IC) will contact the San Diego County Sheriff's Office (SDSO). The SDSO's communications center has the responsibility to request activation of the AlertSanDiego system and release an emergency notification to the affected population. Therefore, the Lilac Hills Ranch community residents are strongly advised to register their land lines, mobile phone numbers and email addresses with Reverse 9-1-1, AlertSanDiego system (http://www.readysandiego.org/AlertSanDiego/) in order to receive emergency evacuation instructions.

The Lilac Hills Ranch community is part of the greater San Diego media market and the media outlets will also be a good source of information, via television and radio. Emergency situations are provided coverage and information is disseminated guiding resident response. In addition, the San Diego Emergency Alert System (EAS) is county-wide and broadcasts emergency information via two radio stations KOGO AM 600 and KLSD AM 1360.

1.3 Get Involved in Community Readiness

Lilac Hills Ranch residents are encouraged to form a volunteer Neighborhood Emergency Response Team through the Community Emergency Response Team (CERT) program which is administered by the DSFPD. In addition, the community HOA will organize annual evacuation public outreach, engage directly with organizations such as the DSFPD Fire Safe Council of San Diego County, as well as maintain a fire safe page on the community Web page, including this Emergency Evacuation Plan and links to important citizen preparedness information.

This evacuation plan is prepared specifically for the Lilac Hills Ranch Community and focuses on wildland fire evacuations, although many of the concepts and protocols will be applicable to other emergency situations. Ultimately, this plan will be used by the Lilac Hills Ranch HOA to educate community residents as to their evacuation approach during wildfires and other similar emergencies. It is important for the Lilac Hills Ranch residents to understand the importance of being prepared, so if/when the time comes where evacuation is necessary, they will be able to calmly implement their evacuation plan. Some actions the community residents can do in advance include:

- Participate in the DSFPD Fire Safe Council: http://www.deerspringsfiresafecouncil.com/dsfsc_2018_006.htm
- Follow the “Ready, Set, Go!” model developed for wildfire evacuations.
  - Create an escape plan from the residence, as well as familiarity with escape routes out of the area.
  - Create a car emergency kit, including cell phone charger, flashlight, jumper cables, water, and food.
  - Gather important paperwork, including birth and marriage certificates, account documents, passports, Social Security cards, and any other important documents.
  - As time allows, make sure to secure your home by locking all doors and windows, and unplugging electrical equipment, such as appliances and electronics.

Sample emergency preparedness resources available to the Lilac Hills Ranch residents are provided in Appendix A (“Ready, Set, Go!” Individual Action Plan) and Appendices B-1 through B-4 (Family Disaster Checklists and Communications Plans), Appendix C (Deer Springs Fire Protection District Community Evacuation Informational Handout), and residents are encouraged to become familiar with the concepts detailed at the following Websites:

1. “Ready, Set, Go!” Personal Action plan:

   http://www.readyforwildfire.org/docs/files/File/Ready-Set-Go-Plan-09_CALFIRE_sm.pdf or http://www.readyforwildfire.org/

2. Red Cross Emergency Planning:

   http://www.redcross.org/get-help/how-to-prepare-for-emergencies/make-a-plan

3. Hazardous Materials Emergency Preparedness:

   https://www.ready.gov/hazardous-materials-incidents

4. Building a disaster kit:

   http://www.redcross.org/get-help/prepare-for-emergencies/be-red-cross-ready/get-a-kit

5. Making a Plan Checklist:

   https://www.ready.gov/make-a-plan

6. Family Communication Plan:

   https://www.fema.gov/media-library-data/1440449346150-1ff18127345615d8b7e1effb4752b668/Family_Comm_Plan_508_20150820.pdf

1.4 Evacuation Plan Purpose and Limitations

Wildfire and other emergencies are often fluid events and the need for evacuations are typically determined by on-scene first responders or by a collaboration between first responders and designated emergency response teams, including Office of Emergency Services and the IC established for larger emergency events. As such, and consistent with all emergency evacuation plans, this Emergency Evacuation plan is to be considered a tool that supports existing pre-plans and provides for citizens who are familiar with the evacuation protocol, but is subservient to emergency event-specific directives provided by agencies managing the event.

2 BACKGROUND

This Lilac Hills Ranch Evacuation Plan has been prepared based on the Unified San Diego County Emergency Services Organization and County of San Diego Operational Area Emergency Operations Plan (EOP) – Evacuation Annex. In order to establish a framework for implementing well-coordinated evacuations, the County of San Diego Office of Emergency Services (OES) developed an Evacuation Annex as part of the Area EOP (San Diego County 2014). Large-scale evacuations are complex, multi-jurisdictional 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, and other cooperating law enforcement agencies have primary responsibility for evacuations. These agencies work closely within the Unified Incident Command System, with the County Office of Emergency Services, and responding fire department personnel who assess fire behavior and spread, which should ultimately guide evacuation decisions. To that end, DSFPD, County Fire, law enforcement, Public Works, Planning, Emergency Services Departments, and Caltrans, amongst others, have worked with a County Pre-Fire Mitigation Task Force to address wildland fire evacuation planning for San Diego County.

It is important to note that every evacuation scenario will include some level of unique challenges, constraints, and fluid conditions that require interpretation, fast decision making, and alternatives. For example, one roadway incident that results in blockage of evacuating vehicles may require short-term or long-term changes to the evacuation process. Risk is considered high when evacuees are evacuating late, and fire encroachment is imminent. This hypothetical scenario highlights the importance of continuing to train responding agencies, model various scenarios, educate the public, and take a very conservative approach to evacuation decision timelines as well as providing contingency plans.

Equally as important, the evacuation procedures should be regularly updated with lessons learned from actual evacuation events, as they were following the 2003, 2007, 2014, and 2017 San Diego County fires. The authors of this Evacuation Plan recommend that occasional updates are provided, especially following lessons learned from actual incidents, as new technologies become available that would aid in the evacuation process, and as changing landscapes and development patterns occur within and adjacent the Lilac Hills Ranch Project that may impact how evacuation is accomplished. At the time of this plan's preparation, there is no encompassing emergency evacuation plan for the Deer Springs Fire Protection District or the greater northern San Diego County area. The only published evacuation information specific to the project vicinity, and including the Lilac Hills Project site, was prepared by the Deer Springs Fire Safe Council in cooperation with the Deer Springs Fire Protection District. The information is located on the DSFSC Website at: http://deerspringsfiresafecouncil.com/linked/evacmap_text _side_final2.pdf plan and is provided in Appendix A. This Web site provides general evacuation safety considerations, but is not a specific evacuation plan for the DSFPD.

This Lilac Hills Wildland Fire Evacuation Plan is consistent with the existing DSFSC plan, although more specific, and provides guidance and pre-planning for Lilac Hills Ranch residents. This plan can be integrated into a regional evacuation plan when and if area officials and stakeholders (DSFPD, CAL FIRE, San Diego County Fire Authority, Office of Emergency Services, San Diego Sheriff's Department, and others) complete one.

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 meet these important factors. Among the methods available to citizens for emergency information are radio, television, social media/internet, neighborhood patrol car PA notifications, and Reverse 911.

3 SAN DIEGO COUNTY EVACUATION PLANNING SUMMARY

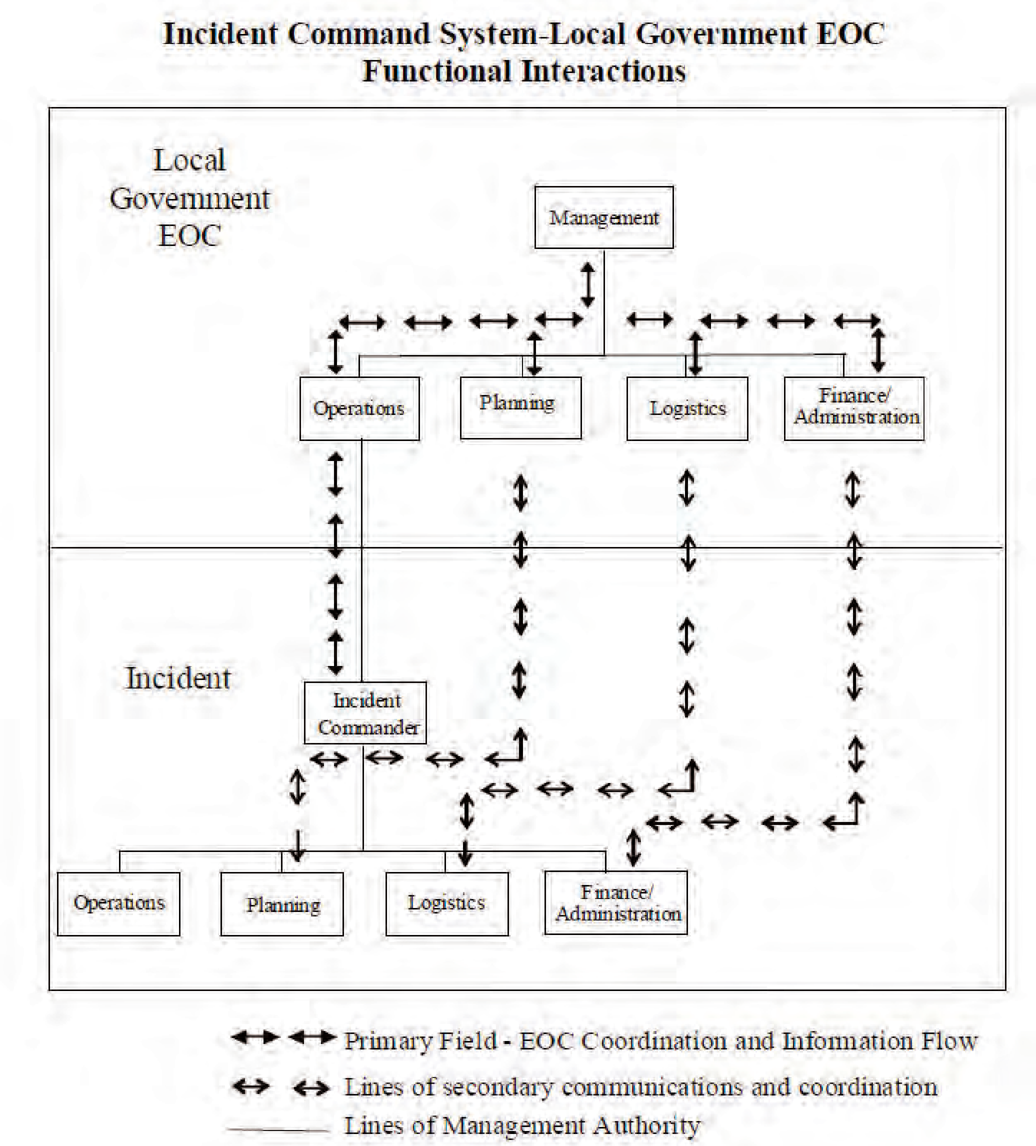
This Wildland Fire Evacuation Plan incorporates concepts and protocols practiced throughout San Diego County. The San Diego County Evacuation Annex (2014) follows basic protocols set forth in the County's Operation Area Emergency Operations Plan and the California Master Mutual Aid Agreement, which dictate who is responsible for an evacuation effort and how regional resources will be requested and coordinated.

First responders are responsible for determining initial protective actions before EOCs and emergency management personnel have an opportunity to convene and gain situational awareness. Initial protective actions are shared/communicated to local EOCs and necessary support agencies as soon as possible to ensure an effective, coordinated evacuation. Figure 3 summarizes the functional interactions of local government EOC under the Incident Command System.

During an evacuation effort, the designated County Evacuation Coordinator is the Sheriff, who is also the Law Enforcement Coordinator. The Evacuation Coordinator will be assisted by other law enforcement and support agencies. Law enforcement agencies, highway/road/street departments, and public and private transportation providers will conduct evacuation operations. Procurement, regulation, and allocation of resources will be accomplished by those designated. Evacuation operations will be conducted by the following agencies:

- County of San Diego Sheriff's Department
- Fire and Rescue
- County Health and Human Services Agency
- Department of Animal Services,
- Department of Planning and Development Services
- Department of Environmental Health
- Department of General Services
- Department of Public Works
- Department of Agriculture, Weights, and Measures
- Department of Parks and Recreation

Figure 3 Incident Command System-Local Government EOC Functional Interactions



The following general information has been largely taken verbatim from the San Diego County Evacuation Annex and is consistent with the City's Emergency Operations Procedures:

3.1 Evacuation Objectives

The overall objectives of emergency evacuation operations and notifications are to:

- Expedite the movement of persons from hazardous areas;

- Institute access control measures to prevent unauthorized persons from entering vacated, or partially vacated areas;
- Provide for evacuation to appropriate transportation points, evacuation points, and shelters;
- Provide adequate means of transportation for persons with disabilities, the elderly, other persons with access and functional needs, and persons without vehicles;
- Provide for the procurement, allocation, and use of necessary transportation and law enforcement resources by means of mutual aid or other agreements;
- Control evacuation traffic;
- Account for the needs of individuals with household pets and service animals prior to, during, and following a major disaster or emergency;
- Provide initial notification, ongoing, and re-entry communications to the public through the Joint Information Center (JIC); and
- Assure the safe re-entry of the evacuated persons.

The San Diego Sheriff's Department (SDSD) is the lead agency for evacuations of the unincorporated areas of San Diego County, including Deer Springs Fire Protection District and the Lilac Hills Project. The SDSD, 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 SDSD 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 decision to evacuate an area is not made lightly and there is a significant impact to public safety and the economy. The following process describes how emergency evacuation decisions are coordinated, allowing emergency managers and other supporting response organizations to make collaborative decisions.

3.2 Evacuation Coordination Process

1. If the emergency only impacts a local jurisdiction, the decision to evacuate will be made at the local jurisdiction level with regional collaboration considerations.
   a. 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.

b. The decision to evacuate will depend entirely upon the nature, scope, and severity of the emergency; the number of people affected; and what actions are necessary to protect the public.

c. Local jurisdictions may activate their Emergency Operations Center (EOC) and conduct evacuations according to procedures outline in their Emergency Operations Plan (EOP).

d. The EOC may make recommendations on whether a jurisdiction should evacuate and may help coordinate the evacuation effort.

e. The Evacuation Annex is automatically activated when an incident occurs requiring an evacuation effort that impacts two or more jurisdictions.

f. The EOC will coordinate with fire, law enforcement, public health, and other relevant support agencies to obtain recommendations on protective actions.

g. The EOC will coordinate with jurisdictional emergency management personnel and other public safety personnel. The Policy Group within the EOC will coordinate will other officials from jurisdictions within the OA to identify command decisions, including:

   i. Gaining regional situational awareness
   ii. Determining response status
   iii. Reviewing status of initial protective actions
   iv. Considering additional protective actions
   v. Evaluating public information needs
   vi. Determining next steps
   vii. Establishing a regular time to share updates

h. The EOC will coordinate emergency public information to citizens in accordance with established procedures.

i. The EOC may support coordinating the evacuation response according to the EOP, including:

   i. Providing transportation for those who need assistance
   ii. Provide support for people with disabilities and other access and functional needs
   iii. Coordinate and communicate with the private sector, community groups, and faith based organizations to utilize their services and resources available to support the response
   iv. Providing shelter for evacuees

3.3 Evacuation Response Operations

An evacuation of any area requires significant coordination among numerous public, private, and community/non-profit organizations. Wildfire evacuations will typically allow time for responders to conduct evacuation notification in advance of an immediate threat to life safety; giving residents time to gather belongings and make arrangements for evacuation. On the other hand, other threats, including wildfires igniting nearby, may occur with little or no notice and certain evacuation response operations will not be feasible (for example, establishing contra flow requires between 24 to 72 hours to be implemented; a no-notice event will not allow for contra flow to be established). Evacuation assistance of specific segments of the population may also not be feasible.

3.3.1 Evacuation Points and Shelters

When the SDSD implements an evacuation order, they coordinate with the responding fire agency, the EOC, and others to decide on a location to use as a Temporary Evacuation Point (TEP). The SDSD Dispatch Center will utilize the AlertSanDiego system to direct evacuees to the established TEP or shelter. These evacuation points will serve as temporary safe zones for evacuees and will provide basic needs such as food, water, and restrooms. If there are residents unable to evacuate and need transportation assistance to get to a TEP or shelter, the SDSD may establish transportation points to collect and transport people without transportation resources to evacuation points. These points should be large, well known sites such as shopping centers, libraries, and schools. Transportation should be accessible to all populations, including people with disabilities and other access and functional needs. When the SDSO or IC implements an evacuation order, they coordinate with the responding fire agency (e.g., DSFPD), the EOC, and others to decide on a location to use as a Temporary Evacuation Point (TEP). The SDSO Dispatch Center will utilize the AlertSanDiego system and City will use their social media pages and in the field direction of evacuees to the established TEPs or shelters. These evacuation points will serve as temporary safe zones for evacuees and will provide basic needs such as food, water, and restrooms. These points should be large, well known sites such as shopping centers, libraries, and schools. Possible shelters and assembly areas that can provide at least short-term refuge:

- Various sites in Escondido
- Sullivan Middle School/High School at 7350 W. Lilac Road, Bonsall
- Bonsall Elementary School at 31555 Old River Road, Bonsall
- Fallbrook High School at 2400 S. Stagecoach Lane, Fallbrook

Other refuge sites are available within urbanized areas of Escondido, San Marcos Vista, Oceanside, and developed communities primarily to the west, south, and northwest of the Lilac Hills Ranch community.

If there are residents unable to evacuate and need transportation assistance to get to a TEP or shelter, the OES may establish transportation points to collect and transport people without transportation resources to evacuation points. Transportation should be accessible to all populations, including people with disabilities and other access and functional needs.

3.3.2 Animal Evacuations

The Pets Evacuation and Transportation Standards Act of 2006 amends the Stafford Act, and requires evacuation plans to take into account the needs of individuals with household pets and service animals, prior to, during, and following a major disaster or emergency.

The San Diego County Department of Animal Services (DAS) has plans in place to transport and shelter pets in a disaster under Annex O of the OA EOP, including the Animal Control Mutual Aid Agreement. Animal Control Officers, the San Diego Humane Society, and private animal care shelters will assist in the rescue, transport, and sheltering of small and large animals. In addition, potential volunteer resources and private groups should be identified and tracked in WebEOC. Only non-emergency resources and personnel, such as public and private animal services agencies, will be used to rescue and transport animals during an evacuation effort.

In most cases, DAS and the OA EOC will coordinate and attempt to co-locate animal shelters with people shelters.

3.3.3 Shelter in Place

Sheltering-in-place 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.

The decision on whether to evacuate or shelter-in-place is carefully considered with the timing and nature of the incident (San Diego County 2014). Sheltering-in-place is the preferred method of protection for people that are not directly impacted or in the direct path of a hazard. This will reduce congestion and transportation demand on the major transportation routes for those that have been directed to evacuate by police or fire personnel. Like most new master planned communities incorporating ignition resistant construction, wide fuel modification zones, and providing defensibility throughout, responding fire and law enforcement personnel will be able to direct residents to temporarily refuge in their homes at Lilac Hills Ranch, in the rare situation where that alternative is determined to be safer than evacuating.

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4 LILAC HILLS RANCH EVACUATION

Wildfire emergencies that would be most likely to include an evacuation of Lilac Hills Ranch would be large wildfires approaching from the north, northeast, or east. These fires are often wind driven and occur during declared Red Flag Warning days where low humidity and high winds facilitate fire ignition and spread. If a fire starts in the backcountry (East County) and is fanned by these fire weather conditions, an early evacuation of the area may occur as many as 24 hours prior to actual threatening conditions. Fires occurring on typical weather days, even fires igniting off the Interstate 15, have been very successfully controlled at small sizes within minutes of ignition and would not typically trigger a need to evacuate the project. Partial evacuation of some neighborhoods could be an option in these cases.

If a wildfire ignited closer to the Lilac Hills Ranch community during weather that facilitates fire spread, where multiple hours are not available for evacuation, a contingency evacuation approach would be available at Lilac Hills Ranch. Because it is preferred to evacuate long before a wildfire is near, and in fact, history indicates that most human fatalities from wildfires are due to late evacuations when they are overtaken on roads, it is prudent to consider a contingency option. For example, if a wildfire is anticipated to encroach upon the community in a timeframe that is shorter than would be required to evacuate all residents, then options available to responding fire and law enforcement personnel should include 1) partial relocation where residents in perimeter homes on the north/northeast/east edge are temporarily relocated to internal areas or to the town center, 2) Individual neighborhood relocations where residents are temporarily relocated to the Town Center or south to Escondido and other nearby cities, 3) temporary on-site refuge where residents are instructed to remain in their well-protected homes. This approach is consistent with San Diego County’s (2014) Evacuation approach which states “*Due to the nature of the threats requiring an evacuation, there may be insufficient time to perform an early evacuation of the area and shelter-in-place instructions may need to be provided.*” Although not an officially designated shelter in place community, the Lilac Hills Ranch includes most of the features that result in the ability to shelter in place. Structures in Lilac Hills Ranch are ignition resistant, defensible and designed to require minimal resources for protection, which enables temporary on-site refuge that may not be available to other nearby communities.

As evidenced by mass evacuations in San Diego County and elsewhere, even with roadways that are designed to the code requirements, it may not be possible, or necessary to move large numbers of persons simultaneously. Road infrastructure throughout the United States, and including San Diego County is not designed to accommodate a short-notice, mass evacuation without careful pre-planning, phased execution, and field intersection control. The need for evacuation plans, pre-planning, and tiered or targeted and staggered evacuations becomes very important for improving evacuation effectiveness.

Among the most important factors for successful evacuations in urban settings is control of intersections downstream of the evacuation area. If intersections are controlled by law enforcement, barricades, signal control, or other means, potential backups and slowed evacuations can be minimized. Another important aspect of successful evacuation is a managed and phased evacuation declaration. Evacuating in phases, based on vulnerability, location, or other factors, enables the subsequent traffic surges on major roadway to be smoothed over a longer time frame and can be planned to result in traffic levels that flow better than when mass evacuations include large evacuation areas at the same time. This plan defers to Law Enforcement and Office of Emergency Services to appropriately phase evacuations and to consider the vulnerability of communities when making decisions. For example, the Lilac Hills Ranch Community will offer its residents a high level of fire safety on site (refer to the Lilac Hills Fire Protection Plan prepared by Firewise 2000, Inc. 2014) along with options for firefighter safety zones and temporary on-site refuge as a contingency, as discussed further in this plan.

The Lilac Hills Ranch planned community interior road network and the existing regional road system that it interconnects provide multi-directional primary and secondary emergency evacuation routes consistent with, or exceeding, most communities in this area. Consistent with County of San Diego evacuation planning annex (2014), major ground transportation corridors in the area will be used as primary evacuation routes during an evacuation effort. The road systems were evaluated to determine the best routes for fire response equipment and “probable” evacuation routes for relocating people to designated safety areas.

During an emergency evacuation from the Lilac Hills Ranch community, the primary and secondary roadways may be providing citizen egress while responding emergency vehicles are inbound. Because the roadways are all designed to meet or exceed County of San Diego Consolidated Fire Code requirements, including 12-foot-wide, unobstructed travel lanes, adequate parking, 28-foot inside radius, grade maximums, signals at intersections, and roadside fuel modification zones, potential conflicts that could reduce the roadway efficiency are minimized, allowing for smooth evacuations.

The community’s primary evacuation routes are accessed through a series of internal neighborhood roadways, which connect with the primary ingress/egress roads that intersect off-site primary and major evacuation routes. Based on the existing road network, the community can evacuate to the north (once off site), south, east and west depending on the nature of the emergency.

There are six ingress/egress routes for Lilac Hills Ranch (Figure 1):

- Northeast corner of the community – Main Street west provides access from W. Lilac Road a relatively short ½ mile from the I-15.
- Northwest corner of the community – Main Street east provides access from W. Lilac Road approximately one mile east of the Main Street west access point.
- East-central portion of the community – Covey Lane provides access from W. Lilac Road approximately one mile east/south from the Main Street east access point.
- Southeast portion of the community – Rodriguez Road provides access from north-south Rodriguez Road, which interconnects with Covey Lane. Rodriguez Road is approximately one half mile south of Covey Lane.
- Southern portion of the community – Mountain Ridge Road provides access to Circle R Drive, which provides egress to the east to Old Highway 395 and the I-15 or west into Valley Center.
- Southern portion of the community – Nelson Way provides a gated, emergency only ingress/egress road to Old Highway 395 and the I-15 north or south.

Depending on the nature of the emergency requiring evacuation, it is anticipated that the majority of the community traffic would exit the Lilac Hills Ranch Project via either Main Street/W. Lilac Road access points, Mountain Ridge Road, and potentially Nelson Way. These are the most direct routes out of the area. In a typical evacuation that allows several hours or more time (as experienced in 2003, 2007, and 2014 wildfires), evacuation traffic may be distributed such that not all of the vehicles are directed onto W. Lilac Road and those that are, are staggered over a longer timeframe to minimize potential congestion. If less time is available, fire and law enforcement officials may direct traffic out all available routes, depending on the nature of the emergency. Please refer to the Project's Evacuation Travel Time Memorandum prepared by Dudek (September 2019) for details regarding anticipated evacuation road usage and evacuation time estimates.

4.1 Evacuation Route Determination

Fire and law enforcement officials will identify evacuation points before evacuation routes are announced to the public. Evacuation routes are determined based on the location and extent of the incident and include as many pre-designated transportation routes as possible.

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5 LILAC HILLS RANCH RESIDENT FIRE/ EVACUATION AWARENESS

The Lilac Hills Ranch Community HOA will be active in its outreach to residents regarding fire safety and general evacuation procedures. There are aspects of fire safety and evacuation that require a significant level of awareness by the residents and emergency services in order to reduce and/or avoid problems with an effective evacuation. Mitigating potential impediments to successful evacuations requires focused and repeated information through a strong educational outreach program. The Lilac Hills Ranch HOA will engage residents and DSFPD through a variety of methods. This evacuation plan will be provided to each homeowner/HOA member as well as being accessible on the HOA Website. Annual reminder notices will be provided to each homeowner encouraging them to review the plan and be familiar with community evacuation protocols. The HOA will coordinated with DSFPD to hold an annual fire safety and evacuation preparedness informational meeting. Representatives of DSFPD will be invited to attend and important fire and evacuation information reviewed. One focus of these meetings and of the HOA's annual message will be on the importance of each resident to prepare and be familiar with their own "Ready, Set, Go!" evacuation plan. The "Ready, Set, Go!" program is defined at: http://www.readysandiego.org/ Resources/ wildfire_preparedness_guide.pdf and information about preparing an individual Action Plan is provided in Appendix B.

The focus of the "Ready, Set, Go!" program is on public awareness and preparedness, especially for those living in the wildland-urban interface (WUI) areas. The program is designed to incorporate the local fire protection agency as part of the training and education process in order to insure that evacuation preparedness information is disseminated to those subject to the potential impact from a wildfire. There are three components to the program:

"READY" – Preparing for the Fire Threat: Take personal responsibility and prepare long before the threat of a wildfire so you and your home are ready when a wildfire occurs. Create defensible space by clearing brush away from your home as detailed in the Lilac Hills Ranch FPP (Firewise 2000, Inc. 2014). Use only fire-resistant landscaping and maintain the ignition resistance of your home. Assemble emergency supplies and belongings in a safe spot. Confirm you are registered for Reverse 911, AlertSanDiego, and DSFPD alert system. Make sure all residents residing within the home understand the plan, procedures and escape routes.

"SET" – Situational Awareness When a Fire Starts: If a wildfire occurs and there is potential for it to threaten Lilac Hills Ranch, pack your vehicle with your emergency items. Stay aware of the latest news from local media and your local fire department for updated information on the fire. If you are uncomfortable, leave the area.

"GO!" – Leave Early! Following your Action Plan provides you with knowledge of the situation and how you will approach evacuation. Leaving early, well before a wildfire is threatening your community, provides you with the least delay and results in a situation where, if a majority of neighbors also leave early, firefighters are now able to better maneuver, protect and defend structures, evacuate other residents who couldn't leave early, and focus on citizen safety.

"READY! SET! GO!" is predicated on the fact that being unprepared and attempting to flee an impending fire late (such as when the fire is physically close to your community) is dangerous and exacerbates an already confusing situation. This Lilac Hills Ranch Wildland Fire Evacuation Plan provides key information that can be integrated into the individual Action Plans, including the best available routes for them to use in the event of an emergency evacuation.

Situation awareness requires a reliable information source. One of the most effective public notification methods is Reverse 911. The San Diego Office of Emergency Services operates the reverse 911 notification system that provides a recorded message over land line telephone systems relating to evacuation notices. In addition, the Office of Emergency Services operates a program known as "Alert San Diego" that has the capability to send emergency notifications over both land lines as well as to cell phones and via text messages. It is up to individual residents to register their cell phones for "Alert San Diego." The registration of cell phones can be done on line at www.ReadySanDiego.com. The Lilac Hills Ranch HOA will strongly encourage all residents to register telephone numbers.

In addition, the DSFPD, through the Deer Springs Fire Safe Council, provides a separate telephone-based emergency alert messaging system that residents can sign up for at www.DeerSpringsFireSafeCouncil.com. The subscription-based information messaging system is for residents of the Deer Springs Fire Protection District. This system is for informational purposes only for emergencies that are threatening the area within the boundaries of the DSFPD. In the event of an emergency (fire or otherwise), volunteer coordinators and observers would closely monitor the situation through observation, radio communications, and coordination with public safety officials. If the determination is made to notify residents of the entire District or individual communities within the District, an appropriate message would be sent to the telephones of residents who have registered for this service. All Lilac Hills Ranch residents will be strongly encouraged to register their telephone numbers. The automated dialer is a computer-based system capable of dialing dozens of numbers simultaneously and can call all currently registered numbers in approximately 20 minutes. This system is not affiliated with the San Diego County Reverse 9-1-1 system and is informational only. It will not be used to issue an evacuation order.

As part of the Lilac Hills Ranch resident fire awareness and evacuation readiness program, information will be delivered in a variety of methods. The Home Owners' Association will be responsible to provide and distribute to each homeowner a complete copy of the project's Fire Protection Plan and this Wildland Fire Evacuation Plan, including materials from the READY! SET! GO! Program. The HOA is also responsible for insuring the distribution of copies of the aforementioned materials to those individuals that purchase properties for re-sales and to the management of non-residential properties. Management of the commercial properties will be responsible for the dissemination of the Evacuation Plan information to their employees.

As part of the approval of this project, it shall be binding on the HOA to actively participate as a partner with the DSFPD and the Deer Springs FireSafe Council (DSFSC) and to assist with the coordination and distribution of fire safety information they develop.

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6 LILAC HILLS RANCH EVACUATION PROCEDURES

6.1 Relocation/Evacuation

Wolshon and Marchive (2007) simulated traffic flow conditions in the wildland urban interface (WUI) under a range of evacuation notice lead times and housing densities. To safely evacuate more people, they recommended that emergency managers (1) provide more lead time to evacuees and (2) control traffic levels during evacuations so that fewer vehicles are trying to exit at the same time.

Wildfire emergency response procedures will vary depending on the type of wildfire and the available time in which decision makers (Incident Command, DSFPD, CAL FIRE, SDSD, and/or County Office of Emergency Management) can assess the situation and determine the best course of action. Based on the community, its road network, and the related fire environment, the primary type of evacuation envisioned is an orderly, pre-planned evacuation process where people are evacuated from the Lilac Hills Ranch community to neighboring urban areas further from an encroaching wildfire (likely to urban areas south, west or north) well before fire threatens. This type of evacuation must include a conservative approach to evacuating, i.e., when ignitions occur and weather is such that fires may spread rapidly, evacuations should be triggered on a conservative threshold. This threshold must include time allowances for unforeseen, but possible, events that could slow the evacuation process.

Evacuation is considered by many to offer the highest level of life protection to the public, but it can result in evacuees being placed in harm's way if the time available for evacuation is insufficient (Cova et al. 2011). An example of this type of evacuation which is highly undesirable from a public safety perspective, is an evacuation that occurs when fire ignites close to vulnerable communities. Lilac Hills Ranch is not considered a vulnerable community, however there are vulnerable communities within DSFPD. This type of situation is inherently dangerous because there is generally a higher threat to persons who are in a vehicle on a road when fire is burning in the immediate area. Conditions may become poor, smoke may inhibit visibility and vehicle accidents may become a higher probability. This scenario occurred in San Diego County during the 2003 Cedar Fire. Even though hundreds of thousands of people were successfully evacuated, night-time evacuations, which were initiated too late on Wildcat Canyon Road, resulted in fatalities. A vehicle offers little shelter from a wildfire if the vehicle is situated near burning vegetation or catches fire itself. This type of evacuation must be considered a very undesirable situation by law and fire officials in all but the rarest situations where late evacuation may be safer than seeking temporary refuge in a structure (such as when there are no nearby structures, the structure(s) is/are already on fire, or when there is no other form of refuge).

A third potential type of evacuation is a hybrid of the first two. In cases where evacuation is in process and changing conditions result in a situation that is considered unsafe to continue evacuation, it may be advisable to direct evacuees to pre-planned temporary refuge locations, including their own home if it is ignition resistant and defensible, such as those within the Lilac Hills Ranch. As with the second type of evacuation discussed above, this situation is considered undesirable, but the evacuation pre-planning must consider these potential scenarios and prepare decision makers at the IC level and at the field level for enacting a contingency to evacuation when conditions dictate.

Indications from past fires and related evacuations in San Diego County and throughout Southern California, are that evacuations are largely successful, even with a generally unprepared populace. It then stands to reason that an informed and prepared populace would minimize the potential evacuation issues and related risk to levels considered acceptable from a community perspective.

Evacuation orders or notifications are often triggered based on established and pre-determined buffers. These buffers are often hard or soft lines on a map and are based on topography, fuel, moisture content of the fuels and wind direction. Evacuations are initiated when a wildfire reaches or crosses one of these pre-determined buffers. Evacuations can also be very fluid. The incident command, law enforcement and County OES would jointly enact evacuations based on fire behavior.

6.2 Lilac Hills Evacuation Baseline

For purposes of this Evacuation Plan, the first and most logical choice for all of the residents and guests within the boundaries of the Lilac Hills Ranch Community is to adhere to the principals and practices of the "READY! SET! GO!" Program previously mentioned in this document. As part of this program, it is imperative that each household develop a plan that is clearly understood by all family members and participates in the educational and training programs sponsored by the Lilac Hills Ranch HOA and the DSFPD/Deer Springs Fire Safe Council. In addition, it is imperative that the "READY! SET! GO!" program information be reviewed on a routine basis along with the accompanying maps illustrating evacuation routes, temporary evacuation points and pre-identified safety zones. It must be kept in mind that conditions may arise that will dictate a different evacuation route than the normal roads used on a daily basis.

Residents are urged to evacuate as soon as they are notified to do so or earlier if they feel uncomfortable. Directions on evacuation routes will be provided in most cases, but if not provided, Lilac Hills Ranch residents will proceed according to known available routes away from the encroaching fire.

Note: this evacuation plan will require adjustment and continued coordination by the Lilac Hills Ranch HOA and/or developer and DSFPD/Law enforcement agencies during each of the construction phases. With each phase, the evacuation routes may be subject to changes with the addition of both primary and secondary evacuation routes.

6.3 Civilian and Firefighter Evacuation Contingency

As of this document's preparation, no community in California has been directed to shelter in place during a wildland fire. Even the communities in Rancho Santa Fe, California which are designed and touted as shelter in place communities, were evacuated during the 2007 Witch Creek Fire. This is not to say that people have not successfully sheltered in place during wildfire, where there are numerous examples of people sheltering in their homes, in hardened structures, in community buildings, in swimming pools, and in cleared or ignition resistant landscape open air areas. The preference will always be early evacuation following the "Ready, Set, Go!" model, but there exists the potential for unforeseen civilian evacuation issues, and having a contingency plan will provide direction in these situations that may result in saved lives.

Potential problems during wildfire evacuation from Lilac Hills Ranch include:

- Fires that prevent safe passage along planned evacuation routes
- Inadequate time to safely evacuate
- Fire evacuations during rush hour traffic or when large events are occurring
- Blocked traffic due to accidents or fallen tree(s) or power pole(s)
- The need to move individuals who are unable to evacuate

Law enforcement agencies responsible for evacuations are prepared for these and other potential issues and utilize in the field decision making supported by situation awareness provided by the Incident Command. It is recommended that local law enforcement and fire agencies conduct concerted pre-planning efforts focusing on evacuation contingency planning for civilian populations when it is considered safer to temporary seek a safer refuge than evacuation.

6.3.1 Safety Zones

The International Fire Service Training Association (IFTSA; Fundamentals of Wildland Fire Fighting, 3rd Edition) defines Safety Zones as areas mostly devoid of fuel, which are large enough to assure that flames and/or dangerous levels of radiant heat will not reach the personnel occupying them. Areas of bare ground, burned over areas, paved areas, and bodies of water can all be used as safety zones. The size of the area needed for a safety zone is determined by fuel types, its location on slopes and its relation to topographic features (chutes and saddles) as well as observed fire behavior. Safety zones should never be located in topographic saddles, chutes or gullies. High winds, steep slopes or heavy fuel loads may increase the area needed for a Safety Zone.

The National Wildland Fire Coordinating Groups (NWFCG), Glossary of Wildland Fire Terminology provides the following definitions for Safety Zone and Escape routes:

> Safety Zone. An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuelbreaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity.

According to NWFCG, Safety Zone(s):

- Must be survivable without a fire shelter
- Can include moving back into a clean burn
- May take advantage of natural features (rock areas, water, meadows)
- Can include Constructed sites (clear-cuts, roads, helispots)
- Are scouted for size and hazards
- Consider the topographic location (larger if upslope)
- Should be larger if downwind
- Should not include heavy fuels
- May need to be adjusted based on site specific fire behavior

The definition for a safety zone includes provisions for separation distance between the firefighter and the flames of at least four times the maximum continuous flame height. Distance separation is the radius from the center of the safety zone to the nearest fuels. For example, considering worst case modeled flame lengths of 45 feet in specific fuel types that may be possible adjacent this site (Firewise 2000, Inc. 2014), then a 180 foot separation would be required, and potentially more if there were site-specific features that would result in more aggressive fire behavior. In order to provide 180 feet in all directions, a minimum of approximately three acres is considered necessary for a safety zone to be considered appropriate for one 3 person engine crew during an extreme weather fire.

If one considers the ignition resistant and maintained landscaping within each of the Lilac Hills Ranch neighborhoods, along with the perimeter fuel modification zone, limited occurrence of higher intensity burning fuels, prominence of agricultural landscapes adjacent the project and Chapter 7A of California Building Code compliant structures, each neighborhood's interior roads would potentially provide Safety Zones to responding firefighters. The neighborhoods as Safety Zones can be part of DSFPD's and County's pre-planning efforts, although during the fire, the identified safety zones may not be feasible due to distance, location, fire behavior, etc.

Identification of potential safety zones will require additional focused study by DSFPD and other fire and law enforcement agencies.

6.3.2 Temporary Firefighter Refuge Areas

Firescope California (Firefighting Resources of Southern California Organized for Potential Emergencies) was formed by legislative action to form a partnership between all facets of local, rural, and metropolitan fire departments, CAL FIRE and federal fire agencies. Firescope defines a contingency plan when it is not possible to retreat to a safety zone. This contingency includes establishment of firefighter TRA(s), which are defined as:

> A preplanned area where firefighters can immediately take refuge for temporary shelter and short-term relief without using a fire shelter in the event that emergency egress to an established Safety Zone is compromised.

Examples of a TRA may include the lee side of a structure, inside of a structure, large lawn or parking areas, or cab of fire engine, amongst others. Differences between a TRA and a Safety Zone is that TRA's are closer to the immediate firefighting area, are considered a contingency to being able to get to a Safety Zone, do not include a requirement for a large area set back four times the flame lengths of adjacent fuels, and cannot be feasibly pre-planned until firefighters arrive on scene and size up the situation.

Firescope appropriately notes that although Safety Zones and viable Escape Routes shall always be identified in the WUI environment, they may not be immediately available should the fire behavior increase unexpectedly. Often a TRA is more accessible in the WUI environment. A TRA will provide temporary shelter and short-term relief from an approaching fire without the use of a fire shelter and allow the responders to develop an alternate plan to safely survive the increase in fire behavior.

TRAs are pre-planned areas (planned shortly after firefighters arrive on scene) where firefighters may take refuge and temporary shelter for short-term thermal relief, without using a fire shelter in the event that escape routes to an established safety zone are compromised. The major difference between a TRA and a safety zone is that a TRA requires another planned tactical action, i.e., TRAs cannot be considered the final action, but must include self-defense and a move out of the area when the fire threat subsides. A TRA should be available and identified on site at a defended structure. TRAs are NOT a substitute for a Safety Zone. TRA pre-planning is difficult, at best because they are very site and fire behavior specific. For the Lilac Hills Ranch Community, TRAs would likely include navigating into any of the neighborhoods where 100 foot wide fuel modification zones provide defensible space and maintained landscapes are provided, along with ignition resistant residences and wide roads that offer numerous opportunities for TRA.

The entire Lilac Hills Ranch community, but especially the interior areas of neighborhoods, are considered TRAs. This is an important concept because it offers last-resort, temporary refuge of firefighters, and as an alternative to a late evacuation, residents. This approach would be consistent with Firescope California (2013) which indicates that firefighters must determine if a safe evacuation is appropriate and if not, to identify safe refuge for those who cannot be evacuated, including civilians.

Each of the site's residences that can be considered for TRA include the following features:

- Ignition Resistant Construction
- 100 foot wide Fuel Modification Zone around perimeter of project
- Adjacent low fuel agricultural areas on large portion of perimeter
- Site-wide vegetation maintenance
- Code-consistent roadways with fire hydrants
- Maintained landscapes and roadside fuel modification
- Ember resistant vents
- Interior fire sprinklers

Because there are potential scenarios where evacuation of the project may be less safe than directed temporary on-site refuge, such as during a fast-moving, wind driven fire that ignites close to the Project, including temporary refuge within residences, at the Town Center, or elsewhere on site is considered a contingency plan for Lilac Hills Ranch. This concept is considered a component of the "Ready, Set, Go!" model as it provides a broader level of "readiness" should the ability to execute an early evacuation be negated by fire, road congestion, or other unforeseen issues. This approach would be considered a last-resort contingency during wildfire with the primary focus being on early evacuation. The decision for evacuation or temporarily refuging on site will be made by responding law enforcement and/or fire personnel.

6.4 Social Aspects of Wildfire Evacuation

Orderly movement of people is the result of planning, training, education, and awareness, all of which are promoted in San Diego County and DSFPD. Evacuation has been the standard term used for emergency movement of people and implies imminent or threatening danger. The term in this Wildland Fire Evacuation Plan, and under the "Ready, Set, Go!" concept, indicates that there is a perceived threat to persons and movement out of the area is necessary, but will occur according to a pre-planned and practiced protocol, reducing the potential for panic.

