

Appendix G

Alternative Materials and Methods of Construction Design Report

Updated March 4, 2025

11588-03

City of Laguna Beach

Attention: Mr. Dennis Bogle, City of Laguna Beach Building Official
Ms. Shaveta Sharma, City of Laguna Beach Senior Planner

505 Forest Avenue
Laguna Beach, California 92651

Subject: *Revised Request for Alternative Materials, and Methods of Construction Design for 2354 San Clemente Street, City of Laguna Beach, California*

Dear Mr. Bogle and Ms. Sharma:

In accordance with the 2022 California Fire Code (CFC), Chapter 1, Section 104.9 (or then current edition at the time of construction), the applicant, Mr. Kevin Aaronson, is requesting an alternate method of fire protection for the proposed demolition of the current wood-sided, non-sprinklered single-family residence, attached single-car garage, and guest house with an interconnected wooden deck area, and the construction of a new code compliant, ignition resistive, fully-sprinklered single-family residence with an attached two-car garage, an interconnected concrete decking area and pool at 2354 San Clemente Street, Laguna Beach, California. This Alternate Materials, Design, and Methods of Construction (AM&M) report provides specific analysis of the property, which is constrained in terms of providing the required Laguna Beach Fire Department (LBFD) property access, **including an inadequate dead end street length and turnaround area**. Per the City of Laguna Beach Code of Ordinances – Title 15.01 - Fire, the 2022 California Fire Code, California Code of Regulations, Title 24, Part 9, includes sections 503.2.5 – Dead Ends and D103.4 – Dead Ends, which have been adopted and amended by the City of Laguna Beach, which state, “a dead-end fire apparatus access road in excess of 150 feet in length shall be provided with an approved area for turning around fire apparatus”. Additionally, this report also provides specific analysis of the property, which is constrained in terms of providing a full 195 feet of fuel modification zone (FMZ) on site, which is the minimum requirement per the City of Laguna Beach Landscape/Fuel Modification Guidelines and Maintenance Program (rev. December 2019), and does not fully conform to the 2022 CFC requirement to provide an effective distance to the rear of the structure by exceeding the 150 feet hose pull distance from the driveway entrance around all sides of the proposed structure (2022 CFC, Section 503.1.1 – Building and Facilities). **This AM&M provides information about the on-site available fuel modification and a proposed fire department turnaround option to meet the 2022 Fire and Building Code requirements (or then current editions at the time of construction), as well as an evaluation of the site's fire environment and risk, available on-site fuel modification area, and alternative means of fire protection.**

A field assessment of the project site and adjacent areas was conducted by a Dudek Fire Protection Planner on December 12, 2018, in order to document existing site conditions and determine potential actions for addressing the protection to the residence. The project's architect provided a plan set and details pertinent to Dudek's fire protection assessment for the field assessment. Evaluations of the area's topography, natural vegetation and fuel loading, closest fire hydrant location, fire department access, and general susceptibility to wildfire formed the basis of the site risk assessment. Representative site photographs were collected and are provided in Attachment 1:

Photograph Log. Field observations were utilized to augment existing site data in formulating the recommendations detailed in this AM&M.

This AM&M demonstrates that the proposed new code-compliant, ignition resistive, fully-sprinklered single-family remodeled residence with attached two-car garage, upgraded landscaping, and on- and off-site fuel modification zones (as achievable) will be in compliance with applicable portions of the City of Laguna Beach (City) Municipal Code, Chapter 15.01 and the City’s Landscape/Fuel Modification Guidelines and Maintenance Program (rev. December 2019). The Project will also be consistent with applicable sections of the 2022 edition of the California Building Code (CBC), including Chapter 7A (or then current edition at the time of construction); applicable sections of the 2022 edition of the California Fire Code (CFC), including Chapter 49 (or then current edition at the time of construction); and 2022 edition of the California Residential Code (CRC), Section 237 as adopted and amended by the City. **Additionally, to mitigate for reduced on-site fuel modification zone areas and minimum 150-foot hose pull requirements, the property will be hardened above and beyond what is required by code, including conforming to current ignition resistant building codes, installing code-exceeding dual pane, dual-tempered windows on the exposed sides of the structure (north, west, and east sides), installing an additional layer of code-exceeding 1-hour rated 5/8-inch Type X fire rated gypsum sheathing will be applied behind the exterior covering or cladding (stucco or exterior siding) on the exterior side of the framing, from the foundation to the roof for a facade on the exposed sides of the structure (north, west, and east sides), a full interior fire sprinkler system to be installed within all rooms of the proposed single-family structure and attached street-level two-car garage, a code-exceeding wet-standpipe system to be installed for the inability to conform to the required 150 feet hose pull requirement, and the installation of an exterior fire sprinkler system. Finally, to mitigate for the dead-end street length and turnaround area, the project shall include the construction of a circular, 32-foot diameter off-set cul-de-sac of unobstructed turnaround space at the end of San Clemente Street, plus an additional approximately 20 feet of driveway turnaround space within the driveway of 2354 San Clemente Street.**

1 Project Location

Site Address:	2354 San Clemente Street Laguna Beach, California 92651 APN Nos. 656-122-04 and 656-122-05
Owner:	Kevin Aaronson
Building Construction Type:	Type VB with addition of 1-HR 5/8-inch Fire Rated gypsum drywall on north, west, and east sides of the structure, and Fully Fire Sprinklered (NFPA 13D)
Building Occupancy Type:	Multi-story, Single-family Residence (R-3/U)
Current Fire Protection Systems:	None

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2 Project Background for AM&M

Project Description

The Project is located within the City of Laguna Beach at 2354 San Clemente Street, approximately 0.5 miles from the Pacific Ocean. The Proposed Project's location is illustrated in Figure 1, *Project Vicinity Map* and Figure 2, *Project Site Location Map*. The Project site lies within a portion of the far northwest corner of Section 31 of Township 7 South and Range 8 West on Laguna Beach, California, U.S. Geological Survey (USGS), 7.5-minute quadrangle.

The Project site located at the end San Clemente Street, encompasses two (2) lots (APN Nos. 656-122-04 and 656-122-05); the first is considered a buildable lot with an existing single-family structure and guest house and the second is considered a non-buildable lot that is to remain as a natural open space zone. A 'significant watercourse' traverses through the non-buildable parcel which requires a minimum setback of 25 feet from both sides of the center flow line. A modified fuel modification plan has been prepared for the non-buildable parcel, which is explained in further detail in Section 5 and shown in Attachment 3. The combined area of both lots is currently 18,604 square feet (ft²) (approximately 9,257 ft² on the buildable lot and approximately 9,347 ft² on the non-buildable open space zone) with an approximately 500 ft² single-family residence (including an attached, one-car garage) and 500 ft² detached guest house. With the proposed project, the existing single-family residence and guest house will be demolished and replaced with a new code compliant, ignition resistive, fully-sprinklered two-level single-family residence with attached garage. The backyard landscape and adjacent undeveloped, naturally vegetated open space land to the north/northwest currently include several of the City's "target plant species" that are found in the Laguna Beach Fire Department (LBFD) guidelines. The Project proposes to remove and replace the existing plant materials within the buildable parcel that are on the City's fuel modification zones species list with ignition resistive, maintained landscape adhering to the Zone A fuel modification guidelines. The City of Laguna Beach Municipal Code (Chapter 25.41) does not allow for building or modifying within the non-buildable, naturally vegetated open space parcel to the north and west in a way that would take away from its naturally vegetated state (i.e. the installation of an irrigation system to the naturally vegetated hillside). Additionally, Section 25.50.030(D)(1) and (2)(a) requires a setback of twenty-five feet be maintained from both sides of the centerline of a significant watercourse. Due to the restrictions within the non-buildable parcel to the north and west, the Project is proposing a modified fuel modified zone that includes a reduced Zone B irrigated zone outside of the 'significant watercourse' 50-foot setback area (25 feet of setback required on each both sides of the watercourse) requiring 50 percent thinning and removal of all dead and dying vegetation and all 'Target Species'¹, and a reduced Zone C non-irrigated Thinning Zone within the 'significant watercourse' setback area. Zone B shall be irrigated by casting water from the buildable parcel thus no permanent irrigation will be placed within the non-buildable parcel (see Attachments 3a and 3b – *Proposed Fuel Modification Plan*). The reduced Zone B and Zone C will reduce the fuel height and density of the plant material located on the hillside, which will result in significantly reduced flame lengths and fire intensity associated with fire in the mix of California

¹ The study area supports areas that have been designated as "High Value Habitat" under the Laguna Beach General Plan Open Space and Conservation Element (City of Laguna Beach 2006b). Species identified as target species unacceptable for the Fuel Modification Zones include lemonade berry; where fuel modification within the lemonade berry scrub may be needed, avoidance or selective thinning of scrubs other than lemonade berry may be removed, minimizing the impact to this natural community.

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coastal sage scrub, pampas grass, and other native and non-native species fuel types. Fuel modification associated with adjacent properties completely envelope the Project site and its associated fuel modification. The single-family residence to the north of the Project site, located at 565 Fern Street extends 193 feet from the southernmost point of the home to the existing house located at 2354 San Clemente Street. Thinning as a result of fuel modification for that residence has already occurred within areas mapped as Zone C. Additionally, the single-family residence to the east located at 2412 Lomita Avenue, has fuel modification within and beyond 2354 San Clemente Street. And all or nearly all of the required fuel modification for the proposed replacement residential structure at 2354 San Clemente Street would be included within the fuel modification area for the existing residential structure as well as for the surrounding three existing single-family residences. It is assumed that fuel modification for the proposed new residence would have minimal impact on the natural communities occurring within the study area of the Project site (2354 San Clemente Street Biological Resources Assessment, ESA. June 2022). Furthermore, San Clemente Street is an approximately 275-foot long dead-end street, which does not meet the required LBFD property access requirements per the City of Laguna Beach Code of Ordinances – Title 15.01 - Fire, the 2022 California Fire Code, California Code of Regulations, Title 24, Part 9, includes sections 503.2.5 – Dead Ends and D103.4 – Dead Ends, which have been adopted and amended by the City of Laguna Beach, which state, “a dead-end fire apparatus access road in excess of 150 feet in length shall be provided with an approved area for turning around fire apparatus”. Additional Fire Protection Measures are proposed for this Project, as allowed by the LBFD, because the standard 195-foot-wide fuel modification zone is not achievable for the entire lot, dead-end road length exceeding 150 feet, and the current property does not conform to the 150 feet hose pull requirement. The in-lieu measures are summarized on page 10 in the Compensating Fire Protection Measures section of this report.

Existing Lot Conditions

As indicated in Figure 3, *Proposed Site Plan*, the buildable parcel's configuration is a parallelogram with the west and east ends ranging from approximately 86 to 156 feet in length and the north and south boundaries approximately 67 feet in width, respectively, totaling approximately 9,257 ft² and the non-buildable, open space parcel's configuration is also a parallelogram with the west and east ends ranging from approximately 156 to 210 feet in length and the north and south boundaries approximately 58 feet in width respectively, totaling approximately 9,347 ft². Currently, the existing residence, guest house and interconnected decking area are elevated. There is an approximately three-foot wide walkway on the eastern side of the existing residence allows for access to the interconnected deck area and rear guest house, as well as access to the side yard; the walkway does not connect all the way around the residence, not conforming to the LBFD fire department access requirements. The Project site is located within a residential community that lies southwest of Aliso Creek Canyon and is located in a wildland urban interface (WUI) open space area. The eastern, southern, and portion of the western boundaries of the property are adjacent to existing residences and landscaped yards. The topography of the parcel with the existing residence is built on includes a steep west/northwest-facing hillside with an approximate 46% slope. The elevations on the Project site vary from roughly 266 feet above mean sea level (amsl) at the base of the canyon to roughly 342 amsl at the northeastern corner of the property.

Additionally, the Project site is located in an area with urban development in all directions, including the residences located across the drainage / sensitive habitat “open space” area directly to the north and west of the Project site. The privately-owned undeveloped “open space” lots that are directly west of the Project site (APN's #656-122-04 and #656-122-03), including the non-buildable lot associated with this project, contain ornamental trees including Eucalyptus trees (*Eucalyptus spp.*) and Canary Island Pine (*Pinus canariensis*), as well as a mix of coastal chaparral-

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sagebrush vegetation, California Buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemisia californica*), Black sage (*Salvia mellifera*), and lemonadeberry (*Rhus integrifolia*). Lesser components include laurel sumac (*Malosma laurina*) and toyon (*Heteromeles arbutifolia*). The neighboring parcels vary in their existing condition with residential properties above and to the north, south, and east of older and newer construction. The subject residence is technically located in a Very High Fire Hazard Severity Zone (VHFHSZ) per LBFD and does have an “FM” (fuel modification) designation in the City’s GIS mapping website: http://gisweb.lagunabeachcity.net/Html5Viewer/index.html?configBase=http://gisweb.lagunabeachcity.net/Geocortex/Essentials/REST/sites/GISMap3/viewers/HTML5_22/virtualdirectory/Resources/Config/Default (City of Laguna Beach 2019). The project area is within a potential “ember zone” from the naturally-vegetated hillside above and adjacent to the property.

The newly proposed, code-compliant, ignition resistive, fully-sprinklered single-family remodeled residence with an attached two-car garage is accessed from San Clemente Street, an approximately 275-foot dead-end residential street that is accessed from Alta Vista Way. San Clemente varies in width of dedicated right-of-way from approximately 16 feet to 50 feet, however, the actual paved road varies from only 15 feet to 26 feet due to the surrounding, existing developments. San Clemente Street is considered a ‘paper street,’ meaning the unimproved right-of-way of San Clemente Street extends west beyond the existing end of the street, however, due to the steep naturally vegetated open space area, the street has never been improved as a through street, and likely never will. Because San Clemente Street is an approximately 275-foot dead-end residential street and does not have a code-compliant turnaround due to the street being so narrow, it does not meet the requirement for a fire apparatus road. However, the junction of San Clemente Street and Alta Vista Way meets the turnaround requirement for a 60-foot “Y” turnaround. San Clemente Street allows for parking on the eastern side of the street for the first approximate 100 feet. The entire western side of the street and the remainder of the eastern side of the street has “No Parking” signs posted.

The nearest fire hydrant (at the driveway entrance of 2399 San Clemente Street), near the intersection of Alta Vista Way and San Clemente Street, is approximately 250 feet from the property, which is within the required minimum fire hydrant spacing distance of 500 feet (2022 CFC, Appendix C, Table C102.1). The applicant’s architect has obtained and completed a Service Availability Letter (hydrant flow report) from the LBFD Fire Marshal and water purveyor (see Attachment 6 – *Completed Hydrant Flow Report*).

Post Construction Condition

With the proposed Project, the existing wood-sided, non-sprinklered single-family residence, attached one-car garage, and guest house with an interconnected wooden deck area will be demolished and the construction of a new code compliant, ignition resistive, fully-sprinklered single-family residence and attached two-car garage with an interconnected concrete decking area and pool. After the proposed remodel, the new two-level structure will occupy 3,583 ft² of livable space, 1,378 ft² of 1-hour Class A construction interconnected decking area, and a 528 ft² attached, two-car garage (located on the street level), with driveway entrance from San Clemente Street. Current exterior materials include board and batten vertical wood siding walls, and a combustible wood interconnected decking area. With the proposed remodel, the exterior materials of the new residence and attached two-car garage will be with smooth stucco walls, along with metal and stone siding materials to meet the current ignition resistive requirements. Furthermore, **an additional layer of code-exceeding 1-hour rated 5/8-inch Type X fire rated gypsum sheathing will be applied behind the exterior covering or cladding (stucco or exterior siding) on the**

exterior side of the framing, from the foundation to the roof for a facade on the exposed sides of the structure (north, west, and east sides). The addition of 1-hour 5/8-inch fire rated gypsum drywall will make the exposed sides of the home ignition resistive (Type VA construction.) All windows for the entire new single-family residence will be upgraded to code-exceeding dual pane windows with both panes tempered glass, including all sliding glass doors. The current roof area will be completely demolished, and a new class A-fire rated roof and associated assembly will be installed. With the proposed roof configurations, there will be attic or void spaces above portions of the first and second story living spaces, as well as above the garages, requiring ventilation to the outside environment. The attic spaces will meet the CFC and CBC requirements with either ember-resistant roof vents or a minimum 1/16-inch mesh and shall not exceed 1/8-inch mesh for side ventilation.

In addition, the new residential design will provide an unimpeded, all-weather, non-combustible minimum three-foot wide, stairway/pathway around all sides of the proposed residence for firefighters to safely perform their job around the entire perimeter of the structure (See Attachment 2, *Fire Department Site Access Plan*). The new lower-level decking area will be built with concrete and ignition resistive surfaces with steel and single pane glass rails, and the upper-level decking area will be constructed with a non-combustible tile on 1-hour Class A construction with waterproof membrane with steel and single pane glass rails. The code minimum requirement for Group R3 Building Occupancy Type is an automatic fire sprinkler system adhering to NFPA 13D, however, this project proposes all rooms and void spaces of the new residence and attached two-car garage, including within all closet and bathroom spaces, will be fitted with an upgraded automatic fire sprinkler system conforming to NFPA 13 requirements. Because the farthest point of the residence will not be within the required 150 feet from San Clemente Street, **the applicant proposes the installation of a code exceeding wet standpipe system and an exterior sprinkler head system.** The wet standpipe system will augment the enhanced interior fire sprinkler system which will function similarly to a system that provides structure protection, with a high degree of success confining or reducing fire spread to the room of origin, extending flashover, providing additional time for firefighter response, and minimizing firefighting resource demands. As such, the modified fire protection system will exceed the life safety function of a normal NFPA 13D, providing the functional equivalency for firefighter access within 150 feet of the shared driveway access by providing a water source closer to the new residence, when properly designed and installed. The wet standpipe system (Fire Department Connections or FDCs) will be installed from the driveway entrance to the rear of the structure. The wet standpipe system will be maintained at all times by a licensed contractor pursuant to NFPA 25 or similar guidelines approved by the Fire Marshal. Signage for both the fire department connection (FDC) riser and the standpipe hose connection shall be red with white letters on a durable sign (metal or rigid plastic). Signage shall be permanently attached to the FDC riser or the standpipe hose connection riser. Both risers are to be painted OSHA red. Signage on FDC riser to state "FDC serves wet standpipes and fire sprinkler system". Signage on hose connection riser to state "Wet Standpipe Hose Connection." **Furthermore, the installation of an exterior fire sprinkler system under all projections (roof, decks, overhangs, etc.) on all levels of the north and west sides of the residence (exposed sides of the residence to the vegetation on the hillsides below) to also help mitigate for the inability to achieve the required hose pull length.** The exterior fire sprinkler heads are required to comply with the 'Exposed Protection' requirements of NFPA 13, Sections 11.3.2 (including both subsections 11.3.2.1 and 11.3.2.2), which describe the design and installation standards that are required to be followed. The recommended upgrades to the interior and exterior of the structure will offset the need of a Phos Chek system, as previously recommended in the Fire Protection Plan by Douglas Nickles in December 2008. Smoke detectors shall be installed at the ceiling of every room.

