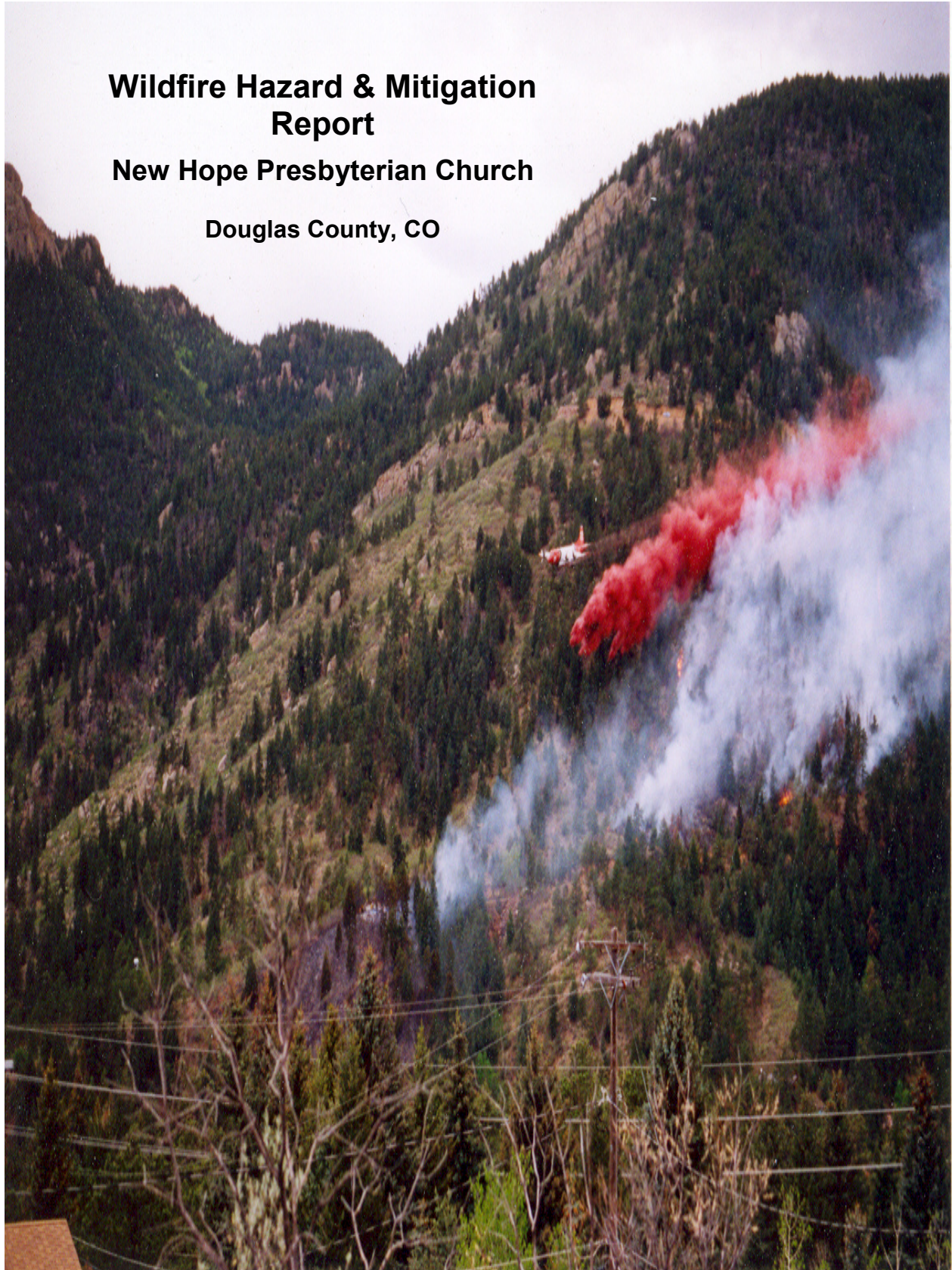


Wildfire Hazard & Mitigation Report

New Hope Presbyterian Church

Douglas County, CO



Wildfire Hazard Evaluation Report

For the

New Hope Church

Douglas County, CO

Prepared for:

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Warning and Disclaimer: The degree of protection from wildfire hazards intended to be provided by this plan is considered reasonable for planning purposes. It is based on accepted forestry and fire science methodology. This plan is intended to aid the New Hope subdivision in minimizing the dangers and impacts from wildfire hazards. Fire is a natural force and a historical part of the native grassland ecosystems. Therefore, unforeseen or unknown wildfire conditions, natural or man-made changes in conditions such as climate, vegetation, fire breaks, fuel materials, fire suppression or protection devices, and ignition sources may contribute to future damages to structures and land uses even though properly permitted within designated wildfire hazard areas.

