

WILDFIRE HAZARD ASSESSMENT AND PLAN



for
J&J Ranch
Subdivision 9271
Orinda, CA

Prepared by
Wildland Res Mgt
Reno, NV
January 22, 2019

Approved by:

Kathy Leonard 2/20/19
Fire Marshal
Moraga-Orinda Fire District

MORAGA-ORINDA FIRE DISTRICT
REVIEWED AND ACCEPTED

APPROVAL OF THIS PLAN DOES NOT AUTHORIZE
OR APPROVE ANY OMISSION OR DEVIATION FROM
APPLICABLE REGULATIONS. FINAL APPROVAL IS
SUBJECT TO FIELD INSPECTIONS. ONE SET OF
APPROVED PLANS SHALL BE AVAILABLE ON THE
PROJECT SITE AT THE TIME.

REVIEWED BY:

WILDFIRE HAZARD ASSESSMENT & PLAN
J&J Ranch, Subdivision 9271, Orinda, CA

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(5) Provide documentation of the factual basis for the finding in a Negative Declaration that a project will not have a significant effect on the environment;

(6) Eliminate unnecessary EIRs;

(7) Determine whether a previously prepared EIR could be used with the project.

(d) Contents. An Initial Study shall contain in brief form:

(1) A description of the project including the location of the project;

(2) An identification of the environmental setting;

(3) An identification of environmental effects by use of a checklist, matrix, or other method, provided that entries on a checklist or other form are briefly explained to indicate that there is some evidence to support the entries. The brief explanation may be either through a narrative or a reference to another information source such as an attached map, photographs, or an earlier EIR or negative declaration. A reference to another document should include, where appropriate, a citation to the page or pages where the information is found.

(4) A discussion of the ways to mitigate the significant effects identified, if any;

(5) An examination of whether the project would be consistent with existing zoning, plans, and other applicable land use controls;

(6) The name of the person or persons who prepared or participated in the Initial Study.

(e) Submission of Data. If the project is to be carried out by a private person or private organization, the Lead Agency may require such person or organization to submit data and information which will enable the Lead Agency to prepare the Initial Study. Any person may submit any information in any form to assist a Lead Agency in preparing an Initial Study.

(f) Format. Sample forms for an applicant's project description and a review form for use by the lead agency are contained in Appendices G and H. When used together, these forms would meet the requirements for an initial study, provided that the entries on the checklist are briefly explained pursuant to subdivision (d)(3). These forms are only suggested, and public agencies are free to devise their own format for an initial study. A previously prepared EIR may also be used as the initial study for a later project.

(g) Consultation. As soon as a Lead Agency has determined that an Initial Study will be required for the project, the Lead Agency shall consult informally with all Responsible Agencies and all Trustee Agencies responsible for resources affected by the project to obtain the recommendations of those agencies as to whether an EIR or a Negative Declaration should be prepared. During or immediately after preparation of an Initial Study for a private project, the

Lead Agency may consult with the applicant to determine if the applicant is willing to modify the project to reduce or avoid the significant effects identified in the Initial Study.

15365. INITIAL STUDY

“Initial Study” means a preliminary analysis prepared by the Lead Agency to determine whether an EIR or a Negative Declaration must be prepared or to identify the significant environmental effects to be analyzed in an EIR. Use of the Initial Study is discussed in Article 5, commencing with Section 15060.

SECTION ONE: EXISTING CONDITIONS

A. Setting/Context

1. General Location of Project

The project site is located at the southwest extent of the City of Orinda in a residential neighborhood approximately 1500 feet off Moraga Way toward the eastern end of Donna Maria Way. The proposed subdivision is on the southern edge of established single-family homes on lots of approximately ½ - 1 acre in size, and between the Del Rey Elementary School, and the northwestern extension of the Moraga Country Club.



Figure 1. Photo of site

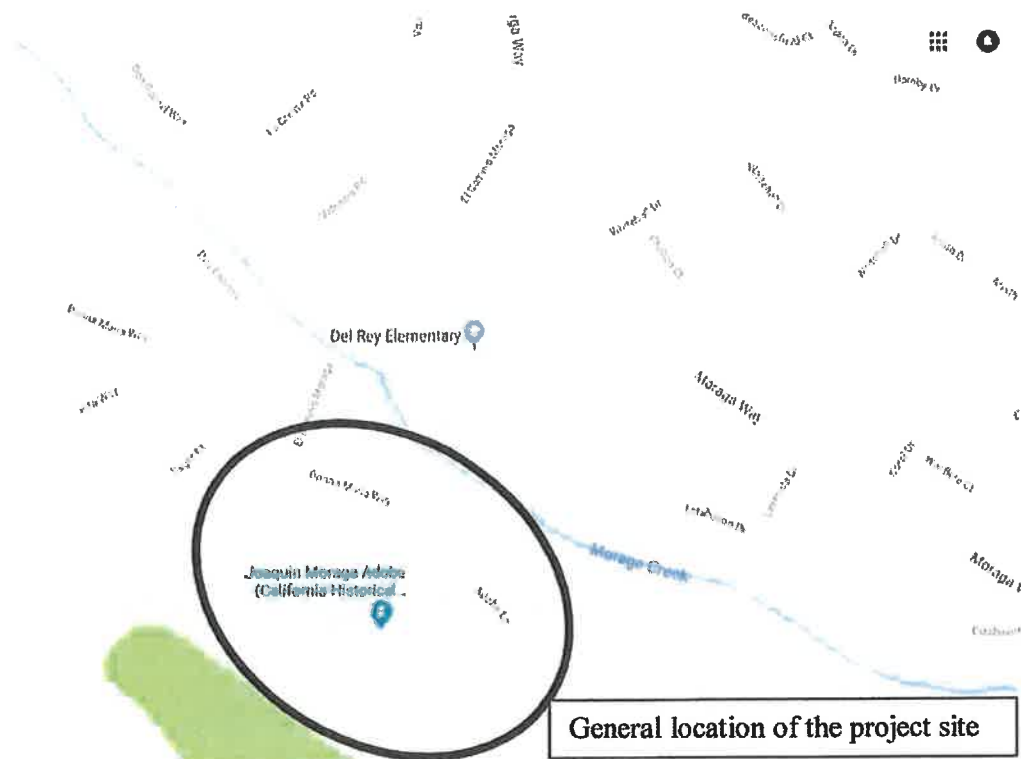


Figure 2. General Location of the Project Site, showing street names and significant features

The J&J Ranch's 20.33-acre property is situated mid- to lower-slope on the northeast side of Gudder Ridge in Moraga, California. The top of the ridge reaches 1,000 to 1,200 feet. The proposed development is southwest of Moraga Valley Creek and the road Moraga Way.

2. Description of Adjacent Properties

The project site is on a northeastern facing hillside at the interface between residential neighborhoods and wildlands (with the exception of a fairway of a golf course) that extend west to the dispersed community of Canyon, Redwood Regional Park and the City of Oakland.

The immediately adjacent land to the southeast is a residential development, the Lavenida Lane subdivision, which itself borders Miramonte High School. When complete, the development will be surrounded by a new subdivision on the southeast (Lavenida), a golf course to the southwest (Moraga Country Club), and existing residences to the north and east. Del Rey Elementary School abuts the northeast of the parcel boundary, bordering Lower Moraga Creek. The westernmost extent of the Project borders wildlands that are continuous to the City of Oakland.

The residential areas along Donna Maria Way and Sager Court, to the northeast and northwest of the project site respectively, are heavily landscaped with construction that could ignite in a wildfire because they were constructed prior to the adoption of fire-safe building practices.

Within the project lies the historic Moraga Adobe, the oldest structure in Contra Costa County is not included in this WHAP.

The terrain in the area consists of relatively gentle slopes rising to the west in a broad plane. There are three ephemeral drainages within the Project, all leading to Donna Maria Way. A small, steeply incised drainage on the southwest edge of the site falls to Donna Maria Way. Another ephemeral drainage crosses the northeast corner of the site. A third drainage is located on the middle of the Project, toward the end of the culdesac.



Figure 3. Recent (2018) aerial image of J&J Ranch property.

3. Description of the Project

The project will create thirteen new lots. The average lot size is 1.44 net acres, and the size ranges from 0.5 to 3.4 acres, with a separate approximately 2.26-acre parcel that will contain the Moraga Adobe and will be restricted to non-residential uses. With the exception of the Moraga Adobe parcel, the land is zoned for residential – low density development that preserves the semi-rural character of the community, with 1-2 dwelling units per acre. The spacing between structures is 40-ft minimum, from side to side. All land will be privately and individually owned, with a 7.9-acre open space easement over riparian areas and sensitive habitat encompassing roughly 39% of the site.

Roads cover slightly more than 1.6 acres, divided between Adobe Lane and Adobe Court. The eastern extension of Donna Maria Way will be a private road that serves the thirteen lots, Adobe Lane, ending in a bulb cul-de-sac. Adobe Court, a private court with access to Lots 4, 5, 6, and 7, will extend south from Adobe Lane to end in a bulb cul-de-sac.

All electrical distribution services will be underground. Water, provided by EBMUD, will run from Moraga Way in 12 inch mains.

All improvements as part of the subdivision will be constructed in one phase. Structures on Lot 1, 3, 4, 5, 7, 8, and 12 are to be constructed first. Lots 2, 6, 9, 10, 11, and 13 are available homesites.

Less than 60% percent of the site will be graded; the wooded portions within the open space easement will remain outside the limit of civil grading. Grading will form a bioretention/detention basin and access routes. Several retaining walls form the edge of Adobe Lane.

More than 70 24-inch box landscaping and native tree replacement will be planted in informal clusters along Adobe Lane and Adobe Court, and near the bio-retention basin.

B. Regulatory Context

1. City of Orinda Fire Safety Regulations – Ordinance No. 16-02

Effective October 5, 2016 Ordinance #16-02, and the 2016 edition of the California Fire Code, including Appendix Chapters A, B, C, D, (with certain amendments) and by reference, the International Fire Code, 2015 Edition became effective. This code regulates and governs the safeguarding of life and property from fire hazards. The code specifically requires exterior structural design and construction become ignition resistant, including exterior wall siding and sheathing, exterior windows, venting, and decking. It further regulates roofing and attic venting, building assemblies, structure projections, (including, but not limited to, porches, decks, balconies), and eaves, and structure openings, including, but not limited to, eave vents and windows.

This ordinance requires plans be submitted for Fire District review. It also requires that construction address, among other issues, the following three items that related to wildfire hazard: provision of access for fire apparatus, provision of water supply for fire protection, and provisions to control the spread of fire including vegetation management on private lots. Appendix D of the California Fire Code outlines the local standards beyond those provided by the IFC and CFC. The code itself is available at www.mofd.org/_literature_237857/16-02_Fire_Code_Ordinance.