A Preliminary Landscape Plan set (Attachments 4a and 4b) has been prepared by M.D. Wilkes Design and Consulting, includes removing all existing site vegetation within Zone A and Zone B that are not on the City's fuel modification zones species list, except those found to be special-status plant species such as lemonade berry, and replanted with new low flammability, drought tolerant shrubs and ground cover approved by LBFD. Landscape plants will be watered by a permanent, automatic irrigation system that will maintain the vegetation in a hydrated condition to prevent ignition by embers from a wildfire. Additionally, the naturally vegetated open space area in the adjacent non-buildable parcel will include an extended irrigated Zone A area to achieve a full 20-foot setback zone extending out from the buildable lot, an irrigated Zone B for all areas outside the 'significant watercourse' setback areas (irrigation provided by Zone B shall be irrigated by casting water from the buildable parcel thus no permanent irrigation will be placed within the non-buildable parcel), and a Zone C non-irrigated and 50-percent thinned fuel modification zone (FMZ). The landscaping will be routinely maintained and as needed per LBFD's VHFHSZ landscaping guidelines. Should future water availability issues be realized due to extended drought, the landscape will be limited to low density, drought tolerant species that do not facilitate fire ignition or spread.

3 Fire Environment

It is important to note that wildland fire may transition to urban fire if structures are receptive to ignition. Structure ignition depends on a variety of factors and can be prevented through a layered system of protective features including fuel modification directly adjacent the structure(s), application of known ignition resistive materials and methods, and suitable infrastructure for firefighting purposes. Understanding the existing wildland vegetation and urban fuel conditions on and adjacent the site along with the site's weather, topography and fire history are necessary to understand the potential for fire within and around the project. The majority of the Laguna Beach coastal area, including the Project area, lie within an area statutorily designated a Local Responsibility Area "Very High Fire Hazard Severity Zone," by the LBFD and CAL FIRE. This classification indicates that the terrain, fuels, weather and ignition sources combine to create an environment that would facilitate fire spread and presents a potential hazard to persons and property. Fires in this portion of Orange County may be affected by seasonal winds that result in fast moving, unpredictable wildfire.

The following description provides details regarding the site's fire environment and general risk from wildland fire.

- The property at 2354 San Clemente Street is within an area subject to occasional weather extremes that may facilitate wildfire ignition and spread;
- The property is within a WUI area (along the northern and western sides of property) and is subject to occasional weather extremes that may facilitate wildfire ignition and spread;
- Terrain within the vicinity of the project may facilitate the spread of fire due to steep, vegetation covered slopes;
- There is a potential risk from ember generated wildfires based on natural, unmaintained fuels to the north and west of the Project's perimeter and associated with adjacent structures that will be less ignition resistive than the proposed residence;
- The unnamed canyon above and adjacent to the Project site has no recorded fires and the Project Area has not burned during the recorded fire history period for Laguna Beach. Typical fire return intervals for sage

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scrub vegetation types ranges between 20–30 years, while that for chaparral vegetation ranges between 40–60 years (up to 100 years) indicating that these open space areas may be susceptible to wildfire, although there is research supporting much longer historic fire intervals for chaparral (Conard and Weise 1998, Keeley and Fotheringham 2001, and others);

- Strong winds may funnel down the adjacent drainage and pre-heat fuels on southeast/northwest facing slope to the north and west of the Project site. Vegetation on hillside will ignite quickly and generate embers;
- Required LBFD fuel modification zones are not possible on site given the parcel sizes and the City of Laguna Beach Municipal Code standards;
- The primary wildfire concerns are considered to be: 1) embers spotting into fuels up-slope from the structure and burning down-slope, toward the structure and 2) structure fire on neighboring lots;
- The remodeled residence and the upgraded landscape and hardscape will improve overall fire hazard conditions by converting a vegetated parcel to an ignition resistive structure and landscape.

4 Fire Risk Assessment

Based on Dudek's assessment, it is expected that wildfires will have the possibility of occurring nearby this site post-development. Fires burning in the adjacent fuel beds often display moderate fire intensity and thresholds for spread that are observed to depend on environmental factors like wind or slope. Wildland fire from the north and northwest along an existing drainage, as well as northeast along the existing drainage that parallel Nyes Place are considered to be the most likely threat for a wildland fire. The Project site includes steep terrain, seasonally flammable vegetation (grasses and chaparral to the north and west) and unpredictable wind patterns that all influence fire spread rates and behavior. There is no recorded history of fire near the project area, but that does not indicate that the fuels will not burn under the right conditions. However, the 2016 Laguna Fire more recently burned about 47 acres approximately 4.5 mile to the north/northeast and the 2018 Aliso Fire burned about 175 acres approximately 6 miles to the north near the Aliso Wood Canyon Park.

As such, a fire burning in the vicinity of the Project during the fall condition (worst-case scenario) would be moderately fast moving downslope and include average flame lengths of up to a model estimated 44 feet for non-maintained, sage and chaparral fuels (See Attachment 5: *Fire Behavior Modeling Summary*). However, vegetation management and/or alternative methods for reducing fire spread rates and fire intensity are important considerations for mitigating direct flame impingement on a structure. Burning embers during a wildfire represent the greatest risk to structures that are set back from wildland fuels. The annual cutting of the sage and chaparral fuels to a height below three inches will reduce the potential risk of a wildland fire spreading onto the subject parcel. It is possible that burning embers would ignite spot fires on the subject parcel, but the proposed remodel to the current residence will be hardened to prevent ember intrusion (**no exterior vents, self-closing exterior doors, dual-tempered dual pane windows and sliding glass doors, the addition of code-exceeding 1-hour rated 5/8-inch Type X fire rated gypsum sheathing applied behind the exterior covering or cladding on the exposed sides of the structure, and the installation of an exterior fire sprinkler system**) and the landscape/hardscape will be treated to minimize receptive fuels, thus minimizing the likelihood of ignitions. Given the heavy, consistent fuels in close proximity to the structure, combined with the structure's ignition resistance level following construction, the risk of wildfire damage to the structure is considered low to moderate. The newly remodeled residential structure, landscape, and hardscape will improve fire

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safety on the parcel from current conditions and will provide improved firefighter access and defensible space. Wildfire may occur in the vicinity of the project and the homeowners will need to be aware of fire safety procedures, maintain the property's landscapes and structural features, and develop a personal evacuation plan (See Section 10).

5 Fuel Modification

As mentioned, the property is adjacent to undeveloped, naturally-vegetated land and is considered to be within a wildland urban interface (WUI) area, per definition of LBFD. As such, the property requires modification of natural vegetation at the WUI and an integrated landscape plan, including a fuel modification zone. The naturally vegetated areas on the slopes to the north and west of the Project site are a potential wildfire threat. As previously discussed, the proposed landscape plan includes removal of all highly flammable (target plants) species not consistent with the LBFD fuel modification guidelines (within the buildable and non-buildable parcels outside of the 'significant watercourse' setback area) and landscaping with ornamental plants suitable for the location within a fully-irrigated, Zone A setback FMZ (LBFD, 2019). For the naturally vegetated open space area in the adjacent non-buildable parcel, an extended irrigated Zone A area to achieve a full 20-foot setback zone extending out from the buildable lot, an irrigated Zone B shall require 50 percent thinning and removal of all dead and dying vegetation and all 'Target Species for all areas outside the 'significant watercourse' setback areas, except those found to be special-status plant species such as lemonade berry, and a Zone C non-irrigated and 50-percent thinned FMZ will be created. Irrigation provided by Zone B shall be irrigated by casting water from the buildable parcel thus no permanent irrigation will be placed within the non-buildable parcel.

A fuel modification zone is a strip of land where combustible vegetation has been removed and/or modified and partially or totally replaced with more adequately spaced, drought-tolerant fire resistant plants in order to provide a reasonable level of protection to structures from wildland fire. A typical landscape/fuel modification installation in Laguna Beach consists of a minimum 195-foot-wide zone comprised of a 20-foot setback zone (Zone A), a minimum 50-foot zone typically irrigated, (Zone B), and an additional 125-foot minimum of vegetation thinning zones (Zones C and D). Based on the steep and limited building area on the property and the undeveloped, open space lands to the north and northwest, it is not possible to achieve the City's standard fuel modification zone depth on site. It is proposed that the entire buildable parcel be managed and maintained as an fully irrigated, Zone A FMZ and that the non-buildable open space parcel be converted into an extended irrigated Zone A area to achieve a full 20-foot setback zone extending out from the buildable lot, an irrigated Zone B with 50 percent thinning and removal of all dead and dying vegetation and all 'Target Species for all areas outside the 'significant watercourse' setback areas, and a Zone C non-irrigated and 50-percent thinned FMZ. Due to the City of Laguna Beach Municipal Code (Chapter 25.41, O-S Open Space) which does not allow for building or modifying the open space area in a way that would take away from its natural state (i.e. the installation of an irrigation system to the naturally vegetated hillside). Chapter 25.41 states, "This zone is intended to protect and preserve open space land which are of notable ecological, scenic, cultural, and scientific value so that such land remains a permanent community resource." Additionally, Section 25.50.030(D)(1) and (2)(a) requires a setback of twenty-five feet be maintained from both sides of the centerline of a significant watercourse. The available managed and maintained fuel modification area (Zones A, B, and C) within the property boundaries, will extend a maximum 20 feet to the south, approximately 100 feet to the west (extending into the open space area), approximately 150 feet on the north side of the property (extending into the northern corner of the open space area) and approximately 19 feet on the eastern side of the property. Due to the City of Laguna Beach Municipal Code (Chapter 25.41) restrictions that do not allow any building or modification

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(installing an irrigation system on the hillside) within the naturally vegetated open space area to the north and west, we are proposing a modified fuel modified zone that includes a reduced Zone B irrigated zone outside of the 'significant watercourse' 50-foot setback area (25 feet of setback required on each both sides of the watercourse) requiring 50 percent thinning and removal of all dead and dying vegetation and all 'Target Species', and a reduced Zone C non-irrigated Thinning Zone within the 'significant watercourse' setback area. Zone B shall be irrigated by casting water from the buildable parcel thus no permanent irrigation will be placed within the non-buildable parcel. Attachments 3a, 3b, 4a, and 4b provide detailed illustrations of the proposed Zones A, B, and C, along with plant materials and fire and fuel maintenance notes. Additional home and property wildfire protection is proposed in this AM&M report to compensate for the constrained fuel modification zone due to the property size. These fire protection features are detailed in the proposed Compensating Fire Protection Mitigation Measures section below.

6 Code/Ordinance Requirements

This AM&M proposes alternatives in lieu of the absence of the requirements for:

1. Constrained 195-foot fuel modification width within the development footprint area due to property boundaries restraints.
2. San Clemente is an approximately 275-foot dead-end residential street and does not have a code-compliant turnaround due to the street being so narrow, thus not providing the appropriate LBFD property access, including an inadequate dead end street turnaround (CFC 503.2.5 – Dead Ends and D103.4 – Dead Ends).
3. Farthest point of building shall not be greater than 150 feet from fire apparatus access road (CFC 503.1.1). The Project as designed is unable to meet the required 150 feet hose pull from the fire apparatus to the rear of the proposed residence along the north, south, and west sides.

The Project as designed will provide an unimpeded, all-weather, noncombustible concrete, minimum three feet wide firefighter access pathway/stairway with unlimited vertical clearance around all sides of the proposed structure for firefighters to safely perform their job around the entire perimeter of the structure. Firefighter access shall be made without the need for special tools (ladders) or ability and have permanent improvements installed when ascending or descending from street level (e.g., stairs). As such, firefighters will be able to achieve entry into the residence around the building.

7 Code Compliance (Intent)

The applicant proposes to add a wet standpipe system and an exterior fire sprinkler head system to augment the automatic interior fire sprinkler system as described in the sections above. The modified system will function similarly to a system that provides structure protection, with a high degree of success confining or reducing fire spread to the room of origin, extending flashover, providing additional time for firefighter response, and minimizing firefighting resource demands. As such, the modified fire protection system and other building features listed below will be part of a system of code-exceeding fire protection measures to provide functional equivalency for fire fighter access and the possibility for a delayed response time.

8 Compensating Fire Protection Features

Based on Dudek's assessment, the project site includes three areas that do not fully conform to the City Fire Department requirements: 1) Constrained 195-foot fuel modification width; 2) Providing the appropriate LBFD property access, including an inadequate dead end street turnaround; and 3) The site does not meet the City's 150 feet of hose pull around the entire single-family residence with attached two-car garage.

Given the potential fire hazard of the Project's location, in addition to the existing residence and guest house being completely demolished and remodeled to the latest ignition resistive codes, including an automatic interior fire sprinkler system with code-exceeding coverage within all rooms of the proposed single-family structure, including all closets and bathrooms, and attached two-car garage, the 2354 San Clemente Street residence and attached two-car garage will include the following Alternative Materials and Methods for additional prevention, protection, and suppression in compensation for the absence of standard LBFD fuel modification zone and constrained fire department emergency vehicle and firefighter access based on a site specific hazard assessment:

1. Constrained 195-Foot Fuel Modification Width:

The Fuel Modification is constrained to 20 feet to the south, approximately 100 feet to the west (extending into the open space area), approximately 150 feet on the north side of the property (extending into the northern corner of the open space area) and approximately 19 feet on the eastern side of the property. The remaining fuel modification is not possible due to its size. Thus, it shall be required the entire buildable parcel of the property (rear, side, and front yards) to be maintained as an irrigated Zone A, according to LBFD Guidelines. The adjacent non-buildable open space parcel will be converted into an extended Zone A irrigated setback zone, a reduced Zone B irrigated zone outside of the 'significant watercourse' 50-foot setback area (25 feet of setback required on each both sides of the watercourse) requiring 50 percent thinning and removal of all dead and dying vegetation and all 'Target Species', and a reduced Zone C non-irrigated Thinning Zone within the 'significant watercourse' setback area, due to the City of Laguna Beach Municipal Code (Chapter 25.41, O-S Open Space Zone) which does not allow for building or modifying the open space area in a way that would take away from its natural state (i.e. installation of an irrigation system to the naturally vegetated hillside). Zone B shall be irrigated by casting water from the buildable parcel thus no permanent irrigation will be placed within the non-buildable parcel. All of the existing site vegetation and shrubs within the buildable parcel and within Zones A and B on the non-buildable parcel shall be removed prior to construction to accommodate the proposed residence and landscape, except those found to be special-status plant species such as lemonade berry. This will address the existing vegetation issues in the Zone A that are not consistent with the LBFD Guidelines. The proposed plant palette for the site's landscaping is consistent with LBFD Guidelines (see Attachment 3). Accordingly, Zones A, B, and C will require the following:

Zone 0 – Ember-Resistant Zone (Exterior wall of structure to 5 feet in all directions)

The ember-resistant zone is applicable site-wide and is measured from the exterior wall of the structure outward to 5 feet (horizontal) and falls within the irrigated Zone A FMZ. The ember-resistant zone is designed to keep fire and embers from igniting materials that can spread the fire to a home.

Zone 0 - Specific Requirements:

- The use of hardscaping like gravel, pavers, concrete, and other non-combustible mulch materials. No combustible bark or mulch.
- Remove all dead and dying weeds, grass, plants, shrubs, trees, branches, and vegetative debris; check roof gutters, decks, porches, and stairways.
- Remove all branches within 10 feet of any chimney or stovepipe outlet.
- Limit plants in this area to low growing, non-woody, properly watered and maintained plants.
- Relocate firewood and lumber away from the structure.
- Vegetation limited to no more than 6-inches in height.
- Vegetation shall be irrigated

Zone A - Irrigated Zone (Zone 0 to Buildable Property Boundary)

The purpose of the zone A is to provide a defensible space for fire suppression forces and to protect structures from radiant and convective heat of wildland fires. No combustible construction shall be allowed within the 20-foot setback zone.

Zone A - Specific Requirements

- a) All existing target (highly flammable) species will be removed.
- b) Automatic irrigation systems to maintain healthy vegetation with high moisture content.
- c) Pruning of foliage to reduce fuel load, vertical continuity, and removal of plant litter and dead wood. Maintenance to be provided on an ongoing basis.
- d) Trees and tree form shrub species are usually not allowed within 10 feet of combustible structures (measured from the edge of a full growth crown).
- e) Trees and tree form shrub species are not allowed to extend beyond the property line (measured from the edge of a full growth crown). It should be noted that the one (1) Dwarf Strawberry (*Arbutus unedo compacta*) tree, one (1) California Sycamore (*Platanus racemosa*) tree, and the two (2) Coast Live Oak (*Quercus agrifolia*) trees, will have their canopies maintained to be within the property line.
- f) Tree and tree form shrub species or groupings of 1 to 3 plants are not allowed within 10 feet of adjacent tree species or groupings as measured from the edge of a full growth crown.
- g) Special consideration should be given for rare and endangered species, geologic hazards, tree ordinances, or other conflicting restrictions.
- h) Maintenance including ongoing removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying fire resistant plantings, maintenance of the operations integrity and

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programming of the irrigation system, regular trimming to prevent ladder fuels will occur at least annually and as needed.

- i) A minimum three (3)-foot wide, all-weathered, non-combustible stairway/pathway with horizontal clearance and unlimited vertical clearance around the exterior of the structure (CFC 504.1) shall be provided for Firefighter access (see Attachment 2). Firefighter access shall be made without the need for special tools (ladders) or ability and have permanent improvements installed when ascending or descending from street level (e.g., stairs). As such, firefighters will be able to achieve entry into the residence around the building.
- j) No combustible construction shall be allowed in Zone A.
- k) No permanent or portable barbeques/grills, fire pits, fireplaces or other flame generating device shall be permitted within 30 feet of non-fire resistive plants/vegetation.
- l) No vines shall be permitted on combustible structures (e.g., Type V non-rated structure).
- m) Fuel modification will be pre-designed and installed by the project developer.
- n) No exposed wood will be allowed on the wildland exposed side(s) of the project's structure. Exceptions to allow pre-treated, fire retardant wood or heavy timber construction or a California State Fire Marshal's- listed WUI product on some exterior wall or under-eave surfaces for nonstructural decorative treatments may be proposed for approval by LBFD.
- o) No combustible fences or gates will be allowed. Wood fences and gates using fire retardant treated wood products may be approved. No plant material (i.e., vines) will be allowed on the fence.
- p) All doors around the exterior of the structure, excluding the main entrance and sliding glass (sliders) doors, shall be self-closing and conform to the exterior door assembly standards addressed in CBC Chapter 7A, Section 704A.3.2.3.