August 14, 2025

General Description

The New Hope Presbyterian Church subdivision is a private development planned within incorporated Castle Rock, Douglas County, Colorado. The development plan proposes the subdivision of approximately 6.763 acres, into two lots of 5.224 acres for the church and associated parking and 1.519 acres for a medical office building.

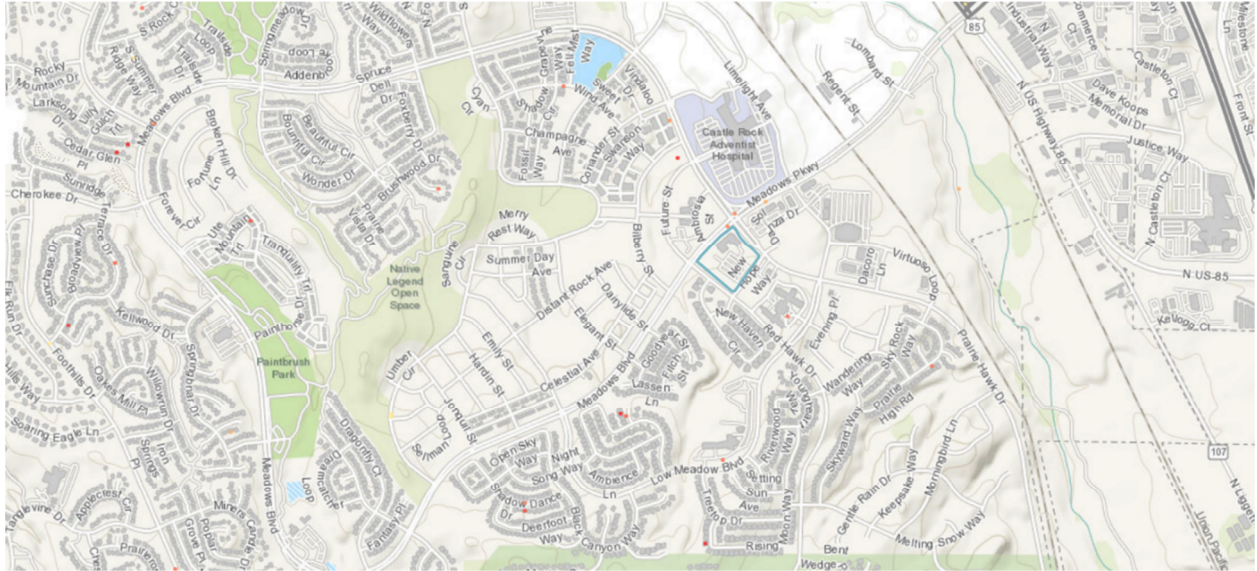
The property is located on the south side of Meadows Parkway, between Prairie Hawk Drive and Red Hawk Drive. The physical address is listed as 3737 New Hope Way. The parcel is identified with the Douglas County Assessor's Parcel Number as 2351-342-01-004.



The subject property is surrounded by residential & commercial subdivisions and individual vacant parcels. The vacant parcels can exhibit a wildfire risk from unmaintained grasses and weeds.

Map 2 identifies locations of fire ignitions from 2009 through 2020. There are only a small number of recorded fire ignitions in the vicinity of the subject property. The location of these ignitions is in residential areas, not in any wildlands. It can be assumed these ignitions are limited to the interior of structures found at these locations and appear to be minor in nature.

Map 2. Non-Federal Fire Ignitions



In total, there were 68 responses to fire by the entire department in 2023 (may have to zoom in to see clearer).