Citizen reactions may vary during an evacuation event, although several studies indicate that orderly movement during wildfire and other emergencies is not typically unmanageable. Evacuation can be made even less problematic through diligent public education and emergency personnel training and familiarity. Social science research literature indicates that reactions to warnings follow certain behavior patterns that are defined by people's perceptions (Aguirre 1994, Drabek 1991, Fitzpatrick and Mileti 1994, Gordon 2006, Collins 2004) and are not unpredictable. In summary, warnings received from credible sources by people who are aware (or have been made aware) of the potential risk, have the effect of an orderly decision process that typically results in successful evacuation. This success is heightened when evacuations are not foreign to residents (Quarantelli and Dynes 1977; Lindell and Perry 2004) as will occur within the Lilac Hills Ranch project. Further, in all but the rarest circumstances, evacuees will be receiving information from credible sources during an evacuation. Further, it would be anticipated that law enforcement and/or fire personnel would be on site to help direct traffic and would be viewed by evacuees as knowledgeable and credible. The importance of training these personnel cannot be understated and annual education and training regarding fire safety and evacuation events will be essential for successful future evacuations.

6.4.1 Evacuation of Special Populations

Vogt (1990 and 1991) defines special populations as those groups of people who, because of their special situations or needs, require different planning strategies from those of the general population. Special needs populations include those in institutions or special facilities, those with disabilities in homes, those who need care, children, and others who cannot provide for their own evacuation if necessitated. The special needs population is concentrated in facilities, but is also widespread in terms of facility locations and those who live in residences. Special needs populations in Lilac Hills Ranch include the hearing or visually impaired, foreign speaking, visitors passing through the area, temporary visitors such as day workers, and the non-ambulatory confined to residences either temporarily or permanently.

Tourists and temporary visitors may not have knowledge of the area's fire hazard, they may not know how to react in a fire emergency, and they may not understand what they are being told to do. Conversely, this segment of the population would typically be easier to evacuate quickly as they have no possession or pets that they would need to prepare. They can get in their cars and be directed out of the area.

The reasons why special needs populations may fail to respond to warnings to take protective actions is that they may require special transportation while others require different types of warnings or technologies to receive a warning. Some groups must rely on care-givers to hear the warning and respond.

Lilac Hills Ranch Approach

The Lilac Hills Ranch community will provide information to residents regarding notifying County OES and Health and Human Services of special needs residents so that accommodations for their notification (Accessible AlertSanDiego, CERT programs, or other), transportation or other special requirements can be provided during an emergency evacuation.

6.4.2 Animal Evacuations

Animal evacuations present a host of challenges that may affect the overall successful movement of people and their possessions out of harm's way. For example, livestock owners do not always have the means to load and trailer their livestock out of the area. Further, most wildfire evacuation relief shelters or commercial lodging facilities do not allow people to bring in pets or other animals. Sorensen and Vogt (2006) indicate that an issue receiving increasing attention is what evacuees do with pets or other animals such as livestock when they leave their homes and whether having pets or animals impacts their decision to evacuate.

The Lilac Hills Ranch Project will not accommodate livestock of any type on site, however the trails and trail access points could conceivably include horses during an evacuation notice. Household pets will be a common occurrence.

Lilac Hills Ranch Approach

- Develop a strong outreach program for pet owners so they understand their responsibilities and that they will not likely be allowed re-entry once evacuated.
- Develop a registration for owners of animals who cannot evacuate them without assistance so that volunteer organizations or individuals, can provide resources.

6.4.3 Re-Entry Procedures

An important component of evacuations is the citizen re-entry process. Guidance and procedures to ensure a coordinated, safe, and orderly re-entry into impacted communities following an incident is provided in the County of San Diego Re-Entry Protocol.

Re-entry will be initiated by the Incident Commander/Unified Command of the Incident Management Team, with the support of the Director of Emergency Services, the OA EOC Director, and the Operations Section Chief at the OA EOC. In most cases the OA EOC will remain activated until full re-entry is complete. In the event that the OA EOC has been deactivated, the Incident Commander or the Liaison Officer of the Incident Management Team will initiate re-entry procedures.

The Incident Commander will designate a Re-Entry Coordinator and the Operations Section Chief of the OA EOC will coordinate with and support the re-entry coordinator. The Re-Entry Coordinator is responsible for coordinating the re-entry procedures with all involved agencies and ensuring effective communication. Priorities for re-entry include:

The impacted areas must be thoroughly investigated to ensure it is safe for residents to return and normal operations have been restored. This assessment will include verification that:

The public will be notified of the re-entry status through the notification measures previously mentioned in this annex, including SDCountyEmergency.com, SDEmergency App for smart phones, emergency broadcast radio, television, press releases, informational phone lines such as 2-1-1, community briefings, and informational updates at shelters.

Once evacuees are permitted to return, it is important that procedures are established to properly identify residents and critical support personnel, as well as ensure the legitimacy of contractors, insurance adjustors, and other personnel. Re-entry points should be staffed by law enforcement personnel.

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7 LIMITATIONS

This Wildland Fire Evacuation Plan has been developed based on wildfire and evacuation standards and the San Diego County Evacuation Annex (San Diego County 2014) and is specifically intended as a guide for evacuations for the Lilac Hills Ranch Community. This plan provides basic evacuation information that will familiarize Lilac Hills Ranch residents with the evacuation route options that may be available to them during an emergency. However, because emergencies requiring evacuation have many variables and must be evaluated on a case by case basis, this plan shall be subservient to real-time law enforcement and fire personnel/ agencies' decision making and direction during an emergency requiring evacuation.

This Evacuation Plan tiers off of the DSFPD/DSFSC's Evacuation Plan Map and promotes the "Ready, Set, Go!" model, adopted by County OES, CAL FIRE, and many fire agencies statewide, including DSFPD. The goal is to raise agency and citizen awareness of potential evacuation issues and get a majority of the public "Ready" by taking a proactive stance on preparedness, training drills, and visitor education, and evacuation planning efforts. The Lilac Hills Ranch populace will be "Set" by closely monitoring the situation whenever fire weather occurs and/or when wildland fire occurs, and elevating pre-planned protocol activities and situation awareness. Lastly, officials will implement the plan and mandate that populations "Go" by executing pre-planned evacuation procedures in a conservative manner, i.e., evacuation will occur based on conservative decision points, as proposed in this evacuation plan or when directed by fire and law enforcement personnel, whichever is more conservative. The preferred alternative will always be early evacuation. However, there may be instances when evacuation is not possible, is not considered safe, or is not an option based on changing conditions. For example, should a fire occur and make evacuation from the project ill advised, a contingency plan for residents will be available. This contingency would include moving people to pre-designated temporary refuge areas until it is safe to evacuate or the threat has been mitigated.

Ultimately, it is the intent of this Evacuation Plan to guide the implementation of evacuation procedure recommendations such that the process of evacuating people from the Lilac Hills Ranch Project is facilitated in an efficient manner and according to a pre-defined, evacuation protocol as well as providing a contingency option of temporarily refuging, if evacuation is considered less safe. The Lilac Hills Ranch residents will be aware of this evacuation plan as the HOA will post it on its Website and provide reminders to residents on at least an annual basis. This educational outreach will result in a populace that understands the potential for evacuations and the routes and options that may be presented to them.

During extreme fire weather conditions, there are no guarantees that a given structure will not burn or that evacuations will be successful all of the time. Wildfires may occur in the area that could damage property or harm persons. However, successful implementation of the recommendations outlined in this Evacuation Plan will provide for an informed populace regarding evacuations. The Lilac Hills Ranch community is designed specifically to be resistant to wildfire ignition and perform as a fire adapted project, offering fire and law officials additional options for resident safety than are available from less defensible communities.

This Wildland Fire Evacuation Plan does not provide a guarantee that all persons will be safe at all times because of the recommendations proposed. There are many variables that may influence overall safety. This Plan provides a summary for implementation of standard evacuation protocols, suggested roadway enhancements, and public outreach, which should result in reduced wildfire related risk and hazard. Even then, fire can compromise the procedures through various, unpredictable ways. The goal is to reduce the likelihood that the system is compromised through implementation of the elements of this Plan and regular occurring program maintenance and updates.

It is recommended that the evacuation process is carried out with a conservative approach to fire safety. This approach must include maintaining the Lilac Hills Ranch fuel modification landscape, infrastructural, and ignition resistant construction components according to the appropriate standards and embracing a “Ready, Set, Go!” stance on evacuation. Accordingly, evacuation of the wildfire areas should occur according to pre-established evacuation decision points, or as soon as they receive notice to evacuate, which may vary depending on many environmental and other factors. Fire is a dynamic and somewhat unpredictable occurrence and it is important for anyone living at the wildland-urban interface to educate themselves on practices that will improve safety.

8 REFERENCES

Aguirre, D.B. 1994. *Planning warning evacuation, and search and rescue: A review of the social science research literature*. College Station, Texas: Texas A&M University, Hazard Reduction Recovery Center.

Collins, S.L. 2004. Evaluation of Evacuation Planning in Wildland-Urban Interface Environments: Executive Analysis of Fire Service Operations in Emergency Management. Applied Research project submitted to the National Fire Academy as part of the Executive Fire Officer Program. 44 pp.

Cova, T.J., P.E. Dennison, and F.A. Drews. 2011. "Modeling evacuate versus shelter-in-place decisions in wildfires." *Sustainability*, 3(10): 1662-1687. Published, 09/30/2011. http://www.mdpi.com/2071-1050/3/10/1662/.

Drabek, T.E. 1991. "Anticipating organizational evacuations: disaster planning by managers of tourist-oriented private firms." *International Journal of Mass Emergencies and Disasters*. 9(2), 219-245.

Finney, M.A. 1998. FARSITE: Fire Area Simulator—model development and evaluation. Res. Pap. RMRS-RP-4, Ogden, Utah: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 47 p.

Fitzpatrick, C. and D.S. Mileti. 1994. "Public Risk Communication." In Dynes, R. R. and K.J. Tierney (Eds) 1994. *Disasters, Collective Behavior, and Social Organization*. Newark University of Delaware Press. 71-98.

Gordon, R. 2006. "Acute Responses to Emergencies: findings and observations of 20 years in the field." *The Australian Journal of Emergency Management*, Vol. 21, No. 1, February 2006. 23 pp.

Firescope 2013. International Fire Chiefs Association. "Ready, Set, Go!" website link: http://wildlandfirersg.org/.

Lindell, M.K. and R.W. Perry. 2004. *Communicating Environmental Risk in Multiethnic Communities*. Thousand Oaks, California: Sage Publications.

Quarantelli, E.L. and R.R. Dynes. 1977. "Response to social crisis and disasters." *Annual Review of Sociology*. 3, 23-49.

San Diego County. 2014. "Annex Q Evacuation." *Unified San Diego County Emergency Services Organization and County of San Diego Operational Area Emergency Operations Plan*. 84 pp.

Sorensen, J. and B.Vogt. 2006. *Interactive Emergency Evacuation Guidebook*. Prepared for the Protective Action IPT – Chemical Stockpile Emergency Preparedness Program.

Vogt, B. 1990. *Evacuation of Institutionalized And Specialized Populations, ORNL/SUB-7685/1 & T23*. Oak Ridge, Tennessee: Oak Ridge National Laboratory.

Vogt, B. 1991. "Issues in nursing home evacuations." Int*ernational Journal of Mass Emergencies and Disasters*. 9, 247-265.

Wolshon B. and E. Marchive. 2007. "Planning in the Urban Wildland Interface; Moving Residential Subdivision Traffic During Wildfires." *ASCE J. Urban Plann. Dev. – Special Emergency Transportation Issue*. 133(1) 73-81.

APPENDIX A

"Ready, Set, Go!" Individual Action Plan

READY, SET, GO!

YOUR PERSONAL WILDLAND FIRE ACTION GUIDE

READY, SET, GO!

Wildland Fire Action Guide

Saving Lives and Property through Advance Planning

Fire is a constant threat in San Diego County, and drought, high temperatures in the summer and fall, combined with seasonal Santa Ana winds can lead to explosive fire growth.

In San Diego County, first responders are busy year-round fighting fires. When large fires threaten our community, local, state, federal, tribal, military and other agencies work together to save lives, protect property, and help those impacted by the disaster.

First responders can't do it alone though. Residents, especially those in the Wildland Urban Interface, play a critical role in being prepared for wildfires before, during, and after the next one strikes.

This guide has been modeled off of the Ready, Set, Go! program that is used locally, throughout California, and across the nation. This version is customized for San Diego County, with important local tips and information.

Use this guide to get "Ready" by making your home hardened against wildfire by using defensible space and smart fire resistant building and design choices. Create and practice a family disaster plan that includes storing essentials like food and water supplies, knowing how you'll meet up or communicate with each other, where you can safely evacuate to, and other important information.

Visit ReadySanDiego.org to register with AlertSanDiego to receive emergency alerts via email, text, cell and landline phones, and download the SD Emergency App to get the latest emergency updates delivered to your Android/iOS devices.

Be "Set" and prepared to leave when in danger by monitoring local media, viewing disaster updates on SDCountyEmergency.com, talking with 2-1-1 San Diego, and taking important steps to harden your home even further when you decide to evacuate.

Finally, be able to "Go" and go early, both to keep you and your family safe, and to make it easier for first responders to get into your community.

This guide is a great place to start as you take action to protect your family home, and community.

Tony Mecham, County Fire Chief

INSIDE

Photos courtesy of CAL FIRE, FEMA and ©Kevin Pack/K.E. Photography

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Living in the Wildland Urban Interface and the Ember Zone

Ready, Set, Go! begins with a house that firefighters can defend

Defensible Space Works!

If you live next to a naturally vegetated area, often called the Wildland Urban Interface, provide firefighters with 100 feet of defensible space to protect your home. The buffer zone you create by removing weeds, brush and thinning vegetation helps keep the fire away from your home and reduces the risk from flying embers. Firewise Communities and your local fire department's brush management guidelines provide valuable guidance on property enhancements.

A home within one mile of a natural area is in the Ember Zone. Wind-driven embers can attack your home. You and your home must be prepared well before a fire occurs. Ember fires can destroy homes or neighborhoods far from the actual flame front of the wildland fire.

What is Defensible Space?

Defensible space is the required space between a structure and the wildland area that, under normal conditions, creates a sufficient buffer to slow or halt the spread of wildland fire to a structure. It protects the home from igniting due to direct flame or radiant heat. Defensible space is essential for structure survivability during wildland fire conditions. For more information about defensible space zones and preparedness techniques within each, visit ReadySanDiego.org/wildland-fire

ZONE ONE

Zone One extends 50 feet from your home.

- Must be permanently irrigated to maintain green and healthy plants.
- Is primarily low-growing plant material, with the exception of trees. Plants shall be low-fuel and fire-resistive.
- Trim tree canopies regularly to remove dead wood and keep branches a minimum of 10 feet from structures, chimney outlets and other trees.
- Remove leaf litter (dry leaves/pine needles) from yard, roof and rain gutters.
- Relocate woodpiles and other combustible materials into Zone Two.
- Remove combustible material and vegetation from around and under decks.
- Remove or prune vegetation near windows.
- Remove "ladder fuels" (low-level vegetation that would allow the fire to spread from the ground to the tree canopy). Create a separation between low-level vegetation and tree branches by reducing the height of the vegetation and/or trimming low branches.

ZONE TWO

Zone Two extends 50 to 100 feet from your home.

- Minimize the chance of fire jumping from plant to plant by removing dead material and removing or thinning vegetation seasonally. The minimum spacing between vegetation is three times the dimension of the plant.
- There should be no permanent irrigation in Zone Two.
- Remove "ladder fuels."
- Cut or mow annual grass down to a maximum height of 4 inches.
- Trim tree canopies regularly to keep branches a minimum of 10 feet from other trees.

What is a Hardened Home?

Construction materials and the quality of the defensible space surrounding a home are what gives it the best chance to survive a wildland fire. Embers from a wildland fire can find the weak link in your home's fire protection scheme and gain the upper hand because of a small, overlooked or seemingly inconsequential factor. However, there are measures you can take to safeguard your home from wildland fire. While you may not be able to accomplish all the measures listed below, each will increase your home's, and possibly your family's, safety and survival during a wildland fire.

ROOFS

Roofs are the most vulnerable surface where embers land because they can lodge and start a fire. Roof valleys, open ends of barrel tiles and rain gutters are all points of entry.

EAVES

Embers can gather under open eaves and ignite exposed wood or other combustible material.

VENTS

Embers can enter the attic or other concealed spaces through vents and ignite combustible materials. Vents in eaves and cornices are particularly vulnerable, as are any unscreened vents.

WALLS

Combustible siding or other combustible or overlapping materials provide surfaces or crevices for embers to nestle and ignite.

WINDOWS and DOORS

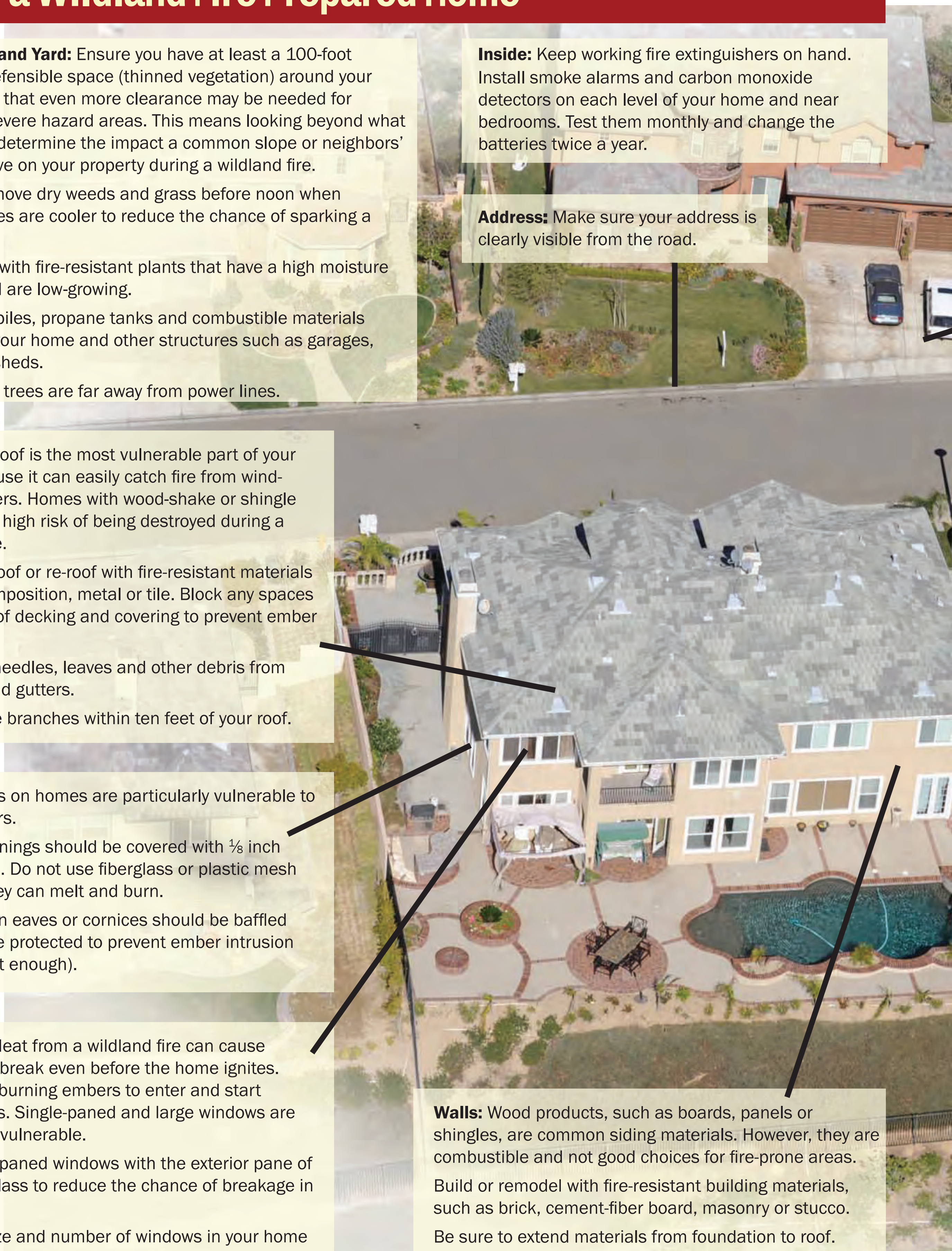
Embers can enter through open windows and gaps in doors, including garage doors. Plants or combustible storage near windows can ignite from embers and generate heat that can break windows and/or melt combustible frames.

BALCONIES and DECKS

Embers can collect in or on combustible surfaces or the undersides of decks and balconies, ignite the material and enter the home through walls or windows.

To harden your home further, consider protecting your home with a residential fire sprinkler system. In addition to extinguishing a fire started by an ember that enters your home, it also protects you and your family year-round from any fire that may start in your home.

Tour a Wildland Fire Prepared Home



Home Site and Yard: Ensure you have at least a 100-foot radius of defensible space (thinned vegetation) around your home. Note that even more clearance may be needed for homes in severe hazard areas. This means looking beyond what you own to determine the impact a common slope or neighbors' yard will have on your property during a wildland fire.

Cut and remove dry weeds and grass before noon when temperatures are cooler to reduce the chance of sparking a fire.

Landscape with fire-resistant plants that have a high moisture content and are low-growing.

Keep woodpiles, propane tanks and combustible materials away from your home and other structures such as garages, barns and sheds.

Ensure that trees are far away from power lines.

Inside: Keep working fire extinguishers on hand. Install smoke alarms and carbon monoxide detectors on each level of your home and near bedrooms. Test them monthly and change the batteries twice a year.

Address: Make sure your address is clearly visible from the road.

Roof: Your roof is the most vulnerable part of your home because it can easily catch fire from wind-blown embers. Homes with wood-shake or shingle roofs are at high risk of being destroyed during a wildland fire.

Build your roof or re-roof with fire-resistant materials such as composition, metal or tile. Block any spaces between roof decking and covering to prevent ember intrusion.

Clear pine needles, leaves and other debris from your roof and gutters.

Cut any tree branches within ten feet of your roof.

Vents: Vents on homes are particularly vulnerable to flying embers.

All vent openings should be covered with ⅛ inch metal mesh. Do not use fiberglass or plastic mesh because they can melt and burn.

Attic vents in eaves or cornices should be baffled or otherwise protected to prevent ember intrusion (mesh is not enough).

Windows: Heat from a wildland fire can cause windows to break even before the home ignites. This allows burning embers to enter and start internal fires. Single-paned and large windows are particularly vulnerable.

Install dual-paned windows with the exterior pane of tempered glass to reduce the chance of breakage in a fire.

Limit the size and number of windows in your home that face large areas of vegetation.

Walls: Wood products, such as boards, panels or shingles, are common siding materials. However, they are combustible and not good choices for fire-prone areas.

Build or remodel with fire-resistant building materials, such as brick, cement-fiber board, masonry or stucco.

Be sure to extend materials from foundation to roof.

Garage: Have a fire extinguisher and tools such as a shovel, rake, bucket and hoe available for fire emergencies.

Install a solid door with self-closing hinges between living areas and the garage. Install weather stripping around and under door to prevent ember intrusion.

Store all combustibles and flammable liquids away from ignition sources.

Driveways and Access Roads: Driveways should be designed to allow fire and emergency vehicles and equipment to reach your house.

Access roads should have a minimum 10-foot clearance on either side of the traveled section of the roadway and should allow for two-way traffic.

Ensure that all gates open inward and are wide enough to accommodate emergency equipment.

Trim trees and shrubs overhanging the road to a minimum of 13½ feet to allow emergency vehicles to pass.

Non-Combustible Fencing: Make sure to use non-combustible fencing to protect your home during a wildland fire.

Non-Combustible Boxed In Eaves: Box in eaves with non-combustible materials to prevent accumulation of embers.

Raingutters: Screen or enclose rain gutters to prevent accumulation of plant debris.

Water Supply: Have multiple garden hoses that are long enough to reach any area of your home and other structures on your property.

If you have a pool or well, consider a pump.

Chimney: Cover your chimney and stovepipe outlets with a non-flammable screen of ½ inch wire mesh or smaller to prevent embers from escaping and igniting a fire.

Make sure that your chimney is at least 10 feet away from any tree branches.

Decks and Balconies: Decks, balconies, and other floor projections and attachments must be of one – or a combination – of the following:

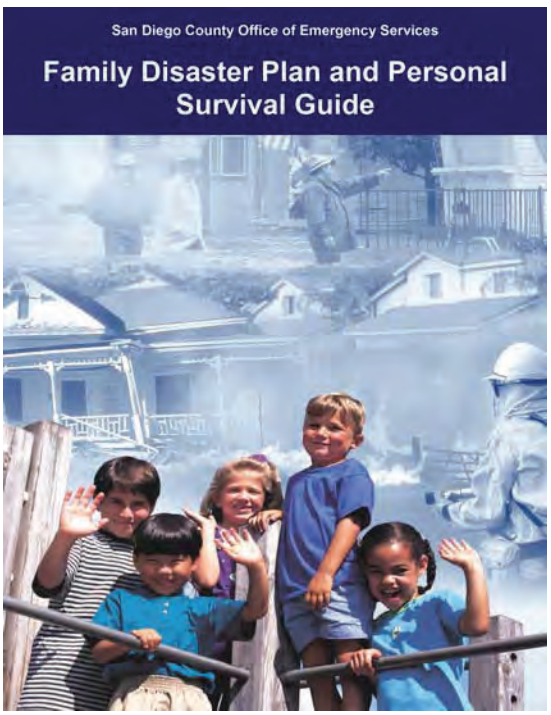
- non-combustible construction (e.g., concrete, metal)
- protected by one-hour fire-resistive material (e.g., stucco, cement-fiber board, ceramic tile, deck surface listed by approved evaluation service as one-hour-rated or Class A roof covering)
- approved fire-retardant treated materials (factory-applied fire retardant, pressure-treated lumber, listed for exterior use, installed per listing)
- heavy timber construction (minimum 4x8 joists, 4x10 or 6x8 beams, 3x ledgers, and 6x6 columns/posts)
- alternative decking materials per County Building Code 92.1.709A.1.4

READY, SET, GO!

Create Your Own Action Guide

Now that you've done everything you can to protect your house, its time to prepare your family. Your **Wildland Fire Action Guide** must be prepared well in advance of a fire. Include *all* members of your household. Use these checklists to help you gain a situational awareness of the threat and to prepare your Wildland Fire Action Guide. For more information on property and home preparedness before a fire threat, review the preparedness checklist on the Firewise Communities website, www.firewise.org

Ready – Preparing for the Fire Threat



For a more extensive survival guide, please visit: ReadySanDiego.org/make-a-plan

- ☐ Create an in-depth family disaster plan at ReadySanDiego.org
- ☐ Register to receive emergency notifications on phone, cell, text, and email for your area. Sign up at AlertSanDiego.org
- ☐ Have fire extinguishers on hand
- ☐ Ensure that your family knows the location of your utility shut-off controls
- ☐ Plan and practice several different evacuation routes
- ☐ Designate an emergency meeting location
- ☐ Assemble an emergency supply kit (water, food, medicine)
- ☐ Maintain a list of emergency contact numbers
- ☐ Have a portable radio

San Diego County

All the information in your hands when you need it! Get the SD Emergency App for Android and iOS!

2-1-1 SAN DIEGO DISASTERRESPONSE

Find out how to volunteer, and get the most up-to-date disaster information! Call 2-1-1

ReadySanDiego.org
Prepare. Plan. Stay Informed.

Visit ReadySanDiego.org for all your preparedness needs! Get a plan, get the app, get informed!

Set – Situational Awareness when a Fire Starts

- ☐ Alert family and neighbors
- ☐ Ensure that you have your emergency supply kit
- ☐ Stay tuned to media, visit: SDCountyEmergency.com
- ☐ Close all windows and doors, leaving them unlocked
- ☐ Remove flammable window shades and curtains
- ☐ Move furniture to the center of the room
- ☐ Turn off pilot lights and air conditioning
- ☐ Leave inside and outside lights on so firefighters can see your house through smoke
- ☐ Bring patio furniture, children's toys, etc. inside
- ☐ Turn off propane tanks and other gas at the meter
- ☐ Don't leave sprinklers on or water running
- ☐ Back your car into the driveway to facilitate a quick departure

- ☐ Cover attic and ground vents with pre-cut plywood or commercial covers
- ☐ Call 2-1-1 for all non-emergency inquiries or visit: 211SanDiego.org

IF YOU ARE TRAPPED: SURVIVAL TIPS

- ☐ Call 9-1-1
- ☐ Remain inside your home until the fire passes
- ☐ Shelter away from outside walls
- ☐ Bring garden hoses inside the house so embers don't destroy them
- ☐ Patrol inside your home for spot fires and extinguish any you find
- ☐ Wear long sleeves and long pants made of natural fibers such as cotton
- ☐ Stay hydrated
- ☐ Ensure you can exit the home if it catches fire (remember if it is hot inside the house, it is four to five times hotter outside)
- ☐ Fill sinks and tubs for an emergency water supply
- ☐ Place wet towels under doors to keep smoke and embers out
- ☐ After the fire has passed, check your home and roof. Extinguish any fires, sparks or embers
- ☐ Check inside the attic for hidden embers
- ☐ If there are fires that you cannot extinguish with a small amount of water or in a short period of time, call 9-1-1

Go – Leave Early

By leaving early, you give your family the best chance of surviving a wildland fire. You also help firefighters by keeping roads clear of congestion.

WHEN TO LEAVE

Do not wait to be advised to leave if there is a possible threat to your home or evacuation route. Leave early enough to avoid being caught in fire, smoke or road congestion. If you are advised to leave by local authorities, do not hesitate!

MEETING LOCATION

Travel to a predetermined location. It should be a low-risk area, such as a well-prepared neighbor or relative's house, a shelter or motel, etc.

HOW TO GET THERE

Know several travel routes out of your community in case one route is blocked by the fire or by emergency vehicles.

WHAT TO TAKE

Take your emergency supply kit containing your prepared family and pet's necessary items.

The County of San Diego Office of Emergency Services has a free, printable, All Hazards Family Disaster Plan and Survival Guide at: ReadySanDiego.org/make-a-plan

Here is a brief checklist to get your emergency supply kit started.

- ☐ Three-day supply of water (one gallon per person per day)
- ☐ Non-perishable food for all family members and pets (three-day supply)
- ☐ First aid kit
- ☐ Flashlight, battery-powered radio, and extra batteries
- ☐ An extra set of car keys, credit cards and cash or traveler's checks
- ☐ Sanitation supplies
- ☐ Extra eyeglasses or contact lenses
- ☐ Important family documents and contact numbers
- ☐ Map marked with evacuation routes
- ☐ Prescriptions or special medications
- ☐ Family photos, valuable and other irreplaceable items that are easy to carry
- ☐ Personal computers, hard drives, disks and flash drivers
- ☐ Chargers for electronic communication devices

Note: Keep a pair of old shoes and a flashlight handy in case of a sudden evacuation at night.

Why can't I immediately return home?

Although a fire has been contained or extinguished there are post-hazard concerns that must be addressed before re-entry into the impacted area(s) may be permitted. Priorities for re-entry include:

1. Safety
2. Security
3. Damage Assessment
4. Restoration of Services
5. Communication of Information

The impacted areas must be thoroughly investigated to ensure it is safe for residents to return and that services have been restored. You will be notified of the re-entry status through: *emergency broadcast radio, television, internet www.SDCountyEmergency.com, 2-1-1, community briefings, and informational updates at shelters.*

Returning Home

After a disaster, **DO NOT attempt to return to your home or cross any barriers or caution tape without permission from law enforcement officials**. When returning home, be cautious in your neighborhood and watch out for:

- Emergency personnel still operating in the area.
- Power lines lying on the ground.
- Small fires that may flare up without warning.
- Ash pits, which are holes filled with hot ash created by burned trees.
- Damaged buildings or debris (including glass, nails, etc.)
- Charred power poles and trees that may be unstable and fall.

Take the following precautions when attempting to enter your house:

POWER:

If a person or piece of equipment comes in contact with an electric line, or if a line is down or broken.

- ☐ **Call 9-1-1**.
- ☐ If you see an electrical fire, fight it with a dry $CO(2)$ extinguisher.
- ☐ If possible, shut off the power.
- ☐ **Don't touch the person or any equipment involved.** The line may still be energized and dangerous.
- ☐ Freeing someone from energized power lines or equipment should only be attempted by a qualified SDG&E employee or a trained rescuer such as a fire fighter.
- ☐ Always assume that power lines are energized.
- ☐ Do not smoke or attempt to light anything. Use a **flashlight instead**.

GAS:

- ☐ Check to see if your gas utility is working properly. If you smell gas, leave your home immediately, and call (24/7) SDG&E at 1-800-411-7343.
- ☐ **DO NOT** light a match, candle, or cigarette.
- ☐ **DO NOT** turn electrical devices on or off, including light switches.
- ☐ **DO NOT** start an engine or use any device, including a telephone, which could cause a spark.
- ☐ **DO NOT** attempt to control the leak or repair the damaged pipe or meter. Do not use or turn off any equipment that could cause a spark.

- ☐ Check for burning embers on roofs, gutters, porches, attic, crawlspace, and throughout your property for several days after a wildfire.
- ☐ Check for any structural damage before entering your home. If you are uncertain, have your home professionally inspected before returning.
- ☐ Do not smoke or attempt to light anything as there could be flammables or leaking gases. Use a flashlight instead.
- ☐ Open windows and doors to allow airflow, which will help dry out of any water damage areas.

San Diego Gas & Electric can be reached at 1-800-411-7343 or SDGE.com/customer-service/contact-us
For more information on damage assessment visit the County's Recovery page at SDCountyRecovery.com.

Fire Action Guide

Out of Area Contact: ______________________ **Phone #:** ______________________

Work: ______________ **School:**______________ **Other:** ______________

Evacuation Routes: ____

____

____

Meeting Location: ______________________ **Location of Supply Kit:** ______________________

Information: **SDCountyEmergency.com** **211SanDiego.org** **SD Emergency App**

You can create a more in-depth plan for free at: ReadySanDiego.org/make-a-plan

READY, SET, GO!

Safety Checklist

Tips To Improve Family and Property Survival During A Wildland Fire

Home	Yes	No
1. Does your home have a metal, composition, tile or other non-combustible roof with capped ends and covered fascia?	☐	☐
2. Are the rain gutters and roof free of leaves, needles and branches?	☐	☐
3. Are all vent openings screened with $^{1}/_{8}$ inch non-combustible, corrosion-resistant metal mesh?	☐	☐
4. Are approved spark arrestors on chimneys?	☐	☐
5. Does the house have non-combustible siding material?	☐	☐
6. Are the eaves “boxed in” and the decks enclosed?	☐	☐
7. Are the windows dual-paned or tempered glass?	☐	☐
8. Are decks, porches and similar areas made of non-combustible material and are they free of easily combustible material?	☐	☐
9. Is all firewood at least 30 feet from the house?	☐	☐

Defensible Space	Yes	No
1. Has dead vegetation been removed from the defensible space zones around your home? (Consider adding distance due to slope of property.)	☐	☐
2. Is the required separation between shrubs maintained?	☐	☐
3. Have ladder fuels been removed?	☐	☐
4. Is there a clean and green area extending at least 50 feet from the house?	☐	☐
5. Is there a non-combustible area within five feet of the house?	☐	☐
6. Is the required separation between trees and crowns maintained?	☐	☐

Emergency Access	Yes	No
1. Is the home address plainly legible and visible from the street?	☐	☐
2. Are trees and shrubs overhanging the street trimmed to $15\frac{1}{2}$ feet?	☐	☐
3. If your home has a long driveway, does it have a suitable turnaround area?	☐	☐

APPENDIX B

Family Disaster Checklists and Communications Plans

Additional Items to Consider Adding to an Emergency Supply Kit:

- ❑ **Prescription medications and glasses**
- ❑ **Infant formula and diapers**
- ❑ **Pet food and extra water for your pet**
- ❑ **Important family documents such as copies of insurance policies, identification and bank account records in a waterproof, portable container**
- ❑ **Cash or traveler's checks and change**
- ❑ **Emergency reference material such as a first aid book or information from www.ready.gov**
- ❑ **Sleeping bag or warm blanket for each person. Consider additional bedding if you live in a cold-weather climate.**
- ❑ **Complete change of clothing including a long sleeved shirt, long pants and sturdy shoes. Consider additional clothing if you live in a cold-weather climate.**
- ❑ **Household chlorine bleach and medicine dropper** – When diluted nine parts water to one part bleach, bleach can be used as a disinfectant. Or in an emergency, you can use it to treat water by using 16 drops of regular household liquid bleach per gallon of water. Do not use scented, color safe or bleaches with added cleaners.
- ❑ **Fire Extinguisher**
- ❑ **Matches in a waterproof container**
- ❑ **Feminine supplies and personal hygiene items**
- ❑ **Mess kits, paper cups, plates and plastic utensils, paper towels**
- ❑ **Paper and pencil**
- ❑ **Books, games, puzzles or other activities for children**

Ready

Prepare. Plan. Stay Informed.®

Emergency Supply List

FEMA

www.ready.gov

Recommended Items to Include in a Basic Emergency Supply Kit:

- Water, one gallon of water per person per day for at least three days, for drinking and sanitation
- Food, at least a three-day supply of non-perishable food
- Battery-powered or hand crank radio and a NOAA Weather Radio with tone alert and extra batteries for both
- Flashlight and extra batteries
- First aid kit
- Whistle to signal for help
- Dust mask, to help filter contaminated air and plastic sheeting and duct tape to shelter-in-place
- Moist towelettes, garbage bags and plastic ties for personal sanitation
- Wrench or pliers to turn off utilities
- Can opener for food (if kit contains canned food)
- Local maps

Through its *Ready* Campaign, the Federal Emergency Management Agency educates and empowers Americans to take some simple steps to prepare for and respond to potential emergencies, including natural disasters and terrorist attacks. *Ready* asks individuals to do three key things: get an emergency supply kit, make a family emergency plan, and be informed about the different types of emergencies that could occur and their appropriate responses.

All Americans should have some basic supplies on hand in order to survive for at least three days if an emergency occurs. Following is a listing of some basic items that every emergency supply kit should include. However, it is important that individuals review this list and consider where they live and the unique needs of their family in order to create an emergency supply kit that will meet these needs. Individuals should also consider having at least two emergency supply kits, one full kit at home and smaller portable kits in their workplace, vehicle or other places they spend time.

Ready.

FEMA

Federal Emergency Management Agency
Washington, DC 20472

BE SMART. TAKE PART. CREATE YOUR FAMILY EMERGENCY COMMUNICATION PLAN

Join with others to prepare for emergencies and participate in America's PrepareAthon! | ready.gov/prepare

Creating your *Family Emergency Communication Plan* starts with one simple question: "What if?"

"What if something happens and I'm not with my family?" "Will I be able to reach them?" "How will I know they are safe?" "How can I let them know I'm OK?" During a disaster, you will need to send and receive information from your family.

Communication networks, such as mobile phones and computers, could be unreliable during disasters, and electricity could be disrupted. Planning in advance will help ensure that all the members of your household—including children and people with disabilities and others with access and functional needs, as well as outside caregivers—know how to reach each other and where to meet up in an emergency. Planning starts with three easy steps:

1. COLLECT.

Create a paper copy of the contact information for your family and other important people/offices, such as medical facilities, doctors, schools, or service providers.

2. SHARE.

Make sure everyone carries a copy in his or her backpack, purse, or wallet. If you complete your *Family Emergency Communication Plan* online at ready.gov/make-a-plan, you can print it onto a wallet-sized card. You should also post a copy in a central location in your home, such as your refrigerator or family bulletin board.

3. PRACTICE.

Have regular household meetings to review and practice your plan.

TEXT IS BEST!

If you are using a mobile phone, a text message may get through when a phone call will not. This is because a text message requires far less bandwidth than a phone call. Text messages may also save and then send automatically as soon as capacity becomes available.

The following sections will guide you through the process to create and practice your *Family Emergency Communication Plan*.

COLLECT
INFORMATION

HOUSEHOLD INFORMATION

Write down phone numbers and email addresses for everyone in your household. Having this important information written down will help you reconnect with others in case you don't have your mobile device or computer with you or if the battery runs down. If you have a household member(s) who is Deaf or hard of hearing, or who has a speech disability and uses traditional or video relay service (VRS), include information on how to connect through relay services on a landline phone, mobile device, or computer.

SCHOOL, CHILDCARE, CAREGIVER, AND WORKPLACE EMERGENCY PLANS

Because a disaster can strike during school or work hours, you need to know their emergency response plans and how to stay informed. Discuss these plans with children, and let them know who could pick them up in an emergency. Make sure your household members with phones are signed up for alerts and warnings from their school, workplace, and/or local government. To find out more about how to sign up, see *Be Smart. Know Your Alerts and Warnings* at http://1.usa.gov/1BDloze. For children without mobile phones, make sure they know to follow instructions from a responsible adult, such as a teacher or principal.

OUT-OF-TOWN CONTACT

It is also important to identify someone outside of your community or State who can act as a central point of contact to help your household reconnect. In a disaster, it may be easier to make a long-distance phone call than to call across town because local phone lines can be jammed.

EMERGENCY MEETING PLACES

Decide on safe, familiar places where your family can go for protection or to reunite. Make sure these locations are accessible for household members with disabilities or access and functional needs. If you have pets or service animals, think about animal-friendly locations. Identify the following places:

- ☐ *Indoor*: If you live in an area where tornadoes, hurricanes, or other high-wind storms can happen, make sure everyone knows where to go for protection. This could be a small, interior, windowless room, such as a closet or bathroom, on the lowest level of a sturdy building, or a tornado safe room or storm shelter.
- ☐ *In your neighborhood*: This is a place in your neighborhood where your household members will meet if there is a fire or other emergency and you need to leave your home. The meeting place could be a big tree, a mailbox at the end of the driveway, or a neighbor's house.
- ☐ *Outside of your neighborhood*: This is a place where your family will meet if a disaster happens when you're not at home and you can't get back to your home. This could be a library, community center, house of worship, or family friend's home.

☐ *Outside of your town or city*: Having an out-of-town meeting place can help you reunite if a disaster happens and:

- You cannot get home or to your out-of-neighborhood meeting place; or
- Your family is not together and your community is instructed to evacuate the area.

This meeting place could be the home of a relative or family friend. Make sure everyone knows the address of the meeting place and discuss ways you would get there.

OTHER IMPORTANT NUMBERS AND INFORMATION

You should also write down phone numbers for emergency services, utilities, service providers, medical providers, veterinarians, insurance companies, and other services.

SHARE

MAKE SURE EVERYONE HAS THE INFORMATION

☐ Make copies of your *Family Emergency Communication Plan* for each member of the household to carry in his or her wallet, backpack, or purse. Post a copy in a central place at home. Regularly check to make sure your household members are carrying their plan with them.

☐ Enter household and emergency contact information into all household members' mobile phones or devices.

☐ Store at least one emergency contact under the name "In Case of Emergency" or "ICE" for all mobile phones and devices. This will help someone identify your emergency contact if needed. Inform your emergency contact of any medical issues or other requirements you may have.

☐ Create a group list on all mobile phones and devices of the people you would need to communicate with if there was an emergency or disaster.

☐ Make sure all household members and your out-of-town contact know how to text if they have a mobile phone or device, or know alternative ways to communicate if they are unable to text.