Section 325 of Ordinance 16-02 specifies Exterior Fire Hazard Control and provides authorization to “Any person owning, leasing, controlling, operating or maintaining any building in, upon, or adjoining any hazardous fire area shall at all times maintain defensible space around and adjacent to such building by removing and clearing away all

excessive combustible material for a distance not less than 100 feet from all portions of the structure. Distances may be increased or decreased by the fire code official based on site specific analysis of local conditions.” Parcels less than one acre must be fully abated. Additionally, parcels more than one acre in size maybe required to provide 30-ft fuel breaks along the perimeter of the property line.

The ordinance further defines weeds to include sagebrush, specific chaparral woody shrub species and poison oak, dry grass, stubble, brush, litter, or other flammable materials that endanger the public safety by creating a fire hazard.

This section of the code also requires that any portion of any tree extending within 10 feet of the outlet of any chimney or stovepipe be removed, and the outlet of every chimney or stove pipe must have a screen constructed and installed in accordance with the California Building Standards code.

Roofs of any structure must be maintained free of leaves, needles or other dead vegetation growth and any tree adjacent to or overhanging any building much be maintained free of dead or dying wood. These portions of trees much be at least 5 feet above the roof surface.

Trees within 100 feet of buildings or within 10 ft of roads are to be maintained so that no branch (associated foliage) is lower than 6 feet from the ground. Tree branches over the road must be no lower than 15 feet off the road, and all flammable vegetation must be removed for a distance of 3 feet from the road.

Section 325.19 notes a fire management plan shall be prepared by the applicant when required by the fire code official. “In lieu of vegetation abatement the property owner shall submit a Fire Management Plan for the property. The plan shall be specific to the property and shall describe ways to minimize, mitigate and/or eliminate potential for loss from wildfire exposure. The plan shall be developed and approved by the Fire District and the property shall be verified as compliant with the plan throughout the year. Verification of compliance shall be completed by a third-party individual or firm knowledgeable in such matters and approved by the Fire District each year.”

2. Orinda Municipal Code Chapter 17.17

Chapter 17.17 – Landscaping of the Orinda Municipal Code requires a landscape plan for the removal of invasive vegetation on the site and a plan to management vegetation to reduce wildfire hazards. This code guides landscape plans to revegetate the site to resemble natural oak woodlands.

3. Fire Department Access: Section 503 of the CFC 2013 and MOFD Ordinance No. 16-02

Section 503 of the California Fire Code (as amended by the Moraga-Orinda Fire Department) addresses fire apparatus access roads. This Fire Prevention Division standard specifies loads, surfacing, road width, turn-around design minimums, gradient and cross slope, and bridge standards

Dimensions. Unobstructed width of not less than 20 feet (6.096 M) (no parking permitted) and vertical clearance not less than 15 feet (4.52 M). Two exceptions allow for areas of reduced vertical clearance and existing access roads. If the roadway serves no more than two homes, the roadway width may be reduced. Written approval for reduced roadway width may be granted by the Fire Marshal. Special provisions may be required for turnout areas.

Turning Radius. Not less than 35 feet turning radius.

Grade. The grade with asphalt surface will not exceed 15 percent. Grades between 16 and 20 percent are permitted when the finished surface is comprised of grooved concrete.

Surface. The fire department access shall be of all weather driving surface and capable of supporting the imposed loads of fire department apparatus (20 tons per axle for engine operations and 30 tons per axle for truck operations). All weather shall mean A/C paving, or concrete or other similar materials capable of supporting the minimum imposed load. When grooved concrete is required, the design shall be 1/ inch wide by 1/2 deep and 1.5 inches on center with a 30-45 degree angle to the centerline of the roadway, as approved by the fire district.

Turnarounds. Dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus. The following design minimums shall be complied with when designing for fire department turn-around:

- A. Areas requiring Truck Operations: Length = 47 feet; Width = 10 feet; Height = 15 feet; Outside Turning Radius = 40 feet; Overhangs = 4.5 feet (front), 21 feet (rear wheelbase); Angle of Approach = 11° (front), 10° (rear); weight = 30 tons imposed weight per axle.
- B. Areas requiring Engine Company Operations: Length = 38 feet; Width = 10 feet; Height = 15 feet; Outside Turning Radius = 38 feet; Overhangs = 4 feet (front), 5 feet (rear); Angle of Approach = 11° (front), 10° (rear); weight = 20 tons imposed weight per axle.

Bridges. All bridges shall be constructed to nationally recognized standards and designed for a live load sufficient to carry the imposed load of the fire apparatus of minimum 20 tons (per axle).

Access to Open Spaces. When access to open land/space or fire trail systems maintained for public or private use is obstructed by new development, the developer shall provide alternate acceptable access into the area for fire personnel and equipment as approved by the Fire Code Official.

4. Required Water Supply for Fire Protection (Section 903 of the California Fire Code)

Capacity. An approved water supply capable of supplying 2,250 gpm from three (3) adjacent hydrants for fire protection. In setting the required fire flow for individual facilities the Fire Code Official may be guided by Appendix III-A.

On-site Hydrants and Mains. When any portion of the facility to be protected is in excess of 150 feet (45.720 M) from a water supply on a public street, as measured by an approved route around the exterior of the facility, on-site fire hydrants and mains capable of supplying the required flow shall be provided when required by the Fire Code Official.

Fire Extinguishing Systems (Fire Sprinklers) (Section 1003). An automatic fire extinguishing system is required in new Residential occupancies (Group R).

5. Statewide Codes

Public Resources Code 4290 and 4291 apply to those lands under the fire protection responsibility of the California Department of Forestry and Fire Protection. However, these codes are often used as a “de-facto” set of codes because they are seen as prudent and reasonable methods to achieve fire safety. Where codes and standards established by the Moraga-Orinda Fire District (MOFD) are more stringent than the statewide codes, MOFD codes will be in force.

Government Code 51182 requires that owners of lands designated as high fire hazard in local jurisdiction need to create and maintain defensible space for 100 feet from each structure, or to the property line, whichever is closer. Guidelines to clarify actions compliant with the regulations are available from the California Department of Forestry and Fire Protection website.

In addition, the State Department of Fish and Wildlife are charged with protecting riparian corridors, and modifications to this environment require a permit from this department. Modification includes removal of vegetative material other than invasive exotic plants.

6. Statement of Compliance with Fire Safety Codes and Regulations

The project complies with all state and local codes and regulations, with the exception of water supply during construction. An Alternative Means of Mitigation (AMM) is being prepared that meets the intent of the requirement and offers equal levels of fire safety.

C. Site-specific assessment of fire hazard

1. Vegetative Fuels

The fuels on the property have been classified by LANDFIRE, a nationwide mapping program that describes vegetation, fuels, and fire regimes. According to the Scott and Burgan classification system within LANDFIRE, the J&J Ranch property consists of a mix of hardwood, shrub, and grassland fuel models (Figure 4), with the majority classified as treed fuel models. However, because of grading, the percentage of vegetation is over-estimated. Grading is expected to alter fuel distribution mainly by reducing the fuel volume and creating fuel-free spaces. Locations adjacent to the Project have the high fuel volume, where not mapped as “Urban”.

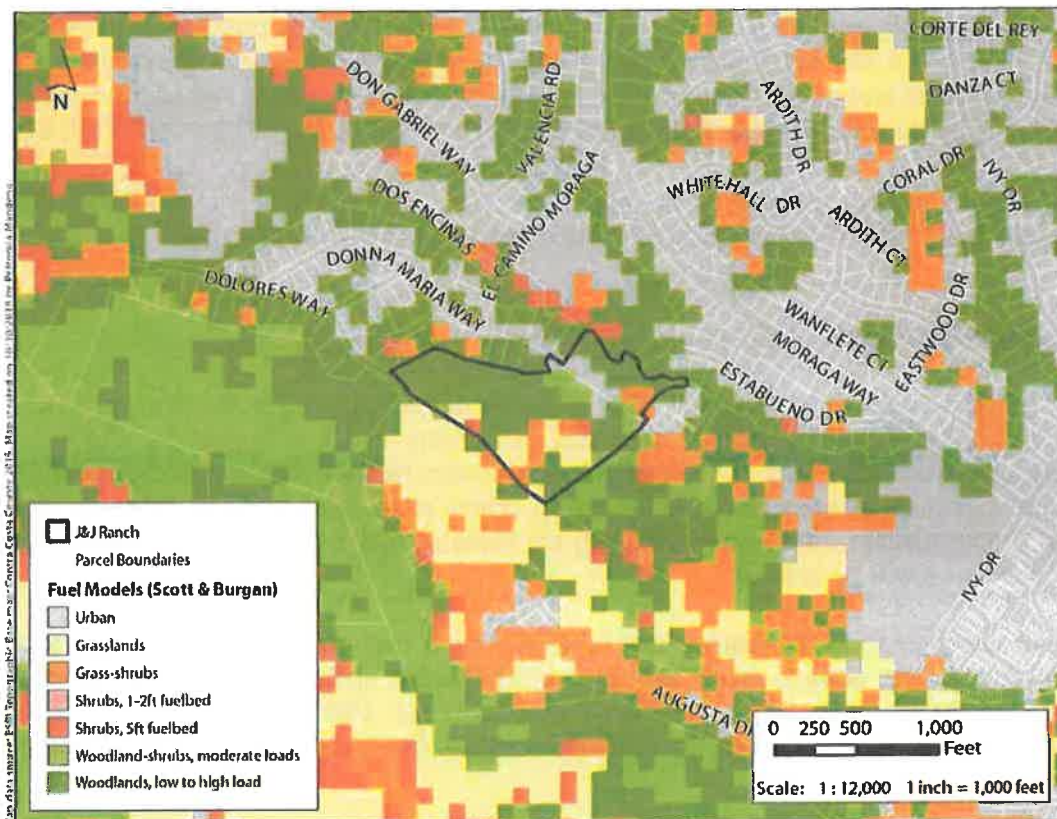


Figure 4. Scott and Burgan's fuel model classifications for the J&J Ranch property and surrounding area.