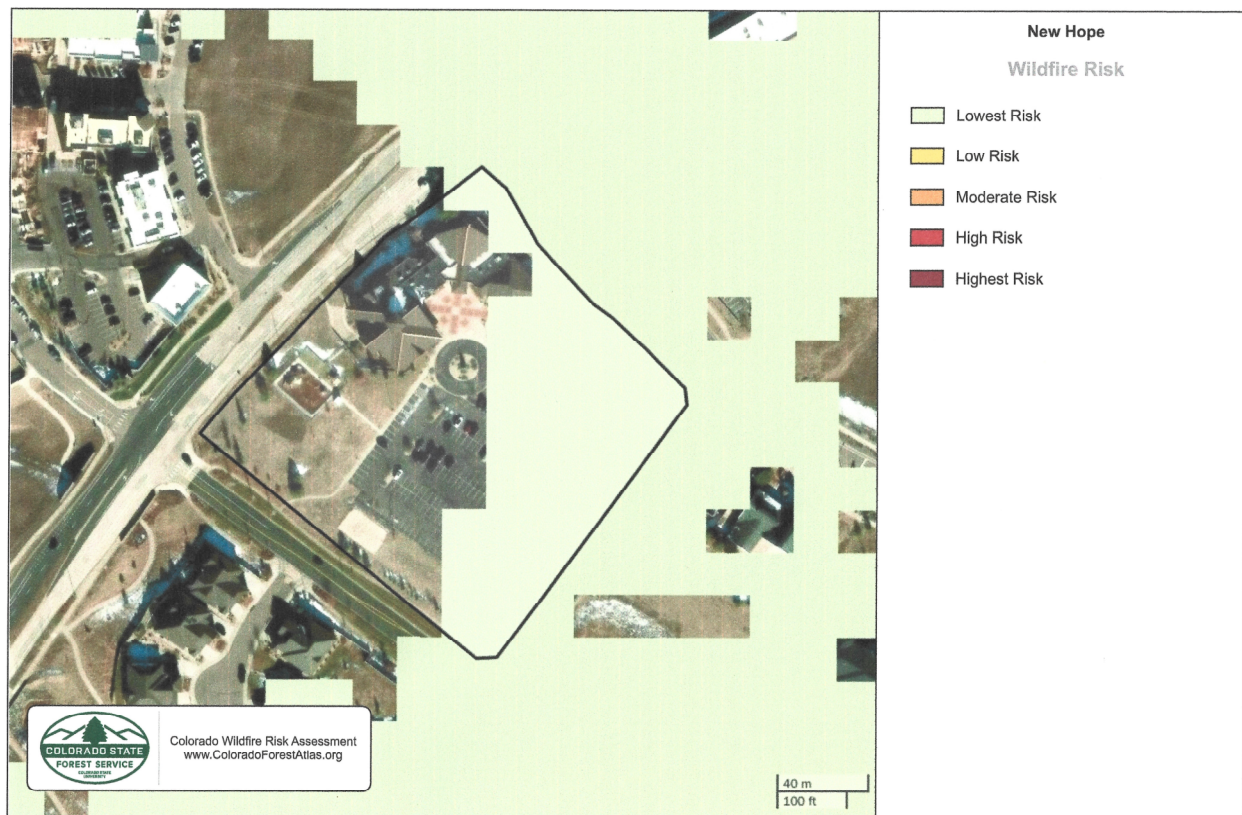
Wildfire Hazard

The Colorado State Forest Service developed a wildfire risk assessment tool in 2012 referred to as the Colorado Wildfire Risk Assessment Web Portal (CO-WRAP). This assessment was recently updated to include wildfire events and acres mitigated up to 2020. A copy is attached to this report.

The assessment report indicates that the property's wildfire risk is the lowest. Wildfire risk is a composite rating which identifies the probability of loss or harm from a wildfire. Risk identifies the greatest impacts from a wildfire to a range of assets, such as the level of Wildland Urban Interface. Wildfire Risk is determined uniformly across the entire state (see Map 3).

The Burn Probability is the annual probability of any location becoming subjected to a wildfire event. The assessment gives the proposed subdivision the lowest ranking in this regard. This is not unexpected as there has been a low number of reported ignitions in the immediate vicinity.

Map 3. Wildfire Risk – COWRAP Assessment



The CO-WRAP assessment uses a detailed and distinct series of fuel models. This is a more dynamic approach, but it does not delineate between smaller fuel beds but considers them uniform across large areas. So even though there may be clusters of shrubs or grasses present, such as nearby undeveloped lots, a refined fuel model may be more appropriate in incorporating these variations.

A field inspection was performed on August 7, 2025, to determine if any change should be made to the CO-WRAP assessment.



Photo 1. A view of the property from the northeast west property corner looking to the south.

Photo 1 depicts an asphalt parking lot and closely mowed grass covered surface. Within the grass surface is small areas of bare mineral soil. The trees that are present are for aesthetic landscape purposes and do not pose a threat from wildfire.