☐ Read *Be Smart. Know Your Alerts and Warnings* at http://1.usa.gov/1BDloze and sign up to receive emergency information.

NOW IT'S TIME TO PRACTICE!

Once you have completed your *Family Emergency Communication Plan*, made copies for all the members of your household, and discussed it, it's time to practice!

Here are some ideas for practicing your plan:

☐ Practice texting and calling. Have each person practice sending a text message or calling your out-of-town contact and sending a group text to your mobile phone group list.

☐ Discuss what information you should send by text. You will want to let others know you are safe and where you are. Short messages like "I'm OK. At library" are good.

- [ ] Talk about who will be the lead person to send out information about the designated meeting place for the household.
- [ ] Practice gathering all household members at your indoor and neighborhood emergency meeting places. Talk about how each person would get to the identified out-of-neighborhood and out-of-town meeting places. Discuss all modes of transportation, such as public transportation, rail, and para-transit for all family members, including people with disabilities and others with access and functional needs.
- [ ] Regularly have conversations with household members and friends about the plan, such as whom and how to text or call, and where to go.
- [ ] To show why it's important to keep phone numbers written down, challenge your household members to recite important phone numbers from memory—now ask them to think about doing this in the event of an emergency.
- [ ] Make sure everyone, including children, knows how and when to call 911 for help. You should only call 911 when there is a life-threatening emergency.
- [ ] Review, update, and practice your *Family Emergency Communication Plan* at least once a year, or whenever any of your information changes.

To help start the conversation or remind your family why you are taking steps to prepare and practice, you may want to watch the 4-minute video, *It Started Like Any Other Day*, about families who have experienced disaster, at www.youtube.com/watch?v=w_omgt3MEBs. Click on the closed captioning (CC) icon on the lower right to turn on the captioning.

After you practice, talk about how it went. What worked well? What can be improved? What information, if any, needs to be updated? If you make updates, remember to print new copies of the plan for everyone.

OTHER IMPORTANT TIPS FOR COMMUNICATING IN DISASTERS[1]

- [ ] Text is best when using a mobile phone, but if you make a phone call, keep it brief and convey only vital information to emergency personnel and/or family or household members. This will minimize network congestion, free up space on the network for emergency communications, and conserve battery power. Wait 10 seconds before redialing a number. If you redial too quickly, the data from the handset to the cell sites do not have enough time to clear before you've re-sent the same data. This contributes to a clogged network.
- [ ] Conserve your mobile phone battery by reducing the brightness of your screen, placing your phone in airplane mode, and closing apps you do not need. Limit watching videos and playing video games to help reduce network congestion.
- [ ] Keep charged batteries, a car phone charger, and a solar charger available for backup power for your mobile phone, teletypewriters (TTYs), amplified phones, and caption phones. If you charge your phone in your car, be sure the car is in a well-ventilated area (e.g., not in a closed garage) to avoid life-threatening carbon monoxide poisoning.

[1] Federal Communications Commission, Public Safety and Homeland Security Bureau. (n.d.) *Tips for communicating in an emergency.* Retrieved from http://transition.fcc.gov/pshs/emergency-information/tips.html

- [ ] If driving, do not text, read texts, or make a call without a hands-free device.
- [ ] Maintain a household landline and analog phone (with battery backup if it has a cordless receiver) that can be used when mobile phone service is unavailable. Those who are Deaf or hard of hearing, or who have speech disabilities and use devices and services that depend on digital technology (e.g., VRS, Internet Protocol [IP] Relay, or captioning) should have an analog phone (e.g., TTY, amplified phone, or caption phone) with battery backup in case Internet or mobile service is down.
- [ ] If you evacuate and have a call-forwarding feature on your home phone, forward your home phone number to your mobile phone number.
- [ ] Use the Internet to communicate by email, Twitter, Facebook, and other social media networks. These communication channels allow you to share information quickly with a widespread audience or to find out if loved ones are OK. The Internet can also be used for telephone calls through Voice over Internet Protocol. For those who are Deaf or hard of hearing, or who have speech disabilities, you can make calls through your IP Relay provider.
- [ ] If you do not have a mobile phone, keep a prepaid phone card to use if needed during or after a disaster.
- [ ] Use a pay phone if available. It may have less congestion because these phones don't rely on electricity or mobile networks. In some public places, you may be able to find a TTY that can be used by those who are Deaf or hard of hearing, or who have speech disabilities.

America's PrepareAthon! is a grassroots campaign for action to get more people prepared for emergencies. Make your actions count at ready.gov/prepare.

The reader recognizes that the Federal Government provides links and informational data on various disaster preparedness resources and events and does not endorse any non-Federal events, entities, organizations, services, or products.

FAMILY EMERGENCY COMMUNICATION PLAN

HOUSEHOLD INFORMATION

Home #: ....
Address:..

Name: .... Mobile #: ....
Other # or social media: ....
Email: ....
Important medical or other information: ....
....

Name: .... Mobile #: ....
Other # or social media: ....
Email: ....
Important medical or other information: ....
....

Name: .... Mobile #: ....
Other # or social media: ....
Email: ....
Important medical or other information: ....
....

Name: .... Mobile #: ....
Other # or social media: ....
Email: ....
Important medical or other information: ....
....

SCHOOL, CHILDCARE, CAREGIVER, AND WORKPLACE EMERGENCY PLANS

Name: ....
Address:..
Emergency/Hotline #: ....
Website: ....
Emergency Plan/Pick-Up: ....

SCHOOL, CHILDCARE, CAREGIVER, AND WORKPLACE EMERGENCY PLANS

Name: ....
Address:..
Emergency/Hotline #: ....
Website: ....
Emergency Plan/Pick-Up: ....

Name: ....
Address:..
Emergency/Hotline #: ....
Website: ....
Emergency Plan/Pick-Up: ....

Name: ....
Address:..
Emergency/Hotline #: ....
Website: ....
Emergency Plan/Pick-Up: ....

IN CASE OF EMERGENCY (ICE) CONTACT

Name: .... Mobile #: ....
Home #: ....Email: ....
Address: ....

OUT-OF-TOWN CONTACT

Name: .... Mobile #: ....
Home #: ....Email: ....
Address: ....

EMERGENCY MEETING PLACES

Indoor: ....
Instructions: ....
Neighborhood: ....
Instructions: ....

Out-of-Neighborhood: ....
Address:..
Instructions: ....

Out-of-Town: ....
Address:..
Instructions: ....

IMPORTANT NUMBERS OR INFORMATION

Police: .... Dial 911 or #: ....
Fire: .... Dial 911 or #: ....
Poison Control: ....#: ....
Doctor: ....#: ....
Doctor: ....#: ....
Pediatrician: ....#: ....
Dentist: ....#: ....
Hospital/Clinic: ....#: ....
Pharmacy: ....#: ....
Medical Insurance: ....#: ....
Policy #: ....
Medical Insurance: ....#: ....
Policy #: ....
Homeowner/Rental Insurance: ....
#: ....
Policy #: ....
Flood Insurance: ....#: ....
Policy #: ....
Veterinarian: ....#: ....
Kennel: ....#: ....
Electric Company: ....#: ....
Gas Company: ....#: ....
Water Company: ....#: ....
Alternate/Accessible Transportation: ....
#: ....
Other: ....#: ....
Other: ....#: ....
Other: ....#: ....

AMERICA'S PrepareAthon!℠
BE SMART. TAKE PART. PREPARE.

Ready

....
Write your family's name above

Family Emergency Communication Plan

FOLD HERE

HOUSEHOLD INFORMATION

Home #: ....

Address: ....

Name: .... Mobile #: ....

Other # or social media: .... Email: ....

Important medical or other information: ....

Name: .... Mobile #: ....

Other # or social media: .... Email: ....

Important medical or other information ....

FOLD HERE

Name: .... Mobile #: ....

Other # or social media: .... Email: ....

Important medical or other information: ....

Name: .... Mobile #: ....

Other # or social media: .... Email: ....

Important medical or other information: ....

FOLD HERE

SCHOOL, CHILDCARE , CAREGIVER, AND WORKPLACE EMERGENCY PLANS

Name: ....

Address: ....

Emergency/Hotline #: .... Website: ....

Emergency Plan/Pick-Up: ....

Name: ....

Address: ....

Emergency/Hotline #: .... Website: ....

Emergency Plan/Pick-Up: ....

FOLD HERE

Name: ....

Address: ....

Emergency/Hotline #: .... Website: ....

Emergency Plan/Pick-Up: ....

Name: ....

Address: ....

Emergency/Hotline #: .... Website: ....

Emergency Plan/Pick-Up: ....

IN CASE OF EMERGENCY (ICE) CONTACT

Name: .... Mobile #: ....

Home #: .... Email: ....

Address: ....

OUT-OF-TOWN CONTACT

Name: .... Mobile #: ....

Home #: .... Email: ....

Address: ....

EMERGENCY MEETING PLACES

Indoor: ....

Instructions: ....

....

Neighborhood: ....

Instructions: ....

....

Out-of-Neighborhood: ....

Address: ....

Instructions: ....

....

Out-of-Town: ....

Address: ....

Instructions: ....

....

IMPORTANT NUMBERS OR INFORMATION

Police: .... Dial 911 or #: ....

Fire: .... Dial 911 or #: ....

Poison Control: .... #: ....

Doctor: .... #: ....

Doctor: .... #: ....

Pediatrician: .... #: ....

Dentist: .... #: ....

Medical Insurance: .... #: ....

Policy #: ....

Medical Insurance: .... #: ....

Policy #: ....

Hospital/Clinic: .... #: ....

Pharmacy: .... #: ....

Homeowner/Rental Insurance: .... #: ....

Policy #: ....

Flood Insurance: .... #: ....

Policy #: ....

Veterinarian: .... #: ....

Kennel: .... #: ....

Electric Company: .... #: ....

Gas Company: .... #: ....

Water Company: .... #: ....

Alternate/Accessible Transportation: .... #: ....

Other: ....

Other: ....

American Red Cross

Family Disaster Plan

Family Last Name(s) or Household Address: **Date:**

____ ________________

Family Member/Household Contact Info (If needed, additional space is provided in #10 below):

Name	Home Phone	Cell Phone	Email:

Pet(s) Info:

Name:	Type:	Color:	Registration #:

Plan of Action

1. The disasters most likely to affect our household are:

____

____

____

2. What are the escape routes from our home?

____

____

3. If separated during an emergency, what is our meeting place near our home?

____

4. If we cannot return home or are asked to evacuate, what is our meeting place outside of our neighborhood?

____

What is our route to get there and an alternate route, if the first route is impassible?

____

____

5. In the event our household is separated or unable to communicate with each other, our emergency contact outside of our immediate area is:

Name	Home Phone	Cell Phone	Email:
____________	____________	____________	____________

After a disaster, let your friends and family know you are okay by registering at "Safe and Well" at https://safeandwell.communityos.org/cms// or by calling 1-800-733-2767. You can also give them a call, send a quick text or update your status on social networking sites.

6. If at school/daycare, our child(ren) will be evacuated to:

Child's Name:	Evacuation Site (address and contact info):
____________	______________________
____________	______________________
____________	______________________
____________	______________________

7. Our plan for people in our household with a disability or special need is:

Person's Name:	Plan:
____________	______________________
____________	______________________

8. During certain emergencies local authorities may direct us to "shelter in place" in our home. An accessible, safe room where we can go, seal windows, vents and doors and listen to emergency broadcasts for instructions, is:

____

9. Family Member Responsibilities in the Event of a Disaster

Task	Description	Family Member Responsible
Disaster Kit*	Stock the disaster kit and take it if evacuation is necessary. Include items you might want to take to an evacuation shelter. Remember to include medications and eye glasses.	
Be informed	Maintain access to NOAA or local radio, TV, email or text alerts for important and current information about disasters.	
Family Medical Information	Make sure the household medical information is taken with us if evacuation is necessary.	
Financial Information	Obtain copies of bank statements and cash in the event ATMs and credit cards do not work due to power outages. Bring copies of utility bills as proof of residence in applying for assistance.	
Pet Information	Evacuate our pet(s), keep a phone list of pet-friendly motels and animal shelters, and assemble and take the pet disaster kit.	
Sharing and Maintaining the Plan	Share the completed plan with those who need to know. Meet with household members every 6 months or as needs change to update household plan.	

**What supplies and records should go in your disaster kit? Visit www.redcross.org*

10. Other information, if not able to be included above.

Congratulations on completing your family disaster plan! Please tell others: "We've made a family disaster plan and you can, too, with help from the American Red Cross."

Get the facts about what you should do if an emergency or disaster occurs at www.redcross.org

American Red Cross

Family Disaster Plan

Family Last Name(s) or Household Address: **Date:**

______________________________________ ______________

Family Member/Household Contact Info (If needed, additional space is provided in #10 below):

Name	Home Phone	Cell Phone	Email:

Pet(s) Info:

Name:	Type:	Color:	Registration #:

Plan of Action

1. The disasters most likely to affect our household are:

____

____

____

2. What are the escape routes from our home?

____

____

3. If separated during an emergency, what is our meeting place near our home?

____

4. If we cannot return home or are asked to evacuate, what is our meeting place outside of our neighborhood?

____

What is our route to get there and an alternate route, if the first route is impassible?

____

____

5. In the event our household is separated or unable to communicate with each other, our emergency contact outside of our immediate area is:

Name	Home Phone	Cell Phone	Email:
____________	____________	____________	____________

After a disaster, let your friends and family know you are okay by registering at "Safe and Well" at https://safeandwell.communityos.org/cms// or by calling 1-800-733-2767. You can also give them a call, send a quick text or update your status on social networking sites.

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Child's Name:	Evacuation Site (address and contact info):
____________	______________________________
____________	______________________________
____________	______________________________
____________	______________________________

7. Our plan for people in our household with a disability or special need is:

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____________	______________________________
____________	______________________________

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____

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Be informed	Maintain access to NOAA or local radio, TV, email or text alerts for important and current information about disasters.	
Family Medical Information	Make sure the household medical information is taken with us if evacuation is necessary.	
Financial Information	Obtain copies of bank statements and cash in the event ATMs and credit cards do not work due to power outages. Bring copies of utility bills as proof of residence in applying for assistance.	
Pet Information	Evacuate our pet(s), keep a phone list of pet-friendly motels and animal shelters, and assemble and take the pet disaster kit.	
Sharing and Maintaining the Plan	Share the completed plan with those who need to know. Meet with household members every 6 months or as needs change to update household plan.	

**What supplies and records should go in your disaster kit? Visit www.redcross.org*

10. Other information, if not able to be included above.

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Get the facts about what you should do if an emergency or disaster occurs at www.redcross.org

APPENDIX C

Deer Springs Fire Protection District Community Evacuation Informational Handout

NON-PROFIT ORG
U.S. Postage
PAID
Permit No. 273
Escondido, CA
ECRWSS

POSTAL CUSTOMER
Escondido, CA 92026

EMERGENCY EVACUATION ROUTES

IMPORTANT: COMMUNITY EVACUATION INFORMATION ENCLOSED

Please Open Immediately

PLAN YOUR ESCAPE NOW!

WHEN YOU RECEIVE THIS HANDOUT YOU SHOULD:

- Highlight your evacuation route now and post this map in a conspicuous location, also put a copy in each of your vehicles;
- Make plans for anyone who may be in your home when you are not, ex., children, elderly, those with special needs, etc.;
- Prepare a checklist of important items to take with you, ex., irreplaceable documents, medications, photos, cell phone/charger, computer tower, etc;
- Once evacuated, road closures may prevent you from returning;
- Prearrange a meeting place outside your neighborhood with family members;
- Those with special needs should develop a Phone Tree network with friends/neighbors who can assist in an evacuation;
- Plan how you will transport your pets. Arrange for the evacuation of large animals and know shelter locations. Make sure all animals have appropriate identification.

DON'T WAIT TO BE TOLD TO EVACUATE!

Most people who are killed or injured in a fire waited too long to evacuate. If you are uncomfortable because of smoke, extreme weather conditions, etc., you should move to a safer location. The longer you wait the more congestion there will be on roadways. **IF IN DOUBT – GET OUT**.

HOW WILL YOU BE TOLD TO EVACUATE?

A Reverse 9-1-1 call from the Sheriff's Office will inform you of a mandatory evacuation. The Deer Springs Fire Safe Council (DSFSC) also maintains a Reverse 9-1-1 system. If you have registered for this free service, the DSFSC will provide you information to assist you in deciding what actions to take. This service will not order an evacuation, as that is the Sheriff's Office responsibility. Remember that if you lose power or your power is turned off, you may not receive an official evacuation call from the Sheriff's Office or a Reverse 911 information call from the DSFSC. Having a corded phone will better your chances of receiving a call in the event power is lost or turned off. See **DeerSpringsFireSafeCouncil.com** to register your phone numbers and to download additional copies of this flyer.

IF YOU FEEL YOU HAVE TIME BEFORE EVACUATION DO THE FOLLOWING:

- Place valuable documents, family mementos, medicines, glasses and other valuables in your vehicle;
- Secure pets in carriers so departure is not delayed;
- Place your car facing out with windows closed;
- Close garage doors but leave them unlocked and disconnect any automatic door openers;
- Shut off propane or natural gas valves and move all portable propane tanks away from your house;
- Close all interior doors to slow any fire;
- Wear long sleeve cotton or wool shirts and long pants, wear gloves, do not wear synthetic fabrics,
- Turn on all exterior lights;
- Move combustibles, yard furniture, cushions, etc., away from the house;
- Attach garden hoses to bibs and lay them out into the yard;
- Place a metal ladder against the side of house opposite the approaching fire;
- Close all windows and doors and close heavy draperies, but open light fabric window coverings;
- Apply fire blocking gel, if trained and if available.

IF YOU FEEL YOU ARE UNABLE TO EVACUATE, DO THE FOLLOWING:

If you are inside your home:

- Move furniture away from windows and sliding glass doors;
- Close all windows and doors and close heavy draperies, but open light fabric window coverings. Leave all exterior doors unlocked.
- Stay inside your house, away from outside walls and in rooms opposite the approaching fire;
- Keep your family together
- Place wet towels around gaps in doors to keep out smoke;
- Stay in your house until the fire passes – the fire will be loud, smoky, hot, but will most likely pass in about 10 to 20 minutes. The conditions will be much worse outside. If your house does catch on fire, you will usually have time to leave before substantial damage occurs.

If you are trapped in your vehicle while attempting to evacuate:

Park in an area clear of vegetation, turn off the ignition, close all windows and vents, cover yourself with a blanket or coat and lie on the floor. Tires may burst from the heat, but remain in your vehicle until the fire passes.

If you are trapped by fire while attempting to evacuate on foot:

Find a ditch or area along a road clear of vegetation; however, avoid canyons since they channel wildfire. Lie face down and cover exposed skin with a jacket or blanket.

Once the fire has passed:

- Account for the safety of every person.
- Check the exterior of your home, roof, and attic for embers.
- Keep doors and windows closed; continue to check your home and yard for burning embers for at least 12 hours.

LILAC HILLS RANCH WILDFIRE SAFETY COMPENDIUM

December 9, 2019

DRAFT

County Fire Authority
County Planning & Development Services

Document Objective

This compendium provides a systematic gathering of wildfire safety plans and measures for the proposed Lilac Hills Ranch (LHR) planned community situated in unincorporated San Diego County. The purpose of this document is to compile and summarize information from various project-related application documents to provide the reader with a comprehensive, single reference for wildfire and evacuation safety. The language herein does not supersede the language contained in the operative application documents, which are found in Volume II of this compendium.

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2. Gates Removal Analysis (EIR Appendix E-2)
3. Fire Protection Plan (EIR Appendix J)
4. Fire and Medical Services Global Response (EIR)
5. Fire and Medical Services Update Global Response (EIR)
6. Conceptual Wildland Fire Evacuation Plan (EIR Appendix K)
7. Updated Evacuation Plan Global Response (EIR)
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13. DSFPD's Project Facility Availability Form for LHR
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15. Road Modification Requests
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18. Evacuation Technical Memo
19. Fuel Modification Plan

List of Acronyms	
APN	*Assessor's Parcel Number*
ASTM	*American Society for Testing and Materials*
CALFIRE	*California Department of Forestry*
CBSC	*California Building Standards Code*
CCFC	*County Consolidated Fire Code*
CEQA	*California Environmental Quality Act*
CFD	*Community Facilities District*
CPA	*Community Planning Area*
CPF	*Community Purpose Facilities*
DG	*Decomposed Granite*
PDS	*Planning and Development Services*
DSFPD	*Deer Springs Fire Protection District*
DSFSC	*Deer Springs Fire Safe Council*
EIR	*Environmental Impact Report*
EPA	*Environmental Protection Agency*
FAHJ	*Fire Authority Having Jurisdiction*
FMZ	*Fuel Modification Zone*
FPP	*Fire Protection Plan*
FSC	*Fire Safe Council*
FSZ	*Fire Severity Zone*
GPA	*General Plan Amendment*
HMD	*Habitat Maintenance District*
HOA	*Homeowner's Association*
IFD	*Infrastructure Financing District*
LHR	*Lilac Hills Ranch*
LHRFSC	*Lilac Hills Ranch Fire Safe Council*
LMD	*Landscape Maintenance District*
NFPA	*National Fire Prevention Association*
OES	*Office of Emergency Services*
PFAF	*Project Facility Availability Form*
PFFP	*Public Facilities Finance Plan*
ROW	*Right-Of-Way*
RF	*Recycling Facility*
RL	*Rural Lands*
RMP	*Resource Management Plan*

RPO	*Resource Protection Ordinance*
SF	*Single Family*
SFM	*State Fire Marshal*
SP	*Specific Plan*
SRA	*State Responsibility Area*
VCCPA	*Valley Center Community Plan Area*
VCMWD	*Valley Center Municipal Water District*
WRF	*Water Reclamation Facility*

Glossary of Critical Terms	
Fire Authority Having Jurisdiction	The governmental agency responsible for providing local fire protection including medical and structure fire response. Local Responsibility Area (LRA) includes cities, districts, and counties. State Responsibility Area (SRA) refers to lands for which the State is responsible and Federal Responsibility Area (FRA) are lands that are Federal responsibility. On SRA and FRA lands, the agencies are primarily responsible for wildfire protection.
Access	Ingress and egress combined with adequate water supply are two of the most essential fire protection infrastructure components of any development. Multiple access points are also an essential safety component for any project within the wildland environment.
Code	A systematic statement of a body of law that is updated periodically by a legislative body in response to changing conditions. A Code is essentially a set of rules about how something must be done. In its widest sense, a Code is a body of *legal* rules expressed in fixed and authoritative written form.
Defensible Space	A well-known practice that removes dead, dying and other vegetation around structures, highways, roads, powerlines, and other critical infrastructure which creates distance between combustible materials, thereby limiting fire spread. It also provides first responders a safer environment while implementing fire suppression actions.
Fuel Modification	A component of defensible space that modifies vegetative fuel by removal, selective thinning or other methods to reduce fuel loading in given treatment area.
Fire Suppression	The coordinated actions taken by fire protection staff and equipment to abate a fire.
Fire Prevention	Measures and practices directed toward the prevention and suppression of destructive fires.
Fire Protection	Measures and practices for preventing or reducing injury and loss of life or property by fire. The collective components that allow an authority having jurisdiction to deliver fire protection services. From receipt of the 9-1-1 call to the termination of the incident. Most fire departments are rated by the Insurance industry that set rates based upon a criteria that looks at infrastructure in combination with an agencies ability to provide their level of service.
Ready-Set-Go	A national program aimed at raising the awareness and preparedness of those living and working in the wildland/urban interface environment. The program helps people to identify things they can do before, during, and after a wildfire.
Fire Safe Council	Fire Safe Councils exist throughout the state. The councils are made up primarily of volunteers, most are residents of the communities at risk. They are led by local, state, and federal agency members that help to identify and secure grants to conduct fuel reduction projects consistent with the grant guidelines.

Risk	A condition, activity or action that exposes people or property to danger. Wildfire risk is the chance that a wildfire will start in or reach a particular area for potential loss of life or property.
Mitigation	An action via the law or best practice that reasonably reduces a risk to an acceptable level.
Water Supply	One of the most critical resources for extinguishing a fire. Water supply is specifically addressed within the local codes to sizing, hydrant locations, and overall needs of the system based upon the risks to be protected.
Wildfire	An unabated fire that burns in open space, wildland and forested areas within a city, district, county, or upon state and federal lands. Many wildfires involve all levels of government as lands have multiple authorities having jurisdiction that protect an area.
Fire Authority Having Jurisdiction	The governmental agency responsible for providing local fire protection including medical and structure fire response. Local Responsibility Area (LRA) includes cities, districts, and counties. State Responsibility Area (SRA) refers to lands for which the State is responsible and Federal Responsibility Area (FRA) are lands that are Federal responsibility. On SRA and FRA lands, the governmental agencies are primarily responsible for wildfire protection.

Section 1: Executive Summary

Recent wildfires throughout California have resulted in a statewide re-evaluation of fire protection for projects within designated fire severity zones, including in San Diego County. The impacts of the proposed Lilac Hills Ranch project (LHR or Project) on wildfire safety were assessed by fire prevention officers and fire fighters, wildfire academic researchers, and fire protection planners, each with decades of experience. This compendium summarizes and centralizes all proposed wildfire safety measures that are designed to enhance the LHR community's fire safety, as well as the safety of the surrounding region.

With that introduction, reducing risks during wildland fire events requires a comprehensive and programmatic approach. A programmatic approach acknowledges that there is no "one solution" to mitigating risks, but instead embraces a multi-faceted approach to ensure that the Project has put into place appropriate precautions and measures that will also, provide a benefit to community residents. The systematic approach taken by LHR includes ensuring that there is:

1. A network of fire access roadways that provide connectivity and circulation in and around the community that will enhance successful evacuation of the region;

2. Ongoing fuel modification along ingress and egress roadways that is performed programmatically;

3. Adequate firefighting water supplies;

4. Fire-resistive construction features on all structures within the new development and resources that will also benefit existing community residents;

5. Strategically located and properly equipped/trained fire suppression resources; and,

6. An educated community that embraces a culture of fire safety.

Table 1 below summarizes the key fire and evacuation features of LHR, with reference to the section of this compendium where each feature is discussed as well as the primary application document that addresses the given feature.

Table 1:
Summary of LHR Fire Protection and Public Safety Features

No.	Key Feature	Compendium Section	Primary Application Document
1	Complies with the version of the California State Fire Code applicable at building permit application.	2.2.1	Fire Protection Plan
2	Complies with Title 14 (Fire Safe Regulations, SRA) of the California Code of Regulations.	2.2.2	Fire Protection Plan
3	Complies with the San Diego County Consolidated Fire Code.	2.3.1	Fire Protection Plan
4	Meets San Diego County General Plan, Safety Element Policy S-6.4 and Table S-1.	3.4.2	Fire Protection Plan
5	Improves water supply, capacity and flow, as the existing area does not offer these water resources. Install hydrants every 300 feet.	3.5	Fire Protection Plan
6	Roads designed to County public and private road standards.	4.2	Specific Plan
7	Cluster development design enhances the fire defense efforts of first responders.	3.1.1	Specific Plan
8	Provides funding for <u>fire station equipment and facilities</u> that is more than double what is statutorily required by County.	3.4.3	Specific Plan
9	Provides funding for <u>fire staffing</u> that is more than what is statutorily required by the County.	3.4.3	Specific Plan
10	Implements a community design that creates large ignition-resistant landscape/fuel break.	3.1	Specific Plan
11	Implements forty (40) improvements to local roads and intersections through direct improvement and payment of TIF.	4.3	Specific Plan
12	Eliminates eleven (11) existing dead-end road segments.	4.1	Specific Plan
13	Provides five (5) means of ingress and egress from the planned community, more than double the statutory requirement.	4.1	Specific Plan
14	Improves three (3) existing blind curves along primary evacuation routes (West Lilac Road & Circle R Drive).	Figure 5	Specific Plan
15	Constructs several key onsite and offsite road facilities (Main Street, Lilac Hills Ranch Road, Mountain Ridge Road and Nelson Way modernization improvements) prior to corresponding neighborhoods being built to ensure roads and circulation are built in advance of project demand.	4.1 & 4.2	Specific Plan
16	Operates a 24/7, around-the-clock gate guard within the community to assist with traffic management, circulation and evacuation.	4.4	Specific Plan

Table 1:
Summary of LHR Fire Protection and Public Safety Features

No.	Key Feature	Compendium Section	Primary Application Document
17	Designates "Areas of Safe Refuge" within the community that offer contingency for temporarily sheltering in place if full evacuation is considered unsafe.	3.3	Specific Plan
18	Provides $2 million in funding to Deer Springs Fire Protection District (DSFPD), for offsite fuel modification and offsite hardening of existing residences.	4.5	Specific Plan
19	Provides a 3rd contingency lane, along West Lilac Road, from Main Street to Hwy 395 (including roundabout) – enables two lanes for evacuation and one lane for inbound emergency response.	4.2	Specific Plan
20	Provides a 3rd contingency lane, along Circle R Drive, from Circle R Court to Old Hwy 395 – enables two lanes for evacuation and one lane for inbound emergency response.	4.2	Specific Plan
21	Within the Phase 1 development area, non-combustible heat-deflecting walls shall be constructed adjacent to internal native fuels (in addition to the 100-foot defensible space).	3.1.4	Specific Plan
22	Within the development areas for Phases 2 through 5, 150-foot fuel modification zones shall be implemented adjacent to native open space.	3.1.2	Specific Plan
23	Provides a Regional Weather Center Station (RAWS) with battery backup.	4.10	Specific Plan
24	Provides a hardened cell/communications tower with battery backup, which ensures functioning communications for several days should power be lost.	4.9	Specific Plan
25	Provides infrastructure to disseminate real-time conditions and messages to evacuees en-route, such as remotely changeable message signs.	4.6	Specific Plan
26	Undergrounds existing overhead powerlines (onsite and offsite) which removes a significant ignition source and evacuation vulnerability. Areas include: • Along the community's boundary; • Project's Boundary to the I-15 Bridge (offsite); • Covey Lane (Offsite); • Mountain Ridge Road (Offsite); • Standel Lane (Offsite).	4.11	Specific Plan

Section 2: Compliance with Established Standards and Codes

2.1 National

The Project is designed to meet all national fire standards contained within the National Fire Protection Association (NFPA) 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire (most recent edition) and the NFPA 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting (most recent edition), Table C.11 (b).

2.2 State of California

2.2.1 California Fire Code

The California Fire Code is a comprehensive set of regulations (over 60 chapters) establishing requirements consistent with nationally recognized good practices to safeguard the public health, safety and general welfare from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises, and to provide safety and assistance to fire fighters and emergency responders during emergency operations. The Project's design meets or exceeds all applicable requirements of the current California Fire Code.

2.2.2 California Code of Regulations, SRA Fire Safe Regulations

The Project is located in a State Responsibility Area (SRA). The California Code of Regulations sets forth the SRA Fire Safe Regulations, which establish wildfire protection standards in conjunction with building, construction and development in SRAs. The SRA Fire Safe Regulations specifically establish requirements for emergency access, signage, water supply, perimeter wildfire protection, and vegetation modification. The Project's design meets or exceeds each applicable measure required by the most recent version of the SRA Fire Safe Regulations.

2.2.3 California Building Code, Chapter 7A

The Project is located in a designated Wildland-Urban Interface Area. The State of California has established a distinct set of standards to mitigate risks in these areas in the California Building Code, Chapter 7A. Chapter 7A establishes standards for the protection of life and property by increasing the ability of a building located in any Fire Hazard Severity Zone within SRAs or any Wildland-Urban Interface Area to resist direct flame impingement and the intrusion of burning embers projected by a vegetation fire and contributes to a systematic reduction in conflagration losses. Chapter 7A sets forth required building standards and materials for safely building in a Very High Fire Hazard Severity Zone (VHFHSZ) in great detail. The Project's design meets or exceeds each applicable standard defined in Chapter 7A.

2.3 County of San Diego

2.3.1 County Building Code and County Consolidated Fire Code

The County Building Code is adopted for the protection of the public health and safety. It includes definitions; requirements for permits and inspection for installing or altering systems; regulations for the erection, construction, enlargement, alteration, repair, moving, removal, conversion, demolition, equipment use and maintenance of buildings, structures and premises, including the installation, alteration or repair of new and existing fire protection systems and their inspection; and, penalties for violation of the code.

The Consolidated Fire Code consists of the County's Fire Code and the amendments of each fire protection district to the Building Standards Code based upon their respective determinations as to what amendments are reasonably necessary because of local climatic, geological and topographical conditions within the district. The Project's design meets or exceeds the requirements of the County Consolidated Fire Code.

Section 3: Safety Features within the LHR Community

3.1 Defensible Space

3.1.1 Introduction

Fuel Modification Zones (FMZ) apply throughout the Project, creating defensible space around all buildings and structures. The Project will have FMZs that range between 100 feet and 150 feet, and, in addition will be buffered by a managed agricultural zones in some locations (for a total managed buffer exceeding 150 feet). These FMZs separate the Project's built environment from the nearest unmaintained fuel sources. The planned FMZ buffers provide a minimum setback of 2 ¼ times and up to nearly 5 times the modeled and anticipated wildfire flame lengths (modeled by FireWise2000 to be between 32 and 44 feet) that may be produced by the adjacent fuels. The clustered development design for this project enhances the fire defense efforts of first responders.

3.1.2 Fuel Modification Zone Requirements

Each FMZ consists of Zone A and Zone B.

Zone A is defined as the area within 50 feet of the edge of all structures in the development. Zone A will be cleared of all vegetation that is not fire resistant and re-planted with landscaping material from the San Diego County Approved Plant List For High Fire Hazard Areas. This Zone shall be irrigated, and all undesirable non-native vegetation shall be removed. Additionally, consistent with the 2019 California Fire Code, the area directly adjacent to all structures will include a minimum 5-foot wide, no-combustible ground cover area. Also, no plants on the California Exotic Pest Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California as of October 1999" or more recent version shall be planted. Zone A includes all manufactured slopes. Additional requirements for Zone A can be found in the Fire Protection Plan, Section 4.5.1.

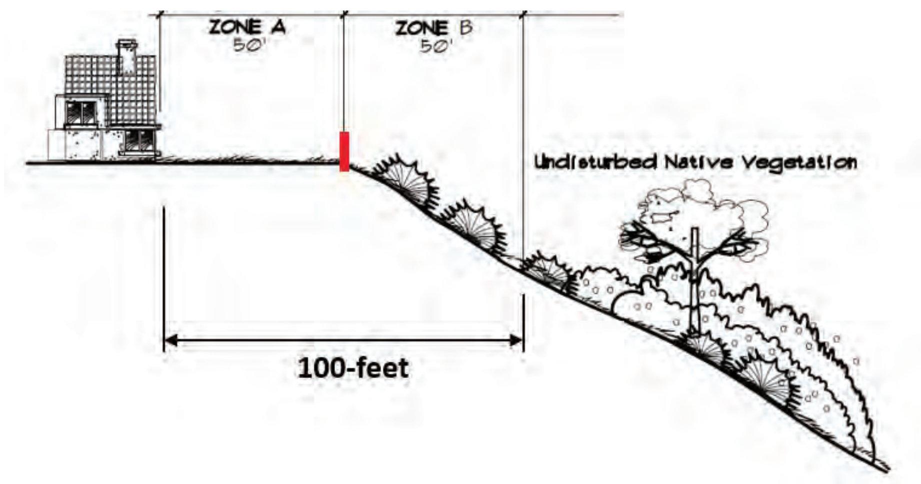
Zone B will provide an additional area of at least 50-100 feet from any structure where fuel volume will be removed or thinned so that combustible vegetation does not occupy more than 50 percent of the Zone's square footage, including the removal of undesirable species and all dead and dying vegetation. All grasses and weeds in this Zone are to be mowed or weed-whipped to a 4-inch stubble height by June 1st of each year or when the fuels become cured, whichever occurs first. Any vegetative biomass (debris and trimmings) produced by thinning and pruning shall be removed from the site or converted to mulch by chipping and evenly distributed to a maximum depth of four (4) inches. This mulching concept helps to maintain soil moisture for the designated plants, reduces the growth of annual grass and minimizes soil erosion. Several areas of Zone B coincide with the Project's "perimeter buffer," which provides enhanced vegetation management, similar to Zone A requirements. The perimeter buffer is an irrigated 50-foot buffer actively managed by the HOA around the western, southern and eastern boundaries of the Project. Additional requirements for Zone B can be found in the Fire Protection Plan, Section 4.5.2.

Most of the FMZs include an 8-foot wide trail located roughly in the middle of the fuel modification area that will be maintained free of vegetation. This vegetation free area provides an enhanced fire break within a fuel break.

PHASE 1 FMZ

The Phase 1 development area includes a 100-foot minimum FMZ (50 feet in Zone A and 50 feet in Zone B) with no exceptions and strategically located heat-deflecting walls.

Figure 1a:
Illustration of Fuel Modification in Phase 1 Development Area



* Example cross section where 100-foot fuel modification zone occurs adjacent to a Phase 1 structure and location of the heat-deflecting landscape wall illustrated in red.

PHASE 2 FMZ

The development areas in Phases 2 will include one of the two following conditions:

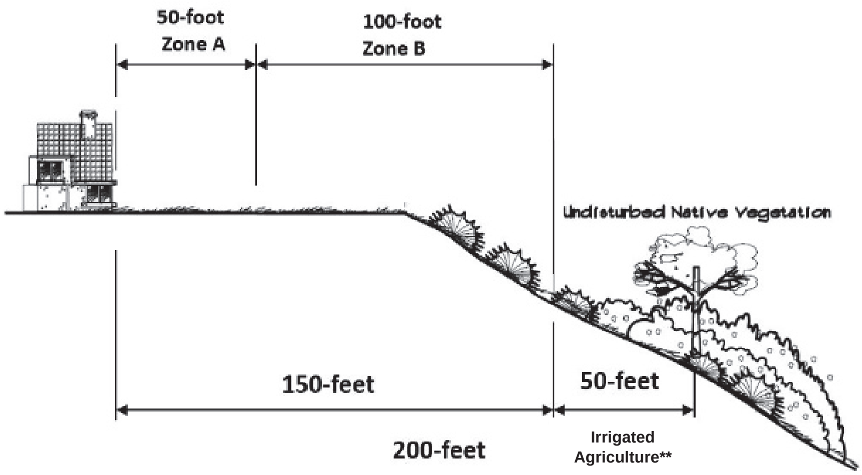
1. Zone A of 50 feet and Zone B of 50 feet and heat-deflecting walls (See Figure 1a); or,

2. Zone A of 50 feet and Zone B of 100 feet (See Figure 1b)

PHASE 3-5 FMZ

The development areas in Phases 3 through 5 include a 200-foot minimum FMZ (50 feet in Zone A and 150 feet in Zone B).

Figure 1b:
Illustration of Fuel Modification Zone in Phases 3-5 Development Areas



* Example cross section where 200-foot fuel modification zone occurs adjacent to a Phase 2 structure. ** In several Project locations, an irrigated agricultural buffer will represent additional area of modified fuels incremental to Zone A and Zone B requirements.

3.1.3 Maintenance of Fuel Modification Zones and Common Areas

The responsibility for vegetation management shall remain with each lot owner and any subsequent owners, and a maintenance agreement through a Home Owner Association to remove dead and dying vegetation, non-native species that may establish over time, and general compliance with the vegetation management requirements the common areas. Maintenance within the zones will be performed year-round. The HOA will provide an annual inspection and certification that all parcels within the development (including privately owned parcels, common areas and roadsides) are in compliance with the applicable fuel modification specifications and defensible space guidelines. Upon receipt of this certification, the District/CALFIRE may, at its discretion, conduct their own inspection of these parcels to verify that fuel modification maintenance activities comply with local and state regulations and guidelines.

3.1.4 Heat-Deflecting Landscape Walls

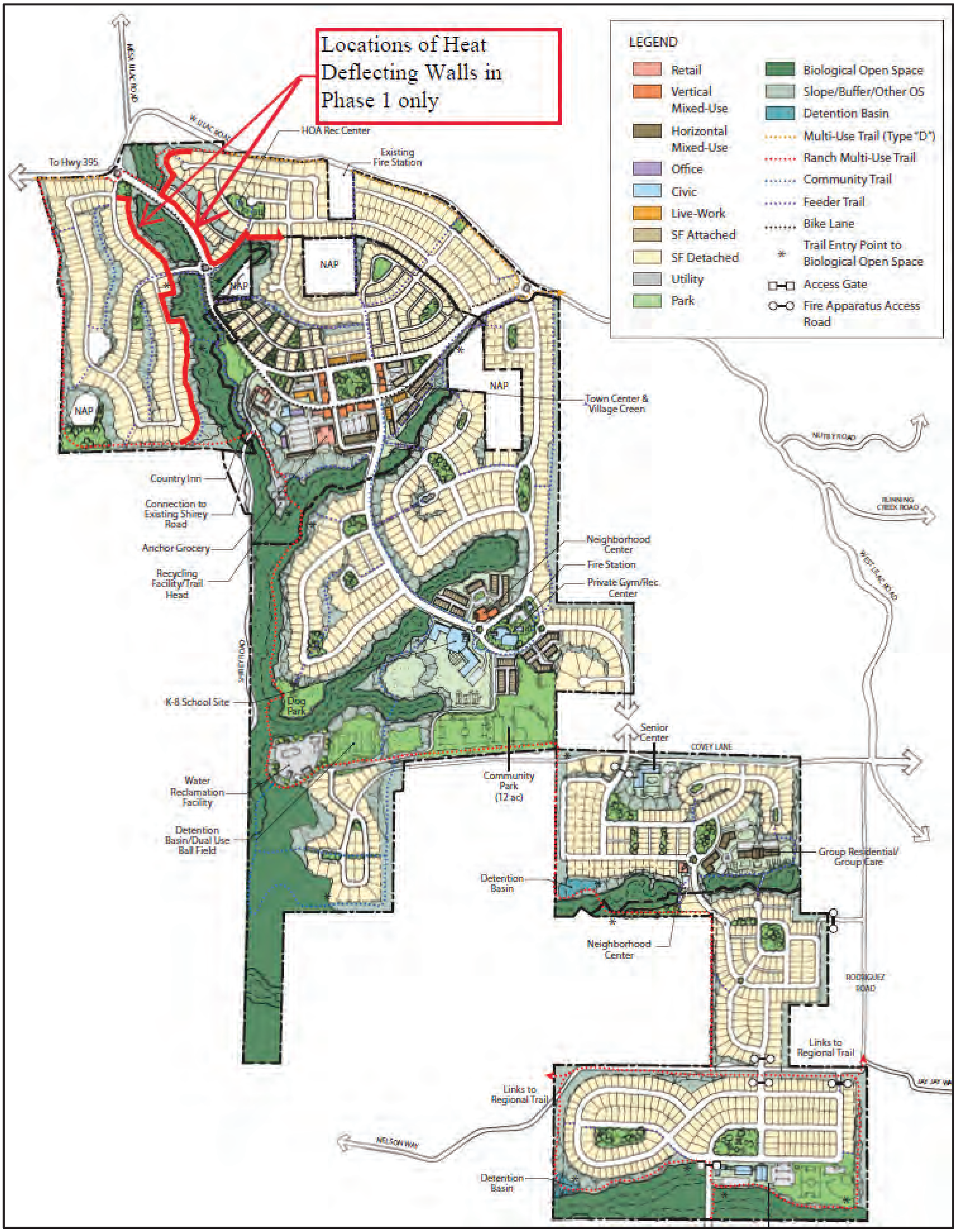
Heat-deflecting landscape walls have been documented to help deflect wildfire flames from structures (NFPA 2005) and are consistent with the NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire – 2008 Edition, Section 5.1.3.3 and A.5.1.3.3 and International Urban Wildland Interface Code (ICC 2012). NFPA 1144, A.5.1.3.3 states: “Noncombustible walls and barriers are effective for deflecting radiant heat and windblown embers from structures.” These walls help reduce the duration of radiant heat impact on the downhill facing side of a structure. An imaginary line extended along the slope depicts the path of the heat (hot air rises) and flame. The structure set back is important to avoid heat and/or flame intersection with the structure. The walls may also intercept wind-blown embers that are being generated from burning vegetation.