This map indicates that there are a few small locations of mature shrubs. The site is mostly woodland. Woodland, with low fuel volume (load) is located close to the existing portion of Donna Maria. The grassy expanse west of the Project is a golf course,

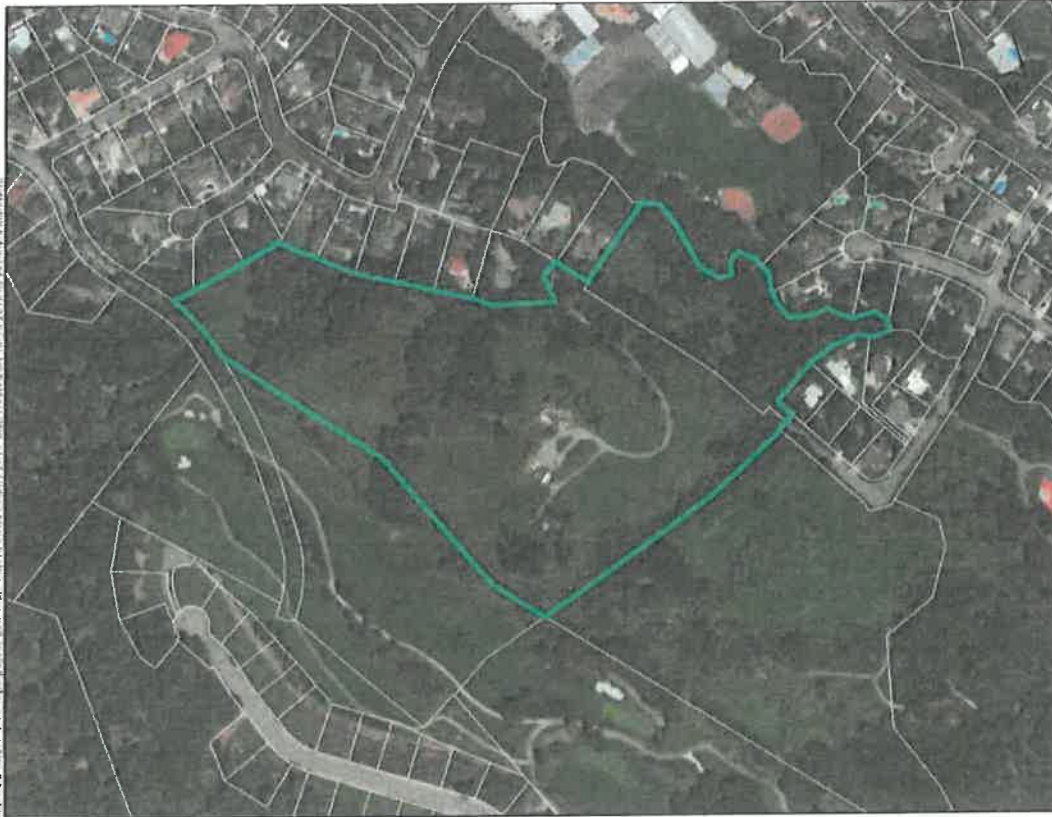


Figure 5. Recent (2014) aerial image of Lavenida property indicating spatial distribution of fuels

Table 1 lists the fuel models, a short description for each, and shows the distribution of each fuel model.

Fuel Model ID	Fuel Model Classification	Fuel Model Description	Acres	Percent of Total
91	NB1	Urban	1.78	9%
101	Short Grass	Short, sparse dry climate grass is short, naturally or heavy grazing, predicted rate of fire spread and flame length low	1.56	8%
102	Tall Grass	Low load, dry climate grass primarily grass with some small amounts of fine, dead fuel, any shrubs do not affect fire behavior	1.33	6%
121	Grass/Shrub Mix	Low load, dry climate grass-shrub; shrub about 1 foot high, grass load low, spread rate moderate and flame length low	1.56	8%
147	Mature Shrubs	Very high load, dry climate shrub, woody shrubs and shrub litter, very heavy shrub load, depth 4-6 feet, spread rate moderate to high and flame very high	0.44	2%

165	Woodland with Shrubby Understory	Very high load, dry climate shrub, heavy forest litter with shrub or small tree understory, spread rate and flame moderate	1.78	9%
182	Woodland with no understory	Low load broadleaf litter, broadleaf, hardwood litter, spread rate and flame low	1.78	9%
183	Woodland with woody debris	Moderate load conifer litter, moderate load conifer litter, light load of coarse fuels, spread rate and flame low	7.34	35%
187	Woodland with heavy woody debris	High load conifer litter, light slash or dead fuel, spread rate and flame low	2.89	14%
TOTALS			20.50	

Table 1. Fuel model descriptions and acres.

2. Terrain on Project Site and Surroundings

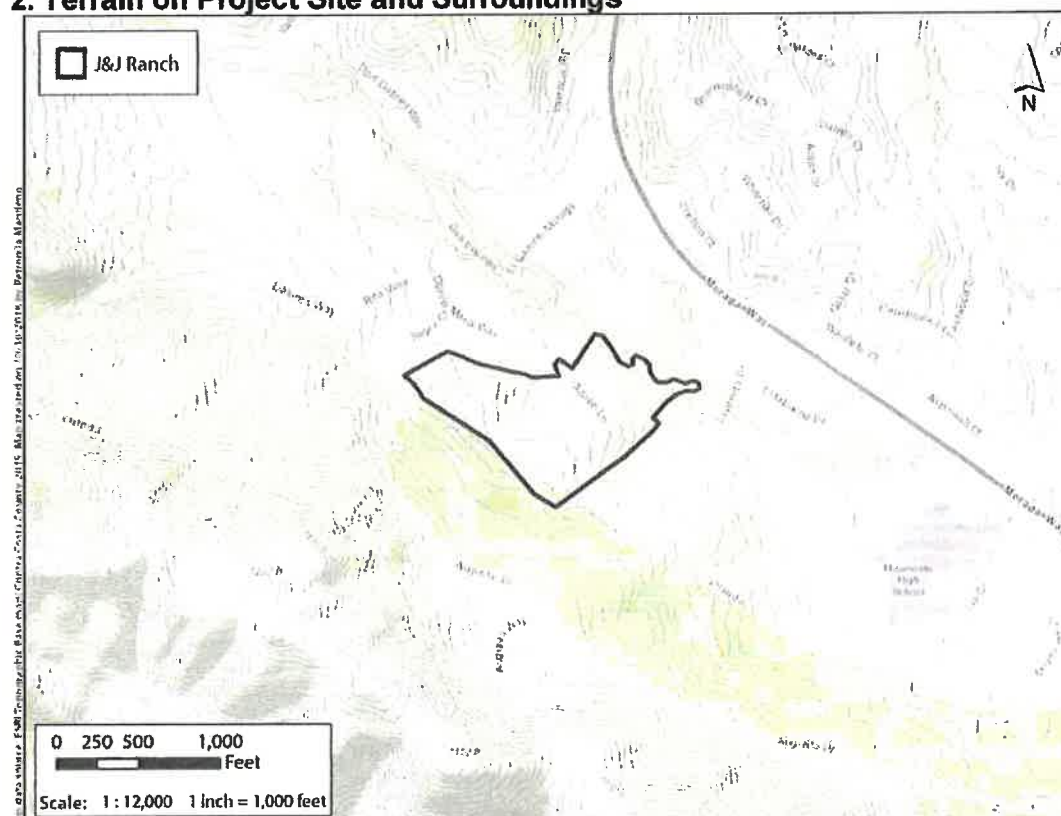


Figure 11. Topographic Map of the project area and vicinity.

The site has no particular hazardous terrain, but is fairly steep in a constant climb to the west. Within the property, elevation ranges from 570 feet to 700 feet, with an average slope of 24.05%. Typical topographic aspect is East to Northeast (Figure 11).

The property is situated mid- to lower-slope on the northeast side of Gudde Ridge in Moraga, California. The top of that ridge reaches 1,000 to 1,200 feet. The proposed development is southwest of Moraga Valley Creek and the road Moraga Way/Highway

3. Predicted Fire Behavior – Current Conditions

Based on these initial fuel model descriptions along with the relatively low elevation gain and slope, and a northeast aspect, general normal fire behavior would be expected to be relatively low to moderate with some pockets of areas experiencing moderate to high rates of spread and flame lengths.

However, we are interested in the extreme weather and a very dry fuel moisture regime. Recently, California has experienced more and more hot and dry days throughout the year, even in what was traditionally considered non-fire season months. Therefore, when predicting expected fire behavior, we used what is considered a very dry fuel moisture regime: 1hr fuels were set at 2% moisture content, 10hr fuels were set to 3%, 100hr fuels at 7% and 1000hr sound and rotten were set at 7% each. Wind speed was set at a moderate-to-high speed of 15mph. In addition, we set the wind direction from the northwest, moving cross-slope from the ridgetop and running down canyon. Foliar moisture was set at 70% (see Figure 7).

Using FlamMap, a fire behavior prediction software developed by the Joint Fire Sciences Program, SEM, and BLM, we created outputs for predicted Flame Lengths, Rate of Spread, and Crown Fire Activity. Each is presented below with a brief explanation of the results.

Run : Northwest Wind

Inputs | Fire Behavior Outputs | Minimum Travel Time | Treatment Optimization Model

Run Name: Northwest Wind

Fuel Moisture Files

Fuel Moisture File (*.fms): E:\fire_behavi...\verydry_2-3-7-70.fms

Use Custom Fuels (*.fmd)

Winds

Wind Direction Wind Speed (MPH @ 20): 15

Wind Blowing Uphill Azimuth (Degrees): 315

Wind Blowing Downhill

Generate Wind Vectors

 Wind Vector Options

Wind Vector Files

 Direction

 Speed

Canopy Characteristics

Height (m): 15 Canopy Bulk Density (Kg/m3): 0.2

Canopy Base Height (m): 5 Foliar Moisture Content (%): 70

Fuel Moisture Settings

Use Fixed Fuel Moistures from Fuel Moisture File

Use Fuel Moisture Conditioning

 Weather File (*.wtr):

 Wind File (*.wnd):

 Fuel Moisture Conditioning Period

	Day	Time
Start	5/31	10:00 AM
End	5/31	10:00 AM

OK Cancel Apply Help

Inputs OK 3 outputs selected Existing outputs up to date

Figure 7. Fire behavior parameters used in FlamMap.

Flame Lengths



Figure 8. Predicted flame lengths for the J&J Ranch property.

In Figure 8 we can see, even under dry and windy conditions, the majority of the area experiences relatively low flame lengths (less than four feet). Areas where flame lengths reach over eight feet correspond with woodland with a shrub understory and where grass and shrubs are located. In order to reduce flame lengths to less than four feet, reducing the shrub component would be helpful.

Just outside the property along its southeast edge, flame lengths are predicted to reach above eight feet along a consistent stretch of the adjacent development. The adjacent Lavenida Lane subdivision is under development, however, so this hazard should be reduced as its respective fire management plan is implemented, as much as regulatory restrictions in riparian allow.