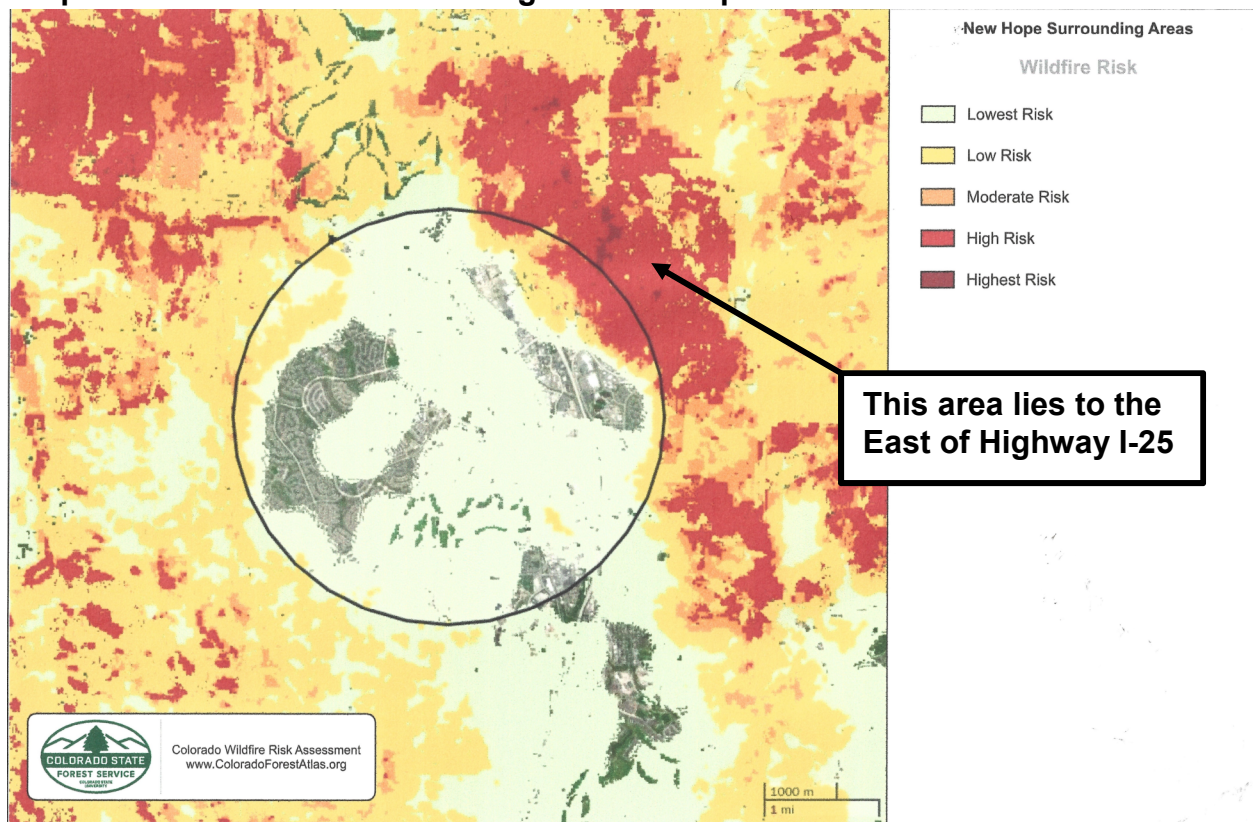
Photo 2. This depiction is along Prairie Hawk Drive looking towards the north.

Photo 2 again shows a closely cut grass area with a line of ponderosa pine providing a visual screen to the parking lot and the east side of the church.

Based upon the assessment results and the field inspection, **the wildfire risk is confirmed as the lowest.**

Map 4 is intended to show context to the wildfire risk to assets. An overview of the area surrounding the property for a two-mile radius. The closest location posing a risk is in the northeast quadrant of the circle. This location is east of I-25 and consists of steep slopes leading up to residential subdivisions.

Map 4 – Wildfire Risk Surrounding the New Hope Subdivision



Wildfire Behavior

This rating considers the role of the three major components that affect wildfire behavior: fuels, topography and weather. These three components will be examined in relation to the New Hope subdivision plan.

Fuels

The area was field checked, and the results of the COWRAP Assessment were confirmed based upon the observed fuel models on the property. The assessment lists three fuel models developed by Techno Sylva to closer describe wildland conditions in urban areas.

The largest descriptor is minor roads surrounded by low load fuels (RNL– 941). This describes the roads surrounding the New Hope property on the south, east and west borders. The second is roads surrounded by non-burnable fuels (RNB -949). This reflects the impact of Meadows Parkway along the north border of the property.

The third fuel model is UNB (919), unburnable urban areas. The asphalt covered parking area and sidewalks are represented in this fuel model. This is approximately 19.7 percent of the total area or 1.33 acres. With the addition of the parking area for the medical office building, this increases to 22.1 percent or 1.49 acres approximately.

There is grass cover present outside of the roads and asphalt areas. The USDA – Forest Service Intermountain Forest and Range Experiment Station in Ogden, Utah, developed fuel model descriptions to represent these areas. In this instance, the fuel model most appropriate to describe the area is Fuel Model 1 (see Appendix A).

The criteria for choosing a fuel model reflects that wildfire will burn in that fuel type which best supports that fire. This translates to which fuel type will carry wildfire to other locations. There may be more than one fuel model represented on any given area of land. In addition, current and expected weather conditions will influence the condition of these fuels.

Fuel Model 1 can be further refined to GR1 (101), Short, Sparse Dry Climate Grass (see Appendix A). This fuel model was developed by Scott & Brogan in 2005. The primary carrier of a fire is sparse grass. The grass is generally short throughout either naturally or from grazing. In this instance it is from mowing.

