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**Wildland Fire Behavior Calculations for the off-site hazardous vegetative fuels.**

Wildland fire behavior calculations have been projected for the hazardous vegetative fuels on the undeveloped sites adjacent to and bordering the Rancho Mission Viejo proposed development. These projections were based on the following “Worst Case” (extreme) Orange County area fire weather condition assumptions:

South, Southwest and West Wind Condition Fuel Moisture Assumptions:  
**a typical Prevailing (normal summer) Afternoon Wind Pattern.**

- \* 1-Hour Fine Fuel Moisture of.....4%
- \* 10-Hour Fuel Moisture of.....6%
- \* 100-Hour Fuel Moisture of .....8%
- \* Live Woody Fuel Moisture of.....60%

South, Southwest and West Wind Condition Fuel Moisture Assumptions:  
Late fire season above-average southwest wind pattern. **A rare even**  
**Under the following fuel moisture conditions which sometimes occur**  
**with the breakdown of an intense Santa Ana condition.**

- \* 1-Hour Fine Fuel Moisture of .....2%
- \* 10-Hour Fuel Moisture of.....3%
- \* 100-Hour Fuel Moisture of .....5%
- \* Live Woody Fuel Moisture of.....50%

North, Northeast and East Wind Condition Fuel Moisture Assumptions:  
(Santa ana Wind Conditions). **An annual event often occurring two or three**  
**times a year.**

- \* 1-Hour Fine Fuel Moisture of .....2%
- \* 10-Hour Fuel Moisture of.....3%
- \* 100-Hour Fuel Moisture of .....5%
- \* Live Woody Fuel Moisture of.....50%

Tables 6.3.1 through 6.3.3 display the expected Rate of Fire Spread (expressed in feet per minute), Fireline Intensity (expressed in British Thermal Units per foot per second) and Flame Length (expressed in feet) for three separate BEHAVE–Fire Behavior Prediction and Fuel Modeling System Computer Calculations. We used a Fuel Model (FM) 2 for these calculations.

Fuel Models 1, 2, 4, and 6 apply directly to the native vegetation that occupies southern California landscapes. FM-1 is one foot tall grass. FM-2 is one foot tall grass and scattered sage brush. FM-4 is chaparral vegetation over 6-feet in height. FM-6 is chaparral vegetation less than 6-feet in height. We chose FM-4 to represent the Rancho Mission Viejo site in its most volatile worst case condition.

As the dedicated open space is restored back to a healthy coastal sage scrub plant community the maximum projected flame lengths will actually diminish (see the following tables 6.3.5 - 6.3.6 displaying rates of spread under “Santa Ana wind conditions for FM-1 and FM-6).

<b>Table 6.3.1</b>	
<b>Expected fire behavior for a prevailing summer season Southwest Wind Pattern for a Fuel Model 2 - Scattered Sage Brush with Tall Grass</b>	
Rate of Spread	75.9 feet/minute
Fireline Intensity	656 BTU's/foot/second
Flame Length	<b>8.9</b> feet in length
<b>Additional Fire Behavior Calculation Input:</b>	
<ul style="list-style-type: none"> <li>• 30 percent slope</li> <li>• 15 mph 20-foot wind speed (6.0 mph mid-flame wind speed)</li> <li>• 30° direction of wind vector to uphill slope</li> </ul>	
<i>This equates to 1.4 acres in 6 minutes, 5.4 acres in 12 minutes, and 12.0 acres in 18 minutes, assuming no initial attack.</i>	

<b>Table 6.3.2</b>	
<b>Expected fire behavior for an above average Southwest afternoon wind for a Fuel Model 2 – Scattered Sage Brush with Tall grass</b>	
Rate of Spread	312.4 feet/minute
Fireline Intensity	3173 BTU's/foot/second
Flame Length	<b>18.4</b> feet in length
<b>Additional Fire Behavior Calculation Input:</b>	
<ul style="list-style-type: none"> <li>• 30 percent slope</li> <li>• 30 mph 20-foot wind speed (12.0 mph mid-flame wind speed)</li> <li>• 30° direction of wind vector to uphill slope</li> </ul>	
<i>This equates to 16 acres in 6 minutes, 65 acres in 12 minutes and 146 acres in 18 minutes, assuming no initial attack.</i>	