Zone B - Irrigated Zone

Zone B is a 12-feet, 4-inch to 42-feet, 6-inch irrigated zone located directly adjacent to the Irrigated Zone A that requires 50 percent thinning and removal of all dead and dying vegetation and all 'Target Species', except those found to be special-status plant species such as lemonade berry. Zone B shall be planted with drought-tolerant, deep-rooted, moisture retentive plants found in the approved Laguna Beach Fire Department Plant List. A permanent automatic irrigation system shall be installed to maintain healthy vegetation with high moisture content. Due to the City of Laguna Beach Municipal Code (Chapter 25.41, O-S Open Space Zone) which does not allow for building or modifying the open space area in a way that would take away from its natural state (i.e. installation of an irrigation system to the naturally vegetated hillside) and the required 50-foot setback area (25 feet of setback required on each both sides of the watercourse), the property owner will not be allowed to install a permanent automatic irrigation system. Instead, we are proposing to irrigate Zone B by casting water from the buildable parcel thus no permanent irrigation will be placed within the boundaries of this zone. All dead and dying vegetation and undesirable

plant species shall be removed within Zone B and no structure shall be built with combustible materials. The following specific requirements shall be followed in Zone B:

- a) Groundcover shall be maintained at a height not to exceed 18 inches;
- b) Native grasses should be allowed to go to seed. Native grasses shall be cut after annual seeding and cut to a maximum height of 8 inches;
- c) Irrigation shall be designed to supplement native vegetation, and establish and maintain planted natives and ornamentals;
- d) Trees and tree form shrub species are not allowed within 10 feet of combustible structures;
- e) Trees and tree form shrub species are not allowed within 10 feet of adjacent tree species as measured from the edge of a full grown crown;
- f) Trees and tree form shrub species are not allowed to extend beyond the property line.

Zone C - Thinning Zone (Non-irrigated)

Zone C is a 0 to 71-feet, 8-inch zone that requires 50 percent thinning and removal of all dead and dying vegetation and undesirable species, except those found to be special-status plant species such as lemonade berry. The thinning zone is meant to reduce the amount of fuel load within the wildland area adjacent to the residential structures, with the intent of reducing the amount of radiant and convective heat a wildfire will produce. Thinning zones are located adjacent to the irrigated zone and can extend 125 feet or more into wildland areas. Due to the City of Laguna Beach Municipal Code (Chapter 25.41, O-S Open Space Zone) which does not allow for building or modifying the open space area in a way that would take away from its natural state (i.e. installation of an irrigation system to the naturally vegetated) and the required 50-foot setback area (25 feet of setback required on each both sides of the watercourse), the property owner will not be allowed to remove all undesirable plant species, nor all dead and dying vegetation from the thinning zones. As in Zone A, combustible construction is not allowed in Zone C. It shall be the responsibility of the homeowner to meet and maintain the 50 percent thinning in Zone C, as well as the following City ordinances and Zone specific requirements:

- a) All fine fuels reduced to a maximum of 8-12 inches in height;
- b) Native grasses should be allowed to go to seed. Native grasses shall be cut after annual seeding and cut to a maximum height of 8 inches;
- c) Trees and tree form shrub species are not allowed within 10 feet of combustible structures;
- d) Trees and tree form shrub species are not allowed within 10 feet of adjacent tree species as measured from the edge of a full grown crown;

- e) Trees and tree form shrub species are not allowed to extend beyond the property line;
- f) Maintain sufficient cover to prevent erosion without requiring pruning.

2. Inadequate LBFD Dead End Street Length and Turnaround:

As noted above, San Clemente Street is an approximately 275-foot long dead-end street, which does not meet the required LBFD property access requirements per the City of Laguna Beach Code of Ordinances – Title 15.01 - Fire, the 2022 California Fire Code, California Code of Regulations, Title 24, Part 9, includes sections 503.2.5 – Dead Ends and D103.4 – Dead Ends, which have been adopted and amended by the City of Laguna Beach, and states, “a dead-end fire apparatus access road in excess of 150 feet in length shall be provided with an approved area for turning around fire apparatus”. Due to limiting road width, inadequate dead-end street length, and fire engine turnaround areas, Fire Department turnaround configurations were created to suffice the City of Laguna Beach Fire Department access requirements. The configuration included in this AM&M (Figure 4 – 2354 San Clemente Street Cul-De-Sac Configuration) includes the construction of a circular, off-set cul-de-sac providing 32 feet of unobstructed turnaround space at the end of San Clemente Street, plus an additional approximately 20 feet of driveway turnaround space. Additionally, we are proposing to widen the northern side of San Clemente to provide 20 feet of unobstructed road width within the proposed cul-de-sac design. The cul-de-sac will require that the no parking along both sides of San Clemente Street remain as is. Fire Lane “No Parking” signs will be installed no more than 50 feet apart and the curbs will be painted red as well. The property will be hardened above and beyond what is required by code, including conforming to current ignition resistant building codes, **installing code-exceeding dual pane, dual-tempered windows on the exposed sides of the structure (north, west, and east sides), installing an additional layer of code-exceeding 1-hour rated 5/8-inch Type X fire rated gypsum sheathing will be applied behind the exterior covering or cladding (stucco or exterior siding) on the exterior side of the framing, from the foundation to the roof for a facade on the exposed sides of the structure (north, west, and east sides),** a full interior fire sprinkler system to be installed within all rooms of the proposed single-family structure and attached street-level two-car garage, **a code-exceeding wet-standpipe system to be installed for the inability to conform to the required 150 feet hose pull requirement, and the installation of an exterior fire sprinkler system.**

3. 150 feet hose pull requirement:

To compensate for this shortage around the exterior of the single-family residence, **a code-exceeding wet standpipe system will be installed from the driveway to the rear of the structure** and will provide a fire hose line for the remainder of the northern and western sides of the structure and the hillside below. Water will be pumped through two-way, freestanding fire department 2.5-inch inlet and outlet standpipe hose connection (a 2.5-inch connection near the driveway entrance and a 3-inch underground standpipe with a 2.5-inch connection along the eastern side of the property). The standpipe hose connection system will be used as an auxiliary connection to supply water for LBFD use around the proposed new single-family structure. The standpipe hose connection outlets will be strategically located around the exterior of the single-family residence so that firefighter hose lines will be able to access all entry points into the proposed structure (see Attachment

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2 for proposed standpipe hose connection locations). The locations of the standpipe hose connections will be reviewed and approved by LBFD prior to installation. The wet standpipe system will be designed and installed per the 2022 CFC and NFPA 14 with a main 3-inch underground standpipe tied into the new single-family residences sprinkler system downstream from check valve on the riser in order to keep standpipe system wet at all times. Wet standpipe system will be tested and maintained annually, or as needed, by a licensed contractor pursuant to NFPA 25 or similar guidelines approved by the Fire Marshal. All inspection and testing documentation shall be forwarded to the LBFD Fire Marshal, annually. Providing test records and performing maintenance on the FDC standpipe system shall be made a deed encumbrance for present and future property owners. Signage for both the FDC riser and the standpipe hose connection shall be red with white letters on a durable sign (metal or rigid plastic). Signage shall be permanently attached to the FDC riser or the standpipe hose connection riser. Both risers are to be painted OSHA red. Signage on FDC riser to state "FDC serves wet standpipes and fire sprinkler system". Signage on hose connection riser to state "Wet Standpipe Hose Connection." **Furthermore, an exterior fire sprinkler head system shall be designed and installed by an approved Fire Sprinkler Engineer and are required to comply with the 'Exposed Protection' requirements of NFPA 13, Sections 11.3.2 (including both subsections 11.3.2.1 and 11.3.2.2), which describe the design and installation standards that are required to be followed. The exterior fire sprinkler heads will be installed under all projections (roofs, decks, overhangs, etc.) on all levels of the north and west sides of the new residence to also help mitigate for the inability to achieve the required 150-foot hose pull length and as an additional fire protection feature to reduce the amount of radiant heat transfer to the residence from a wildfire.**

4. Additional Fire Prevention and Protection Measures:

In addition to the installation of a wet standpipe system and an exterior fire sprinkler system being installed on the exterior side of the structure, the applicant is proposing to provide a more robust interior fire sprinkler system that will be designed to provide additional mitigation for the exceeding 150 feet hose pull. The more robust interior fire sprinkler system will provide coverage beyond the standard system that would be required for this structure and the attached two-car garage, resulting in improved control and suppression of interior fires. Additional measures for the interior sprinkler system are described below:

- a. All rooms within the remodeled single-family residence and attached two-car garage, will be provided with an NFPA 13 upgraded automatic fire sprinkler system with additional coverage. The NFPA 13 system is required:
 - i. To be designed by a licensed fire protection engineer or LBFD-approved sprinkler contractor.
 - ii. To include coverage in all accessible build up areas, closets, bathrooms, and subterranean garage. The full coverage of accessible build up areas exceeds NFPA 13D, CFC, and CRC.
 - iii. To provide fire inspector's test value five feet above grade.
 - iv. To install a fire sprinkler box in garage with wrench and three heads of each type used in design of fire sprinkler system;

- v. To provide sufficient water supply as determined by fire sprinkler hydraulic calculations, which may require increased meter and piping size. If fire flow is insufficient for the designed system, alternative options, such as a fire pump designed to boost fire flow, may be considered, to the approval of LBFD. Alternative options will be submitted to LBFD for approval before installation
- The windows on the exposed side of the structure (north, west, and east sides) shall be dual pane, both panes tempered. Dual pane, one pane tempered glass has been shown during testing and in after fire assessments to significantly decrease the risk of breakage and ember entry into structures. Therefore, requiring code-exceeding dual pane, both panes tempered is anticipated to be an important safety measure that provides enhanced structure protection and provides mitigation for reduced fuel modification zones and limited setbacks from adjacent structures. *The window upgrade also exceeds the requirements of Chapter 7A of the CBC and providing additional protection for the structure's most vulnerable, exterior side (code exceeding).*
- External dryer vents will be baffled or fitted with ember resistive mesh.
- All doors around the exterior of the structure, excluding the main entrance and sliding glass (sliders) doors, shall be self-closing and conform to the exterior door assembly standards addressed in CBC Chapter 7A.
- All exposed sides of the structure (north, west, and east sides) shall also include 5/8-inch Type X fire rated gypsum sheathing applied behind the exterior covering or cladding (stucco or exterior siding) on the exterior side of the framing, from the foundation to the roof for a facade facing the open space and naturally vegetated areas. 5/8-inch Type X fire rated gypsum sheathing is required to be manufactured in accordance with established ASTM standards defining type X wallboard sheathing as that which provides not less than one-hour fire resistance when tested in specified building assemblies and has been tested and certified as acceptable for use in a one-hour fire rated system. CertainTeed Type X Gypsum Board has a Flame Spread rating of 15 and Smoke Developed rating of 0, in accordance with ASTM E 84, (UL 723, UBC 8-1, NFPA 255, CAN/ULC-S102); UL classified for Fire Resistance (ANSI/UL 263; ASTM E119) and listed under UL File No. CKNX.R3660 (CertainTeed, 2021). **CODE EXCEEDING MITIGATION MEASURE.**
- Since property ownership may occasionally change, the fire protection provisions in this AM&M shall be recorded as a deed encumbrance against the property that will be subject to disclosure. Recording the AM&M conditions notifies all future owners that there are approved fire protection measures that need to be followed or updated should changes be proposed for this property.

9 Supporting AM&M Justifications

The following site-specific features, analysis, and discussion provide justification for approval of the proposed residential remodel and addition project at 2354 San Clemente Street:

Construction to Recent Codes

The existing single-family residence, one-car garage, and guest house will be remodeled and built to the 2022 California Building (including Chapter 7A) and Fire Codes (including Chapter 49), as adopted by Laguna Beach. These codes adopted in 2007 and updated in 2010, 2013, 2016, 2019, and most recently in 2022, focus on preventing embers from penetrating into structures, a leading cause for structure loss from WUI fires. Structures that include construction to Chapter 7A of the CBC, as the remodeled residence and attached two-car garage will, have a higher probability of avoiding or reducing damage from wildfire. The 1993 Laguna Fire burned through northern portions of Laguna Beach and structures were lost. That fire moved quickly through the canyons, burning older, vulnerable structures. Embers penetrating structures were likely responsible for some of the structure losses. The existing roof on the residence will be demolished and upgraded with a new class A-fire rated roof and associated assembly. With the proposed roof configurations, there will be attic or void spaces above portions of the first and second story living spaces, as well as above the garages, requiring ventilation to the outside environment. The attic spaces will meet the CFC and CBC requirements with either ember-resistant roof vents or a minimum 1/16-inch mesh and shall not exceed 1/8-inch mesh for side ventilation. **All existing windows will be removed and upgraded to dual pane with dual tempered glass throughout the property, providing an additional approximately 20 minutes of protection from breakage. Exterior walls and appendages will be ignition resistive and ongoing landscaping maintenance requirements; the installation of the 5/8-inch Type X fire rated gypsum sheathing on the south, west, and east sides of the structure increases a wall's fire rating to a minimum of 1 hour, from the 30-minute rating for standard ½-inch drywall.** And restrictions will minimize the possibility of flammable plants or other landscape items from igniting and causing long-duration, high BTU sources directly touching the exposed sides of the structure. **Additionally, interior sprinklers are required in all structures on this site will be provide coverage within all rooms.**

Structure Ignition

There are three primary concerns for structure ignition: 1) radiant and/or convective heat, 2) burning embers, and 3) direct flame contact (NFPA 1144 2008, IBHS 2008, and others). Burning embers have been a focus of building code updates for at least the last decade, and new structures in the WUI built to these codes have proven to be very ignition resistant. Likewise, radiant and convective heat impacts on structures have been minimized through the Chapter 7A exterior fire ratings for walls, windows and doors. Additionally, provisions for modified fuel areas separating wildland fuels from structures have reduced the number of fuel-related structure losses. As such, most of the primary components of the layered fire protection system provided to the 2354 San Clemente Street residence are required by City and state codes, but are worth listing because they have been proven effective for minimizing structural vulnerability to wildfire and, with the inclusion of required interior sprinklers (required in the 2022 Building/Fire Code updates), of extinguishing interior fires, should embers succeed in entering a structure. Even though these measures are now required by the latest Building and Fire Codes, at one time, they were used as mitigation measures for buildings in WUI areas, because they were known to reduce structure vulnerability to wildfire. These measures performed so well, they were adopted into the code. However, these requirements are

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true for a new development, but because this project is considered a minor remodel, this project does not require the installation of an automatic interior fire sprinkler system. The following project features are required for this project and form the basis of the system of protection necessary to minimize structural ignitions as well as providing adequate access by emergency responders:

- a. Planned and maintained fuel modification zone (Irrigated Zone A within the buildable parcel and extending into the non-buildable parcel, a reduced Irrigated Zone B within the non-buildable parcel outside of the required 'significant watercourse' setback area requiring 50 percent thinning and removal of all dead and dying vegetation and all 'Target Species', and a 50-percent thinned Zone C for areas within the required 'significant watercourse' setback area of the non-buildable parcel).
- b. Application of Chapter 7A, ignition resistant building requirements, plus code-exceed Type VA 1-hour fire rated walls on the exposed sides of the structure; Type VB construction of the south side of the structure.
- c. Multi-pane glazing with two tempered panes; dual pane both panes tempered glass for sliding glass doors.
- d. Code exceeding NFPA 13, Interior Automatic Fire Sprinkler Systems for occupancy type, plus the addition of a code-exceeding wet-standpipe system and exterior fire sprinkler system.

Fire Sprinkler System

The proposed single-family residence and attached street-level two-car garage will be provided with an NFPA 13 automatic interior fire sprinkler system. The interior fire sprinkler system will exceed the life safety function of a normal NFPA 13, when properly designed and installed. The upgraded system will function similarly to a system that provides structure protection, with a high degree of success confining or reducing fire spread to the room of origin, extending flashover, providing additional time for firefighter response, and minimizing firefighting resource demands.

Fire Detection and Alarm System

The residence will have electric-powered, hard-wired smoke detectors and a fire alarm system. These fire detection and alarm systems shall be installed in accordance with NFPA 72, Fire Protection Signaling System and LBFD requirements. The fire alarm system will be supervised by a third-party alarm company. The system will be tested annually, or as needed, with test results provided to LBFD.

Exterior Windows

A potentially vulnerable structure component with regard to radiant or convective heat exposure is a structure's windows. The typical duration of large flames from burning vegetation is on the order of 1 minute and up to several minutes for larger fuels at a specific location (Cohen 1995; Butler et al. 2003; Ramsay and Rudolph 2003; Cohen and Quarles 2011). Tests of various glazing products indicate that single pane, tempered glass failure may occur 120–185 seconds from exposure (University of California 2011; Manzello et al. 2007) but those tests include direct and constant heating that would not be experienced during a wildfire near the residence. Depending on the heat applied and the type of glass used in the various studies, the cracking/failure time varied. However, given the short duration of maximum heat (likely 20-30 seconds for the grasses and maintained shrubs on the slope behind the

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structure), the loss of heat over distance, the fire-rated minimum 20-minute glazing specified for this project, wildfire heat and flame will be reduced, and heat experienced by the windows from the wildland fire is not expected to be enough (in temperature or duration) to cause window failure.

Should a window fail, such as due to a neighboring parcel's natural vegetation or structure fire, the interior, automatic fire sprinklers provide a level of protection and some ability to minimize fire spread beyond the room of origin (NFPA 13 is a life safety sprinkler system designed to provide residents the ability to exit the structure, however, during most wildfire events, residents will have been evacuated and the system may help contain a room fire caused by an ember through a failed window). However, Quarles et al. (2010) provides strong endorsement for tempered glass performance. His research and tests conclude that multi-pane (2–3 panes) with at least one pane tempered is well suited for wildfire exposures. He indicates that tempered glass is at least four times stronger and much more resistant to thermal exposures than normal annealed glass. The use of dual pane, both panes tempered glass on the north-facing side of the structure provides several benefits, with thermal exposure performance the most important for this study. ***Requiring both panes to be tempered provides an added level of protection appropriate for the fire environment at this project site.***

In summary, highly ignitable homes can ignite during wildland fires without fire spreading near the structure (Cohen 1995). However, this site will include the latest ignition resistant construction materials and methods for roofs, walls, vents, windows, appendages, along with highly managed landscape and fuel modification areas.