When buildings are set back from slopes, flames spreading up those slopes are deflected vertically and over the structure where cooling occurs, reducing the potential effects of convective heat on the structure. Normally, these walls are used if a structure cannot be setback adequately and where the slope is less than 30 percent. For this Project's application, the noncombustible walls will be used even though the standard FMZ is being provided and, in most cases, exceeded.

For LHR, heat-deflecting landscape walls will be provided at strategic locations where FMZs are the most constrained. More specifically, heat-deflecting landscape walls will be incorporated in Phase 1 development areas, at the top of slope/edge of lots (graphically depicted in Figures 1 and 2). The heat-deflecting landscape walls will provide enhanced protection from interior and exterior riparian fuels.

The heat-deflecting landscape walls will be six-feet tall and would be constructed in accordance with the requirements of the Specific Plan. The walls will be built of non-combustible materials such as concrete-masonry materials, bricks, stones or stucco, with an option that allows for the upper 3 to 4 feet portion of the wall to consist of either dual pane, one pane tempered glazing or such equivalent material that meets the requirements of Chapter 7A and/or DSFPD approval).

Figure 2:
Approximate Locations of Planned Heat-Deflecting Landscape Walls
(in Phase 1 Development Areas)



3.2 Hardening of Onsite Structures

3.2.1 Introduction

In addition to creating suitable defensible space around structures, Project structures themselves will be built to a higher standard commensurate with environmental risks present in regions of the Unincorporated County of San Diego. Specifically, all Project structures within the project will be built using ignition-resistive construction methods required by Chapter 7A of the California Building Code. This section summarizes the enhanced hardening techniques to mitigate region-specific environmental risks.

3.2.2 Non-Exhaustive List of Structure Hardening Measures

Roof: All structures within the Project shall be built with a Class A roof assembly, including a Class A roof covering. All rain gutters, down spouts and gutter hardware shall be constructed from metal or other noncombustible material to prevent wildfire ignition along eave assemblies. Gutters shall be designed to reduce the accumulation of leaf litter and debris that contribute to roof edge ignition. All eaves of roof overhangs shall be enclosed (boxed eaves) on all sides with non-combustible materials or constructed with heavy timber such as 2x starter board and 3x6 rafter tails.

Vents: All structures within the Project are required to be hardened against fire risks, including the requirement that all vents (roof, foundation, combustion-air, etc.) shall provide ventilation while trapping flames and embers before they enter the home (e.g., use of vents produced by Vulcan or Brandguard or any similar vents), building with fire safe construction materials, and limiting of landscaping and yard structures for fire resistiveness. Vents and skylights on structures facing natural fuel and open space areas on-site and off-site native flammable fuels are prohibited. Turbine attic vents shall not be used. Attic ventilation openings or ventilation louvers also will not be permitted in soffits, in eave overhangs, between rafters at eaves, or in other similar exterior overhanging areas.

Exterior Walls and Doors: All exterior walls on all sides of the buildings shall be constructed with one-hour fire resistant building materials, and protected with two-inch nominal solid blocking between rafters at all roof overhangs and under the exterior wall covering. Wood siding of 3/8-inch plywood or 3/4-inch drop siding is permitted, but must have an underlayment of 1/2-inch fire-rated gypsum sheathing that is tightly butted or taped and mudded, or other ignition-resistive materials approved by the Fire Authority Having Jurisdiction (FAHJ) and/or the Planning Authority Having Jurisdiction (PAHJ). Exterior door assemblies will conform to the performance requirements of State Fire Marshal (SFM) Standard 12-7A-1 or will be of approved non-combustible construction, or solid core wood having stiles and rails not less than 1 3/8 inches thick with interior field panel thickness no less than 1 1/4 inches thick, or will have a fire-resistance rating of not less than 20 minutes when tested according to American Society For Testing Materials (ASTM - E2074).

Windows: All glass or other transparent, translucent or opaque glazing materials, including skylights, shall be constructed of tempered glass or a dual glazed window with minimally one pane of tempered glass. All windows to be screened shall be provided with mesh metal or similar non-combustible window screens to prevent embers from entering the structure during high wind condition.

Sprinklers: All buildings shall be fully protected with automatic fire sprinkler systems. The installation of the sprinkler systems shall meet NFPA 13, 13R, or 13D Standards, depending on the occupancy type. The 2010 California Building Standards Code published July 1, 2010, with an effective date of January 1, 2011, requires automatic fire sprinkler systems for all new one-and two-family dwellings and townhouse construction statewide. Fire sprinklers effectively extinguish interior fires between approximately 80 and 98 percent of the time and extend the time of "flash-over", resulting in more time for responding firefighters.

Projections: All projections (exterior balconies, stairs, covers, unenclosed roofs and floors, and similar architectural appendages and projections) shall be of non-combustible construction, one-hour ignition resistive construction on the underside, or heavy timber construction. When such appendages and projections are attached to exterior fire-resistive walls, they shall be constructed to maintain the fire-resistive integrity of the wall.

3.2.3 Building Setbacks

Single-story structures shall be setback a minimum 15 feet horizontally from the top of a slope to the farthest projection from a roof. A single-story structure shall be less than 12 feet above grade. A two-story structure shall be setback a minimum of 30 feet horizontally from the top of a slope to the farthest projection from a roof.

3.2.4 Assisted Living

The Project will be required to meet all applicable local, state, and federal codes, regulations and standards as it relates to the Assisted Living facility and will be required to incorporate any safety measures required by the County of San Diego Planning and Development Services Department and County Fire Marshal.

For additional structural hardening requirements, see the California Building Code, Chapter 7A.

3.3 Temporary Areas of Safe Refuge

3.3.1 Introduction

While not specifically designated as a shelter-in-place community, the Project has been designed and will be built, maintained and monitored using the same standards as those used at dedicated shelter-in-place communities in Rancho Santa Fe. As such, the structures and landscape will be capable of withstanding the types of wildfires that may occur in the area, while still providing multiple means of ingress and egress in the event of an emergency.

Notably, even in Rancho Santa Fe's designated shelter-in-place communities, the first priority is early evacuation. Although the communities are designed, built, monitored, and maintained to provide safety during wildfire events, there is no intention to use them for this purpose unless evacuating is considered unsafe. For example, during the 2007 Witch Creek Fire, the Rancho Santa Fe Fire Protection District (RSFFPD) evacuated residents of The Crosby and did so early, several hours before fire approached the community. Temporarily refuging on-site is considered a contingency solution for instances when an early evacuation is not possible. Fire officials recognize that sheltering in an ignition-resistant community, like The Crosby or Harmony Grove, or any newer master planned community, can be safer than a late evacuation. As such Lilac Hills Ranch provides temporary safe refuge alternatives capable of withstanding the types of fires that may occur in the area.

3.3.2 Dual Purpose Temporary Safe Refuge/Community Buildings

In addition to the Project's homes being built to highly ignition-resistant standards and the capability to temporarily refuge people as an alternative evacuation, the Project would provide designated dual-role, temporary refuge buildings that vary between 5,000 and 10,000 square feet in size, in three different LHR Project phases and locations. (Figure 3 below). It is estimated that based on 15 square feet per person, these buildings could temporarily refuge a minimum of 1,300 persons until it is considered safe to move them back to their homes or temporarily out of the area. These buildings will be built to ignition-resistant standards that exceed even the very robust requirements of Chapter 7A of the California Building Code.

These buildings would be publicized by the HOA as Temporary Safe Refuge sites that residents may be directed to by law enforcement or emergency managers during sometimes unpredictable wildfire scenarios. Following the "Ready, Set, Go!" model, early evacuation of the site will be the highest priority, consistent with the County's stance on evacuation planning and management. However, these Temporary Areas of Safe Refuge would be available to emergency managers/Incident Commanders to provide flexibility to evacuations where targeted segments of the population (for example, perimeter homes) could be relocated to these buildings for a short period while a wildfire burned in the area. Further, these buildings would provide additional options for residents in the Project's vicinity for temporary safe refuge in the event that wildfire prevented an early evacuation from the area.

The Temporary Safe Refuge buildings are as follows:

1. A dual purpose, 5,000 square foot Temporary Safe Refuge / Community Center located in the Phase 1 development area. The structure will be built to the latest fire-resistive standards and be equipped with an emergency back-up power supply to maintain continuity of operations during power grid failures. The structure will also be equipped with phone, television, and computer hookups so that occupants can maintain situational awareness during emergencies. Additionally, the structure will be stocked with basic first aid and emergency supplies.

2. A safe refuge facility in Phase 3 consisting of 10,000 square foot structure, either combined between the community center, school gym and/or a purpose-built Temporary Safe Refuge facility. The facility (or facilities) will be built to the latest fire-resistive standards and be equipped with an emergency back-up power supply to maintain continuity of operations during power grid failures. The facility (or facilities) will also be equipped with phone, television, and computer hookups so that occupants can maintain situational awareness during emergencies. Additionally, the facility (or facilities) will be stocked with basic first aid and emergency supplies.

3. A dual purpose 5,000 square foot Temporary Safe Refuge / Community Center located in the Phase 4 development area. The structure will be built to the latest fire-resistive standards and be equipped with an emergency back-up power supply to maintain continuity of operations during power grid failures. The structure will also be equipped with phone, television, and computer hookups so that occupants can maintain situational awareness during emergencies. Additionally, the structure will be stocked with basic first aid and emergency supplies.

Table 2, below, provides details for the temporary refuge buildings.

Table 2:
Dual Purpose Temporary Safe Refuge/Community Centers Facility Requirements

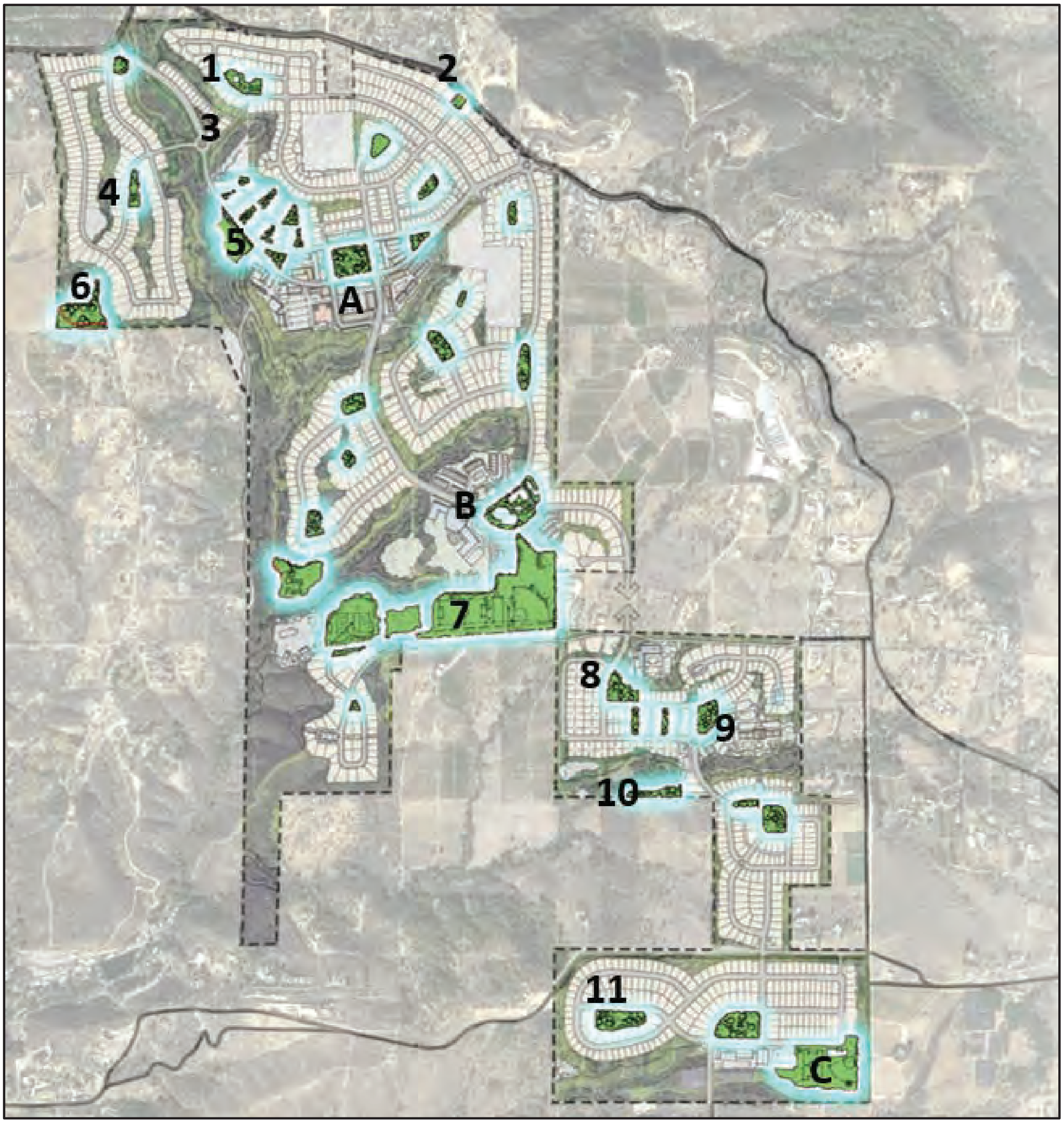
Refuge/Community Center Requirements	Description
Location	See Figure 3.
Size	Vary from 5,000 to 10,000 square feet.
Emergency Occupancy Level (15 sq ft per person)	Minimum 1,330 persons.
Stories	One and/or two stories
Building Requirements	Meet Code requirements as follows: (1) non-combustible building materials, (2) closed eaves, (3) fully sprinklered, and (4) non-flammable landscape material.
Construction	Type I non-combustible construction with applicable elements of Chapter 7A of the California Building Code for ignition resistance.
Fire Protection System	NFPA 13 Compliant.
Windows	Windows dual pane, both panes tempered or fire-rated glazing on all sides.
Power Backup	Emergency backup power supply (diesel or equivalent) generator, appropriately sized.
HVAC	Recycling air handling system to minimize smoke in ventilation.
Communications Hookups	Television, computers, internet, and telephone.
Supplies	Basic supplies to accommodate a short-term sheltering including water and first aid.
Defensible Space	Minimum of 100 feet, up to 200 feet.
Acceptable Landscaping	In accordance with Zone A and Zone B requirements; e.g., turf, garden, orchard, hardscape, sport/recreation courts/fields, swimming pool.

3.3.3 Open Areas of Temporary Safe Refuge (Parks and Village Green)

In addition to the purpose-built structures designated as Temporary Safe Refuges, LHR would provide:

- A 2-acre Village green surrounded by 50-foot roadways on all sides. (See Figure 3, A)
- A 10-acre church site. (See Figure 3, C)
- A total of 11 parks, including a 13.5-acre public park (see Figure 3, P7).
    - The park site (Park P-7) located in the Phase 3 development area will be available to emergency managers for a variety of potential uses, including as a fire-apparatus and law-enforcement-vehicle staging area, a temporary heliport for aerial firefighting or aero-medical operations, an in-car temporary refuge for Project residents and resident from the surrounding community , as well as a large animal relocation site. The park would include grass fields and other ignition-resistant surfaces. The ball fields will be fenced off and these fences could serve as temporary horse corrals, tethering points or a series of picket line anchor points. The area will be equipped with water connections and electrical outlets and is large enough to accommodate large animals, transport vehicles and trailers, temporary feed/hay storage as well as support vehicles (veterinarians, feed transport vehicles).
- Other smaller outside areas could also be used for similar purpose during emergencies if additional spaces were needed. (See Figure 3)

Figure 3:
Locations of Areas of Temporary Safe Refuge



* A, B, C represent Dual Purpose Temporary Safe Refuge/Community Centers.

* Numbers 1 through 11 represent location of parks that can be used for areas of temporary safe refuge.

3.4 Emergency Services Provision

3.4.1 Introduction

Structural fire protection is provided by the Deer Springs Fire Protection District (DSFPD or District) and the California Department of Forestry (CALFIRE) has primary responsibility for wildland fire prevention/suppression in the Project area. The Project's Fire Protection Plan, approved by the DSFPD, assesses fire risks to determine measures necessary to mitigate the fire risks in Project area. As required by the County, the District submitted a Project Facility Availability Form for the Project stating that based upon the "capacity and capability of the District's existing and planned facility, fire protection facilities are currently adequate or will be adequate to service the Project."

3.4.2 County General Plan Compliance

Shortly after publication of the 2015 Draft Final EIR, the County's Planning Commission considered the Project in September 2015 and recommended approval of the Project with the incorporation of several conditions, one of which relates to the Fire and Medical Services. The specific condition recommended by the Planning Commission follows:

> "Construct a new fire station or improve and expand the existing fire station to meet the five-minute rule and require the developer to fund the improvements. Establish a Mello-Roos (CFD) for ongoing staffing for the fire station." (See Compendium Volume II, Attachment 1, Lilac Hills Ranch Specific Plan, Appendix K [Fire & Emergency Services Matrix])

The adoption of this condition would ensure that the Project meets the 5-minute travel time standard set forth in the County's General Plan (see Policy S-6.4 and Table S-1), consistent with one of the four fire service response Options studied in the Project's EIR. These options, in brief, involve the provision of fire service from either a remodeled facility, a new facility or a co-located facility all within CALFIRE's existing Miller Station site or through the construction of an on-site fire station within Phases 3 or 5 of the Project site. Construction of any facility would be <u>fully funded by the Project</u> and <u>will not</u> require any financial resources from the District.

Additionally, by requiring the creation of a community facilities district (CFD), this condition ensures that the District would not incur staffing expenses associated with providing the Project with adequate fire service. As background, the Project is estimated to generate over $2.2 million dollars in one-time Fire mitigation Fees; annual taxes and assessments of over $1.3million dollars that can be applied to fire station staffing; and, CFD financing for fire station staffing. The CFD's special tax for fire services (approximately $179 per unit per year) would cover the gap between the annual funding requirement for fire station staffing and the estimated tax/assessment revenue that can be used for fire station financing. Please see Attachment 2 to the Fire and Medical Services Update Global Response, which contains a memorandum prepared by Development Planning & Financing Group, Inc., dated March 15, 2019, confirming that CFD financing would be sufficient to cover the funding for fire station staffing.

3.4.3 Fire Services Features

The Project applicant has agreed to begin construction on a permanent fire station, staffed at 3-0 Advanced Life Support (ALS), beginning at the 1,001th permit. Project has also agreed to offer more than double the statutory fees, to the DSFPD, for facilities and equipment.

Pursuant to CALFIRE guidance on November 21, 2019, the Project will also provide a sewer hookup, a storage shed, resurfaced driveway, and a temporary garage facility at the Miller Station, prior to the first Certificate of Occupancy in the Phase 1 development area to use until the additional permanent station is built.

See Compendium Volume II, Attachment 5, “Fire and Medical Services Update Global Response (EIR)” for complete description of Fire Services and Funding proposed for the project.

3.5 Water Supply

3.5.1 Introduction

The Community is within the County Water Authority (CWA) boundaries and is served by the Valley Center Municipal Water District (VCMWD). There is significant existing water infrastructure on and to the site. There are transmission lines to the site, numerous meters, and two water tanks on the 608-acre site. In addition, the existing property contains 10 working groundwater wells that are used to irrigate orchards and landscaping throughout the year. The Water Supply Assessment (WSA) approved by the VCMWD confirmed that the Project’s imported water use after Project implementation will use be equal to or less than the imported water use by the 608-acres of property at the time of this application.

3.5.2 Water Supply

The LHR community will have several sources to provide the required firefighting water supplies to meet the standards in the San Diego County’s Consolidated Fire Code for commercial/business/residential development. Fire hydrants will be installed in accordance with the Fire Protection Plan at all road intersections, the beginning radius of cul-de-sacs and within 300 feet of every structure in the development. The main supply will be capable of delivering 2,500 gallons/minute for 2 hours, as confirmed by the VCMWD, which meets the requirements outlined in the Consolidated Fire Code.

Section 4: Regional Safety Features

4.1 Added Connectivity

Redundancy in safety planning refers to the duplication of critical components or functions of a system with the intention of increasing reliability of the system, so as to improve actual system performance. The Project creates evacuation alternatives not presently available to the existing community, thereby creating critical redundancy in the evacuation route network. The new routes will be invaluable as emergency responders adapt to the dynamic circumstances of an evacuation event. The egress routes established through the Project generally follow the alignment of the existing evacuation routes, but with the notable benefit of being located in areas that are generally more insulated from native fuels, making these new routes less susceptible to obstruction than the routes in place today. These new insulated routes are a critical benefit to existing community members as well as future Project residents. These route additions alone provide a net benefit to existing regional residents in the event of evacuation. (See Figure 4) Key new route alternatives established by the Project include:

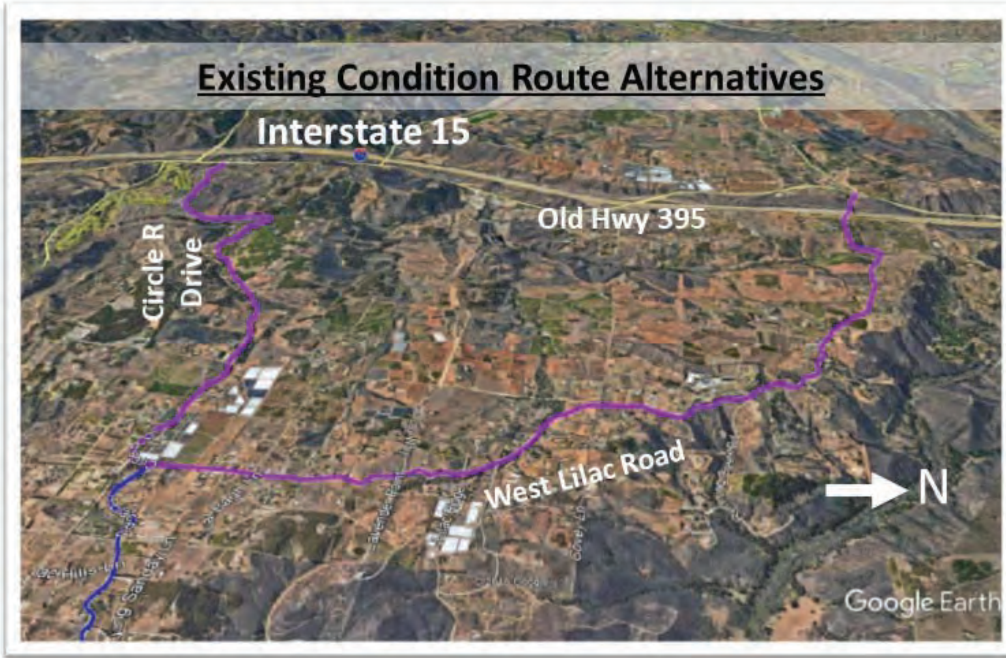
Roundabout Connection Road: Prior to the first Certificate of Occupancy for Phase 1, the project will provide the Roundabout Connection Road through Phase 2, generally between the westerly and easterly roundabouts. This new route provides evacuees an alternative to utilizing the segment of West Lilac Road along the Project boundary. Compared to existing egress segments, this route is more insulated by non-vegetated fuel breaks such as roads, defensible space, and hardened structures. (See Figure 4)

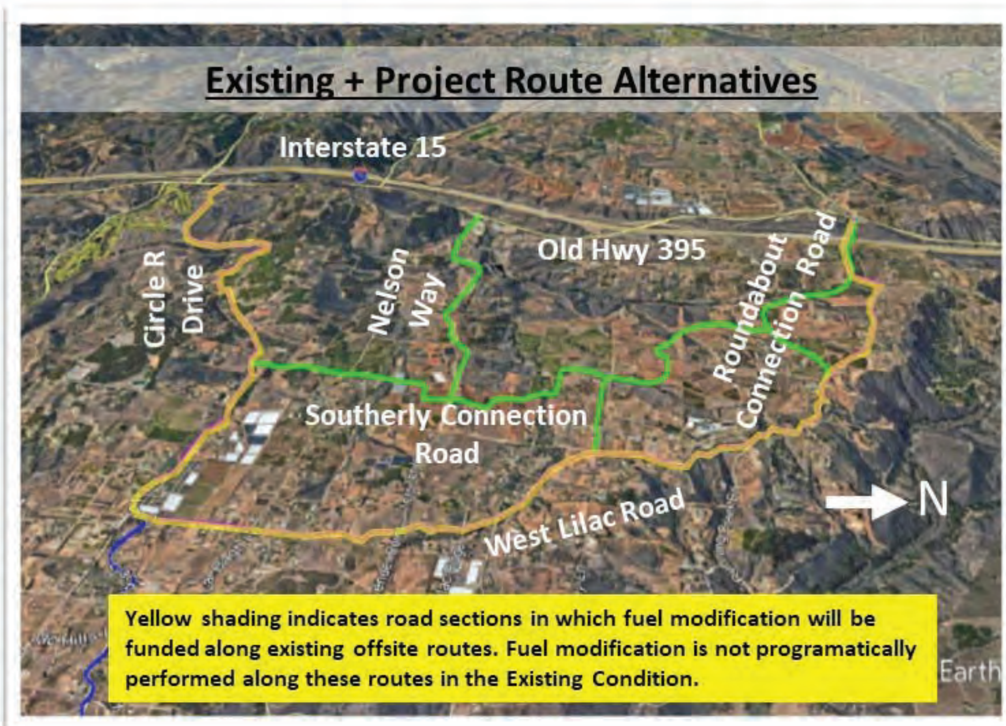
Southerly Connection Road: Prior to the first Certificate of Occupancy for the first residential unit south of the Roundabout Connection Road, the project will provide the Southerly Connection Road for emergency egress purposes only that will generally follow the north-south alignment of Lilac Hills Ranch Road to the gated entry at the northern edge of Mountain Ridge Road. This new route provides connectivity between Circle R Drive and egress routes through the Project (e.g., Nelson Way, the Roundabout Connection Road). One way this route could be used is as an alternative to evacuating via Circle R Drive. (See Figure 4)

Nelson Way: Prior to issuance of the first Certificate of Occupancy for the first residential unit south of the Roundabout Connection Road, the Project will complete the improvements required to modernize and maintain Nelson Way to County private road standards. Connecting this route to the new roads in the Project creates invaluable redundancy to Circle R Drive and West Lilac Road. For additional information on Nelson Way, see Compendium Volume II, Attachment 8.

The Project provides five (5) means of ingress and egress from the planned community, including alternative access routes that are remote from the primary access. The Project also resolves several existing roadway deficiencies (e.g. connects 11 current dead-end roads, improving connectivity and providing these existing residents with evacuation alternatives. (See Figure 5)

Figure 4:
Evacuation Routes in the Project Vicinity





* Top Photo: Evacuation routes currently designated by the Deer Springs Fire Protection District Evacuation Plan are shown in Purple.

Bottom Photo: New select evacuation route alternatives implemented by Project are shown in Green (locations are approximate). Also, existing offsite evacuation routes in which vegetation management will be funded by the Project are shown in Yellow.

Figure 5:
Existing Road Deficiencies Resolved by Project

Existing Deficiency		Resolution of Deficiency by Project
Road Facility	**Safety Issue**	
• Shirey Road • Birdsong Drive • Covey Lane • Rodriguez Road • Mountain Ridge Road • Adams Court • Megan Terrace • Nelson Way • Elmond Drive • Jay Jay Way • Victoria Way	Each listed road exceeds County dead-end road length standard	Eliminates each dead-end road length deficiency
• West Lilac Road • Circle R Drive	Two locations on West Lilac Road and one location on Circle R Drive do not meet line-of-sight distance requirements (blind curves)	Project eliminates all three of these line-of-sight deficiencies
Intersections of: • West Lilac Rd & Old Hwy 395 • Circle R Dr & Old Hwy 395 • I-15 South & Gopher Canyon • I-15 North & Gopher Canyon	Each listed intersection is non-signalized	Project will add 3-phase signals at each location

4.2 Capacity Enhancements along Evacuation Corridors

As part of the implementation of the Specific Plan and at the recommendation of the County Fire Authority to improve existing evacuation routes in the project area, the Project will make several existing roadways safer and increase evacuation capacity by adding new lanes to existing roads and improving roadway conditions. These improvements will improve road capacity along a designated evacuation route in the Deer Springs Fire Protection District's evacuation plan (See Compendium Volume II, Attachment 12 and Attachment 16). In particular, as a condition of the tentative map approval the following improvements will be made:

1. Prior to the first Certificate of Occupancy for Phase 1, the Project will add a third 12-foot contingency travel lane to West Lilac Road from Old Highway 395 to the Project's primary entrance (Main Street Roundabout), doubling the westbound lanes in that segment while leaving an eastbound lane for emergency responders. (See Figure 6)

2. Prior to the first Certificate of Occupancy for the first residential unit south of the Roundabout Connection Road, the Project will add a third 12-foot contingency lane to Circle R Drive from Old Highway 395 to Circle R Court (approximately 0.6 miles). Doubling the outbound lanes along this segment mitigates potential queuing of vehicles as they approach Old Highway 395 and will provide emergency responders an option to more efficiently route traffic north or south. (See Figure 7)

3. Prior to issuance of the first Certificate of Occupancy for the first residential unit south of the Roundabout Connection Road, the Project applicant will complete the improvements required to modernize and maintain Nelson Way to County private road standards With the construction of Nelson Way, the outbound lane of Nelson Way will become a viable evacuation route not previously available to existing residents. For additional information on Nelson Way, see Compendium Volume II, Attachment 8.

Once Nelson Way is modernized, it can be used as an additional evacuation route during wildland fire emergencies in accordance with provisions pertaining to evacuation procedures in State Responsibility Areas. The "Nelson Way Global Response" describes the County's proposed condition and evaluates the environmental implications of modernizing Nelson Way to the design standards identified in the proposed condition.

Figure 6:
West Lilac Road

(3rd Contingency Travel Lane
from Project Entrance to Old Highway 395)

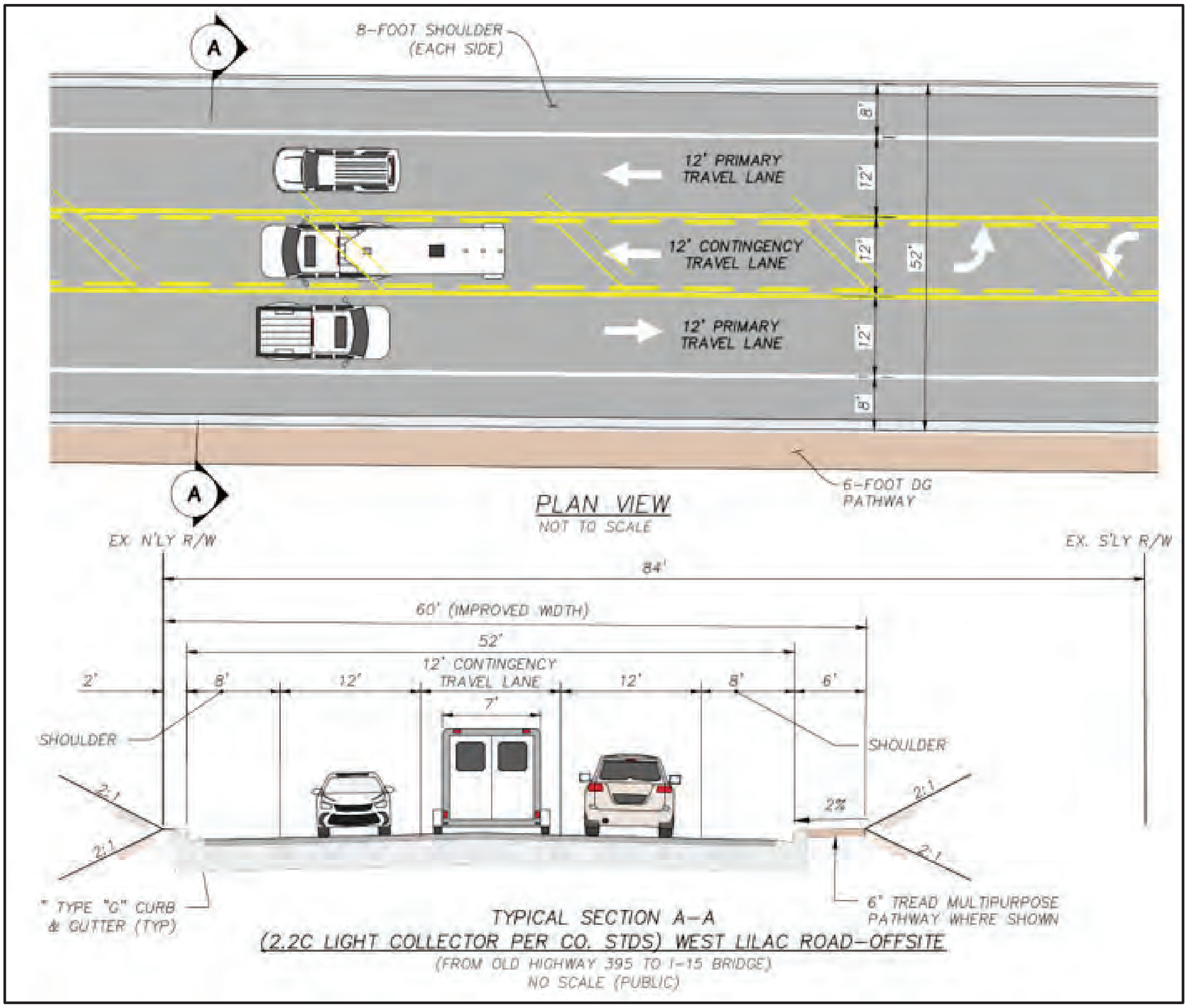


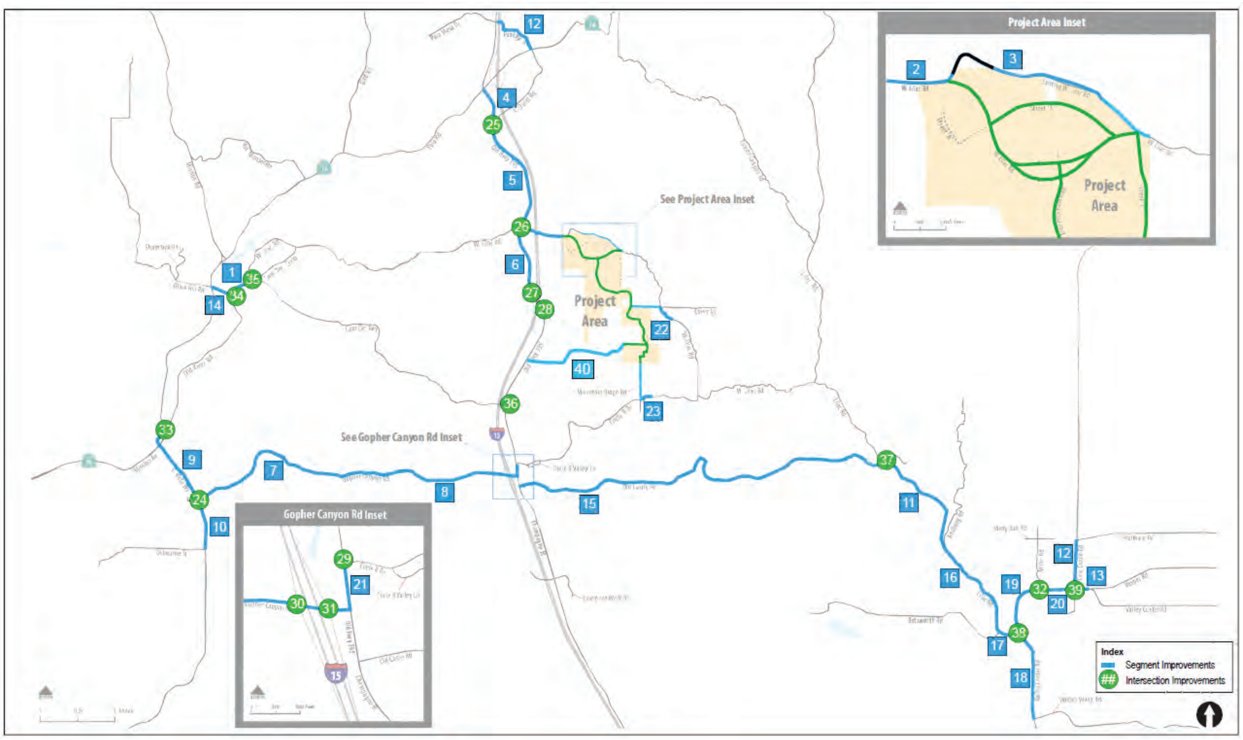
Figure 7:
Circle R Drive

(3rd Contingency Travel Lane
from Circle R Court to Old Highway 395)

4.3 Increased Capacity and Safety on Existing Offsite Roads

Improvements to a total of 40 existing offsite road segments or intersections will be implemented by the Project as project design features, mitigation measures and conditions of project approval. These improvements to existing road infrastructure will provide safety benefits to both LHR and regional residents and enhance capacity, connectivity, mobility, evacuation capacity and capability, and ingress of emergency vehicles. The improvements include the elimination of three (3) blind curves and the signalization of four (4) currently unsignalized intersections along the existing evacuation routes, as well as a segment of West Lilac Road not currently built to County road safety standards[1]. (See Figure 5 and Figure 8). For additional detail on these improvements see Volume II, Attachment 17.

Figure 8:
40 Project Road Segment and Intersection Improvements to Enhance Existing Regional Roadway Capacity and Safety



[1] "County road standards are established to guide road development, maximize safety, assure road capacity and standardize costs." PUBLIC ROAD STANDARDS, COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS, FEBRUARY 9, 2010

4.4 Gates

In order to enhance orderly evacuation and emergency access, the project's Specific Plan has been revised to remove all gates in the Phases 4 and 5 development areas with the exception of one (1) manned 24/7 guard gate on Mountain Ridge Road and an existing gate along Nelson Way, which will remain, but will be rebuilt and upgraded to meet County and DSFPD standards. The Nelson Way gate will be incorporated into the Lilac Hills Ranch Guard Gate system to allow the 24/7 gate guard manager to remotely open and close the gate at any time. The following tentative map condition will be implemented:

"In order to enhance orderly evacuation and emergency access, Phases 4 and 5 of the Project shall have no gated access points, with the exception of (1) manned 24/7 guard gate on Mountain Ridge Road."

4.5 Offsite Fuel Modification and Hardening of Existing Residences

As a condition of tentative map approval, the Project will enhance <u>offsite</u> public safety by providing a total of two million dollars to DSFPD in the manner described below, for the purpose of i) providing fuel modification along offsite evacuation routes, and ii) hardening existing offsite residences as described below. In addition to this funding, the on-going obligation for the continued offsite fuel modification along evacuation routes is also described.

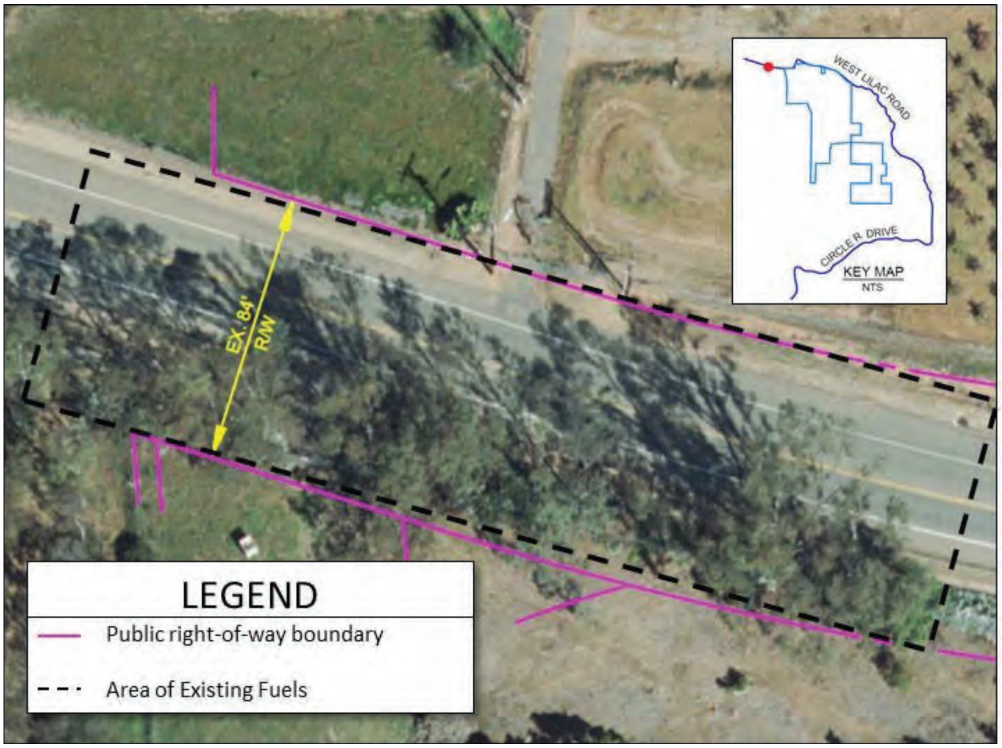
> ***[Note: For detail about fuel modification and maintenance of defensible space <u>within the project boundaries</u>, see Section 3.1.2 and 3.1.3 (Safety Features within the LHR Community: Fuel Modification Zone Requirements and Maintenance of Fuel Modification Zones).]***

4.5.1 Fuel Modification Program for Offsite Evacuation Routes

In the vicinity of the Project, the County Fire Authority has identified ways to increase the evacuation safety of existing evacuation routes relative to their current condition. (See Figure 9)

Figure 9:
Example of Existing Roadside Fuels Not Currently Modified

(West Lilac Road)



One million dollars (of the total two million provided by the Project) will be used to enhance the safety of offsite evacuation routes in the vicinity of the Project during the establishment period of the Project by funding fuel modification activities along these routes relative to their existing condition. This funding shall be provided to DSFPD and placed in a special reserve fund to be used to perform fuel modification within the public rights of way along West Lilac Road from Circle R Drive to Old Highway 395 and along Circle R Drive from West Lilac Road to Old Highway 395 (see Figure 4 in section 4.1). This funding is phased as follows:

- Fuel Modification Initial Payment: $250,000 for initial fuel modification to be provided to DSFPD by the Project applicant with the issuance of the first residential Certificate of Occupancy;

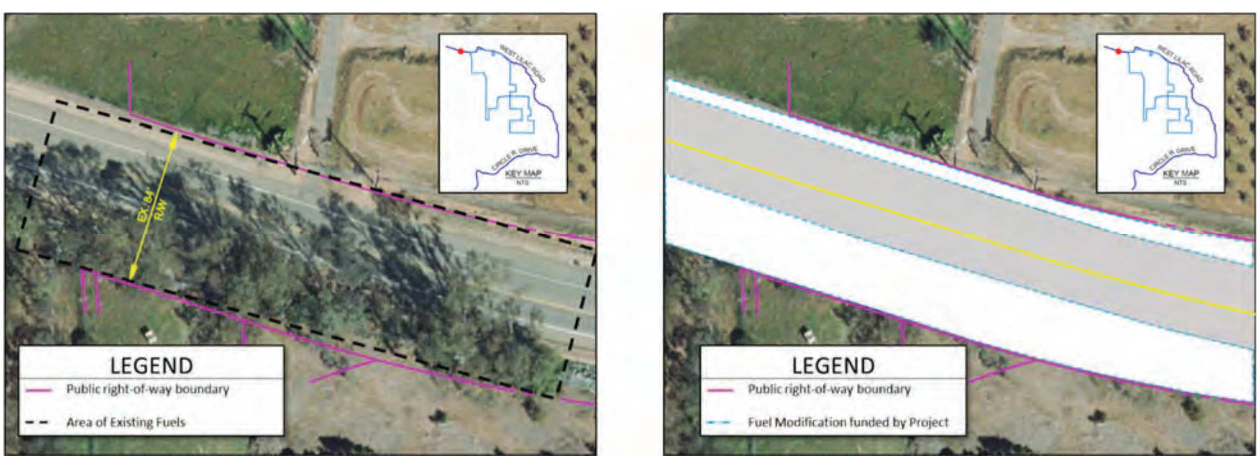
- Fuel Modification Payments during Project Buildout Period: $429.55 to be paid to DSFPD with the issuance of each residential Certificate of Occupancy to be used by DSFPD for fuel modification along these routes during the Project buildout period.