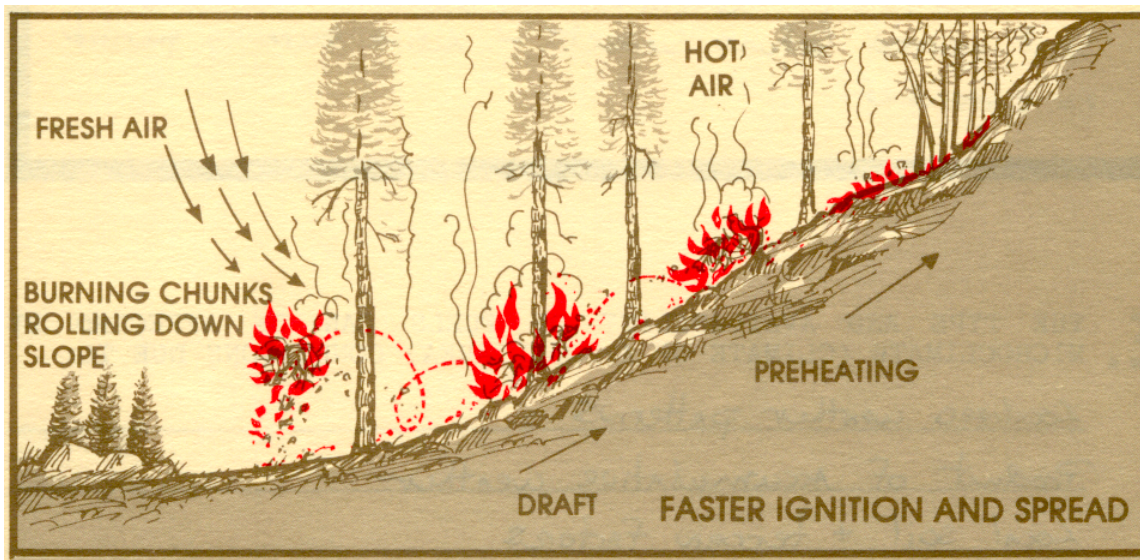
Any fire that ignites in this fuel model will be limited to burning across the ground for the most part. It cannot be ruled out that there may be some torching of individual trees within the aesthetic landscape.

Topography

The topography of the site is one of the main factors that will influence the spread of fire. The aspect or compass direction that any slope faces influence the fuel type that exists and the amount of preheating these fuels receive by the sun. Aspect can also influence the effects of diurnal winds, as they move upslope during the daylight hours and down slope during the evening and early morning hours.

As the percentage of slope increases, the rate of fire spread by convection increases. In other words, wildfire burns faster moving uphill (see Figure 1).

Figure 1. Slope Affects Fire Spread



The specific topography of the property has a slope that was measured from the northeast corner to the southwest corner. This results in a 4.3% slope. However, any ground fire spread will be interrupted by the buildings and the asphalt parking area. Therefore, the spread of wildfire should not be influenced by the topography of the property.

Weather

Weather is the most variable of all the factors. The accumulative effects of weather over time can influence vegetation curing and fuel moisture content.

Grass, for example, is described as one-hour time lag fuel. Time lag is a measure of the rate at which a given dead fuel gains or loses moisture. Hence the grass tends to be influenced by the weather conditions on an hourly basis. Wood fuels that are three

inches in diameter or larger are considered 1,000-hour time lag fuels. This type of fuel requires a long period of dry or wet weather to affect its combustibility.

Winds can influence the direction and rate of spread of wildfire. Of greater concern is the short spotting of the fire by embers transported by winds ahead of the main fire.

The effect of wind on a fire was on display most dramatically in the winter of December of 2021 during the Marshall Fire in Boulder County. This fire grew to over 6,200 acres and destroyed 1,084 homes. The wind gusts up to 115 miles per hour were reported. The wildfire reached the town of Superior, three miles away, in just one hour.

The Fire Intensity Scale from the assessment suggests a moderate intensity with flame lengths up to eight feet with short range spotting possible. The main takeaway is that wildfire will be difficult to control. The assessment may be over predicted due to exclusion of forest management activity completed after the latest revision. It is suggested here that the intensity may be closer to a low or even lowest scale based on the current condition. This means that local suppression forces should be able to contain wildfire using available resources.

Finally, it should not be assumed that the main periods of fire danger would be in the summer months. As history has shown, out of season fire events are much more common than might be expected by the public.

While the weather may contribute greatly to a wildfire event, it is immune to outside influences.

Predicted Fire Behavior

Using the USDA – Forest Service BehavePlus fuel modeling system 7.0.1, released 05/02/25) the following predictions can be made based upon an 80-degree temperature day with a relative humidity of 18% with little cloud cover at 1:00 p.m. in the month of July.

Using the inputs of the 1-hour dead moisture being 7%, the 10-hour and 100-hour dead fuels are both set at 10%; live herbaceous (grasses) and live woody stems are set at 150%. This would be an expectation of mid-summer growth. It could be a windy day, or the site is experiencing strong downdrafts from thunderstorms in the area, so the windspeed is set at 20 mph. Slopes steepness is set at 1% based on continuity from the buildings and parking areas.

