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Technical Memorandum

DATE:	September 8, 2025
TO:	John Eisler, Crook County
FROM:	Erin David, Kendra Ely, PE and Ryan Farncomb, Parametrix
SUBJECT:	Juniper Canyon Alternatives Analysis
PROJECT NUMBER:	274-2825-006
PROJECT NAME:	Crook County Transportation System Plan Update

Introduction

This memorandum summarizes the results of the Juniper Canyon Alternatives Analysis completed as part of the Transportation System Plan (TSP) update. This effort builds on prior studies, community engagement efforts, and planning processes. Conducted in coordination with the TSP update, the Alternative Analysis gathered feedback from community members, consulted with project partners, and analyzed site conditions to identify a preferred alternative that improves access to and from Juniper Canyon. The results of this analysis will be incorporated into the 2025 TSP Update. The following memorandum documents the process used to identify and analyze route alternatives; it also identifies the preferred route for inclusion in the TSP.

Study Area and Context

Juniper Canyon is located south of Prineville in unincorporated Crook County. The area is home to more than 2,000 households and is growing quickly. In 2021, the County identified that available lands in the area could support an additional 2,000 households. There are limited services available in Juniper Canyon, requiring most residents to travel to Prineville or beyond for work, school, errands, and more. Currently, Juniper Canyon Road is the only route that connects area residents to the places they need to go. Prineville Lake Access Road, at the south end of the Juniper Canyon study area, also provides access to the area, but the road is closed seasonally and does not connect to any key destinations. This means that Juniper Canyon Road is effectively the only route of egress for the community and any blockages or closures not only limit residential access but can also negatively affect emergency response.

In the area surrounding Juniper Canyon, there are several factors that further affect connection opportunities, including:

- Steep slopes are present both east and west of Juniper Canyon communities.
- The Wild and Scenic designation on the Crooked River extends north along OR 27 from the Prineville Reservoir and Bowman Dam. This designation aims to preserve and protect the river, water quality, and the associated scenic resources from overuse, instream development, and other impacts. This designation restricts certain types of development both within the designated area and in locations within the area's viewshed.
- Significant portions of the area surrounding Juniper Canyon are owned and operated by the Bureau of Land Management (BLM); the agency's Resource Management Plan guides the allowable uses in these areas. The designations vary across the study area.

- BLM has designated the Chimney Rock segment along the Crooked River as a part of the National Conservation Lands reserve. This segment encompasses the Crooked River and surrounding lands moving northwest from Bowman Dam at the Prineville Reservoir. This area is noted for its remarkable scenic quality and valuable natural resources, and supports critical flora and fauna habitats. These habitats and qualities include a unique stand of dogwood trees, standout basalt formations, uncommonly stable and diverse stream and riparian zones for the region, and a habitat that supports white mule deer and predatory raptors like bald eagles.

The study area and more information about these features are shown in Figure 1.