10 Additional Comments

The goal of the fire protection features, both required and those offered above and beyond the Codes, provided for the 2354 San Clemente Street residence will provide the structure with the ability to survive a wildland fire with little intervention of firefighting forces. Preventing structure ignition results in firefighter and resident hazard reduction and reduces property damage and losses. Mitigating ignition hazards and fire spread potential reduces the threat to structures and can help the fire department optimize the deployment of personnel and apparatus during a wildfire. The analysis in this AM&M report provides support and justifications for acceptance of the additional fire protection measures, including the **installation of an NFPA 13 interior fire sprinkler system within all accessible build up areas, closets, bathrooms, and garage, along with a code-exceeding wet standpipe system; an additional layer of code-exceeding 1-hour rated 5/8-inch Type X fire rated gypsum sheathing applied behind the exterior covering or cladding (stucco or exterior siding) on the exterior side of the framing, from the foundation to the roof for a facade on the exposed sides of the structure; dual pane both panes tempered glass windows throughout the property and for all sliding glass doors; and the construction of a 32-foot diameter offset cul-de-sac at the end of San Clemente Street.**

It is important to note that the proposed remodeled single-family residence with attached two-car garage is not a shelter-in-place structure. It is recommended that the homeowners or other occupants who may reside at the residence at 2354 San Clemente Street adopt a conservative approach to fire safety. This approach must include maintaining the landscape and structural components according to the appropriate standards and embracing a “Ready, Set, Go!” stance on evacuation². Accordingly, occupants shall evacuate the residence and the area as soon

² Information regarding Ready!Set!Go! program can be downloaded at <http://lagunabeachcity.net>

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as they receive notice to evacuate, or sooner, if they feel threatened by wildfire or Red Flag Warning³ conditions when fire ignition and spread is facilitated. Fire is a dynamic and somewhat unpredictable occurrence and it is important for residents to educate themselves on practices that will improve their home survivability and their personal safety.

11 Limitations

This AM&M report does not provide guarantee that residents and visitors will be safe at all times because of the fire protection features it requires. There are many variables that may influence overall safety. This report provides requirements and recommendations for implementation of the latest fire protection features that have proven to result in reduced structure fire or wildfire related risk and hazard.

For maximum benefit, project contractors, engineers, designers, and architects are responsible for proper implementation of the concepts and requirements set forth in this AM&M report. Homeowners are responsible to maintain their structures and lots as required by this AM&M report, the applicable Fire Code, and the LBFD.

If you have any questions regarding this AM&M Report, please contact me at 760.642.8379.

Sincerely,



Noah Stamm
Fire Protection Planner IV
Dudek's Urban Forestry and Fire Protection Planning

Att: Figures 1-4
Attachment 1, Photograph Log
Attachment 2, Fire Department Site Access Plan
Attachments 3a and 3b, Proposed Fuel Modification Plan
Attachments 4a and 4b, Preliminary Planting Plan
Attachment 5, Fire Behavior Modeling Summary
Attachment 6, Completed Laguna Beach Fire Department Hydrant Flow Report

³ Red Flag Warnings are issued by the National Weather Service when conditions are conducive to the formation of wildfires. Dry conditions combined with high winds and low humidity are the hallmarks of weather conducive to producing large wildfires.

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Signatures:

Requested by:

Kevin Aaronson
The Aaronson Group – Property Owner

Geoff Sumich – Project Architect
Geoff Sumich Design

Approved by City of Laguna Beach:

Dennis Bogle
Building Official

Shaveta Sharma
City of Laguna Beach Senior Planner

TO: City of Laguna Beach
Subject: Request for Alternative Materials, and Methods of Construction Design for 2354 San Clemente Street, Laguna Beach, California

References Cited

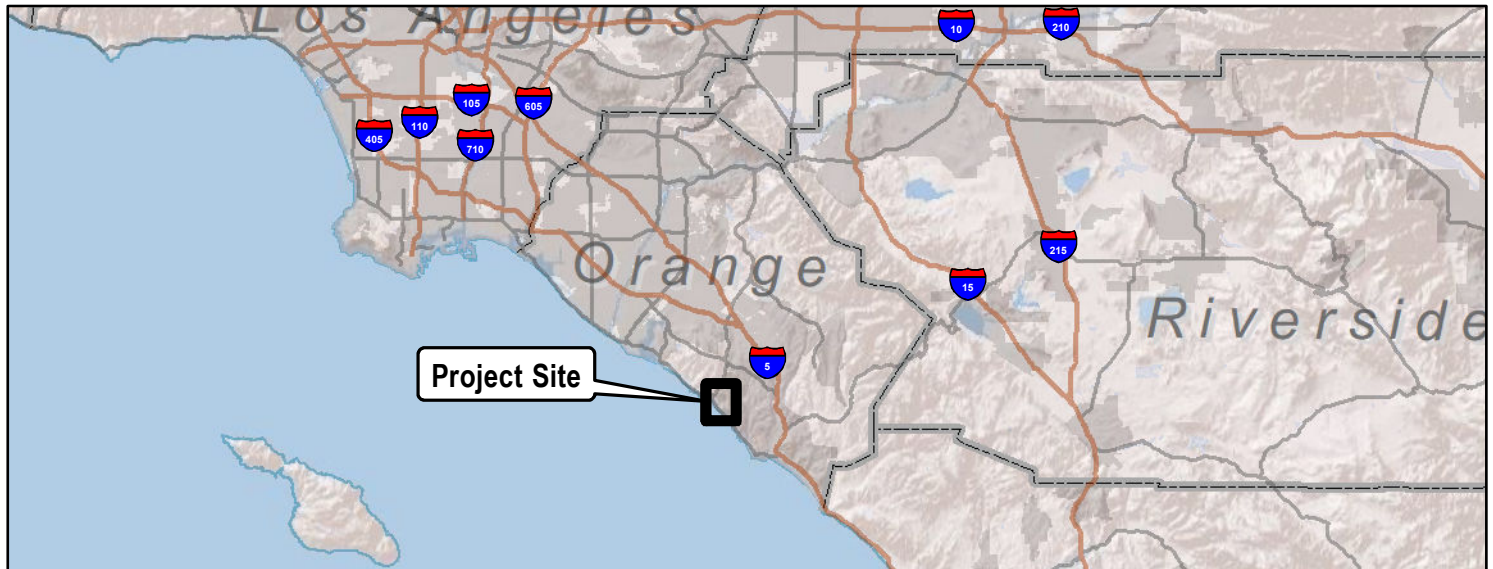
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Subject: Request for Alternative Materials, and Methods of Construction Design for 2354 San Clemente Street,
Laguna Beach, California

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SOURCE: USGS 7.5 Minute Series Laguna Beach Quadrangle

DUDEK

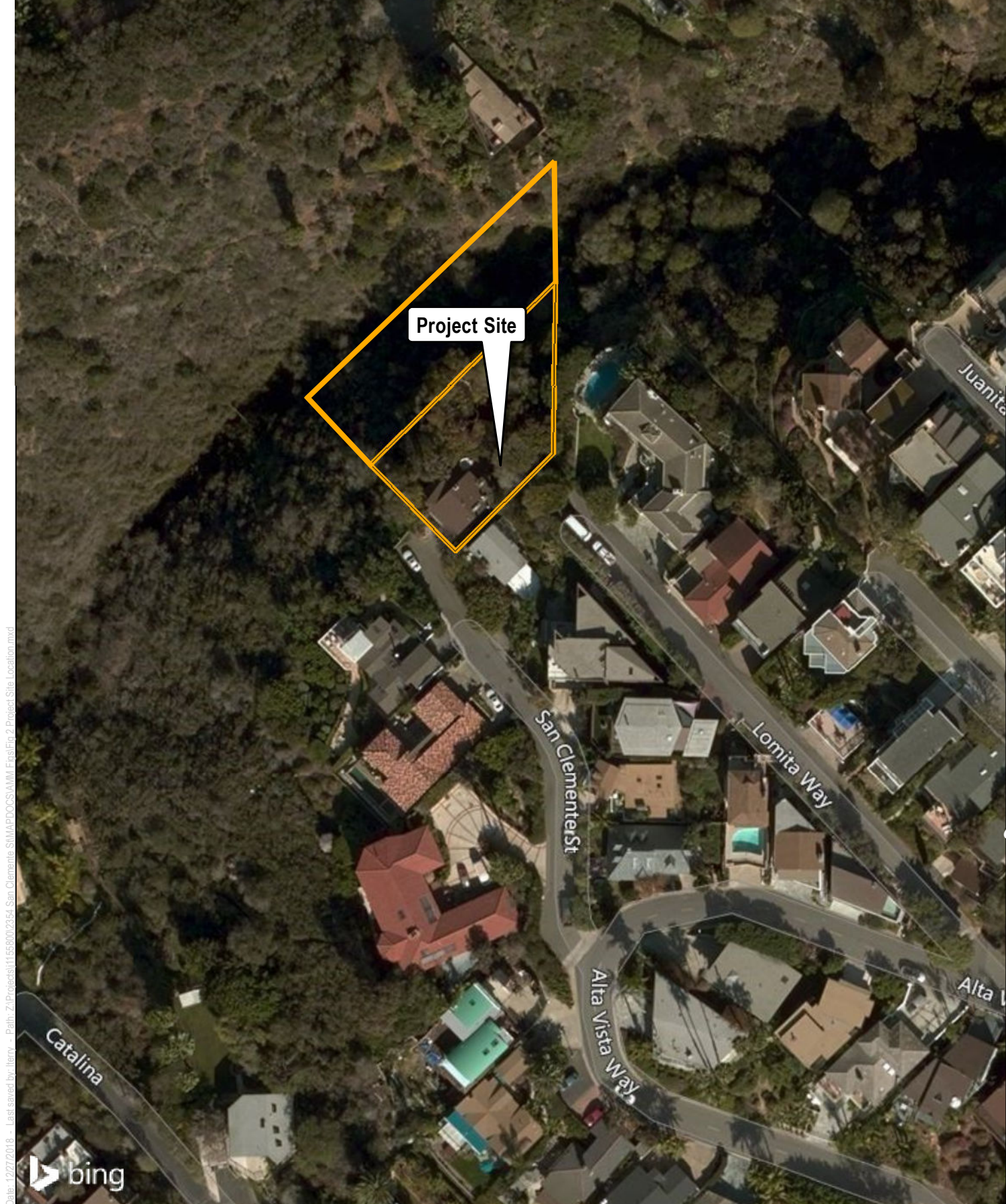


0 1,000 2,000 Feet

FIGURE 1

Project Location

2354 San Clemente Street, Laguna Beach, CA AM&M



SOURCE: BING MAPPING SERVICE

DUDEK

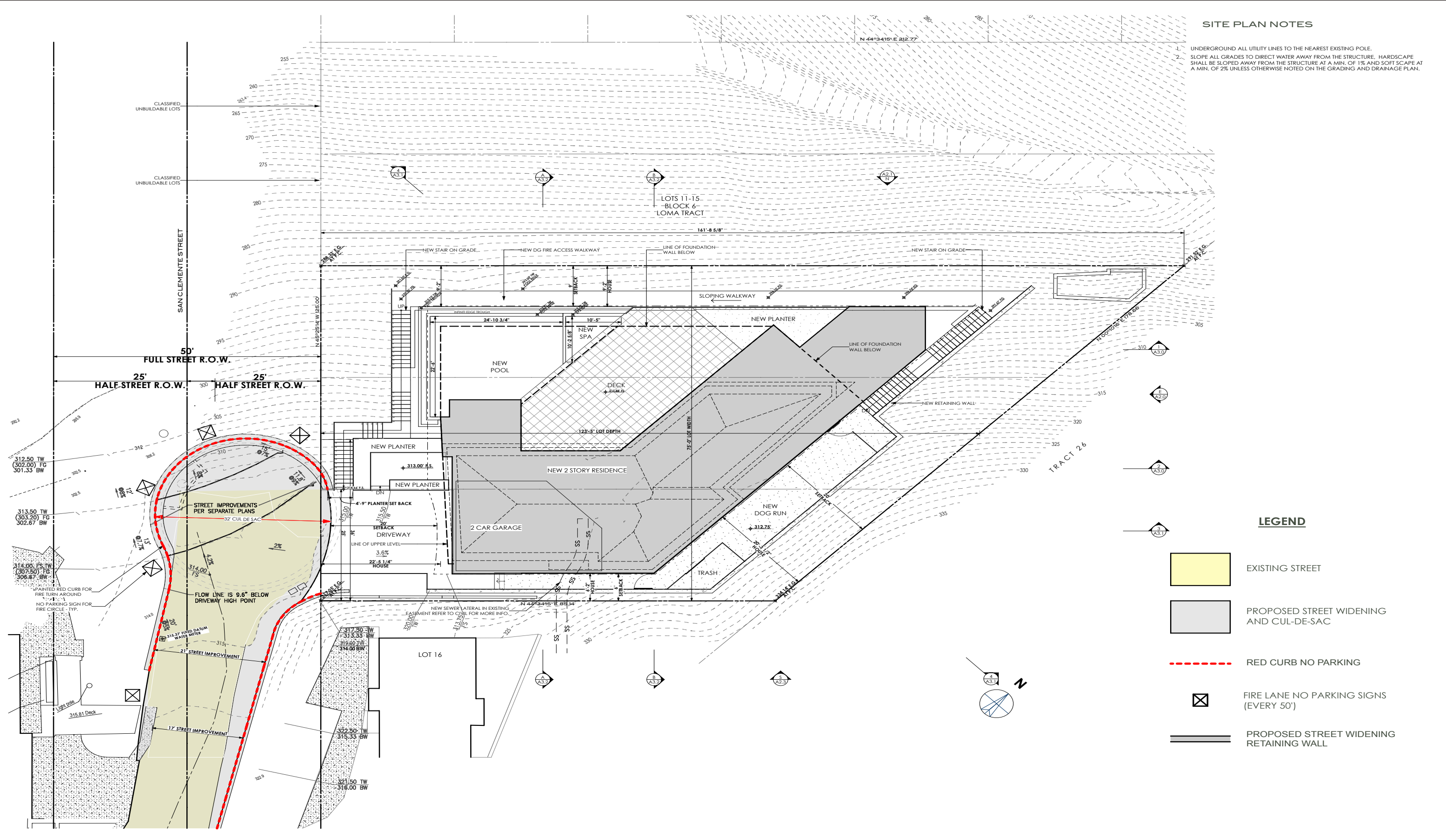


0 40 80 Feet

FIGURE 2

Project Site Location

2354 San Clemente Street, Laguna Beach, CA AM&M



SOURCE: GEOFF SUMICH DESIGN, 2025



Figure 4

San Clemente Street Cul-De-Sac Configuration (32-foot Diameter)

2354 San Clemente Street, Laguna Beach, CA AM&M Report



Attachment 1

Photograph Log

2354 San Clemente Street Photograph Log





Photograph 1. Photograph of the front entrance and driveway entrance of the existing residence. Photograph taken facing northeast.



Photograph 2. Photograph of the front of the existing residence, viewing vegetation on the western side of the property. Photograph taken facing north.



Photograph 3. Existing vegetation west/northwest of the existing structure. Photograph taken facing north.



Photograph 4. Existing vegetation west/northwest of the existing structure. Photograph taken facing north.



Photograph 5. Photograph of the southern (driveway entrance) to the existing residence. Photograph taken facing east. Note road extension area (red arrow).



Photograph 6. Photograph of the existing eastern side yard, which is vegetated with vines. Photograph taken facing north.



Photograph 7. Photograph of the existing vegetation northeast of the residence. Photograph taken facing north.



Photograph 8. Photograph of the existing vegetation under the existing residence. Photograph taken facing north.



Photograph 9. View looking northwest down San Clemente Street towards end of street and residence on right side of street. Photograph taken facing northwest.



Photograph 10. View looking south up San Clemente Street towards intersection with Alta Vista Way.



Photograph 11. View looking southeast towards Alta Vista Way. Note location of closest fire hydrant approximately 250 feet from property (red arrow).

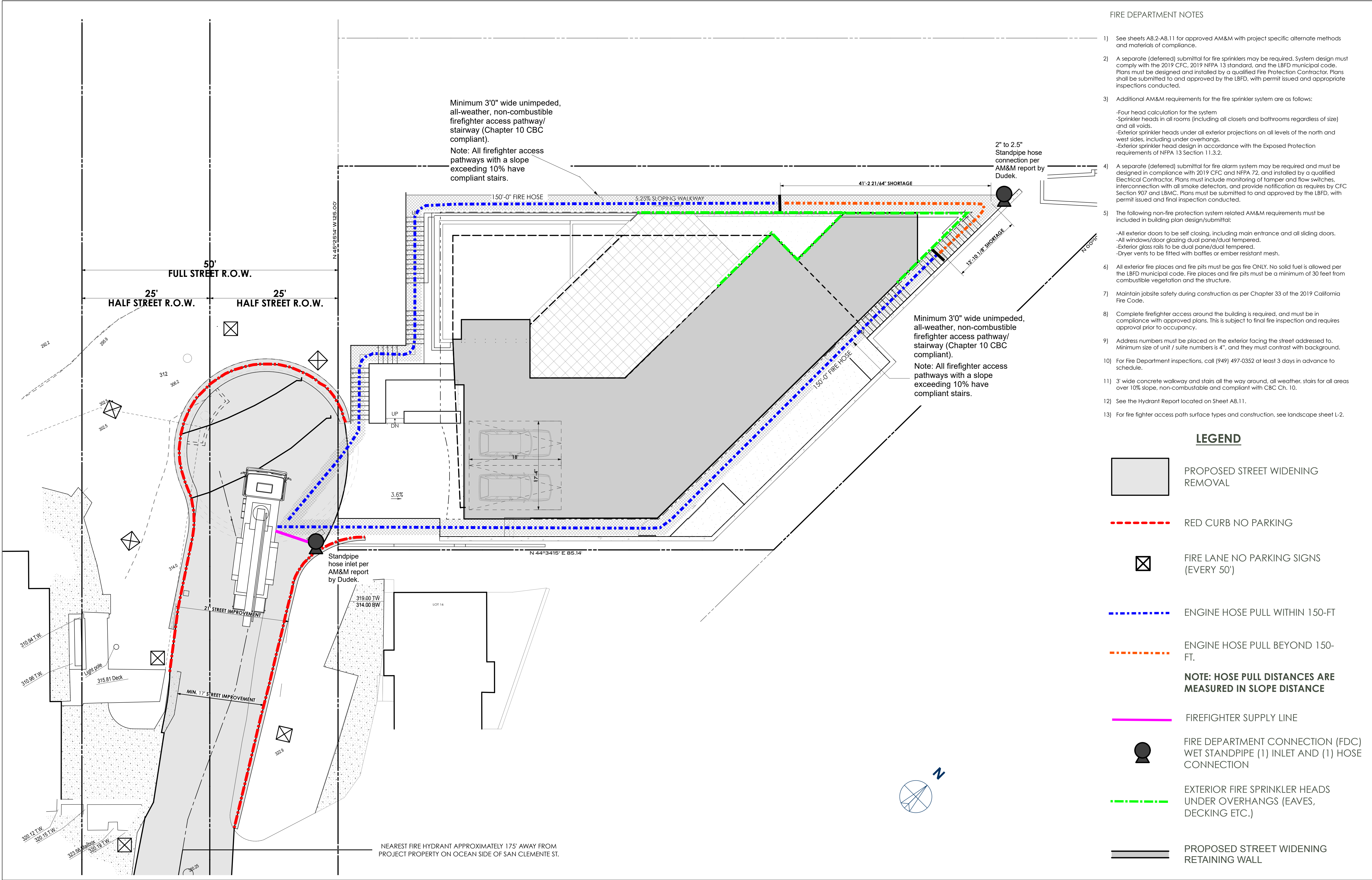


Photograph 12. View looking down drainage above property from Fern Street. Photograph taken facing southwest.