Based on these inputs, wildfire could spread at a rate of 132 feet per hour up to 264 feet per hour with a flame length of four-tenths of a foot or 4-6 inches.

If the inputs are changes to reflect a growing season plagued by long term drought, the outcome is decidedly different. The 1-hour dead fuel moisture is lowered to 3%. The 10-hour and 100-hour dead fuels have dried to 5%. The live fuel moisture is 50%, reflecting with early dry growing season conditions. The live woody fuel moisture is composed of leaves and fine stems that have matured and set at 100%, which would normally be a late growing season condition.

The wind speed of 20 mph and a slope of 1% remain the same as in the previous example. Even with the drier conditions, the rate of spread and flame length remain the same.

The probability of fuels igniting in advance of the fire front is 86%. In the fifteen minutes that it may take for the fire to be noticed, reported to the fire department's dispatch office and for the arrival of the initial attack force, the fire may have traveled over 33 feet. The modeling scenario appears to confirm a low risk of damage or loss to wildfire.

It is predicted that local suppression forces should be able to contain the initial fire outbreak with mobile engines and hand constructed control lines.

Wildfire Mitigation

It should be noted here that the occurrence of a wildland fire on this property and any subsequent spread of wildfire to or from adjacent land can never be eliminated. In the Spaatz Fire, west of Monument, Colorado, suppression forces were able to arrive on scene in approximately four minutes after the fire was reported. Even with this rapid response, the wildfire reached a size of 67 acres before it was controlled.

The potential for loss can be reduced and the odds can be improved that initial response forces can be successful in keeping wildfire to the smallest size possible and structure loss to a minimum. But even with the best efforts of suppression forces, there will always exist a level of risk of loss to wildfire.

The only way to reduce the risk of loss from wildfire is to modify the factors that influence fire behavior. Of the three factors discussed previously, the only factor that could be modified prior to a wildland fire is the fuels. The efforts in modifying fuels can be targeted to their arrangement, continuity and availability.

• Arrangement

The arrangement of fuel considers the size, shape and compactness of the fuel itself. Smaller fuel sizes have greater surface area exposure for preheating. If these smaller sized fuels are only lightly compacted in spacing this results in easier ignition and increased combustion.

Fuels that are tightly compacted and larger in size have lower surface areas. This makes ignition and combustion less likely. This is currently the case for the grass fuel within the property.

• Continuity

The second factor affecting fuels that can be modified is their continuity. Is the fuel continuous or patchy in nature? Is the fuel layered in such a manner that it can leave the ground and spread into a vegetative canopy?

In this instance, the ground fuel is continuous. Due to the compressed nature to the ground fuel due to mowing, no further mitigation to the continuity should be necessary other than what is being done.

• Availability

The final consideration is the availability of the fuel to physically burn. This factor is influenced by the weather on a daily or yearly basis and cannot be readily influenced.

The current weather patterns have contributed to a long-term drought situation that has influenced the availability of the fuels to burn. The trend of above average daytime temperatures and below normal precipitation levels have allowed fuels to reach a higher state of availability than might normally be the case, particularly during winter months.

Other Considerations

Firebrands & Secondary Ignitions

It is becoming more apparent that structure loss is not occurring during the passage of a burning wildfire front but from ignition of the structure by firebrands and secondary ignitions. Firebrands are burning materials or embers that are lifted into the air by convective wind currents. Firebrands can be cast hundreds of feet in advance of the fire front.

Research and case studies in Australia have found that there is a 50% probability of loss of structures that are 100 – 200 feet from the fire front. This would seem to indicate that firebrands are a major contributing factor of structure loss.

In the U.S., studies indicate there is 90% probability that a structure with a non-flammable roof and that is at least 100 feet from the fuel bed will not be lost during a wildfire. However, this statistic may be misleading as the Cedar Fire (CA) in 2003 indicated that 60% -70% of the structures lost were ignited by firebrands. This would also infer that solely relying on 'defensible space' for structure protection may not be adequate.

In a professional paper by Scott (2005), the exposure of a structure to embers and firebrands is discussed. In an inference to fuel mitigation in the 'defensible space' zones, Scott states that "In no case is complete removal of the forest canopy required to mitigate crown fire potential near a structure." This infers that 'defensible space', while a good starting point, may not be the whole solution in preventing structure loss.

Currently, fire-safe construction is the recommended protocol for fire brand risk reduction by the professional wildfire community.

Landscaping

The vegetation that is used in the landscaping of the structure should be fire resistant. For example, ornamental junipers can be very flammable and easily ignited by aerial firebrands. Planting these shrubs near the exterior walls of structures provide a readily available fuel source that could threaten the structure and divert suppression forces to protect the building instead of controlling the wildfire.

