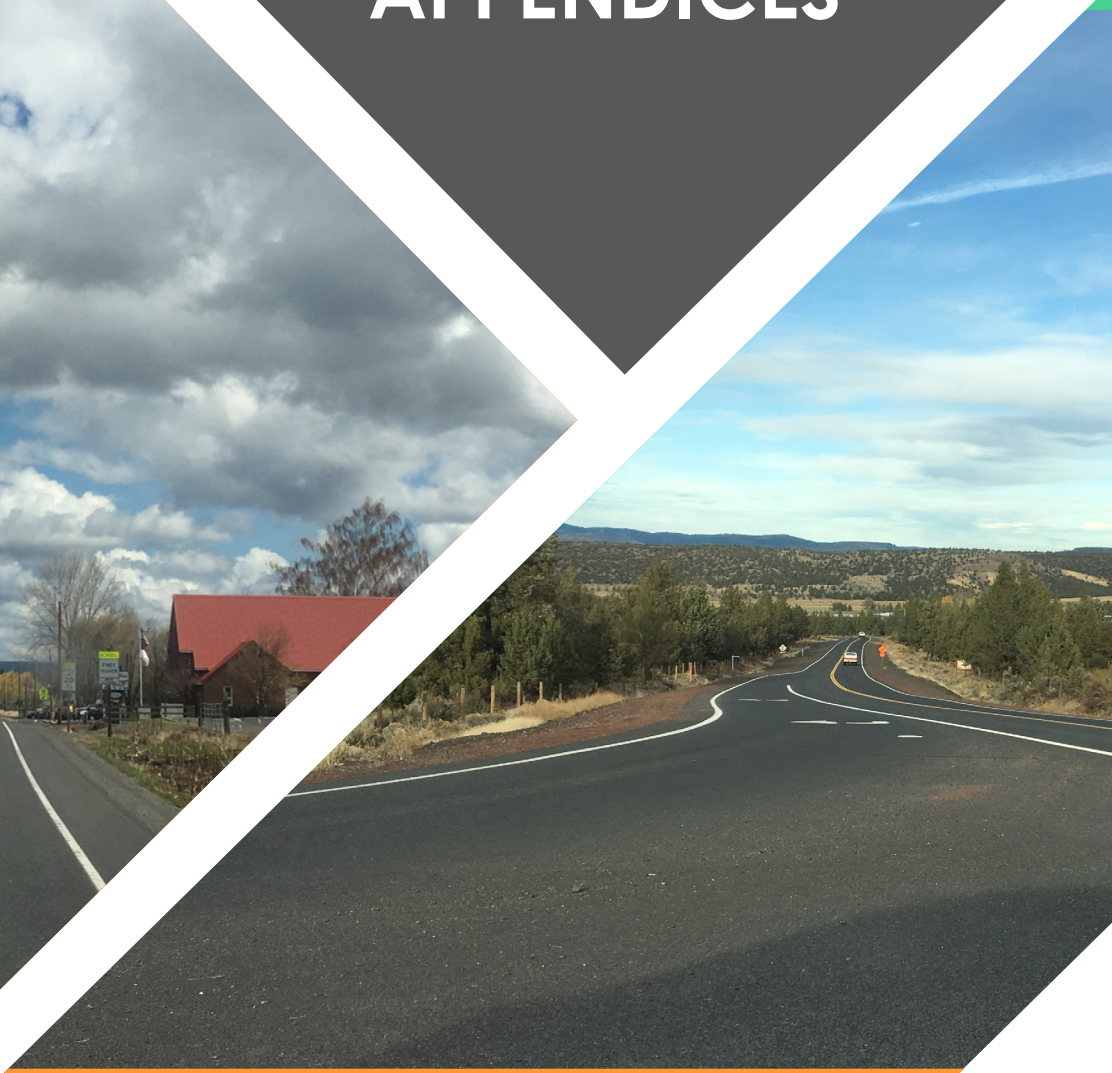
CROOK COUNTY

TRANSPORTATION SYSTEM PLAN

VOLUME 2: TECHNICAL APPENDICES



SEPTEMBER 2017

1. TECHNICAL MEMO #1
PLANS AND POLICIES REVIEW

MEMORANDUM

Date: February 3, 2017

To: Crook County TSP Update Project Management Team

From: Darci Rudzinski and Jamin Kimmell, Angelo Planning Group

CC: Ashleigh Ludwig, Kittelson & Associates

Re: Plans and Policy Review for Crook County TSP Update

This memorandum presents a review of existing plans, regulations, and policies that affect transportation planning in the Crook County Transportation System Plan (TSP) update study area. The review explains the relationship between the documents and planning in this area, identifying key issues that will guide the TSP development process.

Some documents included in this review establish transportation-related standards, targets, and guidelines with which the TSP shall coordinate and be consistent; others contain transportation improvements that will need to be factored into the future demand modeling and otherwise reflected in the draft TSP. Local policy and regulatory documents described in this review – such as the Crook County Code (CCC) – may be subject to recommended amendments to implement the updated TSP. This memorandum helps set the stage for those potential amendments, which will be prepared as part of project Task 6.1.

Table 1 provides a list of the documents reviewed in this memorandum, their project relevance, and the page on which they can be found.

Table 1. Summary of Documents Reviewed and Project Relevance

Document	Relevance to TSP	Page #
STATE DOCUMENTS		
Oregon Transportation Plan (2006)	*Projects, policies, and regulations proposed as part of the updated TSP will reflect the policies of the Oregon Transportation Plan and will comply with or move in the direction of meeting the standards and targets established in the OHP related to safety, access, and mobility. State modal plans will inform recommended improvements in the updated TSP; TSP recommendations will be consistent with state policy and requirements.*	5
Oregon Highway Plan (1999, updated 2011)		6
ODOT Highway Design Manual		11
Oregon Bicycle and Pedestrian Plan (2016)		11
Oregon Transportation Safety Action Plan (2016)		13
Oregon Public Transportation Plan (2016)		14
Oregon Freight Plan (2011)		15
Oregon State Rail Plan (2014)		16
Oregon Aviation Plan (2007)		17
Transportation Planning Rule (OAR 660-012, updated 2011)		19
Access Management Rule (OAR 734-051, updated 2012)		20
Statewide Transportation Improvement Program (2015-2018)	*The TSP update analysis will consider projects that are programmed in the STIP. An expected outcome of this planning process is proposed recommendations to update the STIP to include projects from the updated TSP.*	22
REGIONAL DOCUMENTS		
COIC Regional Transit Master Plan (2013)	*The TSP update will integrate the regional transit and transportation demand management strategies identified by COIC plans.*	24
COIC Transportation Options Plan (2013)		26
COIC Regional Park & Ride Plan (2014)		27
COACT ODOT Region 4 Report on Central Oregon Rail Planning (2009)	*The TSP update will consider how to preserve and enhance access to rail infrastructure.*	27
COIC Comprehensive Economic Development Strategy (2007, update in progress)	*The TSP update will integrate regional economic development policies and priorities into transportation policies and project prioritization.*	28
Central Oregon Regional Large Lot Industrial Land Needs Analysis (2011)		29
COUNTY DOCUMENTS		
Crook County Comprehensive Plan (1979, updated in 2003)	*The TSP update will be adopted as an element of the Comprehensive Plan, replacing the 2005 TSP, will provide more specific policy direction, and will include more detailed system planning and project prioritization.*	30
Crook County Transportation System Plan (2005)		31

Document	Relevance to TSP	Page #
Crook County Coordinated Human Services Public Transportation Plan (2009)	*The TSP update will evaluate if the priorities identified in the Crook County Coordinated Human Services Transportation Plan are still relevant to public transportation needs in the county or have been addressed by the COIC Regional Transit Master Plan.*	32
OR 126 Corridor Facility Plan (2012)	*The TSP update will integrate the findings and recommendations of the OR-126 corridor plan into the policy direction and prioritization of future projects.*	33
Crook County Code (update 2016)	*Amendments to CCC provisions related to transportation improvements may be recommended as part of this planning process to implement the updated TSP, ensure consistency between the CCC and TSP, and strengthen compliance with the TPR.*	35
Crook County Transportation Budget	*The TSP will consider the department's current revenue levels, planned expenditures, and potential future revenue sources to develop a funding plan for TSP projects.*	36
CITY DOCUMENTS		
City of Prineville Transportation System Plan (2013)	*The TSP update will consider city policies and planned projects as they relate to transportation planning and coordination between the city and county and the potential impact on county roadways or services.*	38
Prineville Downtown Enhancement Plan (1997)		40
Prineville Airport Master Plan (update in progress)		41
Prineville/Crook County Pedestrian and Bicycle Safety Health Impact Assessment (2011)		41
Improving Community Health in Crook County through Pedestrian Design: A Rapid Health Impact Assessment of Prineville's Highway 26 Streetscape Improvement Project (2016)		42

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STATE PLANS AND POLICIES

Oregon Transportation Plan (2006)

The Oregon Transportation Plan (OTP) is a comprehensive plan that addresses the future transportation needs of the State of Oregon through the year 2030. The primary function of the OTP is to establish goals, policies, strategies, and initiatives that are translated into a series of modal plans, such as the Oregon Highway Plan and Oregon Bike and Pedestrian Plan.

The OTP emphasizes:

- Maintaining and maximizing the assets in place
- Optimizing the performance of the existing system through technology
- Integrating transportation, land use, economic development and the environment
- Integrating the transportation system across jurisdictions, ownerships and modes
- Creating sustainable funding
- Investing in strategic capacity enhancements

The following OTSP policies and strategies are considered particularly relevant to Crook County's TSP update and transportation planning needs.

Policy 1.3 – Relationship of Interurban and Urban Mobility - Provide intercity mobility through and near urban areas in a manner which minimizes adverse effects on urban land use and travel patterns and provides for efficient long distance travel.

Strategy 1.3.2: In coordination with affected jurisdictions, develop and manage the transportation network so that local trips can be conducted primarily on the local system and the interstate and statewide facilities can primarily serve intercity movement and interconnect the systems.

Policy 1.2 – Equity, Efficiency and Travel Choices –Promote a transportation system with multiple travel choices that are easy to use, reliable, cost-effective and accessible to all potential users, including the transportation disadvantaged.

Strategy 1.2.1 – Develop and promote inter and intra-city public transportation by, for example, promoting frequent public transit as a method to increase ridership and decrease travel times, especially during peak travel periods and along heavily traveled highway corridors.

Policy 3.3 – Downtowns and Economic Development – Provide transportation improvements to support downtowns and to coordinate transportation and economic strategies.

Strategy 3.3.1 – Coordinate private and public resources to provide transportation improvements and services to help stimulate active and vital downtowns, economic centers and main streets.

Strategy 3.3.2 – Integrate transportation planning and investments with state and local economic development strategies and plans.

Policy 4.1 – Environmentally Responsible Transportation System –Provide a transportation system that is environmentally responsible and encourages conservation and protection of natural resources.

Strategy 4.1.2 – Encourage the development and use of technologies that reduce greenhouse gases.

Policy 4.3 – Creating Communities – Increase access to goods and services and promote health by encouraging development of compact communities and neighborhoods that integrate residential, commercial and employment land uses to make shorter trips, transit, walking and bicycling feasible. Integrate features that support the use of transportation choices.

Strategy 4.3.2 – Promote safe and convenient bicycling and walking networks in communities.

- *Fill in missing gaps in sidewalk and bikeway networks, especially to important community destinations such as schools, shopping areas, parks, medical facilities, and transit facilities.*
- *Enhance walking, bicycling, and connections to public transit through appropriate community and main street design.*
- *Promote facility designs that encourage walking and biking.*

Project Relevance: The Crook County TSP update will consider the above policies, as well as other policies and strategies in the OTP, for guidance on local policy development, project identification, and project prioritization. Broadly, the OTP emphasizes maintenance and optimization of existing assets—through use of technology, system management and strategic planning—before considering larger and costlier additions to the system.

Oregon Highway Plan (1999, updated 2011)

The Oregon Highway Plan (OHP) is a modal plan of the OTP that guides Oregon Department of Transportation's (ODOT's) Highway Division in planning, operations, and financing. Policies in the OHP emphasize the efficient management of the highway system to increase safety and to extend highway capacity, partnerships with other agencies and local governments, and the use of new techniques to improve road safety and capacity. These policies also link land use and transportation, set standards for highway performance and access management, and emphasize the relationship between state highways

and local road, bicycle, pedestrian, transit, rail, and air systems. The following policies are relevant to the TSP update process.

Policy 1A: State Highway Classification

The OHP classifies the state highway system into four levels of importance: Interstate, Statewide, Regional, and District. ODOT uses this classification system to guide management and investment decisions regarding state highway facilities. The system guides the development of facility plans, as well as ODOT's review of local plan and zoning amendments, highway project selection, design and development, and facility management decisions including road approach permits.

The following five highways traverse Crook County:

- US/Oregon 26 – Madras Prineville Highway Number 360/Ochoco Highway Number 41
- Oregon 126 – Ochoco Highway Number 41
- Oregon 370 – Oneil Highway Number 370
- Oregon 27 – Crooked River Highway Number 14
- Oregon 380 – Paulina Highway Number 380

The purpose and management objectives of these highways are provided in Policy 1A, as summarized below.

- **Statewide highways** (US/OR 26-Ochoco Highway, OR-126) typically provide inter-urban and inter-regional mobility and provide connections to larger urban areas, ports, and major recreation areas that are not directly served by Interstate Highways. A secondary function is to provide connections for intra-urban and intra-regional trips. The management objective is to provide safe and efficient, high-speed, continuous-flow operation. In constrained and urban areas, interruptions to flow should be minimal. Inside Special Transportation Areas (STAs), local access may also be a priority.
- **Regional highways** (US/OR 26-Madras-Prineville) typically provide connections and links to regional centers, Statewide or Interstate highways, or economic or activity centers of regional significance. The management objective for these facilities is to provide safe and efficient, high-speed, continuous-flow operation in rural areas and moderate to high-speed operations in urban and urbanizing areas. A secondary function is to serve land uses in the vicinity of these highways.
- **District highways** (OR 370, OR 27, OR 380) are facilities of county-wide significance and function largely as county and city arterials or collectors. They provide connections and links between small urbanized areas, rural centers and urban hubs, and also serve local access and traffic. The management objective is to provide for safe and efficient, moderate to high-speed continuous-flow operation in rural areas reflecting the surrounding environment and moderate to low-speed operation in urban and urbanizing areas for traffic flow and for pedestrian and bicycle movements.

In addition to the state highway classification system, Crook County highways have been given the following designations:

- **US/OR 26-Ochoco Highway**: National Highway System; Special Transportation Area (from mileposts 18.24 to 19.38); Reduction Review Route[1]
- **US/OR 26-Madras-Prinville:** Federally-designated Truck Route; State Freight Route; Reduction Review Route
- **OR-126:** National Highway System; Federally-designated Truck Route; State Expressway; State Freight Route; Reduction Review Route

Policy 1B: Land Use and Transportation

Policy 1B applies to all state highways. It is designed to clarify how ODOT will work with local governments and others to link land use and transportation in transportation plans, facility and corridor plans, plan amendments, access permitting and project development. Policy 1B recognizes that state highways serve as the main streets of many communities and strives to maintain a balance between serving local communities (accessibility) and the through traveler (mobility). This policy recognizes the role of both the state and local governments related to the state highway system and calls for a coordinated approach to land use and transportation planning. Inside designated Special Transportation Area (STAs) local access is a priority; inside designated Urban Business Areas (UBAs), mobility is balanced with local access. US/OR-26 Ochoco Highway is designated as a STA within downtown Prineville, from mileposts 18.24 to 19.38. Highway segment designations may change the applicable ODOT design standards, mobility standards, and access management spacing standards within the segment.

Policy 1C: State Highway Freight System

The primary purpose of the State Highway Freight System is to facilitate efficient and reliable interstate, intrastate, and regional truck movement through a designated freight system. This freight system, made up of the Interstate Highways and select Statewide, Regional, and District Highways, includes routes that carry significant tonnage of freight by truck and serve as the primary interstate and intrastate highway freight connection to ports, intermodal terminals, and urban areas. Highways included in this designation have higher highway mobility standards than other statewide highways.

Policy 1F: Highway Mobility Standards Access Management Policy

Policy 1F sets mobility standards for ensuring a reliable and acceptable level of mobility on the state highway system. The standards are used to assess system needs as part of long range, comprehensive planning transportation planning projects, during development review, and to demonstrate compliance with the Transportation Planning Rule (TPR).

[1] A Reduction Review Route (RRR) are state freight routes designated by ORS 366.215 for which the vehicle-carrying capacity of the roadway may not be reduced without complying with the process defined by OAR 731-012-0010. The purpose of the designation is to prevent unnecessary changes that would prohibit legal freight loads and permitted over-dimension loads from using the roadway.

Significant amendments to Policy 1F were adopted at the end of 2011. The revisions were made to address concerns that state transportation policy and requirements have led to unintended consequences and inhibited economic development. Policy 1F now provides a clearer policy framework for considering measures other than volume-to-capacity (v/c) ratios for evaluating mobility performance. Also as part of these amendments, v/c ratios established in Policy 1F were changed from being standards to "targets." These targets are to be used to determine significant effect pursuant to TPR Section -0060.

Table 2 includes the mobility targets for the state facilities in the TSP study area. The mobility targets have been amended since the last Crook County TSP was completed in 2005.

Table 2. State Facility Mobility Targets

Highway/Category	**Inside UGB**				**Outside UGB**	
	STA	Non-MPO outside of STAs where nonfreeway **speed <= 35 mph, or a Designated UBA**	Non-MPO outside of STAs where non-freeway **speed > 35 mph but < 45 mph**	Non-MPO Where nonfreeway **speed limit >= 45 mph**	Unincorporated Communities	Rural Lands
Statewide Expressway *(OR 126)*	N/A	0.85 v/c	0.85 v/c	0.80 v/c	0.70 v/c	0.70 v/c
Statewide Highway (not a Freight Route) *(US/OR 26-Ochoco)*	0.95 v/c	0.90 v/c	0.85 v/c	0.80 v/c	0.75 v/c	0.70 v/c
Freight Route on a Regional Highway *(US/OR 26-Madras-Prineville)*	0.95 v/c	0.90 v/c	0.85 v/c	0.85 v/c	0.75 v/c	0.70 v/c
District/Local Interest Roads *(OR 370, OR 27, OR 380)*	1.0 v/c	0.95 v/c	0.90 v/c	0.90 v/c	0.80 v/c	0.75 v/c

Policy 1G: Major Improvements

This policy requires maintaining performance and improving safety on the highway system by improving efficiency and management on the existing roadway network before adding capacity. The state's highest priority is to preserve the functionality of the existing highway system. Tools that could be employed to improve the function of the existing interchanges include access management, transportation demand management, traffic operations modifications, and changes to local land use designations or development regulations.

After existing system preservation, the second priority is to make minor improvements to existing highway facilities, such as adding ramp signals, or making improvements to the local street network to minimize local trips on the state facility.

The third priority is to make major roadway improvements such as adding lanes to increase capacity on existing roadways. As part of this TSP process, ODOT will work with Crook County and other stakeholders to determine appropriate strategies and tools that can be implemented at the local level that are consistent with this policy.

Policy 2B: Off-System Improvements

This policy recognizes that the state may provide financial assistance to local jurisdictions to make improvements to local transportation systems if the improvements would provide a cost-effective means of improving the operations of the state highway system. As part of this TSP update process, ODOT will work with Crook County and project stakeholders to identify improvements to the local road system that support the planned land use designations in the study area and that will help preserve capacity and ensure the long-term efficient and effective operation of high functional class facilities.

Policy 2F: Traffic Safety

This policy emphasizes the state's efforts to improve safety of all users of the highway system. Action 2F.4 addresses the development and implementation of the Safety Management System to target resources to sites with the most significant safety issues.

Policy 3A: Classification and Spacing Standards

It is the policy of the State of Oregon to manage the location, spacing, and type of road intersections on state highways to ensure the safe and efficient operation of state highways consistent with the classification of the highways.

Action 3A.2 calls for spacing standards to be established for state highways based on highway classification, type of area, and posted speed. Tables in OHP Appendix C present access spacing standards which consider urban and rural highway classification, traffic volumes, speed, safety, and operational needs. The access management spacing standards established in the OHP are implemented by access management rules in OAR 734, Division 51, addressed later in this report.

Policy 4A: Efficiency of Freight Movement

This policy emphasizes the need to maintain and improve the efficiency of freight movement on the state highway system. US/OR 26-Madras-Prinville and OR-126 are state freight routes and federally designated truck routes.

Policy 4B: Alternative Passenger Modes

This policy encourages the development of alternative passenger services and systems as part of broader corridor strategies and promotes the development of alternative passenger transportation services located off the highway system to help preserve the performance and function of the state highway system. The Central Oregon Intergovernmental Council (COIC) operates Cascades East Transit (CET), which provides public transportation service in the study area. Improving safety, access, and mobility for pedestrians and bicyclists is an objective of this process.

Project Relevance: The TSP update is being developed in coordination with ODOT so that projects, policies, and regulations proposed as part of the updated TSP will comply with or move in the direction of meeting the standards and targets established in the OHP related to safety, access, and mobility.

ODOT Highway Design Manual

The Highway Design Manual (HDM) provides uniform standards and procedures for ODOT and is used for all projects that are located on state highways. The HDM is in general agreement with the 2001 American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets. Some key areas where guidance is provided are the location and design of new construction, major reconstruction, and resurfacing, restoration or rehabilitation (3R) projects. Design standards for state highways are dependent on the highway's functional classification and the project type. Chapter 6 addresses urban highway design (non-freeway), applicable to the state highways in the City of Gladstone.

Project Relevance: The HDM will be consulted for all projects on state highways in Crook County to determine design requirements, including the maximum allowable v/c ratios for use in the design of highway projects.

Oregon Bicycle and Pedestrian Plan (2016)

The Oregon Bicycle and Pedestrian Plan (OBPP), adopted in May of 2016, is a modal plan that implements the Oregon Transportation Plan. The vision of the plan is that:

> *"In Oregon, people of all ages, incomes, and abilities can access destinations in urban and rural areas on comfortable, safe, well connected biking and walking routes. People can enjoy Oregon's scenic beauty by walking and biking on a transportation system that respects the needs of its users and their sense of safety. Bicycle and pedestrian networks are recognized as integral, interconnected elements of the Oregon transportation system that contribute to our diverse and vibrant communities and the health and quality of life enjoyed by Oregonians."*

The recently adopted plan includes a much broader policy framework than the original plan, developed in 1995 and reaffirmed as an element of the OTP in 2006. The broad goals and policies of the plan are rooted in the numerous benefits of walking and biking; the plan presents a growing body of evidence that walking and biking support economic growth, health, environmental quality, and mobility. These benefits represent important opportunities, but many issues and challenges remain in planning for and supporting walking and biking. Accordingly, the plan outlines a broad set goals, policies and strategies to address these issues:

> ***Goal 1: Safety.*** *Eliminate pedestrian and bicyclist fatalities and serious injuries, and improve the overall sense of safety of those who bike or walk.*
>
> ***Goal 2: Accessibility and Connectivity.*** *Provide a complete bicycling and pedestrian network that reliably and easily connects to destinations and other transportation modes.*
>
> ***Goal 3: Mobility and Efficiency.*** *Improve the mobility and efficiency of the entire transportation system by providing high quality walking and biking options for trips of short and moderate distances. Support the ability of people who bike, walk or use mobility devices to move easily on the system.*
>
> ***Goal 4: Community and Economic Vitality.*** *Enhance community and economic vitality through walking and biking networks that improve people's ability to access jobs, businesses, and other destinations, and to attract visitors and tourists, new residents, and new business to the state, opening new opportunities for Oregonians.*
>
> ***Goal 5: Equity.*** *Provide opportunities and choices for people of all ages, abilities, races, ethnicities, and incomes in urban, suburban, and rural areas across the state to bike or walk to reach their destinations and to access transportation options, assuring transportation disadvantaged communities are served and included in decision making.*
>
> ***Goal 6: Health.*** *Provide Oregonians opportunities to become more active and healthy by walking and biking to meet their daily needs.*
>
> ***Goal 7: Sustainability.*** *Help to meet federal, state, and local sustainability and environmental goals by providing zero emission transportation options like walking and biking.*
>
> ***Goal 8: Strategic Investment.*** *Recognize Oregon's strategic investments in walking and biking as crucial components of the transportation system that provide essential options for travel, and can help reduce system costs, and achieve other important benefits.*
>
> ***Goal 9: Coordination, Cooperation, and Collaboration.*** *Work actively and collaboratively with federal, state, regional, local, and private partners to provide consistent and seamless walking and biking networks that are integral to the transportation system.*

Each goal includes several policies and strategies to guide implementation. Many of these strategies are relevant to the planning process for the Crook County TSP update. In addition, the plan provides specific direction for how cities and counties can play a role in implementation, including ensuring that planning

and design practices are consistent with the OBPP and other ODOT plans, working with adjacent jurisdictions, revising ordinances, collecting data, performing inventories, and partnering with community organizations for education and encouragement programs.

ODOT also published a work plan to provide more detailed information on ODOT-led actions to advance implementation of the OBPP. The work plan organizes the actions into three key initiatives; this TSP update may be able to leverage the tools and outcomes of these initiatives:

1. Defining the network by inventorying the existing system, updating design guidelines, and setting expectations for how the system should be built and rebuilt.
2. Data collections and standardization.
3. Development of plan- and program-level performance measures.

The ODOT Bicycle and Pedestrian Design Guide is the technical element of the plan, adopted in 2011, that guides the design and management of bicycle and pedestrian facilities on state-owned facilities. It has been designated as a companion piece to the Highway Design Manual and includes updated and innovative pedestrian and bicycle treatments. As noted above, the OBPP anticipates an update to the design guidelines.

Project Relevance: The policies and design guidance provided in the OBPP apply to bicycle and pedestrian improvements associated with state highway facilities in Crook County, which include OR-126, US/OR 26, OR 27, OR 270 and OR 380. Policy and design guidance should also be considered in the TSP's local street standards and the bicycle and pedestrian modal plans should be consistent with the goals, policies, and strategies for implementation identified in the OBPP.

Oregon Transportation Safety Action Plan (2016)

The Oregon Transportation Safety Action Plan (TSAP) establishes an ambitious vision for transportation safety in Oregon, specifically that there will be "no deaths or life-changing injuries on Oregon's transportation system by 2035." The long-term goals of the TSAP are to foster a safety culture, develop infrastructure for safety, support healthy communities, leverage technology, and coordinate agencies and stakeholders to work together. In the near-term, the plan focuses on four emphasis areas for improving safety:

- **Risky behaviors**, such as impaired driving, distracted driving, unbelted driving, speeding.
- **Infrastructure** such as intersection improvements.
- **Protections for vulnerable users**, such as pedestrians, bicyclists, and older road users.
- **Improved systems**, including data collection, training, enforcement, licensing and emergency response.

A review of safety trends found that roadway lane departure crashes were the most common (54 percent of crashes); young drivers (15-25) were most frequently involved (31 percent of crashes), and

speeding was the most common behavioral factor (27 percent of crashes). ODOT Region 4 (Central Oregon, including Crook County) has a higher frequency of roadway or lane departure and speed-related fatal and serious injury crashes, and a higher proportion of unrestrained occupants than the state overall.