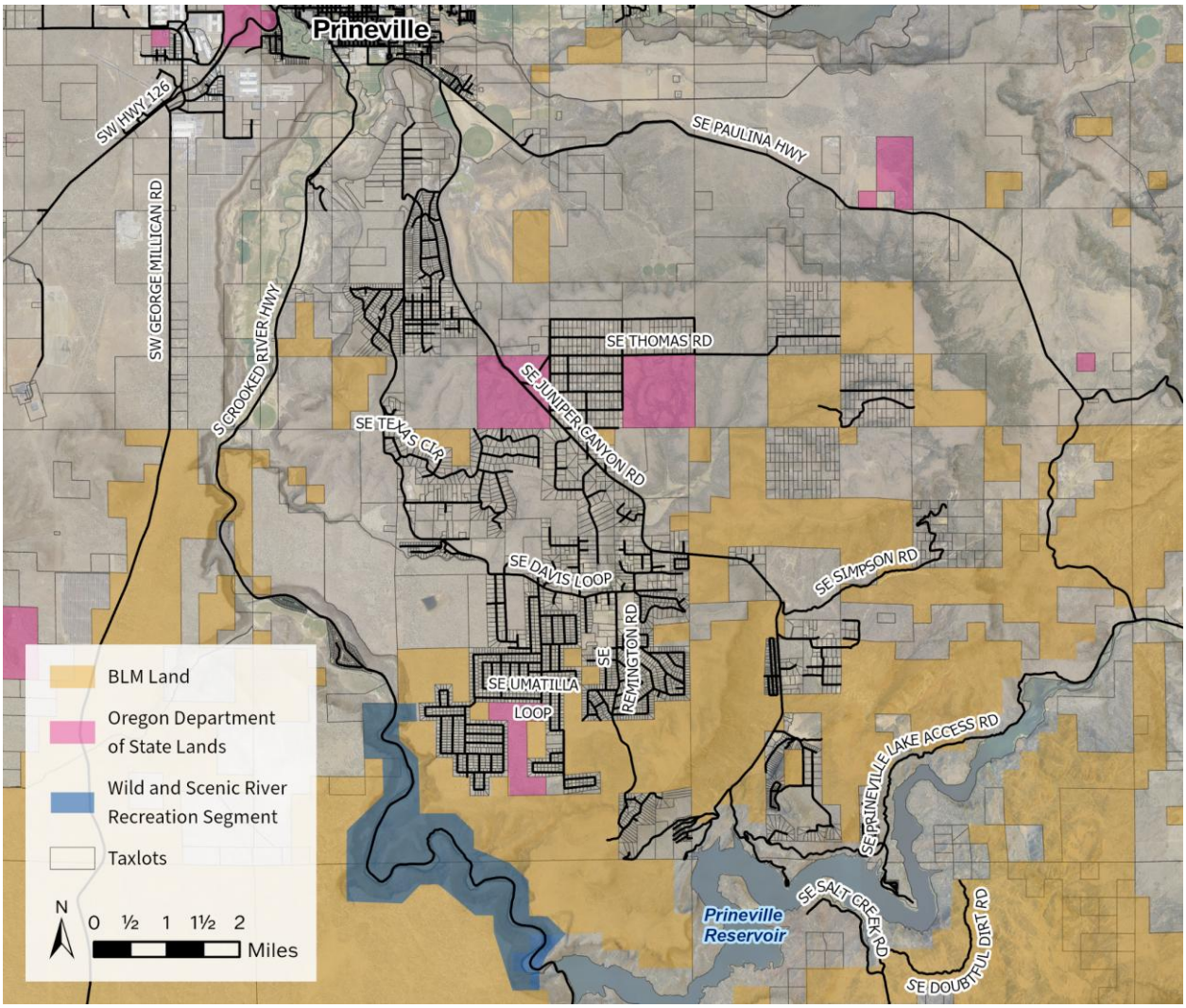

Figure 1. Juniper Canyon Study Area

Access Needs

A new access route has been a community priority for many years. The primary reasons for developing an additional access include:

- **Traffic Congestion:** As the Juniper Canyon community grows, there will be increasing demand on Juniper Canyon Road and its connections into Prineville. The TSP found that the

intersection of SE Juniper Canyon Road and OR 380 is expected to exceed mobility targets in the future higher growth scenario.[1] A new access route could help alleviate congestion at this intersection and on 3rd Street/US 26 through Prineville.

- **Emergency Services Response**: Juniper Canyon Road is a two-lane roadway and is the only route for emergency service response. In the event of a crash or other blockage, Juniper Canyon Road can be inaccessible to emergency services, limiting access both into and out of the community.
- **Evacuation Routes:** Community members have identified concerns about evacuation in the event of a fire or other natural disaster. This study only addresses access issues in the area, and other efforts are underway to holistically address the risk of fire to the Juniper Canyon area. Local fire officials have noted that an additional evacuation route is not necessary, given the expected behavior of fires in the region and the desired community response when a fire occurs. However, it is important to note the longstanding concerns of the community, which the project team considers in the development of alternatives and the recommended connection.

These needs may reflect competing priorities, with the need to balance improvements that respond to transportation system needs, such as traffic congestion and safety, with evacuation options for area residents. Prior planning and engagement efforts identified potential routes, explored public perception of funding mechanisms, and conducted limited property owner discussions for high priority routes. The most recent public survey was completed in 2021, with varied feedback from the community. A preliminary route with connections to the northern extent of Davis Loop was identified.

Study Process

The study was completed in several phases that incorporated information from previous studies, analysis of data that describes each route alternative, community and partner agency input, and early design considerations. The process is summarized in Table 1. The sections that follow describe each phase in more detail.

Table 1. Juniper Canyon Study Process

Study Phase	Description of Activities
Identify and Refine Route Alternatives	The project team compiled previously proposed routes and conducted preliminary analysis about each route's length, slope, percent of route on public land, and alignment with existing facilities. Additional route options were discussed with County staff. Based on feedback received and coordination with the County Board of Commissioners, three news route options were identified for further evaluation following the second engagement milestone. The project team analyzed these routes and developed cost assumptions, consistent with the approach used in earlier phases of the study.
Evaluate Alternatives	The project team evaluated the identified alternatives based on the factors listed above, as well as a relative cost opinion, the goals each route achieved, and if there were any fatal flaws, such as location within the Wild and Scenic River area.