Phase	Units	Fuel Modification Funding During Buildout Period
1	352	$151,203
2	466	$200,172
3	460	$197,595
4	171	$73,454
5	297	$127,577
Total	**1,746**	**$750,000**

At the issuance of the Certificate of Occupancy of the 1,700th residence, the Project's HOA will be responsible for performing annual fuel modification activities along these routes by contracting with a fuel modification service provider approved by CALFIRE, pursuant to the County Consolidated Fire Code Section 4907. The roadside fuel modification service provider will be contracted to perform the roadside fuel modification services within the public right of way that include the following:

- Modifying combustible vegetation;
- Maintaining minimum horizontal clearances for fire resistant and non-fire resistive trees;
- Pruning mature trees to remove limbs and maintain a vertical separation;
- Removing dead wood and litter.

Figure 10:
Roadside Fuel Modification
(Existing vs. Existing Plus Project)



See Volume II, Attachment 18 for several key locations in which area safety will be greatly increased by the fuel modification program described above.

4.5.2 Offsite Hardening of Existing Residences

Often, an overlooked component to a systematic approach to community safety involves reducing structural ignitability in the existing structures located within a given community.

Ember intrusion into the interior of structures is often cited as a significant source of structural ignitions during wildland fires. As such, hardening structures by installing ember resistant vents can reduce structural ignitions from the ember outfall often associated with wind driven wildland fire events.

To address this specific vulnerability, as a condition of tentative map approval, LHR will provide DSFPD with a total of one million dollars (of the total two million dollars provided) to fund an Offsite Hardening Program to retrofit (eave, roof, foundation) vents in offsite structures with approved ember resistant vents (produced by Vulcan or Brandguard or any other approved vents) for the surrounding community. This Program is on the leading edge of fire safety planning in the state and, when combined with the other strategies outlined herein, embraces the concept of a true systematic approach to minimizing structural losses during wildland fire events.

Funding for this Offsite Hardening Program will be provided by the Project to DSFPD as follows:

- At each Certificate of Occupancy the Project will fund $572.73 to DSFPD to administer the program:

Phase	Units	Funding
1	352	$201,604
2	466	$266,896
3	460	$263,495
4	171	$97,938
5	297	$170,103
Total	**1,746**	**$1,000,000**

The funding shall be used to retrofit (eave, roof, foundation) vents in offsite structures with approved ember resistant vents (vents produced by Vulcan or Brandguard or any other approved vents) in the Project vicinity. If there are funds remaining in the program after retro-fitting vents in the existing structures identified and selected by DSFPD, DSFPD shall have sole discretion in allocating those remaining funds for the purpose of additional structural hardening of the existing community which may include (but is not limited to) installation/retro-fitting with: dual-paned/tempered replacement windows, approved fire resistive siding, enclosed boxed eaves, approved class A rated roof covering.

Additionally, the Lilac Hills Ranch Fire Safe Council (LHRFSC) will establish a D-SAP program for existing homes along the West Lilac Corridor (from Old Hwy 395 to Circle R Drive). This program will be focused on locating resources for existing homeowners (not only disabled or disadvantaged as is customarily the case with a DSAP program) for establishing and maintaining defensible space around their homes and properties to Zone A and Zone B standards.

4.6 Evacuation Signage

As discussed in the County's "Operational Area Emergency Operations Plan, Evacuation Annex" (September 2018), evacuation routes include pre-designated transportation routes. Important roadway characteristics and factors that should be considered when selecting a pre-designated evacuation route include:

- Shortest route to the designated destination areas.
- Maximum capacity.
- Ability to increase capacity and traffic flow using traffic control strategies.
- Maximum number of lanes that provide continuous flow through the evacuation area.
- Availability of infrastructure to disseminate real-time conditions and messages to evacuees en-route, such as Changeable Message Signs.

In order to enhance the signage of pre-designated transportation routes available for evacuation in the County, the Project provides as follows:

i) As part of the Project's Signage Plan (See Specific Plan), the Project will install evacuation signs at strategic locations along on-site roadways, chosen in consultation with CALFIRE, at the time such on-site roadways area constructed.

ii) Prior to the approval of each final map containing residential units for the Project, the Project applicant will submit an application with the County and such other governmental agencies as may be required, to install fixed signage in public rights of way along the applicable offsite evacuation routes associated with the development of that final map. The Project will agree to install the signs within one year from obtaining approval from the County, and other governmental agencies as may be required, for the installation of such signs. Fixed signage will be constructed of non-combustible materials to withstand the effects of heat damage during fire events and in accordance with Department of Public Works standards in accordance with County requirements, policies and Ordinances issuance of the first Certificate of Occupancy for a residential unit in the Project.

iii) At the request of CALFIRE in consultation with the San Diego County Office of Emergency Services (OES), prior to the issuance of the 500th residential certificate of occupancy for the Project, the Project applicant agrees to submit an application for and install in accordance with County requirements, policies and Ordinances, up to five interactive signs in the vicinity of the Project boundaries to provide "real time" directions or information along primary evacuation routes, thus increasing situational awareness for residents and visitors during emergencies in real time. Interactive signage control will be located in the San Diego County Emergency Operations Center (EOC) and controlled/operated by the Office of Emergency Services (OES) during EOC activations. Prior to submittal of the request, the Project will coordinate with CALFIRE to determine the precise location of such evacuation signage.

Figure 11a:
Example of Fixed Evacuation Signage

Figure 11b:
Example of Fixed Evacuation Signage

Figure 11c:
Example of Interactive Evacuation Signage

4.7 Project and Regional Evacuation

4.7.1 Evacuation Travel Time per County Emergency Operations Plan Guidelines

Dudek performed an evacuation travel time analysis that is consistent with evacuation travel time estimates prepared by Dudek for several projects in San Diego County and focuses on calculating the evacuation travel times based on existing homes (those in the immediate area to the north and east of the Project and existing residences along Nelson Way), with the addition of the project's home counts and enhanced road conditions and features described herein. San Diego's current guidelines for the evaluation of evacuation are contained in the County's Emergency Operations Plan, Evacuation Annex Q.

The evacuation travel time resulting from this analysis ranges from 14 to 49 minutes. This compares favorably with other recent, County-approved residential projects. In each case, the Project's calculated evacuation time is favorably comparable to thresholds recommended by the San Diego County Fire Authority and San Diego County Sheriff's Department.

4.7.2 Comprehensive Regional Evacuation Modeling

In order to provide a more comprehensive analysis beyond the current guidelines and inclusive of populations surrounding the Project, a multi-disciplinary evacuation planning team was assembled to analyze evacuation of the Project and relevant existing communities within the wildland/urban corridor to the east of LHR, including large portions of Valley Center. This team consists of fire prevention and emergency response professionals, including experts with operational experience participating in evacuation events in San Diego County, a transportation engineer, and a CEQA-certified fire protection planner.

Whereas formulaic calculations satisfy the guidelines in the County's Emergency Operations Plan, the comprehensive modeling analysis utilizes County-approved, industry-standard, traffic simulation software to simulate an evacuation scenario to calculate vehicle travel time and speed.

The simulations were calculated using the current version of Synchro/SimTraffic, (version 10). *Synchro* is a macroscopic analysis and optimization software application that is consistent with the *Highway Capacity Manual's 6th Edition.*

The results of this analysis are shown in Table 3 below:

Table 3
Evacuation Network Performance Summary

Performance Metric	Existing Condition	Existing Plus Project	Difference
Average Travel Time (minutes) per Vehicle to Exit Network	48.5 minutes	45.1 minutes	-3.4 minutes
Average Speed Across Network (miles per hour – MPH)	9 MPH	9 MPH	0 MPH

Source: Dudek, 2019

The decrease in average travel time is attributed to the added road connectivity, added capacity, and road safety improvements provided by LHR.

Notably, several features provided by the proposed project that would also enhance orderly and safe evacuation, and likely further improve the Existing plus Project results, include, but are not limited to: new evacuation signage, funding for fuel modification activities related to West Lilac Road and Circle R Drive in the Project vicinity, funding an offsite hardening program to retrofit (eave, roof, foundation) vents in offsite structures in Project vicinity, additional emergency services located in the Project, creation of temporary areas of safe refuge, and inclusion of a hardened cell phone tower for communications. These critical additional safety features are not reflected in the average travel time results above. These would reduce the potential for evacuation friction or interruption relative to the Existing Condition.

4.8 Pre-Planning and Education

Through the establishment of the Project's Fire Safe Council, the LHRFSC will provide education about effective defensible space and evacuation routes to not only Project residents, but to existing area residents within the DSFPD and Valley Center Community. Similar precedent through local and state Fire Safe Councils has shown to be very effective and was approved as a Board of Supervisors Objective on March 12, 2019: "Develop and implement a more cohesive pre-fire strategy, including expansion and increased support to Fire Safe Councils."

On a quarterly basis, the LHRFSC will hold a community meeting and will disseminate information (both printed handouts, mailers and emails) on community fire safety, defensible space, areas of temporary safe refuge (within the Project), evacuation protocols and evacuation routes. The LHRFSC will also coordinate with DSFPD, the Deer Springs Fire Safe Council (DSFSC) and the Greater Valley Center Fire Safe Council (GVCFSC) to ensure that education activities, seminars and presentations are consistent and include all concerned residents in the region.

Important and essential information will include, but not limited to:

1. County Office of OES

   https://www.readysandiego.org/alertsandiego/

2. Cal Fire

   https://www.fire.ca.gov/

   https://www.readyforwildfire.org/more/ready-for-wildfire-app/

3. San Diego Wildfires Education Project

   https://interwork.sdsu.edu/fire/index.htm

4. Firewise - Sponsored by the National Fire Protection Association's (NFPA)

   https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA

5. Fire Adapted Communities

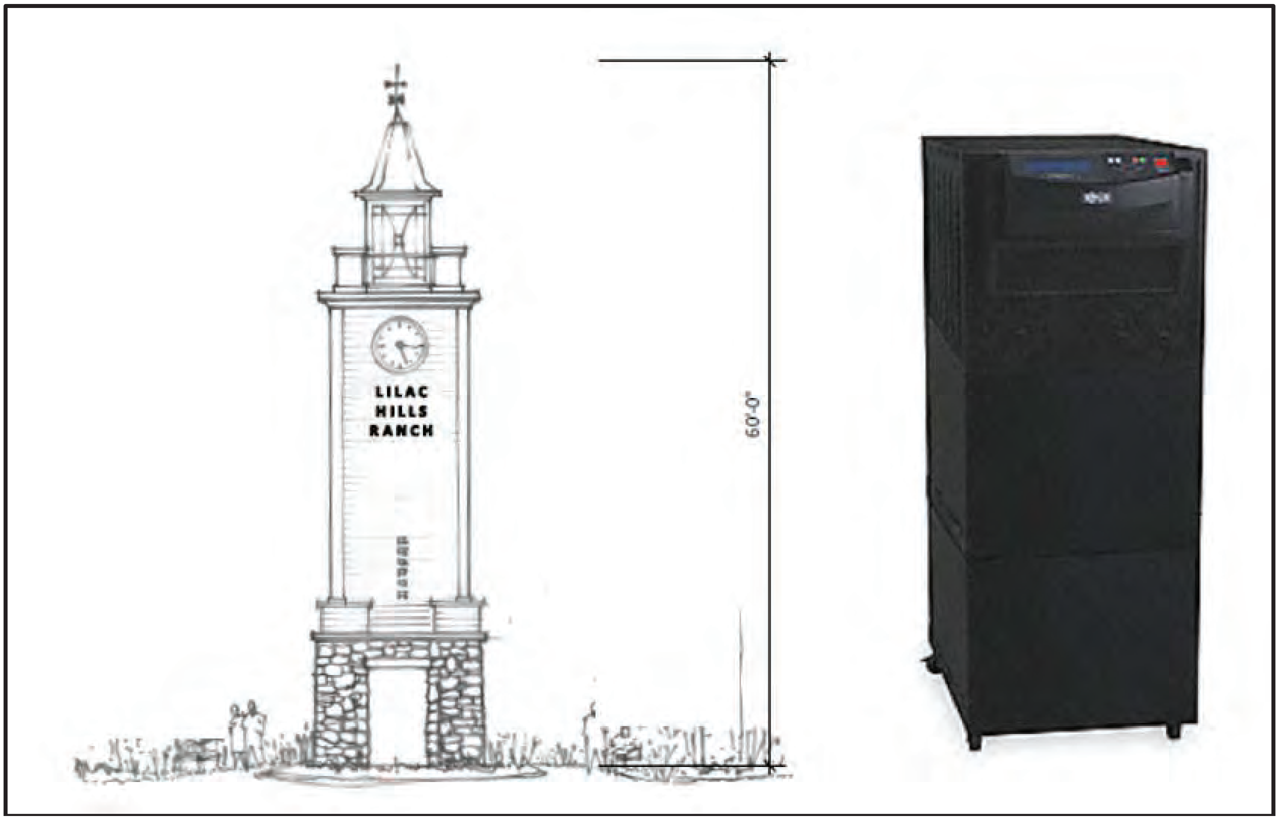
   https://fireadapted.org/

4.9 Hardened Cellular Tower

To maintain communications during large wildland fire events, a “hardened” cell phone/communications tower will be installed. The tower will be constructed to the latest fire resistive standards in the County of San Diego Building and Fire Codes and related standards, which includes noncombustible exterior walls and an emergency back-up power supply to ensure continuity of operations during power failures in the electrical grid.

Prior to the first unit in the Phase 2 development area, the Project will construct a hardened cell tower with battery backup within the town center, as shown in the Project’s Specific Plan. The cell tower shall be contained with the clock tower, located in the town center.

Figure 12:
Hardened Cell Tower With Battery Backup



4.10 Remote Automatic Weather Station (RAWS)

There are nearly 2,200 interagency Remote Automatic Weather Stations (RAWS) strategically located throughout the United States. These stations monitor the weather and provide weather data that assists land management agencies with a variety of projects such as monitoring air quality, rating fire danger, and providing information for research applications.

Most of the stations owned by the wildland fire agencies are placed in locations where they can monitor fire danger. RAWS units collect, store, and forward data to a computer system at the National Interagency Fire Center (NIFC) in Boise, Idaho, via the Geostationary Operational Environmental Satellite (GOES). The GOES is operated by the National Oceanic and Atmospheric Administration (NOAA). The data is automatically forwarded to several other computer systems including the Weather Information Management System (WIMS) and the Western Regional Climate Center (WRCC) in Reno, Nevada.

Fire managers use this data to predict fire behavior and monitor fuels; resource managers use the data to monitor environmental conditions. Locations of RAWS can be searched online courtesy of the Western Regional Climate Center.

As a condition of project approval, prior to the first certificate of occupancy, the Project will fund a RAWS unit on the CALFIRE Miller Station.

Figure 13:
RAWS With Battery Backup

SOURCE: https://raws.nifc.gov/

4.11 Undergrounding Powerlines

All implementing subdivision maps and Site Plans for the Project shall be conditioned to underground utilities, pursuant to the County Subdivision Ordinance. All utility connections and apparatus shall be coordinated with the site's architectural elements so as not to be exposed except where required by the utility provider.

In conjunction with the planned roadway improvements along the following road segments, the Project will underground the following offsite powerlines, which will substantially reduce potential utility caused wildland fire ignitions as well as potential roadway obstructions resulting from downed utility poles or lines.

- Along the project frontage with West Lilac Road;

- West Lilac Road offsite (from the easterly roundabout to the West Lilac Road / I-15 Bridge);
- Covey Lane offsite (from project boundary to West Lilac Road);
- Mountain Ridge Road offsite (from project boundary to Circle R Drive);
- Standel Lane (from West Lilac Road to project boundary).

Figure 14:
View west of West Lilac Road SDGE Utility poles (Offsite) to be undergrounded within proposed roadway improvement area

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DRAFT MEMORANDUM

To: Sam Hartman/Jon Rilling, Ranch Capital, LLC
From: Dudek - Michael Huff, Principal Fire Protection Planner
Subject: Lilac Hills Ranch Evacuation Travel Times per San Diego County Formula
Date: December 9, 2019
Attachment(s):

Attachment A – Evacuation Travel Time per Guidelines in San Diego County Emergency Operations Plan
- Attachment A, Appendix 1 – Road Evacuation Capacity Analysis (LLG)
- Attachment A, Appendix 2 – West Lilac Road Planned Roundabout Detail (Landmark)

Attachment B – Comprehensive Regional Evacuation Evaluation Modeling
Attachment C – Study Limitations

This memo is composed of two parts:

Attachment A: Evacuation Travel Time per Guidelines in San Diego County Emergency Operations Plan

This analysis provides an estimate of evacuation travel times for the Lilac Hills Ranch Project ("LHR," "LHR Project," or "project") and incorporates information provided by traffic engineers Linscott, Law & Greenspan (Attachment A, Appendix 1) and civil engineers Landmark Consulting (Attachment A, Appendix 2).

This analysis is consistent with evacuation travel time estimates prepared by Dudek for several projects in San Diego County and focuses on calculating the evacuation travel times based on existing homes (those in the immediate area to the north and east of the Project and existing residences along Nelson Way, with the addition of the project's home counts and enhanced road conditions. San Diego's current guidelines for the evaluation of evacuation are contained in the County's Emergency Operations Plan, Evacuation Annex Q. The satisfaction of these guidelines and the County's request for evacuation planning, has been provided in the following analysis.

Attachment B: Comprehensive Regional Evacuation Modeling

Additionally, in order to provide a more comprehensive analysis beyond the current guidelines and inclusive of the LHR project's upstream populations, a multi-disciplinary evacuation planning team was assembled to analyze evacuation of the Project and relevant existing communities within the wildland/urban corridor to the east of LHR, including large portions of Valley Center. Whereas formulaic calculations satisfy the guidelines in the County's Emergency Operations Plan, the comprehensive modeling analysis utilizes County-approved, industry-standard, traffic simulation software to simulate an evacuation scenario to calculate vehicle travel time and speed. Attachment B provides a summary of this comprehensive evacuation simulation modeling method and its results.

Attachment A

Dudek: Evacuation Travel Time Per Guidelines in San Diego County Emergency Operations Plan (Consistent with Previous San Diego County Project Evacuation Travel Time Analyses)

Roadway Emergency Capacities

Roadway capacity represents the calculated number of vehicles that can reasonably be accommodated on a single road lane. Roadway capacity is typically measured in vehicles per hour and can fluctuate based on the number of available lanes, number of traffic signals, construction activity, accidents, and obstructions as well as positively by traffic control measures, including downstream intersection control.

Each roadway classification has a different capacity based on level of service, with freeways and highways having the highest capacities. Based on traffic engineer Linscott, Law, & Greenspan ("LLG") estimates each travel lane for the primary roadways that would be used in an evacuation from Lilac Hills Ranch (LHR) currently has the capacity of 1,490 vehicles per hour, excluding the I-15, which would have a substantially higher capacity (Attachment A, Appendix 1). LLG applies two adjustment factors to this capacity: 1) a downward adjustment for conditions associated with evacuation of the applicable roadways, and 2) an upward adjustment for the enhancements made to the applicable roadways from their existing condition that serve to increase their capacity relative to existing conditions.

Roads that would be the most likely evacuation routes for the LHR project are West Lilac Road and Circle R Drive. Both roads lead to Old Highway 395 and their respective intersections are remote from each other with approximately 2 miles of separation. From these points it is a short distance to the I-15 on-ramps. First, it would not be anticipated that these or other roads would meet their maximum capacity during an evacuation due to the potential for bursts of heavier traffic, vehicles towing trailers, and downstream intersections. Accounting for slowing associated with evacuation conditions, taking into account the geographical characteristics of the Study Area, LLG in Attachment A, Appendix 1, estimates a discounted average road capacity of 1,270 vehicles per hour. The planned road improvements associated with Lilac Hills Ranch offset the discounts, resulting in 1,429 vehicles per hour/lane with the addition of one lane on West Lilac and Circle R Road for resulting capacities of 2,858 and 2,616 vehicles per hour, respectively. This analysis also includes the use of a modernized Nelson Way, which would serve as an emergency evacuation route and include two twelve (12) foot travel lanes (one in each direction). This enhancement results in a vehicle capacity of 1,192 vehicles per hour.

Understanding the speed vehicles would travel to accommodate 1,429 vehicles per hour or 1,192 vehicles per hour provides additional supporting context. If the average vehicle is approximately 16 feet long, and allowing approximately 10 feet between vehicles (26 total feet per vehicle), an average travel speed of approximately 7 mph would enable 1,429 vehicles to pass a given point every hour (10.3 feet per second (at 7 mph) X 2.5 seconds = 26 feet) and an average speed of 6 mph would enable 1,192 vehicles to pass a given point every hour (8.82 feet per second (at 6 mph) x 3.0 seconds = 26 feet). Therefore, the following travel time and evacuation estimates are not reliant on unrealistic vehicle speeds in order to achieve the targeted vehicles per hour capacity.

Study Assumptions

The following analysis assumes the road improvements listed in Attachment A. This notably includes West Lilac Road being improved by the project to include a 2.2C Public Road Standard for the segment that starts at the LHR easterly boundary with West Lilac Road and ends at Old Highway 395, including within planned roundabouts. The improvements, the existing vehicle capacity, and the resulting evacuation capacity post-project are provided in **Table 1**.

Table 1. Travel Lanes and Capacity by Segment and Scenario

Road	Existing Condition		Existing Plus Project	
	Lanes[1]	Evacuation Capacity	Lanes[1]	Evacuation Capacity
West Lilac Road	1	1,270	2	2,858
Circle R Drive	1	1,270	2	2,616
Nelson Way	1[2]	N/A[2]	1	1,192

1 Lanes refer to westbound lanes only

2 Nelson Way is currently an existing 12-25 feet wide private roadway that is partially improved and includes varying widths and surfaces and is pressure tested to support 75,000 pounds. In the Existing Condition Nelson Way provides evacuation for approximately 30 residences along the road.

This evacuation and travel time estimate assumes that vehicle traffic flow is maintained at an average of 7 mph or less. For comparison, the average human walks between 2.5 and 3 mph. This can be accomplished with limited downstream intersection control, which San Diego County Sheriff's Department (SDCSD) has stated would be implemented in evacuation events. For additional understanding of SDCSD's stated management capabilities of large scale, mass evacuations in North San Diego County, see SDCSD Captain Brown's testimony during the Harmony Village Grove South Planning Commission Hearing on May 24, 2018 (Minute 4'37" at the following link, https://media.avcaptureall.com/session.html?sessionid=aa0c1020-3c05-41aa-8df8-35402343f4ce&prefilter=240,2901.

Study Area and Evacuation Routes

The Study Area consists of the LHR project site and the existing residences (81 total) that occur to the north and east of the project and 30 residences along Nelson Way. This approach is consistent with the approach utilized by Dudek for several San Diego County projects' evacuation plans. A more comprehensive model that incorporates an upstream evacuation area encompassing a large portion of Valley Center is provided in Attachment B to this memo.

Prior to the first Certificate of Occupancy for Phase 1, the project will provide an interim roadway through Phase 2, generally between the westerly and easterly roundabouts ("Roundabout Connection Road") to enhance emergency egress until Main Street is completed. The project will construct the Roundabout Connection Road within the project's development footprint to interim public roadway standards, as a 28-foot paved road within a 40- foot graded roadbed. This will provide existing traffic in the area, an improved direct route from the east to the west, through the project, which would be shorter and more direct, and more insulated than using West Lilac Road.

Additionally, prior to the first Certificate of Occupancy for the first residential unit south of the Roundabout Connection Road, the project will provide an interim roadway for emergency egress purposes only that will generally follow the north-south alignment of Lilac Hills Ranch Road to the gated entry at the northern edge of Mountain Ridge Road ("Southerly Connection Road") to enhance emergency egress until Lilac Hills Ranch Road is completed. The project will construct the Southerly Connection Road to private roadway standards, as a 24-foot paved interim road with a minimum design speed of 25 mph generally following the north-south alignment of Lilac Hills Ranch Road to the gated entry at the northern edge of Mountain Ridge Road.

In addition, the LHR Project would provide 40 other road segment and intersection enhancements throughout the LHR vicinity, directly and through contribution to the TIF program, including modernizing Nelson Way from Rodriguez Road to Old Highway 395 (Figure 3 and Attachment A). These road enhancements and phasing commitments are designed to facilitate day-to-day traffic and would also have a positive effect during evacuation events.

Roundabouts

The roundabouts are designed to facilitate movement of larger vehicles including fire engines, delivery vehicles, and large pickups with livestock trailers without causing traffic congestion. Various studies indicate that there may be some minor slowing of fire engines when compared to a traditional intersection, but even if this delay occurred, it is not significant in terms of fire response. See Attachment A, Appendix 2: "West Lilac Road Roundabout Detail"

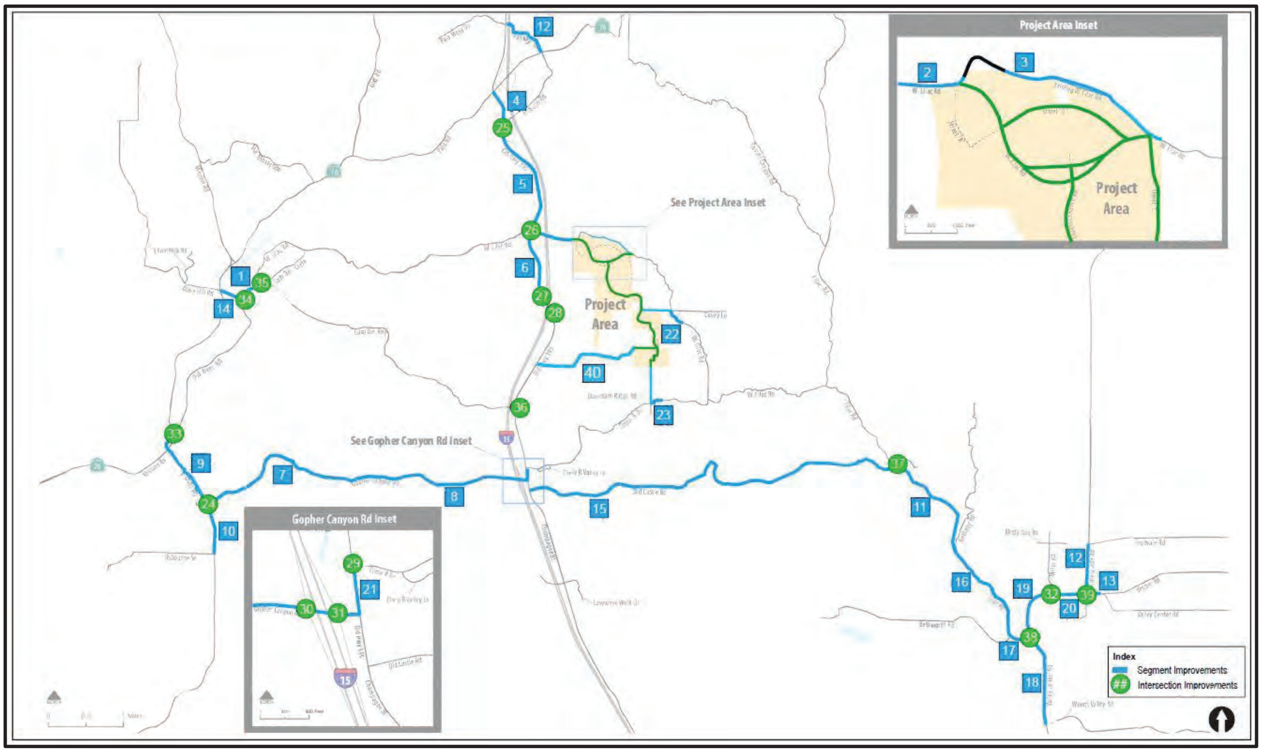

Figure 3. 40 road segment and intersection improvements improved by LHR (directly or via TIF) enhancing existing regional roadways and circulation.

Per Federal Highway Administration Publication No. FHWA-14-098:

- Roundabouts are designed for safety and efficiency of all users and can actually improve emergency response times by eliminating/minimizing stops and delays.
- Roundabouts are safer than intersections, even when signals are fitted with preemption devices.
- Emergency vehicles slow down to pass through intersections similarly to slowing down to proceed through a roundabout.
- Roundabouts accommodate larger vehicles and often include rolled curbs and truck aprons for rear wheels

Finally, roundabout experts, Reid Middleton, provided a peer review (included as EIR Appendix A) on the design and analysis of the proposed roundabouts. Based on Reid Middleton's findings, both roundabouts along West Lilac Road would operate at LOS A with low volume-to-capacity ratios. Review of this analysis in the context of evacuation indicates that the roundabouts would not likely create incremental evacuation delay not already considered in the road capacity discounts.

Vehicle Demand

The first step to calculate evacuation travel time for the Study Area is to determine the number of outbound vehicle trips made in an evacuation event. To most conservatively capture the highest potential outbound trip generation, residents are assumed to be present in every home located in the Study Area when evacuation notice is given. The number of vehicles that each household is assumed to use during an evacuation is conservatively estimated based on population, which are supported by recent after-fire evacuation statistics that resulted in 1.75 vehicles per household (Table 2).

Table 2 – Vehicle Utilization Rates

Vehicles Used to Evacuate	Percentage of Households
1 vehicle per household	46%
2 vehicles per household	38%
3 vehicles per household	11%
4 vehicles per household	5%

Source: Santa Rosa CA Post-Fire Survey, 2018.

Table 3 provides a summary of the calculated number of vehicles from the project and the immediate project vicinity. The existing residential area homes would be expected to produce slightly over 3,077 vehicles in an evacuation, assuming the vehicle per household distribution in Table 2 and an additional 22 vehicles associated with the assisted living facility.

Table 3. Evacuating Vehicle Trip Generation By Area

Residential Area	Development	Vehicles
West Lilac Corridor	81 RU	142
Nelson Way	30 RU	53
Existing Residential Total	**111 RU**	**195**
Project Buildout Residential	1,746 RU	3,077
Existing Plus Project Total	**1,637 RU**	**3,272**

Notes: Residential Units (RU) Source: Chicago Title Company; Source: Calculations by Fehr & Peers.

For LHR, it is calculated that up to 3,077 vehicles could be evacuating the project in a major incident that required full evacuation of the community. The total number of vehicles evacuating the project's vicinity is calculated at 3,272 with the LHR Project build out. This is a conservative estimate and the actual number of vehicles could be lower, as depending on the time of day, many of these vehicles would already be off site, such as if a fire occurred during typical work hours. However, this study utilizes the more conservative approach for purposes of estimating worst-case evacuation requirements. It is assumed that none of these vehicles leave in advance of the evacuation notice.

Vehicle Route Assignment

The vehicle trips generated are assigned to the existing roadway network towards I-15 based on the Deer Springs Fire Protection District's evacuation routes and fire movement that influences evacuation direction. The specific allocation of evacuation vehicle trips is presented in **Table 4.**

Table 4. Evacuation Route Vehicle Distribution Estimates

Area	West Lilac Road	Circle R Drive	Nelson Way
West Lilac Road Vicinity	100% / 142 vehicles	0%	0%
Existing Nelson Way	0%	0%	100%/53 vehicles
LHR Project	50% / 1,539 vehicles	20% /615 vehicles	30%/923 vehicles
Total	**1,681 vehicles**	**615 vehicles**	**976 vehicles**

Results

Evacuation Travel Time Estimate

Using the estimates presented above, the evacuation time for a given population can be estimated by calculating the required travel time and applying a buffer time for dispatch, evacuation declarations, and preparation. Following the San Diego County Emergency Operation Plan Evacuation Annex protocol, the evacuation time is calculated by dividing the population by the average vehicle occupancy and then dividing by the roadway capacity (**Figure 4**).

Figure 4. Evacuation Time Formula.

$$\text{Evacuation Time} = \frac{\left(\dfrac{\text{Evacuation Population}}{\text{Average Vehicle Occupancy}}\right)}{\text{Roadway Capacity}}$$

Estimated evacuation travel time was calculated based on the following factors:

1) 3,272 evacuating vehicles, 2) road capacities: 2,858 (1,429 per lane) vehicles per hour on West Lilac Road, 2,616 (1,308 each lane) vehicles per hour on Circle R Road, and 1,192 vehicles per hour on Nelson Way, 3) three primary egress routes and one emergency egress route with estimated 51% of vehicles (1,681) using West Lilac Road, 19% (615) using Circle R Drive, and 30% (976 vehicles) using Nelson Way. All four roads intersect Old Highway 395, which leads to I-15.

Based on these factors and assumptions regarding development area evacuation routes, it is estimated that the potential 1,681 vehicles anticipated to use West Lilac Road westbound (average discounted capacity of 2,858 vehicles/hour out of the area) to Old Highway 395 Highway intersection where travel to the north, west, or south is available, would require a travel time of just 35.3 minutes. Once at the intersection of Old Highway 395, traffic may be routed west on Lilac Road toward Bonsall/Oceanside, south on Old Highway 395 toward Escondido/San Marcos with the option of continuing on Old Highway 395 or entering the I-15 on ramp within a short distance or north on Old Highway 395 to SR-76 west or onto I-15 northbound.

Simultaneous evacuation of the estimated 615 vehicles via Circle R Road (minimum capacity of 2,616 vehicles/hour), to Old Highway 395 would require up to 14 minutes travel time for the last vehicle to clear the area. From that point, traffic can be routed south on Old Highway 395 or diverted onto I-15 south or west through Gopher Canyon toward Vista/Oceanside.

Evacuation of the 976 mostly LHR vehicles via Nelson Way (estimated capacity of 1,192 vehicles per hour) to Old Hwy 395 would require up to 49 minutes travel time. From that point, traffic can be routed south on Old Hwy 395 to the Gopher Canyon I-15 on-ramp or north on Old Hwy 395 toward Bonsall and the I-15 northbound on-ramp.

Travel Time

Table 5 indicates calculated travel times by roadway.

Table 5. Evacuation Travel Time (Existing residents plus Project residents)

Area	West Lilac Road	Circle R Drive	Nelson Way
LHR Project	35 min	14 min	49 minutes

Evacuation Time Estimate

The evacuation timeframe may be longer or shorter. See discussion of factors that could drive changes to the travel estimates above in Attachment C. Traffic flow is a priority during evacuation events and phased evacuations are important to reduce the number of vehicles accessing roadways at the same time. Assuming a 30 minute "reflex" buffer time, to LHR evacuation time, inclusive of travel time, results in less than 80 minutes. This compares favorably with other recent, County-approved residential projects. In each case, the LHR project's calculated evacuation time is favorably comparable to thresholds recommended by SDCFA and SDCSD.

Notes

This study is not intended to be an Evacuation Plan and does not purport to include elements and measurements typically found in an Evacuation Plan. The sole purpose of this analysis is to focus on the vehicle travel times in an evacuation event. Attachment C provides additional study limitation details.

Attachment A: Appendix 1

Linscott, Law & Greenspan

Road Evacuation Capacity Analysis

LINSCOTT LAW & GREENSPAN engineers

MEMORANDUM

To:	Mr. Jon Rilling Lilac Hills Ranch	Date:	August 28, 2019
From:	John Boarman, P.E. LLG, Engineers	LLG Ref:	3-18-2938
Subject:	Lilac Hills Ranch, Capacity of West Lilac Road, Circle R Drive and Nelson Way		

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This memorandum has been prepared to estimate the carrying capacity of West Lilac Road, Circle R Drive and Nelson Way in relation to an evacuation event. LLG researched many publications to determine the proper capacity and determined that the October 2017 "Simplified Highway Capacity Calculations Method for the Highway Performance Monitoring System" report was the best source. Within this publication, there is a section describing "Two Lane Highways with No Traffic Control", which best fits the characteristics of West Lilac Road, Circle R Drive and Nelson Way. The one-way capacity of such a road is 1,490 vehicles per hour (vph) (per lane) and it is assumed that this capacity is under ideal conditions. The 1,490 value is discussed on page 6 of the attached publication (***Appendix A***). Several factors can lower a roadway's carrying capacity, such as heavy vehicles (trucks and animal storage vehicles), lack of shoulders, and visibility. A 15% discount factor was applied to the 1,490 capacity to account for these factors, resulting in a capacity of 1,270 vph.

Road and intersection improvements are contemplated along West Lilac Road and Circle R Drive, and Nelson Way would be modernized to meet County Private Road Standards which are not reflected in the above VPH capacities. In our professional estimation, these improvements would increase the capacity of the roadways and intersections as explained below.

West Lilac Road:

1. Hwy 395 & WLR Intersection:

   The existing intersection is controlled by a stop sign (east-west) and has free movement (north-south). The intersection has an east-west travel lane in each direction along with a short westbound "turn-off" for northbound traffic. Lilac Hills Ranch ("Project") would improve the existing intersection by adding a 3-phased signal and widening the westbound approach to 2 12-foot travel lanes, a 375' dedicated left-turn lane, and a 375' shared right-turn/thru lane.

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2. Hwy395 to I-15 Bridge Segment:

   The existing improved roadway is approximately 40-feet in width, with a 12-foot lane in each direction and an 8-foot shoulder on each side. The proposed improvements provide a 2-foot parkway along the north, a 6-foot shoulder, (2) 12-foot travel lanes, a 6-foot shoulder on the south and a 6-foot multi-purpose pathway.

3. I-15 Bridge Segment:

   The existing Bridge width is 40-feet, with (2) 8-foot shoulders and (2) 12-foot travel lanes. The proposed improvements provide a 6-foot shoulder on the north, (2) 12-foot travel lanes, a 4-foot shoulder on the south and a 6-foot sidewalk.

4. I-15 Bridge to Project Boundary Segment:

   The existing improved roadway is approximately 40-feet in width, with a 12-foot lane in each direction and an 8-foot shoulder on each side. The proposed improvements provide a 2-foot parkway along the north, a 6-foot shoulder, (2) 12-foot travel lanes, a 6-foot shoulder on the south and a 6-foot multi-purpose pathway.

5. Project Boundary to Westerly Roundabout Segment:

   The existing improved roadway is approximately 24-feet in width, with a 11-foot lane in each direction and a 1-foot shoulder on each side.

   The proposed improvements provide a 2-foot parkway along the north, two 5-foot bike lanes on each side, a 15-foot travel lane on the north, a center 10-foot raised median, a 13-foot travel lane on the south side, an 8-foot parking area and a 15-foot landscaped parkway.

6. Westerly Roundabout:

   The Project application includes a 5-segment Roundabout which would be designed to accommodate two 12-foot travel lanes in-bound and out-bound. The importance of this Roundabout for traffic flow during an emergency or evacuation, is that if power is cut off for any duration of time, this Roundabout would still function at a maximum capacity due to the fact that it does not rely on signalization for turn movements. The roundabout is also designed so that it can accommodate parallel 40-foot long trucks, fire engines and horse trailers.

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7. Project Boundary to Easterly Roundabout Segment:

   The existing roadway along the project frontage is approximately 24-feet in width, with a 11-foot lane in each direction and a 1-foot shoulder on each side. The proposed improvements provide two 8-foot shoulders, two 12-foot travel lanes and a 30-foot parkway on the south side.

8. Easterly Roundabout:

   The Project application proposes a 4-segment Roundabout which would be designed to accommodate two 12-foot travel lanes in-bound and out-bound. This roundabout is also designed so that it can accommodate parallel 40-foot long trucks, fire engines and horse trailers.

9. Clear-space Easement (WLR & Covey Ln):

   Also proposed is the elimination of an existing sharp curve (offsite), south of Covey Lane to improve the sight distance to meet County Public Road Standards.

Circle R Drive:

1. Clear-space Easement (Circle R Drive & Mtn Ridge Road):

   Also proposed is the elimination of an existing sharp curve (offsite) along Circle R Drive, east of Mountain Ridge Road, which would improve sight distance to meet County Public Road Standards.

2. Circle R Drive & Hwy395 Intersection:

   The existing intersection is a one-way stop-controlled intersection. The proposed improvement consists of adding signal control and dedicated left and right turn lanes.

Nelson Way:

1. Project Boundary to Old Highway 395:

   The existing improved roadway is approximately 15 to 25-feet in width, with a 7 to 12-foot lane in each direction and in some areas a 1 to 2-foot shoulder on each side. The road currently turns to gravel midway between Old Highway 395 and the Project Boundary, but the right-of-way is graded and cleared to allow for road improvements and paving to be added.

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The proposed improvements would modernize the road to meet County Private Road Standards, which includes a 24-foot paved roadway (including two 12-foot travel lanes) on a 28-foot graded roadbed.

Gopher Canyon Road & I-15 Ramps (south and north)

The existing I-15 on and off ramps are currently one-way stop controlled. Proposed improvements consist of adding a traffic signal at both ramps.

West Lilac Road Improvements Capacity

The County of San Diego contains traffic volume capacities for Light Collector 2.2E and 2.2F classifications. The only difference between these two classifications is shoulder width (2 feet vs 8 feet). The LOS D capacity increase is 25% with the wider shoulders. Not all of West Lilac Road will have an increase in shoulder width and taking this into account and the other physical improvements being completed along West Lilac Road a capacity increase of ½ this amount (12.5%) is estimated.

Circle R Drive Capacity

The improvements to Circle R Drive are relatively minimal but are expected to increase capacity by about 3%.