Attachment 2

Fire Department Site Access Plan





Attachment 3

Proposed Fuel Modification Plan

ZONE B NOTES

Zone B - Thinning Zone (Irrigated from adjacent buildable lot)
Zone B is a 12'-4" to 42'-6" wide zone directly adjacent to the irrigated Zone A that requires 50 percent thinning and removal of all dead and dying vegetation and all Target Species. The thinning zone is meant to reduce the amount of fuel load within the wildland area adjacent to the residential structures, with the intent of reducing the amount of radiant and convective heat a wildfire will produce. Thinning zones are located adjacent to irrigated zone A and can extend 125 feet or more into wildland areas. Due to the City of Laguna Beach Municipal Code (Chapter 25.41, O-S Open Space Zone) which does not allow for building or modifying the open space area in a way that would take away from its natural state (i.e. installation of an irrigation system to the naturally vegetated hillside). As in Zone A, combustible construction is not allowed in Zone B. It shall be the responsibility of the homeowner to meet and maintain the 50 percent thinning in Zone B, as well as the following City ordinances and Zone specific requirements:
a) All fine fuels reduced to a maximum of 8-12 inches in height;
b) Native grasses should be allowed to go to seed. Native grasses shall be cut after annual seeding and cut to a maximum height of 8 inches;
c) Trees and tree form shrub species are not allowed within 10 feet of combustible structures;
d) Trees and tree form shrub species are not allowed within 10 feet of adjacent tree species as measured from the edge of a full grown crown;
e) Trees and tree form shrub species are not allowed to extend beyond the property line;
f) Maintain sufficient cover to prevent erosion without requiring pruning.

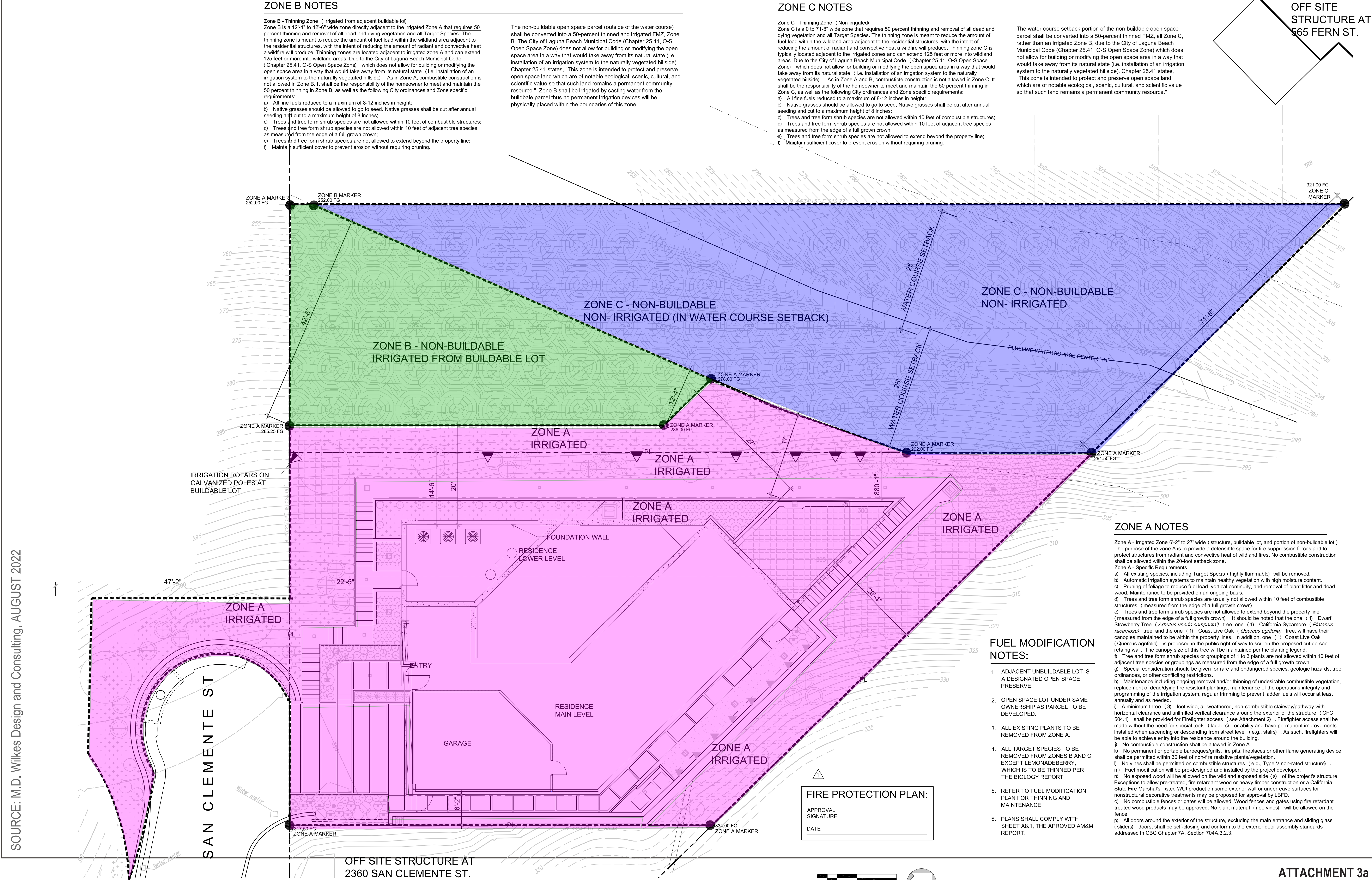
The non-buildable open space parcel (outside of the water course)
Zone C is a 0 to 71'-8" wide zone that requires 50 percent thinning and removal of all dead and dying vegetation and all Target Species. The thinning zone is meant to reduce the amount of fuel load within the wildland area adjacent to the residential structures, with the intent of reducing the amount of radiant and convective heat a wildfire will produce. Thinning zone C is typically located adjacent to the irrigated zones and can extend 125 feet or more into wildland areas. Due to the City of Laguna Beach Municipal Code (Chapter 25.41, O-S Open Space Zone) which does not allow for building or modifying the open space area in a way that would take away from its natural state (i.e. installation of an irrigation system to the naturally vegetated hillside). As in Zone A and B, combustible construction is not allowed in Zone C. It shall be the responsibility of the homeowner to meet and maintain the 50 percent thinning in Zone C, as well as the following City ordinances and Zone specific requirements:
a) All fine fuels reduced to a maximum of 8-12 inches in height;
b) Native grasses should be allowed to go to seed. Native grasses shall be cut after annual seeding and cut to a maximum height of 8 inches;
c) Trees and tree form shrub species are not allowed within 10 feet of combustible structures;
d) Trees and tree form shrub species are not allowed within 10 feet of adjacent tree species as measured from the edge of a full grown crown;
e) Trees and tree form shrub species are not allowed to extend beyond the property line;
f) Maintain sufficient cover to prevent erosion without requiring pruning.

ZONE C NOTES

Zone C - Thinning Zone (Non-irrigated)
Zone C is a 0 to 71'-8" wide zone that requires 50 percent thinning and removal of all dead and dying vegetation and all Target Species. The thinning zone is meant to reduce the amount of fuel load within the wildland area adjacent to the residential structures, with the intent of reducing the amount of radiant and convective heat a wildfire will produce. Thinning zone C is typically located adjacent to the irrigated zones and can extend 125 feet or more into wildland areas. Due to the City of Laguna Beach Municipal Code (Chapter 25.41, O-S Open Space Zone) which does not allow for building or modifying the open space area in a way that would take away from its natural state (i.e. installation of an irrigation system to the naturally vegetated hillside). As in Zone A and B, combustible construction is not allowed in Zone C. It shall be the responsibility of the homeowner to meet and maintain the 50 percent thinning in Zone C, as well as the following City ordinances and Zone specific requirements:
a) All fine fuels reduced to a maximum of 8-12 inches in height;
b) Native grasses should be allowed to go to seed. Native grasses shall be cut after annual seeding and cut to a maximum height of 8 inches;
c) Trees and tree form shrub species are not allowed within 10 feet of combustible structures;
d) Trees and tree form shrub species are not allowed within 10 feet of adjacent tree species as measured from the edge of a full grown crown;
e) Trees and tree form shrub species are not allowed to extend beyond the property line;
f) Maintain sufficient cover to prevent erosion without requiring pruning.

The water course setback portion of the non-buildable open space parcel shall be converted into a 50-percent thinned FMZ, all Zone C, rather than an irrigated Zone B, due to the City of Laguna Beach Municipal Code (Chapter 25.41, O-S Open Space Zone) which does not allow for building or modifying the open space area in a way that would take away from its natural state (i.e. installation of an irrigation system to the naturally vegetated hillside). Chapter 25.41 states, "This zone is intended to protect and preserve open space land which are of notable ecological, scenic, cultural, and scientific value so that such land remains a permanent community resource."

OFF SITE
STRUCTURE AT
565 FERN ST.



ZONE A NOTES

Zone A - Irrigated Zone 6'-2" to 27' wide (structure, buildable lot, and portion of non-buildable lot)
The purpose of the zone A is to provide a defensible space for fire suppression forces and to protect structures from radiant and convective heat of wildland fires. No combustible construction shall be allowed within the 20-foot setback zone.
Zone A - Specific Requirements
a) All existing species, including Target Species (highly flammable) will be removed.
b) Automatic irrigation systems to maintain healthy vegetation with high moisture content.
c) Pruning of foliage to reduce fuel load, vertical continuity, and removal of plant litter and dead wood. Maintenance to be provided on an ongoing basis.
d) Trees and tree form shrub species are usually not allowed within 10 feet of combustible structures (measured from the edge of a full growth crown).
e) Trees and tree form shrub species are not allowed to extend beyond the property line (measured from the edge of a full growth crown). It should be noted that the one (1) Dwarf Strawberry Tree (*Arbutus unedo compacta*) tree, one (1) California Sycamore (*Platanus racemosa*) tree, and the one (1) Coast Live Oak (*Quercus agrifolia*) tree, will have their canopies maintained to be within the property lines. In addition, one (1) Coast Live Oak (*Quercus agrifolia*) is proposed in the public right-of-way to screen the proposed cul-de-sac retaining wall. The canopy size of this tree will be maintained per the planting legend.
f) Tree and tree form shrub species or groupings of 1 to 3 plants are not allowed within 10 feet of adjacent tree species or groupings as measured from the edge of a full growth crown.
g) Special consideration should be given for rare and endangered species, geologic hazards, tree ordinances, or other conflicting restrictions.
h) Maintenance including ongoing removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying fire resistant plantings, maintenance of the operations integrity and programming of the irrigation system, regular trimming to prevent ladder fuels will occur at least annually and as needed.
i) A minimum three (3) -foot wide, all-weathered, non-combustible stairway/pathway with horizontal clearances and unlimited vertical clearance around the exterior of the structure (CFC 504.1) shall be provided for Firefighter access (see Attachment 2). Firefighter access shall be made without the need for special tools (ladders) or ability and have permanent improvements installed when ascending or descending from street level (e.g., stairs). As such, firefighters will be able to achieve entry into the residence around the building.
j) No combustible construction shall be allowed in Zone A.
k) No permanent or portable barbecues/grills, fire pits, fireplaces or other flame generating device shall be permitted within 30 feet of non-fire resistive plants/vegetation.
l) No vines shall be permitted on combustible structures (e.g., Type V non-rated structure).
m) Fuel modification will be pre-designed and installed by the project developer.
n) No exposed wood will be allowed on the wildland exposed side (s) of the project's structure. Exceptions to allow pre-treated, fire retardant wood or heavy timber construction or a California State Fire Marshal's-listed WUI product on some exterior wall or under-eave surfaces for nonstructural decorative treatments may be proposed for approval by LBFD.
o) No combustible fences or gates will be allowed. Wood fences and gates using fire retardant treated wood products may be approved. No plant material (i.e., vines) will be allowed on the fence.
p) All doors around the exterior of the structure, excluding the main entrance and sliding glass (sliders) doors, shall be self-closing and conform to the exterior door assembly standards addressed in CBC Chapter 7A, Section 704A.3.2.3.

FUEL MODIFICATION NOTES:

- ADJACENT UNBUILDABLE LOT IS A DESIGNATED OPEN SPACE PRESERVE.
- OPEN SPACE LOT UNDER SAME OWNERSHIP AS PARCEL TO BE DEVELOPED.
- ALL EXISTING PLANTS TO BE REMOVED FROM ZONE A.
- ALL TARGET SPECIES TO BE REMOVED FROM ZONES B AND C, EXCEPT LEMONADEBERRY, WHICH IS TO BE THINNED PER THE BIOLOGY REPORT
- REFER TO FUEL MODIFICATION PLAN FOR THINNING AND MAINTENANCE.
- PLANS SHALL COMPLY WITH SHEET A8.1, THE APPROVED AM&M REPORT.

FIRE PROTECTION PLAN:

APPROVAL SIGNATURE _____

DATE _____

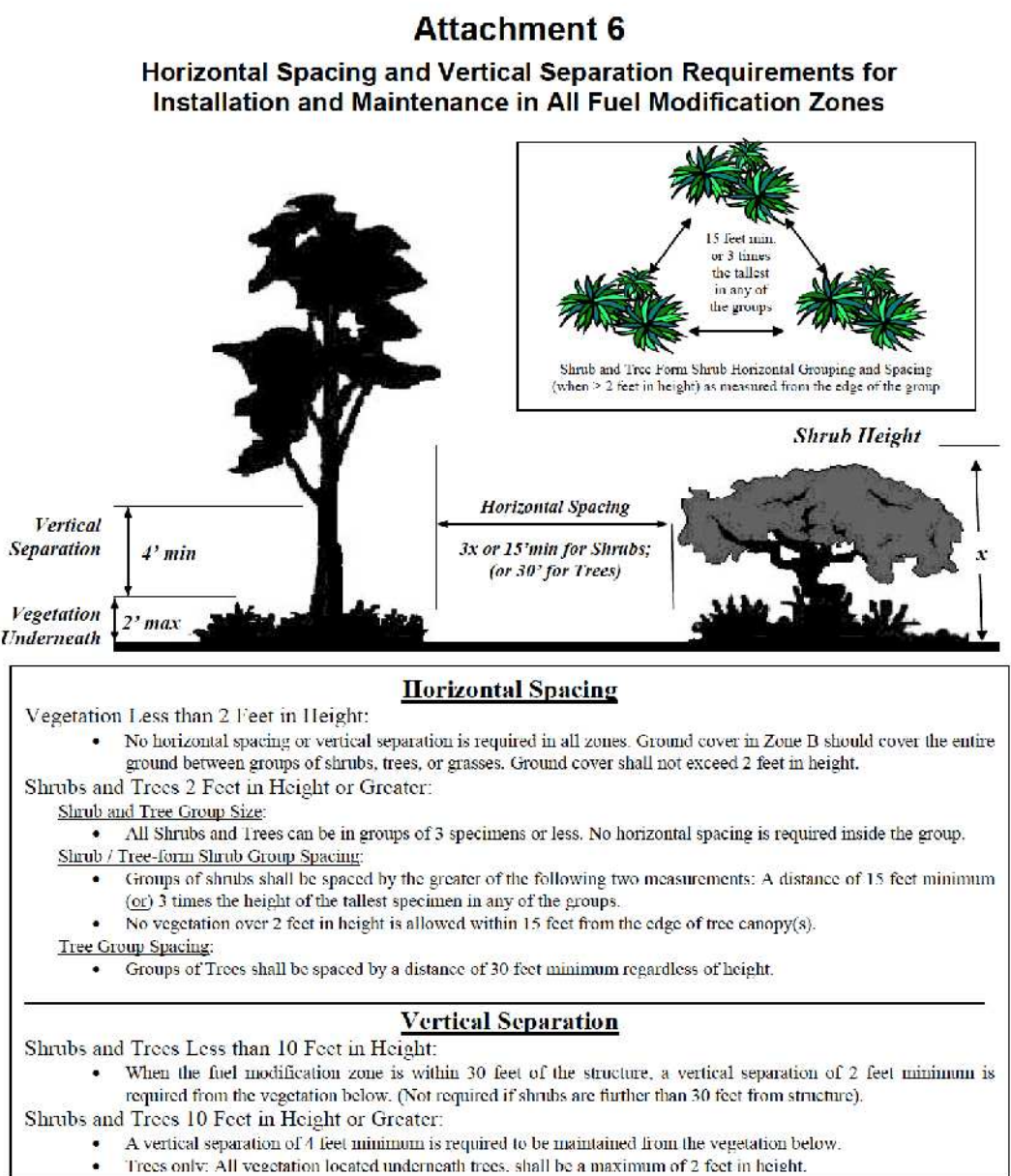
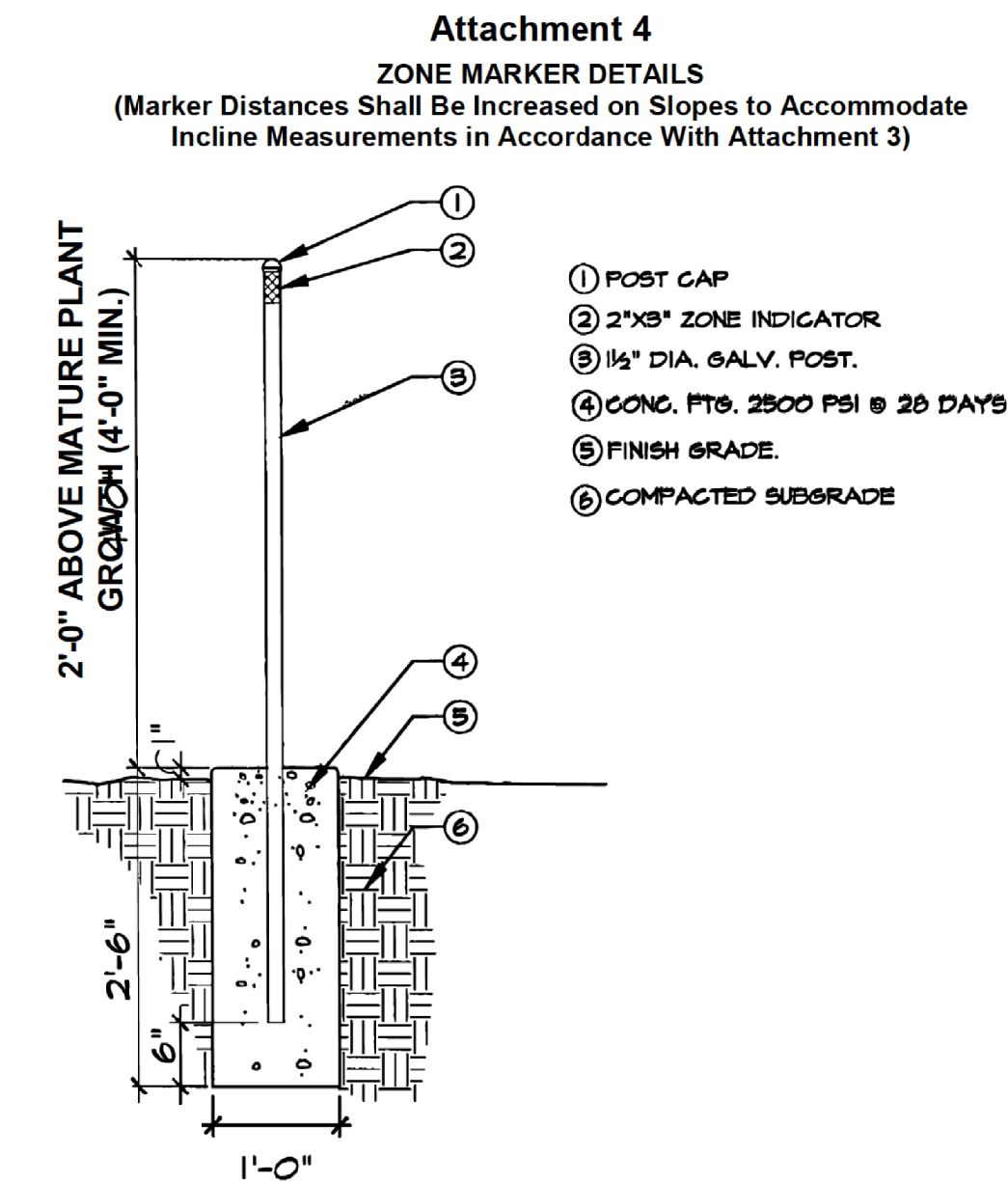
SOURCE: M.D. Wilkes Design and Consulting, AUGUST 2022