The TSAP identifies several actions to improve transportation safety focusing on the four emphasis areas above. The actions were developed through consideration of the crash trends, and qualitative factors like co-benefits of the action, institutional capacity, and evidence of effectiveness. The following actions may be particularly relevant to the Crook County TSP update:

Action 6.3.2: Continue work between ODOT, cities, and counties to consider and revise, as appropriate, regulations and programs for establishing speed limits to achieve safety goals, improve balance among multimodal interests, and support community objectives.

Action 6.3.6: Focus facility design and redesign to achieve operating speeds consistent with safety goals, context, users, and land use.

Action 6.5.1: Implement design treatments to achieve appropriate speeds and manage sight distance consistent with context, users, and community goals.

Action 6.5.3: Support multimodal safety considerations during local Transportation System Plan development, and other planning efforts (e.g., local Transportation Safety Action Plans) to guide project planning, operations and maintenance for safer transportation facilities.

Action 6.6.1: Implement low-cost systemic safety improvements at intersections.

Action 6.8.1: Evaluate the safety performance of innovative pedestrian facilities. Continue implementing the most effective.

Action 6.8.2: Provide safe facilities and crossings in areas where pedestrians are present or access is needed. Prioritize transit corridors, school areas, multilane streets and highways and other high risk areas and facilities.

Action 6.10.1: Evaluate the safety impacts of innovative bicycle facilities. Continue implementing the most effective.

Project Relevance: Consistent with the state's TSAP, the TSP update process will identify sites with high occurrences of safety problems and consider safety in the selection and prioritization of transportation projects to meet the county's future system needs for all modes of transportation.

Oregon Public Transportation Plan (1997)

The Oregon Public Transportation Plan (OPTP) is the modal plan of the OTP that provides guidance for ODOT and public transportation agencies regarding the development of public transportation systems. The vision guiding the Public Transportation Plan is as follows:

- *A comprehensive, interconnected and dependable public transportation system, with stable funding, that provides access and mobility in and between communities of Oregon in a convenient, reliable, and safe manner that encourages people to ride*
- *A public transportation system that provides appropriate service in each area of the state, including service in urban areas that is an attractive alternative to the single-occupant vehicle, and high-quality, dependable service in suburban, rural, and frontier (remote) areas*
- *A system that enables those who do not drive to meet their daily needs*
- *A public transportation system that plays a critical role in improving the livability and economic prosperity for Oregonians.*

The OPTP Implementation Plan directs ODOT investments towards commuter and mobility needs in larger communities and urban areas, and in smaller communities where warranted. It also prioritizes investments in intercity connections statewide. Long-term implementation and funding is geared toward both modernization and preservation projects while preservation projects are more the focus for short term implementation and funding.

The OPTP is currently being updated. Public participation activities occurred through the summer of 2016 and a draft vision and goals will be developed in Fall of 2016. Policies and strategies will be crafted throughout 2017 and the plan will be adopted in Spring 2018.

COIC acts as the regional transit planning agency for Central Oregon and operates Cascades East Transit, the primary transit provider. One fixed-route transit line serves Crook County; Route 26 connects Redmond and Prineville. Dial-a-Ride transit services are available in the City of Prineville.

Project Relevance: The update of the OPTP will be monitored by the project management team and, where appropriate, draft policy guidance that affects the Crook County TSP will be considered during the update of the TSP. The COIC Regional Transit Master Plan, completed in 2013, is reviewed in more detail in the Regional Plans and Policies section of this document. Additionally, the project advisory committee includes a representative from COIC.

Oregon Freight Plan (2011)

The Oregon Freight Plan (OFP) is another modal plan of the OTP and implements the state's goals, and policies related to the movement of goods and commodities. Its purpose statement identifies the state's intent "to improve freight connections to local, Native American, state, regional, national and global markets in order to increase trade-related jobs and income for workers and businesses." The objectives of the plan include prioritizing and facilitating investments in freight facilities (including rail, marine, air, and pipeline infrastructure) and adopting strategies to maintain and improve the freight transportation system.

The plan defines a statewide strategic freight network. Crook County is located near the confluence of two strategic freight corridors. The Central Oregon Corridor is the major north-south corridor connecting

Central Oregon with markets in Washington and California, and is centered on US 97 and the Burlington Northern Santa Fe/Union Pacific class I rail line. The US 20 Corridor is just south of Crook County and is the major east-west corridor through the middle of the state, connecting important cities such as Boise, Bend and Corvallis.

The following policy and strategic direction provided in the OFP prioritizes preservation of strategic corridors as well as improvements to the supply chain achieved through coordination of freight and system management planning.

> ***Strategy 1.2****: Strive to support freight access to the Strategic Freight System. This includes proactively protecting and preserving corridors designated as strategic.*
>
> ***Action 1.2.1****. Preserve freight facilities included as part of the Strategic Freight System from changes that would significantly reduce the ability of these facilities to operate as efficient components of the freight system unless alternate facilities are identified or a safety-related need arises.*
>
> ***Strategy 2.4****: Coordinate freight improvements and system management plans on corridors comprising the Strategic Freight System with the intent to improve supply chain performance.*

Project Relevance: Maintaining and enhancing efficiency of the truck and rail freight system in the study area should be integrated into the updated Crook County TSP. The project advisory committees include representatives from ODOT and local freight interests.

Oregon State Rail Plan (2014)

The Oregon State Rail Plan ("State Rail Plan"), a state modal plan under the OTP, addresses long-term freight and passenger rail planning in Oregon. The State Rail Plan provides a comprehensive assessment of the state's rail planning, freight rail, and passenger rail systems. The State Rail Plan identifies specific policies and planning processes concerning rail in the state, establishes a system of integration between freight and passenger elements into the land use and transportation planning processes, and calls for cooperation between state, regional and local jurisdictions in completing the plan.

The City of Prineville Railway (COPR) is the only rail service in Crook County; it is the oldest continuously operating municipal short line railway in the United States. The line runs 18 miles from north of downtown Prineville to the Oregon Trunk Line at Prineville Junction, east of Redmond. COPR primarily transports raw materials, timber and other products manufactured in Crook County. The City of Prineville operates an intermodal facility—the Prineville Freight Depot—that connects to the line. No passenger rail service is available on COPR.

Project Relevance: The TSP update will consider the needs of the rail freight system in developing recommended policies and projects related to improving safety and mobility in the county. In addition, the project technical advisory committee includes ODOT representatives that will advise on rail and freight interests.

Oregon Aviation Plan (2007)

The Oregon Aviation Plan (OAP) is a modal plan of the OTP that defines policies and investment strategies for Oregon's public use aviation system for the next 20 years. The plan addresses the existing conditions, economic benefits, and jurisdictional responsibilities for the existing aviation infrastructure. The plan contains policies and recommended actions to be implemented by Oregon Department of Aviation in coordination with other state and local agencies and the Federal Aviation Administration.

The OAP categorizes airports based on functional role and service criteria. Crook County includes one airport, Prineville Airport, which the OAP classifies as a Category IV – Local General Aviation Airport. Category IV airports support primarily single-engine general aviation aircraft but can accommodate smaller twin-engine general aviation aircraft. These airports support local air transportation needs and special use aviation activities. Pursuant to the 2005 Crook County TSP, the county is also served by six additional airstrips which are not included in the Oregon Aviation Plan. Most of these airstrips are for private use.

The Redmond Municipal Airport is a Category I – Commercial Service Airport located just 20 miles west of Crook County, adjacent to OR-126. Category I airports provide scheduled commercial passenger service in addition to general aviation aircraft; the Redmond Municipal Airport is the primary airport for commercial passenger travel in Central Oregon.

In 2014 the state undertook an update of the Economic Impact Study that was completed as part of the 2007 OAP. The Economic Impact Study Update ("update") was conducted to determine the value of the Oregon Aviation System. As two of the fifty-seven Oregon airports listed in the National Plan of Integrated Airport Systems (NPAIS), the update included the Prineville Airport and Redmond Municipal Airport. The analysis measured economic impacts of these airport facilities, within the region and throughout the state. The direct effect of airport activities on the economy for both of Crook County's airports was calculated in terms of jobs, wages and business sales.

Project Relevance: The TSP update will consider access to the Prineville Airport and Redmond Municipal Airport in developing its policies and projects. The economic impacts of these airport facilities are significant, as supported by the OAP Economic Impact Study Update[2]; the TSP update will evaluate access to each airport, consistent with the facility's function in the regional and national transportation system for both passenger travel and freight movement.

[2] Oregon Aviation Plan: Economic Impact Statement (2014): https://www.oregon.gov/aviation/docs/system_plan/2014_Oregon_Aviation_Economic_Update_Executive_Summary.pdf

Transportation Planning Rule (OAR 660-012, updated 2011)

Transportation System Planning in Oregon is required by state law as one of the 19 statewide planning goals (Goal 12 - Transportation). The Transportation Planning Rule (TPR), OAR Division 12, defines how to implement Goal 12. The TPR applies at the state, regional, and local level. The TPR requires:

- The state to prepare a TSP, referred to as the Oregon Transportation Plan (OTP);
- Metropolitan planning organizations to prepare a Regional Transportation Plan (RTP) consistent with the OTP; and,
- Counties and cities to prepare local TSPs that are consistent with the OTP and RTP.

The overall purpose of the TPR is to provide and encourage a safe, convenient, and economical transportation system. The rule also implements provisions of other statewide planning goals related to transportation planning in order to plan and develop transportation facilities and services in close coordination with urban and rural development. The TPR directs TSPs to integrate comprehensive land use planning with transportation needs and to promote multi-modal systems that make it more convenient for people to walk, bicycle, use transit and drive less.

The TPR also requires local governments to adopt land use regulations consistent with state and federal requirements "to protect transportation facilities, corridors and sites for their identified functions (OAR 660-012-0045(2))." This policy is achieved through a variety of measures, including:

- Standards to protect future operations of roads;
- A process for coordinated review of future land use decisions affecting transportation facilities, corridors or sites;
- A process to apply conditions to development proposals to minimize impacts and protect transportation facilities, corridors or sites;
- Regulations to provide notice to ODOT of land use applications that require public hearings, involve land divisions, or affect private access to roads; and,
- Regulations assuring that amendments to land use designations, densities and design standards are consistent with the functions, capacities and performance standards of facilities identified in the TSP. (See OAR 660-012-0060.)

The TPR does not regulate access management. ODOT adopted OAR 734-051 to address access management and it is expected that ODOT, as part of this project, will coordinate with the county in planning for access management on state roadways consistent with its Access Management Rule. See the review of OAR 734-051 in the next section for a review of these access management rules.

The most recent amendments to TPR, effective January 1, 2012, include new language that allows a local government to exempt a zone change from the “significant effect” determination if the proposed zoning is consistent with the comprehensive plan map designation and the TSP. In addition, the TPR now allows a local government to amend a functional plan, comprehensive plan, or land use regulation without applying mobility standards if the subject area is within a designated multi-modal mixed-use area

(MMA). Amendments also include a new "balancing test" available for jurisdictions to weigh land use amendments that will create industrial or traded-sector jobs, as defined by the TPR.

Project Relevance: Crook County's TSP and land use regulations must be consistent with the current TPR. The TSP will be updated consistent with the requirements of the TPR and the Crook County Code, Title 18 Zoning, will be reviewed and, where necessary, revised consistent with TPR Section -0045. Future work associated with the TSP update (Technical Memorandum #5) will include summary comments and recommendations for improving consistency between Title 18 and the TPR. These recommendations will help to ensure that the updated Crook County TSP and Zoning Code are consistent with applicable requirements established by the TPR. The updated TSP will be adopted as part of the Crook County Comprehensive Plan.

Access Management Rule (OAR 734-051, updated 2012)[3]

OAR 734-051 governs the permitting, management, and standards of approaches to state highways to ensure safe and efficient operation of the state highways. ODOT has adopted the rules to establish procedures and criteria to govern highway approaches, access control, spacing standards, medians, and restriction of turning movements in compliance with statewide planning goals, in a manner compatible with acknowledged comprehensive plans and consistent with state law and the OTP. Access management spacing standards for state highways vary depending on the classification of the highway, posted speed, average annual daily traffic (AADT) volumes, and several other variables. Spacing standards for Crook County highways are presented in Table 3 and Table 4. Any new street or driveway connections, as well as any changes to existing street or driveway connections, to state roads within the TSP study boundary must be in compliance with these rules by ODOT.

[3] Amendments to OAR 734-051 were adopted in early 2012 based on passage of Senate Bill 1024 and Senate Bill 264 in the 2010 and 2011 Oregon Legislature respectively. The amendments were intended to allow more consideration for economic development when developing and implementing access management rules, and involved changes to how ODOT deals with approach road spacing, highway improvements requirements with development, and traffic impact analyses requirements for approach road permits.

Table 3. Spacing Standards for Highways, ADT < or = 5,000 (OR 27, OR 370 and OR 380)

Posted Speed (mph)	Spacing (feet)			
	Regional and District Highways, Rural and Urban (feet)	Statewide Highways, Rural Areas (feet)	Statewide Highways, Urban Areas (feet)	Highways, Unincorporated Communities, Rural Areas (feet)
55 and higher	650	1,320	1,320	1,320
50	425	1,100	1,100	1,100
40-45	360	990	360	750
30-35	250	770	250	425
25 and lower	150	550	150	350

Table 4. Spacing Standards for Statewide Highways, ADT > 5,000 (UR/OR 26, OR 126)

Posted Speed (mph)	Spacing (feet)			
	Expressway, Rural Area	Expressway, Urban Area	Rural Area	Urban Area
55 and higher	5,280	2,640	1,320	1,320
50	5,280	2,640	1,100	1,100
40-45	5,280	2,640	990	800
30-35	-	-	770	500
25 and lower	-	-	550	350

Project Relevance: State highways in Crook County are subject to the rules in OAR 734-051, including OR-126, US/OR 26, OR 27, OR 270 and OR 380. Crook County's updated TSP will articulate policy support for requiring future development to adhere to access management spacing standards for private and public approaches on statewide highways, as required by the Oregon Highway Plan and OAR 734-051.

Statewide Transportation Improvement Program (2015-2018)

The Statewide Transportation Improvement Program (STIP) is Oregon's four-year transportation capital improvement program that identifies funding for, and scheduling of, transportation projects and programs. It includes projects on the federal, state, city, and county transportation systems; multimodal projects (highway, passenger rail, freight, public transit, bicycle, and pedestrian); and, projects in the National Parks, National Forests and Native American tribal lands. Oregon's STIP covers a four-year construction period, but is updated every two years in accordance with federal requirements. The program currently approved is the 2015-2018 STIP. The projects within Crook County in the 2015-2018 STIP are listed in Table 5.

Table 5. 2015-2018 STIP Projects in Crook County

Project Name	Project Description	Key	Funding and Cost	
			Total STIP Funding	Project Cost
9TH ST EXTENSION: MAIN ST @ 10TH ST (PRINEVILLE)	TRAFFIC SIGNAL AND ADA RAMPS	16333	$705,000	$495,000
OCHOCO CREEK TRAIL: HARWOOD ST - THIRD ST	RECONSTRUCT THE MULTI-USE PATH CONNECTING RESIDENTIAL AREAS TO PARKS & COMMERCIAL CENTERS	18103	$592,000	$599,855
GEORGE MILLICAN RD: OR126-RESERVOIR RD	ROAD RECONSTRUCTION, SHOULDER WIDENING, OVERLAY PAVING, SIGNS, STRIPING AND DELINEATORS	18446	$8,163,800	$7,672,531
FFO - OR126 @ TOM MCCALL ROAD (PRINEVILLE)	INTERSECTION IMPROVEMENTS	18728	$4,500,000	$4,500,000
REGION 4 HSIP TRANSITION RURAL	SIGN UPGRADES, RUMBLE STRIPS, DELINEATORS & STRIPING	19165	$870,276	$578,305
REGION 4 CENTERLINE RUMBLE STRIP	INSTALL RUMBLE STRIPS	19196	$3,000,000	$541,149
OR380: OCHOCO CREEK BRIDGE REPLACEMENT	REPLACE BRIDGE #07282	19209	$3,240,000	$2,743,532
US26: MEADOW LAKES-KNOWLEDGE STREET ADA (PRINEVILLE)	CONSTRUCT ADA RAMP	19254	$315,000	$315,000
US26: MP24.9 - MP26.24 BIKE PATH (PRINEVILLE)	2" OVERLAY BIKE PATH	19360	$120,000	$110,000
SE LYNN STREET (PRINEVILLE)	SAFETY IMPROVEMENTS	19758	$50,721	$50,721

Project Name	Project Description	Key	Funding and Cost	
OCHOCO TRAIL REHABILITATION	The project will restore and rehabilitate three historic non-motorized multi-use trails that have been not been maintained for decades.	19856	$157,120	$157,120

Project Relevance: The TSP update analysis will consider projects that are programmed in the STIP. An expected outcome of this planning process is to develop a list of projects that will be recommended for inclusion in the next STIP.

REGIONAL PLANS AND POLICIES

COIC Regional Transit Master Plan (2013)

The purpose of the Regional Transit Master Plan, coordinated by the Central Oregon Intergovernmental Council (COIC), is to analyze the needs of the existing transit system, customer, decision-maker and stakeholder and to summarize feedback from these groups to provide direction on future growth, determine a regional funding structure, and promote the benefits of transit as part of the multi-modal transit system. The plan covers Crook, Deschutes, and Jefferson counties, and was completed in coordination with the Bend MPO Transit Plan.

The plan refined the vision for Cascades East Transit in the region, COIC's transit operator:

> *Provide safe, efficient, reliable and cost-effective regional transit connections within and between the urban growth boundaries of all communities in Central Oregon.*

The plan includes seven goals to advance the vision. Highlighted below are several goals and implementation measures that may be relevant to the Crook County TSP update.

Goal 1: Ensure transit service is safe, efficient, and reliable

- *Operate on schedule within on-time performance standards*

Goal 4: Increase the visibility and elevate the image of transit in Central Oregon.

- *Communicate to the region the role of transit and why it is valuable to the region.*
- *Continue to partner with local organizations, businesses, municipalities and other agencies to maintain COIC/CET's community outreach and information efforts.*

Goal 5: Provide appropriate service levels and types for CET's ridership markets.

- *CET only operates fixed-route service in Bend, but demographic data suggests Redmond could support fixed-route service in the near or mid-term and that Prineville and/or Madras may be able to support fixed-route service within the timeframe of this plan.*
- *Provide service to rural areas (outside UGBs) only as subsidized to do so. Develop cost-effective services to provide mobility options outside urban growth boundaries (UGBs) for those without other transportation options, such as volunteer driver progra*

Goal 6: Coordinate regional services with other local or intercity transit providers.

Goal 7: Advocate for transit-supportive development practices.

- *Pedestrian-supportive development practices and community design help provide safe and convenient access routes to transit services.*

- *Encourage higher-density development and relaxed parking requirements around Community Connector stops or transit hubs.*

The plan also included a detailed service plan for the short-, mid- and long-term future of the system. Summarized below are key elements of the service plan that may be relevant to the TSP update:

> ***Short-Term (1-3 years).*** *The short-term service plan assumes that transit service is funded with existing revenue sources and that these sources continue to be unstable and declining. Thus, a short-term service reduction (and restructuring) plan was developed until a more stable local funding source can be established.*
>
> ***Mid-Term (3-10 years).*** *The mid-term service plan assumes a preferred regional and local service network designed to meet local and regional demand. The primary improvements in the mid-term include expansion of the fixed route network in Redmond, as well expansion of the highest demand connections on the Community Connectors (based on the demand estimates).*
>
> ***Long-Term (10-20 years).*** *The long-term service plan provides a vision for CET (outside of Bend) beyond a 10-year time frame. As with the mid-term service plan, the long-term vision is presented as a prioritized menu of service improvements that can be implemented as funding becomes available.*

The implications of the plan on Crook County are largely limited to regional transit originating in Prineville and a local service route within Prineville. In the short-term, the plan calls for the elimination of one morning trip on the Redmond-Prineville Community Connector route, and the closing/relocation of the park-and-ride at OR 126/OR 26. In the medium and long-term, the plan calls for additional morning, evening and weekend service and the use of the Community Connector for some extended local service.

Project Relevance: The updated public transportation element of the TSP will be consistent with the Regional Transit Master Plan and, generally, the TSP will recommend projects and policies that are supportive of the vision, goals and implementation measures for enhancing the regional transit system. As the report notes, though transit service is limited in many parts of the region currently, demographic changes and population growth will drive greater demand in the future. Projects and policies in the Crook County TSP should be integrated with the regional transit plan to maximize opportunities for increasing transit ridership and transportation options, in accordance with statewide transportation planning policies.

COIC Transportation Options Plan (2013)

The Central Oregon Strategic Transportation Options Plan (COTOP) is a long-range plan intended to help local governments and the State meet the 2030 demand for intercommunity trips in the region through cost-effective solutions, including public transit and other alternatives to single-occupancy vehicles. The plan focused on intercommunity trips in eight corridors in the region, including the following in Crook County:

- Hwy 126, Redmond - Prineville
- Hwy 26, Madras - Prineville

The plan considered a set of four transportation options/strategies: intercity bus, employer vanpool/carpool, commuter rail, and pricing. The analysis evaluated the impacts of these investments against a baseline case for 2030 to identify if the investments could lessen the need for future capacity-enhancing roadway projects in the study corridors.

Broadly, the study found that the intercity transportation strategies can have a relatively small influence on capacity needs, because the corridors are expected to remain relatively uncongested, and a large share of the trips on these corridors are through-travel rather than intercommunity travel. Through travel would not be impacted by the transportation options that were studied.

The study found that investments in the Madras-Prineville and Redmond-Prineville corridors have limited potential. The study notes that investments in one corridor benefit travel on corridors not directly studied; improved service from Prineville-Redmond and Redmond-Bend improves travel from Prineville-Bend.

The study posited the following conclusions about intercommunity travel alternatives:

> *Vanpool investments are a relatively low-cost (and underutilized) means of providing mobility for peak-hour trips and could yield benefits in the region.*
>
> *Commuter rail approaches the benefits of the "High Transit" scenario but focuses resources in a limited part of region (i.e., US 97 corridor between Madras and Bend) and would have several challenges.*
>
> *A broad pricing policy (e.g., VMT-based driving fee) could be an effective complement to a high level of transit investment. A relatively high fee would make the cost of driving more visible and increase the marginal cost of driving.*

Accordingly, the study outlined the following implementation concepts to be considered by local jurisdictions, ODOT and other partners:

- There does not appear to be a need for significant capacity expansion in the corridors.
- Transit/vanpool investments would be most effective in the Redmond-Bend corridor.
- Consider ways to expand the provision of vanpools, which are very cost-effective.

- Consider transit-supportive land use and urban form as a complement to developing non-SOV transportation options.
- Invest in the Drive Less Connect program to expand outreach for transit and vanpool programs.

Project Relevance: The findings and implementation recommendations of the COTOP can inform the transportation options explored for the County as part of the TSP update. COTOP findings may influence policy development related to alternative modes of transportation, transportation demand management, or the integration of land use policy with the transportation system. Additionally, the findings should inform the analysis of alternative improvements and modal plans, specifically public transit.

COIC Regional Park & Ride Plan (2014)

This plan identifies, prioritizes and provides preliminary design and cost information for park-and-ride lots in areas of ODOT Region 4. Park-and-ride lots can be classified as intermodal transfer facilities; they provide a staging location for travelers to transfer between the auto mode and transit or between the single occupant vehicle (SOV) and other higher occupancy vehicle (HOV or carpools) modes. Park-and-rides can reduce SOV trips, facilitate a multi-modal transportation system, and reduce the need for capacity-enhancing roadway projects. The planning process included stakeholder interviews, a survey, estimates of demand, and determination of a prioritized list of locations for Park-and-Rides.

The study concluded that a potential Park-and-Ride at the Erickson's Thriftway Parking Lot near downtown Prineville was ranked as the fifth highest priority for future lots in the region. The lot has potential to replace the existing Community Connector shuttle stop at city hall and has good bike and pedestrian access. Proposed improvements include signs, lighting, a transit shelter, and ADA improvements to sidewalks.

Project Relevance: The TSP update will include the development of the Park-and-Ride at the Erickson's Thriftway as a potential project to be coordinated with CET and the City of Prineville.

COACT ODOT Region 4 Report on Central Oregon Rail Planning (2009)

The Central Oregon Area Commission on Transportation (COACT) coordinated technical work and stakeholder involvement, conducted between 2007 and 2009, to address various rail-related safety, congestion, freight mobility, and economic development issues for Central Oregon. One of the primary goals of the study was to evaluate the feasibility of relocating the Burlington Northern Santa Fe (BNSF) line to the east of Redmond and Bend; this was found to not be feasible due to high costs. The study also evaluated the need and priority of eliminating or improving at-grade rail crossings throughout the region. No rail crossings were located within Crook County, but the BNSF/COPR line crossing of O'Neil Highway, near Redmond, was identified as a priority for improvement. More broadly, the report found

there was an opportunity to better leverage the COPR line for economic development by marketing industrial sites along the line and enhancing the Prineville Freight Depot.

Project Relevance: As identified in the Oregon State Rail Plan, the TSP update will consider how to preserve and enhance access to the industrial sites that use the COPR and to the Prineville Freight Depot. The COPR is a valuable economic asset that needs reliable access for freight shippers and industrial users to succeed.

COIC Comprehensive Economic Development Strategy (2007, update in progress)

The Comprehensive Regional Economic Development Strategy (CEDS) is a regional framework for economic development planning efforts in the Central Oregon Region. The strategy is coordinated by COIC. The purpose of the strategy is to coordinate the region's needs, priorities, strategies and goals for economic development. The CEDS was last updated in 2007; an update is currently in progress. Generally, the 2007 CEDS identified transportation infrastructure as a critical foundation for the regional economy and outlined the following transportation-related objectives:

Develop an integrated long-range transportation plan for the region, which coordinates and integrates local planning for all transportation modes (rail, air, roads, transit, bicycle/pedestrian)

Provide for/support transportation options appropriate to the commuting needs of Central Oregon workforce

Develop and/or improve intermodal facilities for the efficient movement of goods and services

Secure funding for backlog of transportation project needs, as per COACT project needs list

Most of these broad objectives are still relevant today, but the update in progress should provide a more accurate view of the transportation priorities for regional economic development.

Project Relevance: The TSP update will consider the transportation objectives identified in the 2007 CEDS as they relate to policy and project prioritization. Further, to the extent it is possible to obtain information on the update of the CEDS currently in progress, and depending on what strategy decisions have been made, the TSP should consider how to address and advance the needs identified in the 2016 CEDS update.

Central Oregon Regional Large Lot Industrial Land Needs Analysis (2011)

The Regional Large Lot Industrial Lands Needs Analysis (Land Needs Analysis) documented that economic changes over the previous decade were driving real estate demand for large, developable parcels of industrial land between 50 and 200 acres in size. It found that to compete for the large firms that require this type of land—data centers or distribution centers, for example—a region must have a substantial supply of vacant sites in this size range that are developable for industrial uses. Regional officials recognized that Central Oregon was an attractive location for these firms, but lacked a sufficient supply of sites.