Nelson Way Capacity

By modernizing Nelson Way to a County Private Road Standard for the entire length, it is expected to provide a capacity of about 80% of the base capacity of 1,490 VPH discussed above, 1,192 VPH.

Summary

The table below summarizes our findings of the road carrying capacity of West Lilac Road and Circle R Drive west of the Lilac Hills Ranch Development under today's conditions and with the improvements listed above.

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Road Section	Total Travel Lanes	Capacity(VPH) Per Lane
West Lilac Road: Existing	2	1,270
West Lilac Road: Improved	2	1,429
Circle R Drive: Existing	2	1,270
Circle R Drive: Improved	2	1,308
Nelson Way: Existing	2*	*
Nelson Way: Modernized	2	1,192

*Existing Nelson Way is a 15-25 foot width private roadway that is partially improved and gravel for much of its length. Little to no capacity exists today.

Please call me with any questions.

Thank you.

cc: File

APPENDIX A

SIMPLIFIED HIGHWAY CAPACITY CALCULATION METHOD FOR THE HIGHWAY PERFORMANCE MONITORING SYSTEM

Simplified Highway Capacity Calculation Method for the Highway Performance Monitoring System

October 2017

U.S. Department of Transportation
Federal Highway Administration

Notice

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16. Abstract

The Federal Highway Administration's Highway Performance Monitoring System (HPMS) provides information on the extent, condition, performance, use, and operating characteristics of the Nation's highways. Each year State Transportation Agencies must submit HPMS data to the FHWA. The Sample Panel portion of HPMS provides detailed statistical data on a randomly selected sample of roadway sections on the State's public road system. One data item submitted for sample panels is capacity (Sample Panel Data Item 69). The HPMS Field Manual guidance for capacity is as follows: "The capacity of a roadway facility is the maximum reasonable hourly rate at which vehicles can be expected to transverse a point or a uniform section of lane or roadway during a given time period under prevailing road-way, traffic, and control conditions." Reasonable expectancy is that the stated capacity can be achieved repeatedly. The Highway Capacity Manual (HCM) provides procedures, formulas, graphics, and tables in assessing roadway capacity. This item should be estimated based on procedures consistent with the HCM.

The results of the project are the development of:
1. Capacity computation methods that use HPMS data items to the extent possible, and can be used to validate HPMS Sample Panel Item 69; and
2. Simplified Methodologies to Create Generalized Level of Service (LOS) Lookup Tables. Both of these results use the most recent HCM methodologies. Specifically, it was found that the procedures in National Cooperative Research Program Report 825 ("Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual") could be easily adapted to the types of data present in HPMS.

17. Key Words Highway Capacity Manual; level of service; generalized service volumes; HPMS data	18. Distribution Statement No restrictions		
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CHAPTER 1. INTRODUCTION

The Federal Highway Administration's (FHWA) Highway Performance Monitoring System (HPMS) provides information on the extent, condition, performance, use, and operating characteristics of the Nation's highways. Each year State Transportation Agencies (STA) must submit HPMS data to the FHWA. Certain data items, including length, lane-miles, and travel are required for all public roads that are eligible for Federal-aid highway funds. The data items reported for all public roads are known as full extent data items. In addition to full extent data items, there are data items that are reported on a partial extent basis, which are known as sample panel data items. The sample panel provides more detailed statistical data on a randomly selected sample of roadway sections in the State's public road system. One data item submitted for sample panels is capacity (Sample Panel Data Item 69). The HPMS Field Manual guidance for capacity is as follows: "The capacity of a roadway facility is the maximum reasonable hourly rate at which vehicles can be expected to transverse a point or a uniform section of lane or roadway during a given time period under prevailing roadway, traffic, and control conditions. Reasonable expectancy is that the stated capacity can be achieved repeatedly. The *Highway Capacity Manual (HCM)* provides procedures, formulas, graphics, and tables in assessing roadway capacity. This item should be estimated based on procedures consistent with the HCM. All urban and rural capacity for freeways and other multilane facilities is for the peak direction. If a rural facility has two or three lanes with one-way operation, it is considered to be a multilane facility for determining capacity. The capacity for rural facilities with two or three lanes and two-way operation is for both directions."

The objectives of the project are to develop:

1. Capacity computation methods that: 1) use HPMS data items to the extent possible, and 2) can be used to validate HPMS Sample Panel Item 69.
2. Simplified methodologies to create generalized level of service (LOS) lookup tables.
3. These two objectives were covered by tasks 2 and 3 and are presented as separate sections below (figure 1).

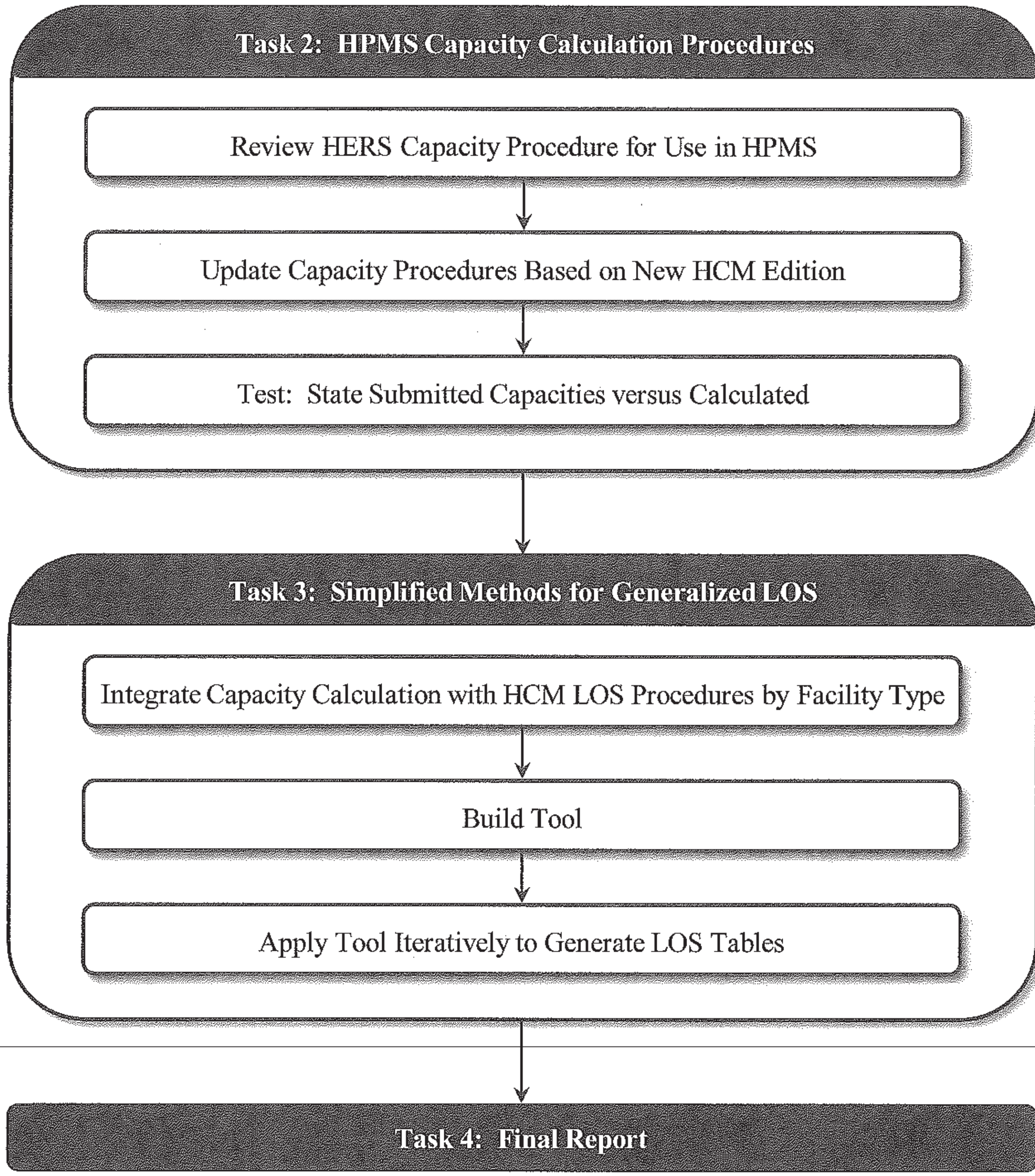

Figure 1. Flow chart. Overview of major task activities.

CHAPTER 2. DEVELOPMENT OF CAPACITY COMPUTATION METHODS

REVIEW HIGHWAY ECONOMIC REQUIREMENTS SYSTEM CAPACITY PROCEDURES FOR USE IN HIGHWAY PERFORMANCE MONITORING SYSTEM

The Highway Economic Requirements System (HERS) capacity procedures, completed in 2014, adapted the Highway Capacity Manual (HCM) 2010 capacity calculation methods.[1] It utilized Highway Performance Monitoring System (HPMS) data items to the maximum extent but also had to make many assumptions about default values. The HPMS data items that were used are shown in table 1. HCM capacity input data that had to set to default values are as follows:

- **Freeways**—ramp density, peak-hour factor, and driver population factor.
- **Multilane highways**—driveway density, peak-hour factor, and driver population factor.
- **Signals**—lane group assignments (based on presence of right- and left-turning lanes), grade, number of parking maneuvers per hour, bus blockage, area type, lane utilization, left- and right-turn lanes.
- **Rural two-lane highways**—driveway density and peak-hour factor.
- **Stop signs**—conflicting flow rates, base critical gap, follow-up times, and assignment of turning movements to lanes.

The project team compared the HERS procedures with National Cooperative Highway Research Program (NCHRP) Project 07-22, Planning and Preliminary Engineering Applications Guide to the HCM. The report has recently been published as NCHRP Report 825.[2] Its midlevel analysis methods for capacity are very similar to the HERS procedures which preceded it. Where the two methods differ, we developed a test procedure using 2014 HPMS data to compare the capacity values obtained with each method. The results of the comparison are as follows.

Table 1. Highway performance monitoring system data items used in the highway economic requirements system capacity calculation procedures.

	Facility Type				
HPMS Data Item	**Freeways**	**Multilane**	**Signals**	**Rural Two Lane**	**Stop Sign**
Lane Width	●	●	●	●	–
Right Shoulder Width	●	●	–	●	–
Left Shoulder Width	–	●	–	–	–
Through Lanes	●	●	–	–	●
Peak Lanes	–	–	–	–	●
% SU Trucks	●	●	●	●	●

[1] Task 6 Technical Memo: Procedures for Estimating Highway Capacity, May 2014.

[2] Dowling, Richard et al., *Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual*, NCHRP Report 825, 2016, http://www.trb.org/NCHRP/Blurbs/174958.aspx.

Table 1. Highway performance monitoring system data items used in the highway economic requirements system capacity calculation procedures (continuation).

	Facility Type				
HPMS Data Item	**Freeways**	**Multilane**	**Signals**	**Rural Two Lane**	**Stop Sign**
% Comb. Trucks	●	●	●	●	●
Median Type	–	–	–	–	–
No. Other Intersections	–	●	–	●	–
Right-Turn Lanes	–	–	●	–	●
Left-Turn Lanes	–	–	●	–	●
K-factor	–	–	●	●	●
D-factor	–	–	●	●	●
Percent Green Lime	–	–	●	–	–
Terrain	●	●	–	●	–
Functional Class	–	–	–	–	●
Speed Limit[a]	–	–	–	●	–

[a] Speed limit is generally used in the computation of service measures but except for rural two-lane highways is not used in capacity calculation.

Freeways

The HERS capacity procedure is very similar to that of NCHRP 825. The HERS procedure follows the HCM procedure verbatim, with adjustments for lane width, lateral clearance, interchange density, heavy trucks, and the peak-hour factor. The NCHRP method excludes the peak-hour factor. However, their formulations for the final capacity value are slightly different. When applied to 2014 Sample Panel data (21,940 freeway sections), HERS-developed capacity values are five percent lower than those of NCHRP 825. We consider this difference negligible, ***so we recommend the NCHRP 825 method for capacity and (Level of Service) LOS calculations.***

$$Capacity = \frac{\left(2{,}200 + 10 \times (\min(70, FFS) - 50)\right)}{1 + \%HV/100} \times Lanes$$

Where: FFS = free flow speed
%HV = percent of heavy vehicles (decimal), with heavy vehicles consisting of trucks with more than four tires, buses, and recreational vehicles Multilane Highways

Figure 2. Equation. Capacity calculation for freeway capacity.

$$FFS = 75.4 - f_{LW} - f_{RLC}$$

Where: f_{LW} = adjustment for lane width (HPMS data item 34)
f_{RLC} = adjustment for right side lateral clearance (HPMS data item 38)
Lanes = HPMS data item 10

Figure 3. Equation. Calculation or free flow speed for freeways.

The HERS method follows the HCM faithfully. NCHRP 825 recommends using the HCM method, so the two methods are the same. ***Therefore, the HCM method (which also is the HERS method) is recommended for capacity and LOS calculations.***

Multilane Highways

The HERS method follows the HCM faithfully. NCHRP 825 recommends using the HCM method, so the two methods are the same. ***Therefore, the HCM method (which is also the HERS method) is recommended for capacity and LOS calculations.***

$$Capacity = BaseCapacity \times f_{HV} \times Lanes$$

Where: $BaseCapacity = 1{,}000 + 20 \times FFS; for\ FFS \leq 60; 2{,}200\ otherwise$

f_{HV} = adjustment for heavy vehicles

$$f_{HV} = \frac{1}{(1 + PT \times (ET - 1))}$$

PT = HPMS data item 23 + HPMS data item 25
ET = 1.5 if HPMS data item 2 indicates a forma urban area; otherwise:
= 1.5 if HPMS data item 44 = 1
= 2.5 if HPMS data item 44 = 2
= 4.5 if HPMS data item 44 = 3
FFS = HPMS data item 14 + 5
Lanes = HPMS data item 10

Figure 4. Equation. Calculation of capacity for multilane highways.

Signalized Highways

Different philosophies are taken between the HERS method and NCHRP 825 method. In the HERS method, the capacity of the entire approach is calculated. This done because in HERS' speed estimation, turning movement volumes are not available in HPMS and the volume on the entire segment is used. In the NCHRP 825 method, only the through movement is used. (It offers a solution if only total volume is available: if exclusive left-turn and right lanes exist, deduct 10 percent for each.) To be comparable, we used the HERS method to analyze just the through movement. In the HERS method, saturation flow rate is adjusted downward for lane width, heavy vehicles, parking, and the peak-hour factor. In the NCHRP 825 method, saturation flow rate is unadjusted. As a result, when applied to the Sample Panel data (26,504 signalized sections), the HERS method produces capacities that are 14 percent lower than NCHRP 825. The main problem with the HERS method is that the turning lane and their volume assignments are based on many assumptions. ***Because of its simplicity in dealing with turning movements, we recommend the NCHRP 825 method for capacity and LOS calculations.***

$$Capacity = \frac{g}{C} \times Lanes \times 1{,}900$$

Where: g/C = HPMS data item 30
Lanes = HPMS data item 10

Figure 5. Equation. Calculation of capacity for signalized highways.

Two-Lane Highways with No Traffic Control

Completely different approaches are taken by the two methods. The HERS method assumes that no traffic control is present while the NCHRP 825 method includes delay at intersections if they are present. The HERS procedure calculates two-way capacity while the NCHRP method uses one-way capacity and assigns a fixed value, either 1,450 or 1,490 vehicles per hour, but capacity is not used in the calculation of LOS—it is only used to create a v/c ratio for screening. Because of this difference, no tests were made. The HERS method is quite complex, accounting for grades, heavy vehicles, peak-hour factor, and percent no passing zones. The NCHRP 825 approach is simpler for capacity, but the calculation of speed and associated LOS basically follows the same method as for the capacity calculation in HERS. This is because capacity is "backcalculated" in the HERS method so that the HERS speed equations, which are based on the AADT-to-capacity ratio, can be used. In the NCHRP 825 method, capacity is largely irrelevant for two-lane highway LOS as it is based on average travel speed or percent of time following. ***Because it is more closely tied to HCM methods for the calculation of average travel speed (the basis for LOS), we recommend the NCHRP 825 method for capacity (one-way) and LOS calculations. That is, the one-way capacity is set at 1,490 vehicles per hour.***

Stop-Controlled Highways

Very different capacity calculations are used in the HCM 2010 depending on whether an intersection has two-way stop control or all-way stop control. Unfortunately, it is impossible to distinguish the two conditions with HPMS data. Both HERS and NCHRP 825 procedures are complex and highly dependent on turning movements on all the approaches. The HERS procedure is based on the HCM 2000 procedure for two-way stop-controlled intersections. It is data intensive and makes many assumptions about turning movements based on the presence of turning lanes. In contrast, the NCHRP 825 procedure uses the highly simplified adaptation of the HCM procedure for all-way stop control and a more complex procedure for two-way stop control which is based on the update to the HCM 2010. For this reason, we did not run any comparisons between the two methods. ***Because, the two-way stop control procedures in NCHRP 825 is***

based on the recently updated version of the HCM 2010, we recommend that the NCHRP 825 procedure be used for capacity and LOS calculations. In doing so, it is assumed that all stop control is two-way.

Capacity = *1,200 vehicles/hour; where HPMS data item 10 = 1*

= *1,500 vehicles/hour otherwise*

Figure 6. Equation. Calculation of capacity for stop-controlled highways.

UPDATE CAPACITY PROCEDURES BASED ON NEW HIGHWAY CAPACITY MANUAL EDITION

The Major Update to the HCM 2010 has been released. We reviewed the new procedures against the HERS capacity procedures and found no changes in the way capacity is calculated except for two-way stop-controlled intersections. The NCHRP 825 method is consistent with the new HCM as the researchers had access to the draft chapters. Therefore, the recommendations made above are not changed.

CHAPTER 3. BACKGROUND DEVELOP SIMPLIFIED METHODOLOGIES TO CREATE GENERALIZED LEVEL OF SERVICE (LOS) LOOKUP TABLES

BACKGROUND

This report documents the work performed on Task 3: Develop Simplified Methodologies to Create Generalized Level of Service (LOS) Lookup Tables. At the kickoff meeting it was decided that a stand-alone tool would be built that can interface directly with Highway Performance Monitoring System (HPMS) data. Based on the task 2 assessment, the **National Cooperative Highway Research Program** (NCHRP) Report 825 version of the Highway Capacity Manual (HCM) procedures for calculating LOS has been programmed into this tool.[3] The advantage is that all relevant HPMS data elements could be used. Also, updating would be much easier—all that is required is to change the procedure rather than regenerate the massive lookup table that otherwise would have been created. In addition to the LOS designation for an HPMS section, the actual value of the service measure on which LOS is based will also be reported. It also was decided that generalized service volume tables for each facility would be produced, accounting for all of the nondefault factors that are covered by the NCHRP 825 methodology.

The types of facilities that are included in the analysis are as follows. These follow the facility types covered by the HCM:

- Freeways.
- Multilane highways.
- Rural two-lane highways.
- Signalized highways.
- Stop-controlled highways.

HPMS sections can be grouped into these categories based on their data elements. A hierarchy is used to make these assignments:

- If functional system is one or two, and full access control exists, then the section is a freeway.
- If stop signs exist, then the section is stop controlled.
- If signals exist, then the section is signalized.
- If through lanes are greater than or equal to four, the section is multilane.
- If through lanes are equal to two or three and the urban code indicates rural, the section is rural two lane.

However, a significant number of HPMS Sample Panel sections (about 30,000) cannot be classified using the above scheme. These tend to be two-, three-lane urban highways with no traffic control device on the actual section. Level of Service was not calculated for these

[3] Dowling, Richard et al., *Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual*, NCHRP Report 825, 2016, http://www.trb.org/NCHRP/Blurbs/174958.aspx.

sections. One option for these sections is to treat them as signalized highways with 100 percent green time, but this results in a vast majority in LOS A, which is most likely misleading. Therefore, Level of Service was not calculated for these sections.

DEFAULT VALUES

For freeways and multilane highways, the NCHRP 825 method is followed directly and all of the required data elements are present in the HPMS Sample Panel. For signalized highways, the only data element not present in HPMS is cycle length. The following cycle lengths are assumed:

- **Principal arterials**—120 seconds.
- **Minor arterials**—90 seconds.
- **Collectors**—60 seconds.

For rural two-lane highways, LOS is based on average travel speed (ATS). A greatly simplified method was used for stop-controlled highways because so much of the required data on turning movements and cross-street volumes do not exist in HPMS:

- It is assumed that the section is two-way stop controlled.
- Conflicting flow rates are based on the values in table 2.

Table 2. Conflicting flow rates for two-way stop-controlled highways—vehicles per hour.

	Functional System		
Land Use	**Principal Arterial**	**Minor Arterial**	**Collector**
Rural	100	150	200
Urban	250	500	750

Preliminary analysis of the 2014 HPMS Sample Panel revealed that many data items used to undertake the LOS calculations were missing. As a result, the project team developed default values for the required data items. These were calculated as the median value for records where the data items were present (table 3).

RESULTS

Tables 4 and 5 present the results of applying the HCM-based LOS calculation procedures to the 2014 HPMS Sample Panel data. Tables 6 through 10 show the individual HPMS sections with LOS and service measure attached for each highway type; a separate spreadsheet contains the entire dataset. Tables 11 and 12 provide the LOS ranges for each highway type from the HCM.

Generalized service volume tables are provided in the appendix.

Table 3. Default values for level of service calculation.

HPMS Data Item	Freeways		Multilane			Rural Two Lane
	Urban	**Rural**	**Urban**	**Rural**	**Signalized**	
LANE_WIDTH	12	12	12	12	11	12
SHOULDER_WIDTH_R	10	10	10	10		5
AADT_SINGLE_UNIT	=AADT*0.034	=AADT*0.043	=AADT*0.038	=AADT*0.043		=AADT*0.051
AADT_COMBINATION	=AADT*0.060	=AADT*0.193	=AADT*0.035	=AADT*0.082		=AADT*0.048
K_FACTOR	10	9	10	10	10	11
D_FACTOR	55	55	59	57	57	57
MEDIAN_TYPE			3	2		
SPEED_LIMIT			55	65	40	55
PCT_GREEN_TIME					50	
SIGNAL_TYPE					2	
TERRAIN_TYPE	1	2	1	2		2

Table 4. Level of service for 2014 highway performance monitoring system sample panel—rural sections.

Area Type	Highway Type	Level of Service	No. Sections	Mileage	% of Mileage
Rural	Freeway	A	3,561	18,209	56.3%
Rural	Freeway	B	2,148	8,711	26.9%
Rural	Freeway	C	687	3,402	10.5%
Rural	Freeway	D	270	1,407	4.4%
Rural	Freeway	E	78	343	1.1%
Rural	Freeway	F	88	265	0.8%
Rural	**Freeway**	**A-F Total**	**6,832**	**32,336**	**100.0%**
Rural	Multilane	A	2,624	30,015	89.7%
Rural	Multilane	B	478	2,647	7.9%
Rural	Multilane	C	131	616	1.8%
Rural	Multilane	D	43	91	0.3%
Rural	Multilane	E	13	42	0.1%
Rural	Multilane	F	12	47	0.1%
Rural	**Multilane**	**A-F Total**	**3,301**	**33,459**	**100.0%**
Rural	Rural Two Lane	A	9,559	374,043	77.9%
Rural	Rural Two Lane	B	1,679	33,692	7.0%
Rural	Rural Two Lane	C	1,323	28,683	6.0%
Rural	Rural Two Lane	D	888	18,033	3.8%
Rural	Rural Two Lane	E	1,808	23,353	4.9%
Rural	Rural Two Lane	F	182	2,333	0.5%
Rural	**Rural Two Lane**	**A-F Total**	**15,439**	**480,137**	**100.0%**
Rural	Signalized	A	442	6,921	87.7%
Rural	Signalized	B	101	566	7.2%
Rural	Signalized	C	81	277	3.5%
Rural	Signalized	D	23	30	0.4%
Rural	Signalized	E	15	24	0.3%
Rural	Signalized	F	40	76	1.0%
Rural	**Signalized**	**A-F Total**	**702**	**7,894**	**100.0%**
Rural	Stop Controlled	A	100	1,334	1.0%
Rural	Stop Controlled	B	2,022	127,671	97.6%
Rural	Stop Controlled	C	62	1,359	1.0%
Rural	Stop Controlled	D	10	138	0.1%
Rural	Stop Controlled	E	6	177	0.1%
Rural	Stop Controlled	F	15	74	0.1%
Rural	**Stop Controlled**	**A-F Total**	**2,215**	**130,754**	**100.0%**

Note: Mileage is the expanded mileage—section length times the HPMS expansion factor.

Table 5. Level of service for 2014 highway performance monitoring system sample panel—urban sections.

Area Type	Highway Type	Level of Service	No. Sections	Mileage	% of Mileage
Urban	Freeway	A	3,507	6,338	21.7%
Urban	Freeway	B	3,631	6,465	22.2%
Urban	Freeway	C	3,170	6,445	22.1%
Urban	Freeway	D	2,130	4,397	15.1%
Urban	Freeway	E	975	2,107	7.2%
Urban	Freeway	F	1,695	3,414	11.7%
Urban	**Freeway**	**A-F Total**	**15,108**	**29,166**	**100.0%**
Urban	Multilane	A	5,774	18,605	56.9%
Urban	Multilane	B	2,875	8,616	26.4%
Urban	Multilane	C	1,393	3,632	11.1%
Urban	Multilane	D	508	1,264	3.9%
Urban	Multilane	E	195	304	0.9%
Urban	Multilane	F	147	273	0.8%
Urban	**Multilane**	**A-F Total**	**10,892**	**32,695**	**100.0%**
Urban	Signalized	A	8,759	57,615	56.3%
Urban	Signalized	B	5,495	20,887	20.4%
Urban	Signalized	C	4,558	11,602	11.3%
Urban	Signalized	D	2,061	4,083	4.0%
Urban	Signalized	E	1,336	2,525	2.5%
Urban	Signalized	F	2,918	5,571	5.4%
Urban	**Signalized**	**A-F Total**	**25,127**	**102,284**	**100.0%**
Urban	Stop Controlled	B	1,643	3,358	5.5%
Urban	Stop Controlled	C	7,525	34,253	55.6%
Urban	Stop Controlled	D	1,234	8,657	14.1%
Urban	Stop Controlled	E	559	3,682	6.0%
Urban	Stop Controlled	F	1,839	11,611	18.9%
Urban	**Stop Controlled**	**A-F Total**	**12,800**	**61,560**	**100.0%**

Table 6. Selected highway performance monitoring system freeway sections with level of service and service measures attached.

Highway Type	State Code	Functional System	Route Signing	Route Number	Begin Point	End Point	County Code	Level of Service	Service Measure	Service Measure Value	Expanded Mileage
Freeway	1	1	2	65	182.47	183.53	1	C	Density	21.8	3.61
Freeway	1	1	2	10	29.07	29.073	3	E	Density	44.4	0.00
Freeway	1	1	2	10	29.073	30.258	3	F	Density	51.1	1.26
Freeway	1	1	2	10	30.258	32.77	3	F	Density	58.1	2.68
Freeway	1	1	2	10	32.77	34.5	3	F	Density	58.1	1.84
Freeway	1	1	2	10	34.5	34.98	3	F	Density	58.1	0.51
Freeway	1	1	2	10	34.984	35.181	3	F	Density	49.8	0.20
Freeway	1	1	2	10	35.181	38.775	3	E	Density	38.6	3.60
Freeway	1	1	2	10	38.775	41.3	3	C	Density	18.5	2.53
Freeway	1	1	2	10	41.3	44.31	3	C	Density	18.5	3.01
Freeway	1	1	2	10	44.32	44.89	3	B	Density	13.8	0.57
Freeway	1	1	2	10	44.89	44.899	3	B	Density	13.8	0.01
Freeway	1	1	2	10	58.56	66.29	3	C	Density	19.9	36.99
Freeway	1	1	2	65	32.21	34.07	3	C	Density	21.4	8.90
Freeway	1	1	2	65	34.092	37.77	3	A	Density	9.8	4.70
Freeway	1	1	2	65	37.77	37.88	3	A	Density	7.8	0.14
Freeway	1	1	2	65	107.5	111.81	13	B	Density	12.5	20.62
Freeway	1	1	2	65	120.25	123.87	13	B	Density	13.6	17.32
Freeway	1	1	2	65	126.09	126.44	13	B	Density	13.3	0.52
Freeway	1	1	2	65	128.12	129.66	13	B	Density	12.7	2.29
Freeway	1	1	2	65	130.2	131.11	13	B	Density	15.1	1.36
Freeway	1	1	2	65	131.81	133.93	13	B	Density	15.5	10.14
Freeway	1	1	2	65	135.21	139.6	13	B	Density	15.5	21.01

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Table 7. Selected highway performance monitoring system multilane sections with level of service and service measures attached.

Highway Type	State Code	Functional System	Route Signing	Route Number	Begin Point	End Point	County Code	Level of Service	Service Measure	Service Measure Value	Expanded Mileage
Multilane	6	2		20	14.869	15.231	13	B	Density	17.1	4.34
Multilane	6	2		20	14.869	15.231	13	B	Density	17.1	0.94
Multilane	6	2		20	144.831	144.962	13	B	Density	17.1	0.18
Multilane	6	2		20	144.831	144.962	13	B	Density	17.1	1.57
Multilane	6	2		20	144.831	144.962	13	B	Density	17.1	0.34
Multilane	6	2		20	14.958	15.14	13	B	Density	17.1	0.25
Multilane	6	2		20	14.958	15.14	13	B	Density	17.1	2.18
Multilane	6	2		20	14.958	15.14	13	B	Density	17.1	0.47
Multilane	6	2		50	16.374	16.49	17	C	Density	24.0	0.31
Multilane	6	2		50	16.374	16.49	17	C	Density	24.0	0.13
Multilane	6	2		50	45.959	46.059	17	D	Density	32.7	0.25
Multilane	6	2		50	49.066	49.31	17	C	Density	24.0	0.65
Multilane	6	2		50	49.066	49.31	17	C	Density	24.0	0.28
Multilane	6	2		101	706.865	707.463	23	C	Density	21.9	1.51
Multilane	6	2		111	1.04	1.048	25	B	Density	17.7	0.01
Multilane	6	2		111	1.048	2.076	25	C	Density	19.5	1.03
Multilane	6	2		111	2.076	2.56	25	C	Density	19.0	0.51
Multilane	6	2		111	2.076	2.56	25	C	Density	19.0	0.48
Multilane	6	2		111	11.7	11.708	25	C	Density	19.0	0.01
Multilane	6	2		111	11.7	11.708	25	C	Density	19.0	0.01
Multilane	6	2		33	89.04	89.491	29	A	Density	5.5	1.75

Table 8. Selected highway performance monitoring system rural two-lane sections with level of service and service measures attached.

Highway Type	State Code	Functional System	Route Signing	Route Number	Begin Point	End Point	County Code	Level of Service	Service Measure	Service Measure Value	Expanded Mileage
Rural two lane	29	3	3	59	90.64	96.586	21	A	ATS	66.0	28.53
Rural two lane	29	3	3	59	96.586	99.204	21	A	ATS	66.0	12.56
Rural two lane	29	3	3	59	99.204	101.211	21	A	ATS	66.0	9.63
Rural two lane	29	3	4	53	3.078	9.02	23	A	ATS	59.0	18.99
Rural two lane	29	3	3	54	88.448	93.976	29	A	ATS	66.0	17.67
Rural two lane	29	3	3	54	93.976	97.224	29	A	ATS	64.0	15.58
Rural two lane	29	3	3	54	104.956	107.78	29	A	ATS	67.0	9.84
Rural two lane	29	3	4	72	157.529	161.565	31	A	ATS	61.0	12.90
Rural two lane	29	3	3	24	85.633	87.797	33	A	ATS	61.0	3.88
Rural two lane	29	3	4	21	147.476	148.761	35	A	ATS	61.0	2.31
Rural two lane	29	3	4	291	40.983	43.001	37	B	ATS	54.0	9.68
Rural two lane	29	3	3	54	40.832	44.162	39	A	ATS	67.0	5.97
Rural two lane	29	3	3	24	107.134	109.726	41	A	ATS	67.0	8.28

Table 8. Selected highway performance monitoring system rural two-lane sections with level of service and service measures attached (continuation).

Highway Type	State Code	Functional System	Route Signing	Route Number	Begin Point	End Point	County Code	Level of Service	Service Measure	Service Measure Value	Expanded Mileage
Rural two lane	29	3	3	60	65.175	66.136	43	A	ATS	63.0	3.35
Rural two lane	29	3	3	61	0	2.413	45	A	ATS	62.0	7.71
Rural two lane	29	3	4	92	22.623	26.498	47	B	ATS	55.0	12.38
Rural two lane	29	3	4	8	4.782	14.947	55	A	ATS	61.0	18.24
Rural two lane	29	3	4	8	19.762	22.989	55	A	ATS	59.0	10.31
Rural two lane	29	3	4	8	23.454	33.377	55	A	ATS	61.0	31.71
Rural two lane	29	3	3	65	213.933	215.239	59	A	ATS	66.0	4.17
Rural two lane	29	3	4	6	47.655	51.941	61	A	ATS	66.0	13.70

Table 9. Selected highway performance monitoring system signalized sections with level of service and service measures attached.

Highway Type	State Code	Functional System	Route Signing	Route Number	Begin Point	End Point	County Code	Level of Service	Service Measure	Service Measure Value	Expanded Mileage
Signalized	5	3	4	22	2.56	3.2	131	C	ATS	25.6	4.88
Signalized	5	3	4	22	3.2	3.58	131	A	ATS	35.7	2.90
Signalized	5	3	4	22	8.91	10.64	131	A	ATS	45.9	10.63
Signalized	5	3	3	71	3.91	4.92	131	A	ATS	41.2	7.70
Signalized	5	3	6		0	1.88	131	A	ATS	36.7	11.55
Signalized	5	3	6		0	1.88	131	A	ATS	36.7	11.55
Signalized	5	3	6		0	1.88	131	A	ATS	36.7	11.55
Signalized	5	3	6		0	1.88	131	A	ATS	36.7	11.55
Signalized	5	3	3	71	12.47	13.34	133	A	ATS	44.3	3.62
Signalized	8	3	10		1.009	1.989	1	B	ATS	39.0	7.14
Signalized	8	3	10		0	0.48	1	D	ATS	18.0	3.50
Signalized	8	3	10		1.06	2.08	1	A	ATS	43.6	7.43
Signalized	8	3	10		2.08	4.19	1	B	ATS	39.2	6.30
Signalized	8	3	4	2	3.039	4.401	1	B	ATS	43.5	9.92
Signalized	8	3	10		2.32	3.38	1	A	ATS	42.5	16.90
Signalized	8	3	4	44	0.435	1.807	1	F	ATS	13.8	10.00
Signalized	8	3	4	44	0.435	1.807	1	F	ATS	13.8	10.00
Signalized	8	3	3	160	229.351	230.428	3	C	ATS	36.7	7.62
Signalized	8	3	10		7.82	8.83	5	B	ATS	32.9	16.11
Signalized	8	3	10		0	1.11	5	D	ATS	22.5	17.70
Signalized	8	3	10		2.1	3.1	5	B	ATS	32.2	15.95

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Table 10. Selected highway performance monitoring system stop-controlled sections with level of service and service measures attached.

Highway Type	State Code	Functional System	Route Signing	Route Number	Begin Point	End Point	County Code	Level of Service	Service Measure	Service Measure Value	Expanded Mileage
Stop Control	1	5	1	1046	0.12	0.83	33	C	Delay	16.0	1.22
Stop Control	1	5	1	1386	0.294	1.12	33	C	Delay	16.0	1.41
Stop Control	1	5	6	30	5.335	7.2	35	B	Delay	10.2	75.01
Stop Control	1	5	6	85	1.368	6.63	37	B	Delay	10.3	211.63
Stop Control	1	5	6	101	0	1.55	39	C	Delay	16.0	9.61
Stop Control	1	5	6	687	0.07	0.71	39	C	Delay	15.9	3.97
Stop Control	1	5	6	19	0	1.52	39	C	Delay	16.1	9.42
Stop Control	1	5	6	36	7.41	8.17	43	C	Delay	17.3	15.85
Stop Control	1	5	6	11	1.84	6.67	45	B	Delay	10.3	194.25
Stop Control	1	5	6	50	1.534	3.38	45	C	Delay	17.9	38.50
Stop Control	1	5	6	375	0.104	0.69	45	C	Delay	16.3	0.96
Stop Control	1	5	6	377	0	0.31	45	C	Delay	15.7	0.51
Stop Control	1	5	6	23	4.5	7.24	51	C	Delay	17.2	10.80
Stop Control	1	5	6	1	10.858	17	53	B	Delay	10.3	247.02

Table 10. Selected highway performance monitoring system stop-controlled sections with level of service and service measures attached (continuation).

Highway Type	State Code	Functional System	Route Signing	Route Number	Begin Point	End Point	County Code	Level of Service	Service Measure	Service Measure Value	Expanded Mileage
Stop Control	1	5	6	49	1.132	1.46	53	D	Delay	25.8	20.19
Stop Control	1	5	6	5039	0.9	1.5	53	C	Delay	20.1	12.51
Stop Control	1	5	6	15	0	1.43	55	C	Delay	20.2	9.01
Stop Control	1	5	6	185	0	1.86	55	C	Delay	18.2	11.72
Stop Control	1	5	6	185	1.869	2.65	55	C	Delay	18.6	4.92
Stop Control	1	5	1	419	4.238	4.97	55	C	Delay	18.7	4.61
Stop Control	1	5	1	810	0	0.88	55	C	Delay	16.3	1.20

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Table 11. Level of service ranges by highway type.

	Freeway	Multilane	Rural Two Lane	Stop Controlled
Service Measure	**Density**	**Density**	**Average Travel Speed (ATS)**	**Delay**
Level of Service A	<= 11	<= 11	> 55	<= 10
Level of Service B	> 11-18	> 11-18	> 50-55	> 10-15
Level of Service C	> 18-26	> 18-26	> 45-50	> 15-25
Level of Service D	> 26-35	> 26-35	> 40-45	> 25-35
Level of Service E	> 35-45	> 35-45	<= 40	> 35-50
Level of Service F	> 45 or where demand > capacity	> 45 or where demand > capacity	Demand > capacity	> 50

Notes: Density is measured as passenger cars per mile, per lane. ATS is measured as miles per hour. Delay is measured in seconds per vehicle.

Table 12. Level of service ranges for signalized highways.

Base-Free Flow Speed	Average Travel Speed					
	Level of Service A	**Level of Service B**	**Level of Service C**	**Level of Service D**	**Level of Service E**	**Level of Service F**
>= 55	> 44	> 37	> 28	> 22	> 17	<= 17
50	> 40	> 34	> 25	> 20	> 15	<= 15
45	> 36	> 30	> 23	> 18	> 14	<= 14
40	> 32	> 27	> 20	> 16	> 12	<= 12
35	> 28	> 23	> 18	> 14	> 11	<= 11
30	> 24	> 20	> 15	> 12	> 9	<= 9
<= 25	>20	> 17	> 13	> 10	> 8	<= 8

APPENDIX A. GENERALIZED SERVICE VOLUME TABLES

The service volumes in the tables are the maximum values that can be maintained and still be within the Level of Service (LOS) range. For example in the first row of the freeway table, if the actual volume is less than or equal to 46,100, then it is LOS B. Therefore, the service volumes in the tables are the **maximum** volumes that can be achieved for that LOS category.

For roadways that are dual carriageways, AADT should be divided by two before entering the tables.

Table 13. Freeway generalized service volume table.

Area Type	Number Lanes	Truck Percent	Level of Service B Service Volume	C Service Volume	D Service Volume	E Service Volume
Rural						
	4	0	46,100	62,000	74,800	84,700
		10	43,900	59,000	71,200	80,700
		20	41,900	56,300	68,000	77,000
		30	40,100	53,900	65,000	73,700
	6	0	69,200	93,000	112,200	127,100
		10	65,900	88,500	106,900	121,100
		20	62,900	84,500	102,000	115,600
		30	60,100	80,800	97,600	110,500
	8	0	92,200	124,000	149,600	169,500
		10	87,800	118,100	142,500	161,400
		20	83,800	112,700	136,000	154,100
		30	80,200	107,800	130,100	147,400
	10	0	115,300	155,000	187,100	211,900
		10	109,800	147,600	178,100	201,800
		20	104,800	140,900	170,000	192,600
		30	100,300	134,800	162,600	184,200
	12	0	138,400	186,000	224,500	254,300
		10	131,800	177,100	213,800	242,200
		20	125,800	169,100	204,100	231,200
		30	120,300	161,700	195,200	221,100

Table 13. Freeway generalized service volume table (continuation).

Area Type	Number Lanes	Truck Percent	Level of Service B Service Volume	Level of Service C Service Volume	Level of Service D Service Volume	Level of Service E Service Volume
Urban						
	4	0	43,700	60,100	73,100	83,000
		10	41,600	57,200	69,600	79,100
		20	39,700	54,600	66,400	75,500
		30	38,000	52,200	63,600	72,200
	6	0	65,600	90,100	109,700	124,600
		10	62,500	85,800	104,400	118,600
		20	59,600	81,900	99,700	113,200
		30	57,000	78,300	95,400	108,300
	8	0	87,500	120,200	146,200	166,100
		10	83,300	114,400	139,300	158,200
		20	79,500	109,200	132,900	151,000
		30	76,100	104,500	127,200	144,400
	10	0	109,400	150,200	182,800	207,600
		10	104,200	143,100	174,100	197,700
		20	99,400	136,600	166,200	188,700
		30	95,100	130,600	159,000	180,500
	12	0	131,300	180,300	219,400	249,200
		10	125,000	171,700	208,900	237,300
		20	119,300	163,900	199,400	226,500
		30	114,100	156,700	190,800	216,700

Table 14. Multilane highway generalized service volume table.

Area Type	Number Lanes	Truck Percent	Level of Service B Service Volume	C Service Volume	D Service Volume	E Service Volume
Rural						
	4	0	42,000	57,300	69,600	80,000
		10	39,900	54,600	66,300	76,100
		20	38,100	52,100	63,300	72,700
		30	36,500	49,900	60,600	69,500
	6	0	63,000	86,000	104,500	120,000
		10	59,900	81,900	99,500	114,200
		20	57,200	78,200	95,000	109,000
		30	54,700	74,800	90,900	104,300
	8	0	84,000	114,700	139,300	160,000
		10	79,900	109,300	132,700	152,300
		20	76,300	104,300	126,700	145,400
		30	73,000	99,800	121,200	139,100
	10	0	105,000	143,400	174,200	200,000
		10	99,900	136,600	165,900	190,400
		20	95,400	130,400	158,300	181,800
		30	91,300	124,700	151,500	173,900
Urban						
	4	0	34,500	49,300	61,400	71,600
		10	32,800	47,000	58,400	68,200
		20	31,300	44,800	55,800	65,100
		30	30,000	42,900	53,300	62,300
	6	0	51,700	74,000	92,100	107,500
		10	49,200	70,500	87,700	102,300
		20	47,000	67,300	83,700	97,700
		30	45,000	64,400	80,000	93,400
	8	0	69,000	98,700	122,800	143,300
		10	65,700	94,000	116,900	136,500
		20	62,700	89,700	111,600	130,300
		30	60,000	85,800	106,700	124,600
	10	0	86,200	123,400	153,500	179,100
		10	82,100	117,500	146,200	170,600
		20	78,400	112,200	139,500	162,800
		30	75,000	107,300	133,400	155,700

Table 15. Signalized highway generalized service volume table.