TARGET SPECIES UNACCEPTABLE FOR USE IN ALL FUEL MODIFICATION ZONES (A,B,C,D)

BOTANICAL NAME	COMMON BAME	FORM
ACACIA LONGIFOLIA	SYDNEY GOLDEN WATTLE	SHRUB
ACACIA REDOLENS	NCN	SHRUB
ADENOSTOMA FASCICULATUM	CHAMISE	SHRUB
ARTEMISIA CALIFORNICA	CALIFORNIA SAGEBRUSH	SHRUB
ARUNDO DONAX	GIANT REED	GRASS
ATRIPLEX LENTIFORMIS	QUAIL BUSH	SHRUB
BAMBUSA SPECIES	BAMBOO	GRASS
BRASSICA NIGRA	BLACK MUSTARD	ANNUAL
CAPROBOTUS EDULIS	HOT N TOT FIG	GROUNDCOVER
CEDRUS SPECIES	CEDAR	TREE
CARTADERIA SELLOANA	PAMPUS GRASS	GRASS
CUPRESSES SEMPERVIRENS	ITALIAN CYPRESS	TREE
CYNARA CARDUNCULUS	ARTICHOKE THISTLE	PERENNIAL
CYTISUS SPECIES	BROOM	SHRUB
DELOSPERMUM SPECIES	ICEPLANT	GROUNDCOVER
DROSANTHEMUM SPECIES	ICEPLANT	GROUNDCOVER
ERIOGONUM FASCICULATUM	BUCKWHEAT	SHRUB
EUCALYPTUS SPECIES	GUMS	TREE
FARGESIA SPECIES	BAMBOO	GRASS
HEDERA CANARIENSIS	ALGERIAN IVY	GROUNDCOVER
JUNIPERUS SPECIES	JUNIPER	SHRUB/ TREE
LAMPFRANTHUS SPECIES	ICEPLANT	GROUNDCOVER
MELALEUCA LINARIFOLIA	FLATLEAF PAPERBARK	TREE
MELALEUCA QUINQUENERVIA	CAJEPUT TREE	TREE
NICOTIANA GLAUCA	TREE TOBACO	PERENNIAL
OTATEA ACUMINATA	MEXICAN WEEPING BAMB.	GRASS
PENNISETUM SETACEUM	FOUNTAIN GRASS	GRASS
PHYLLOSTACHYS SPECIES	BAMBOO	GRASS
PINUS SPECIES	PINE	TREE
RICINUS COMMUNIS	CASTOR BEAN PLANT	PERENNIAL
SALVIA (NATIVE AND VARIETIES)	SAGE	SHRUB
SASCOLA AUSTRALIS	RUSSIAN THISTLE	ANNUAL
SEMIARUNDINARIA FASTUOSA	NARIHIRA BAMBOO	GRASS
SCHINUS TERENCEBINTHIFOLIUS	BRAZILIAN PEPPER	TREE
THUJA SPECIES	ARBORVITAE	SHRUB
UMBELLULARIA CALIFORNICA	CALIFORNIA BAY	TREE
VINCA MAJOR	PERIWINKLE	GROUNDCOVER
WASHINGTONIA SPECIES	FAN PALM	PALM

ADDITIONAL TARGET SPECIES UNACCEPTABLE FOR USE IN FUEL MODIFICATION ZONE A (Zone closest to combustible structures)

BOTANICAL NAME	COMMON BAME	FORM
ACACIA SPECIES	ACACIA/WATTLE	VARIOUS
ARCTOSTAPHYLOS SPECIES	MANZANITA	SHRUB/ TREE
ATRIPLEX SPECIES	SALTBUSH	SHRUB
BOUGAINVILLEA SPECIES	BOUGAINVILLEA	SHRUB/ VINE
CALLISTEMON SPECIES	BOTTLEBRUSH	TREE
CINNAMOMUM CAMPHORA	CAMPHOR	TREE
COTONEASTER SPECIES	COTONEASTER	SHRUB/ TREE
DODONEA VISCOSA	HOPSEED	SHRUB
HAKEA SUAVOLENS	SWEET HAKEA	SHRUB
HETEROMELES ARBUTIFOLIA	TOYON	SHRUB
LAURUS NOBILIS	BAY LAUREL	SHRUB/ TREE
MALOSMA LAURINA	SUGARBUSH	SHRUB/ TREE
MELALEUCA NESOPHILA	PINK MELALEUCA	TREE
MISCANTHUS SINENSIS	SILVER GRASS	GRASS
MUHLENBERGIA RIGENS	DEER GRASS	GRASS
PENNISETUM RUBRUM	PURPLE FOUNTAIN GRASS	GRASS
PHOENIX CANARIENSIS	CANARY ISLAND PALM	PALM
PHOENIX DACTYLIFERA	DATE PALM	PALM
RHUS INTEGRIFOLIA	LEMONADE BERRY	SHRUB
ROSMARINUS OFFICINALIS	ROSEMARY	SHRUB
SCHINUS MOLLE	CALIFORNIA PEPPER	TREE



ATTACHMENT 7
UNDESIRABLE PLAN SPECIES (Target Species)

CERTAIN PLANTS ARE CONSIDERED UNDESIRABLE IN THE LANDSCAPE DUE TO CHARACTERISTICS THAT MAKE THEM HIGHLY FLAMMABLE. PLANTS WITH THESE CHARACTERISTICS MAY NOT BE PLANTED IN FUEL MODIFICATION ZONES AS LISTED BELOW. SHOULD THESE SPECIES ALREADY EXIST WITHIN THESE AREAS, THEY MUST BE REMOVED.

PLANS SHOULD BE SUBMITTED TO THE CITY FOR REVIEW WITHOUT THE TARGET PLANTS LISTED BELOW. IN CASES WHERE UNDESIRABLE PLANTS ARE INCLUDED IN A SUBMITTAL FOR NEW PLANTINGS OR PRESERVATION, THE APPLICANT MUST SUBMIT A REQUEST FOR USE OF ALTERNATIVE MATERIALS AND METHODS AS OUTLINED IN THE CITY OF LAGUNA BEACH FIRE DEPARTMENT GUIDELINES FOR ALTERNATIVE MATERIALS AND METHODS REQUESTS. THE REQUEST WILL BE EVALUATED BY THE FIRE DEPARTMENT FOR ACCEPTABILITY.

THE LIST OF UNDESIRABLE PLANTS IS COMPREHENSIVE, BUT NOT COMPLETE. CLOSELY RELATED SPECIES AND VARIETIES HAVING SUBSTANTIALLY SIMILAR FLAMMABLE CHARACTERISTICS AS THE IDENTIFIED SPECIES MAY ALSO NOT BE ACCEPTABLE.

APPLICANTS ARE ENCOURAGED TO MAXIMIZE FIRE SAFETY BY USING PLANTS WITH HIGH WATER CONTENT, LOW FUEL VOLUMES, SUCCULENT LEAVES AND STEMS, LOW LITTER, AND LOW AMOUNTS OF FLAMMABLE OILS AND RESINS. AVOIDANCE OF TARGET SPECIES ALONE DOES NOT CONFER MAXIMUM SAFETY.

SPACING REQUIREMENTS OF ATTACHMENT 6 APPLY TO ALL SPECIES AND MUST BE REFLECTED IN THE PLANTING DESIGN PLAN SUBMITTED TO THE CITY.

VINES ARE NOT ALLOWED ON COMBUSTIBLE STRUCTURES.

EXTENSIVE MASSING OF GRASSES WITH HEIGHTS GREATER THAN 12" HIGH MAY NOT BE ACCEPTABLE.

ADDITIONAL FACTORS TO CONSIDER WHEN SELECTING PLANTS FOR WILDLAND INTERFACE AREA INCLUDE: DEER AND RABBIT RESISTANCE, AESTHETIC COMPATIBILITY WITH HILLSIDE CHARACTER, EROSION CONTROL, AND DROUGHT TOLERANCE.



SAN CLEMENTE ST. SOUTH



SAN CLEMENTE ST. END (NORTH)



EX. RESIDENCE ON SAN CLEMENTE ST.



ADJACENT OPEN SPACE

FIRE DEPARTMENT NOTES:

1. A SEPERATE (DEFERRED) SUBMITTAL FOR FIRE SPRINKLERS IS REQUIRED. SYSTEM DESIGN MUST COMPLY WITH THE 2016 CFC AND 2016 MFPA 13 STANDARD. PLANS MUST DESIGNED AND INSTALLED BY A QUALIFIED FIRE PROTECTION CONTRACTOR. PLANS SHALL BE SUBMITTED TO AND APPROVED BY THE LBF, WITH PERMIT ISSUED AND APPROPRIATE INSPECTIONS CONDUCTED.
2. ALL EXTERIOR FIRE PLACES AND FIRE PITTS MUST BE GAS FIRED ONLY. NO SOLID FUEL IS ALLOWED PER THE LBF MUNICIPAL CODE. FIRE PLACES AND FIRE PITTS MUST BE A MINIMUM OF 10' FROM COMBUSTIBLE VEGETATION.
3. MAINTAIN JOBSITE SAFETY PER CHAPTER 33 OF THE CALIFORNIA FIRE CODE.
4. COMPLETE FIREFIGHTER ACCES IS REQUIRED AROUND THE BUILDING, AND MUST BE IN COMPLIANCE WITH THE DRB APPROVED PLANS. SEE THIS SHEET FOR DETAILS. THIS IS SUBJECT TO FINAL FIRE INSPECTION AND REQUIRED APPROVAL PRIOR TO OCCUPANCY.
5. BUILDING ADDRESS NUMBERS MUST BE PLACED ON THE EXTERIOR FACING THE STREET ADDRESSED TO. MINIMUM SIZE OF UNIT/ SUITE NUMBER IS 4", WITH THE MINIMUM SIZE BUILDING NUMBERS BEING 6". NUMBER COLOR MUST CONTRAST WITH THE BACKGROUND.
6. FOR FIRE DEPARTMENT INSPECTION, CALL (949) 497-0352 AT LEAST 3 DAYS IN ADVANCE TO SCHEDULE.

ADDITIONAL NOTES

FIRE MODIFICATION AND/OR FIRE APPARATUS ACCESS ROAD SHALL BE PROVIDED PRIOR TO START OF CONSTRUCTION AND/ OR LUMBER DELIVERY.

REFER TO SHEET L-2.1 AND L-2.2 FOR PRELIMINARY PLANTING PLAN AND PLANT PALETTE

FIRE MITIGATION/ JUSTIFICATION:
REFER TO AM&M REPORT

MAPPED ENVIRONMENTALLY SENSITIVE AREAS

1. FUEL MODIFICATION ZONE
2. VERY HIGH FIRE HAZARD SEVERITY ZONE
3. HIGH VALUE HABITAT
4. OPEN SPACE PRESERVE

MAINTENANCE NOTES

THE PROPERTY OWNER SHALL UNDERTAKE ANNUAL FUEL MODIFICATION AN ALL ZONES IN ACCORDANCE WITH THE FUEL MODIFICATION NOTES AND ATTACHMENTS.

THE PROPERTY OWNER SHALL ENGAGE A THIRD PARTY INSPECTOR ON AN ANNUAL BASIS TO REVIEW THAT ALL PLANTINGS ARE BEING PROPERLY MAINTAINED IN ACCORDANCE WITH THIS PLAN.

IRRIGATION NOTE:

THE IRRIGATION SYSTEM SHALL BE DESIGNED TO BE FULLY AUTOMATIC, USING LOW-VOLUME HEADS/ DRIP OR BUBBLER IRRIGATION WITH MATCHING PRECIPITATION RATES AND HEAD TO HEAD COVERAGE. PROVIDE APPROVED BACKFLOW

TREE MAINT. NOTE

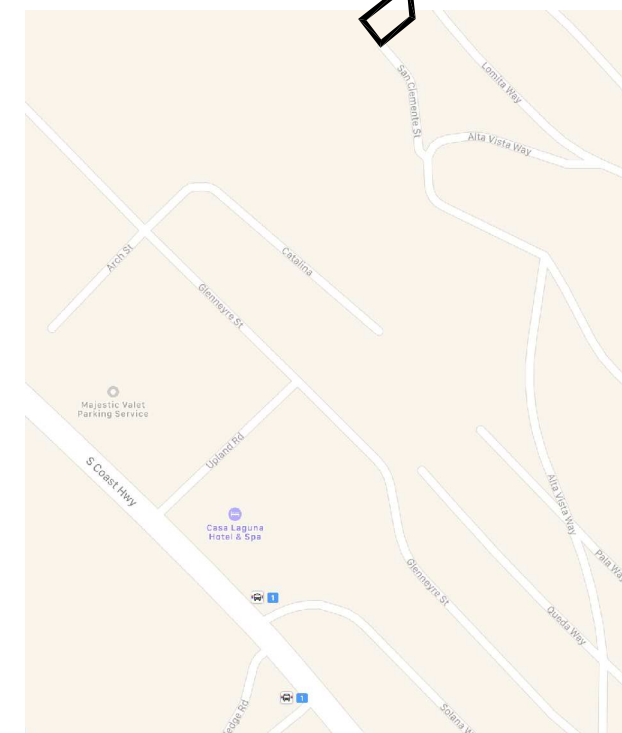
ALL PROPOSED TREE CANOPIES SHALL BE MAINTAINED TO ACHIEVE A MINIMUM 10' HORIZONTAL AND 10' VERTICAL CLEARANCE FROM THE STRUCTURE.

ALL TREE CANOPIES SHALL BE RAISED ACCORDINGS TO MAINTAIN A MINIMUM 4X UNDERSTORY PLANT HEIGHT CLEARANCE.

PLANT SPACING NOTE:

MAINTAIN 10' CANOPY SPACING BETWEEN TREES AND LARGE SHRUBS AND 3X UNDERSTORY HEIGHT VERTICAL CLEARANCE BETWEEN TREES AND UNDER PLANTINGS PER ATTACHEMENT 6

SITE



VICINITY MAP

APPROVED AM&M REPORT:

REFER TO APPROVED AM&M REPORT FOR FUEL MODIFICATION DESCRIPTION.