[1] For more information on traffic operations and the growth scenarios evaluated, see the Transportation System Plan.

Study Phase	Description of Activities
	Based on this evaluation, a limited number of alternatives were advanced for a refined evaluation of cost. This process included assumptions about potential facility types, such as paved highway, gravel road, and any bridges or structures required.
Funding Options and Funding Scenarios	The project team developed example funding scenarios to support community engagement and coordination with the County Board of Commissioners. The funding scenarios describe potential funding mechanisms, conceptual costs for Juniper Canyon residents, and implementation timelines.
Community Feedback	Community members were invited to review the route evaluation and development findings and share feedback on preferred alternatives concurrent with the TSP Milestone 2 engagement events in October 2024. A public meeting was held in April 2025 to review the process to date, present the three new alternatives, and convene a community forum to discuss the route options. The County will convene a public meeting in August 2025 to present findings from the study and discuss additional measures related to public safety and fire prevention.
Partner Agency Coordination	The BLM was invited to review the proposed routes and provide feedback about the feasibility of each from the agency's perspective. BLM provided two memoranda documenting the opportunities and limitations of routes. These are included in Appendix C.

Develop and Refine Route Alternatives

The project team identified alternatives based on previous studies and collaboration with County staff (Figure 2). During the course of the study and as a result of outreach, some additional alternatives were added. The project team conducted more in-depth study on the following routes based on community and stakeholder feedback, as well as results of the initial technical evaluation:

- **Alternative W08:** This alternative was originally omitted in the preliminary screening process based on its location adjacent to the Wild and Scenic River area (see Alternatives Evaluation below for more information). However, community members requested additional information about this route, including possible costs.
- **Alternative E05-B:** This is a new alternative that connects to Prineville Lake Access Road from Golden Eagle Drive.
- **JC-2**: This alternative would widen only the northern most segment of Juniper Canyon Road, north of lower Davis Canyon Loop.

Following a fourth community presentation in August 2025, led by Crook County, and through continued discussions with project partners, the County identified an additional route for further consideration that was examined in-depth:

- **Alternative E10** This is a modified alternative that connects SE Simpson Road to OR 380 through BLM land. This alternative only considers a gravel roadway and represents a variation of the original E04.