The Central Oregon Regional Large Lot Industrial Land Needs Analysis was a collaboration between the cities and counties of Central Oregon, the Central Oregon Intergovernmental Council, and Business Oregon (the state's economic development office). The study was preceded by a rulemaking effort with DLCD to establish a defined process for the cities and counties in the Central Oregon region to designate lands for large lot industrial use and, where necessary, amend Urban Growth Boundaries (UGBs) to make the lands developable under the statewide land use framework. The analysis establishes the adequate factual basis for Central Oregon cities and counties to amend UGBs and apply a large lot industrial zoning designation to potential sites.

This study analyzed economic and industry trends and estimated the potential market demand for these types of sites across the region. The analysis concluded that the region could anticipate demand for up to 6 large lot industrial sites of varying sizes of 50 acres or greater distributed across at least three different jurisdictions in the region. Jurisdictions would propose sites to the COIC, who would apply a standard set of criteria to determine if the site met the needs identified in the analysis. COIC was granted the authority to accept or deny potential sites be included in the large lot industrial program.

COIC has approved proposals by two cities to consider a site through the Regional Large Lot Industrial Program. The City of Madras proposed a site northwest of the Madras Municipal Airport and the City of Redmond proposed a site just south of the Deschutes County Fairgrounds. Both sites are outside the existing UGBs, and applications to amend the UGBs to include the sites are not yet submitted.

Project Relevance: The transportation impacts of development of proposed large lot industrial sites will be evaluated as part of the UGB amendment process for each jurisdiction. While current proposals are for sites outside of Crook County, development in these locations has the potential to generate significant trips that may have an impact on regional transportation infrastructure. The Crook County TSP update will recommend that Crook County monitor the UGB amendment process to determine if development of the sites will have short-term impacts on Crook County transportation systems. This TSP update will also identify the need for future planning efforts to assess the transportation impacts of other large lot industrial sites within Crook County as their location, scale and uses are defined.

COUNTY PLANS AND POLICIES

Crook County Comprehensive Plan (1979, updated in 2003)

The Crook County Comprehensive Plan is the primary guiding policy document for growth management, land use and transportation in the county. The plan was originally developed in 1979, and has been amended many times, most recently in 2003. Most broadly, the plan establishes policies to direct the relationship between rural land and urban development that conserves valuable farmland and environmental resources. In accordance with statewide planning goals, the plan outlines the criteria by which UGBs are defined and amended in the county. The provision and management of transportation facilities are expected to be consistent with and support these growth management decisions:

> ***Rural-Urban Relationship – Implementation Guideline 1.*** *The type, location and phasing of public facilities and services are factors which should be utilized to direct urban expansion.*
>
> ***Rural-Urban Relationship – Implementation Guideline 2.*** *The type, design, phasing and location of major public transportation facilities (i.e. all modes: air, rail, mass transit, highways, bicycle and pedestrian) and improvements thereto are factors which should be utilized to support urban expansion into urbanizable areas and restrict it from rural areas.*

Additionally, the Comprehensive Plan directs transportation policies and projects to support economic development in the county. The selected policies below, though likely developed as part of the original plan in 1979, remain relevant to the TSP update:

> ***Industry Policy 5****. Facilitate industrial development on designated sites by reducing permit procedure, delaying site improvement requirements and providing public utilities in advance.*
>
> ***Industry Policy 6.*** *Encourage the concept of an industrial park complete with platted streets, railroad spur and lots, and with utility hook-ups for development on at least one designated site by local government, private enterprise or dry land port district.*
>
> ***Railroad Policy 1.*** *To insure input from the Prineville Railroad upon plans for road construction adjacent to, or affecting, the railroad tracks.*
>
> ***Railroad Policy 2.*** *To provide appropriate measures (i.e. signals, gates, grade separation) as part of a long-range capital improvement program for all crossings.*

Policy direction for supporting alternative modes of transportation is also provided in the Comprehensive Plan. While several of the more specific policy goals may have been achieved, the broad policy statements remain relevant to transportation planning in the county. For example, the comprehensive plan offers policy direction for the active transportation system to focus on safety, convenience, access, connectivity, sufficient bicycle parking, and accessibility.

> ***Taxi and Bus Policy 4.*** *To encourage private efforts to supply forms of inter and intra city transit to the commuter and the transportation disadvantaged.*

Bicycle and Pedestrian Policy 1. *To insure routes are safe and convenient.*

Bicycle and Pedestrian Policy 2. *To avoid conflicts (combining intersections) among differing transportation modes.*

Bicycle and Pedestrian Policy 3*. To require that all proposed subdivisions consider bicycle and pedestrian paths, integrated with the Metro Area bicycle and pedestrian path network, within the plat design, and to encourage these paths outside of the street right-of-ways preferably along preserved open spaces.*

The plan establishes that the Airport Master Plan is an adopted element of the Comprehensive Plan and that this document guides all city actions related to aviation planning. The policy guidance established by the Airport Master Plan is described later in this memorandum.

Project Relevance: The Crook County Comprehensive Plan establishes that the transportation system must serve the growth management policies of the community, facilitate economic development, and enable safe and convenient travel by all modes. The TSP update will be adopted as an element of the Comprehensive Plan, replacing the 2005 TSP, will provide more specific policy direction, and will include more detailed system planning and project prioritization. Policy changes considered as part of the TSP update process must either be consistent with existing policies, including those identified above, or propose amendments to adopted policies.

Crook County Transportation System Plan (2005)

The Crook County Transportation System Plan (TSP) was last updated in 2005 to address anticipated transportation needs through the year 2025. This 2017 update of the TSP will replace the 2005 TSP and extend the planning horizon to 2036. The existing conditions and transportation modeling analysis will be updated and a revised set of alternative improvements will be evaluated. The TSP is an adopted element of the Comprehensive Plan and is designed to meet federal and state requirements for system planning.

The first two sections of the TSP provide the context and framework for the technical analysis and project prioritization; these two sections will need to be updated to reflect current conditions and community needs.

- **Section 1: Introduction.** This section will need to be revised to include a summary of the policy and regulatory context of the TSP currently; this memorandum will be used to draft that introduction. Additionally, this section will describe the planning process for development of the TSP.
- **Section 2: Goals and Policies.** This section will also be revised to reflect current conditions and needs. The existing TSP outlines nine goals for the transportation system:
    - *Goal 1 - Mobility*
    - *Goal 2 - Efficiency*

- *Goal 3 - Safety*
- *Goal 4 - Equity*
- *Goal 5 - Environmental*
- *Goal 6 - Alternative Modes of Transportation*
- *Goal 7 - Maintain Multi-Jurisdiction Coordination*
- *Goal 8 - Roadway Functional Classification*
- *Goal 9 - Transportation Financing*

The existing plan analyzed alternative improvements to the transportation system, and recommended improvement projects in the following categories; the identification and prioritization of projects will be updated based on current conditions and updated policy direction:

- *ODOT STIP Projects (from the 2004-2007 STIP)*
- *City of Prineville Improvements within the UGB or Impacting Crook*
- *County Transportation System*
- *Intersection Improvements*
- *Safety Improvements*
- *Roadway Improvements*
- *Crook County Road Department Projects*
- *Oregon Forest Highway Improvement Projects*
- *Bicycle and Pedestrian Improvements*
- *Future Park & Ride Locations*

In addition, standards for the design and management of county roads will be updated, where necessary. These standards can be found in the following sections of the existing TSP:

- **Functional Classification (Section 7.1.2):** This classification defines each roadway's role in the countywide network to determine the appropriate design and access standards.
- **Street Design Standards (Section 7.1.3, Tables 7-2 and 7-2):** These standards define the appropriate dimensions of each component of the roadway based on its functional classification.
- **Access Management Standards (Section 7.1.4, Tables 7-3):** These standards define the number of access points on a roadway and appropriate adjacent land uses to maintain it's safe and efficient performance. Access management standards on state facilities are governed by OAR Chapter 734, Division 51 and the Oregon Highway Plan.
- **Transportation Impact Analysis (TIA) Requirements (Section 7.1.7):** These requirements establish an objective assessment of the transportation impacts associated with a land use or development action and determine if improvements will be necessary because of the action. This section defines when a TIA is required, the methods of the analysis, intersection operation standards, and review policies and procedures.

Project Relevance: The goal of this planning project is to update the 2005 TSP; the outline above provides a partial overview of key elements of the TSP that will be reviewed and potentially revised. Existing conditions analysis, travel forecasts, and modal plans will also be updated.

Crook County Coordinated Human Services Public Transportation Plan (2007, updated in 2009)

The purpose of Crook County Coordinated Human Services Transportation Plan is to improve transportation services for people with disabilities, seniors, and low-income individuals by coordinating resources and guiding future investment, including acquisition of grant resources. The plan is required federally of all agencies that received Special Transportation Funds (STF) to provide transit services to disadvantaged populations. The plan was updated in 2009 to establish a new set of priorities for coordinating resources and making investments in the transit system. Several priorities remain relevant to the 2017 TSP update, and may influence policy direction or project prioritization:

***Support What We Have**. Support, maintain, and strengthen the existing transportation network, including local service and community connector shuttles.*

***Information Clearinghouse**. Enhance the Cascades East Ride Center (CERC) and the CET website to provide a clearinghouse for transportation information.*

***Expand Days**. Expand public transportation service hours of operation to weekends*

***Marketing, Outreach, and Travel Training**. Develop a comprehensive marketing and awareness campaign targeting seniors, persons with disabilities, and low-income households, to ensure that they are aware of the services provided by Cascades East Transit, and educating them on how to access CET services.*

***Veterans Shuttle Wheelchair Accessibility**. Develop a wheelchair-accessible shuttle to the VA hospital in Portland.*

Project Relevance: The TSP update will evaluate if the priorities identified in the Crook County Coordinated Human Services Transportation Plan are still relevant to public transportation needs in the county or have been addressed by the COIC Regional Transit Master Plan. If needs are still relevant, they will be reflected in TSP transit policies and projects, where appropriate.

OR 126 Corridor Facility Plan (2012)

The OR Highway 126 Corridor Facility Plan assesses the highway segment of OR 126 between the western Crook County boundary and the junction with US/OR 26 in Prineville. The highway is classified as an Expressway in the OHP, intended for "safe and efficient high-speed and high-volume traffic movements." Land uses along this segment of the highway are diverse, users must cross the highway at several points, significant growth is anticipated for the corridor, and the highway has some operational and safety concerns. The purpose of this plan was to:

> *Establish a long-term vision for OR Highway 126 and provide a series of strategies aimed at addressing congestion, improving safety, supporting economic development and expected population growth in Crook County and Prineville, and serving statewide mobility needs.*

The plan evaluated conceptual alternative improvements through a multi-stage screening process. Ten long-term transportation improvements were selected, including roadway widening in specific locations and redesign or optimization of several intersections (Table 6).

Table 6. OR-126 Facility Plan Long-Term Improvements

App "A" Reference	Location	Project Description
CS1	County Line to Powell Butte Highway	Widen highway shoulders along two-lane section
PB1[1]	Powell Butte Highway	Multilane roundabout
CS1	Powell Butte Highway to Williams Road	Widen highway shoulders along two-lane section
W1	Williams Road	Two offset "T" intersections
CS1	Williams Road to Tom McCall Road	Widen highway shoulders along two-lane section
M1	Airport Road/ Millican Road	Reroute to Tom McCall Road
T1	Tom McCall Road	Interchange
CS2	Tom McCall Road to Prineville "Y"	Widen highway to four-lanes
01[2]	O'Neil Highway	Reroute to US 26
Y1[3]	Prineville "Y"	Signal or multilane roundabout

[1] A roundabout is the preferred option at the OR Highway 126/Powell Butte Hwy intersection. Pending ODOT policy regarding roundabouts along state highways, signalization could be an alternative intersection treatment option.
[2] Ultimate route will be defined as part of the City of Prineville TSP process.
[3] Ultimate intersection control will be defined as part of City of Prineville's TSP process.

The plan also includes two cross-section design standards for the highway segment, recommendations for access management, an assessment of right-of-way needed to implement the improvements and a phasing plan.

Project Relevance: The TSP update will integrate the findings and recommendations of the OR-126 corridor plan into the policy direction and prioritization of future projects. The cross-section design standards and access management approach may need to be reflected in the relevant sections of the TSP. The list of implementation projects and phasing plan will be incorporated into the alternatives analysis and modal plans.

Crook County Code (updated 2016)

The Crook County Code (code) regulates development within unincorporated Crook County and implements the long-range land use vision embodied in the Comprehensive Plan. The code contains several sets of requirements that address the relationship between land use development and transportation system development. Those requirements are discussed below and address access and connectivity, design standards, traffic impact analysis, and parking.

Street Access and Connectivity

Road access is primarily addressed in Chapter 12.04 of the code. The section establishes that an access permit is required and the County roadmaster and Crook County planning department have authority to approve or deny the permit in accordance with access standards adopted by order of the county court. The specific access spacing standards are not provided in the code; these standards are presented in the adopted TSP (Section 7.1.4, Table 7-3). The code does not provide any specific design standards for access, except where specific standards are requested by emergency service providers (17.36.020 (1)(d)).

The code does not define specific connectivity standards such as block length or width related to new land divisions, but does require that the subdivision plan remain consistent with the comprehensive plan (17.16.020(1)):

> *The subdivision is an effective, efficient and unified treatment of the development possibilities on the project site while remaining consistent with the comprehensive plan relative to orderly development and land use patterns in the area.*

No standards in the code address pedestrian or bicycle access or connectivity. The 2005 TSP identifies that bicyclists and pedestrians are mainly served by road shoulders in rural areas.

Street Design Standards

Street design standards are established in Chapter 17.36 of the code and replicated in the 2005 TSP (Section 7.1.3). The standards define dimensions of total right-of-way, vehicle travel lanes, and shoulders for local streets, arterials, collectors. The standards do not include separated pedestrian or bicycle facilities.

Transportation Impact Analysis and Performance Standards

The 2005 TSP establishes that a Transportation Impact Analysis (TIA) is required if a proposed land use action triggers any one of four criteria. The code does not include specific provisions for when a TIA is required, the methods of the analysis, or the applicable performance standards; these provisions are defined in the TSP (Section 7.1.7). As the requirement to complete a TIA is not explicit in the code, it is assumed that the discretionary approval criteria of the code provide a link to this requirement in the TSP, such as to "carry out the comprehensive plan of the county" or for the "orderly and economic provision of public facilities and services" (18.04.020).

Parking

Minimum off-street parking requirements are provided in Chapter 18.128 of the code. The chapter establishes the minimum number of off-street parking spaces required for new development and expansion of an existing development consistent with the proposed (or existing expanding) land use. The chapter also establishes other use and design provisions for parking, such as lighting and dimensions. The code does not stipulate a maximum number of parking spaces.[4]

Project Relevance: Amendments to code provisions related to pedestrian and bicycle access and connectivity, transit access, traffic impact analyses, and parking standards may be recommended as part of this planning process to implement the updated TSP, ensure consistency between the code and TSP, and strengthen compliance with the TPR.

[4] Chapter 18.128 does not include standards for pedestrian circulation around and through parking areas, requirements for preferential parking for carpools and vanpools, for allowing transit-related uses such as park-and-rides in parking areas, or that bicycle parking be provided, all of which are state requirements pursuant to the TPR. Recommendations related to implementing the updated TSP may include updating code requirements in these areas, where applicable to Crook County.

Crook County Transportation Budget

Crook County's road fund budget provides general information on revenue sources and funding for capital improvements (Table 7). Crook County does not maintain a Capital Improvement Plan. The total annual budget amounts to approximately $22 million. In 2016/2017, approximately 30% of revenues were allocated non-capital expenses and $13.5 million was reserved for future expense. In 2015/2016, after several years of setting aside revenue, the department made a $14.5 million capital outlay.

Table 7. Crook County Road Funds Budget, 2015-2017

	Adopted Budget	
	2015/2016	**2016/2017**
Beginning balance/interest	$18,075,000	$19,976,134
Licenses, permits, fee	17,000	15,000
Intergovernmental payments	50,000	-
Misc. revenue	-	7,000
Reimbursed revenue	16,000	16,000
State revenue	2,000,000	2,207,908
Federal shared revenue	1,001,200	1,200
Interfund loan	285,500	106,000
TOTAL REVENUE	**$21,444,700**	**$22,329,242**
Personnel services	$1,618,485	$1,751,307
Materials and services	4,951,820	4,223,100
Capital outlay	14,574,395	2,235
Transfers out	-	247,120
Contingency	300,000	300,000
Interfund loan	-	-
Reserved for future expense	-	13,572,715
TOTAL EXPENSE	**$21,444,700**	**$20,096,477**

Project Relevance: The TSP update will estimate the total costs of identified improvements and assess funding needed to implement the improvements. The TSP may conclude that it is not feasible to fund all projects within the time horizon of the plan; projects for which funding is not anticipated are identified as "vision" projects. The TSP will consider the department's current revenue levels, non-capital expenditures, anticipated short-term capital projects, and potential future revenue sources in developing the funding plan.

CITY PLANS AND POLICIES

City of Prineville Transportation System Plan (2013)

The City of Prineville updated their TSP in 2013 to respond to new development activity, completion of the OR 126 Corridor Facility Plan, and a new System Development Charge (SDC) for transportation funding. The plan identifies key needs for the transportation system to address congestion and safety on 3rd Street (OR 26/126) and Main Street (continuation of OR 27). Additionally, major industrial development activity around the airport and on the east side of the city is driving a need for improved multi-modal connections and safety improvements in these areas. The sections below outline recommendations of the Prineville TSP that are relevant to the Crook County TSP: access management standards, improvement projects, and planning for freight access to rail infrastructure.

Access Management Spacing Standards

The 2013 Prineville TSP incorporated ODOT's 2011 revisions to access management standards (Table 8). The plan also provided examples of a series of access improvements that could be used to move a highway segment to be more consistent with ODOT's access management spacing standards. Some of these standards may impact ODOT roadways that extend into county jurisdiction.

Table 8. Access Management Spacing Standards for Highway Segments

Route Name	Description	Functional Classification	2012 AADT	Posted Speed (mph)	Access Spacing Standard (feet)
US 26					
Ochoco Hwy	East of Prineville "Y"	Statewide Highway[1]	>5,000	30	500
Madras Hwy	City Limits to Prineville "Y"	Regional Highway	>5,000	55 40 30	990 500 350
OR 27, Crooked River Hwy	Outside City Limits	District Highway	<5,000	45	360
OR 126, Ochoco Hwy	Entire Segment	Statewide Highway[2]	>5,000	55 45 30	2,640 800 500
OR 370, O'Neil Hwy	Entire Segment	District Highway	<5,000	55	650
OR 380, Paulina Hwy	Entire Segment	District Highway	<5,000	35 45	250 360

[1] STA= Special Transportation Area – from Milepost 18.24 (Locust Avenue) to 19.38 (Spruce Lane)

[2] EXP= Expressway - from Milepost 1.37 (Veteran's Way) to 17.92 (O'Neil Highway)

Transportation Improvement Projects

Many improvement projects identified in the Prineville TSP may impact roadways under county jurisdiction. Table 9 presents a selected list of projects that may be relevant to county system planning.

Table 9. Transportation Improvement Projects, Prineville 2013 TSP

Project #	Project Name	Description	Cost
ROADWAY PROJECTS - SHORT-TERM			
R6	Main Street Restriping	Restripe roadway into a three-lane cross-section from 9th Street to Peters Road	$60,000
R8	Combs Flat Road Widening	Widen to major arterial standard, including off street path, from US 26 to Lynn Boulevard	$2.63 M
R9	3rd Street Signal Coordination	Coordinate signals to improve traffic flow through downtown area	$50,000
ROADWAY PROJECTS - MEDIUM-TERM			
R3	Combs Flat Road Extension & Connection with Peters Road	Connection will extend from Laughlin north to Peters Road	$6.85 M
R2	Peters Road Connection to Lamonta	New road extends west from Main Street and aligns with Gardner at Lamonta	$4
ROADWAY PROJECTS – VISION TERM			
N/A	Combs Flat Road Extension	Extension extends from Peters Road north to Barnes Butte	N/A
N/A	Crestview Extension	New Roadway Construction (may trigger need for intersection improvements at OR 126/Rimrock Rd.)	N/A
N/A	Downtown Couplet	Conversion of NE 3rd Street and NE 2nd Street or NE 3rd Street and NE 4th Street to a one-way couplet	N/A
N/A	Fairgrounds Road	Construct new road between SE Lynn Boulevard and Main Street (aligning with Crestview Extension)	N/A
INTERSECTION IMPROVEMENTS			
I36	Access restrictions at 3rd Street and Meadow Lake Drive	Restripe to restrict eastbound and northbound left-turning movements in order to provide pedestrian crossing	$10,000
I9	Combs Flat & US 26	Address safety consideration: signal modification for addition of north/south left-turn lane with protected/permitted left-turn phasing	$180,000

MULTI-USE TRAIL VISIONARY IMPROVEMENT PROJECTS			
M1	O'Neil Hwy Shared-use Trail	Shared use trail – unpaved	$20,000
M2	Crooked River Shared-use Trail	Shared use trail – unpaved	Volunteers
M3	Ochoco Creek Shared-use Trail – North	Shared use trail – paved	$440,000
M9	Carey Foster Shared-use Trail	Shared use trail – paved	$350,000
M10	Look-out Shared-use Trail	Shared use trail – unpaved	$50,000
M12	Main Street (North)	Shared use trail – paved, from Peter's Road to north UGB (5,100')	$332,000
M13	Main Street (South)	Shared use trail – paved, from softball fields to south UGB (5,275')	$343,000

Rail Service

The City recently reclassified Lamonta Road to a freight route to enhance access to the Prineville Junction via Bus Evans Road. The road runs parallel to the City of Prineville Railroad. The City would like to work with Crook County to classify the portion of Lamonta Road that is under county jurisdiction.

Project Relevance: The Crook County TSP update will ensure consistency with the standards, improvements, and classifications of the Prineville TSP. Many of the policies and projects identified in the TSP may impact transportation conditions on county roadways or represent opportunities to better integrate the transportation systems of the city and county.

Prineville Downtown Enhancement Plan (1997)

The Prineville Downtown Enhancement Plan articulates a vision for 3rd Street (OR 26/126) in Downtown Prineville as a pedestrian-oriented, attractive commercial district. The plan proposes a range of streetscape improvements, including wider sidewalks, façade design regulations, curb extensions, surface treatments, parking configuration, landscaping, street furniture, lighting and utilities.

Project Relevance: The Crook County TSP update will consider if any changes to 3rd Street are programmed for implementation by the City of Prineville and ODOT. If necessary, the TSP will consider if the changes have potential to affect countywide planning considerations for OR 26/126.

Prineville Airport Master Plan (update in progress)

The Prineville Airport Master Plan is in the final stages of a plan update. The Federal Aviation Authority (FAA) is reviewing the plan and comments and approval are anticipated before the end of the year. This memorandum will be updated once the plan is finalized.

Prineville/Crook County Pedestrian and Bicycle Safety Health Impact Assessment (2011)

The Crook County Public Health Department partnered with planning staff from the City of Prineville and Crook County to perform a Health Impact Assessment (HIA) of the active transportation network in the city and county. A HIA evaluates the health impacts of potential plans, policies or projects and recommends ways to promote positive health outcomes. The HIA focused on safety and accessibility of sidewalks, walking paths, and bicycling facilities. The study used a demographic analysis of the city and county, a literature review, and a community participation process to appraise the impacts of a set of pedestrian and bicycle improvement projects. The findings and recommendations of the study follow below.

Sidewalks and walking paths

- *Increase current sidewalk connectivity (Harwood St., Elm St., Ochoco Creek Park, Lynn Blvd., Combs Flat Rd., etc.).*
- *Pursue "Rails to Trails" funding.*

Safety and accessibility of bicycle use

- *Increase existence of bicycle lanes in Prineville / Crook County.*
- *Create connectivity of bicycle lanes.*
- *Reduce/eliminate parked cars in bicycle lanes.*
- *Bicycle safety education and enforcement.*
- *Increased bicycle parking facilities throughout Prineville.*

Pedestrian safety

- *Develop a process for prioritizing pedestrian route improvements based on demand, existing conditions, and proximity to a designated Safe Route to School corridors.*
- *Signage to direct individuals to walking paths in the community.*
- *Develop a pedestrian education campaign.*
- *Implement traffic calming, including clear identification of school speed zones, specifically on Lynn Blvd for CCHS and CCCS.*
- *Improve sight distances for turning cars where needed.*

- *Create a safe crossing area for Highway 126 near (or under) Crooked River bridge*
- *Create strategic plan for student drop off and pick up around all school zones and educate students and parent regarding plan*

Project Relevance: The TSP update will consider how the findings and recommendations of the HIA influence pedestrian and bicycle policies, the identification and prioritization of pedestrian and bicycle projects, and the pedestrian and bicycle modal plans.

Improving Community Health in Crook County through Pedestrian Design: A Rapid Health Impact Assessment of Prineville's Highway 26 Streetscape Improvement Project (2016)

Crook County collaborated with the Oregon Health Authority and Crook County Public Health to perform a rapid Health Impact Assessment (HIA) to better understand the health impacts in and around downtown Prineville of a streetscape improvement project on Highway 26 (3rd Street).[5] The HIA model is a widely use tool in the public health field to assess the health impacts of policies, programs, and projects that are administered in non-health sectors. The model is based on the finding that social, economic, and physical conditions in which people live determine many health outcomes. As depicted in Figure 1 (Figure 2 in the HIA document), health is related to the Highway 26 streetscape project because pedestrian infrastructure can influence health issues and behaviors—such as physical activity or driving behaviors—which in turn impact health outcomes, such as injury, cardiovascular health, or obesity.

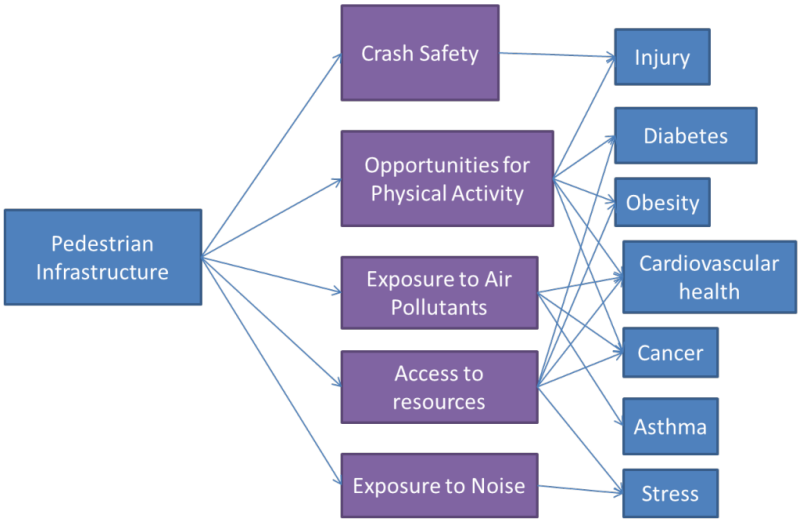
The goals of the HIA included increasing awareness of health impacts among local planning and design professionals, recommending design features for the 3rd Street that would have positive health effects, and informing project stakeholders about the potential for health impacts. The HIA is the result of a full-day workshop that involved local planning and public health professionals and other stakeholders.