FIRE PROTECTION PLAN:

APPROVAL
SIGNATURE
DATE

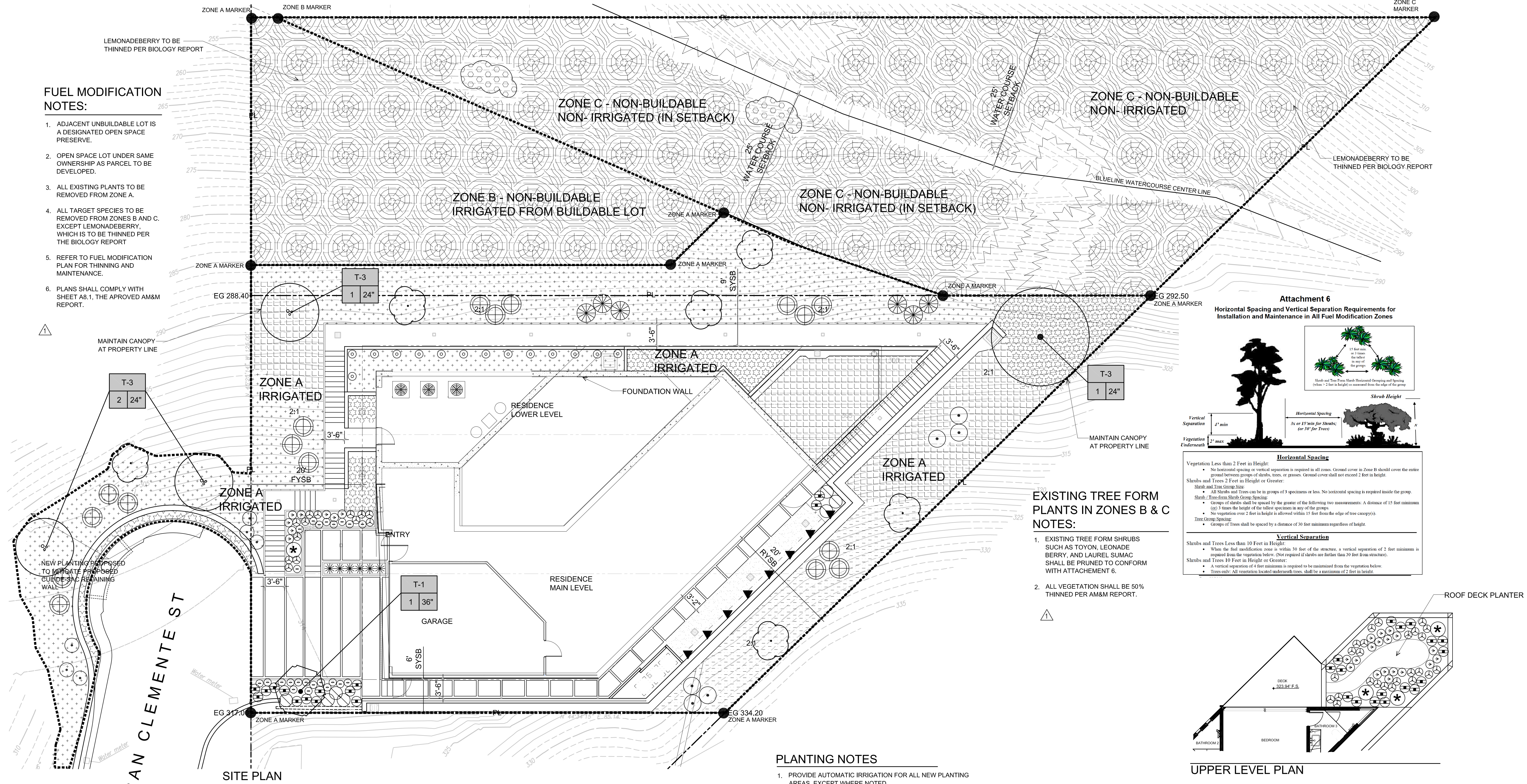


Attachment 4

Preliminary Landscape Plan Set

FUEL MODIFICATION NOTES:

1. ADJACENT UNBUILDABLE LOT IS A DESIGNATED OPEN SPACE PRESERVE.
2. OPEN SPACE LOT UNDER SAME OWNERSHIP AS PARCEL TO BE DEVELOPED.
3. ALL EXISTING PLANTS TO BE REMOVED FROM ZONE A.
4. ALL TARGET SPECIES TO BE REMOVED FROM ZONES B AND C. EXCEPT LEMONADEBERRY, WHICH IS TO BE THINNED PER THE BIOLOGY REPORT
5. REFER TO FUEL MODIFICATION PLAN FOR THINNING AND MAINTENANCE.
6. PLANS SHALL COMPLY WITH SHEET A8.1, THE APPROVED AM&M REPORT.



SITE PLAN

- LEGEND
- PA = PLANTING AREA
 - (E) = EXISTING
 - (N) = NEW
 - BW = BOTTOM OF WALL
 - DN = DOWN
 - FF = FINISH FLOOR
 - FL = FLOW LINE
 - FS = FINISH SURFACE
 - EG = EXISTING GRADE
 - FG = FINISH GRADE
 - GFF = GARAGE FINISH FLOOR
 - NG = NATURAL GRADE
 - SCO = SEWER CLEANOUT
 - TBM = TEMPORARY BENCHMARK
 - TC = TOP CURB
 - TOR = TOP OF ROOF
 - TW = TOP WALL
 - WV = WATER VALVE
 - WM = WATER METER

IRRIGATED PLANTING AREA:

ON GRADE PLANTING AREA	3,040 SF
ON STRUCTURE PLNT AREA	160 SF
UNBUILDABLE LOT (ZONE B)	2680
TOTAL:	5,680 SF

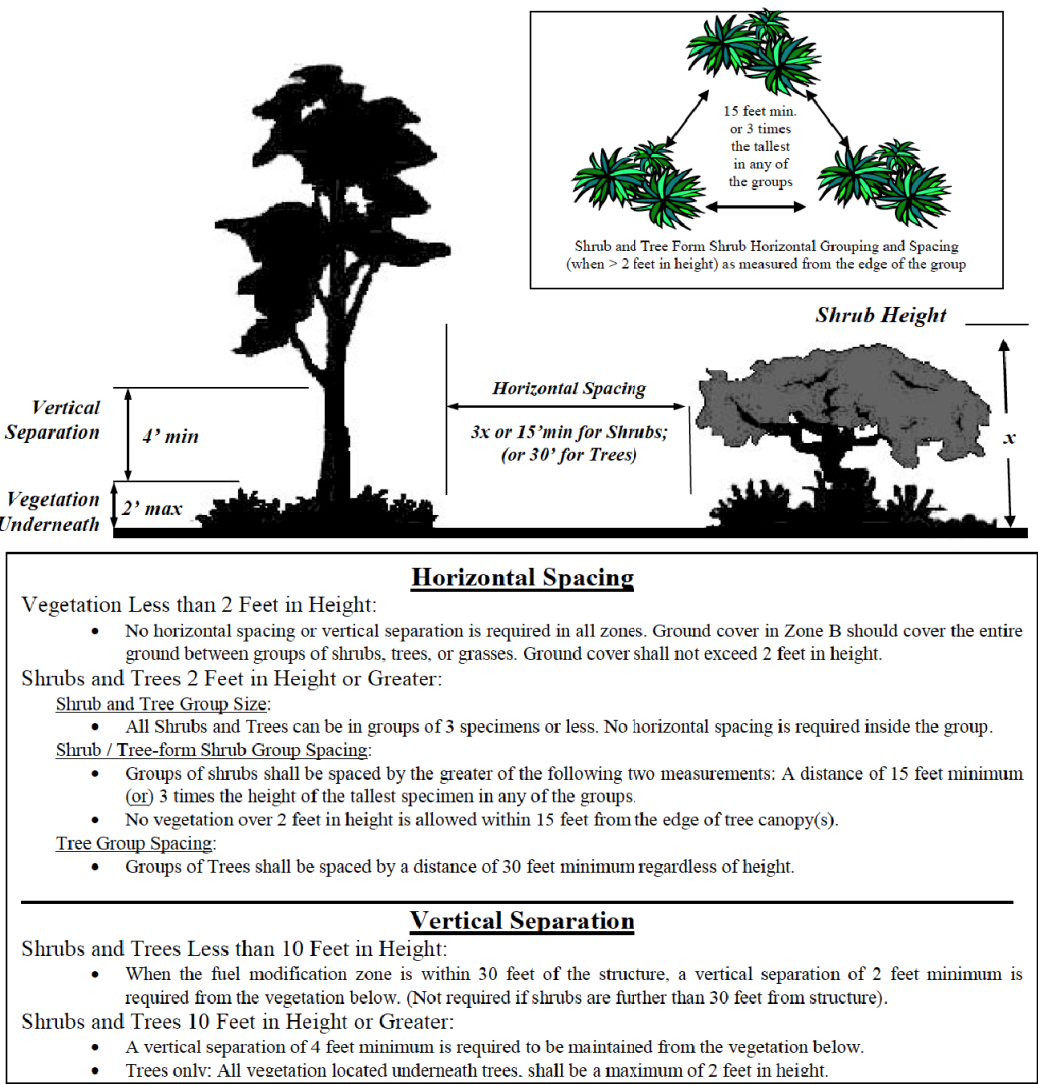
HERITAGE TREE NOTES

1. ORIGINAL HERITAGE PINE TREE WAS REMOVED BY PREVIOUS HOME OWNER.
2. NO REPLACEMENT PINE TREE WAS EVER PLANTED.
3. PINE TREES ARE CONSIDERED TARGET SPECIES IN ALL FUEL MODIFICATION ZONES.
4. NO REPLACEMENT PINE TREE IS PROPOSED.
5. THREE NEW TREES ARE PROPOSED ON THE SUBJECT PROPERTY AS MITIGATION.

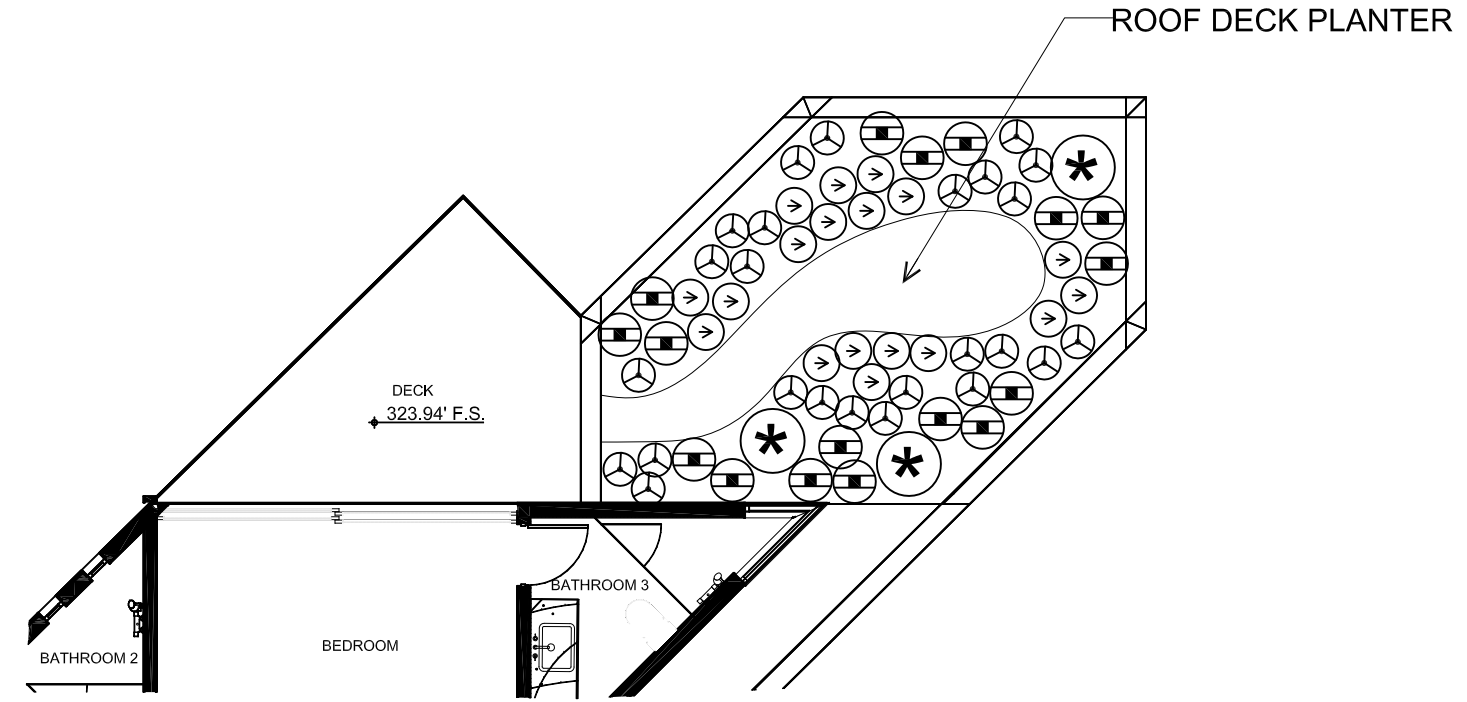
PLANTING NOTES

1. PROVIDE AUTOMATIC IRRIGATION FOR ALL NEW PLANTING AREAS, EXCEPT WHERE NOTED.
2. IRRIGATION SHALL CONSISTING OF A COMBINATION OF LOW VOLUME DRIP TUBING, BUBBLERS AND HIGH EFFICIENCY SP HEADS, CONTROLLED WITH AUTOMATIC VALVES AND A PROGRAMMABLE WEATHER SENSITIVE AUTOMATIC CONTROLLER.
3. PROVIDE A REDUCED PRESSURE BACKFLOW PREVENTER T WILL NOT BE LOCATED IN THE RIGHT OF WAY.
4. THIS PRELIMINARY PLANTING PLAN IS NOT INTENDED FOR CONSTRUCTION PURPOSES.
5. ALL EXISTING VEGETATION ON DEVELOPED PARCEL TO BE REMOVED.
6. PREVIOUS LISTED HERITAGE TREE WAS REMOVED BY PREVIOUS PROPERTY OWNER. DESIGNATED REPLACEMENT PINE TREE WAS NEVER PLANTED AND CANNOT BE PLANTED FUEL MODIFICATION ZONE.

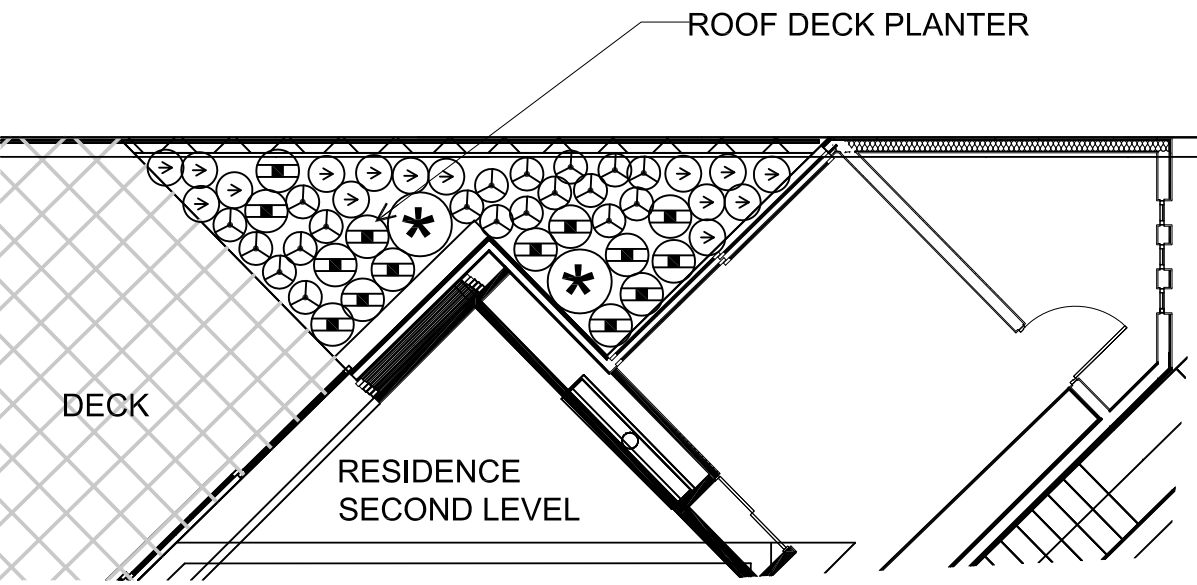
Attachment 6
Horizontal Spacing and Vertical Separation Requirements for Installation and Maintenance in All Fuel Modification Zones



- Horizontal Spacing**
- Vegetation Less than 2 Feet in Height:
 - No horizontal spacing or vertical separation is required in all zones. Ground cover in Zone B should cover the entire ground between groups of shrubs, trees, or grasses. Ground cover shall not exceed 2 feet in height.
 - Shrubs and Trees 2 Feet in Height or Greater:
 - Shrub and Tree Group Size:
 - All Shrubs and Trees can be in groups of 3 specimens or less. No horizontal spacing is required inside the group.
 - Shrub: Tree-form Shrub Group Spacing:
 - Groups of shrubs shall be spaced by the greater of the following two measurements: A distance of 15 feet minimum (or) 3 times the height of the tallest specimen in any of the groups.
 - Tree Group Spacing:
 - No vegetation over 2 feet in height is allowed within 15 feet from the edge of tree canopy(s).
 - Tree Group Spacing:
 - Groups of Trees shall be spaced by a distance of 30 feet minimum regardless of height.
- Vertical Separation**
- Shrubs and Trees Less than 10 Feet in Height:
 - When the fuel modification zone is within 30 feet of the structure, a vertical separation of 2 feet minimum is required from the vegetation below. (Not required if shrubs are further than 30 feet from structure).
 - Shrubs and Trees 10 Feet in Height or Greater:
 - A vertical separation of 4 feet minimum is required to be maintained from the vegetation below.
 - Trees only: All vegetation located underneath trees, shall be a maximum of 2 feet in height.



UPPER LEVEL PLAN



MAIN LEVEL PLAN

FUEL MODIFICATION NOTES:

- 1. ADJACENT UNBUILDABLE LOT IS A DESIGNATED OPEN SPACE PRESERVE.
- 2. OPEN SPACE LOT UNDER SAME OWNERSHIP AS PARCEL TO BE DEVELOPED.
- 3. ALL EXISTING PLANTS TO BE REMOVED FROM ZONE A.
- 4. ALL TARGET SPECIES TO BE REMOVED FROM ZONES B AND C.
- 5. REFER TO FUEL MODIFICATION PLAN FOR THINNING AND MAINTENANCE.
- 6. PLANS SHALL COMPLY WITH SHEET A8.1, THE APPROVED AM&M REPORT.