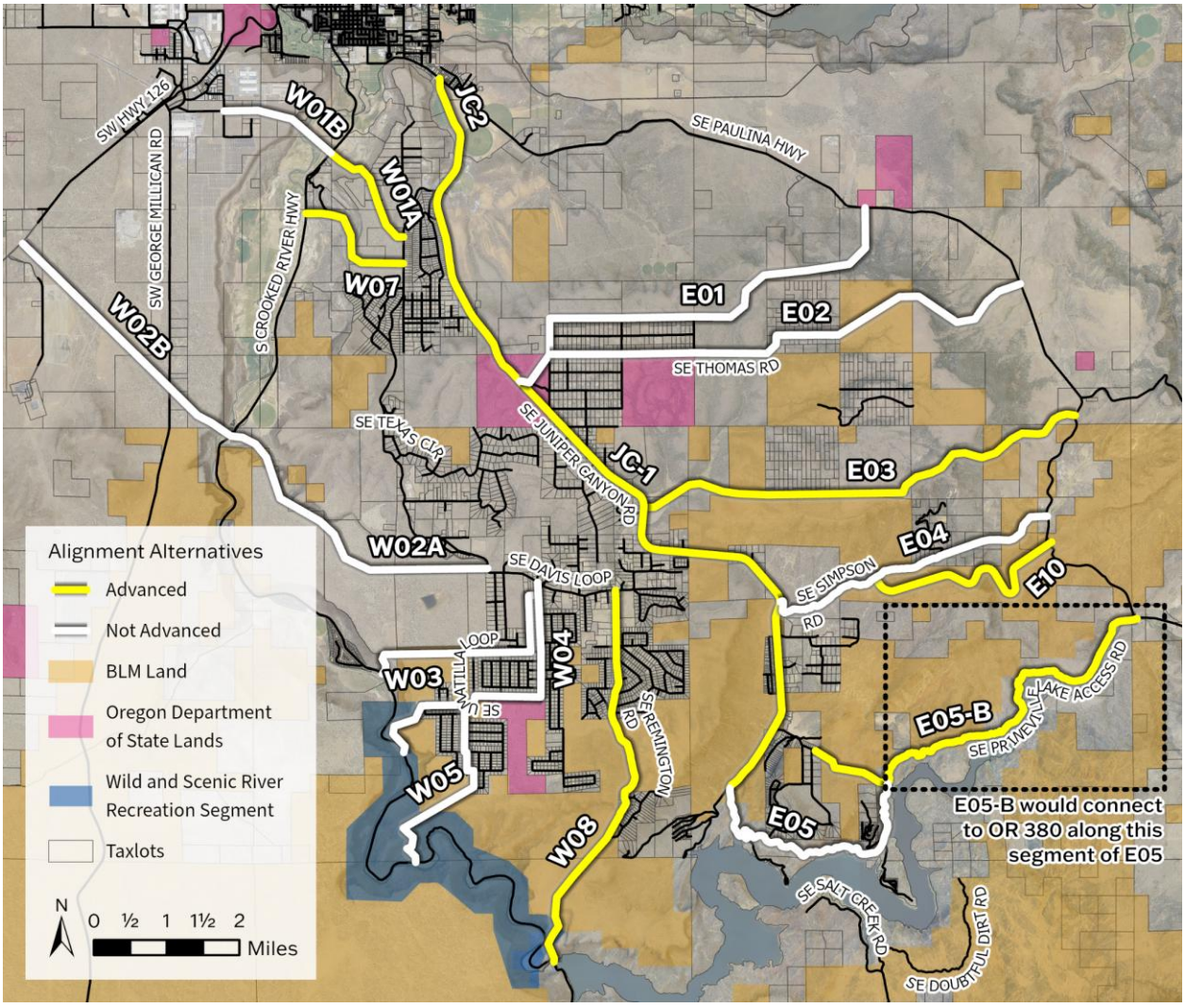

Figure 2. Juniper Canyon Milestone 3 Alternatives

Evaluate Alternatives

The project team evaluated route alternatives based on consistency with TSP goals, route feasibility, and community and partner agency feedback. A screening process was used to identify alternatives that were most likely to meet the study goals. This process also identified alternatives that had significant feasibility flaws. The screening criteria are summarized in Table 2.

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Table 2. Preliminary Alternative Screening

Criteria	Description	Measurement
Route Length and Steepest Slope	Steep slopes impact route feasibility and cost due to needed grading, structures such as bridges and retaining walls, and the type of roadway that could be supported.[2] In conjunction with overall route length, the project team developed an opinion of relative cost.	Relative cost, ranging from $ - $$$$
Route Utility/Consistency with TSP	A high level assessment was completed to identify what each route achieved and its consistency with the findings of the TSP and previous Juniper Canyon access studies: ▪ Alleviates Prineville through traffic and traffic congestion ▪ Creates connection to Highway 126 west of Prineville ▪ Provides egress for emergency evacuation ▪ Provides an alternative access route in case of Juniper Canyon closure	Yes/No for each factor
Public Lands	The project team calculated the percentage of each route located on public lands. This information provided insight into both opportunities to collaborate with BLM, as well as potential schedule impacts related to permitting and NEPA processes.	Percentage of Route on Public Lands
Existing Facilities	In some instances, route alternatives coincide with existing primitive roads.	Yes/No
Facility Type Assumptions	The project team identified the type of roadway expected for each route based on its purpose and grade. *This criterion did not result in removal of any alternative but informed discussion with community members in Milestone 2.*	Facility Type Description
Environmental Impacts	Routes that travelled through the Crooked Wild and Scenic River Area or through sensitive habitat areas were removed from consideration.	Yes/No

[2] Per ODOT highway design manual, table 200-17, rural arterial maximum grades for 45 mph shall be 7%. Alignments with grades exceeding this will need to be reviewed and/or structures added.

The project team identified eight alternatives that were advanced for further analysis, development, and public review. For each analysis, the project team:

- Identified a typical cross section and expected facility type for the roadway
- Refined the route to better account for topography and provide a more complete understanding of grading implications or the need for structures
- Establish an expected cost range based on the route concept

A summary of evaluation outcomes is shown in Table 3. The complete evaluation table is included in Appendix A, and public meeting exhibits are included in Appendix B.