Rate of Spread

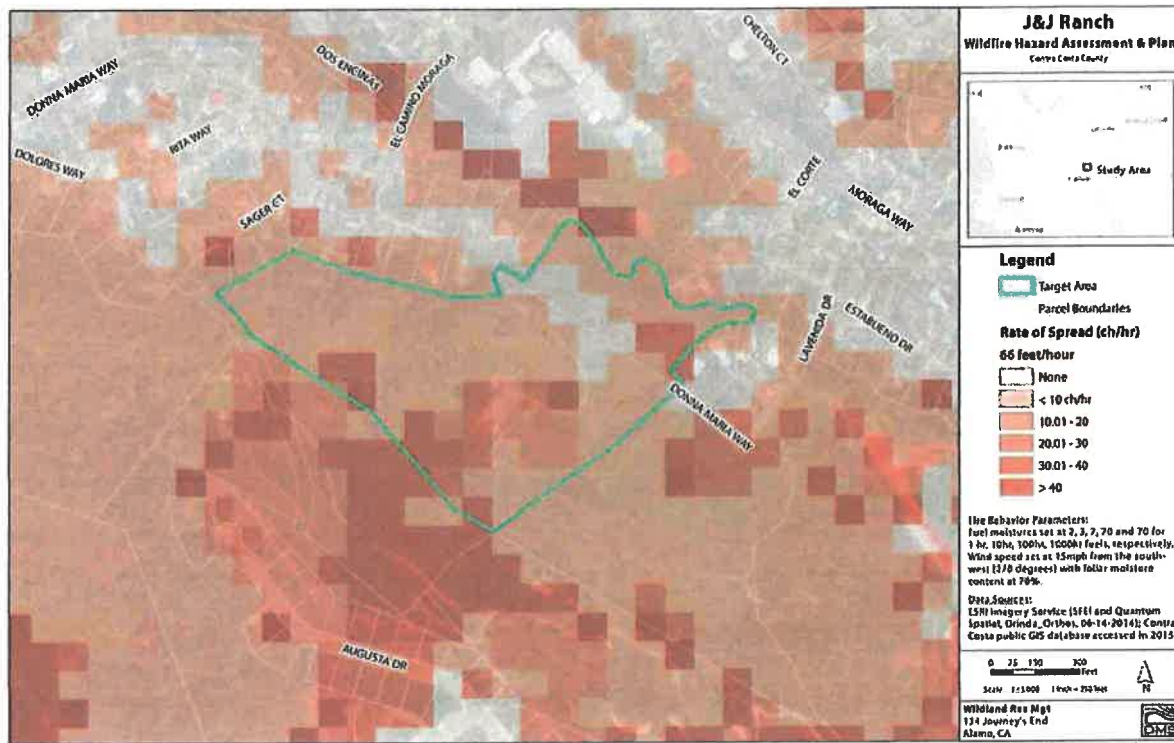


Figure 9. Predicted rate of spread for the J&J Ranch property.

Just as flame lengths were generally benign within the property, rate of spread remains relatively low (slower than 10 feet per minute) throughout the property except where shrub-dominated fuel models are located. These areas are toward the center and easternmost corner of the property and throughout its southwestern edge. At these locations, rate of spread was predicted to reach over 40 feet per minute.

Outside of the property, the fire behavior prediction model shows an elevated rate of spread through the golf-course. Because LANDFIRE grasslands and given the dry conditions we set the fuel moistures at, this rapid rate of spread is expected, however, since we know golf courses would rarely get that dry, we can be confident in saying that the rate of spread in the golf course would not pose a threat to containment. The area to the immediate northeast would pose more of a threat to the property.

Crown Fire Activity

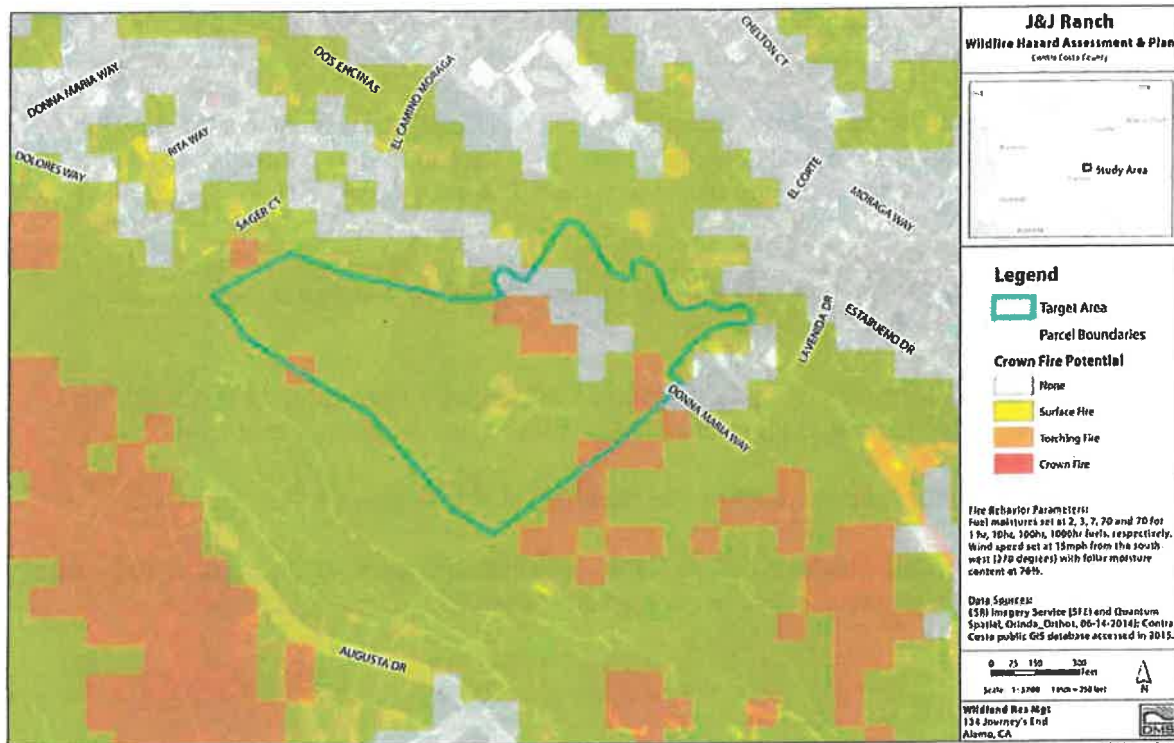


Figure 10. Predicted Crown Fire Potential for the J&J Ranch property.

Crown fire potential predicts whether a fire will reach into the tops of trees in an independent manner (torching) or actively spread through the treetops (crowning). Where fuel models are classified as grass or shrubs, there will be no crown fire or torching predicted. Only treed fuel models can exhibit torching or crowning. This is an important parameter to model as it gives indication of possible ember production that could facilitate fire spread.

Our prediction model shows that individual tree torching should be expected given the dry conditions used as inputs, though it is not widespread. It is more of an issue outside the property along its southeastern boundary and in the tree groves of the golf course to the southwest. Moreover, the whole ridgeline to the southwest abutting Augusta Drive is prone to torching (where flames reach up into the crowns of trees), and a westerly wind could easily blow embers onto the property.

Within the property, the clumps of trees near the entrance of the property to the east would torch. However, plan implementation can mitigate this torching risk, and crown fire potential for the remainder of the property is generally minimal.

4. Access

Fire apparatus access has been designed to meet all fire district criteria. The new roads will be private, and maintained by J & J Ranch Homeowners Association, a California nonprofit mutual benefit corporation.

Access to the subdivision is from the southern end of Donna Maria Way, continuing into Adobe Lane. Adobe Lane adds approximately 1000 feet to Donna Maria Way. Adobe Court, a spur cul-de-sac provides access to Lots 4-7. Adobe Court is short, shorter than 200 feet in length.

There is one way in and out of serving the 13 lots. Camino de Moraga currently provides sole access to more than 75 residences.

All roads are 20 feet wide, with short stretched of parking spaces of eight feet width on Lots 11 and 2. No parking is allowed on either Adobe Lane or Adobe Court.

The grade of Adobe Lane is less than 6%; the grade of Adobe Court is less than 13%.

An arched culvert will provide access across an ephemeral creek at the western end of Adobe Lane. This crossing will have a minimum load of 20,000 pounds per axle.

5. Water Supply

Water supply for the site comes from an extension of a 12-inch main off Don Gabriel Way to serve individual domestic and emergency water demands, and five fire hydrants, which are fairly evenly spaced on Adobe Lane. A 6-inch main will serve Lots 1 - 13. Water service is provided by East Bay Municipal Utilities District with anticipated fire flows of 1500 gallons per minute for 120 minutes.

Under eaves sprinkler systems will be addressed during the process of individual building plans check.



Figure 12. Proposed water supply.

D. CURRENT RISK OF PROJECT SITE AND SURROUNDINGS

1. Fire History of the Area

No fires larger than 10 acres have occurred on the project site since records have been kept. However, fires in the area indicate the potential for large fires to occur. For example, a grassfire in June 2018 consumed 5 acres near La Salle Drive, less than 3 miles away from the J&J Ranch parcel. In October 2017 the Fish fire in Moraga consumed nearly 20 acres and caused a partial shutdown of Highway 24, while a fire near Sibley Volcanic Regional Preserve reached 4.5 acres two weeks later. Similarly, four structures were destroyed by three separate wildfires in the community of Canyon between 2000 and 2005. Another large wildfire occurred approximately 15 years ago near the Crestview neighborhood.

2. General Weather Information

Weather conditions significantly impact both the potential for fire ignition and the rate, intensity, and direction in which fires burn. The most important weather variables used to predict fire behavior are wind, temperature, and humidity.

Wind direction and velocity profoundly affect fire behavior. Wind increases the flammability of fuels both by removing moisture through evaporation and by angling the flames so that they heat the fuels in the fire's path. The direction and velocity of surface winds can also control the direction and rate of the fire's spread. Winds can carry embers and firebrands downwind. These burning fuels can ignite spot fires that precede the

primary front. Gusty winds cause a fire to burn erratically and make it more difficult to contain.

The winds that create the most severe fire danger, known as the "Santa Ana" or "Diablo" winds, typically blow from the northeast. However, winds from the west are also likely to cause unacceptable damage. Another worst-case scenario is a fire driven by a northwest wind that follows a northeast wind. Because the northeast wind is normally associated with low humidities and high temperatures, it dries the fuels. At the end of this "Santa Ana," or "Diablo" wind condition, the fog often moves quickly shoreward, preceded by a brisk, high-speed northwest wind. Under these conditions, the fuels would still be dry from the previous weather conditions. The combination of the northwest wind and the east-facing slope could quickly spread a fire into the densely developed portion of Orinda.

3. Local Weather Conditions

The project site's location in proximity to the coast influences its weather conditions. It has warm, dry summers and cool, moist winters characteristic of the fog belt area. The area averages about 38 inches of precipitation a year. Most measurable rainfall generally occurs from mid-October to mid-April. Thus, the fire season (the time of highest fire danger) comprises the dry months of May to mid-October.

Weather observations from three nearby weather stations were reviewed and summarized for this report. The stations were chosen because of their location and completeness of data. Table 1 lists the stations used and the date range of available data from each station for the three years (2013 – 2017).