Based on existing research, the study identified five primary health "pathways" associated with pedestrian infrastructure - ways in which pedestrian infrastructure can impact health. These pathways included:

1. Provide opportunities for physical activity
2. Reduce or exacerbate crash risk
3. Improve access to health supportive resources, such as healthy food, clinical care, social services, parks, etc.
4. Reduce or exacerbate exposure to air pollution
5. Reduce or exacerbate exposure to noise

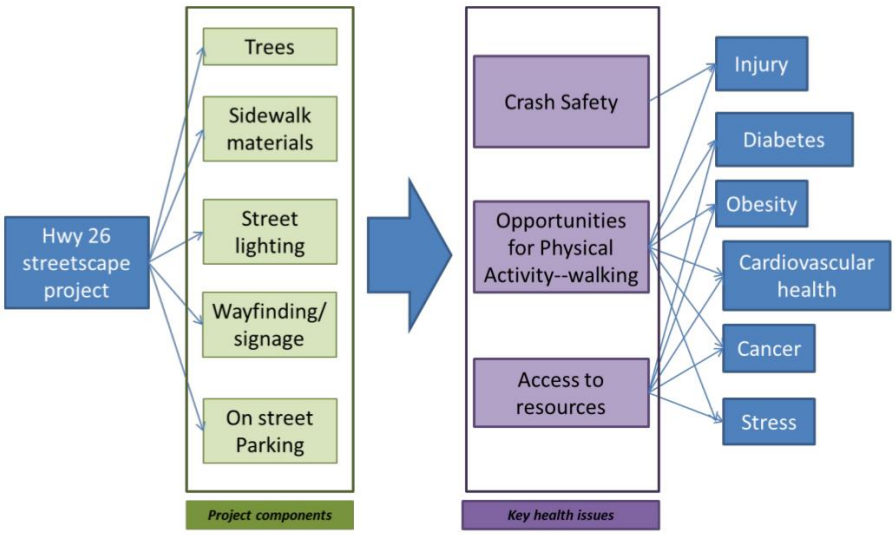
[5] A "rapid" HIA is a condensed version of a conventional HIA, completed in a shorter period of time and using an all-day workshop format to collect stakeholder input.

Figure 1. *Pathways between Pedestrian Infrastructure and Health*



Workshop participants opted to focus on health pathways that were most likely to be affected by the project, which were determined to be physical activity, crash risk, and access to resources (items 1-3 in list above). Participants then identified components of the streetscape project with greatest potential to impact these health pathways. The scope of components was limited to elements that were not guaranteed to be included in the project, which included lighting, concrete style, availability of on-street parking, trees, and wayfinding/signage (Figure 2, Figure 3 in the HIA document).

Figure 2. *Selected Health Pathways for the Highway 26 Streetscape Project*



The participants used a quantitative scoring approach to estimate the potential impacts of each project component on health issues. The HIA concluded with three key findings:

1. Wayfinding/signage and street lighting would have the greatest impact on all three health issues (crash safety, opportunities for physical activity, access to resources);
2. Trees and attractive paving materials would create an inviting walking experience, thereby increasing physical activity and access to health resources;
3. Minor changes to on-street parking would have a limited impact on health issues.

Based on these findings, the HIA recommended that project planners include wayfinding and signage, trees, lights, and decorative concrete in the design of the project. Additionally, the study recommended that project stakeholders continue to collaborate on the design of these project components to ensure that the features identified by the workshop participants that would influence health outcomes were well-integrated into the final project.

Project Relevance: The findings and recommendations of this rapid HIA should be considered in relation to any projects proposed in the TSP that could affect the operations or safety conditions of Highway 26 in downtown Prineville. Where projects related to Highway 26 are included in the TSP, the recommendations of the HIA should be consulted and, where appropriate, referenced in project descriptions. A secondary goal of the HIA was to build awareness of methods for integrating health impacts into transportation planning. The TSP update includes objectives related to health - see Goal 3 (Safety) and Goal 4 (Multimodal Users) in Technical Memorandum #2 - and will employ criteria focused on these goals for the purpose of evaluating transportation alternatives. In this way the TSP update integrates health impacts into current planning efforts and provides an opportunity to establish policies in support of health impact planning methods to evaluate future land use and transportation decisions.

2. TECHNICAL MEMO #2 GOALS, OBJECTIVES & EVALUATION CRITERIA

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
354 SW Upper Terrace Drive, Suite 101, Bend, Oregon 97702 P 541.312.8300 F 541.312.4585

TECHNICAL MEMORANDUM #2

Crook County Transportation System Plan Update

Plan Goals, Objectives, and Evaluation Criteria

Date: February 28, 2017
Project #: 20189

To: Ann Beier, Crook County
Devin Hearing, ODOT

From: Marc Butorac, PE, Ashleigh Ludwig, AICP, and Camilla Dartnell

This memorandum documents the draft guiding principles, goals, objectives, and evaluation criteria for the Crook County Transportation System Plan (TSP) update. The goals and objectives will guide the TSP update process to ensure key issues are addressed within this process.

This document is organized into three sections:

- Background – An overview of the goals and objectives from the 2005 TSP. Key transportation issues and changes in Crook County since the adoption of the current TSP.
- Goals and Objectives - Desired project outcomes and transportation needs that support the land use and growth vision for Crook County. Plan goals for the Updated TSP were developed based on the prior TSP, the County's Comprehensive Plan, and County and ODOT input. Objectives outline the discrete elements that, taken as a whole, support and promote the goals.
- Evaluation Criteria - Establishes a method for evaluating future alternatives and policies that move in the direction of achieving the identified plan goals and objectives.

This document was reviewed by the County, State, Technical Advisory Committee (TAC), Public Advisory Committee (PAC), and the public. Their input was used to revise the draft goals, objectives, and evaluation criteria.

BACKGROUND

Transportation System Plans provide the County and ODOT with guidance for planning, operating, funding, and improving a multimodal transportation system. The TSP focuses on priority projects, policies, programs, pilot projects, and studies for the next 20 years but also provides a vision for additional projects that could be implemented should funding become available. The TSP is intended to be flexible to respond to changing community needs and revenue sources over the next 20 years. The TSP builds consensus among the County, the city of Prineville, unincorporated communities, and

ODOT on the transportation needs and priority projects for the communities, allowing the local citizens to inform projects that are carried forward for funding from state and federal agencies.

The goals from the existing 2005 Crook County TSP are summarized below; the complete goals and objectives of the existing plan are provided as Attachment A.

- Goal 1 - Mobility: to provide a multi-modal transportation system that maximizes the mobility of Crook Country residents and businesses.
- Goal 2 - Efficiency: to create and maintain a multi-modal transportation system with the greatest efficiency of movement possible for Crook County residents and businesses in terms of travel time, and efficient management of the transportation system.
- Goal 3 - Safety: to maintain and improve transportation system safety.
- Goal 4 - Equity: to ensure the cost of transportation infrastructure and services are borne by those who benefit from them.
- Goal 5 - Environmental: to limit and mitigate adverse environmental impacts associated with traffic and transportation development.
- Goal 6 - Alternative Modes of Transportation: to increase the use of alternative modes of transportation (walking, bicycling, rideshare/carpooling, and transit) through improved access, safety, and service. Increasing the use of alternative transportation modes includes maximizing the level of access to all social, work, and welfare resources for the transportation disadvantaged. Crook County seeks for its transportation disadvantaged citizens the creation of a customer-oriented regionally coordinated public transit system that is efficient, effective, and founded on present and future needs.
- Goal 7 - Maintain Multi-Jurisdiction Coordination: to maintain coordination between Crook County, the City of Prineville, and the Oregon Department of Transportation (ODOT).
- Goal 8 - Roadway Functional Classification: to properly plan and maintain its transportation system based on a roadway functional classification system. The street and access standards are based on this roadway functional classification system.
- Goal 9 - Transportation Financing: to seek adequate financial revenues to fund its Capital Improvement Program and maintenance needs.

Significant changes in Crook County since the 2005 TSP will be considered in this TSP update. Increased population, economic development, and changes to commuting patterns throughout the Central Oregon region have placed additional demands on the Crook County transportation system since the adoption of the 2005 TSP. Moreover, freight traffic, including over-sized loads, has increased with the recovery since the Recession of 2008, placing additional stress on the County's transportation system and creating potential conflicts with other system users. Since 2005, there has been an increased demand for multi-modal transportation options in the County, which will be

addressed in this TSP update. Finally, several of the destination resorts approved within the County over the past 15 years are starting to build-out as the state and national economy has started to improve. Potential future development will further change the demand and travel patterns throughout the County.

Crook County's 2005 TSP did not reference State policies and guidance such as the Transportation System Management and Operations (TSMO) strategies that enhance safety, mobility, and the reliability of transportation systems. In addition, transportation related-technology has improved since the adoption of the County's current TSP. Through this project, the project team will evaluate opportunities to use Intelligent Transportation Systems (ITS)[1] to address traffic safety by providing real-time information to drivers and to enhance transportation efficiency for all modes of travel.

GUIDING PRINCIPLE AND PLAN GOALS AND OBJECTIVES

The overall guiding principle of the plan is to update it to provide and encourage a safe, convenient, and economical transportation system. The following plan goals are suggested to achieve this guiding principle. These goals will also help to support the land use and growth vision for Crook County and are considered desired project outcomes:

- Mobility & Connectivity
- Economic Development
- Safety
- Environmental
- Multimodal Users
- Planning and Funding
- Equity

GOAL 1: MOBILITY AND CONNECTIVITY

Promote a transportation system that links rural communities to key destinations in the County, Prineville, and adjacent Counties, and serves existing and future needs for transporting goods and people throughout.

[1] Intelligent Transportation Systems (ITS) are systems that integrate advanced communication technologies into vehicles and transportation infrastructure. Examples may include a wide range of technologies, including dynamic road message signs, vehicle detection systems, automatic road enforcement, and variable speed limits.

Objectives

1.1 Identify the 20-year roadway system needs to accommodate developing or undeveloped areas.

1.2 Promote transportation linkages that support local communities and regional connections to the County by promoting an integrated system of principal highways that move people and goods throughout the County, a County road system that facilitates transportation between various areas of the County and between principal highways, and a local road system that serves as access to commercial and residential areas.

1.3 Coordinate with the Oregon Department of Transportation (ODOT) and local communities to identify priority roadway improvements and maintenance needs.

1.4 Update roadway performance standards to ensure the efficient movement of people, goods, commodities, and commercial waste.

1.5 Update policies and standards that address street connectivity, spacing, and access management.

1.6 Balance local community and state goals for the state highways that run through the communities.

1.7 Support transit service to improve mobility within the County and connectivity to major destinations outside of Crook County, including regional jobs and higher education opportunities in Bend, Prineville, and Redmond.

1.8 Prioritize ADA compliance for facilities within the county to increase mobility options for all persons.

GOAL 2: ECONOMIC DEVELOPMENT

Plan a transportation system that supports existing industry and encourages economic development in the County.

Objectives

2.1 Develop and promote a multi-modal transportation network that supports the existing industrial, data storage, agricultural, and tourism industries and supports economic diversification in the future.

2.2 Promote railroad freight service when possible through integration of road and rail transportation, and upgrade highways in areas where rail is not an option.

2.3 Prioritize improving and maintaining the key freight routes of OR 26,OR 126, and George Millican Road throughout the county.

2.4 Identify the 20-year roadway system needs to accommodate developing or undeveloped areas.

2.5 Improve coordination between the private sector and the County to better integrate the County's industrial areas with these future transportation system improvements.

2.6 Encourage recreational tourism by developing connections and promoting access to major recreational locations and destinations and key services in the County, including the Ochoco National Forest, reservoirs, and trail systems.

2.7 Encourage bicycle tourism by prioritizing and improving recreational routes through the County.

GOAL 3: SAFETY

Provide a transportation system that promotes the safety of current and future travel modes for all users.

Objectives

3.1 Develop a multi-modal transportation system that incorporates safety and operational improvements for bicyclists.

3.2 Promote a transportation system that balances the needs for mobility and accessibility to allow for efficient travel on state highways that also provides safe, livable, and vibrant multimodal corridors in the core of unincorporated communities.

3.3 Ensure that roadways are designed, constructed, and maintained to an appropriate standard for their expected use, vehicle speeds, and vehicle traffic.

3.4 Reduce incidence and severity of crashes.

3.5 Provide a transportation system that allows for adequate emergency vehicle access to all land uses.

3.6 Promote railway and highway safety at and near railway intersections.

3.7 Update County access management standards for all county roads and County design standards.

3.8 Evaluate opportunities for Intelligent Transportation Systems (ITS) to address traffic safety by providing real-time information to drivers and to enhance transportation efficiency for all modes.

3.9 Develop traffic calming guidelines to encourage appropriate rural traffic calming methods and locations.

3.10 Evaluate increasing access points to Juniper Canyon and other locations where few access points may present a safety hazard.

3.11 Consider strategies to improve safe transport of farm equipment within the county.

3.12 Consider traffic calming techniques to encourage appropriate use of local and residential roads and support the addition of pedestrian crossings along roads when appropriate.

GOAL 4: MULTIMODAL USERS

Provide a multimodal transportation system that permits the safe and efficient transport of people and goods through active modes, which may also provide a benefit in improved health and environment within the County.

Objectives

4.1 Promote alternative modes, transit/dial-a-ride service, and rideshare/carpool programs through community awareness and education.

4.2 Support the development of regional public transit, including park-and-ride, opportunities.

4.3 Promote an interconnected network of bicycle, pedestrian, and transit facilities throughout the County.

4.4 Consider bicycle and pedestrian facility needs during construction of new roads and during upgrades of existing roads.

4.5 Promote a transportation system that includes pedestrian and bicycle facilities within the unincorporated communities to promote active transportation to and from schools, grocery stores, and other services.

4.6 Develop plan elements that guide pedestrian and bicycle pathways and facilities to achieve maximum connectivity between bicycle, pedestrian, transit, and vehicle routes and facilities, securing an intermodal network of safety and access for all types of users.

4.7 Develop a plan that supports the Crook County Parks and Recreation Trail system plans and interfaces with the City of Prineville pedestrian and bicycle system.

4.8 Promote a transportation system that include pedestrian and bicycle connections to recreational and tourist destinations throughout the County.

4.9 Support widening shoulders for bicycle travel as part of roadway preservation and improvement projects or as separate projects.

4.10 Support efforts to improve connectivity to the Prineville and Redmond airports.

GOAL 5: ENVIRONMENT

Provide a transportation system that balances transportation services with the need to protect the environment.

Objectives

5.1 Develop a multi-modal transportation system that avoids reliance upon one form of transportation as well as minimizes energy consumptions and air quality impacts.

5.2 Promote design standards that support acquiring only the minimum roadway width necessary for the roadway, including facilities for all users for the roadway classification.

5.3 Develop and upgrade transportation facilities to be consistent with the adopted Oregon Transportation Plan (OTP), the Oregon Highway Plan (OHP), and the Transportation Planning Rule (TPR), and ensure that valuable soil, water, scenic, historic, and cultural resources are preserved.

5.4 Comply with all applicable state and federal noise, air, water, and land quality regulations.

GOAL 6: PLANNING AND FUNDING

Maintain the safety, physical integrity, and function of the County's multi-modal transportation network, consistent with Goal 6 of the OTP.

Objectives

6.1 Seek and maintain long-term funding stability for transportation maintenance projects.

6.2 Evaluate new innovative funding sources for transportation improvements.

6.3 Ensure that the existing transportation network is conserved and enhanced through maintenance and preservation.

6.4 Identify areas where refinement plans or interim measures would increase the life of a facility or delay the need for improvements.

6.5 Continue to enhance relationships and improve coordination among Crook County, Prineville, ODOT, and the Federal Highway Administration (FHWA).

a. Cooperate with ODOT in the implementation of the Statewide Transportation Improvement Program (STIP);

b. Encourage the improvement of state highways;

c. Encourage planning coordination between Prineville, Crook County, and the State by establishing cooperative road improvement programs, funding alternatives, and schedules;

d. Work with applicable jurisdictions in establishing the right-of-way needed for new roads identified in the TSP;

e. Leverage federal and state highway funding programs; and

f. Encourage citizen involvement in identifying and solving transportation issues.

GOAL 7: EQUITY

Provide access to the transportation system for all users.

7.1 Provide transportation mode choices to all users of the transportation system.

7.2 Consider accessibility of those with sociodemographic characteristics that may make them less likely to rely on personal motor vehicles for access to key destinations, including poverty status, race/ethnicity, youth populations, elderly populations, and persons with disabilities.

7.3 Consider impacts to low income or minority populations when assessing the impacts of transportation infrastructure projects.

EVALUATION CRITERIA

A qualitative process using the six goals and corresponding objectives above will be used to evaluate the policies and alternatives developed during the TSP update process. The policies and alternatives will be qualitatively scored for each criteria based on the following scale:

- Most Desirable: The concept addresses the criterion and/or makes substantial improvements in this criteria category.
- Moderately Desirable: The concept partially addresses the criterion and/or makes some improvements in this criteria category.
- No Effect: The criterion does not apply to the concept or the concept has no influence on the criteria.
- Least Desirable: This concept does not support the intent of and/or negatively impacts the criteria category.

At this level of screening, the qualitative comparison will be used to inform discussions about the benefits and tradeoffs of each alternative. The specific evaluation measures to evaluate each criteria will be developed after confirmation of the goals and objectives with the project stakeholders. An example of potential evaluation measures that may be used are shown in Table 1.

Table 1. Example Evaluation Measures in Evaluation Matrix

Criteria Number	Evaluation Criteria	Evaluation Measures (Example)
Goal 3: Provide a transportation system that promotes the safety of current and future travel modes for all users.		
3.1	Reduce incidence and severity of motor vehicle crashes.	To what extent does the alternative reduce the estimated frequency of fatal and serious injury crashes? Whenever possible, measure the crash modification factors (CMFs) from the Highway Safety Manual for estimating relative change in predicted crash frequency.

ATTACHMENTS

Attachment A: 2005 Crook County TSP Goals and Objectives

ATTACHMENT A: 2005 CROOK COUNTY TSP GOALS AND OBJECTIVES

SECTION 2.0
TRANSPORTATION GOALS AND POLICIES

Section 2.0
Transportation Goals and Policies

This section establishes broad policy objectives that provide the context to make transportation investment decisions and to develop the existing and future transportation system within the unincorporated areas of Crook County.

2.1. GOAL 1 – MOBILITY

It is the goal of Crook County to provide a multi-modal transportation system that maximizes the mobility of Crook County residents and businesses.

The policies to be used to implement Goal 1 – Mobility are as follows:

1.1. Establish a transportation system that can accommodate a wide variety of travel modes and minimizes the reliance on any one single mode of travel.

1.2. Properly plan transportation infrastructure to meet the level of service set for each type of facility.

1.3. Maintain a level of service standard of LOS D or better for signalized intersections and a level of service of LOS E at unsignalized intersections if the intersection does not meet the most current Manual of Uniform Traffic Control Devices (MUTCD) signal warrants. If the intersection meets signal warrants, then the level of service standard for the unsignalized intersection shall be LOS E. At least two MUTCD signal warrants shall be met prior to consideration of signalization. A traffic study shall be conducted to analyze the potential installation of a signal that includes average daily traffic counts by hour on all intersection approaches, a signal warrant analysis based on the most recent MUTCD, and any other factors identified by a traffic engineer deemed as a factor for signalization such as poor sight distance, vehicle travel speed, and intersection geometric conditions.

For Oregon Department of Transportation (ODOT) facilities, Crook County shall defer to ODOT mobility standards described in the *1999 Oregon Highway Plan*. Section 3, Existing Conditions, describes the relevant ODOT mobility standards within the Crook County planning area.

1.4. Develop a local street plan to preserve future rights-of-way for future streets and to maintain adequate local and regional circulation in a manner consistent with Crook County's existing street system.

1.5. Require developments to construct their accesses consistent with the local street plan.

1.6. Develop an access management policy for the local arterial system and direct commercial development access to local streets wherever possible.

1.7. Encourage development to occur near existing community centers where services are presently available to minimize the need for expanding services and to more efficiently utilize existing resources.

1.8. Identify local traffic problems and recommend solutions.

1.9. Review and revise, if necessary, street cross section standards for local, collector, and arterial streets to enhance safety and mobility.

1.10. Develop and adhere to a capital improvement program implementing the improvement recommendations of the TSP as funding is identified.

1.11. Future transportation improvements along OR 126 shall occur by a four phase process. These phases are: 1) passing lanes every 3-5 miles; 2) continuous four-lane section; 3) grade separate the higher volume road intersections with interchanges and/or overpasses; 4) full access control with median barriers, frontage roads. Depending on the intersection, some elements of Phase 3 and Phase 4 can be intermixed.

The goal of this four-phase approach is to incrementally improve an existing two-lane rural highway, culminating in a four-lane facility with grade-separated interchanges and frontage roads. The timing of improvements may be tied to volume-capacity (v/c) ratios, levels of service, crash rates per million vehicle miles, reducing types of crashes, or other performance standards."

1.12. Any transporting changes near the Prinville Airport must consider the current Prineville Airport Layout Plan when considering such changes. Crook County does not necessarily support the conclusions of the 1998 City of Prineville Transportation System Plan in regard to their preferred option to improve the airport industrial area access to OR 126. The City of Prineville is in the process of updating their transportation system plan and should closely coordinate the airport industrial area access issues to OR 126 with Crook County since part of the affected facility and traffic is on county roads. The ultimate solution should adequately connect Tom McCall Road and Millican Road together in an efficient manner with one interchange connection to OR 126.

1.13. Crook County recognizes that the IGA agreements with ODOT in regard to the Powell Butte jurisdictional transfer and the improvements along OR 126 provide the framework to implement the transportation improvements along those

corridors. Specifically, the IGA addresses the planning and funding of the Powell Butte Highway interchange with OR 126 and the eventual four-lane widening of OR 126 from Redmond to Prineville. In addition, the IGA addresses the process to develop the Tom McCall Road/Millican Road interchange with OR 126.

2.2. GOAL 2 – EFFICIENCY

It is the goal of Crook County to create and maintain a multi-modal transportation system with the greatest efficiency of movement possible for Crook County residents and businesses in terms of travel time, travel distance, and efficient management of the transportation system.

The policies to be used to implement Goal 2– Efficiency are as follows:

2.1. Develop Crook County's transportation system with alternative parallel corridors to reduce reliance on any one corridor and improve local access through a local street plan that preserves future rights-of-way for future streets that develops Crook County's local street system.

2.2. Plan and improve routes to facilitate the movement of goods and services.

2.3. Manage Crook County's resources to improve the transportation system through an up-to-date Capital Improvement Program (CIP) reflecting the transportation needs of the county.

2.3. GOAL 3 – SAFETY

It is the goal of Crook County to maintain and improve transportation system safety.

The policies to be used to implement Goal 3 – Safety are as follows:

3.1. Examine the need for speed reduction in specific areas such as adjacent to local schools.

3.2. Ensure that the multi-modal transportation system within Crook County is structurally and operationally safe.

3.3. Periodically review crash records in an effort to systematically identify and remedy unsafe intersection and roadway locations.

3.4. Develop a traffic calming program to implement in areas with vehicle speeding issues.

3.5. Ensure adequate access for emergency services vehicles throughout Crook County's transportation system.

2.4. GOAL 4 – EQUITY

It is the goal of Crook County to ensure the cost of transportation infrastructure and services are borne by those who benefit from them.

The policies to be used to implement Goal 4 - Equity are as follows:

4.1. System Development Charges (SDCs) shall be considered to be implemented and it should accurately reflect a nexus between the traffic impact of development and the fees assessed to the development.

4.2. Crook County shall seek equitable funding mechanisms to maintain transportation infrastructure and services to an acceptable level.

4.3. Developments shall be responsible for mitigating their direct traffic impacts. These impacts shall be determined through a traffic study requirement to the developer and/or findings from County staff.

4.4. Developments that desire to have "private roads and maintenance" shall still be required to construct the road system in accordance with Crook County road standards established for county and public roads.

4.5. Road districts may be created to bring private roads into Crook County's road system as long as those private roads directly connect to a county owned road. Prior to Crook County taking any private road over, the road district must bring the private road up to current Crook County standards. Only after the private road meets the current Crook County road standard will Crook County consider assuming jurisdiction and ownership of the private road. Other factors of Crook County to assume jurisdiction and ownership of a private road is whether the county has adequate available funding to support additional maintained miles within the road budget. The County Court shall make the final decision of accepting a private road into the county's road system.

4.6. For private roads not within a road district and directly connecting to a county owned road, Crook County will assist private property owners in creating a local improvement district (LID) to improve the private roadway to current Crook County standards.

2.5. GOAL 5 – ENVIRONMENTAL

It is the goal of Crook County to limit and mitigate adverse environmental impacts associated with traffic and transportation system development.

The policies to be used to implement Goal 5 – Environmental are as follows:

5.1. Transportation project related environmental impacts shall be identified at the earliest opportunity to ensure compliance with all federal and state environmental standards.

5.2. Transportation project environmental impacts shall be mitigated to state and federal standards as appropriate.

2.6. GOAL 6 – ALTERNATIVE MODES OF TRANSPORTATION

Increase the use of alternative modes of transportation (walking, bicycling, rideshare/carpooling, and transit) through improved access, safety, and service. Increasing the use of alternative transportation modes includes maximizing the level of access to all social, work, and welfare resources for the transportation disadvantaged. Crook County seeks for its transportation disadvantaged citizens the creation of a customer-oriented regionally coordinated public transit system that is efficient, effective, and founded on present and future needs.

The policies to be used to implement Goal 6 – Alternative Modes of Transportation are as follows:

6.1. Develop a countywide pedestrian and bicycle plan.

6.2. Promote alternative modes and rideshare/carpool programs through community awareness and education.

6.3. Coordinate with regional transit service efforts.

6.4. Seek Transportation and Growth Management (TGM) and other funding for projects evaluating and improving the environment for alternative modes of transportation.

6.5. Seek improvements of mass transit services to Crook County.

6.6. Transportation Disadvantaged

a. Continue to support programs for the transportation disadvantaged where such programs are needed and are economically feasible.

b. Increase all citizens' transportation choices.

c. Identify and retain community identity and autonomy.

d. Create a customer-oriented focus in the provision of transportation services.

e. Hold any regional system accountable for levels and quality of service.

f. Enhance public transportation sustainability.

g. Promote regional planning of transportation services.

h. Use innovative technology to maximize efficiency of operation, planning, and administration of public transportation.

i. Promote both inter-community and intra-community transportation services for the transportation disadvantaged.

2.7. GOAL 7 – MAINTAIN MULTI-JURISDICTION COORDINATION

Maintain coordination between the Crook County, City of Prineville, and the Oregon Department of Transportation (ODOT).