Table 3: Summary of Alternatives Evaluation

Project	Considerations	Cost
Alternatives Advanced		
JC 1: Widen full length of Juniper Canyon (Paved)	▪ Widening is difficult in physically constrained areas of existing roadway, especially at intersections ▪ May have multimodal benefits ▪ Safety performance must be re-evaluated for current standards ▪ Not expected to improve traffic through Prineville	$57.7M to $123.6M
JC 2: Widen from 380 to Davis Loop (Paved)	▪ Phased implementation of Juniper Canyon Widening to reduce costs ▪ Responds to traffic congestion ▪ Improves emergency response access	$9M to $19.3M
W01A (Paved)	▪ Previously vetted alternative ▪ Limited emergency evacuation benefit due to northerly position relative to housing in Juniper Canyon ▪ Must negotiate steep canyon walls ▪ Provides some traffic reduction benefit on Juniper Canyon Rd	$9.3M to $20M
W07 (Paved)	▪ Limited emergency evacuation benefit due to northerly position relative to housing in Juniper Canyon ▪ Provides some traffic reduction benefit on Juniper Canyon Rd ▪ Alignment located partially along existing dirt road	$8.8M to $19M
E03 (Gravel)	▪ Gravel Road - provides emergency evacuation benefit only ▪ Adds significant out of direction travel to Prineville & OR126 ▪ Centralized location = greater evacuation benefit than other east emergency evacuation options ▪ Highest utilization of BLM land of east alternatives	$60M to $128.6M
E05B (Gravel)	▪ Would make a more direct connection to the existing gravel road ▪ Significant topography results in higher costs ▪ Crosses sensitive habitat and is closed seasonally ▪ Would provide seasonal access only ▪ Redundant access in case of evacuation or blockage of Juniper Canyon Road	$10.8M to $23.0M
W08 (Paved)	▪ Steep slopes require significant earthwork to maintain grades ▪ Impacts Crooked Wild and Scenic River area, sensitive habitat ▪ Crosses BLM land ▪ Would use existing connection across the dam ▪ Would provide a new connection out to Reservoir Road and destinations to the west ▪ Would require tribal consultation	$64.6M to $138.4M
E10 (Gravel)	▪ Gravel road – provides emergency evacuation benefit only ▪ Located primarily on BLM land ▪ Provides connection for areas further south in Juniper Canyon; route is located south of the fire station ▪ Significant slopes will require extensive excavation, resulting in higher project costs	$24M to $52M
Alternatives Not Advanced		
W01B	Bridge required to cross Crooked River and adjust grades	$$$
W02A	Feasibility issues, out of direction travel, limited benefit	$$
W02B	Requires 3,000' long bridge across canyon. Infeasible costs.	$$$$
W03	Feasibility concerns, minimal traffic reduction, out-of-direction travel	$$

Project	Considerations	Cost
W04	Fatally Flawed - impacts Crooked River Wild & Scenic River recreation, minimal traffic reduction benefit, out-of-direction travel	$$
W05	Fatally Flawed - impacts Crooked River Wild & Scenic River recreation, minimal traffic reduction benefit, out-of-direction travel	$$
W06	Fatally Flawed - impacts Crooked River Wild & Scenic River recreation, minimal traffic reduction benefit, out-of-direction travel	$$$
E01	Emergency evacuation benefit only, significant out of direction travel to Prineville & OR126.	$$
E02	Emergency evacuation benefit only, significant out of direction travel, impacts more properties	$$
E04	Emergency evacuation benefit only, significant out of direction travel to Prineville & OR126.	$$
E05	Provides emergency evacuation benefit only. Connection exists today. Federally protected bird habitat and closed part of the year.	$

Funding Options and Funding Scenarios

To support community engagement activities, the project team identified potential funding sources and described possible scenarios to fund a new access route in Juniper Canyon. Project costs for a new route are expected to be significant and vary substantially based on route locations and desired roadway characteristics. New funding sources and likely a combination of funding sources will be needed. Example funding sources are summarized in Table 4 and Table 5.

Table 4: Potential Grant Funding Options

Grant	Funder	Description	Chance of success
BUILD (Better Utilizing Investments to Leverage Development)	Federal	Competitive grant that funds transportation projects with significant local/regional impact	Low – project may not rise to the level needed
Federal/State Earmark	Federal/ State	Requested funds for specific projects by members of Congress or the Legislature	Dependent on lobbying
STIP (Statewide Transportation Improvement Program)	State	Federal and state money directed to projects by Oregon Transportation Commission	Low – project is not regionally significant; competition is high for this source
FEMA BRIC (Building Resilient Infrastructure and Communities)	Federal	Competitive grants that aim to build preparedness and reduce disaster risk Note: As of April 2025, FEMA is looking at elimination of this grant	Low/Medium – evacuation benefits would need to be demonstrated and be higher than other projects competing for this grant
FLAP (Federal Lands Access Program)	Federal	Competitive grant that aims to improve transportation facilities in, near, or accessing federal land	Medium – would need to make case for improving access to BLM or Crook River Canyon area