Number Lanes	% Green Time	Speed Limit	Level of Service B Service Volume	Level of Service C Service Volume	Level of Service D Service Volume	Level of Service E Service Volume
2	40	35	12,800	14,900	16,400	18,700
		40	12,600	14,400	15,900	17,700
		45	12,000	14,200	15,500	17,400
		50	11,800	13,800	15,200	16,700
		55	12,300	14,100	15,400	16,900
		60	12,700	14,300	15,500	17,100
	45	35	14,600	16,900	18,500	21,100
		40	14,400	16,300	18,000	20,000
		45	13,900	16,100	17,600	19,700
		50	13,600	15,700	17,200	18,900
		55	14,200	16,000	17,400	19,100
		60	14,600	16,200	17,600	19,300
	50	35	16,500	18,900	20,700	23,600
		40	16,300	18,300	20,100	22,300
		45	15,700	18,100	19,600	22,000
		50	15,500	17,700	19,200	21,100
		55	16,100	17,900	19,500	21,400
		60	16,400	18,100	19,600	21,500
	55	35	18,400	20,900	22,900	26,000
		40	18,100	20,300	22,200	24,700
		45	17,600	20,000	21,700	24,300
		50	17,400	19,600	21,300	23,400
		55	17,900	19,900	21,500	23,600
		60	18,300	20,100	21,700	23,800
	60	35	20,300	22,900	25,100	28,500
		40	20,000	22,200	24,400	27,000
		45	19,500	22,000	23,800	26,600
		50	19,300	21,500	23,300	25,600
		55	19,800	21,800	23,600	25,800
		60	20,200	22,100	23,800	26,100

Table 15. Signalized highway generalized service volume table (continuation).

Number Lanes	% Green Time	Speed Limit	Level of Service B Service Volume	C Service Volume	D Service Volume	E Service Volume
2	65	35	22,200	25,000	27,300	31,000
		40	21,900	24,200	26,500	29,400
		45	21,400	24,000	25,900	28,900
		50	21,200	23,500	25,400	27,800
		55	21,700	23,800	25,700	28,100
		60	22,100	24,000	25,900	28,300
	70	35	24,100	27,000	29,500	33,500
		40	23,800	26,200	28,700	31,700
		45	23,300	26,000	28,000	31,200
		50	23,100	25,400	27,500	30,100
		55	23,600	25,800	27,800	30,400
		60	24,000	26,000	28,000	30,600
	75	35	26,000	29,100	31,700	36,000
		40	25,700	28,200	30,800	34,100
		45	25,200	28,000	30,100	33,600
		50	25,000	27,400	29,600	32,300
		55	25,500	27,700	29,900	32,700
		60	25,900	28,000	30,100	32,900
	80	35	27,900	31,100	33,900	38,500
		40	27,600	30,300	33,000	36,500
		45	27,100	30,000	32,300	35,900
		50	26,900	29,400	31,700	34,600
		55	27,400	29,700	32,000	35,000
		60	27,800	30,000	32,300	35,200
4	40	35	27,400	30,600	33,300	37,800
		40	27,100	29,700	32,400	35,900
		45	26,500	29,400	31,700	35,300
		50	26,200	28,800	31,100	34,000
		55	26,800	29,200	31,400	34,300
		60	27,300	29,500	31,700	34,600

Table 15. Signalized highway generalized service volume table (continuation).

Number Lanes	% Green Time	Speed Limit	B Service Volume	C Service Volume	D Service Volume	E Service Volume
			Level of Service			
4	45	35	31,100	34,500	37,600	42,700
		40	30,700	33,600	36,600	40,500
		45	30,100	33,300	35,800	39,900
		50	29,800	32,600	35,100	38,400
		55	30,500	33,000	35,500	38,800
		60	30,900	33,400	35,800	39,100
	50	35	34,700	38,500	41,900	47,600
		40	34,400	37,500	40,800	45,100
		45	33,700	37,100	39,900	44,400
		50	33,500	36,400	39,200	42,800
		55	34,100	36,900	39,600	43,200
		60	34,600	37,200	39,900	43,600
	55	35	38,400	42,600	46,300	52,500
		40	38,100	41,400	45,100	49,800
		45	37,400	41,000	44,100	49,000
		50	37,100	40,200	43,200	47,200
		55	37,800	40,700	43,700	47,700
		60	38,300	41,100	44,100	48,100
	60	35	42,100	46,600	50,700	57,400
		40	41,800	45,400	49,300	54,400
		45	41,100	44,900	48,200	53,600
		50	40,800	44,100	47,300	51,700
		55	41,500	44,600	47,800	52,200
		60	42,000	45,000	48,300	52,600
	65	35	45,900	50,700	55,100	62,300
		40	45,500	49,300	53,600	59,200
		45	44,800	48,900	52,400	58,300
		50	44,500	48,000	51,500	56,200
		55	45,200	48,500	52,000	56,700
		60	45,700	49,000	52,400	57,100

Table 15. Signalized highway generalized service volume table (continuation).

Number Lanes	% Green Time	Speed Limit	Level of Service B Service Volume	C Service Volume	D Service Volume	E Service Volume
4	70	35	49,600	54,700	59,500	67,300
		40	49,200	53,300	57,900	63,900
		45	48,500	52,800	56,600	62,900
		50	48,200	51,900	55,600	60,700
		55	48,900	52,400	56,200	61,200
		60	49,500	52,900	56,700	61,700
	75	35	53,400	58,800	63,900	72,300
		40	53,000	57,300	62,200	68,600
		45	52,200	56,800	60,900	67,600
		50	51,900	55,800	59,800	65,200
		55	52,700	56,400	60,400	65,800
		60	53,200	56,900	60,900	66,300
	80	35	57,200	63,000	68,400	77,300
		40	56,800	61,300	66,600	73,400
		45	56,000	60,800	65,100	72,300
		50	55,700	59,700	64,000	69,700
		55	56,400	60,400	64,600	70,400
		60	57,000	60,900	65,200	70,900
6	40	35	41,700	46,100	50,200	56,900
		40	41,300	44,900	48,800	53,900
		45	40,600	44,400	47,700	53,100
		50	40,300	43,600	46,800	51,200
		55	41,000	44,100	47,300	51,700
		60	41,500	44,600	47,800	52,100
	45	35	47,100	52,000	56,600	64,100
		40	46,700	50,700	55,100	60,800
		45	46,000	50,200	53,900	59,900
		50	45,700	49,300	52,900	57,700
		55	46,400	49,800	53,400	58,300
		60	47,000	50,300	53,900	58,800

Table 15. Signalized highway generalized service volume table (continuation).

Number Lanes	% Green Time	Speed Limit	Level of Service B Service Volume	Level of Service C Service Volume	Level of Service D Service Volume	Level of Service E Service Volume
6	50	35	52,600	58,000	63,100	71,500
		40	52,200	56,500	61,400	67,800
		45	51,400	56,000	60,100	66,800
		50	51,100	55,000	59,000	64,400
		55	51,800	55,600	59,600	65,000
		60	52,400	56,100	60,100	65,500
	55	35	58,100	64,100	69,600	78,800
		40	57,700	62,400	67,800	74,800
		45	56,800	61,800	66,300	73,700
		50	56,500	60,700	65,100	71,000
		55	57,300	61,400	65,700	71,700
		60	57,900	62,000	66,300	72,200
	60	35	63,700	70,100	76,200	86,200
		40	63,200	68,300	74,100	81,800
		45	62,300	67,700	72,500	80,600
		50	62,000	66,500	71,200	77,700
		55	62,800	67,200	71,900	78,400
		60	63,500	67,800	72,600	79,000
	65	35	69,300	76,200	82,700	93,600
		40	68,800	74,200	80,600	88,900
		45	67,800	73,600	78,800	87,500
		50	67,400	72,200	77,400	84,400
		55	68,300	73,100	78,200	85,200
		60	69,000	73,700	78,900	85,900
	70	35	74,900	82,300	89,400	101,100
		40	74,300	80,200	87,000	95,900
		45	73,300	79,500	85,100	94,500
		50	72,900	78,100	83,600	91,100
		55	73,900	78,900	84,500	92,000
		60	74,700	79,700	85,200	92,700

Table 15. Signalized highway generalized service volume table (continuation).

Number Lanes	% Green Time	Speed Limit	Level of Service B Service Volume	C Service Volume	D Service Volume	E Service Volume
6	75	35	80,500	88,500	96,000	108,600
		40	80,000	86,200	93,500	103,100
		45	78,900	85,500	91,500	101,500
		50	78,500	83,900	89,900	97,900
		55	79,500	84,900	90,800	98,800
		60	80,300	85,700	91,600	99,600
	80	35	86,200	94,700	102,700	116,100
		40	85,600	92,300	100,000	110,200
		45	84,500	91,400	97,900	108,600
		50	84,100	89,800	96,100	104,700
		55	85,100	90,800	97,100	105,700
		60	86,000	91,700	97,900	106,500
8	40	35	55,800	61,600	67,000	75,900
		40	55,400	60,000	65,200	72,000
		45	54,500	59,400	63,700	70,900
		50	54,200	58,300	62,600	68,300
		55	55,000	59,000	63,200	69,000
		60	55,700	59,600	63,800	69,500
	45	35	63,100	69,500	75,600	85,600
		40	62,600	67,700	73,500	81,200
		45	61,700	67,100	71,900	80,000
		50	61,300	65,900	70,600	77,100
		55	62,200	66,600	71,300	77,800
		60	62,900	67,200	72,000	78,400
	50	35	70,400	77,500	84,200	95,300
		40	69,900	75,500	82,000	90,500
		45	68,900	74,800	80,200	89,100
		50	68,500	73,500	78,700	85,900
		55	69,400	74,300	79,500	86,700
		60	70,200	75,000	80,200	87,400

Table 15. Signalized highway generalized service volume table (continuation).

Number Lanes	% Green Time	Speed Limit	B Service Volume	C Service Volume	D Service Volume	E Service Volume
8	55	35	77,700	85,500	92,900	105,100
		40	77,200	83,300	90,400	99,800
		45	76,100	82,600	88,500	98,300
		50	75,700	81,100	86,900	94,700
		55	76,700	82,000	87,800	95,600
		60	77,500	82,700	88,500	96,400
	60	35	85,100	93,600	101,600	115,000
		40	84,500	91,200	99,000	109,100
		45	83,300	90,400	96,800	107,500
		50	82,900	88,800	95,100	103,600
		55	84,000	89,700	96,000	104,600
		60	84,900	90,600	96,900	105,400
	65	35	92,600	101,700	110,400	124,900
		40	91,900	99,100	107,500	118,500
		45	90,700	98,200	105,200	116,800
		50	90,200	96,500	103,300	112,600
		55	91,400	97,500	104,400	113,600
		60	92,300	98,400	105,200	114,500
	70	35	100,100	109,900	119,200	134,800
		40	99,300	107,100	116,100	128,000
		45	98,000	106,100	113,600	126,100
		50	97,600	104,200	111,600	121,600
		55	98,800	105,400	112,700	122,700
		60	99,800	106,400	113,700	123,700
	75	35	107,600	118,100	128,100	144,800
		40	106,800	115,100	124,800	137,500
		45	105,400	114,100	122,100	135,500
		50	104,900	112,100	119,900	130,600
		55	106,200	113,300	121,100	131,900
		60	107,300	114,300	122,200	132,900
	80	35	115,200	126,300	137,000	–
		40	114,400	123,100	133,500	297,000
		45	112,900	122,100	130,600	144,900
		50	112,300	119,900	128,300	139,700
		55	113,700	121,200	129,600	141,000
		60	114,800	122,300	130,700	142,100

Table 16. Stop sign-controlled highways generalized service volume table.

Land Use	Functional System	Level of Service B Service Volume	C Service Volume	D Service Volume	E Service Volume
Rural	Princ. Arterial	7,600	11,100	12,400	13,600
	Minor Arterial	6,800	10,200	11,500	12,600
	Collector	5,900	9,300	10,600	11,700
Urban	Princ. Arterial	5,200	8,500	9,800	10,900
	Minor Arterial	1,900	5,200	6,400	7,400
	Collector		2,800	4,000	4,800

Table 17. Rural two-lane highways generalized service volume table.

Speed Limit	Terrain	Truck Pct.	Level of Service B Service Volume	C Service Volume	D Service Volume
45	Flat	0	3,600	8,700	13,900
		2	3,500	8,700	13,900
		4	3,500	8,700	13,900
		6	3,500	8,700	13,900
		8	3,400	8,600	13,900
		10	3,400	8,600	13,900
	Rolling	0	3,600	8,700	13,900
		2	3,500	8,600	13,900
		4	3,400	8,500	13,900
		6	3,300	8,400	13,900
		8	3,300	8,200	13,900
		10	3,200	8,100	13,900
	Mountainous	0	3,600	8,700	13,900
		2	3,200	7,700	12,300
		4	2,800	7,000	11,100
		6	2,600	6,300	10,100
		8	2,400	5,800	9,300
		10	2,200	5,400	8,500
50	Flat	0	8,700	13,900	19,000
		2	8,700	13,900	19,000
		4	8,700	13,900	19,000

Table 17. Rural two-lane highways generalized service volume table (continuation).

Speed Limit	Terrain	Truck Pct.	Level of Service B Service Volume	Level of Service C Service Volume	Level of Service D Service Volume
50	Flat	6	8,700	13,900	19,000
		8	8,600	13,900	19,000
		10	8,600	13,900	19,000
	Rolling	0	8,700	13,900	19,000
		2	8,600	13,900	19,000
		4	8,500	13,900	19,000
		6	8,400	13,900	19,000
		8	8,200	13,900	19,000
		10	8,100	13,900	19,000
	Mountainous	0	8,700	13,900	19,000
		2	7,700	12,300	16,900
		4	7,000	11,100	15,200
		6	6,300	10,100	13,900
		8	5,800	9,300	12,700
		10	5,400	8,500	11,700
55	Flat	0	13,900	19,000	24,200
		2	13,900	19,000	24,200
		4	13,900	19,000	24,200
		6	13,900	19,000	24,200
		8	13,900	19,000	24,200
		10	13,900	19,000	24,200
	Rolling	0	13,900	19,000	24,200
		2	13,900	19,000	24,200
		4	13,900	19,000	24,200
		6	13,900	19,000	24,200
		8	13,900	19,000	24,200
		10	13,900	19,000	24,200
	Mountainous	0	13,900	19,000	24,200
		2	12,300	16,900	21,500
		4	11,100	15,200	19,400
		6	10,100	13,900	17,600
		8	9,300	12,700	16,100
		10	8,500	11,700	14,900

Table 17. Rural two-lane highways generalized service volume table (continuation).

Speed Limit	Terrain	Truck Pct.	Level of Service: B Service Volume	Level of Service: C Service Volume	Level of Service: D Service Volume
60	Flat	0	19,000	24,200	29,300
		2	19,000	24,200	29,300
		4	19,000	24,200	29,300
		6	19,000	24,200	29,300
		8	19,000	24,200	29,300
		10	19,000	24,200	29,300
	Rolling	0	19,000	24,200	29,300
		2	19,000	24,200	29,300
		4	19,000	24,200	29,300
		6	19,000	24,200	29,300
		8	19,000	24,200	29,300
		10	19,000	24,200	29,300
	Mountainous	0	19,000	24,200	29,300
		2	16,900	21,500	26,100
		4	15,200	19,400	23,500
		6	13,900	17,600	21,400
		8	12,700	16,100	19,600
		10	11,700	14,900	18,100
65	Flat	0	24,200	29,300	34,500
		2	24,200	29,300	34,500
		4	24,200	29,300	34,500
		6	24,200	29,300	34,500
		8	24,200	29,300	34,500
		10	24,200	29,300	34,500
	Rolling	0	24,200	29,300	34,500
		2	24,200	29,300	34,500
		4	24,200	29,300	34,500
		6	24,200	29,300	34,500
		8	24,200	29,300	34,500
		10	24,200	29,300	34,500
	Mountainous	0	24,200	29,300	34,500
		2	21,500	26,100	30,700
		4	19,400	23,500	27,600
		6	17,600	21,400	25,100
		8	16,100	19,600	23,000
		10	14,900	18,100	21,300

Federal Highway Administration
Office of Policy and Governmental Affairs
1200 New Jersey Avenue, SE
Washington, DC 20590

https://www.fhwa.dot.gov/policy/

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APPENDIX B

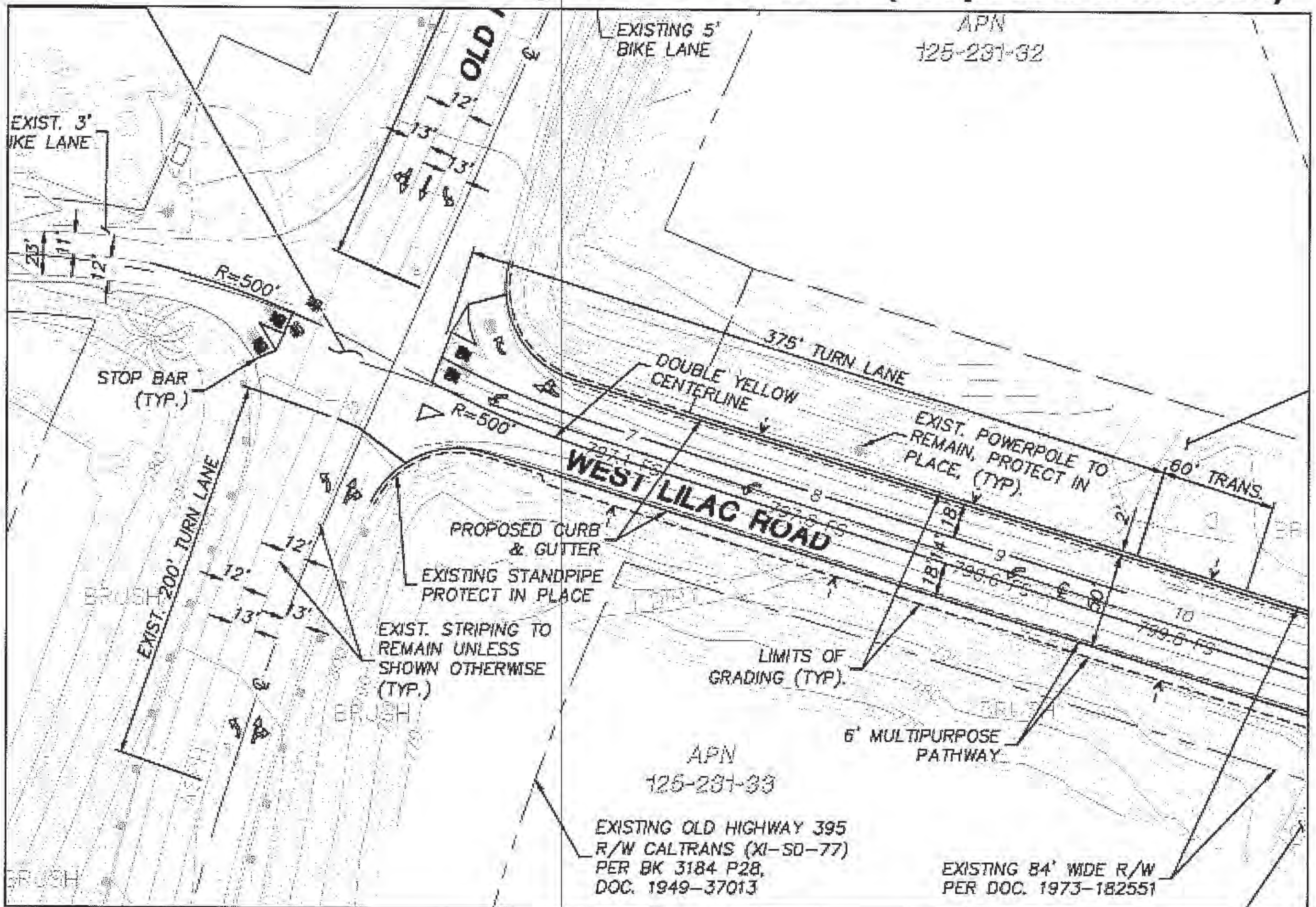
WEST LILAC ROAD SECTIONS

West Lilac Road
Hwy395 Intersection (Existing Condition)

Existing intersection:

- Stop-controlled (east-west) and has free movement (north-south).
- east-west travel lane in each direction
- short turn-off for northbound traffic.

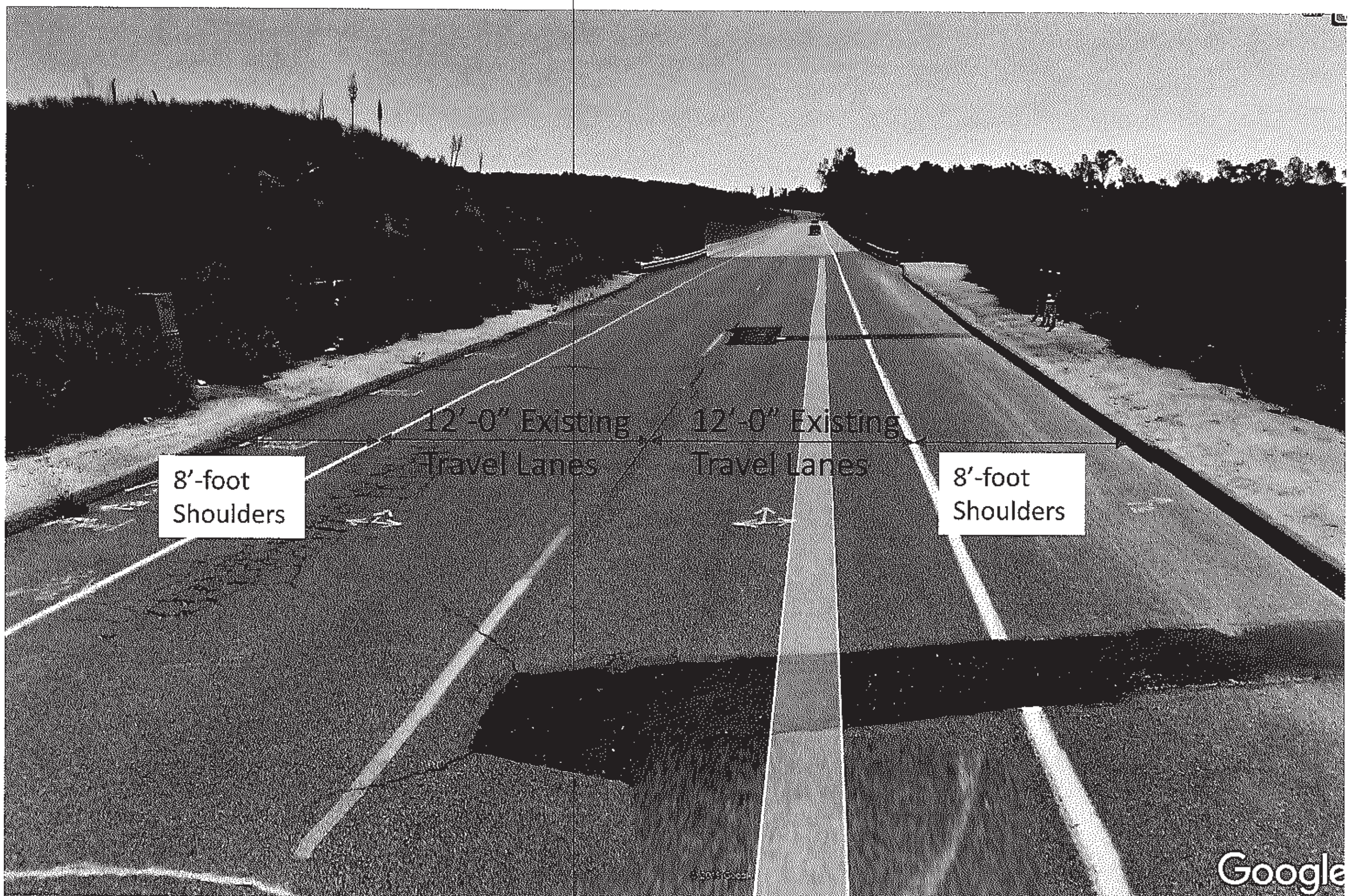
West Lilac Road
Hwy395 Intersection (Proposed Condition)



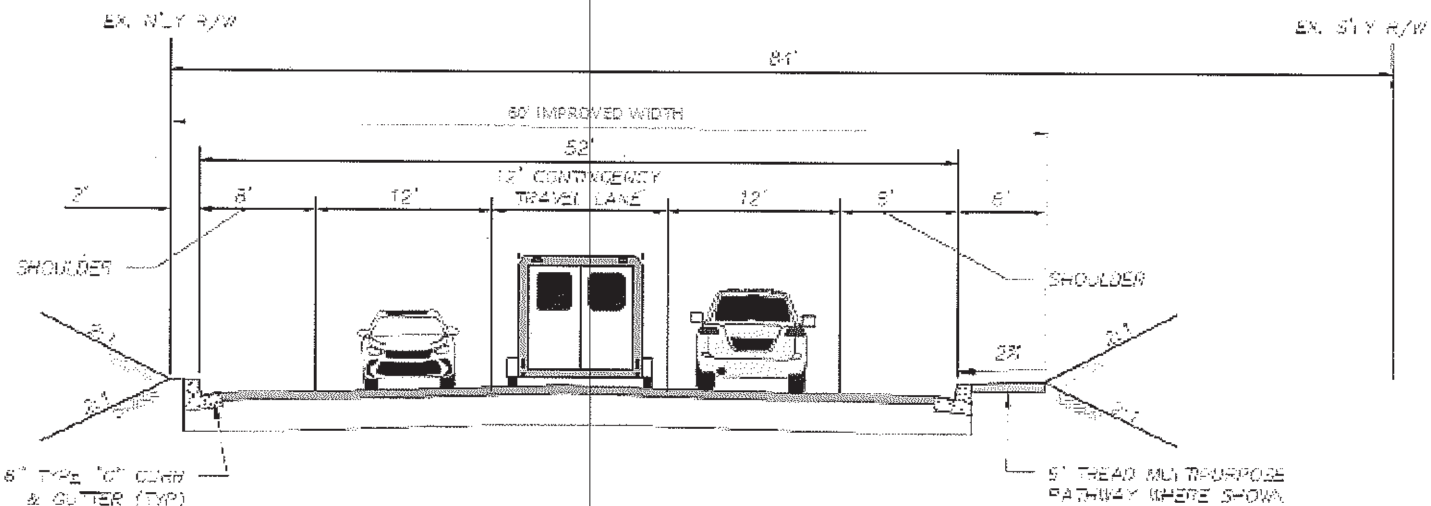
Proposed Intersection:

- 3-phased signal,
- 375' dedicated northbound turn lane,
- 375' dedicated southbound turn lane
- middle westbound through lane.

West Lilac Road
Hwy395 – I-15 Bridge (Existing Condition)

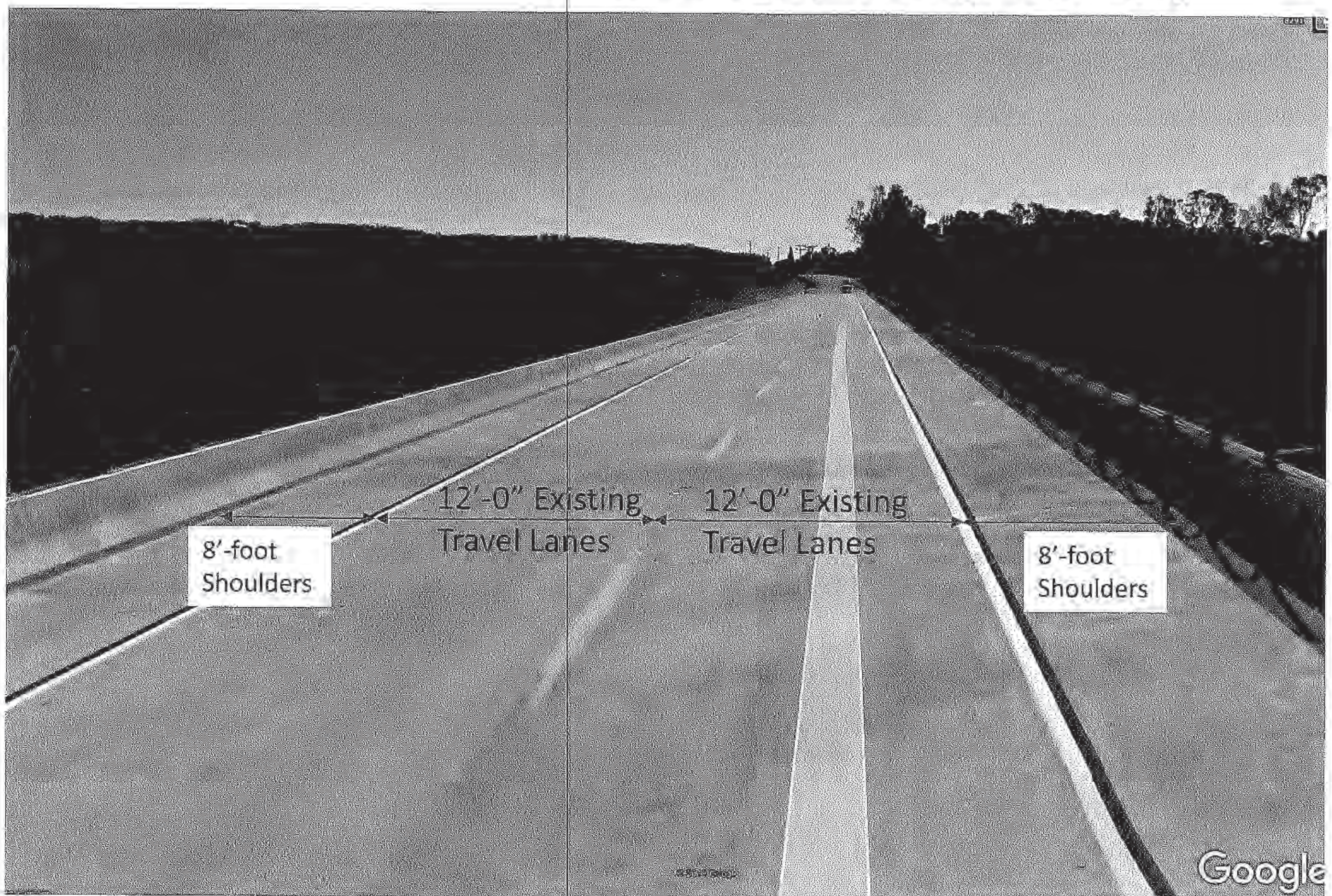


West Lilac Road
Hwy395 – I-15 Bridge (Proposed Condition)

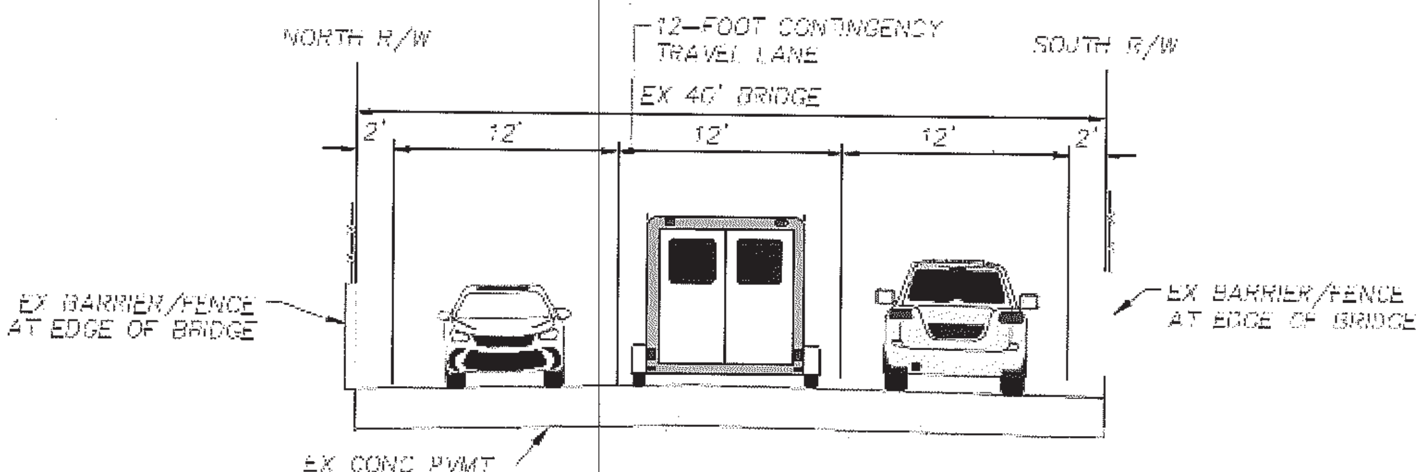


PROPOSED SECTION

West Lilac Road
I-15 Bridge (Existing Condition)

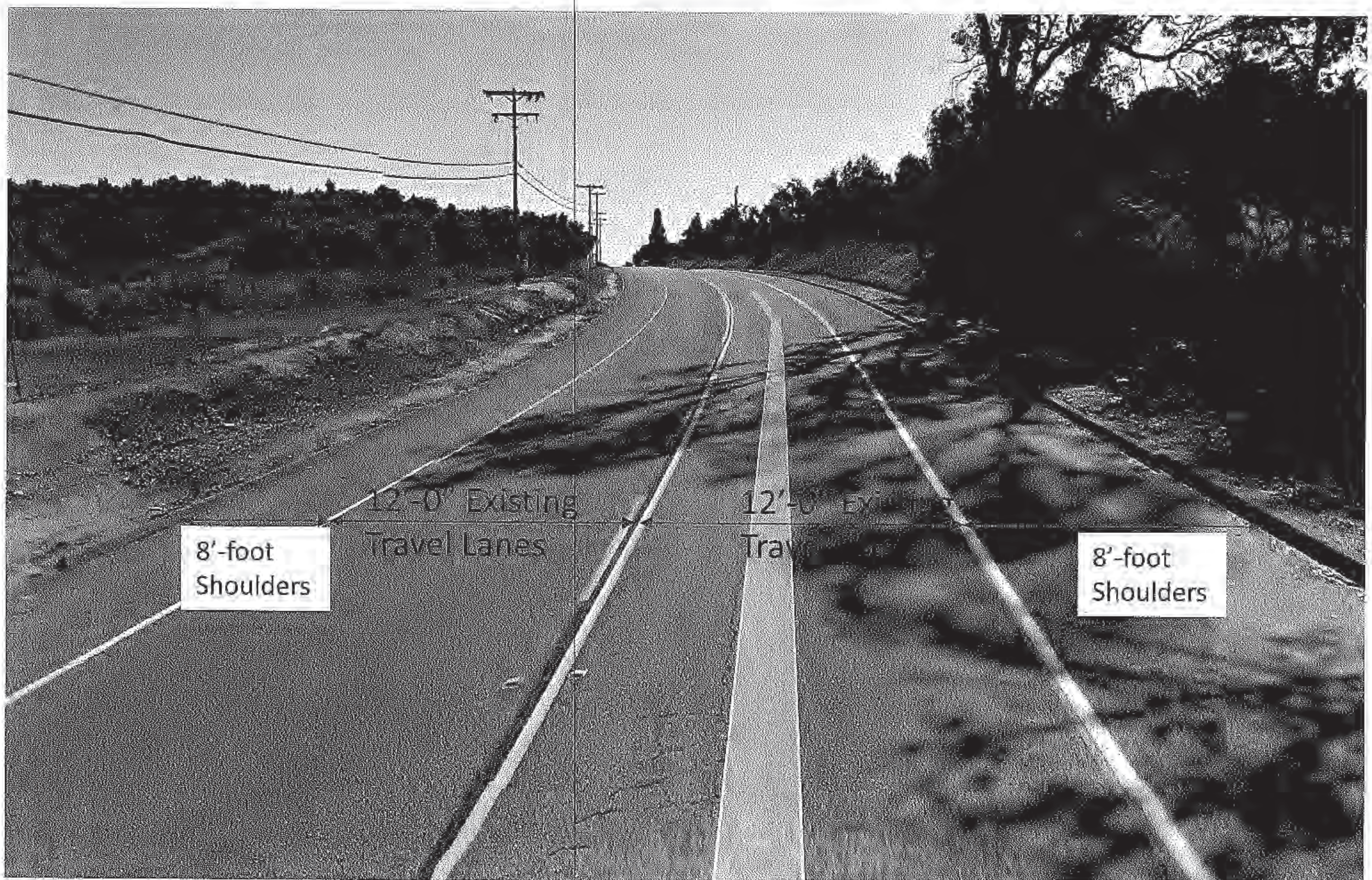


West Lilac Road
I-15 Bridge (Existing Condition)



PROPOSED SECTION
(WITHIN THE EXISITING 40' ROW)

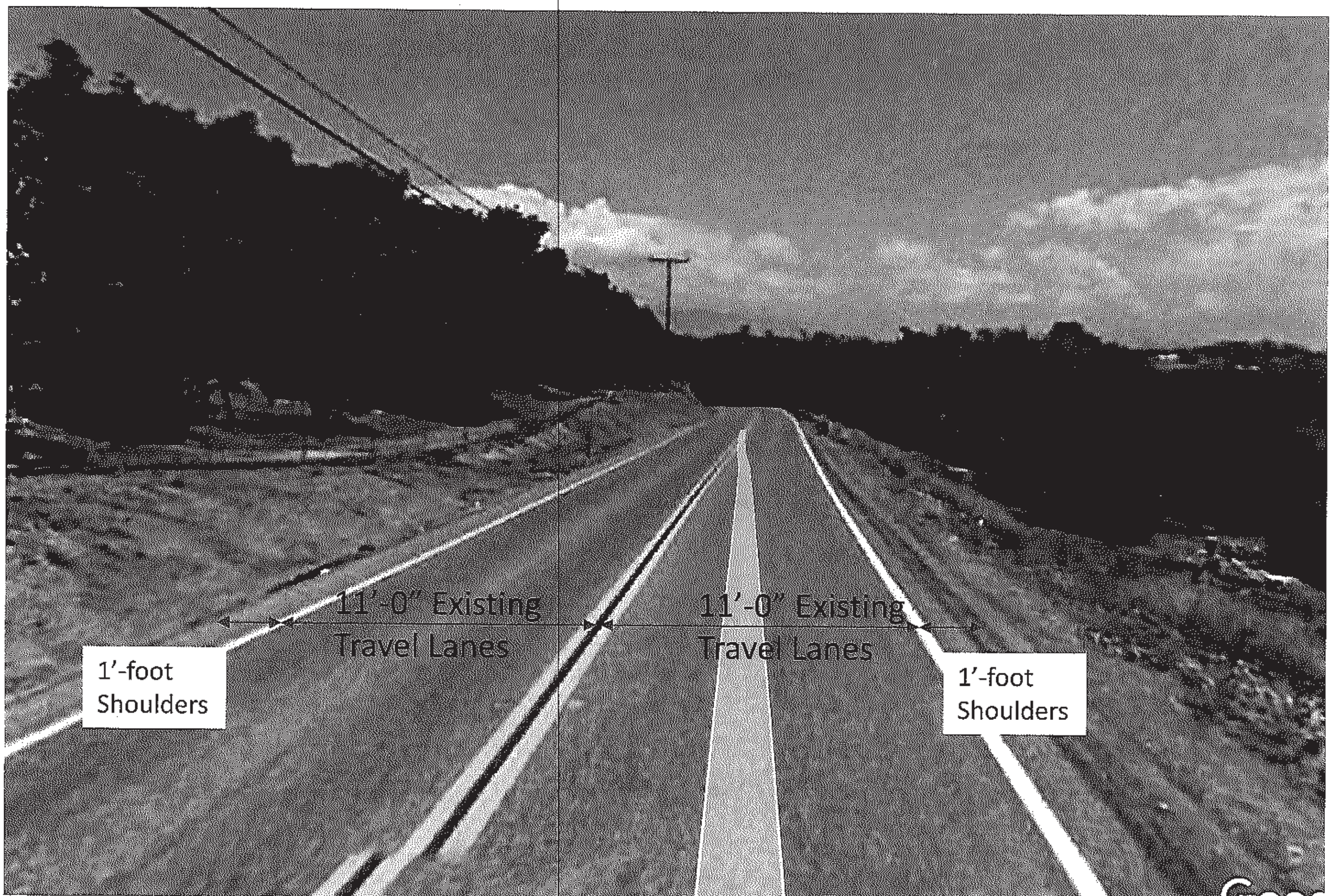
West Lilac Road
I-15 Bridge to Project (Existing Condition)



<u>Existing improved roadway:</u>

- 40-feet in width,
- 2-foot lane in each direction
- 8-foot shoulder on each side.