The policies to be used to implement Goal 7 – Maintain Multi-Jurisdictional Coordination are as follows:

7.1. Cooperate with ODOT in the implementation of the Statewide Transportation Improvement Program (STIP).

7.2. Encourage improvement of state highways.

7.3. Work with ODOT and the City of Prineville in establishing cooperative transportation improvement programs and schedules.

7.4. Work to establish the right-of-way needed for transportation improvements identified in the TSP.

7.5. Take advantage of federal and state highway funding programs.

7.6. Crook County shall maintain an urban growth boundary (UGB) management agreement with the City of Prineville. This agreement shall be the basis to manage facilities outside the Prineville city limits but within the UGB as well as to eventually transfer facilities from Crook County to the City of Prineville when annexations occur.

7.7. Jurisdictional transfers between Crook County and the Oregon Department of Transportation (ODOT) shall be conducted through a management agreement between the two agencies. The conditions of a jurisdictional transfer of facilities shall be negotiated on a case by case basis.

7.8. Crook County shall coordinate with the City of Prineville in the development and update of its transportation system plan (TSP). Crook County shall also coordinate with the City of Prineville in the development of the city's TSP. Consistency between Crook County's and City of Prineville's TSPs shall be sought.

7.9. For Oregon Department of Transportation (ODOT) facilities, Crook County shall defer to ODOT access management standards described in Oregon Administrative Rule (OAR) Chapter 734, Division 51, the Oregon Highway Plan, and/or the most recent ODOT adopted access management standards and regulations.

7.10. Crook County will coordinate with the Crook County School District when making transportation changes.

2.8. GOAL 8 – ROADWAY FUNCTIONAL CLASSIFICATION

It is the goal of Crook County to properly plan and maintain its transportation system based on a roadway functional classification system. The street and access standards are based on this roadway functional classification system.

The policies to be used to implement Goal 8 – Roadway Functional Classification are as follows:

8.1. The transportation system plan (TSP) shall classify roadways throughout Crook County's transportation system. Both an arterial and local street classification shall be identified in the TSP.

8.2. The street and access standards shall employ the roadway functional classification system.

8.3. The roadway functional classification system represents a continuum in which through traffic increases and access provisions decrease in the higher classification categories. The street and access standards shall reflect this principal.

2.9. GOAL 9 – TRANSPORTATION FINANCING

It is the goal of Crook County to seek adequate financial revenues to fund its Capital Improvement Program and maintenance needs.

The policies to be used to implement Goal 9 – Transportation Financing are as follows:

9.1. Crook County shall aggressively seek state and federal funding for relevant transportation projects.

9.2. Crook County shall proactively seek new local and regional funding sources for its Capital Improvement Program.

3. TECHNICAL MEMO #3
EXISTING CONDITIONS

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
354 SW Upper Terrace Drive, Suite 101, Bend, Oregon 97702 P 541.312.8300 F 541.312.4585

TECHNICAL MEMORANDUM #3

Crook County Transportation System Plan Update

DRAFT Existing Conditions Memorandum

Date: February 1, 2017 Project #: 20189

To: Ann Beier, Crook County
Devin Hearing, ODOT

From: Marc Butorac, PE; Ashleigh Ludwig, AICP; Camilla Dartnell

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This memorandum inventories and evaluates the existing conditions of the Crook County transportation system to establish a baseline for the planning efforts to be conducted as part of the Transportation System Plan (TSP) update. The information was obtained and assembled using Geographic Information System (GIS) maps and data provided by Crook County, inventory conducted using Google Earth aerial images, site visits, and studies provided or produced by Crook County and the Oregon Department of Transportation (ODOT).

This document is organized into the following sections:

The majority of the inventory and analysis results are presented in figures and tabular form with supplemental text provided, as needed, to explain the illustrated information. This memorandum will

identify existing transportation needs based on currently adopted performance measures that will be addressed in the Transportation System Plan (TSP) Update through policies, projects, programs, pilot projects and refinement studies to improve the system.

STUDY AREA

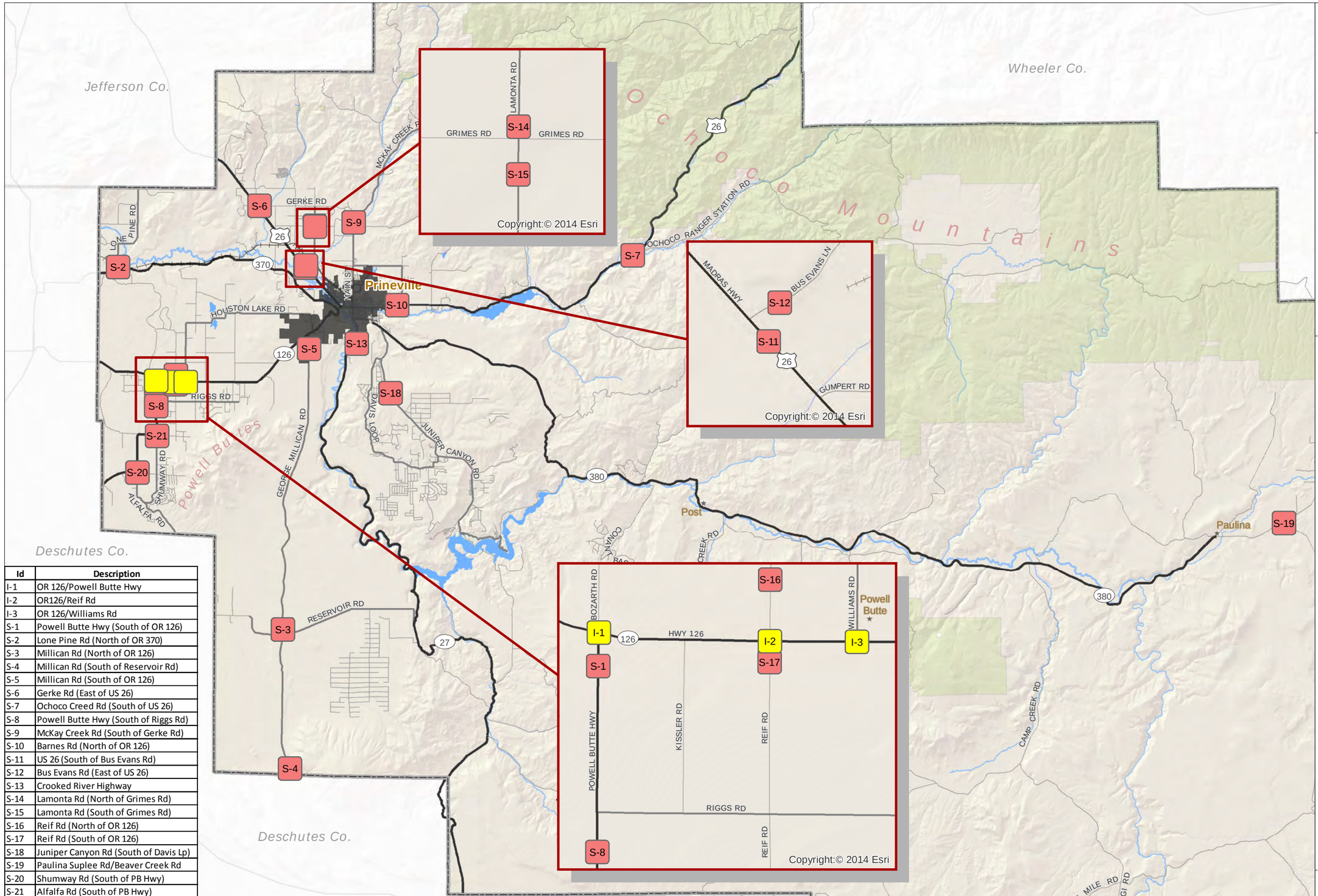
The Transportation System Plan (TSP) focuses on Crook County, excluding the City of Prineville, as shown in Figure 1. Several intersections and roadway segments will be evaluated during the study. The study segments are summarized in Table 1, and the study intersections are summarized in Table 2.

Table 1: Study Segment Locations

Segment/Intersection Number	Roadway Name	Location Description
1	Powell Butte Highway	South of OR 126 (MP 0.10)
2	Lone Pine Road	North of OR 370 (MP 0.10)
3	Millican Road	North of Reservoir Road
4	Millican Road	South of Reservoir Road
5	Millican Road	South of OR 126 (MP 0.20)
6	Gerke Road	East of US 26
7	Ochoco Creek Road	South of US 26
8	Powell Butte Highway	South of Riggs Road (MP 1.2)
9	McKay Road	South of Gerke and McKay Creek Road
10	Barnes Road	South of Wainwright, North of Highway 26
11	US 26	South of Bus Evans Road
12	Bus Evans Road	East of US 26
13	Crooked River Highway	South of Diversion Creek Canal
14	Lamonta Road	North of Grimes Road (MP 4.7)
15	Lamonta Road	South of Grimes Road (MP 4.6)
16	Reif Road	North of Riggs Road, South of Highway 126
17	Reif Road	North of Highway 126 (MP2.8)
18	SE Juniper Canyon Road	South of Davis Loop Road North
19	Beaver Creek Road	North of Paulina Suplee
20	Shumway Road	South of Powell Butte Highway
21	Alfalfa Road	South of Powell Butte Highway

Table 2: Study Intersection Locations

Study Intersection	East-West Road Name	North-South Road Name
1	OR 126	Reif Road
2	OR 126	Powell Butte Highway
3	OR 126	Williams Road



Id	Description
I-1	OR 126/Powell Butte Hwy
I-2	OR126/Reif Rd
I-3	OR 126/Williams Rd
S-1	Powell Butte Hwy (South of OR 126)
S-2	Lone Pine Rd (North of OR 370)
S-3	Millican Rd (North of OR 126)
S-4	Millican Rd (South of Reservoir Rd)
S-5	Millican Rd (South of OR 126)
S-6	Gerke Rd (East of US 26)
S-7	Ochoco Creed Rd (South of US 26)
S-8	Powell Butte Hwy (South of Riggs Rd)
S-9	McKay Creek Rd (South of Gerke Rd)
S-10	Barnes Rd (North of OR 126)
S-11	US 26 (South of Bus Evans Rd)
S-12	Bus Evans Rd (East of US 26)
S-13	Crooked River Highway
S-14	Lamonta Rd (North of Grimes Rd)
S-15	Lamonta Rd (South of Grimes Rd)
S-16	Reif Rd (North of OR 126)
S-17	Reif Rd (South of OR 126)
S-18	Juniper Canyon Rd (South of Davis Lp)
S-19	Paulina Suplee Rd/Beaver Creek Rd
S-20	Shumway Rd (South of PB Hwy)
S-21	Alfalfa Rd (South of PB Hwy)

Study Areas

- Study Intersection
- Study Segment

Transportation

- Railroad
- Major Roads (26)
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Study Area data provided by Kittleson
Map created by CC GIS - Revised 1/24/2017

10 Miles
10 Kilometers

Crook County GIS

Crook County TSP
Figure 1 - 1
Study Areas Overview

LAND USE AND POPULATION

The land use and population inventory identifies existing, planned, and potential future land uses. The land use and population inventory will inform the existing and future conditions analyses, particularly as the project team works with the community to develop future alternative scenarios. As shown in Figure 2, key activity centers and destinations within the County include:

- Brasada Ranch Resort
- Ochoco National Forest
- Crooked River Recreation Areas
- Prineville and Ochoco Reservoirs
- Paulina and Powell Butte Schools
- Prineville Airport
- City of Prineville Railway
- Crook County Landfill

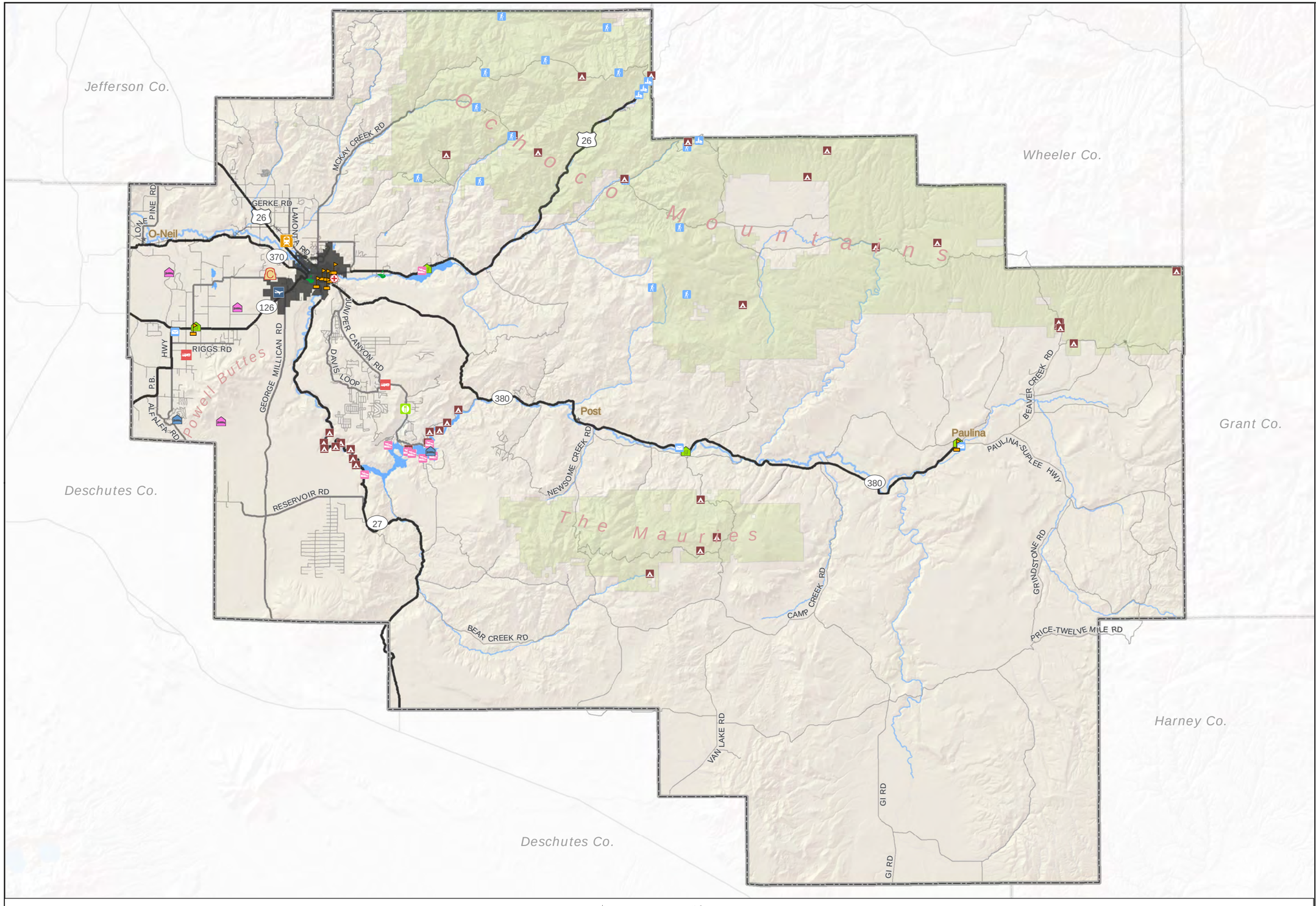
In addition to these key activity centers in the County, additional key destinations such as major employment centers, schools, medical facilities, and shopping centers are located within the City of Prineville. Although the transportation system within the City of Prineville is not part on the study area, connectivity between the County and nearby cities (e.g., Prineville, Redmond, and Bend) are important aspects and considered as part of this TSP Update.

Zoning

Figure 3 shows the zoning districts within Crook County. The majority of Crook County is zoned Exclusive Farm Use (EFU 1, EFU2, or EFU3). The Juniper Canyon area and several other small communities in the Powell Butte area and northwest of Prineville are zoned Rural Residential.

Natural Resources and Hazards

Chapter 15 of the Crook County Code requires new developments to evaluate the flood risk as part of the permit process. Buildings are required to be elevated above the flood level. Figure 4 shows the Crook County floodplain map, indicating the areas within the County that are subject to 100-year and 500-year floods.



Attractions

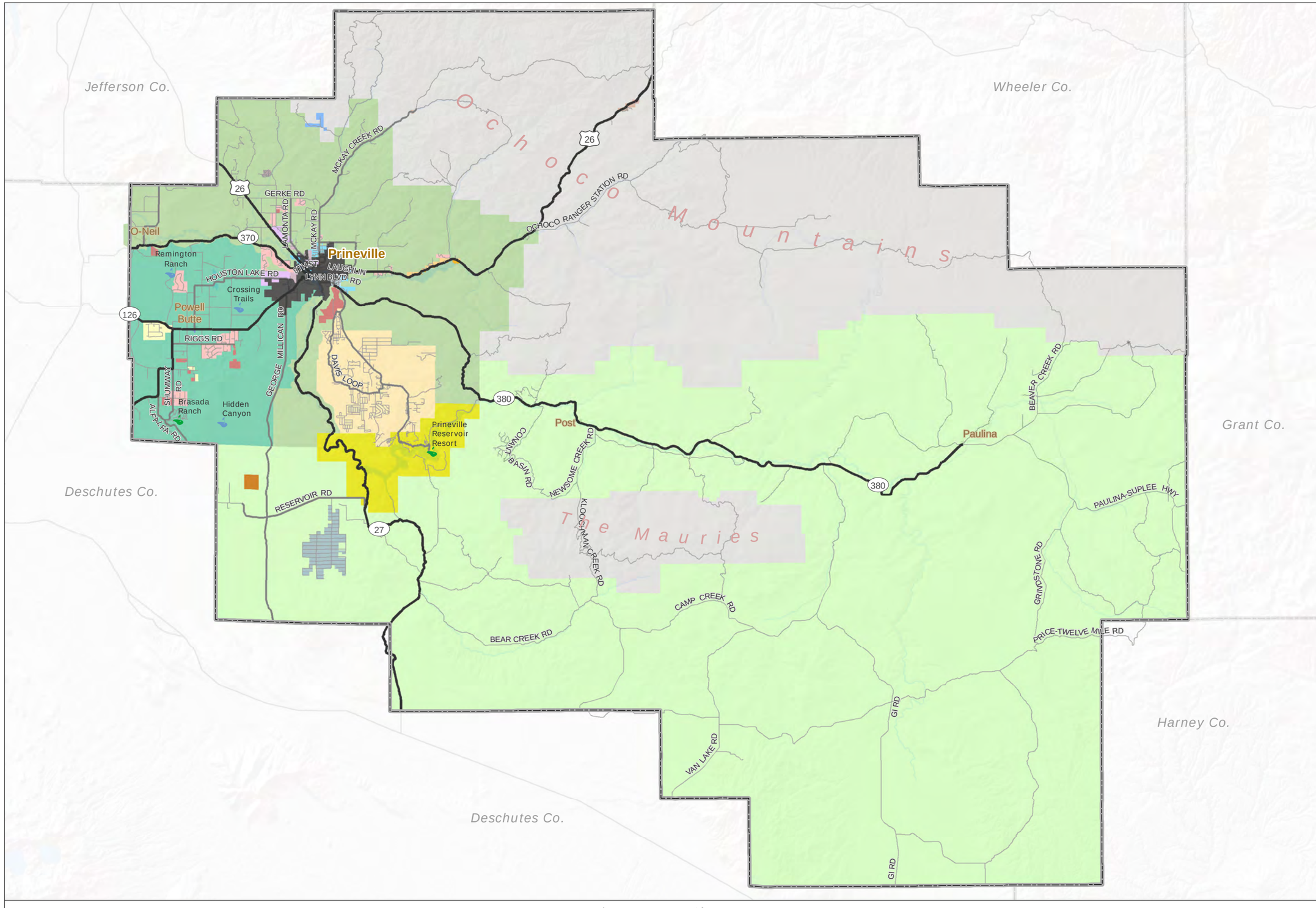
- Train Depot
- Rural Fire Stations
- County Landfill
- Post Office
- Prineville Airport
- Schools
- Current Resort
- Future Resort
- Golf Course
- Hospital
- Store
- Restaurant
- Boat Ramps
- Camping
- Snowpark
- Trailhead

Transportation

- Railroad
- Major Roads (26)
- Arterial Roads
- Minor Roads

Attraction locations provided by CC GIS
Map created by CC GIS - Revised 1/24/2017

Crook County TSP
Figure 2 - 1
Attractions



Zones

- Farm Use (EFU1)
- Farm Use (EFU2)
- Farm Use (EFU3)
- Farm Use (EFUJA)
- Forest (F1)
- Forest Recreation (FR10)
- Heave Industial(HM)
- Limited Commercial (LC)
- Light Industrial (LM)
- Neighborhood Commercial (NC)
- Rural Residential (PBR20)
- Park Reserve (PR)
- Rural Residential (R10)
- Rural Residential (R5)
- Rural Aviation Community (RAC)
- Recreation Residential (RR1)
- Recreational Residential (RR5)
- Recreational Residential (RRM5)
- Rural Service Center (RSC)
- Residential Woodlot (RW40)
- Suburban Residential (SR1)
- Suburban Residential (SRM1)

Zones provided by CC GIS
Map created by CC GIS - Revised 1/24/2017

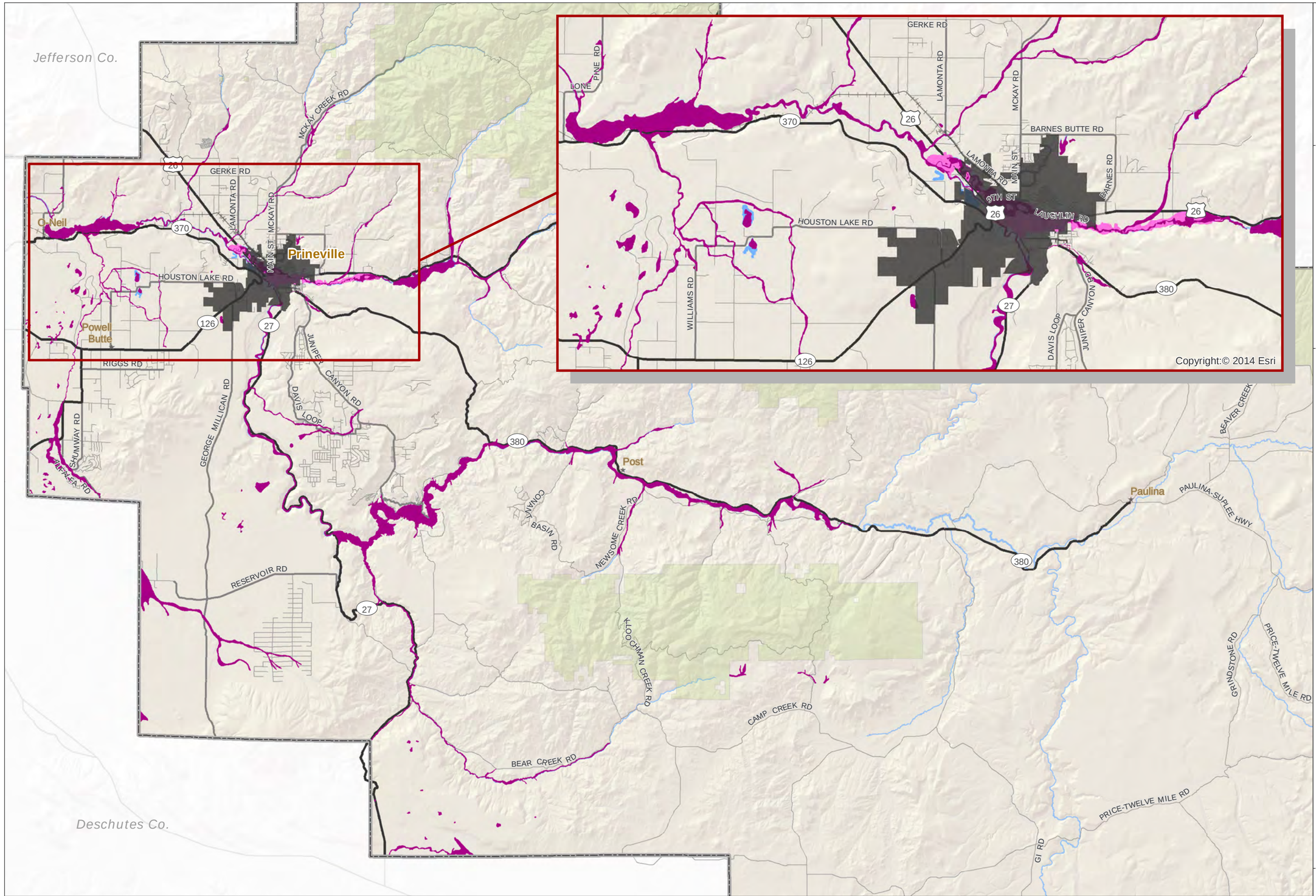
10 Miles
10 Kilometers

Crook County GIS

Crook County TSP

Figure 3 - 1

Zones



Floodplain

- 100 Year
- 500 Year

Transportation

- Railroad
- Major Roads
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Floodplains created by FEMA
Map created by CC GIS - Revised 1/24/2017

5 Miles
5 Kilometers

Crook County GIS

Crook County TSP
Figure 4 - 1
Floodplain

Population Inventory

By Oregon Revised Statute 195.034, counties are directed to formulate and adopt coordinated population projections throughout the County and within incorporated cities. Further, the Statute requires that population projections for counties be prepared by the Portland State University (PSU) Center for Population Research. The latest population projections, shown for 2020-2040 in Table 3 were prepared in 2015 for Crook County, while the 2016 population presented is based upon PSU population estimates published in December 2016. The table illustrates the total County population as well as the population of the unincorporated areas and the City of Prineville. This population projection will be adopted as part of the TSP and will be the County's official population projections until the next update is complete.