Table 5: Potential Local Funding Options

Funding Option	Description	Feasibility
System Development Charge (SDC)	▪ One-time fees assessed at the time of development that contribute toward transportation projects. ▪ Average fee (statewide) is $2,500 per new home constructed.	County does not have SDCs today but is looking at them. May take longer to fund entire project since revenues are dependent on development
Developer-built	▪ Part or all of the road built with new housing development by private developers	Possible, dependent on private developer and County coordination. Timeline uncertain.
General fund	▪ County's general fund for many services. Revenues from property tax and other sources.	Many competing needs on general fund. Not feasible to use.
Local Improvement District (LID) or Special Road District (SRD)	▪ Local district that levies a property tax to support a specific project. ▪ Collects special property tax from everyone in the district for a set time frame (up to 15 years) ▪ Funds can be used to float a bond to pay for the project immediately ▪ SRDs have their own governing body and often taken on maintenance responsibility	Requires majority of property owners to agree.
General Obligation (GO) Bond	▪ Bond supported by county tax revenues generally	GO bond recently issued for a different project. Taxpayer interest for another is unlikely.

Two funding scenarios were evaluated, as described in Table 6. These scenarios explore how grants and/or local options could fund the project.

Table 6. Funding Scenario Descriptions

	Scenario 1	Scenario 2
Assumption	Grants fund 50% of project	Local revenue/developer fees fund most of the project
Likelihood/Feasibility	Grant opportunities exist but are competitive; small grant request amounts with higher local match typically perform better.	Fully under local control; high feasibility.
Local Funding Required	Approximately 50% local revenue would be required; this could include SDCs and/or a local improvement district.	100% local revenue would be required; this could include SDCs and/or a local improvement district.
Timeline	5-20 years to construct	▪ 2-5 years for local improvement district ▪ 5-10 years for SDCs

These scenarios were then applied to two example projects, with the assumption that local funding is sourced from a local improvement district. Project A is expected to cost $75 million, while Project B is expected to cost $10 million. These project costs represent low and high ends of the cost estimates developed for the route alternatives and can help inform funding approaches based on the final route selected. Table 7 describes the potential property tax charge for Juniper Canyon residents as part of the local improvement district.

Table 7: Local Improvement District Funding Scenarios for Example Projects

Funding Scenarios	Project Cost	Property Tax Charge*
50% of project cost covered by grants or other sources, 50% covered by local improvement district	Project A: $75M Project	$2,239 per year ($33,599 total over 15 years)
	Project B: $10M Project	$298 per year ($4,479 total over 15 years)
100% of project cost covered by local improvement district	Project A: $75M Project	$4,479 per year ($67,199 total over 15 years)
	Project B: $10M Project	$597 per year ($8,959 total over 15 years)

*Per year for 15 years; this is the typical bond repayment period. Property tax charges were calculated for median property value ($410,000) in Juniper Canyon.

Community Feedback

Engagement was a key component of the Juniper Canyon study process. Countywide, residents were asked to provide feedback on community needs and route alternatives at three milestones, held in coordination with the TSP update engagement activities. The three milestones included:

- **Milestone 1 (February 2024):** Gathered input from the community on current transportation trends, goals, and opportunities or issues that the TSP should address. One community event was held in Juniper Canyon; the desire for a new access route was a common point of feedback during this event.
- **Milestone 2 (October – November 2024)**: Milestone 2 introduced new roadway alignment options to expand access in Juniper Canyon, along with a preliminary evaluation that included cost, feasibility, and expected outcomes.
- **Milestone 3 (April 2025)**: Community members were invited to a public meeting to learn about new route concepts informed by Milestone 2 input and potential funding scenarios. A community forum invited residents to share feedback, ask questions, and identify priorities.
- **Milestone 4 (July 2025):** Community members were invited to a follow-up public meeting to discuss the route concepts further and share additional information about related efforts to support wildfire evacuation needs.

More information about the public engagement process and findings can be found in the summaries for each milestone.

Key Findings

Throughout the study, several key findings emerged from the community feedback opportunities. These include:

- **New Access Purpose:** Most participants in all three engagement milestones emphasized the desire for a route for emergency evacuation purposes. Specifically, community members noted concern about wildfires, especially in summer months. However, some participants identified traffic congestion, emergency response, and transportation safety as priorities for a new access route.
- **New Access Location:** Community members emphasized the importance of location for an emergency evacuation route so that it can serve the greatest number of Juniper Canyon

residents. Most comments identified locations south of upper Davis Canyon Loop. Participants who prioritized operational improvements and emergency response preferred locations further north.