Station ID	City	Start Date	End Date
D3835	Orinda	01/01/2013	12/31/2017
E3193	Moraga	07/24/2013	12/31/2017
E4855	Orinda	03/26/2014	12/31/2017

Table 2 – Station data date range.

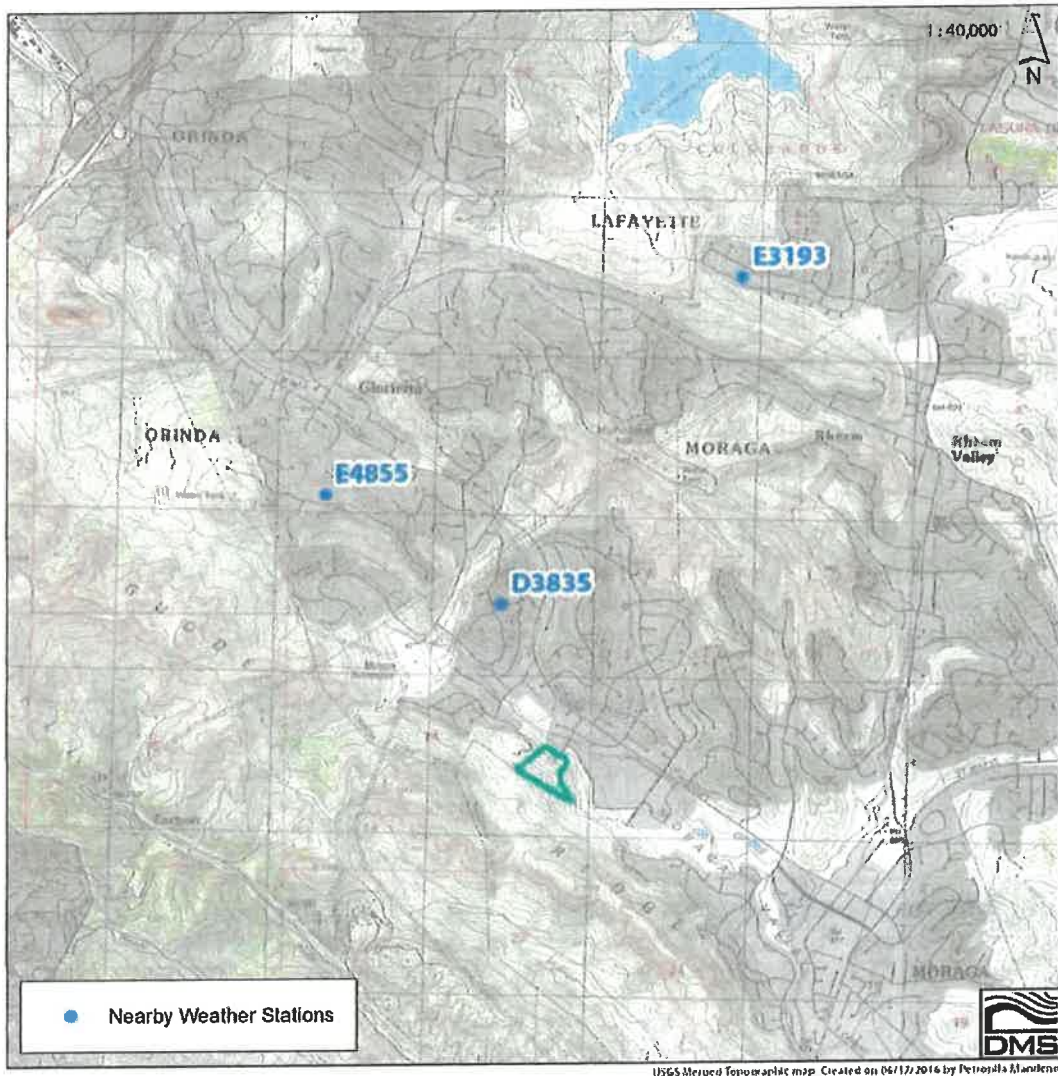


Figure 13 – Location of weather stations used in this summary. Data downloaded from MesoWest on 10/27/2018.

Table 3 shows these stations calculated 90th, 95th, and 97th percentile values for relative humidity, temperature, and wind speed (using May to Oct data only).

	90th Percentile			95th Percentile			97th Percentile		
	Relative Humidity (%)	Temperature (°F)	Wind Speed (mph)	Relative Humidity (%)	Temperature (°F)	Wind Speed (mph)	Relative Humidity (%)	Temperature (°F)	Wind Speed (mph)
D3835	37	79	5	29	85	7	25	88	7
E3193	33	81	3	25	87	3	21	90	4
E4855	29	80	8	22	85	10	19	89	11
Average	33	80	5	25	86	7	22	89	7

Table 3 – 90th percentile values.

Table 4 shows the maximum and minimum for these parameters for all three stations.

	Max Temp	Max Wind	Lowest RH
D3835	102	29	10
E3193	101	19	8
E4855	102	27	6
Average	102	25	8

Table 4 – Max and min for temperature, relative humidity, and wind speed.

Months when the 97th percentile weather conditions were met fell in the month of September in 2013, the months of May, June, July, September, and October in 2014, and June through September in 2015. The predominate wind direction was from the southwest.

Because these nearby weather stations did not reliably record wind direction, no further analysis can be deduced from the downloaded data. However, one previously analysis of nearby weather stations noted that though westerly winds were more common for this area, northeasterly winds were associated with extreme fire weather conditions.

Although summertime temperatures are usually quite warm (75° to 85° F), it is common for the fog to roll in during the early evenings and creep over the ridge tops and down into the site. Thus, proximity to the bay often creates a pattern of hot days and cool nights. Fog also sometimes keeps summertime temperatures cool on the project site.

4. Conclusion about Risk from Wildfire

CALFIRE classified the site as a Very High Fire Hazard Severity Zone, based on current fuels, population density, and topography.

There is a significant threat of fire from the neighboring yards and structures due to ignition-prone construction as well as from un-maintained ornamental vegetation or small pockets of wildland vegetation. The greater threat is posed by older homes to the northeast of the project site because these homes have both more flammable construction and yards with greater volumes of vegetative fuel. Both the structures and un-maintained vegetation pose an ignition threat to the Project from possible spread through flaming fronts, but more particularly from the embers they will likely produce, thereby starting innumerable fires in the surrounding area.

The adjacent residential neighborhoods could be locations of ignitions because of the concentrated use, and possible unsafe behaviors, including barbecues, mechanical equipment use, or fireplace use without screens. The mature neighborhoods have mixed construction type, with some ignitable structures that could propagate fire to the site. The neighborhood to the north is upwind during a northeast Diablo wind condition; embers produced from this neighborhood would expect to be distributed on the project site.

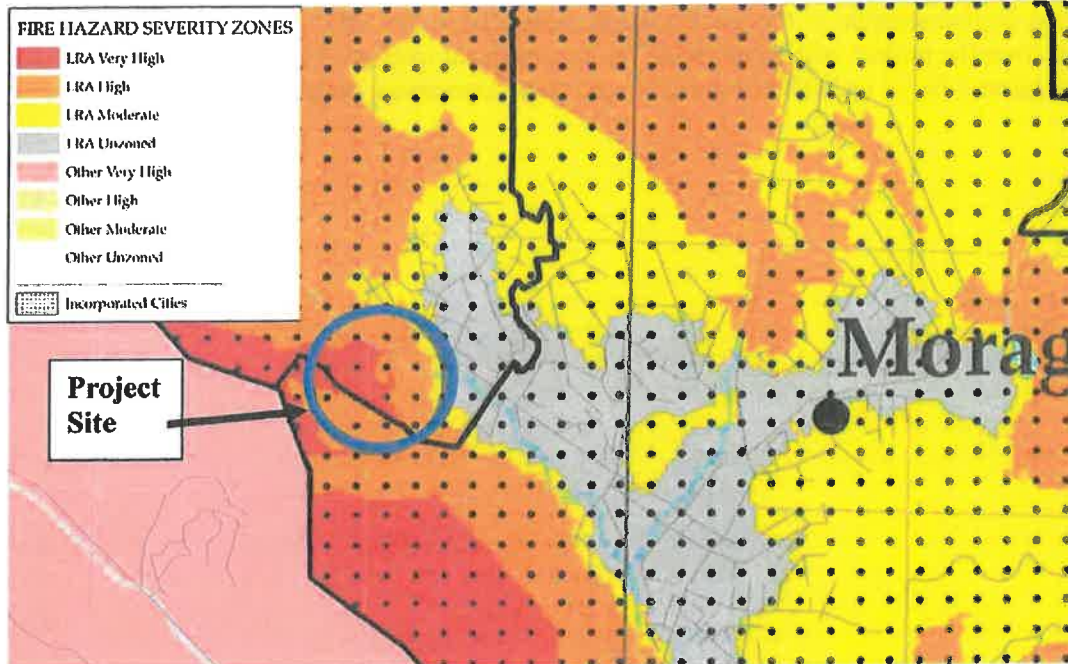


Figure 14. Fire hazard severity designation by CALFIRE, found on http://frap.cdf.ca.gov/webdata/maps/contra_costa/fhszl06_1_map.7.jpg

A fire in the untreated fuels to the west could also pose a threat to the Project site from possible spread through flaming fronts, but more particularly from the embers they will likely produce, thereby starting fires in the older neighborhood on Donna Maria.

However, mitigation measures in Section Two, the ignition-resistance construction style within the project, and the placement of structures low on the slope limit the threat of wildfire to the Project and to adjacent properties. The proposed development offers several layers of mitigations addressing wildfire hazards. These include:

- Proposed access suitable for emergency vehicles simultaneous with evacuation of residents.
- A water system that supports effective fire suppression needs.
- Structure design that is ignition-resistant through the use of non-combustible roofs, interior fire extinguishing sprinkler systems, non-combustible siding, and decking, and otherwise complying with the 2016 California Building Code and California Residential Code Section R337.
- Selection of landscaping species that are fire-resistive in nature as well as drought-resistive, and design that provides gaps and low fuel volume.
- Vegetation maintenance that ensures landscaping and vegetation will produce flames that will not promote structure damage. This is accomplished by maintaining vegetation to reduce heat output and fire spread (two feet near structures and prevention of crown fires anywhere on the Project site).

Upon implementation of the measures recommended in this WHAP the fire risk posed to and from the project will be minimal, an improvement over pre-Project conditions, and a low hazard, based on MOFD's parcel based Risk Assessment procedure.

Section Two: FIRE HAZARD MITIGATION MEASURES

Fire damage can be mitigated by preventing potential ignitions and changing the resulting fire behavior or by enhancing fire suppression capabilities. This section addresses methods to reduce fire hazard by changing potential fire behavior on the Project site, done by modifying both vegetative and structural fuels.