From the historical fire record of the region, the ignition of ornamental junipers around structures is a major contributor of damage and subsequent loss. **It is strongly recommended that the use of junipers and any other low growing ornamental conifer in the landscape be prohibited within thirty feet of a structure's foundation (see Photo 3).**



Photo 3. These junipers are an example of the risk posed being located beneath windows which may allow entry of a fire into the building.

If a native landscape is retained, the use of periodic irrigation helps keep landscapes lush and green, thereby lowering their ability to ignite. There are many irrigation techniques available that can keep plants less susceptible to burning while still adhering to water conservation principles.

There appears to be irrigation for the lawn space on the north side of the building. However, it appears to be inactive or disabled. Due to the landscape planting at the northeast corner of the building it is suggested that the irrigation be activated.

Another alternative to irrigated green space would be to line the footprint of the foundation of the structure with rock. If rock is used, it should be placed at a minimum

width of five feet from the foundation. This should prevent flame lengths from reaching the building.

There are many different sizes and types of rock available. It should be noted here that it would be necessary to remove leaves and other litter from within this rock fuel break on an annual basis.

This is becoming an issue of concern around the present structures. A rock barrier is in place, but it appears nominal maintenance has or is occurring (see Photo 4). In this example, weeds and grasses are growing in the rock border directly beneath vents that could allow embers into the building.



Photo 4. Note the presence of dried cheat grass along with other weeds and grasses below the vents. The rock border will be ineffective in preventing flames from reaching the building.

Construction Considerations

Due to the increased loss of structures to wildfire events nationwide, there is growing emphasis on 'hardening the structure. A recent report published by Headwaters Economics discusses the costs of added protection during construction of a residential structure. A copy of the full report can be downloaded at: [Construction Costs for a Wildfire Resistant Home, California Edition \(headwaterseconomics.org\)](https://headwaterseconomics.org/construction-costs-for-a-wildfire-resistant-home-california-edition)

The report lists several construction improvements that are relatively inexpensive to install.

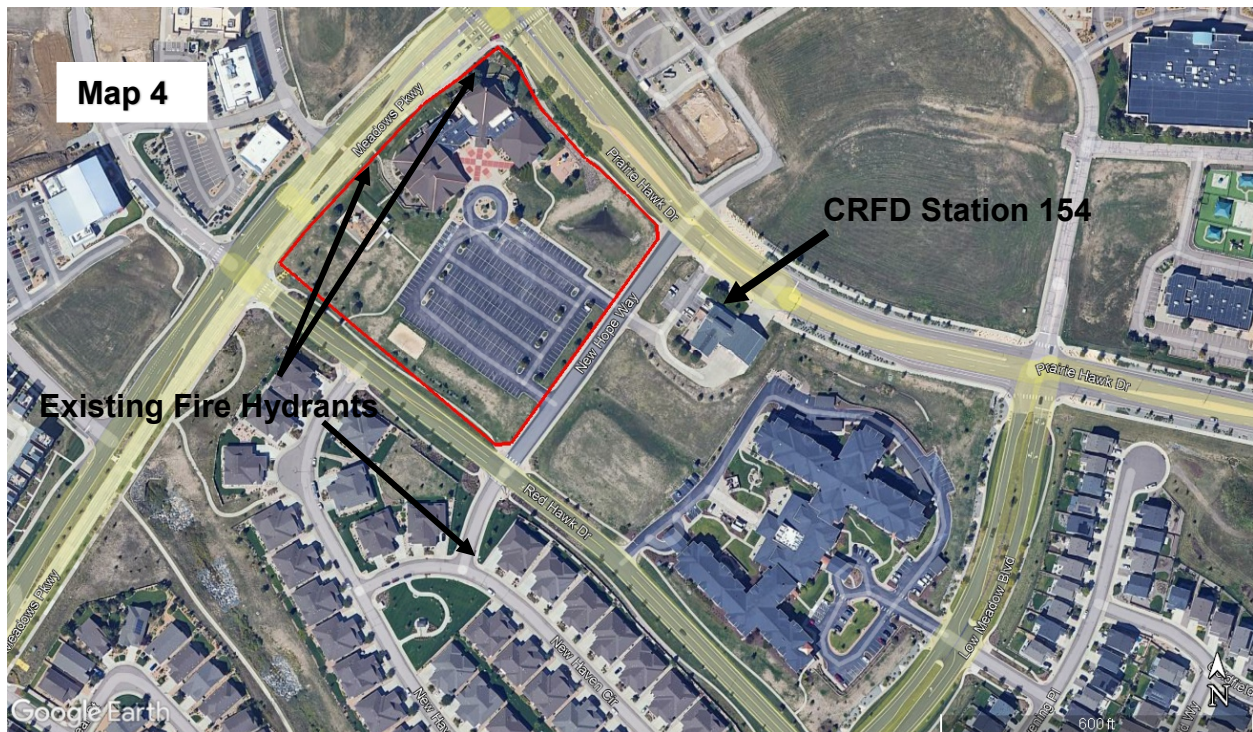
Water Supply

The property lies within the municipal limits of incorporated city of Castle Rock in Douglas County, Colorado .