- Seasonal Access: Community feedback was divided on the sufficiency of a seasonal route. In the second milestone, many community members expressed interest in route options such as along the Prineville Reservoir that would only be available in summer months. This approach could allow for a gravel road, which may be lower cost to implement, and could expand potential route options, such as areas along the Prineville Reservoir that have seasonal closures due to wildlife habitat. However, in the third milestone, community feedback questioned this approach and the potential need for an evacuation route in winter months.
- Funding Options: Community members preferred funding options that use grants or system development charges (SDCs). Many participants indicated that they were not interested in options that would require increased costs to Juniper Canyon residents, such as through a local improvement district.

It is important to acknowledge that many of the comments received reflect community fear of a significant wildfire event. As noted previously, local fire officials have indicated that there is not a need for an additional evacuation route due to the nature of fires in the Juniper Canyon area and in terms of the desired community response, which is generally to shelter in place or assemble in designated areas. Note that this study does not make recommendations about emergency management and is purely focused on transportation access to Juniper Canyon, Regardless, community feedback was clear that additional routes that would function during an evacuation are a strong desire and therefore this study considers this feedback in the selection of the preferred access route. The County is continuing to coordinate with project partners, including Crook County Fire & Rescue and BLM, to identify a range of strategies to improve public safety.

Partner Agency Coordination

The BLM was invited to review the proposed routes and provide feedback about the feasibility of each from the agency's perspective. The project team met with BLM representatives to provide project information and an overview of the study process and route alternatives. BLM provided two memoranda documenting the opportunities and limitations of route alternatives, including consistency with the agency's Resource Management Plan. Feedback identified areas where routes would be inconsistent with area designations, as well as areas where there would be increased potential for collaboration. In general, this feedback has implications both for the timeline and cost of implementation. Depending on the location, there may be additional permitting, Resource Management Plan amendments, or related processes that must be followed. The documentation provided by BLM is included in Appendix C.

Recommendation

Based on the results of this study, two routes are recommended for new Juniper Canyon Access: W01A and E10. These two routes will provide different benefits to the community and are expected to have differing requirements and timelines for implementation. The recommendation for each route is summarized below.

W01A – Davis Loop to OR 27

This 1.7-mile route connects lower Davis Loop to OR 27 to the west and responds to transportation system concerns, including alleviating congestion in Prineville and providing a cost-effective alternative route for emergency response or community travel in the event of a blockage on Juniper Canyon Road.

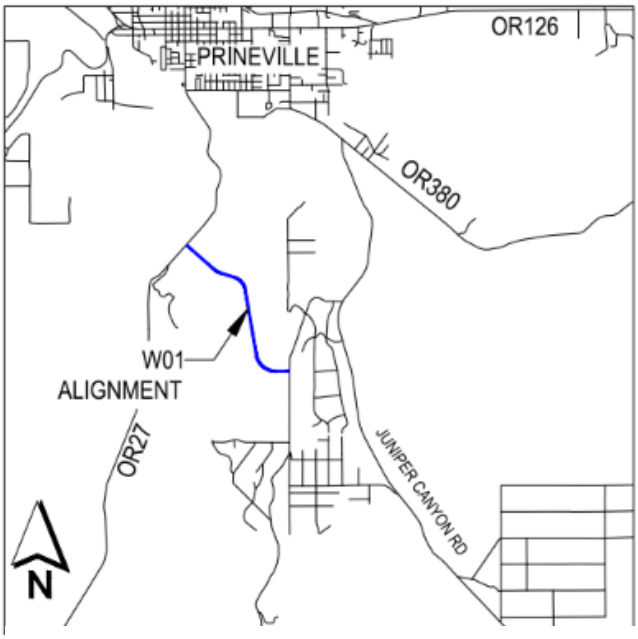

Figure 3: Recommended Juniper Canyon Access Alternative – W01A

Traffic analysis was not conducted as part of this study to understand how much vehicle traffic may divert to the new roadway; it is recommended that the County conduct traffic analysis during future due diligence to understand traffic impacts to Juniper Canyon and Davis Loop roads. If significant diversion is likely to occur, the County could consider controlling access to the new road such that it would only be useable by emergency responders and/or during occasions when Juniper Canyon Road is blocked.

This route is consistent with the recommendations of the 2021 study. It also minimizes environmental and land use impacts. Community feedback on this alternative was mixed, with varying degrees of support; the primary concern about this alternative is that it would not provide significant evacuation benefits. As noted, local fire officials prioritize wildfire response measures above a new evacuation route.