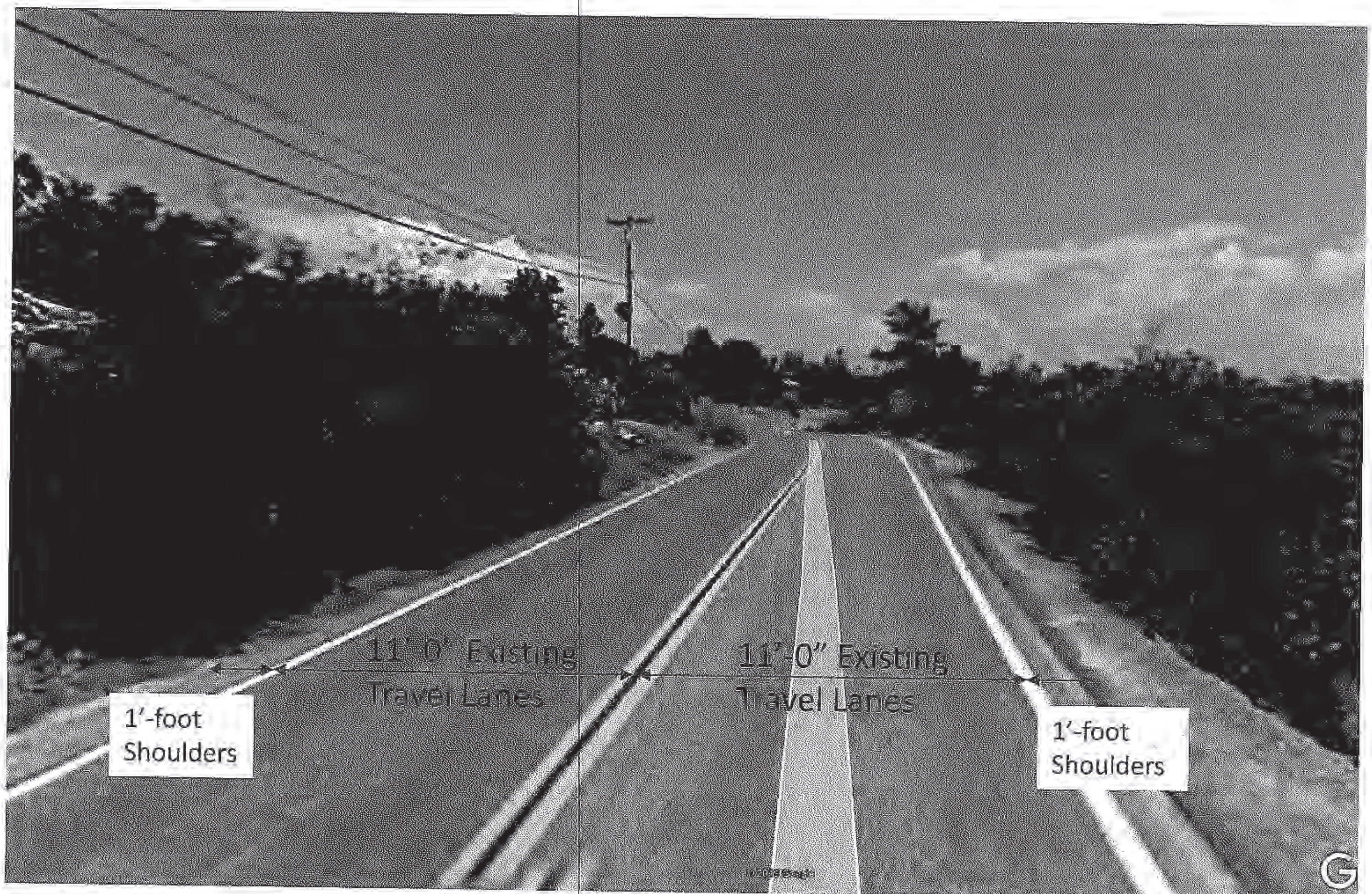
West Lilac Road
Project Bdry to Roundabout (Existing Condition)



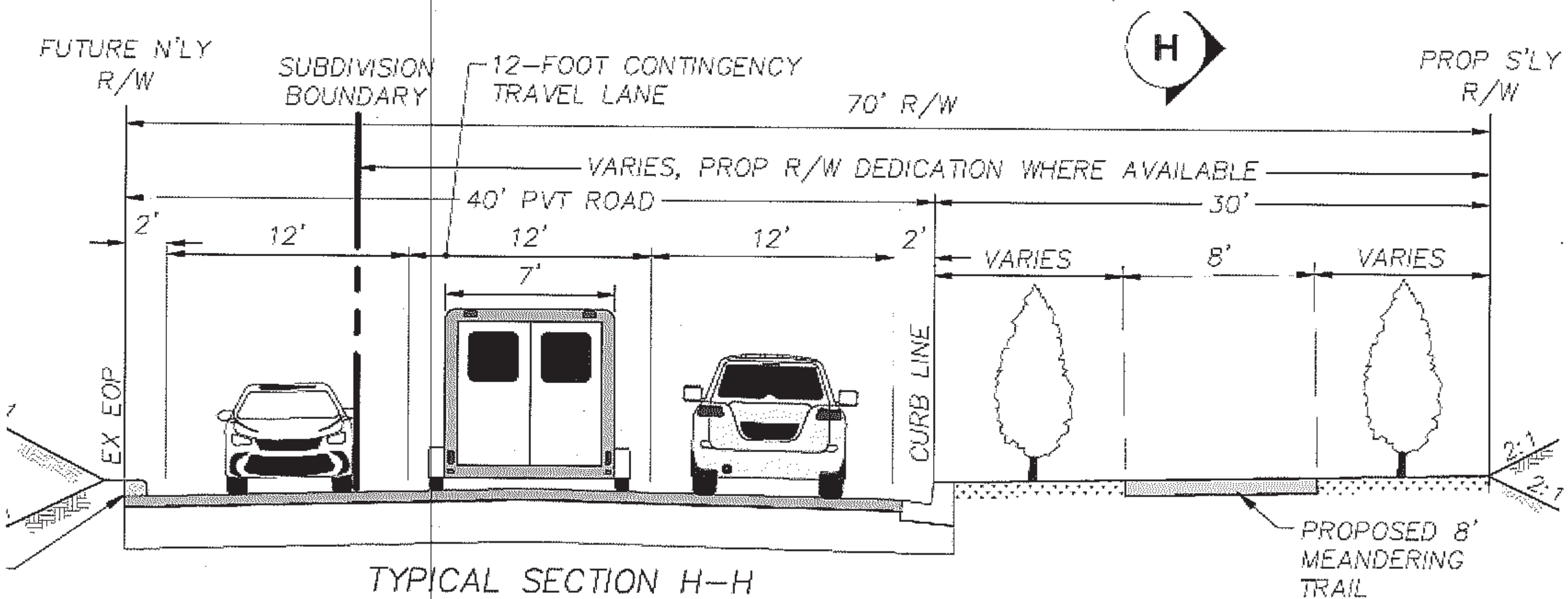
<u>Existing improved roadway</u>

- 24-feet in width,
- One 11-foot lane in each direction
- 1-foot shoulder on each side.

West Lilac Road
Project Frontage (Existing Condition)



West Lilac Road - Project Frontage
Proposed Condition



TYPICAL SECTION H-H
(MODIFIED 2.2C LIGHT COLLECTOR PER CO. STDS)
WEST LILAC ROAD W/ 30' S'LY PARKWAY
(ALONG NORTHERLY BOUNDARY)
NO SCALE (PUBLIC)
*PRESCRIPTIVE RIGHTS OVER EXISTING PAVEMENT

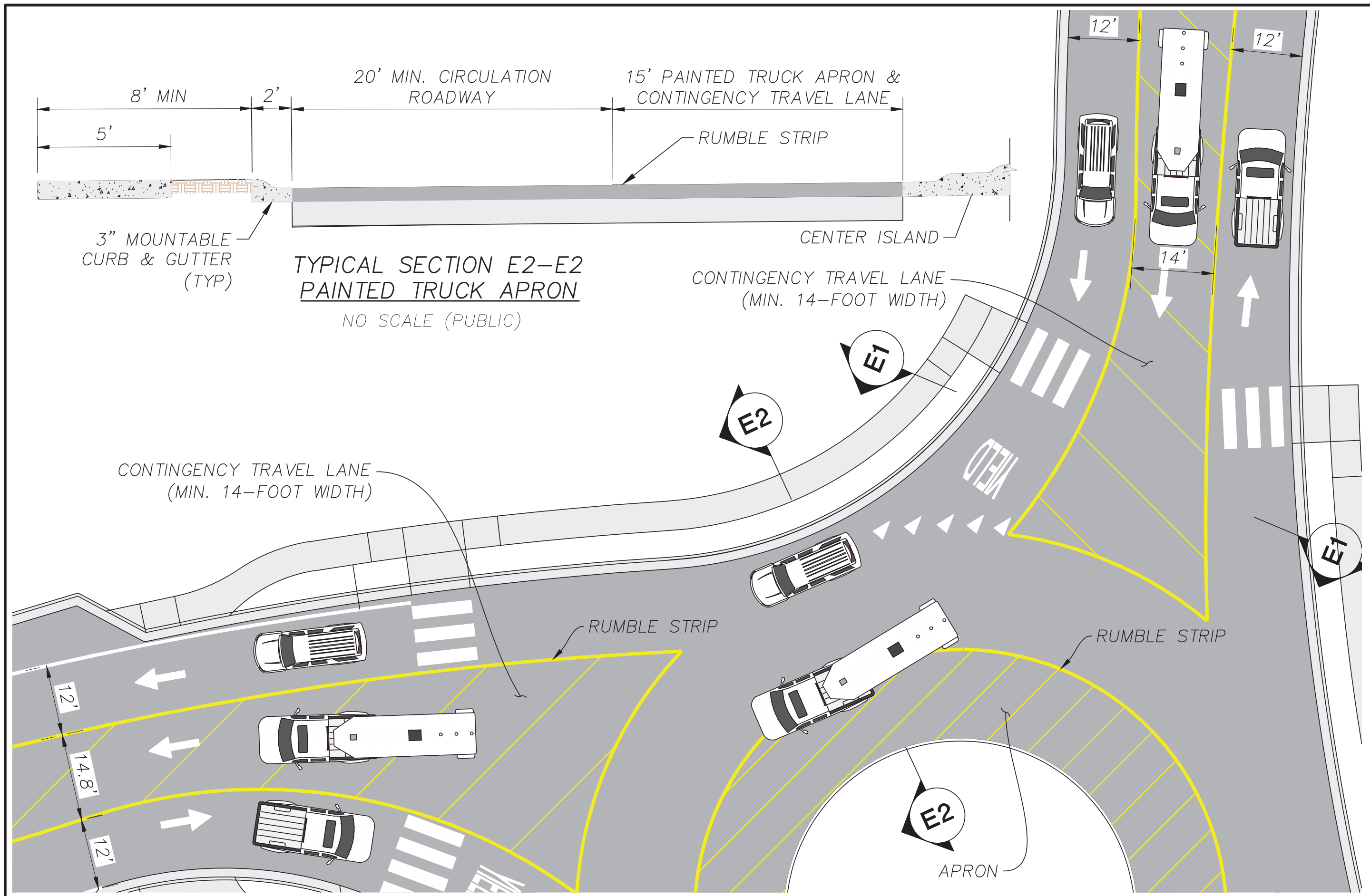
Attachment A: Appendix 2

Landmark Consulting

West Lilac Road Planned Roundabout Detail

EXHIBIT 'E-ALT'

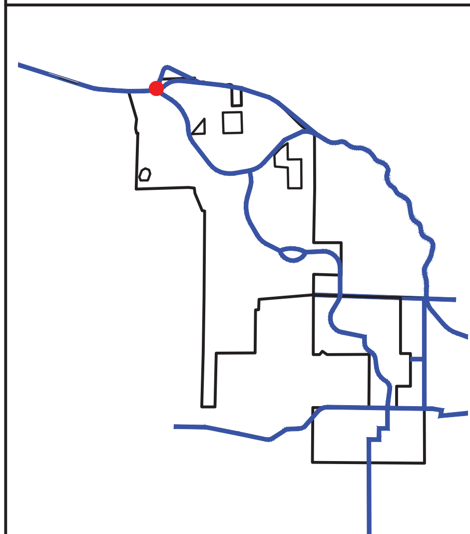
WEST LILAC ROAD
WESTERLY ROUNDABOUT



TYPICAL SECTION E2–E2
PAINTED TRUCK APRON
NO SCALE (PUBLIC)

PLAN VIEW
NOT TO SCALE

TYPICAL SECTION E1–E1
SPLITTER ISLAND
NO SCALE (PUBLIC)



KEY MAP
NOT TO SCALE

P:\103-7 LILAC HILLS RANCH\E EXHIBITS\FIRE RESPONSE IMPROVEMENTS\FIRE RESPONSE_2.DWG 4/29/2019 4:43 PM

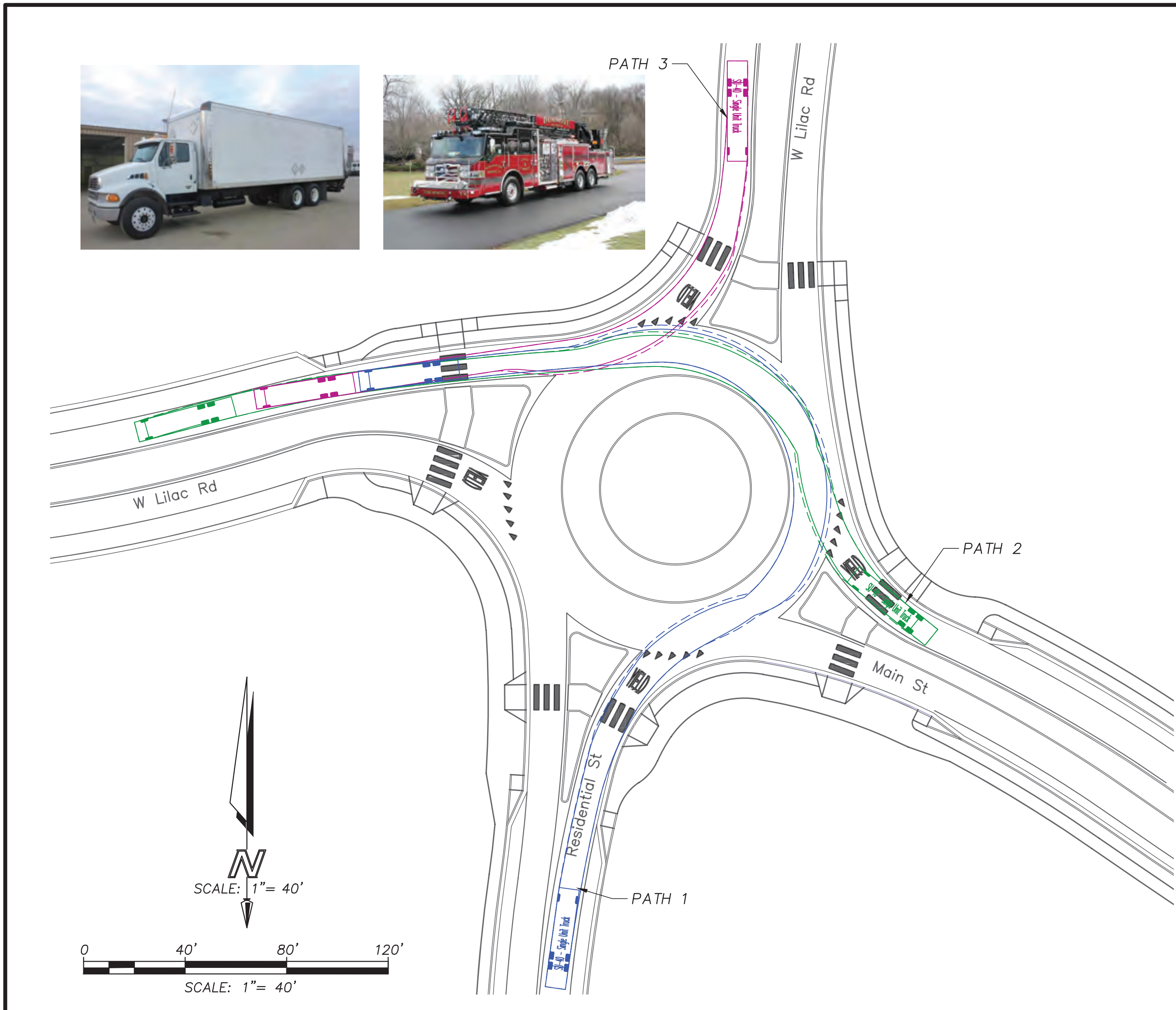


EXHIBIT 'A-1'

LILAC HILLS RANCH
WESTERLY ROUNDABOUT

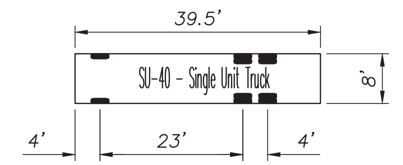
TURN TEMPLATE EXHIBIT

NOTES:

VEHICLE USED – AASHTO 2011 SU-40
SINGLE-UNIT TRUCK

OVERALL LENGTH	39.50	FT
OVERALL WIDTH	8.00	FT
OVERALL BODY HEIGHT	13.50	FT
MIN BODY GROUND CLEARANCE	1.367	FT
TRACK WIDTH	8.00	FT
LOCK-TO-LOCK TIME	5.00	SEC
MAX STEERING ANGLE	31.80°	

AASHTO SU-40



LEGEND

TIRE PATHS
- PATH 1
- PATH 2
- PATH 3

BUMPER OVERHANG PATHS
- PATH 1
- PATH 2
- PATH 3

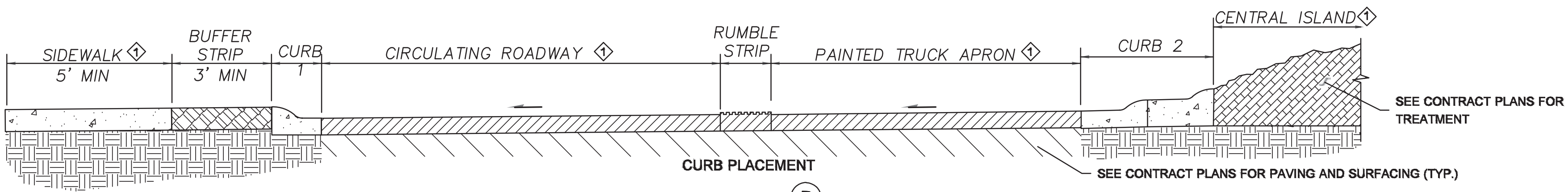
LANDMARK
CONSULTING
Planning Engineering Surveying
9555 Genesee Avenue, Suite 200
San Diego, CA 92121, (858) 587-8070

P:\103-7 LILAC HILLS RANCH\E EXHIBITS\FIRE RESPONSE IMPROVEMENTS\103-7 ROUNDABOUT_AUTOTURN.DWG 4/24/2019 2:28 PM

EXHIBIT 'B'

LILAC HILLS RANCH
WESTERLY ROUNDABOUT

ROUNDABOUT CROSS–SECTION
ALTERNATIVE



CURB PLACEMENT

SECTION B

NOT TO SCALE

LANDMARK
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Planning Engineering Surveying
9555 Genesee Avenue, Suite 200
San Diego, CA 92121, (858) 587-8070

P:\103–7 LILAC HILLS RANCH\E EXHIBITS\FIRE RESPONSE IMPROVEMENTS\103–7 PAINTED CENTER MEDIAN EXHIBIT.DWG 4/23/2019 4:10 PM

Attachment B

Dudek

Comprehensive Evacuation Simulation Modeling

605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 F 760.632.0164

ATTACHMENT B MEMORANDUM

To:	Sam Hartman, Ranch Capital, LLC Jon Rilling, Ranch Capital, LLC
From:	Dennis Pascua, Transportation Services Manager Amanda Meroux, EIT, Assistant Transportation Engineer
Subject:	Comprehensive Regional Evacuation Modeling
Date:	December 6, 2019
cc:	

NOTE: The following discussion of evacuation traffic simulations is not intended to be an Evacuation Plan and does not purport to include elements and measurements typically found in an Evacuation Plan. The sole purpose of the traffic simulations is to focus on the vehicle travel times and speeds in an evacuation event.

Introduction

This memorandum provides a summary of the traffic simulations (herein referred to as, simulations) conducted for an evacuation scenario of the Lilac Hills Ranch (LHR – proposed project) and the areas of Valley Center to the east/northeast within unincorporated San Diego County (County). The simulations have been conducted for the Existing (no project) scenario, and the Existing plus Project (including proposed roadway improvements constructed by the project) scenario. As noted above, the sole purpose of the simulations is to model the vehicle travel times and related speeds in an evacuation event.

The simulations were conducted using the same Synchro/SimTraffic network used in the *Lilac Hills Ranch Traffic Impact Study* (TIS) prepared by Chen Ryan in 2014 for the proposed project's Environmental Impact Report (EIR). While the TIS analyzed typical (i.e., no evacuation scenario) weekday daily, AM and PM peak hour intersection and roadway segment level of service (LOS) conditions, the Synchro network was adapted and modified to model and simulate a one-way (outbound) worst-case evacuation scenario that would occur in the nighttime/early morning hours when residents of the proposed project and the Valley Center area would be in their homes.

Currently, the County does not have any specific method and criteria to analyze potential traffic impacts, and associated metrics (e.g., travel time and speed), during an evacuation event. However, the simulations for the Existing and Existing plus Project scenarios have been prepared using the County's traffic analysis standards, and industry-wide transportation planning and engineering standards, to their extent possible, along with input from fire and emergency professionals.

Methods

The simulations have been prepared using the current version of Synchro/SimTraffic, (version 10). *Synchro* is a macroscopic analysis and optimization software application that is consistent with the *Highway Capacity Manual's 6th Edition* (HCM 6, Transportation Research Board 2016) for signalized intersections, unsignalized intersections, and roundabouts. HCM 6 is the required analysis method for the County as indicated in the San Diego Traffic Engineering Council/Institute of Transportation Engineers (SANTEC/ITE) TIS guidelines. *SimTraffic* is a traffic simulation software application that performs micro-simulation and animation of vehicular and pedestrian-related traffic. With SimTraffic, individual vehicles are modeled and displayed traversing a street network. SimTraffic models signalized and unsignalized intersections, as well as freeway sections with cars, trucks, pedestrians, and buses. Synchro is used to develop the street network and code roadway and intersection characteristics and parameters, while SimTraffic is used to simulate the traffic data onto the Synchro network and review network performance metrics, such as travel time and speed.

Study (Simulation) Area

Per discussions with the multidisciplinary evacuation team, consisting of fire prevention and emergency response professionals, including experts with operational experience participating in evacuation evens in San Diego County and transportation engineers, the study area for the simulations includes the LHR project area (including LHR's new street network) and the Valley Center area to the east of the project. This area is generally comprised of residential uses whose occupants would access the evacuation routes of W. Lilac Road, Lilac Road, Circle R Drive, Old Castle Road, Cole Grade Road, Valley Center Road, Lake Wolford Road, and Woods Valley Road.

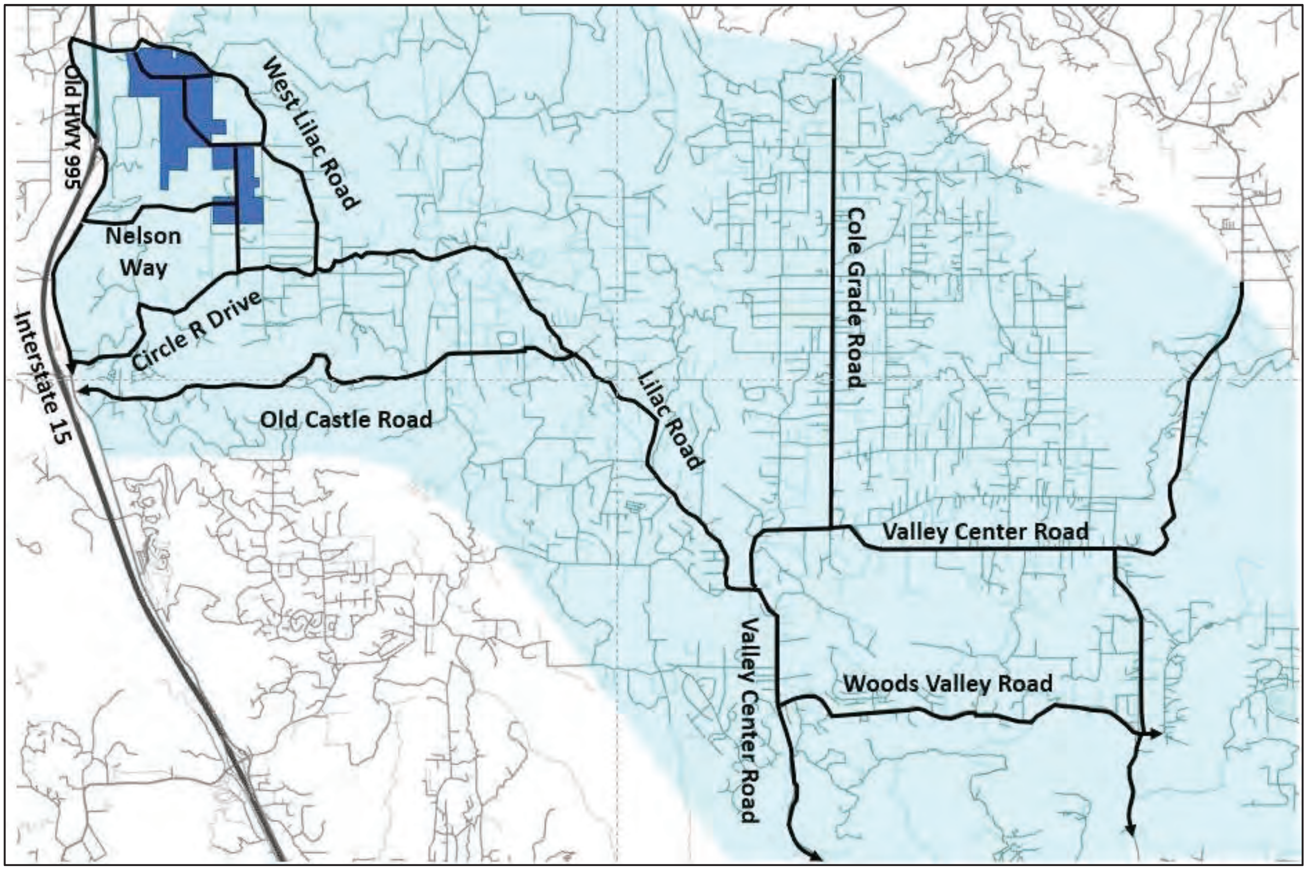
The following principles, as described in the County's *Operational Area Emergency Operations Plan, Evacuation Annex* (September 2018), were generally applied when determining applicable transportation routes:

- Shortest route to the designated destination areas.
- Maximum capacity.
- Ability to increase capacity and traffic flow using traffic control strategies.
- Maximum number of lanes that provide continuous flow through the evacuation area.
- Availability of infrastructure to disseminate real-time conditions and messages to evacuees en-route, such as Changeable Message Signs.

Based on those principles, and shown in Figure 1, the following roadways have been modeled and simulated as the Primary Evacuation Routes and their Safe Zones (destinations) for the study area:

- W. Lilac Road, to Old Highway 395 west of I-15
- Nelson Way (after proposed project provides access to this roadway), to Old Highway 395 to W. Lilac Road, Camino Del Rey, and Gopher Canyon Road (all west of I-15)
- Circle R Drive, to Old Highway 395 to Camino Del Rey and Gopher Canyon Road (both west of I-15)
- Old Castle Road, to Gopher Canyon Road (west of I-15)
- Valley Center Road, to south of Woods Valley Road (towards Escondido)

Figure 1: Study Area and Arterial Roadways (Approximately 70 square miles) *



* Project area is shaded in dark blue. Approximate boundaries of full study area shaded in light blue (inclusive of Project area). The unshaded area to the southwest was not included as its only Primary Evacuation Route at this time would be Mountain Meadow Road – Deer Springs Road, leading to Interstate (I) 15. Similarly, the unshaded area northeast was not included as State Route (SR) 76 would be the most direct and highest capacity Primary Evacuation Route for those residents.

Assumptions

The following assumptions were made for the traffic simulations in consultation with the project's fire prevention and emergency response experts:

- The wildfire event is assumed to occur northeast of the study area, in Pauma Valley, and travel in a westerly and southwesterly direction, requiring all vehicles in the study area to evacuate towards I-15 to the west, and toward Escondido to the south.
- The evacuation order would occur with 100% occupancy of residences in the Study Area. This represents the worst-case home occupancy condition.
- No contraflow lanes were assumed in order to provide access to emergency vehicles requiring entry into the evacuation area. Two-way travel is always provided, and all evacuating vehicles are outbound movements to Safe Zones.

- Synchro/SimTraffic network assumptions include (for BOTH Existing and Existing plus Project):
  - Consistent with San Diego County Sheriff's Department public statements for officer availability and capacity, some intersection control by traffic control officers for major roadway intersections is incorporated. This was done by modifying signalized intersections to operate as if an officer is controlling traffic by prioritizing higher volume roadways with more "green" (light) time to pass through the intersection. Or, where both intersecting roadways have equally high volumes, "green" time is equally given. This assumption is consistent with recent information provided by County Fire and Emergency responders to the County Planning Commission and Board of Supervisors. San Diego County Sheriff's Department (SDCSD) has stated a robust response to evacuation areas for intersection control during evacuation events. For additional understanding of SDCSD's stated management capabilities of large scale, mass evacuations in North San Diego County, see SDCSD Captain Brown's testimony during the Harmony Village Grove South Planning Commission Hearing on May 24, 2018 (Minute 4'37" at the following link, https://media.avcaptureall.com/session.html?sessionid=aa0c1020-3c05-41aa-8df8-5402343f4ce&prefilter=240,2901.
  - Vehicle Factors in SimTraffic were modified to reflect a high volume of passenger cars and trucks with horse trailers relative to average composition of vehicle types.
  - Driver Factors in SimTraffic were modified to reflect conditions that could likely be present in an evacuation event; e.g., lower speeds, less aggressive maneuvering to simulate driving in dark and smoky conditions.

Simulation

The traffic modeling and simulation of the Existing (no project) and Existing plus Project conditions were based on the transportation planning and engineering industry-standard "Four Step Modeling Process" of: 1) trip generation; 2) trip distribution; 3) trip model split; and, 4) trip assignment. The following summarizes this process and provides the results of the simulations for the Existing and Existing plus Project conditions.

Trip Generation

Trip generation estimate for the evacuation scenarios were based on the traffic volumes generated by the evacuating households in the study area during a nighttime/early morning period when there are very low volumes of ambient background traffic. Table 1 provides the number of vehicles generated per household based on 2018 survey data collected from a wildfire event in Santa Rosa in Northern California. Table 2 presents the number of existing households in the study area based on housing property information provided from First American Title Company, and the number of households proposed for LHR provided by the Applicant.

Table 1 – Vehicle Utilization Rates

Vehicles Used to Evacuate	Percentage of Households
1 vehicle per household	46%
2 vehicles per household	38%
3 vehicles per household	11%
4 vehicles per household	5%

Source: Santa Rosa CA Post-Fire Survey, 2018.

Table 2 – Network Trip Generation

Existing Condition		Lilac Hills Ranch Project		Existing plus Project	
# Homes	# Vehicles	# Homes	# Vehicles	# Homes	# Vehicles
4,807	8,416	1,946	3,077	6,753	11,493

Source: Dudek, 2019

Based on the tables, for the Existing (no project) condition, a total of approximately 8,416 vehicles would be generated during a wildfire evacuation event. The proposed project would add approximately 3,077 vehicles. For the Existing plus Project condition, a total of approximately 11,493 vehicles would be generated during a wildfire event.

Trip Distribution

Table 3 provides the trip distribution percentages on the Primary Evacuation Routes for the Existing and Existing plus Project conditions. These distribution percentages were based on County standards (shortest route to Safe Zones with maximum capacities) and consultation with fire and emergency response professionals, including experts with operational experience participating in evacuation events in San Diego County.

Table 3 –Trip Distribution

Route	Existing	Existing + Project
Vehicles	8,416	11,493
West Lilac Road	4%	23%
Nelson Way	0%	7%
Circle R Drive[1]	22%	16%
Old Castle Road	7%	5%
Valley Center Road	67%	49%
Total	100%	100%

Source: Dudek, 2019
[1] *The reduction in the number of vehicles utilizing Circle R is due to the addition of Nelson Way and the increased capacity on other routes, providing more flexibility and options during an evacuation.*

As shown in the table, during the Existing (no project) condition, approximately 51% of the evacuating traffic would drive west to the areas west of I-15 and south (Old Highway/W. Lilac Road, Camino Del Rey, and Gopher Canyon Road). These are households that generally have access to Lilac Road and W. Lilac Road, and also, are west of Valley Center Road. Approximately 49% of the evacuating traffic would drive south on Valley Center Drive to the urban areas in Escondido via Cole Grade Road, Lake Wolford Road, and Woods Valley Road.

During the Existing plus Project condition, the volume of evacuating traffic to Valley Center Road, to the south, would remain the same as all LHR traffic would evacuate to areas west of I-15 and south. The highest volume increase would occur on W. Lilac Road as a result of the development of LHR.

Trip Mode Split

Since this is an evacuation scenario, all trips will be made via motorized vehicles (passenger car, light duty truck, and truck with horse trailer). No non-motorized modes of travel are assumed in the simulations. As previously noted, the Vehicle Factors in SimTraffic have been modified to reflect the higher volume of trucks with horse trailers in the study area which affects travel speed (lower speeds) and density (larger vehicles) throughout the study area.

Trip Assignment

The trip assignment for the Existing (no project) and Existing plus Project conditions are shown in Table 3 above. For the Existing plus Project, the following network improvements, constructed by the proposed project, were assumed in the Existing plus Project network and simulation.

LHR Network Improvements

- Add additional (second) westbound lane to W. Lilac Road, between Old Highway 395 and Main Street. This improvement is a two-way left-turn lane (TWLTL) that under evacuation conditions, would function as an additional travel lane.
- Add additional westbound lane to Circle R Road for 0.6 miles approaching Old Highway 395. The improvement is a TWLTL that under evacuation conditions, would function as an additional travel lane.
- Convert intersection of the LHR northern access road (Main Street) at W. Lilac Road from a stop-controlled intersection to a roundabout.
- Improve Nelson Way to SRA and San Diego County Private Road Standards from the project boundary to Old Highway 395 (modeled in simulation as a standard two-lane road).
- Add a southerly connection road, providing vehicular access between Covey Lane and Nelson Way.

Results

Table 4 shows the results of the SimTraffic simulations conducted for the Existing and Existing plus Project conditions. The average speed on the network remains at 9 MPH without and with the project. The average travel time, however, is decreased (a benefit) by 3.4 minutes (48.5 minutes to 45.1 minutes) with the proposed project.

Table 4 – Network Performance Summary

Performance Metric	Existing Condition	Existing Plus Project	Difference
Average Travel Time (minutes) per Vehicle to Exit Network [1]	48.5 minutes	45.1 minutes	-3.4 minutes
Average Speed Across Network (miles per hour – MPH)	9 MPH	9 MPH	0 MPH

Source: Dudek, 2019

[1] Average Travel Time is based on the time vehicles reach a Primary (evacuation) Route from their residence, to a Safe Zone.

The decrease in average travel time (which is based on the time vehicles reach a Primary Evacuation Route from their residence, to a Safe Zone) is attributed to the added road connectivity, added capacity, and road safety improvements provided by LHR.

Several factors provided by the proposed project that would enhance orderly and safe evacuation and likely further improve the Existing plus Project results include, but are not limited to: new evacuation signage, fuel modification along West Lilac Road and Circle R Road, structural hardening of LHR and offsite homes, additional emergency services located in LHR, temporary areas of safe refuge, and hardened cell phone tower for communications. These critical additional safety features are not reflected in the average travel time results above. These evacuation enhancements would reduce the potential for evacuation friction or interruption.

Conclusion

Based on the evacuation simulations conducted for the Existing and Existing plus Project conditions, household evacuating traffic generated by the LHR project would not significantly increase the average travel time and speed in the study area during a worst-case evacuation scenario relative to the average travel time of the Existing Condition. The Existing plus Project simulation shows that average travel time would decrease by 3.4 minutes and vehicle speed would remain the same (at 9 MPH). Furthermore, the decrease in average travel time is primarily attributed to LHR network improvements listed above, which provide additional roadway capacity for evacuating vehicles.

Attachment C

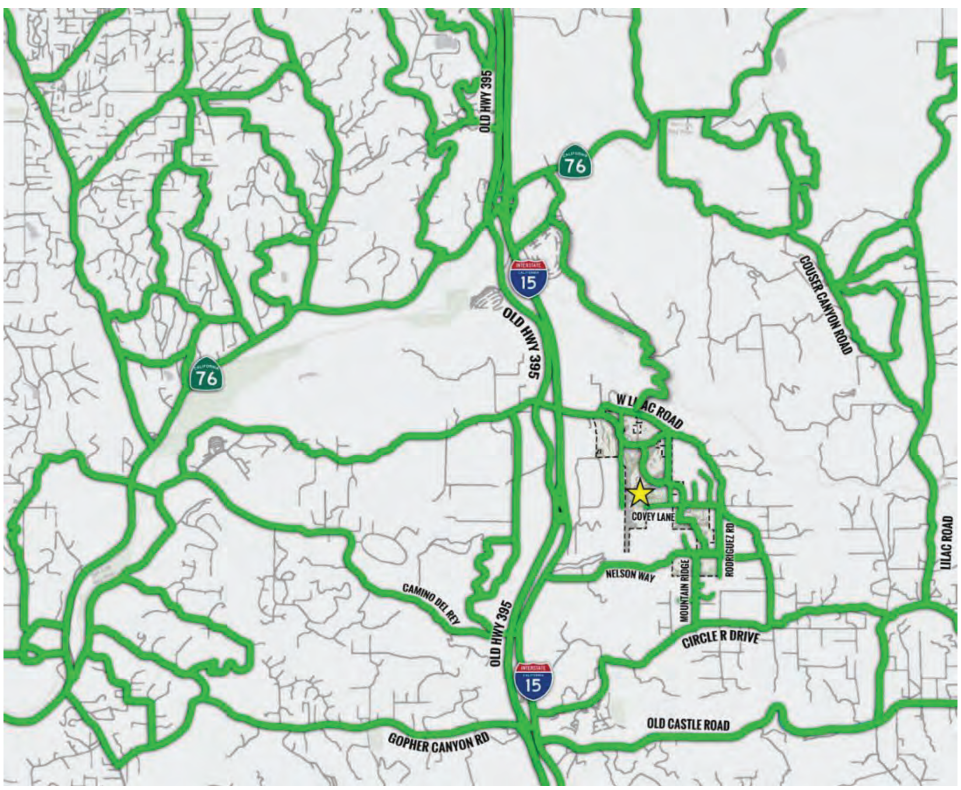
Study Limitations

The underlying planning principle for fire preparedness, given the dynamic nature of a fire, is to demonstrate the availability of multiple route alternatives and response strategies to permit emergency professionals to manage their response according to the specific circumstances. The Study Area provides ample route and response alternatives. Emergency responders will coordinate the safest possible evacuation based on the dynamic circumstances of the actual event, including the appropriate phasing of the evacuation, and utilization of the most appropriate ingress and egress routes for area residents and emergency responders.

The Exhibit below illustrates a non-exhaustive view of the many route alternatives that could be utilized by evacuees and emergency responders in the region. In any one of the Development Areas designated in the Study Area, multiple routes of ingress and egress are available.

The breadth of route alternatives and response strategies available to emergency professionals to manage a potential fire in this region cannot and should not be evaluated using this Dudek Lilac Hills Ranch Evacuation Travel Times memorandum alone. A comprehensive view of project fire safety is gained by understanding this memo, the Fire Protection Plan, the Evacuation Plan, and the Lilac Hills Ranch Wildfire Risk Assessment, along with the standard protocols and “in-the-field” decision making of emergency responders.

Route Alternatives: Non-exhaustive Map of Road Connectivity and Route Permutations in and Around Project



Dudek’s evacuation travel time analyses present a reasonable vehicle travel time estimates based on professional judgments made by Dudek and fire operations experts with experience participating in evacuations in San Diego County, as well as input by Linscott, Law & Greenspan. Changing any number of these assumptions can lengthen or shorten the average vehicle travel time.

For instance, a situation could arise in which professionals *may* choose to utilize additional roadways for evacuation not utilized in the analyses, and *may also* choose to send more vehicle trips to the southerly evacuation routes, and *may also* choose to guide vehicle trips to more or different route permutations relative to what has been modeled in this the analyses.

The net result of changing the variables selected could yield an average evacuation travel time shorter or longer than the results detailed in the analyses. Many factors can shorten or lengthen the vehicle time from the results shown herein. For example:

1. Changing the possible evacuation routes selected would affect the results. For instance, utilizing roads for ingress and/or egress that are not utilized in this analysis could shorten vehicle travel times relative to the results shown herein.
2. Increasing or decreasing the number of path permutations and percentage of the population utilizing each route that leads out of the immediate area could shorten or lengthen vehicle travel time relative to the results shown herein.
3. Emergency professionals electing to reserve certain road lanes for emergency vehicle ingress for portions of time could affect the travel time relative to the results shown herein.
4. Assuming evacuees utilize fewer or more vehicles to evacuate from their homes relative to the vehicle utilization rate selected in the analysis would shorten or lengthen vehicle travel time relative to the results shown herein.
5. Changing the mix of vehicle trips allocated to each evacuation route could shorten or lengthen vehicle travel time relative to the results shown herein.
6. Assuming a different road condition adjustment factors could shorten or lengthen the vehicle travel time relative to the results shown herein.
7. Assuming fewer people are at home when the evacuation notice is given would reduce the number of vehicle trips and shorten vehicle travel time relative to the results shown herein. For instance, an evacuation during daytime hours could result in fewer outbound trips than assumed in this analysis
8. Assuming some portion of vehicles trips are made in advance of the evacuation notice would reduce the number of vehicle trips relative to the results shown herein.

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MEMORANDUM

To:	Sam Hartman/Jon Rilling, Ranch Capital, LLC
From:	Dudek - Michael Huff, Principal Fire Protection Planner
Subject:	Lilac Hills Ranch Evacuation – West Lilac Road North of Covey Lane
Date:	January 15, 2020
Attachment(s):	N/A

Dudek understands that the Lilac Hills Ranch Project (Project) is proposing to provide an alternative road network that consists of two segments, the first segment parallels West Lilac Road from Covey Lane to Lilac Walk and the second segment will parallel West Lilac Road from Lilac Walk to Standel Lane ("WLR Parallel Egress Alternative"), approximately one mile from Old Highway 395" (Figure 1). This WLR Parallel Egress Alternative would be built to interim road standards, which meet the County's and Deer Springs Fire Protection District's standards for fire apparatus access roads, and that would be further built out to final conditions with the related Project phase completion milestones. The WLR Parallel Egress Alternative would be operational prior to the Project's first Certificate of Occupancy in Phase 1, providing vehicles an additional evacuation route that shifts traffic south of the existing West Lilac Road, bypassing the West Lilac – Covey Segment altogether.

This particular section of West Lilac Road has been indicated by San Diego County Sherriff's Department's Captain Dave Brown as a section that could be closed to west bound traffic during a large wildfire event approaching from the north/northeast under Santa Ana wind conditions. Given this possibility, providing additional flexibility to emergency management personnel for moving evacuating vehicles through a hardened evacuation route is considered a substantial benefit. If West Lilac Road is closed at Covey Lane to the north, existing westbound traffic, originating from the east, would have an alternate route to avoid the segment of West Lilac Road between Covey Lane and Lilac Walk.

The California Fire Code provides evacuation protections from higher occupancy buildings, including stairwells and exit corridors. These egress routes are hardened through the use of materials that are less prone to combustion and have longer ignition times and higher ignition temperatures. In the same manner, vehicle evacuation routes can be hardened through location away from unmaintained fuels and fire facilitating terrain, and placement within areas of ignition resistant landscapes, including agriculture, developed areas, and associated, maintained landscapes. Based on Dudek's evaluation, the parallel road system proposed by the Project provides this type of hardened evacuation route that also meets an important element of evacuation safety of providing more options to evacuees and emergency managers in the field and at the Incident Command Post.

In addition to the secondary, hardened route paralleling south of West Lilac Road from Covey Lane to the north, once in the Project road network, vehicles would have additional options, depending on the emergency situation, and could be directed to the south to Circle R Road or out the modernized Nelson Way to Old Highway 395 on hardened roadways (Figure 1).

Based on these observations and analysis, Dudek considers the proposed alternative parallel road system to be a valid and beneficial measure that would provide improved evacuation safety through: setbacks from steep slopes to the north, placement in less burnable landscapes, and optionality and flexibility for evacuation managers. This proposed road network would benefit existing and Project residents.

Figure 1. Existing and Proposed Parallel Road Network. Note the light blue existing road network and its proximity to the steeper slopes to the north. The proposed alternative road system (magenta, green, dark blue and orange) parallels West Lilac Road to the north, but is set back considerably and located within hardened (less burnable) landscapes. The routes provide additional flexibility and optionality to the west and south that do not currently exist.