The area falls under the jurisdiction of the Castle Rock Fire Department. The nearest station is located at Station 154, at the intersection of Prairie Hawk Drive and New Hope Way (see Map 4).

The resources that are available for dispatch include a Type 1 engine with a minimum of 750 gallons of water and a Type 6 wildland unit with a minimum of 50 gallons.

In the event of an extended suppression event, there are three (3) hydrants to refill any of the engines or tankers in vicinity of the property. Two of the hydrants are located along Meadow Blvd. and a third is located just west of the property at the intersection of New Hope Way and New Haven Circle in the southeast corner.



Noxious Weeds

There was no evidence of noxious weeds being found during the inventory. Due to ground disturbance from forest improvements, there is a seed bed for the establishment of several weeds common in the area. Common Mullien, for example, can become very invasive and may retard the establishment of ponderosa pine in mountain pine beetle treated locations.

Areas of highest risk are locations of soil disturbance that lack vegetative cover. Any equipment brought from outside of the property should be cleaned prior to use to prevent inadvertent spread of noxious weeds.

Appendix A

Fuel Model Descriptions

Fuel Model 1 Summary Page

Source: Anderson, Hal E. Aids to Determining Fuel Models for Estimating Fire Behavior, National Wildfire Coordinating Group, General Technical Report INT-122, April 1982.

This report presents photographic examples, tabulations, and a similar chart to assist fire behavior officers, fuel management specialists, and other field personnel in selecting a fuel model appropriate for a specific field situation. Proper selection of a fuel model is a critical step in mathematical modeling of fire behavior and fire danger ratings.

Urban/Developed (NB1) Summary Page Short, Sparse Dry Climate Grass (GR1) Summary Page

Source: Scott, Joe H. & Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's (1972) 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.

"This report describes a new set of standard fire behavior fuel models for use with Rothermel's surface fire spread model and the relationship of the new set to the original 13 fire behavior fuel models."

FUEL MODEL DESCRIPTIONS

Grass Group

Fire Behavior Fuel Model 1

Fire spread is governed by the fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. Very little shrub or timber is present, generally less than one-third of the area.

Grasslands and savanna are represented along with stubble, grass-tundra, and grass-shrub combinations that met the above area constraint. Annual and perennial grasses are included in this fuel model. Refer to photographs 1, 2, and 3 for illustrations.

This fuel model correlates to 1978 NFDRS fuel models A, L, and S.

Fuel model values for estimating fire behavior

Total fuel load, < 3-inch dead and live, tons/acre	0.74
Dead fuel load, 1/4-inch, tons/acre	.74
Live fuel load, foliage, tons/acre	0
Fuel bed depth, feet	1.0



Photo 1. Western annual grasses such as cheatgrass, medusahead ryegrass, and fescues.



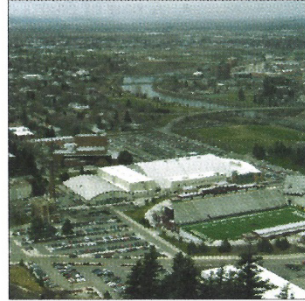
Photo 2. Live oak savanna of the Southwest on the Coronado National Forest.



Photo 3: Open pine—grasslands on the Lewis and Clark National Forest

NB1 (91)

Urban/Developed



Description: Fuel model NB1 consists of land covered by urban and suburban development. To be called NB1, the area under consideration must not support wildland fire spread. In some cases, areas mapped as NB1 may experience structural fire losses during a wildland fire incident; however, structure ignition in those cases is either house-to-house or by firebrands, neither of which is directly modeled using fire behavior fuel models. If sufficient fuel vegetation surrounds structures such that wildland fire spread is possible, then choose a fuel model appropriate for the wildland vegetation rather than NB1.

Expected fire behavior:

No fire spread

GR1 (101)

Short, Sparse Dry Climate Grass (Dynamic)



Description: The primary carrier of fire in GR1 is sparse grass, though small amounts of fine dead fuel may be present. The grass in GR1 is generally short, either naturally or by grazing, and may be sparse or discontinuous. The moisture of extinction of GR1 is indicative of a dry climate fuelbed, but GR1 may also be applied in high-extinction moisture fuelbeds because in both cases predicted spread rate and flame length are low compared to other GR models.

Fine fuel load (t/ac)	0.40
Characteristic SAV (ft-1)	2054
Packing ratio (dimensionless)	0.00143
Extinction moisture content (percent)	15