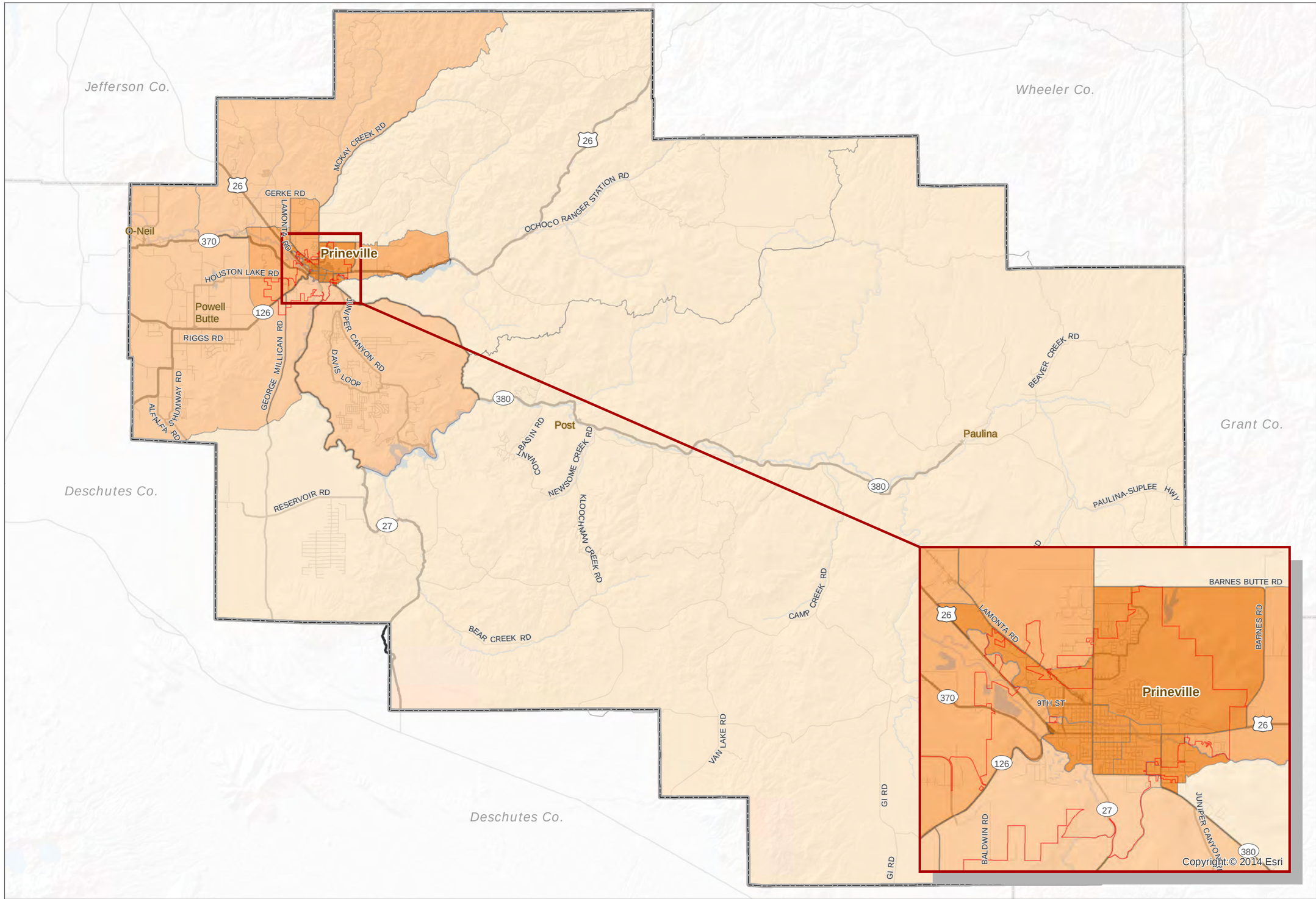
Table 3: Crook County Population Projections

Year	Population Projections		
	Crook County (Total)**	Unincorporated Area	Prineville
2010*	20,978	11,725	9,253
2016**	21,580	11,935	9,645
2020	21,678	10,145	11,533
2025	22,404	10,470	11,935
2030	23,222	10,806	12,416
2035	23,916	11,071	12,845
2040	24,543	11,305	13,238

*2010 population totals are based on the 2010 census data

** 2016 population totals are based on PSU population estimates published in December 2016, while population projections for 2020-2040 are based on PSU population projections published in June 2015.

Figure 5 illustrates the population density throughout the County. The highest concentration of population is located in the western portion of the County, including the Powell Butte and Juniper Canyon areas. Figure 6 illustrates the density of elderly population throughout the County. Although the total population is low in the majority of the County east of Prineville, this area also has the highest percentage of elderly, with 25 to 35 percent of the population over age 65 in this area. The eastern portion of the County near Powell Butte also has high percentages of elderly with 16 to 24 percent of the population over age 65.



Population Density

- 0 - 5
- 6 - 50
- 51 - 500
- 501 - 5080

Transportation

- Railroad
- Major Roads
- Arterial Roads
- Minor Roads

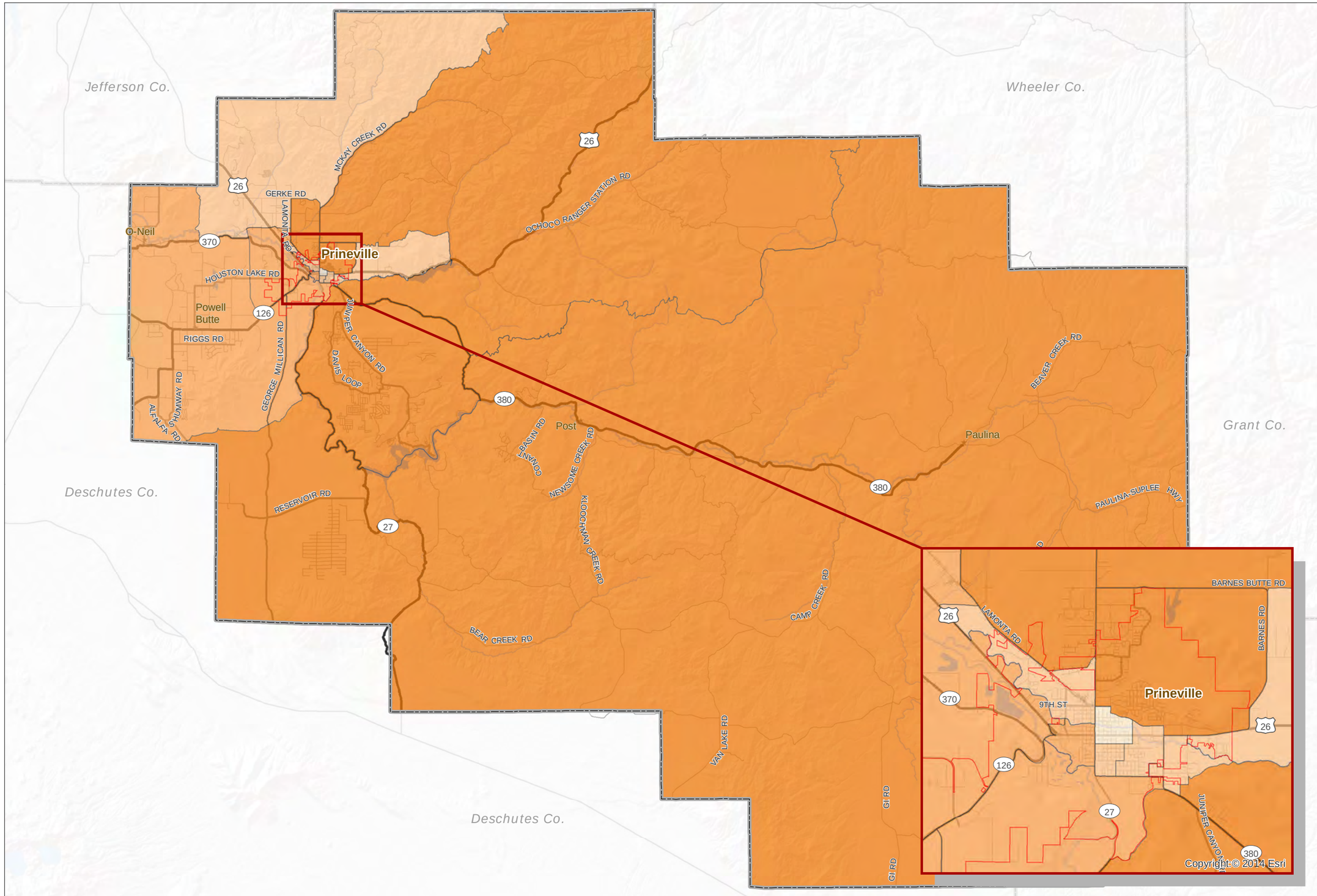
Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- Prineville City Limits

Demographic data provided by US Census
Map created by CC GIS - Revised 1/25/2017

2 Miles
2 Kilometers

Crook County TSP
Figure 5 - 1
Population Density



65+ Percentage

- 5%
- 6% - 15%
- 16% - 24%
- 25% - 35%

Transportation

- Railroad
- Major Roads
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- Prineville City Limits

Demographic data provided by US Census
Map created by CC GIS - Revised 1/24/2017

10 Miles
10 Kilometers

Crook County GIS

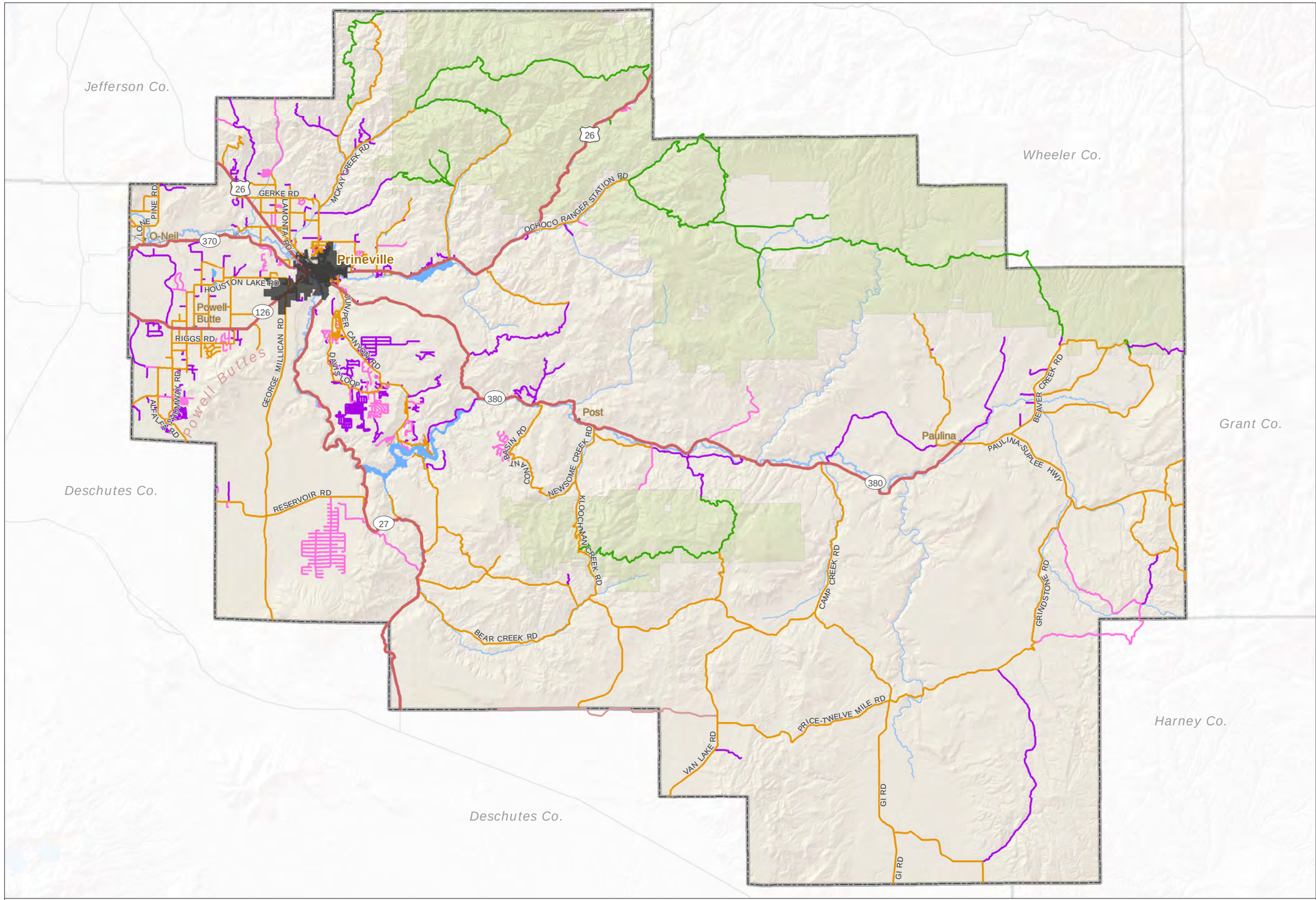
Crook County TSP
Figure 6 - 1
Elderly Population

STREET SYSTEM AND TRAFFIC ANALYSIS

A network of highways, arterials, collectors, and local streets serve Crook County. The characteristics and operational performance of these roadway facilities are summarized below.

Street System Overview

Most roadways within unincorporated Crook County fall under the jurisdiction of the state (ODOT) or the County, although there are several other agencies and private entities responsible for roadways within the study area. The following sections describe the jurisdiction and characteristics of the roadways, and Figure 7 presents a map of the roadway ownership in Crook County.



Ownership

- Oregon Dept of Transportation
- County
- City
- Private
- Other
- Bureau of Land Mangagement
- US Forest Service

Base Layers

- Railroad
- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Road Ownerships provided by CC GIS
Map created by CC GIS - Revised 1/24/2017

10 Miles
10 Kilometers

Crook County GIS

Crook County TSP
Figure 7 - 1
Road Ownership

State Roadways

The state facilities within Crook County provide statewide and regional connectivity. These facilities include US Route 26, Oregon Highway 126, Oregon Highway 370, Oregon Highway 380, and Oregon Highway 27. The following list describes the connections provided by the state roadways:

- Oregon Highway 126 provides direct connections between Redmond, Powell Butte, and Prineville.
- US Route 26 provides connections to eastern Oregon and Idaho to the east and Madras to the west.
- Oregon Highway 380 provides connections between Prineville and the eastern areas of Crook County including the community of Paulina.
- Oregon Highway 27 provides connections between Prineville and US Route 20 to the south. It also serves recreational areas including the Crooked River and Prineville Reservoir.
- Oregon Highway 370 provides a connection between Prineville and US Route 97 north of Redmond.

County Roadways

The county facilities within Crook County provide connections to state highways, the City of Prineville, unincorporated communities, and local destinations such as the National Forest and reservoirs. Most of the roadways within Crook County are County owned and maintained with the exception of state roadways and other federal and private owned facilities.

Other Roadways

In addition to the State and County, there are several other agencies responsible for roadways within the study area. These roadways are owned by the US Forest Service, Bureau of Land Management, and private owners. The majority of these facilities connect to County or State roadway facilities.

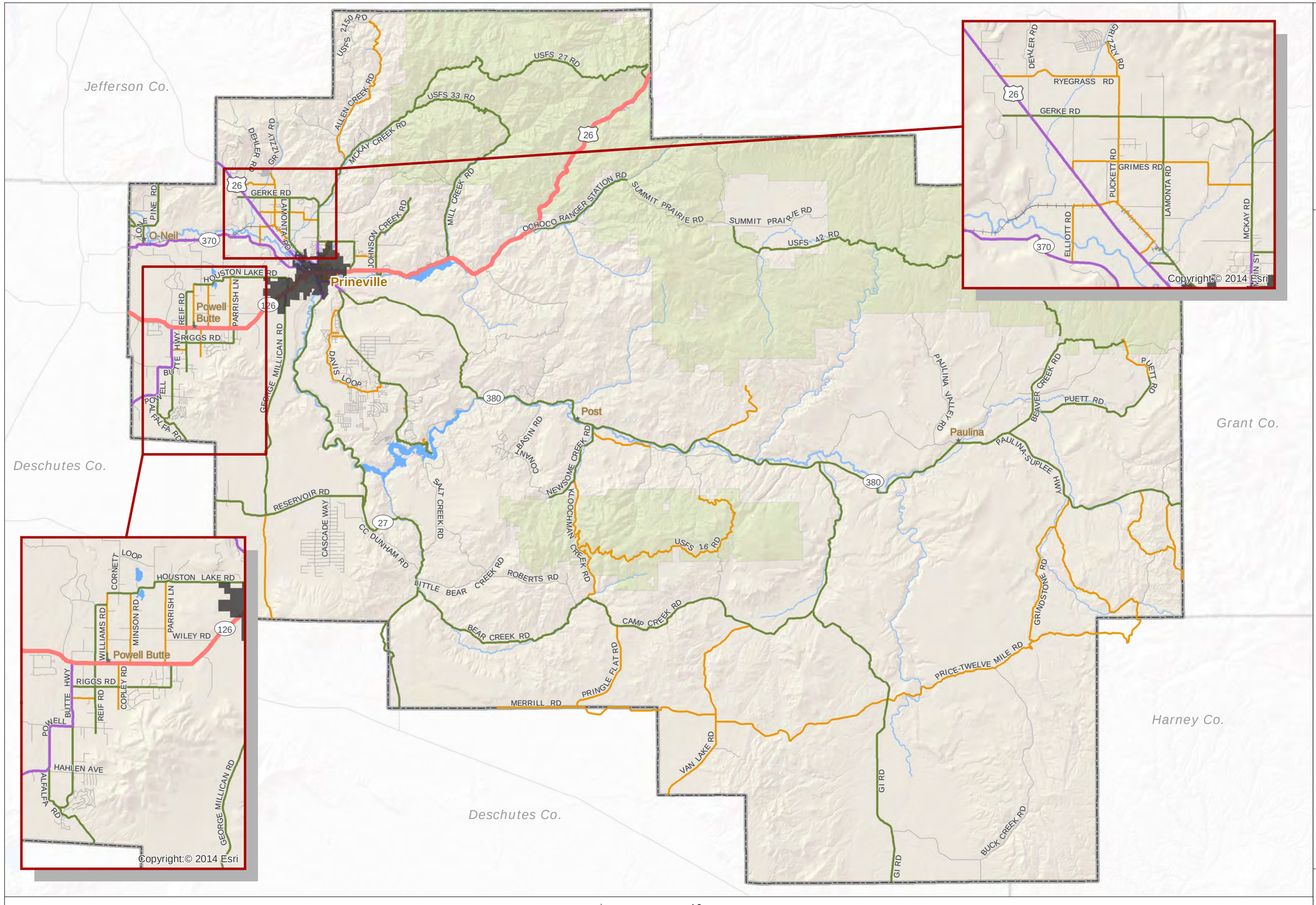
Street System Characteristics

The following set of figures and tables illustrate and summarize the current street characteristics within the County including roadway classifications, roadway standards, and intersection characteristics.

Functional classification levels for roadways are used to establish a hierarchy of roadways based on their primary function (moving people across regions or providing access to local destinations). These classification levels are identified by ODOT for state facilities and the County for County facilities.. The classification levels also determine the recommended roadway cross-section for different facilities. The functional classification of roadways that local agencies typically establish is based on the following hierarchy:

- **Arterials** represent the highest class of roadway. These roadways are intended to provide mobility by serving high volumes of traffic, particularly through traffic, at higher speeds. They also serve truck movements and should emphasize traffic movement over local land access. In some cases, arterial streets are further designated as "major/principal" or "minor." Major/principal arterials have higher design speed, fewer accesses per mile, and usually do not permit direct private driveway access. Minor arterial provide slightly lower travel speeds and have a few more accesses than major/principal arterials.
- **Collectors** represent the intermediate roadway class. As their name suggests, these roadways collect traffic from the local street system and distribute it to the arterial street system. These roadways provide a balance between traffic movement and land access and should provide extended continuous stretches of roadway to facilitate traffic circulation through the county. Collector streets are sometimes divided into two categories – urban collector/rural major collector and minor collector. Urban collector/rural major collector have the same basic roadway design but are differentiated by urban features like bike lanes and sidewalk as well as adjacent land use (i.e., the land is inside or outside the Urban Growth Boundary). Minor collectors serve lower volume of traffic and have lower design speeds than the urban collector/rural major collector.
- **Local** roads and streets are the lowest roadway class. Their primary purpose is to provide local land access and to carry locally generated traffic at relatively low speeds to the collector street system. Local streets should provide connectivity through neighborhoods but should be designed to discourage cut-through vehicular traffic.

Figure 8 illustrates the functional classification of roadways within Crook County.



Road Classifications

- Major Arterial
- Minor Arterial
- Major Collector
- Minor Collector

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Classifications provided by CC Roads Dept
Map created by CC GIS - Revised 1/24/2017

10 Miles
10 Kilometers

Crook County GIS

Crook County TSP
Figure 8 - 1
Functional Classifcation

State Facilities

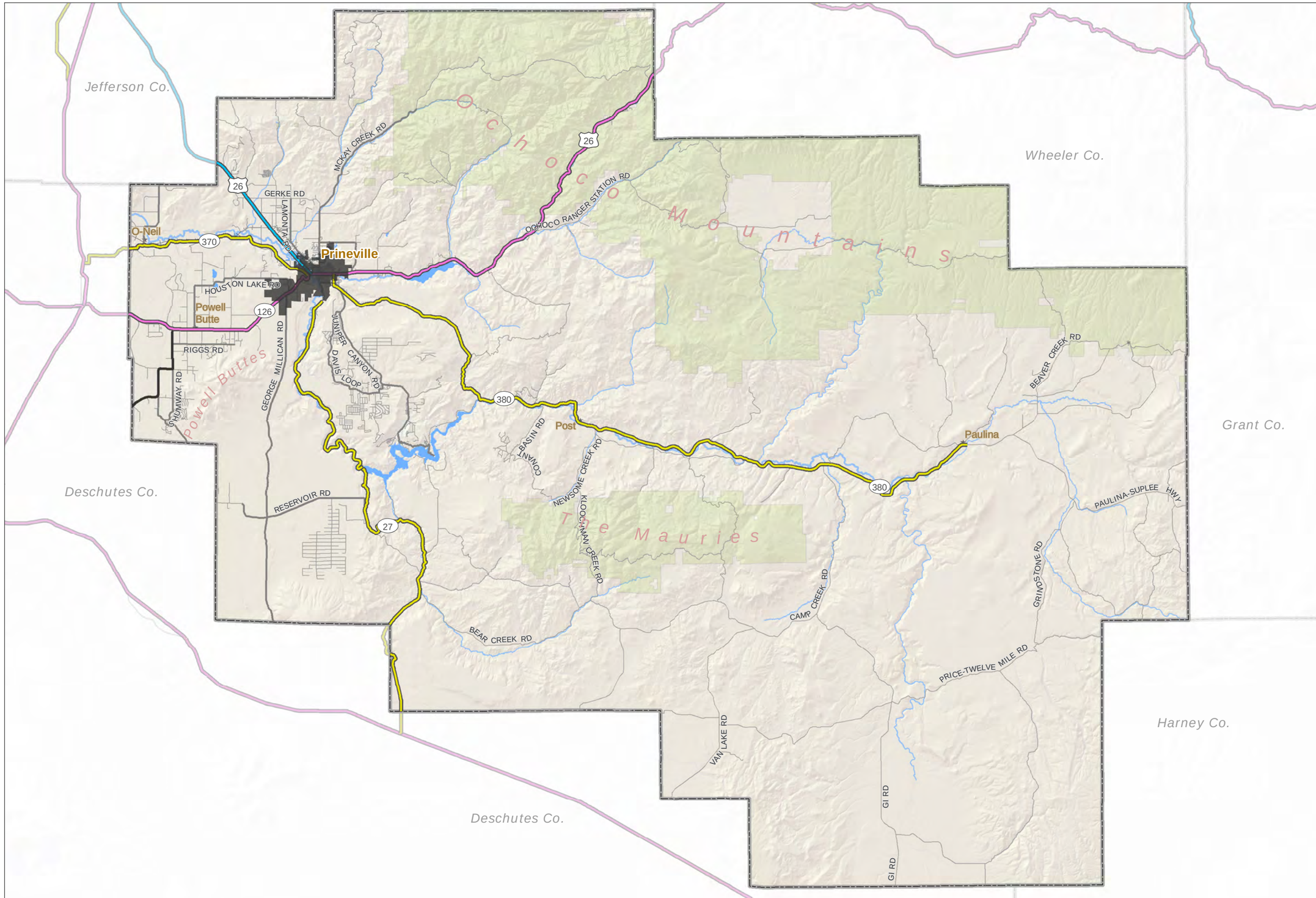
Table 4 summarizes the roadway characteristics for state highways within Crook County, and Figure 9 illustrates the ODOT facility designations for state highways. The state highways in Crook County are all two lane roadways with posted speed limits of 55 miles per hour (mph) throughout the majority of the County. Posted speed limits drop to 45 mph within the community of Powell Butte. As of 2014, the pavement condition for state highways was noted as "Good" for US 26 and OR 270, while the pavement condition of OR 126, OR 380, and OR 27 varied.

Table 4: State Functional Classifications

Route Name	ODOT Highway Number	Facility Extents	ODOT Facility Designation	ODOT Functional Classification	Posted Speed Limit	Number of Lanes	Pavement Condition (2014)
US Route 26	360	West of Prineville	Regional Highway	Rural Minor Arterial	55	2	Good
	041	East of Prineville	Statewide Highway	Rural Other Principal Arterial	55	2	Good
OR 370	370	Entire section within County limits, excluding Prineville	District Highway	Rural Minor Arterial	55	2	Good
OR 126	041	Entire section within County limits, excluding Prineville	Statewide Highway	Rural Other Principal Arterial	55*	2	Fair (milepoints 13.47 to 14.68); good (milepoints 14.68 to 6.75); fair (milepoints 6.75 to 4.35); poor (west of milepoint 4.35)
OR 380	380	Entire section within County limits, excluding Prineville	District Highway	Rural Major Collector	55	2	Poor (Prineville City Limits to milepoint 20.75); fair (milepoint 20.75 to 35.7); poor (east of milepoint 35.7)
OR 27	014	Entire section within County limits, excluding Prineville	District Highway	Rural Major Collector	55	2	Good (south of Prineville to milepoint 4.6); poor (milepoints 4.6 to 6.15); fair (milepoints 6.15 to 19.72); good (south of milepoint 19.72)

*Speed limit on OR 126 drops to 45 mph through Powell Butte

Figure 1 illustrated the locations of the three study intersections that are part of the TSP Update. All three study intersections are located along OR 126 in the Powell Butte area and are currently unsignalized intersections. Figure 10 illustrates the location and existing intersection configuration of the study intersections.



ODOT Highway Classifications

- Statewide
- Regional
- District

Base Layers

- Railroad
- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Classifications provided by ODOT
Map created by CC GIS - Revised 1/25/2017

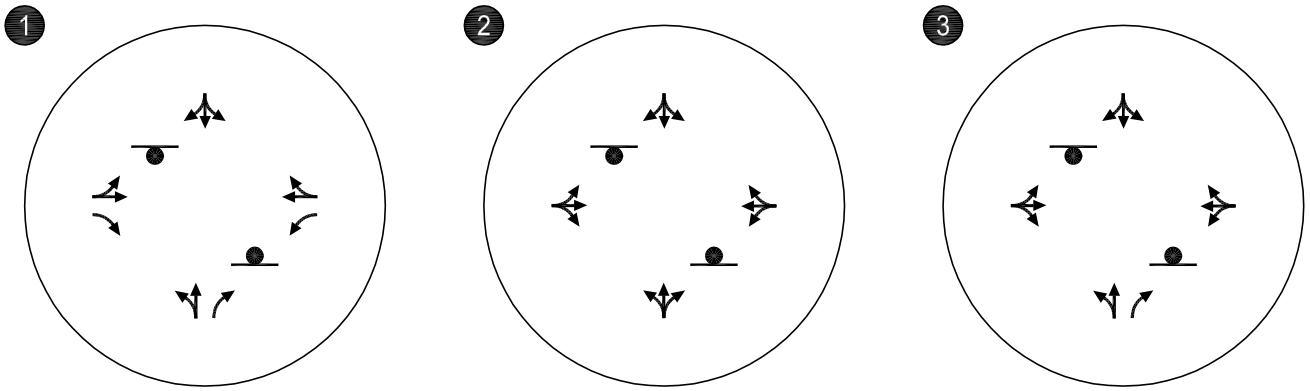
10 Miles
10 Kilometers

Crook County GIS

Crook County TSP

Figure 9 - 1

ODOT Highway Classifications



Lane Configurations of Study Intersections
Crook County, Oregon

Figure **10**

- STOP SIGN

Oregon Department of Transportation

County Facilities

Unincorporated Crook County has two minor arterials (Main Street/County Road 100 and Powell Butte Highway), as shown in Figure 8. The majority of County roads are collectors or local roads. Crook County has 38 major rural collectors and 26 minor rural collectors.