A. INTRODUCTION

A combination of techniques is often used to reduce fire hazard. In order of decreasing effectiveness, the following approaches may be taken to minimize fire resistance to control:

1. Reduce the total fuel load (amount of fuels to burn);
2. Alter the fuel distribution by arranging the horizontal and vertical spacing of vegetation so that the fire cannot spread;
3. Reduce the flammability of fuels by increasing moisture in the current vegetation or by changing to a more fire-resistant vegetation type.

Managing vegetation is one way to calm fire behavior before a fire starts. Typically, vegetative fuel modification is done immediately around structures, by roadways, and in areas of potential extreme fire behavior. The effect of fuel modification is to reduce ignitability, rate of spread, and fire intensity (or heat output). A specific goal of this fuel management plan is to create conditions where a wildfire will not be propagated in the crowns of oaks nearby. This would result in fewer, smaller, and less damaging fires.

In measurable terms of fire behavior, the goal of vegetation management would be to produce flame lengths shorter than 2 ft within 100 ft of a structure. Areas where fuel modification is restricted by regulations governing riparian corridors will not be able to meet these goals.

Mitigation measures in relation to fuels from structures generally address the building exterior, in compliance with the 2016 California Building Code and California Residential Code Section R337. Specifications restrict some design features and eaves and horizontal projections such as decks and porches. Design of eave lengths and vents are also constrained. Specifications for installation of double-paned windows, as well as placement and sizing are aimed at preventing window breakage, thus keeping a wildland fire outside the building.

The effect of these mitigation measures is to decrease greatly the chance a building will be available as fuel. A perfectly "hardened" (ignition-proof) structure acts as an area of no fuel, and thus serves as a fire-break.

B. SUMMARY OF VEGATIVE FUEL MANAGEMENT ZONES

There are three treatment zones in this fuel management plan:

- The Non-combustible Zone
- The Defensible Space/Landscaping Zone
- The Roadside Vegetation Management Zone

The Non-combustible and Defensible Space/Landscaping Zones encompass the space nearest the structures and is designed to reduce ignitions near structures, support structural survival during a wildfire, and reduce the chance that an ignition will move off-site.

The Roadside Vegetation Management Zone consists of vegetation near the roads and is designed to assist evacuation and emergency vehicle access and to limit roadside ignitions. The standards and actions to comply with both the Defensible Space/Landscaping Zone and the Roadside Vegetation Management Zone are the same, with one exception: in the Roadside Vegetation Management Zone there must also be a 15 ft vertical clearance created by tree-trimming the entire length of the roadway.

C. STANDARDS FOR NON-COMBUSTIBLE ZONE

The zone 0-5 ft around the structure is called the Non-Combustible Zone. The proposed management standards for this Zone are as follows:

1. This area will be planted with material that will not ignite. This translates into non-combustible landscape constructions (trellises or fences), and completely herbaceous (not woody) plants which do not contain dead material. Lawn, spider plant, and bulbs, as well as stone paths or gravel walkways, are suitable for this zone. Species that produce and keep dead material such as ice plant or ivy may not be planted here. This zone will be kept free of all dead plants and combustible materials.
2. The ground, decking, and balconies will be kept free of dead leaves, needles, or other plant debris
3. Dead material that drapes over ground cover will need to be removed yearly before June 20. This includes leaves, bark, and branches.

D. STANDARDS FOR DEFENSIBLE SPACE/LANDSCAPING ZONE

This proposed set of maintenance standards will be used to certify compliance and to direct maintenance activities in the zone from 5-100 ft of the structure or to the property boundary. If the structure lies within 100 ft of the property boundary, a fuel management easement will be requested of the adjoining neighbor. These vegetation management actions comply with the California State PRC 4291, and Ordinance 16-02. Areas regulated by the California Department of Fish and Wildlife are exempt from these standards.

1. Remove all dead plants and dry vegetation to establish and maintain a defensible space. The following actions will provide an equivalent level of fire safety as removing all combustible material:
 - a. Cut grass and weeds yearly to less than 3 in. in height when 30% of the grasses have cured. Beginning May 15, inspect the grass on a weekly basis to determine the state of grass curing. Cut the grass within the week when 30% of the grass cover is cured, and no later than June 15. Re-mow if late-season rains promote grass growth after the first cutting. Optionally, delay cutting of native grass and wildflowers until after seed set if they do not constitute a means of rapidly transmitting fire to any structure.
 - b. Keep the ground, roofs, decking, and balconies free of dead leaves or other plant debris.
 - c. Clear leaves, bark, and humus under trees and shrubs (including vines and semi-woody species) every year. At no time should a buildup of leaves and humus exceed 1 in. in depth anywhere in a landscaped area. However, do not expose bare earth in over 50% of the site.
 - d. Remove dead material that drapes over ground cover (including leaves, bark, and branches) annually, before June 15.
 - e. From mature trees, remove all vines, loose papery bark, dead branches, and live branches smaller than 3 in. in diameter to a height of 8 ft above the ground.
 - f. Remove all dead branches from within live ground covers, vines, shrubs (including semi-woody species), and immature and landscape trees.
2. Prune trees and large tree-form shrubs (e.g. oaks, bay) that are being retained to provide clearance of three times the height of the understory plant material, or 8 ft, whichever is higher. Prune limbs that are smaller than 3 in. in diameter up to 8 ft above the ground; in young trees, prune these branches the lower one-third of the height of the tree. (Thus, if a tree is 10 ft tall, prune the lower 3-4 ft and keep the understory plant material to less than 1 ft in height. Then as it grows to 24 ft in height, it can achieve the 8-ft distance from the ground, and the understory plant material can reach 2.5 ft in height.) Do not disturb or thin the tree canopy, because these actions promote growth of more flammable vegetation (see Figure 15). Remove all branches within 10 ft of any chimney, flue, or stovepipe. Maintain 5 ft of vertical clearance between roof surfaces and overhanging portions of trees.
3. Do not locate plants that are replacing ones that die, or oaks planted as a mitigation measure, under trees. To avoid creating "ladder fuel situations" (in which a fire can climb from one vegetation layer to the next higher one), do not plant shrubs (including vines, semi-woody species, and all chaparral species) under trees.
4. Make sure that all landscaping and replacement plants are fire-resistant in nature. Prohibit planting of plants that are highly ignitable and burn with intensity.

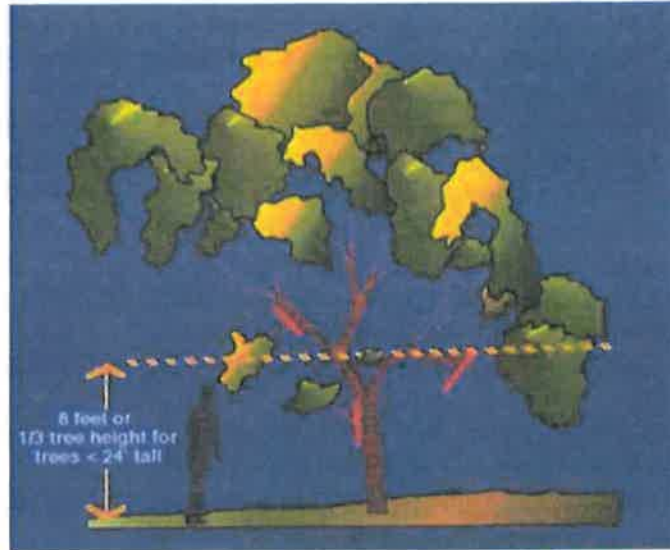


Figure 15 - Prune branches to a height of 8 ft above the ground. In young trees, prune branches on the lower one-third of the height of the tree. Do not disturb or thin the tree canopy. This promotes growth in the understory, which is more easily ignited.

5. Manage individual plants or shrub masses to maintain adequate horizontal spacing. Design distinct groupings of shrubs (including vines, semi-woody species, all types of brush, and all chaparral species) to dampen the spread of fire. Make sure that the plant groupings are small enough to provide adequate horizontal separation between groupings and to allow proper maintenance; groupings should measure no wider than two times the grouping height, or 120 sq ft. (However, one row of shrubs in a linear band with a maximum width of 7 ft, located at least 10 ft from the structure, need not comply with the 120 sq ft area limit.) The space between islands should be greater than three times the height of the shrubs, or 12 ft at a minimum. On emerging trees, clear a spacing of 12 ft from the edge of the canopy (see Figure 16).
6. Hardscaping (patios, walkways, driveways, and bare dirt) and irrigated lawn should comprise at least 25% of the area immediately surrounding the structure (within first 30 feet).
7. Remove and safely dispose of all cut vegetation and hazardous refuse.
8. Allow chipped materials to remain on the site, provided the mulch layer is no greater than 2 in. in depth.



Figure 16. Shrub island spacing. Design groups of plants small enough to provide horizontal separation between groups. This allows proper maintenance and helps slow the spread of fire. Each shrub or group of plants should measure no wider than two times its height, or less than 120 sq. ft. (or 6 ft x 20 ft). The space between groups should be greater than three times the height of the shrubs, or at least a 12 ft. distance

E. STANDARDS FOR ROADSIDE VEGETATION MANAGEMENT

The standards for Defensible Space/Landscaping Zone will apply to the strip of land within 10 ft of the pavement edge from both sides of the roadways. In the Roadside Vegetation Management Zone there will also need to be an unobstructed vertical clearance of 15 ft over along the entire length of the roadway.

F. FIRE PROTECTION STANDARDS FOR CONSTRUCTION OF STRUCTURES AND GARDEN FEATURES

The following construction standards are for structures located on development sites where maximum built-in fire protection measures are necessary due to steep slopes or wildland fuel loading nearby. Because the project is located within the CAL FIRE Very High Fire Hazard Severity Zone, all structures must comply with Chapter 7A of the California Building Code.

In addition, four types of further restrictions are warranted:

1. Fences

Fences will be constructed of either noncombustible material or of timbers with a minimum of one-inch nominal thickness. Typical fencing might include "view fencing", consisting of open wire-mesh with four-inch posts and stringers that have a minimum one-inch nominal thickness.

2. Signage

Signing and building numbering will comply with Contra Costa County regulations for zoning, which require that street, road, and building-address signs will have a minimum letter height of 4 in. and be:

- 1/2 in. thick,

- reflectorized (or lit)
- painted a color contrasting with the background color of the sign, and
- visible within 100 ft traveling from both directions.

3. Accessory Buildings

Jurisdiction Ancillary and detached accessory structures, e.g. gazebos, spas, other outbuildings) will comply with the same requirements as the main structure.