<b>Table 6.3.3</b> <b>Expected fire behavior for a late season Santa Ana wind condition for a Fuel Model 2 – Scattered Sage Brush with Tall Grass</b>	
Rate of Spread	1,065 feet/minute
Fireline Intensity	10,808 BTU's/foot/second
Flame Length	<b>32.3</b> feet in length
<b>Additional Fire Behavior Calculation Input:</b> <ul style="list-style-type: none"> <li>• 30 percent slope</li> <li>• 60 mph 20-foot wind speed (24.0 mph mid-flame wind speed)</li> <li>• 210° direction of wind vector to uphill slope</li> </ul>	
<i>This equates to 107 acres in 6 minutes, 427 acres in 12 minutes and 960 acres in 18 minutes, assuming no initial attack.</i>	

<b>Table 6.3.4</b> <b>Expected Fire Behavior for an above average Southwest wind condition for a Fuel Model 1 – Native Grass Stubble 4-inches in height</b>	
Rate of Spread	732.6 feet/minute
Fireline Intensity	1415 BTU's/foot/second
Flame Length	<b>12.7</b> feet in length
<b>Additional Fire Behavior Calculation Input:</b> <ul style="list-style-type: none"> <li>• 30 percent slope</li> <li>• 30 mph 20-foot wind speed (12.0 mph mid-flame wind speed)</li> <li>• 30° direction of wind vector to uphill slope</li> </ul>	
<p><b>COMMENTS:</b> The above fire behavior projections are based on grass fuels one-foot tall. Therefore, Rates of Spread, Fireline Intensity and Flame Lengths should be reduced one-third for 4-inch stubble grass fuels, i.e. Rate of Spread = 224 feet/minute                      Fireline Intensity = 471 BTU's/ft/sec                      Flame Length = 4.21 feet in length</p>	

<b>Table 6.3.5</b> <b>Expected fire behavior for a late season Santa Ana Wind Condition For a Fuel Model 1 – one-foot tall cured grass</b>	
Rate of Spread	732.6 feet/minute
Fireline Intensity	1415 BTU's/foot/second
Flame Length	<b>12.7</b> feet in length
<b>Additional Fire Behavior Calculation Input:</b> <ul style="list-style-type: none"> <li>• 30 percent slope</li> <li>• 60 mph 20-foot wind speed (24.0 mph mid-flame wind speed)</li> <li>• 210° direction of wind vector to uphill slope</li> </ul>	

<b>Table 6.3.6</b> <b>Expected fire behavior for a late season Santa Ana Wind Condition</b> <b>for a Fuel Model 6 – Chaparral Brush less than 6-feet in height</b>	
Rate of Spread	438 feet/minute
Fireline Intensity	4493 BTU's/foot/second
Flame Length	<b>21.5</b> feet in length
<b>Additional Fire Behavior Calculation Input:</b> <ul style="list-style-type: none"> <li>• 30 percent slope</li> <li>• 60 mph 20-foot wind speed (24.0 mph mid-flame wind speed)</li> <li>• 210° direction of wind vector to uphill slope</li> </ul>	

<b>Table 6.3.7</b> <b>Expected fire behavior for a late season Santa Ana Wind Condition</b> <b>for a Fuel Model 4 – Chaparral Brush greater than 6-feet in height</b>	
Rate of Spread	2591.6 feet/minute
Fireline Intensity	149,053 BTU's/foot/second
Flame Length	<b>107.9</b> feet in length
<b>Additional Fire Behavior Calculation Input:</b> <ul style="list-style-type: none"> <li>• 30 percent slope</li> <li>• 60 mph 20-foot wind speed (36.0 mph mid-flame wind speed)</li> <li>• 210° direction of wind vector to uphill slope</li> </ul>	