ROADWAY CROSS-SECTION STANDARDS

County Facilities

The County's current TSP identifies recommended roadway standards and shoulder widths for rural roads, as presented in Table 5 and Table 6 below. The county currently does not include standards for separated pedestrian or bicycle facilities. Figure 11 illustrates the typical street cross section by roadway classification.

Table 5: Recommended Roadway Standards

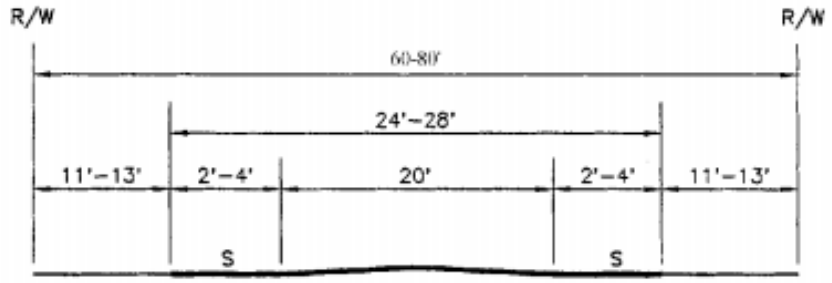
Classification	Pavement Width, Including Paved Shoulder(ft)	Paved Shoulder Width (ft)	Parking	Right-of-Way (ft)
Arterial	36-40	6-8	None	80-100
Major Collector*	32-40	4-8	Off Pavement	80
Minor Collector*	30-38	4-8	Off Pavement	80
Local	24-28	2-4	Off Pavement	60-80

Table 6: Recommended Shoulder Widths on Rural Roads

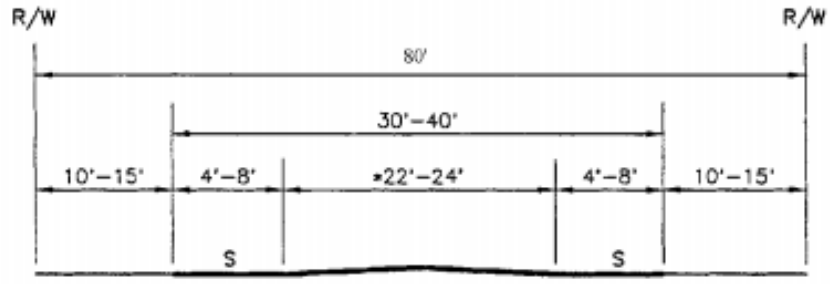
Classification	Shoulder Width (ft)				
	*ADT < 400	*ADT > 400 *DHV<100	*DHV 100-200	*DHV 200-400	*DHV > 400
Arterial	4	6	6	8	8
Collector	2	4	6	8	8
Local	2	2	4	6	8

*ADT (Average Daily Traffic) is the average number of trips over a 24-hour period, and DHV (Design Hour Volume) is the expected traffic volume in the peak design hour

A. LOCAL STREET

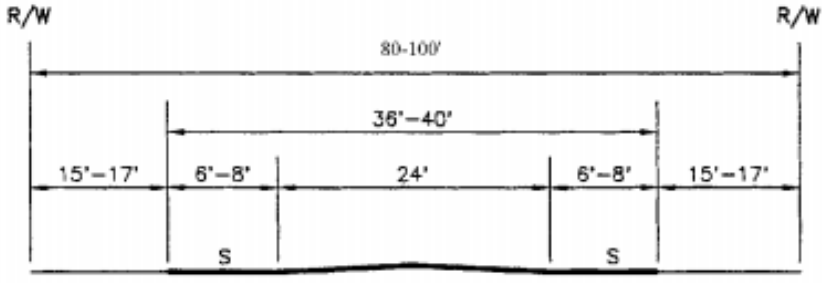


B. COLLECTOR



*Major Collector: 12' Travel Lanes
Minor Collector: 11' Travel Lanes

C. ARTERIAL



LEGEND

R/W = RIGHT-OF-WAY LINE
S = SHOULDER

Figure 11: Typical Street Cross Sections

(Source: Crook County Transportation System Plan, 2005)

Access Management and Spacing

Providing adequate access to other public roadways, land uses, and destinations is a critical part of an effective transportation system. However, it is necessary to balance access with the need for mobility and safety on the system. Providing access via other public streets and driveways to land uses creates friction from a traffic operations perspective; thereby, reducing mobility and introducing conflict points that increase the potential for conflicts.

Access management strategies and implementation require careful consideration to balance access and mobility in a safe and efficient manner. In general, access management is generally more stringent on higher classified roads where mobility is the highest priority. Figure 12 illustrates the relationship between access and mobility relative to the street classifications in Crook County.

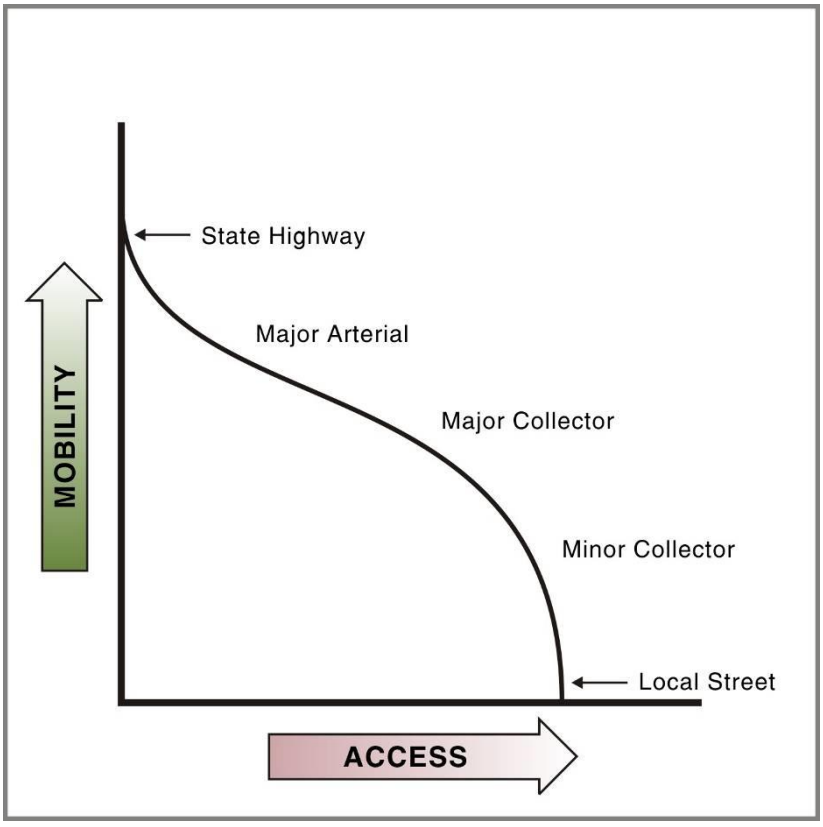


Figure 12: Relationship between Access, Mobility, and Functional Classification

State Facilities

Access management for state facilities is outlined in OAR 734-051, and spacing standards are dependent upon several variables including average annual daily traffic (AADT) volumes, posted speed, and functional classification. The access management standards for state facilities in Crook County are presented in the Plan and Policy Review (Technical Memorandum #1) for the TSP update and are summarized in Table 7.

Table 7: Access Spacing Standards for ODOT Facilities

Route Name	ODOT Highway Number	Facility Extents	ODOT Facility Designation	ODOT Functional Classification	Posted Speed Limit (MPH)	AADT	Access Spacing Standard (Feet)
US Route 26	360	West of Prineville	Regional Highway	Rural Minor Arterial	55	> 5,000	1,320
	041	East of Prineville	Statewide Highway	Rural Other Principal Arterial	55	> 5,000	1,320
OR 370	370	Entire section within County limits, excluding Prineville	District Highway	Rural Minor Arterial	55	< or = 5,000	650
OR 126	041	Entire section within County limits, excluding Prineville	Statewide Highway	Rural Other Principal Arterial	55*	> 5,000	1,320
OR 380	380	Entire section within County limits, excluding Prineville	District Highway	Rural Major Collector	55	< or = 5,000	650
OR 27	014	Entire section within County limits, excluding Prineville	District Highway	Rural Major Collector	55	< or = 5,000	650

AADT = Average Annual Daily Traffic
MPH = Miles per Hour

County Facilities

The access management standards for Crook County facilities are summarized in the existing Crook County TSP and summarized in Table 8. The spacing standards are intended to be applied to newly constructed or reconstructed roads and new driveways as development or redevelopment occurs rather than used to eliminate existing driveways.

Table 8. Access Management Spacing Standards for Crook County Facilities

Functional Classification	Minimum Posted Speed (mph)	Minimum Spacing Between Driveways/Streets (ft)	Minimum Spacing Between Intersections	Adjacent Land Use
Arterial	55	1200	1 mile	Undeveloped or agricultural land between major population centers
Major Collector	35-55	500	½ mile	Undeveloped or agricultural land between and through cities or rural service centers
Minor Collector	25-55	300	¼ mile	Undeveloped or agricultural land between and through cities or rural service centers
Local	25	Access to each lot permitted	150 feet	Residential

Street System Traffic Analysis

The focus of this section is to report the existing traffic operations for study intersections and roadway segments identified for the TSP update. The sub-sections below present information on the traffic count data used in the evaluation, the analysis methodology applied, the operational standards used to assess the results, and the traffic operations results for the study intersections.

Analysis Methodology and Performance Standards

All operations analysis described in this report were performed in accordance with the procedures in the *2010 Highway Capacity Manual.*

The intersection operational evaluations were conducted to be consistent with this Methodology Memorandum (see Attachment A) and the ODOT *Analysis Procedures Manual* (APM). Intersection operational evaluations were conducted based on the peak 15- minute flow rate observed during the weekday peak hour. Using the peak 15-minute flow rate ensures this analysis is based on a reasonable worst-case scenario. For this reason, the analysis reflects the conditions that are likely to occur for 15 minutes out of each average weekday peak hour. The transportation system will likely operate under conditions better than those described in this report during other typical time periods.

The operational results for study intersections and segments were compared with their corresponding mobility targets. Table 9 summarizes the mobility targets for state facilities, while Table 10 summarizes the mobility standards for County facilities. These mobility targets have been updated since the adoption of the 2005 TSP. The three study intersections as part of this TSP update are subject to state mobility targets.

Table 9: State Facility Mobility Targets

Highway/Category	Inside UGB				Outside UGB	
	STA	Non-MPO outside of STAs where non-freeway speed <= 35 mph, or a Designated UBA	Non-MPO outside of STAs where non-freeway speed > 35 mph but < 45 mph	Non-MPO Where non-freeway speed limit >= 45 mph	Unincorporated Communities	Rural Lands
Statewide Expressway *(OR 126)*	N/A	0.85 v/c	0.85 v/c	0.80 v/c	0.70 v/c	0.70 v/c
Statewide Highway (not a Freight Route) *(US/OR 26-Ochoco)*	0.95 v/c	0.90 v/c	0.85 v/c	0.80 v/c	0.75 v/c	0.70 v/c
Freight Route on a Regional Highway *(US/OR 26-Madras-Prineville)*	0.95 v/c	0.90 v/c	0.85 v/c	0.85 v/c	0.75 v/c	0.70 v/c
District/Local Interest Roads *(OR 370, OR 27, OR 380)*	1.0 v/c	0.95 v/c	0.90 v/c	0.90 v/c	0.80 v/c	0.75 v/c

Table 10: County Mobility Standards

Intersection Standard Maximum	Signalized Intersection Standard	Unsignalized Intersection Standard
0.95 v/c	Minimum LOS D	Minimum LOS E Or LOS F with maximum .95 v/c for the critical movement

Traffic Volumes

The following sub-sections discuss the weekday peak hour traffic volume development and the seasonal adjustment factor used to adjust the traffic counts.

Roadway Segment Capacity

Twenty one study segments were identified throughout the County. Traffic volumes for these locations were obtained from the County's records or traffic counts conducted on November 15, 2016. Speed, volume, and vehicle classification counts were all conducted for a 24-hour period at the

locations counted in November 2016. The County traffic volume data varied with some locations including 4-hour counts and others including 24-hour counts.

Traffic count data provided by the County came from a variety of years. The majority of counts were conducted in 2015 and 2016. However, some counts were conducted in 2008, 2012, or 2014. The counts conducted prior to 2016 were increased based on an average annual growth rate. The growth rate of 5.32 percent was calculated based on the average annual growth at the intersection of OR 126/Powell Butte Highway between 2010 and 2016. This percentage was used to estimate the current volumes at the intersections as well as segments because several of the intersection counts were taken in 2010 and needed to be projected to the study year of 2016. The percentage was also applied to the segment counts for consistency.

Seasonal and yearly adjustments were made to the counts as described in the Methodology Memo, included as Attachment A. Automatic Traffic Recorder (ATR) 07-002 was used to perform the On-Site ATR seasonal adjustment method outlined in the Methodology Memo. The seasonal adjustment factor was applied, based on the month that the count was conducted.

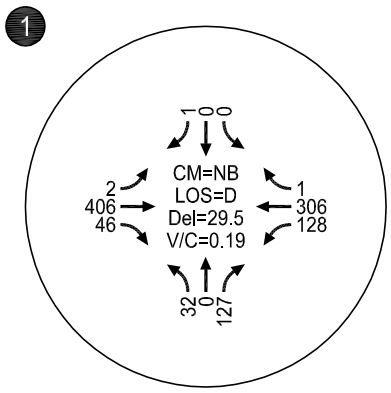
Attachment B presents the demand profile by time of day for Powell Butte Highway, Highway 126, and Highway 26. Based on these traffic profiles, the hour with the highest traffic volume was identified as the peak hour for each facility. Two-lane highway capacity analysis was conducted for each roadway segment based on the peak hour traffic volumes, when available. Table 11 summarizes the peak hour, traffic volumes, and volume-to-capacity ratio for each study segment.

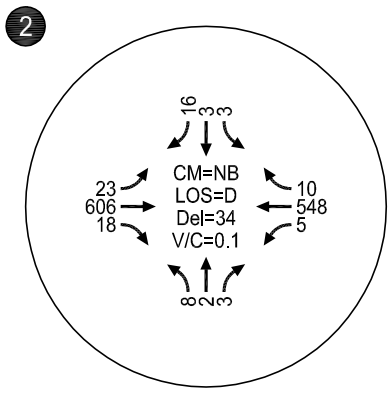
Table 11: Roadway Segment Operations Analysis

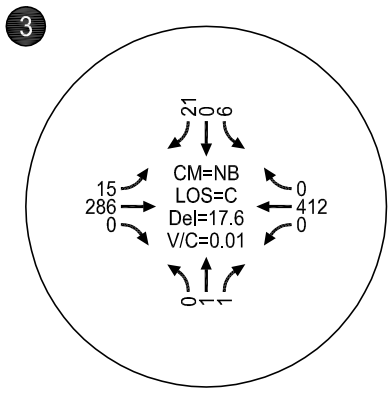
ID	Roadway	Location Description	2016 ADT	Seasonally-Adjusted Peak Hour Count	PHF*	Two-Way Demand Flow	Critical Flow Rate	Units	Calculated V/C Ratio
1	Powell Butte Highway	Riggs Road to OR 126	4853	571	0.9	635	2000	pc/h	0.32
2	Lone Pine Road	OR 370 to Smith Rock Way	999	115	0.9	128	1500	pc/h	0.09
3	Millican Road	Reservoir Road to South Prineville City Limits	672	77	0.9	86	1500	pc/h	0.06
4	Millican Road	Reservoir Road to South County Limits	511	59	0.9	65	1500	pc/h	0.04
5	Millican Road	South Prineville City Limits to OR 126	1604	185	0.9	205	1500	pc/h	0.14
6	Gerke Road	US 26 to Lamonta Road	254	30	0.9	33	1500	pc/h	0.02
7	Ochoco Creek Road	US 26 to Canyon Creek Road	99	14	0.9	16	1500	pc/h	0.01
8	Powell Butte Highway	West County Limit to Riggs Road	4247	489	0.9	544	2000	pc/h	0.27
9	McKay Road	Gerke Road to Barnes Butte Road	1089	114	0.9	126	1500	pc/h	0.08
10	Barnes Road	US 26 to Wainwright Road	1297	135	0.9	150	1500	pc/h	0.10
11	US 26	Bus Evans Road to Gumpert Road	2989	301	0.9	334	2000	pc/h	0.17
12	Bus Evans Road	US 26 to Elliott Lane	257	35	0.9	39	1500	pc/h	0.03
13	Crooked River Highway	South Prineville City Limits to Reservoir Road	249	37	0.9	41	1500	pc/h	0.03
14	Lamonta Road	Gerke Road to Grimes Road	850	60	0.9	67	1500	pc/h	0.04
15	Lamonta Road	Grimes Road to Gumpert Road	981	52	0.9	57	1500	pc/h	0.04
16	Reif Road	OR 126 to Twin Lakes Ranch Road	566	65	0.9	72	1500	pc/h	0.05
17	Reif Road	Riggs Road to OR 126	335	39	0.9	43	1500	pc/h	0.03
18	SE Juniper Canyon Road	OR 380 to South Davis Loop	933	216	0.9	240	1500	pc/h	0.16
19	Beaver Creek Road	Paulina Suplee Road to Puett Road	141	104	0.9	116	1500	pc/h	0.08
20	Shumway Road	Powell Butte Highway to Alfalfa Road	1139	131	0.9	146	1500	pc/h	0.10
21	Alfalfa Road	Powell Butte Highway to Brasada Ranch Road	848	98	0.9	109	1500	pc/h	0.07

Intersection Operations Analysis

Traffic counts at the three study intersections were completed on October 19, 2010; November 3, 2010; and November 15, 2016. Counts at one study intersection (OR 126/Powell Butte Highway) were conducted in 2010 and 2016. The counts from this location were used to calculate an annual growth rate (5.32 percent) that was applied to the 2010 counts to represent today's conditions. Additionally, seasonal adjustment factors were applied to the counts. Due to the close proximity between all three study intersections, a system-wide peak hour (4:45 – 5:45 p.m.) was used for analysis. Figure 13 shows the peak hour volumes and intersection operations analysis results at the three study intersections.







Intersection Operations Analysis Results
Crook County, Oregon

Figure **13**

Summary of Existing Traffic Operations

All the study intersections and segments assessed in the TSP Update operate acceptably under existing conditions according to the level of service (LOS) and volume to capacity ratios (v/c). LOS is a qualitative measure of traffic that rates service on a scale from A to F, with LOS A indicating free flowing conditions and LOS F indicating congested conditions with higher delay. Similarly, v/c is a commonly used quantitative measure of traffic service. It generally varies between 0 and 1, where low ratios represent sufficient capacity and ratios approaching 1 indicate that the roadway is approaching capacity. Ratios exceeding 1.0 indicate that a roadway exceeds capacity. According to the operational analysis, the study intersections and segments operate acceptably under existing conditions compared to their respective v/c targets.

HISTORIC CRASH ANALYSIS

Crash data from the latest five years of complete data (January 1, 2010 through December 31, 2014) was obtained from ODOT for all roadways within Crook County.

County Crash Patterns

A total of 628 crashes were reported in unincorporated Crook County between 2010 and 2014. Table 12 and Figure 14 summarize the reported crashes by severity, and Figure 15 illustrates the location of reported crashes within the County by severity. Half of the reported crashes involved an injury, including three crashes involving fatalities. Two fatalities were reported as fixed-object crashes and one was reported as a non-collision overturned vehicle crash. Of the two fixed-object fatal crashes, one occurred on an icy roadway during normal light conditions and the other occurred on dry road conditions during dawn. The fatal overturned vehicle crash report indicated that the vehicle was a motorcycle or dirt-bike, drugs were involved, and that the crash occurred during daylight on dry roadway conditions. Crash reports for the three fatal crashes indicated that speed was a contributing factor.

Table 12: Reported Crashes by Severity (2010-2014)

	Crash Severity					
	Fatal	Injury A	Injury B	Injury C	PDO	Total
Number of Reported Crashes	3	45	147	119	314	628
Percentage of Total Crashes	<1%	7%	23%	19%	50%	100%

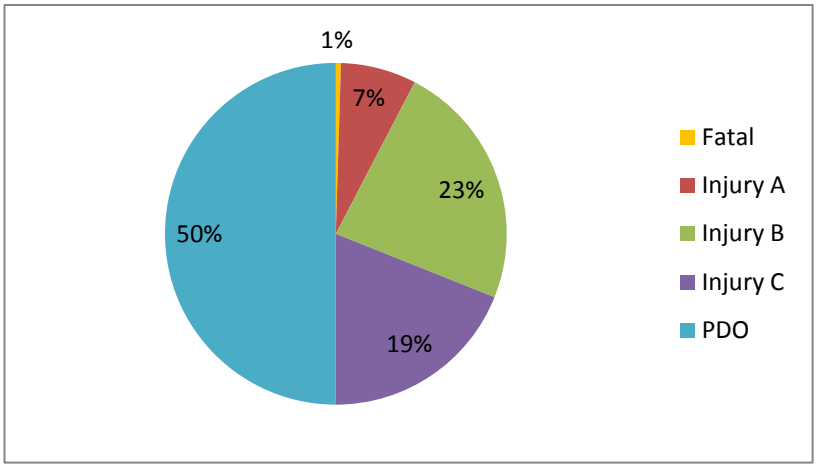


Figure 14: Reported Crashes by Severity (2010-2014)

Jefferson Co.

Deschutes Co.

Harney Co.

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Crash Severity

- Property Damage Only (PDO)
- Minor Injury (Injury C)
- Moderate Injury (Injury B)
- Serious Injury (Injury A)
- Fatal

Transportation

- Railroad
- Major Roads
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

ODOT Reported Crash Data: 2010 – 2014
Map created by CC GIS and Kittelson and Associates, Inc. - Revised 1/25/2017

10 Miles
10 Kilometers

Crook County GIS
GEOGRAPHIC INFORMATION SYSTEMS

Crook County TSP
Figure 15- 1
Reported Crashes 2010-2014

As shown in Figure 16, the highest crash frequency occurred during winter months, from November through January. Winter months in Crook County can include inclement weather conditions creating wet, icy, and/or snowy conditions. Further review of crashes in November, December, and January (192 crashes) indicate that 61.5 percent (118 crashes) occurred on roadway surfaces that were wet, icy, or snow-covered. Forty-seven percent (90 crashes) occurred in dark, dawn, or dusk lighting conditions, as shown in Figure 17.

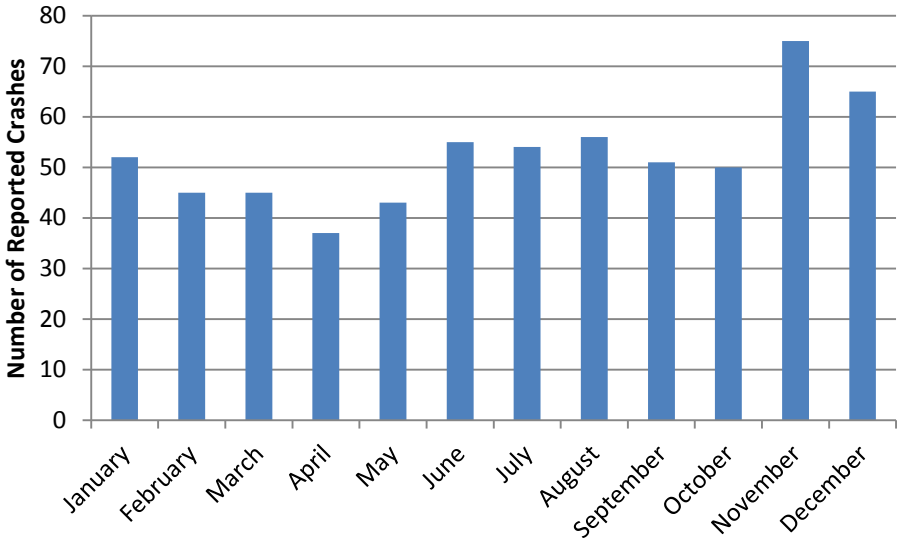


Figure 16: Crash Frequency by Month

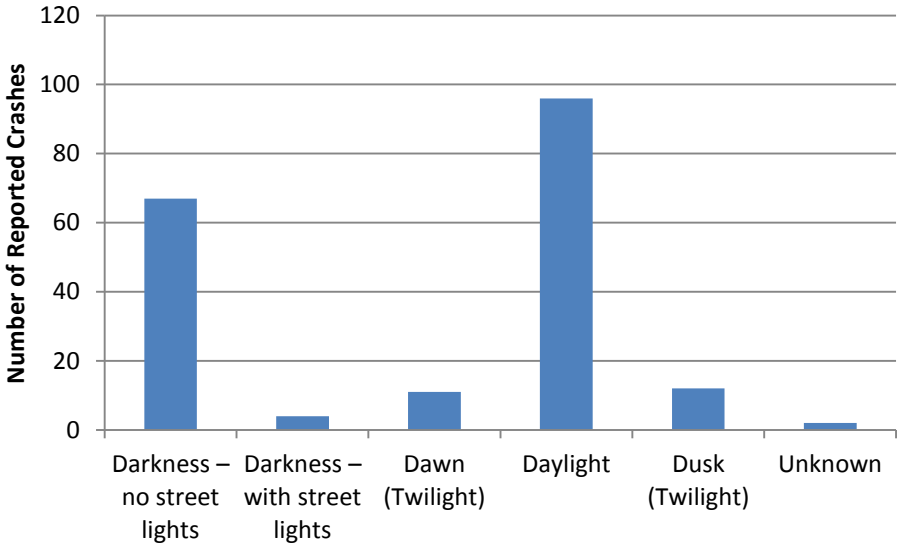


Figure 17: Crash Frequency By Month

Over the study period, fixed-object crashes were the most prevalent and contributed to 40 percent (249 crashes) of all crashes, as shown in Figure 18. There were also a high number of non-collision, rear-end, and turning movement crashes. Additionally, there was one crash involving a pedestrian

and two crashes involving bicyclists in unincorporated Crook County during the study period. The pedestrian crash was categorized as an Injury B (moderate injury) crash and occurred when a vehicle was turning into a driveway or alley. One of the crashes involving a bicyclist was categorized as an intersection crash and was an Injury B crash, while the other crash was categorized as an Injury A crash and occurred when a motorist sideswiped the bicyclist. All three bicyclist and pedestrian crashes occurred during the day.