Barbeques. Barbeques must be surrounded by at least 100 sq ft of noncombustible materials and be located 10 ft away from all overhanging structures or trees. Barbeques must not be left unattended when in use. During use, portable barbeques must be located in an area that is surrounded by at least 100 sq ft of noncombustible material. No structures or trees should overhang the use area within a distance of 10 ft. Both the portable barbeque and the stationary barbeque should be located no farther than 15 ft from a water source (including a garden hose) or be equipped with a fire extinguisher. No wood-burning fireplaces or wood-burning pizza ovens are allowed.

Built-in Fireplaces. Built-in fireplaces should be either no farther than 15 ft from a water source or be equipped with a fire extinguisher. No wood may be burned in the fireplaces. All associated chimneys will be fitted with a spark arrestor. Spark arrestors will be approved or listed per CBC or NFPA standards.

4. Smoke/Carbon Dioxide Detectors

The residence will have smoke/carbon dioxide detectors that comply with California Building Code. When required by California Building Code Section 1505.3 roof and attic vents will resist the intrusion of flame and embers into the attic area of the structure, or will be protected by corrosion resistant, non-combustible wire mesh with 1/8th-inch openings or its equivalent

I. SUMMARY OF FIRE HAZARD OF PROJECT WITH MITIGATIONS

Once the suggested fire-mitigation measures have been implemented on the project site, fire behavior in the area within 100 ft of any structure on the lot should exhibit less than 2-ft flame lengths. This is achieved by either mowing of dried grass and/or removing understory plant materials – both live and dead. The potential for crown fires is minimized through these actions coupled with maintaining tree canopies (pruning trees of lower branches and removal of dead material in the tree canopy). Flame lengths of less than 2 ft typically do not threaten structure survival. Also, because available fuels will either be kept mowed or will be compact in nature, any ignited fire(s) should travel only at easily containable speeds.

Areas regulated by the California Department of Fish and Wildlife will not be affected by the mitigation in the WHAP. With the approval of this Wildfire Hazard Assessment and Plan, the J&J Ranch project complies with all fire safety codes and regulations relating to exterior risk mitigation.

Section Three: IMPLEMENTATION MECHANISMS

A. MECHANISMS FOR COMPLIANCE

The individual homeowner will be responsible for maintaining the entire lot per this report with enforcement authority provided to the Moraga Orinda Fire Department. The J & J Ranch Homeowners Association will retain as an independent contractor a professional with wildland fire management expertise who will certify on an annual basis to the MOFD that the common areas have been maintained as detailed in this report. HOA-maintained areas are shown in Figure 17. This professional will submit a certificate of compliance by June 15. The intent of using a third-party inspection service is to alleviate the burden to the MOFD of site inspection. Compliance with vegetation management requirements will need to be done yearly in advance of inspection.

B. SCHEDULE OF ACTIONS

Construction offers ignition potential due to associated activities such as hot work or increased vehicular traffic. Thus, fuel management and other fire prevention measures are required during construction.

Initial fuel-management actions will be completed before construction begins. These actions include tree pruning, brush removal, and grass cutting (if construction takes place between June 15 and Nov. 1).

- Hydrants will be in place and functional before framing begins.
- A construction fire-prevention plan must be approved by the MOFD Fire Marshal before building permits are issued. This plan will include precautions to carry out during high fire danger, a list of tools to have on hand, a description of available communications, specifications for the supply of water to have on hand, and descriptions of other actions that will reduce the risk of ignition and immediate control of an incipient fire.
- MOFD will inspect roadways, including emergency vehicle access and fire roads, hydrants, and fuel management before framing begins.
- All required clearing and grass cutting will be completed before June 15th of each year. Mowing must begin as soon as 30% of the grass has cured.
- Grass cuttings and clippings will be removed the day they are cut. No clippings are permitted to remain in piles or scattered, unless so approved by the MOFD Fire Marshal.

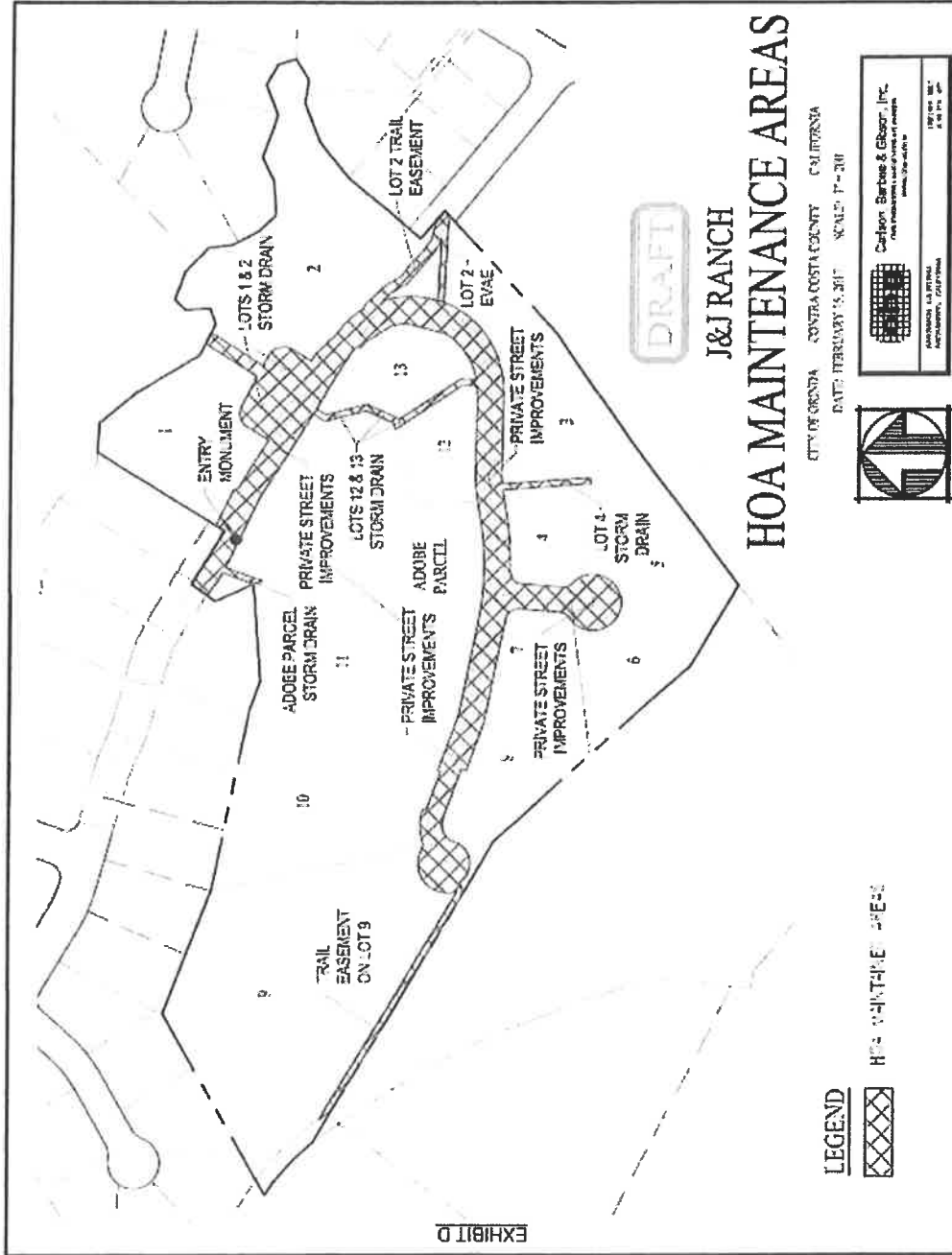


Figure 17. HOA Maintenance Areas

- All brush piles and tree clippings are to be removed within one week of cutting. No brush or clippings are permitted to remain in piles, unless so approved by the MOFD Fire Marshal.
- Annual fuel management measures include:
 - removal of all combustible vegetation along roadways, driveways, access roads, and trails according to stated standards
 - maintenance of the emergency-access easement
 - maintenance of the defensible space around structures according to stated standards for Zones 0, I and II.

C. FREQUENCY OF FUTURE MAINTENANCE

Annual management

- Mow or graze grass near structure(s) and under trees and shrubs within the zones
- Mand crew cut shrubs and weeds in grasslands within the zones
- Monitor site for weed and shrub encroachment within the zones
- Inspect trees for deadwood, vertical clearances within the zones
- Re-establish vertical clearance in Defensible Space/Landscape Zone
- Remove weeds, all dead material in Defensible Space/ Landscape Zone

Management that will occur every 3 years

- Thin shrubs into groupings
- Remove new understory shrubs
- Prune trees of lower branches to re-establish vertical clearance

**APPENDIX A
SPECIES LIST FOR PROHIBITED LANDSCAPING PLANTS**

Due to their combustible nature, these plants shall be prohibited from the project area. These plants will not be allowed as replacement plants; where feasible, existing plants should be removed during the next five years.

<u>Botanical Name</u>	<u>Common name</u>
<i>Abies spp.</i>	fir
<i>Acacia spp.</i>	acacia
<i>Adenostoma fasciculatum</i>	chamise
<i>Adenostoma sparsifolium</i>	red shanks
<i>Artemisia californica</i>	California sage
<i>Baccharis spp.</i>	coyote brush
<i>Bamboo spp.</i>	bamboo
<i>Cedrus spp.</i>	cedar
<i>Chamaecyparis spp.</i> (except dwarf)	false cypress
<i>Cortaderia selloana</i>	pampas grass
<i>Cryptomeria japonica</i> (except dwarf)	Japanese cedar
<i>Cupressus spp.</i>	cypress
<i>Cupressocyparis</i>	Leyland cypress
<i>Cystisus/Gentista/Spartum</i>	brooms
<i>Dodonaea viscosa</i>	hopseed bush
<i>Erigeron spp.</i>	Buckwheat
<i>Eucalyptus spp.</i>	eucalyptus
<i>Hedera canariensis</i>	Algerian ivy
<i>Juniperus spp.</i>	Juniper
<i>Larch spp.</i>	larch
<i>Metasequoia</i>	dawn redwood
<i>Miscanthus spp.</i>	silvergrass
<i>Muhlenbergia spp.</i>	deer grasses
<i>Palms (Arecales spp.)</i>	palms
<i>Pennisetum setaceum</i>	fountain grass
<i>Picea spp.</i>	spruce
<i>Pinus spp.</i> (except dwarf Mugo)	pinus
<i>Salvia mellifera</i>	black sage
<i>Schinus spp.</i>	California pepper tree
<i>Tamarix spp.</i>	tamarisk or salt cedar
<i>Taxodium spp.</i>	bald cypress
<i>Taxus spp.</i> (except dwarf)	yew
<i>Thuja spp.</i>	White cedar, redcedar, and thuja
<i>Tsuga spp.</i>	hemlock