In order for the route to provide everyday travel utility, the project team recommends that the route be paved and designed to accommodate larger vehicles. As shown in Figure 4, an illustrative connection would include two general purpose travel lanes, measuring 12 feet in width each, and 8 to 10 feet wide shoulders on both sides of the roadway. The wide shoulders can also support active travel modes, including people walking or biking. The existing slope of this route exceeds the design maximum, meaning that significant earthwork will be required. The estimated cost ranges from $9.3 million to $20 million. More information about the connection, including a conceptual location and elevation profile, is included in Appendix D.

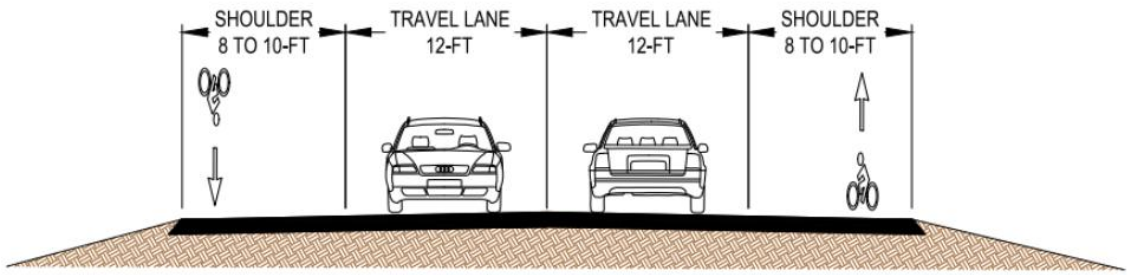

Figure 4: Proposed Cross Section

It is important to note that this alternative was selected to address known transportation issues. While the northern location of this route results in fewer evacuation benefits, it does increase access cost-effectively, in comparison to other alternatives, and would support emergency service response.

E10 – Simpson Rd to OR 380

Based on continued exploration of route alternatives with County staff, elected officials, and project partners, route E10 should continue to be explored as a new emergency access route for the Juniper Canyon community, as shown in Figure 5. This route is approximately 3.2 miles long and would connect SE Simpson Rd to OR 380, traveling along a route south of SE Simpson Road through BLM-owned land. This roadway is assumed to be 20 feet in width and a gravel surface, serving as an emergency evacuation route. The road would be designed with a maximum grade of 12%. The estimated cost ranges from $24.0M to $52.0M. The substantial cost for this alternative is largely due to the route topography, with significant grading required to meet the assumed design parameters.

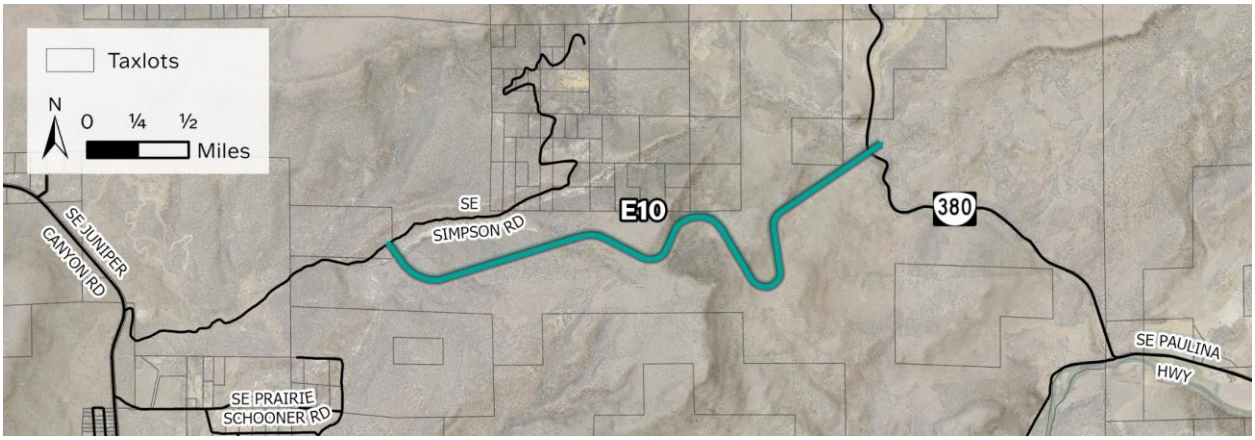

Figure 5: Alternative E10 - Simpson Rd to OR 380

This route is located further south in the Juniper Canyon community, south of the fire station, and is expected to provide additional benefits for evacuation. In addition to this route, the County should continue to work with project partners and the Juniper Canyon community to advance strategies that respond to wildfire mitigation and evacuation.