PLANT IMAGES



QUERCUS DUMOSA
SCRUB OAK



SAMBUCUS MEXICANA
MEXICAN ELDERBERRY



WESTRINGIA FRUTICOSA 'BLUE BOX'
BLUE BOX COAST ROSEMARY



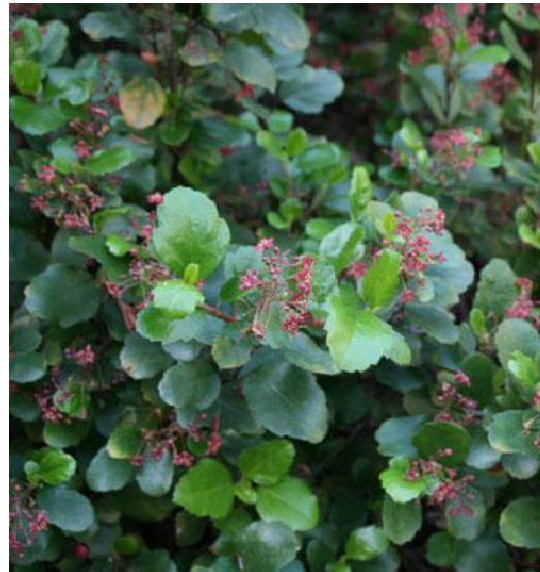
DENDROMECON HARFORDII
ISLAND BUSH POPPY



CEANOTHUS GRISEUS HORIZONTALIS 'YANKEE POINT'
PROSTRATE CEANOTHUS



GALVEZIA SPECIOSA
ISLAND SNAPDRAGON



RIBES VIBURNIFOLIA 'SPOONER'S MESA'
EVERGREEN CURRANT



BACCHARUS PILULARIS 'PIGEON POINT'
DWARF COYOTE BUSH



LOBELIA LAXIFLORA
VAR. ANGUSTIFOLIA
MEXICAN LOBELIA



ALOE STRIATA
CORAL ALOE



AGAVE ATTENUATA
FOXTAIL AGAVE



ARBUTUS UNEDO 'COMPACTA'
DWARF STRAWBERRY TREE



AGAVE 'BLUE GLOW'
BLUE GLOW AGAVE



CISTANTHE GRANDIFLORA
ROCK PURSELANE



CRASSULA FULCATA
AIRPLANE PLANT



GREVILLEA LANIGERA
'COASTAL GEM'
PROSTRATE GREVILLEA



OPUNTIA LITTORALIS
COASTAL PRICKLY PEAR



HETEROMELES ARBUTIFOLIA
TOYON
EXISTING AT UNBUILDABLE LOT



RHUS INTEGRIFOLIA
LEMONADE BERRY
EXISTING AT UNBUILDABLE LOT



ALOE AFRICANA
THORNY ALOE



PLATANUS RACEMOSA
CALIFORNIA SYCAMORE



SENECIO MANDRALISCAE
BLUE CHALK STICKS

PLANT LEGEND

TREES:					
	SYMBOL	BOTANICAL NAME	COMMON NAME	CONTAINER SIZE	WULCOL WATER USE
T-1		ARBUTUS UNEDO COMPACTA'	DWARF STRAWBERRY TREE	36" BOX, MULTI-STEM	LOW
T-2		PLATANUS RACEMOSA	CALIFORNIA SYCAMORE	24" BOX, STANDARD	MODERATE
T-3		QUERCUS DUMOSA	SCRUB OAK	24" BOX, MULTI-STEM	VERY LOW

SHRUBS:					
	SYMBOL	BOTANICAL NAME	COMMON NAME	CONTAINER SIZE	WULCOL WATER USE
		AGAVE ATTENUATA	FOX TAIL AGAVE	15 GALLON	LOW
		AGAVE 'BLUE GLOW'	BLUE GLOW AGAVE	15 GALLON	LOW
		ALOE AFRICANA	SPINY ALOE	15 GALLON	LOW
		ALOE STRIATA	CORAL ALOE	1 GALLON	LOW
		CISTANTHE GRANDIFLORA	ROCK PURSELANE	1 GALLON	LOW
		CRASSULA FULCATA	AIRPLANE PLANT	1 GALLON	LOW
		DENDROMECHON HARFORDII	ISLAND BUSH POPPY	5 GALLON	LOW
		GALVEZIA SPECIOSA	ISLAND SNAPDRAGON	1 GALLON	LOW
		GREVILLEA LANIGERA 'COASTAL GEM'	PROSTRATE GREVILLEA	1 GALLON	LOW
		SAMBUCUS MEXICANA	MEXICAN ELDERBERRY	15 GALLON, MULTI-STEM	VERY LOW
		SENECIO MANDRALISCAE	BLUE CHALK STICKS	1 GALLON	LOW
		WESTRINGIA FRUTICOSA 'GRAY BOX'	GRAY BOX COAST ROSEMARY	5 GALLON	LOW
		HETEROMELES ARBUTIFOLIA	TOYON	EXISTING, THIN PER BIOLOGY REPORT	VERY LOW
		RHUS INTEGRIFOLIA	LEMONADE BERRY	EXISTING, THIN PER BIOLOGY REPORT	VERY LOW

GROUND COVER:					
	SYMBOL	BOTANICAL NAME	COMMON NAME	CONTAINER SIZE	WULCOL WATER USE
		BACCHARUS PILULARIS PIGEON POINT'	DWARF COYOTE BUSH	1 GALLON @ 48" O.C.	LOW
		CEANOTHUS GRISEUS HORIZONTALIS 'YANKEE POINT'	YANKEE POINT PROSTRATE CALIFORNIA LILAC	1 GALLON, 60" O.C.	LOW
		LOBELIS LAXIFLORA SSP. ANGUSTIFOLIA	MEXICAN LOBELIA	1 GALLON, 36" O.C.	LOW
		OPUNTIA LITTORALIS	COAST PRICKLY PEAR	1 GALLON, 36" O.C. INFILL AT BARE SOIL	VERY LOW
		RIBES VIBURNIFOLIA 'SPOONER'S MESA'	EVERGREEN CURRANT	1 GALLON, 36" O.C.	LOW
		FESTUCA ARUNDINACEA 'MARATHON II'	MARATHON II SOD	-	HIGH

GROUND COVER:					
	SYMBOL	BOTANICAL NAME	COMMON NAME	CONTAINER SIZE	WULCOL WATER USE
		FICUS REPENS	CREEPING FIG	1 GALLON, STAKED	MODERATE



Attachment 5

Fire Behavior Modeling Summary

ATTACHMENT 5
Fire Behavior Modeling Summary
2354 San Clemente Street, Laguna Beach, CA

BEHAVEPLUS FIRE BEHAVIOR MODELING

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

Fire behavior modeling conducted on this site includes a relatively high-level of detail and analysis which results in reasonably accurate representations of how wildfire may move through available fuels on and adjacent the property. Fire behavior calculations are based on site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths, spread rates, and fireline intensities, this analysis incorporated predominant fuel characteristics, slope percentages, and representative fuel models observed on site. The BehavePlus fire behavior modeling system, which is the industry standard, was used to analyze anticipated fire behavior within and adjacent to key areas just outside of the proposed lots.

Predicting wildland fire behavior is not an exact science. As such, the movement of a fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire prevention planning information.

To be used effectively, the basic assumptions and limitations of BehavePlus must be understood.

ATTACHMENT 5 (Continued)

- First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is dead fuels less than one-quarter inch in diameter. These are the fine fuels that carry fire. Fuels greater than one inch have little effect while fuels greater than three inches have no effect on fire behavior.
- Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within six feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
- Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.
- Fourth, the BehavePlus fire behavior computer modeling system was not intended for determining sufficient fuel modification zone widths. However, it does provide the average length of the flames, which is a key element for determining “defensible space” distances for minimizing structure ignition.

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

The seven fuel characteristics help define the 13 standard fire behavior fuel models¹ and the five custom fuel models developed for Southern California². According to the model classifications, fuel models used in BehavePlus have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface to volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in BehavePlus. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models:

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

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

ATTACHMENT 5 (Continued)

- 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 models³ developed for use in BehavePlus modeling efforts. These new models attempt to improve the accuracy of the standard 13 fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the new 40 fuel models:

- 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

BehavePlus software was used in the development of this Alternative Materials and Methods (AM&M) in order to evaluate potential fire behavior for the Project site. Existing site conditions were evaluated, and local weather data was incorporated into the BehavePlus modeling runs.

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

ATTACHMENT 5 (Continued)

FUEL MODELS

Dudek utilized the BehavePlus software package to analyze fire behavior potential for the Project site at 2354 San Clemente Street in Laguna Beach. As is customary for this type of analysis, two fire scenarios were evaluated, including one summer, onshore weather condition (west and northwest from the Project Site) and one extreme fall, offshore weather condition (north and northeast of the Project Site). Fuels and terrain at and beyond this distance can produce flying embers that may affect the project, but defenses have been built into the structures to prevent ember penetration and to extinguish fires that may result from ember penetration. It is the fuels adjacent to and within fuel modification zones that would have the potential to affect the project's structures from a radiant and convective heat perspective as well as from direct flame impingement. BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The output variables used in this analysis include flame length (feet), rate of spread (feet/minute), fireline intensity (BTU/feet/second), and spotting distance (miles). The following provides a description of the input variables used in processing the BehavePlus models for the Proposed Project site. In addition, data sources are cited and any assumptions made during the modeling process are described. Table 1 provides a description of the fuel model observed in the vicinity of the site that were subsequently used in the analysis for this project. Modeled areas include the chaparral (Sh5) that occur on the north / northwest facing hillside, north and adjacent to the Project site, and Eucalyptus forest woodland (FM9) that occur on the north / northwest facing hillside, north and adjacent to the Project site. A total of two fire modeling scenarios were completed for the Project site. These sites were selected based on the strong likelihood of fire approaching from these directions during a Santa Ana wind-driven fire event (fire scenario 1) and an on-shore weather pattern (fire scenario 2).

Table 1
Existing Fuel Model Characteristics

Fuel Model	Description	Location	Fuel Bed Depth (Feet)
Sh5	High Load, Dry Climate Shrub	Fuel type is concentrated on the north / northwest facing hillside adjacent and below the Project site.	4.0 ft.
FM9	Eucalyptus Forest Woodland	Fuel type is concentrated directly adjacent and north of the existing residence	<12.0 ft.

Topography

Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds.

ATTACHMENT 5 (Continued)

Additionally, fire burning uphill spreads faster than those burning on flat terrain or downhill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. Slope values ranging from 15–30% were measured from U.S. Geological Survey (USGS) topographic maps.

Weather

Historical weather data for the coastal region was utilized in determining appropriate fire behavior modeling inputs for the Project area. 50th and 97th percentile moisture values were derived from Remote Automated Weather Station (RAWS) and utilized in the fire behavior modeling efforts conducted in support of this report. Weather data sets from the Bell Canyon RAWS⁴ were utilized in the fire modeling runs.

RAWS fuel moisture and wind speed data were processed utilizing the Fire Family Plus software package to determine atypical (97th percentile) and typical (50th percentile) weather conditions. Data from the RAWS was evaluated from August 1 through November 30 for each year between 1995 and 2017 (extent of available data record) for 97th percentile weather conditions and from June 1 through September 30 for each year between 1995 and 2017 for 50th percentile weather conditions.

Following analysis in Fire Family Plus, fuel moisture information was incorporated into the Initial Fuel Moisture file used as an input in BehavePlus. Wind speed data resulting from the Fire Family Plus analysis was also determined. Initial wind direction and wind speed values for the two BehavePlus runs were manually entered during the data input phase. The input wind speed and direction is roughly an average surface wind at 20 feet above the vegetation over the analysis area. Table 2 summarizes the wind and weather input variables used in the Fire BehavePlus modeling efforts.

⁴ http://raws.wrh.noaa.gov/cgi-bin/roman/meso_base.cgi?stn=CAPC1&unit=0&time=LOCAL
Latitude: 33.551833 Longitude: -117.572944; Elevation: 793 ft.)

ATTACHMENT 5 (Continued)

Table 2
BehavePlus Fire Behavior Inputs

Model Variable	Summer Weather (Onshore Winds)	Fall Weather (Offshore Winds)
Fuel Models	Sh5	Sh5
1 h fuel moisture	7%	1%
10 h fuel moisture	9%	3%
100 h fuel moisture	14%	6%
Live herbaceous moisture	60%	30%
Live woody moisture	114%	60%
20 ft. wind speed	24 mph (sustained winds)	15 mph (sustained winds); 50 mph (gusty winds)
Wind Directions from north (degrees)	300	40
Wind adjustment factor	0.4	0.4
Slope (uphill)	24%	20%

Fire Behavior Modeling Effort

As mentioned, the BehavePlus fire behavior modeling software package was utilized in evaluating anticipated fire behavior adjacent to the Proposed Project site. Three focused analyses were completed, each assuming worst-case fire weather conditions for a fire approaching the project site from the north, northwest, northeast, and west. Three fire behavior variables were selected as outputs from the BehavePlus analysis conducted for the project site, and include flame length (feet), rate of spread (mph), fireline intensity (BTU/feet/second), and surface fire spotting distance (miles). The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2008). Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in initial attack and fire suppression efforts (Rothermel and Rinehart 1983). Spotting distance is the distance a firebrand or ember can travel down wind and ignite receptive fuel beds. The information in Table 3 presents an interpretation of the outputs for two fire behavior variables as related to fire suppression efforts. The results of fire behavior modeling efforts are presented in Table 4.

ATTACHMENT 5 (Continued)

Table 3
Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 to 8 feet	100-500 BTU/ft/s	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 to 11 feet	500-1000 BTU/ft/s	Fires may present serious control problems -- torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

FIRE BEHAVIOR MODELING RESULTS

The results presented in Table 4 depict values based on inputs to the BehavePlus software and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

Based on the BehavePlus analysis, worst-case fire behavior is expected in non-maintained chaparral north and below the proposed Project site under Peak weather conditions (represented by Fall Weather, Scenario 1). The fire is anticipated to be a wind-driven fire from the north/northeast during the fall. Under such conditions, expected surface flame lengths reach 45 feet with wind speeds of 50+ mph. Under this scenario, fireline intensities reach 21,859 BTU/feet/second with fast spread rates of 6.81 mph and could have a spotting distance up to 2.4 miles away.

Based on the BehavePlus analysis, post development fire behavior is expected in irrigated and replanted with plants that are acceptable with LBFD (Zone-A - FM8 and Zone B – Sh1) and in 50 percent thinned, non-irrigated area (Zone C - Gs1) under peak weather conditions (represented by Fall Weather, Scenario 3). Under such conditions, expected surface flame length is expected to be significantly lower, with flames lengths reaching approximately 10 feet in the irrigated zones and approximately 14 feet in the thinned zones with wind speeds of 50+ mph. Under this scenario, fireline intensities reach 964 BTU/feet/second in the irrigated zones and 1,763 BTU/feet/second in the thinned zones with relatively slow spread rates of 1.5 mph in the

ATTACHMENT 5 (Continued)

irrigated zones and 3.0 mph in the thinned zones and could have a spotting distance up to 1.0 miles away in the irrigated zones and 1.1 miles away in the thinned zones.

Table 4
BehavePlus Fire Behavior Model Results

Fire Scenario	Flame Length (feet)	Spread Rate (mph)	Fireline Intensity (Btu/ft/s)	Spot Fire (Miles)
<i>Scenario 1: 20% slope, Fall, Offshore, Extreme Winds</i>				
Chaparral (Sh5)	23.3' (44.4')	1.70 (6.70)	5,320 (21,659)	0.7 (2.4) ⁵
Forest Woodlands (FM9)	5.2' (13.0')	0.3 (1.9)	202 (1,498)	0.2 (0.8) ⁵
<i>Scenario 2: 24% slope, Summer, Onshore Winds</i>				
Chaparral (Sh5)	17.5'	1.30	2,851	0.8 ⁵
<i>Scenario 3: 20% slope, Fall, Off-shore, Extreme Winds (Post Development)</i>				
FMZ Zone A (FM8)	1.8' (3.0')	0.1 (0.2)	21 (62)	0.1 (0.3) ⁵
FMZ Zone B (Sh1)	1.7' (10.6')	0.1 (1.5)	18 (964)	0.1 (1.0)
FMZ Zone C (Gs1)	6.4' (14.0')	0.5 (3.0)	323 (1,763)	0.3 (1.1)

⁵ It should be noted that the wind mph in parenthesis represent peak gusts of 50 mph.

ATTACHMENT 5 (Continued)

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Attachment 6

Completed Laguna Beach Fire Department
Hydrant Flow Report



Laguna Beach Fire Department
505 Forest Ave., Laguna Beach, CA 92651
(949) 497-0700

HYDRANT FLOW REPORT AND FIRE FLOW INFORMATION

Please complete Section A of this form (*must be saved as an Adobe "pdf" document*) and e-mail it to: **James Brown, LBFD Fire Marshal** --- jdbrown@lagunabeachcity.net.

The LBFD will complete Section B and send to the Water Purveyor for completion of Section C. Once all Sections are complete, the LBFD will send a copy back to the requesting party via e-mail.

NOTE: Water Purveyors require a fee to be paid prior to completing Section C. Please contact them for payment information.

SECTION A: TO BE COMPLETED BY APPLICANT

Date of Request: 4/5/19 Construction Type: SFR SA Square Footage*: 4300 FT
Contact Name: Kevin Aaronson Project Address: R-37U, S13-D 2354 San Clemente St.
Data Requested for: ☐ Fire Protection System Design** ☒ Fire Hydrant Flow Report (Check which apply)

*Square Footage must include all attached garages, carports and solid roof patio covers.

**Include estimated water (Fire Flow) needed for System Design: _____ GPM

SECTION B: TO BE COMPLETED BY LAGUNA BEACH FIRE DEPARTMENT

As required by Appendix B of the 2016 CFC, the minimum Hydrant Flow is: 875 GPM for 1 hours at a minimum residual pressure of 20 PSI. Completed by: James Brown, Fire Marshal Date: 4/5/2019
Name and Title of LBFD Representative

Water Purveyor ☒ LBCWD ☐ SCWD

SECTION C: TO BE COMPLETED BY WATER PURVEYOR

The test shall be provided from the closest junction node on the same pressure system as the proposed project.

NOTE: All water information is provided using the water purveyors' current hydraulic water model simulated under maximum day demand conditions. The pressure provided reflects at street level elevations unless noted otherwise.

Fire Flow Requested in Section A: _____ GPM Static Press.: _____ PSI Residual Press.: _____ PSI

Hydrant Flow Required by Section B: 1045 GPM at 20 PSI residual pressure

Junction Node location and elevation: 2399 SAN CLEMENTE STREET (ELEV. 327ft/NODE (W-FH-16-120))

Elevation of water meter for project: 317ft.

Completed by: Eric Callahan Digitally signed by Eric Callahan
DN: cn=Eric Callahan, o=Laguna Beach County Water
District, ou, email=ecallahan@lbcwd.org, c=US
Date: 2019.04.11 09:21:58 -0700 Engineering Tech Date: 04-11-19
Name and Title of Water Purveyor Representative