In addition, plants should not be established which could invade the neighboring park and open spaces. Refer to the Vegetation Management Almanac for the East Bay Hills (published by the Hills Emergency Forum, and available from the Tilden Nature Center)

for a list of species which should not be planted because of their invasive nature. The list includes:

Blackwood acacia
mayten
Pampas grass
cotoneaster
Italian hawthorn
vinca major

ivy
holly
Genista, broom
pyracantha
blackberry

APPENDIX B

SELECTION OF FIRE RESISTANT LANDSCAPING

Factors that must be considered in rating the fire performance of plants include:

- ❖ **Total volume.** The greater the volume of plant material (potential fuel) present, the greater the fire hazard.
- ❖ **Moisture content.** The moisture content of plants is an important consideration; high levels of plant moisture can both lower fire risk and act as a heat sink if a fire occurs, reducing its intensity and spread.
- ❖ **Amount and distribution of dead material.** The amount of dead material in a given plant influences the total amount of water in the overall plant; the dead material is usually much drier than living tissue. Whereas dead material rarely has a moisture content higher than 25%, live foliage moisture content ranges from 60 to 80% for chaparral species in xeric conditions to a high of 200 to 400% for succulent plants or plants under irrigation.
- ❖ **Size of leaves, twigs, and branches.** Materials with large surface areas (such as needles, twigs, or large flat leaves) dry more rapidly under fire conditions than materials with lower surface ratios (such as branches and fleshy leaves).
- ❖ **Geometry and arrangement of the plant (overall spatial distribution of the biomass).** The shape of a plant and the way the biomass is distributed throughout the plant is important because this bulk density affects the air flow and heat transfer through the plant. The arrangement of material within the plant affects its fuel continuity and tendency to undergo preheating and promote fire spread.
- ❖ **Plant maintenance.** The significance of proper plant and landscape maintenance cannot be overemphasized. *Poorly maintained landscapes can easily become fire hazards, even if many of the plants are favorably recommended for fire performance.*

All of the above-mentioned plant characteristics are related to maintenance. Plants with higher moisture content generally have a lower fire risk. For example, the moisture content of a plant is influenced by regular and proper irrigation, and large amounts of dead material lower the plant's overall moisture content. To increase the plant's overall moisture content, it is important to remove and properly dispose of dead material. In addition, regular maintenance should include thinning or pruning to reduce fuel volume and improve plant geometry.

The positioning of plants relative to each other and to structures is also very important. Design landscapes to discourage the creation of "fuel ladders"—a continuous fuel path by which a fire can climb from the ground to a shrub, to a tree, and ultimately to the structure. Continuous removal of any potential fuel ladders needs to be part of routine landscape maintenance.

A landscape environment that is inconsistently or improperly maintained does not function as defensible space, and it contributes to the fire hazard. Consult a nursery or landscape professional for their recommendations on plant spacing, pruning, aeration, fertilization, irrigation, and other cultivation practices.

APPENDIX C Key Terminology

bio-retention - the process of removing contaminants and sedimentation from stormwater runoff in a treatment area consisting of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants

clearance – treatments that provide separation of vegetation, such as between the ground and tree canopy, or from power lines to tree branches

crown fire – when a fire burns the canopy of the tree and advances from tree to tree via canopy

curing (i.e. of grass)

defensible space – the area within the perimeter of a parcel, neighborhood or community that provides a key point of defense from an approaching wildfire or defense against encroaching wildfires or escaping structure fires

drainage - the location where water is removed and flows from the ground's surface, such as in a creek, and the area of its creek banks

easement - a right to cross or otherwise use someone else's land for a specified purpose

fire hazard – factors that make a fire more difficult to extinguish

fire intensity – the amount of heat released by a fire in an area in any given time period. Fire intensity is usually related to the flame lengths of a fire.

flame length – the length of a flame as measured from the base to the tip, regardless of the tilt, or angle of the flame

fuel break – an area in which flammable materials have been cleared away or thinned out to minimize fire spread to structures and/or natural resources

fuel – anything that will burn easily, such as vegetation or small woody material

hardscaping - man-made features used in landscape architecture, e.g. paths or walls, as contrasted with vegetation

humus - organic component of soil, formed by the decomposition of leaves and other plant material by soil microorganisms

ignition potential – the combined factors that provide energy to cause *ignition*. These include high temperature, relative humidity and wind speed

ladder fuel - live or dead vegetation that allows a fire to climb up from the landscape or forest floor into the tree canopy

litter - dead plant material (such as leaves, bark, needles, twigs) that have fallen to the ground.

non-combustible zone – the area immediately adjacent to structures that is void of material that embers could ignite

open space - land that is undeveloped (has no buildings or other built structures) and is accessible to the public. Open space can include: Green space (land that is partly or completely covered with grass, trees, shrubs, or other vegetation).

rate of spread - the forward rate of spread at the head of a surface fire.

topography – geographic elements on an area, such as slope steepness, aspect, existence of hills, canyons and rough terrain

torching – when a fire consumes the canopy of a tree but does not spread to adjacent tree canopies

total fuel load - the total amount of combustible material in a defined space. Fuel load is quantified in heat units or in its equivalent weight in wood

wildland – areas which are not developed or farmed

CEQA Guidelines Appendix G Environmental Checklist

Excerpts from CEQA Statute and Guidelines

Title 14. California Code of Regulations

Chapter 3: Guidelines for Implementation of the California Environmental Quality Act

15002. GENERAL CONCEPTS

(k) Three Step Process. An agency will normally take up to three separate steps in deciding which document to prepare for a project subject to CEQA.

(1) In the first step the Lead Agency examines the project to determine whether the project is subject to CEQA at all. If the project is exempt, the process does not need to proceed any farther. The agency may prepare a Notice of Exemption. (See: Sections 15061 and 15062.)

(2) If the project is not exempt, the Lead Agency takes the second step and conducts an Initial Study (Section 15063) to determine whether the project may have a significant effect on the environment. If the Initial Study shows that there is no substantial evidence that the project may have a significant effect, the Lead Agency prepares a Negative Declaration. (See: Sections 15070 et seq.)

(3) If the Initial Study shows that the project may have a significant effect, the Lead Agency takes the third step and prepares an EIR. (See: Sections 15080 et seq.)

15063. INITIAL STUDY

(a) Following preliminary review, the Lead Agency shall conduct an Initial Study to determine if the project may have a significant effect on the environment. If the Lead Agency can determine that an EIR will clearly be required for the project, an Initial Study is not required but may still be desirable.

(1) All phases of project planning, implementation, and operation must be considered in the Initial Study of the project.

(2) To meet the requirements of this section, the lead agency may use an environmental assessment or a similar analysis prepared pursuant to the National Environmental Policy Act.

(3) An initial study may rely upon expert opinion supported by facts, technical studies or other substantial evidence to document its findings. However, an initial study is neither intended nor required to include the level of detail included in an EIR.

(b) Results.

(1) If the agency determines that there is substantial evidence that any aspect of the project, either individually or cumulatively, may cause a significant effect on the environment, regardless of whether the overall effect of the project is adverse or beneficial, the Lead Agency shall do one of the following:

(A) Prepare an EIR, or

(B) Use a previously prepared EIR which the Lead Agency determines would adequately analyze the project at hand, or

(C) Determine, pursuant to a program EIR, tiering, or another appropriate process, which of a project's effects were adequately examined by an earlier EIR or negative declaration. Another appropriate process may include, for example, a master EIR, a master environmental assessment, approval of housing and neighborhood commercial facilities in urban areas, approval of residential projects pursuant to a specific plans described in section 15182, approval of residential projects consistent with a community plan, general plan or zoning as described in section 15183, or an environmental document prepared under a State certified regulatory program. The lead agency shall then ascertain which effects, if any, should be analyzed in a later EIR or negative declaration.

(2) The Lead Agency shall prepare a Negative Declaration if there is no substantial evidence that the project or any of its aspects may cause a significant effect on the environment.

(c) Purposes. The purposes of an Initial Study are to:

(1) Provide the Lead Agency with information to use as the basis for deciding whether to prepare an EIR or a Negative Declaration.

(2) Enable an applicant or Lead Agency to modify a project, mitigating adverse impacts before an EIR is prepared, thereby enabling the project to qualify for a Negative Declaration.

(3) Assist in the preparation of an EIR, if one is required, by:

(A) Focusing the EIR on the effects determined to be significant,

(B) Identifying the effects determined not to be significant,

(C) Explaining the reasons for determining that potentially significant effects would not be significant, and

(D) Identifying whether a program EIR, tiering, or another appropriate process can be used for analysis of the project's environmental effects.

(4) Facilitate environmental assessment early in the design of a project;

**WILDFIRE HAZARD ASSESSMENT & PLAN
J&J Ranch, Subdivision 9271, Orinda, CA**

EXECUTIVE SUMMARY

This wildfire hazard assessment and plan for the J&J Ranch property is intended to meet the requirements established by the Moraga-Orinda Fire District Ordinance #16-02, which calls for a wildfire hazard assessment plan to be submitted for Fire District review. The wildfire hazard assessment includes a detailed description of existing conditions and proposed fuel modifications that will, in part, direct maintenance of landscaping and any open space areas.

The assessment shall address the following items related to wildfire hazards:

- Provision of access for fire apparatus,
- Provision of water supply for fire protection, and
- Provisions to control the spread of fire.

In order to control the spread of and damage from wildfire, the following plan describes actions needed to maintain fuels in a fire-safe condition. To make vegetation management easier to implement, it is based upon (1) delineating vegetation fuel management zones, (2) establishing appropriate treatments for each, plus (3) documenting maintenance requirements and mechanisms for enforcement. Information on fire-resistant and drought-tolerant landscaping is provided so that homeowners can protect their properties against wildland fire.

The proposed project poses moderate hazard. The environmental impact report associated with this project found the project to be located in a Very High Fire Hazard Severity Zone but would incorporate Project elements to minimize the risk". The project site is at the interface between residential neighborhoods and wildlands (with the exception of a fairway of a golf course) that extend west to the dispersed community of Canyon, Redwood Regional Park and the City of Oakland. Apart from the historic Moraga Adobe, the site itself a mixture of grass, coast live oaks, and patches of north coastal scrub.

The proposed project creates thirteen single family residential lots on 18.69 buildable acres, with an average lot size of 1.44-acre, as well as a separate approximately 2.26-acre parcel containing the Moraga Adobe. Proposed fuel modifications emphasize actions to decrease fire intensity that facilitate fire suppression and minimize property loss. Development and maintenance of a defensible space zone for the entirety of all lots (excepting areas of open space easements), and 10 feet from roadside edge will help reduce fire risk. Fire behavior under current environmental conditions and with mitigation measures in place will be generally less than two-foot flame length within 100 feet of a structure, with landscaping characterized by low ignition potential and rates of spread being two feet per minute or less.

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