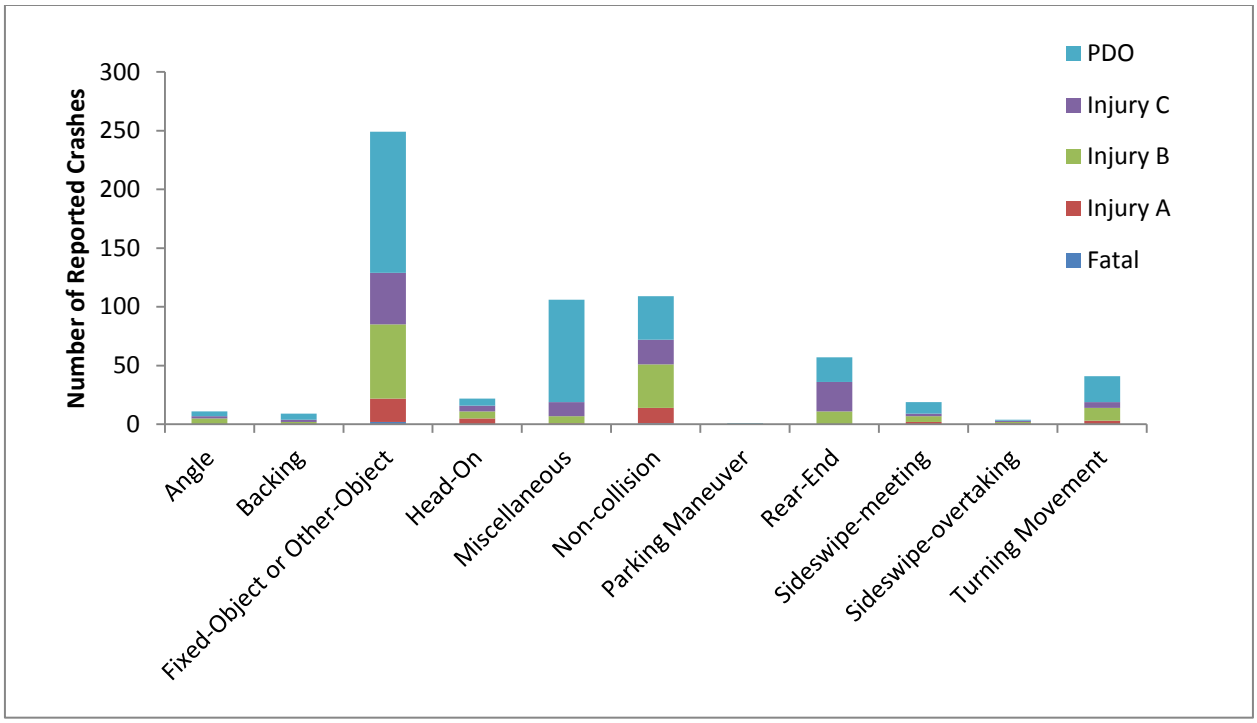


Figure 18. Collision Types

Of the 45 reported severe injury crashes, several trends were noted:

- Excessive speed was reported in 26 reported crashes (58%).
  Fixed-object and non-collision crashes accounted for 73% of all severe injury crashes, as 20 crashes (44%) were fixed object and 13 crashes (29%) were non-collision, as shown in Figure 19.
- Alcohol was indicated as a factor in ten reported crashes, and drugs were indicated as a factor in two reported crashes.
- At least 34 crashes (76%) occurred on roadways with a speed limit of 55 mph.
- Thirty-two (71%) crashes occurred during daylight conditions.
- Thirty-eight (84%) crashes were reported on dry roadway conditions.

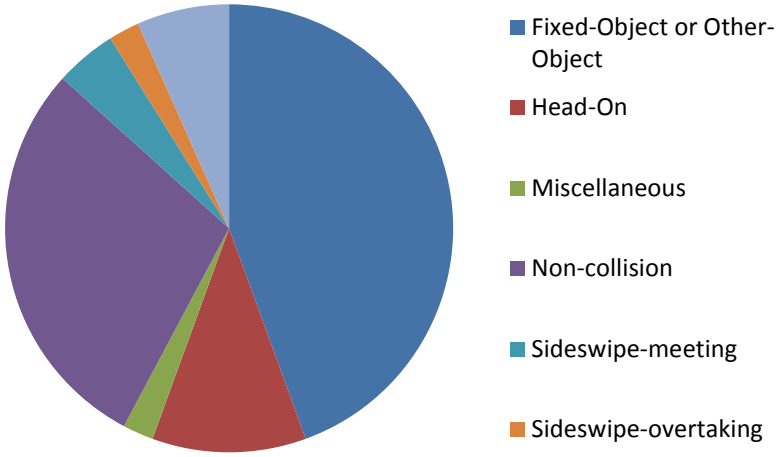


Figure 19. Severe Injury Collision Types

Intersection and Segment Crash Analysis

Study intersections and segments were analyzed individually and compared to statewide averages for similar facilities, when possible. Reported crashes at study intersections are summarized in Table 13. Intersection exposure was measured in terms of total entering vehicles (TEV), derived from the peak hour volumes used in the intersection operational analysis. The peak hour was assumed to be ten percent of the daily volume. The 90th percentile crash rates presented in Table 13 are identified in the ODOT Analysis Procedures Manual, Exhibit 4-1. The ODOT APM indicates that intersections that exceed the 90th percentile should be further analyzed. None of the study intersections in Crook County exceed their corresponding 90th percentile crash rates.

Table 13: Reported Crashes at Study Intersections

Intersection Name	# of Crashes	TEV	Crash Rate	90th Percentile Crash Rates	Crash Type					Severity		
					Angle	Rear-End	Turning	Fixed-Object	Other	PDO	Injury	Fatality
Powell Butte Highway/Ochoco Highway	3	1049	0.157	1.080	0	0	0	2	1 (Animal)	2	1	0
Reif Road/Ochoco Highway	9	1245	0.396	1.080	0	5	3	1	0	3	6	0
Williams Road/Ochoco Highway	7	739	0.519	1.080	0	4	2	1	0	2	5	0

[1]TEV = Total entering vehicles
[2]PDO = Property damage only
[3]Crash Rate = Crashes per million entering vehicles

Although none of the study intersections exceed the 90th percentile crash rate for similar facilities, several trends were noted at the intersections. The intersection crashes at Reif Road/Ochoco Highway and Williams Road/Ochoco Highway resulted in more injury crashes than property damage only crashes. In addition, rear-end crashes were the most common crash types at these two intersections. Rear-end crashes may be associated with drivers slowing or accelerating at the intersections.

Reported crashes along roadway study segments are summarized in Table 14. Exposure on the segments was based on ADT, which was estimated from available traffic counts when not readily available. For segments with 24-hour or multiple day counts, the ADT was based upon those counts. For other segments, the estimate of ADT was based upon 4-hour classification counts. The crash rate for each segment is compared to the statewide average for similar facilities as reported in the ODOT 2014 Crash Rate book.

Table 14: Reported Crashes on Study Segments

ID	Road Name	Segment Boundaries	Length (miles)	ADT	Crash Rate (2010 – 2014 average)	State Average	Crash Type							Severity		
							Rear end	Side swipe	Angle/ Turning Movement	Non-collision	Head-On	Fixed-Object	Other	PDO	Injury	Fatality
1	Powell Butte Highway	Riggs Road to OR 126	1.04	4853	0.33	1.18	0	0	0	2	1	0	0	1	2	0
2	Lone Pine Road	OR 370 to Smith Rock Way	4.98	949	0.35	1.38	0	1	1	0	0	1	0	1	2	0
3	Millican Road	Reservoir Road to South Prineville City Limits	14.17	638	0.67	1.38	0	1	0	4	0	4	2 (animal)	5	6	0
4	Millican Road	Reservoir Road to South County Limits	7.31	485	0.15	1.16	0	0	0	1	0	0	0	0	1	0
5	Millican Road	South Prineville City Limits to OR 126	1.48	1523	1.22	1.51	1	0	1	2	0	1	0	2	3	0
6	Gerke Road	US 26 to Lamonta Road	2.96	254	1.46	1.38	1	0	1	0	0	0	0	0	2	0
7	Ochoco Creek Road	US 26 to Canyon Creek Road	8.48	99	1.31	0.77	0	0	0	0	1	1	0	1	1	0
8	Powell Butte Highway	West County Limit to Riggs Road	1.65	4247	0.70	1.18	1	0	1	0	2	5	0	1	8	0
9	McKay Road	Gerke Road to Barnes Butte Road	2.30	1034	1.61	1.38	0	0	2	1	0	3	1 (animal)	3	4	0
10	Barnes Road	US 26 to Wainwright Road	1.12	1169	0.00	1.38	0	0	0	0	0	0	0	0	0	0
11	US 26	Bus Evans Road to Gumpert Road	0.30	2989	2.44	1.18	1	0	2	0	0	0	1 (animal)	4	0	0
12	Bus Evans Road	US 26 to Elliott Lane	0.44	257	0.00	1.38	0	0	0	0	0	0	0	0	0	0
13	Crooked River Highway	South Prineville City Limits to Reservoir Road	21.48	249	1.13	1.38	0	0	0	3	1	6	1 (animal)	4	7	0
14	Lamonta Road	Gerke Road to Grimes Road	1.00	766	2.86	1.38	0	0	4	0	0	0	0	0	4	0
15	Lamonta Road	Grimes Road to Gumpert Road	2.37	797	3.77	1.38	1	0	5	1	0	5	1 (animal)	7	6	0
16	Reif Road	OR 126 to Twin Lakes Ranch Road	2.54	335	1.29	1.16	0	0	0	1	0	1	0	1	1	0
17	Reif Road	Riggs Road to OR 126	1.00	566	0.00	1.16	0	0	0	0	0	0	0	0	0	0
18a	Juniper Canyon Road	OR 380 to South Davis Loop (North)	1.68	2702	3.42	1.38	4	2	4	5	3	11	5	17	17	0
18b	Juniper Canyon Road	South Davis Loop (North) to South Davis Loop (South)	6.01	886	3.77	1.38	2	2	4	9	1	21	5	19	24	1
19	Beaver Creek Road	Paulina Suplee Road to Puett Road	2.28	93	0.00	1.38	0	0	0	0	0	0	0	0	0	0
20	Shumway Road	Powell Butte Highway to Alfalfa Road	3.96	1139	1.70	1.38	0	0	5	1	1	5	2 (animal)	8	6	0
21	Alfalfa Road	Powell Butte Highway to Brasada Ranch Road	2.32	848	1.11	1.38	0	0	0	1	0	3	1 (animal)	4	0	0

Those cells highlighted in gray indicate that the crash rate exceeds the state average for similar roadways. These locations are discussed in further detail below.

- Gerke Road had two crashes reported within the study segment, but the segment has a low ADT and short segment length, contributing to the high crash rate. Both crashes resulted in an injury. One crash was a turning-movement crash, and the other crash was a rear-end crash.
- Ochoco Creek Road also experienced two crashes within the study segment and has a low ADT that may contribute to the high crash rate. One crash resulted in an injury.
- McKay Road experienced seven crashes along the segment. Over half the crashes (4 out of 7) resulted in an injury. The crash types included fixed object (3 crashes), angle or turning movement (2 crashes), animal (1 crash), and non-collision crashes (1 crash).
- US 26 has four crashes along the segment. All four crashes were property damage only crashes. Two crashes were angle/turning movement crashes, one crash was a rear-end crash, and one crash involved an animal. The short segment (0.3 miles) likely contributed to the high crash rate.
- Four intersection angle or turning movement crashes at Lamonta Road and Grimes Road are associated with both Lamonta Road segments (segments 14 and 15). These are the only crashes associated with Segment 14, while Segment 15 includes nine additional crashes. The intersection related crashes were all classified as turning movement or angle crashes. The majority of the segment crashes were fixed object crashes. Approximately half of the crashes on Lamonta Road resulted in an injury.
- Reif Road had two crashes associated with the study segment but has a low ADT that may contribute to the high crash rate. One crash resulted in an injury. One crash was reported as a fixed object crash, and one was reported as a non-collision crash.
- Both segments of Juniper Canyon Road have crash rates more than double the state average. Both segments have a high percentage of injury crashes, and Segment 18b (between the north and south intersections with Davis Loop Road) includes one fatality. Both segments have high numbers of fixed object and non-collision crashes.
- Shumway Road has 14 crashes associated with the study segment. These include mostly angle or turning movement crashes and fixed object crashes. Six of the crashes resulted in injuries.

Statewide Priority Index System (SPIS)

ODOT developed the Safety Priority Index System (SPIS) to identify and prioritize sites where countermeasures could be implemented to potentially reduce the number of crashes. No segments or intersections within unincorporated Crook County were identified in the top five percent of the 2015 SPIS list.

ODOT All Roads Traffic Safety (ARTS) Program

ODOT developed a Roadway Departure Safety Implementation Plan that identifies systemic treatments to address roadway departure crashes on roads of all jurisdictions throughout Oregon. Several roadways in Crook County are identified for systemic treatments in Crook County. These include the following treatments:

- OR 126: Shoulder and centerline rumble strips
- OR 380: Edgeline rumble strips; enhanced signs and markings for curves
- Juniper Canyon Road: Edgeline rumble strips, alignment delineation such as raised pavement markers, enhanced signs and markings for horizontal curves
- Davis Road: Edgeline rumble strips, alignment delineation such as raised pavement markers, enhanced signs and markings for horizontal curves, tree removal
- Powell Butte Road: Enhanced signs and markings for horizontal curves

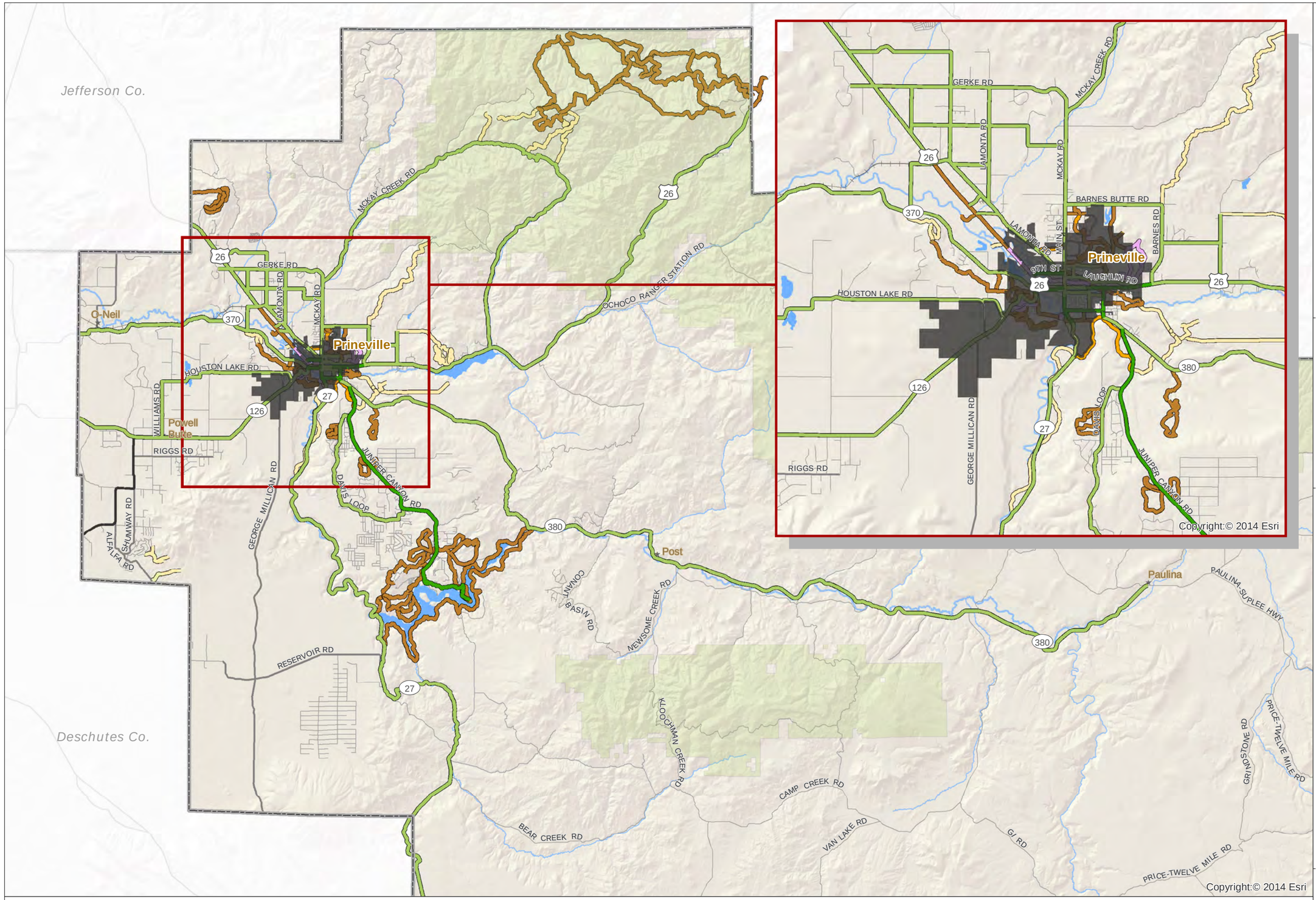
PEDESTRIAN AND BICYCLIST SYSTEM

There are no existing sidewalks in unincorporated Crook County to serve pedestrians. However, there are existing multi-use trails within the County, as shown in Figure 20. In addition, the figure presents the existing dedicated bicycle lanes available within the County. Bicyclists and pedestrians must share the shoulder or roadway on roadways where facilities are not provided.

Bicyclists also share the road when there is no bicycle lane or shoulder provided. Bicyclists may be of any age or ability. However, only the more confident, experienced riders are likely to be comfortable sharing the high speed, rural roads. On lower classification roadways, shared facilities may be appropriate.

Strava is a website and mobile application that allows bicyclists to track their rides. Strava store and compiles the information provided by users. This information can be used to indicate relative usage of roadways among Strava application users. For example, high usage roadways are those that are traveled by many cyclists using the Strava application. Although it is not representative of all bicyclists (those without the Strava application are not represented) and does not indicate the comfort level of the bicyclists on the roadway, the data provides a general understanding which facilities are more commonly used by bicyclists. That existing Strava data is presented in Figure 21. Based on the Strava data in the figure, Highway 27, Highway 26 (east of Prineville), McKay Creek Road, Highway 370, Lamonta Road, Alfalfa Road, Shumway Road, and parts of Houston Lake Road are all popular roadways for bicyclists. Many of these, including Alfalfa Road, Shumway Road, Highway 370, and Highway 27, do not have paved shoulders under existing conditions.

ODOT is currently undertaking a project to complete an active transportation needs inventory for all state facilities. As shown in Figure 22, the majority of OR 370, OR 380, and OR 27 lack shoulders for pedestrians. The remaining facilities are typically less than five feet wide. Similarly, Figure 23 illustrates the bicycle inventory and gaps along similar roadways.



Trails

- Existing Bike Lanes
- Proposed Bike Lanes
- Existing
- Proposed Trail High Priority
- Proposed Trail Medium Priority
- Proposed Trail Low Priority

Transportation

- 26 Major Roads
- Arterial Roads
- Minor Roads

Base Layers

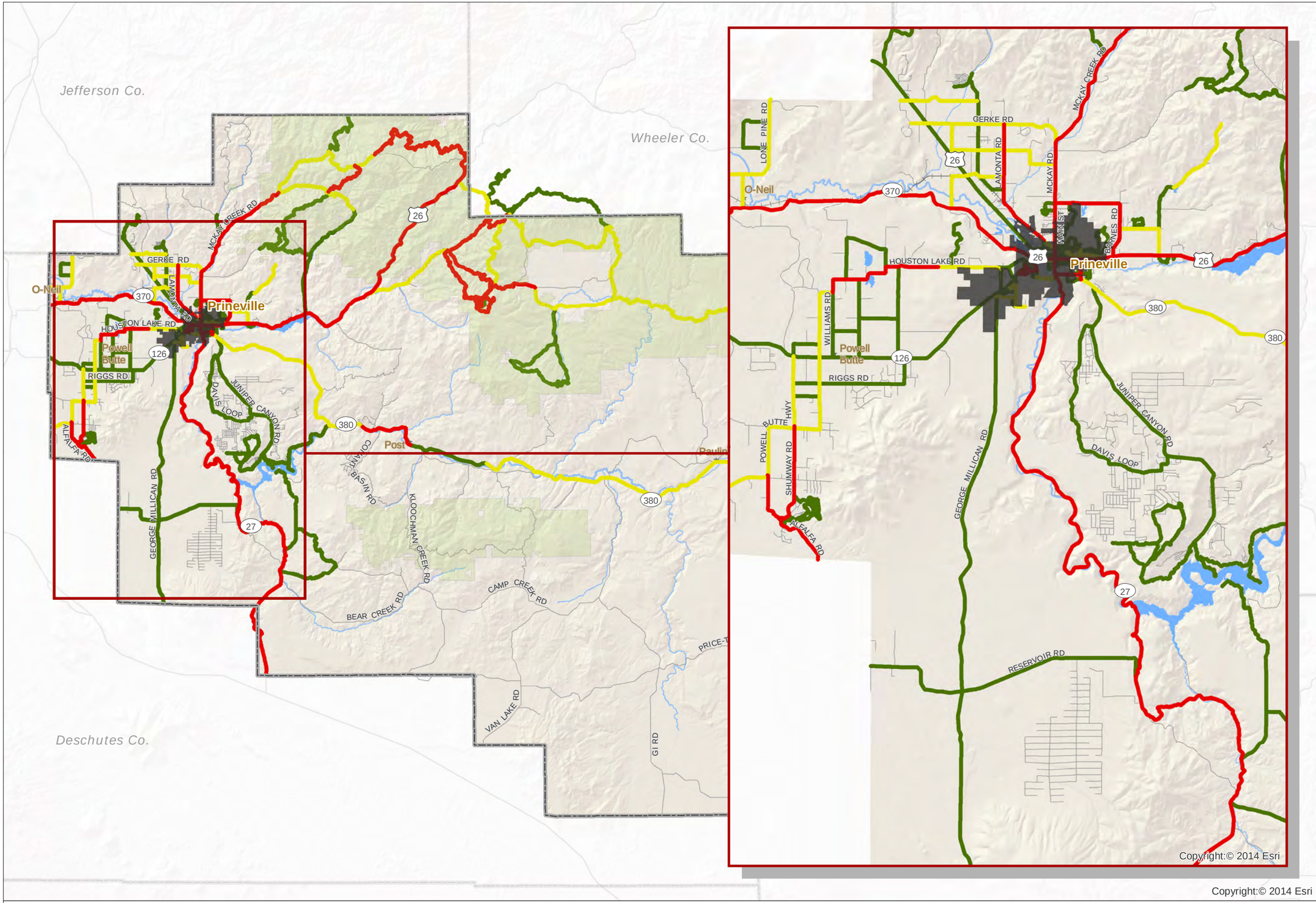
- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Trail data provided by COTA and CC GIS
Map created by CC GIS - Revised 1/24/2017

10 Miles
10 Kilometers

Crook County GIS

Crook County TSP
Figure 20 - 1
Trails



Roadway Bicycle Utilization

- High Use
- Medium Use
- Low Use

Transportation

- 26 Major Roads
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Qualitative interpretation of Strava data as of 2016
Map created by CC GIS - Revised 1/25/2017

10 Miles
10 Kilometers

Crook County GIS

Crook County TSP

Figure 21 - 1

Roadway Bicycle Utilization

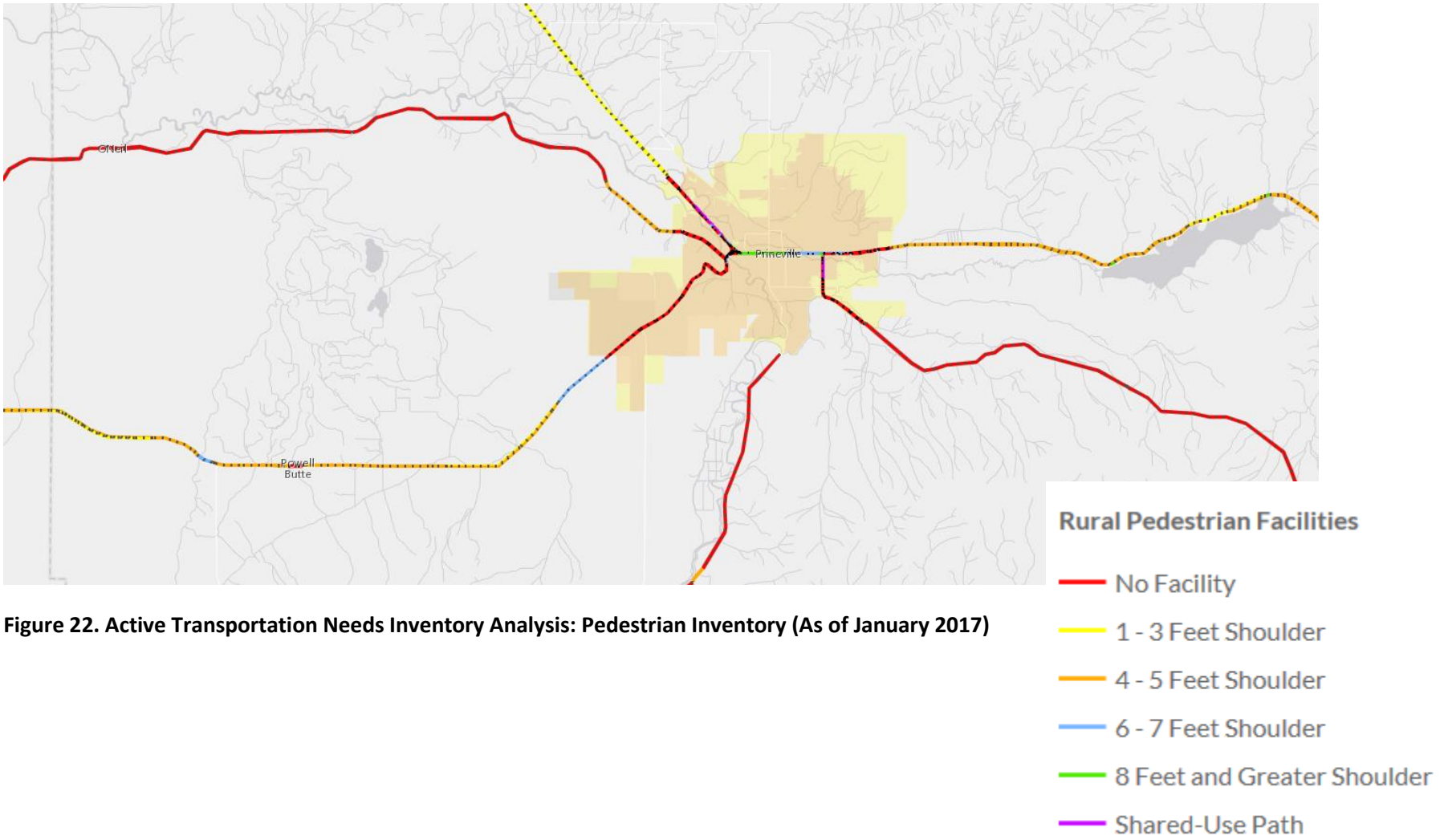


Figure 22. Active Transportation Needs Inventory Analysis: Pedestrian Inventory (As of January 2017)

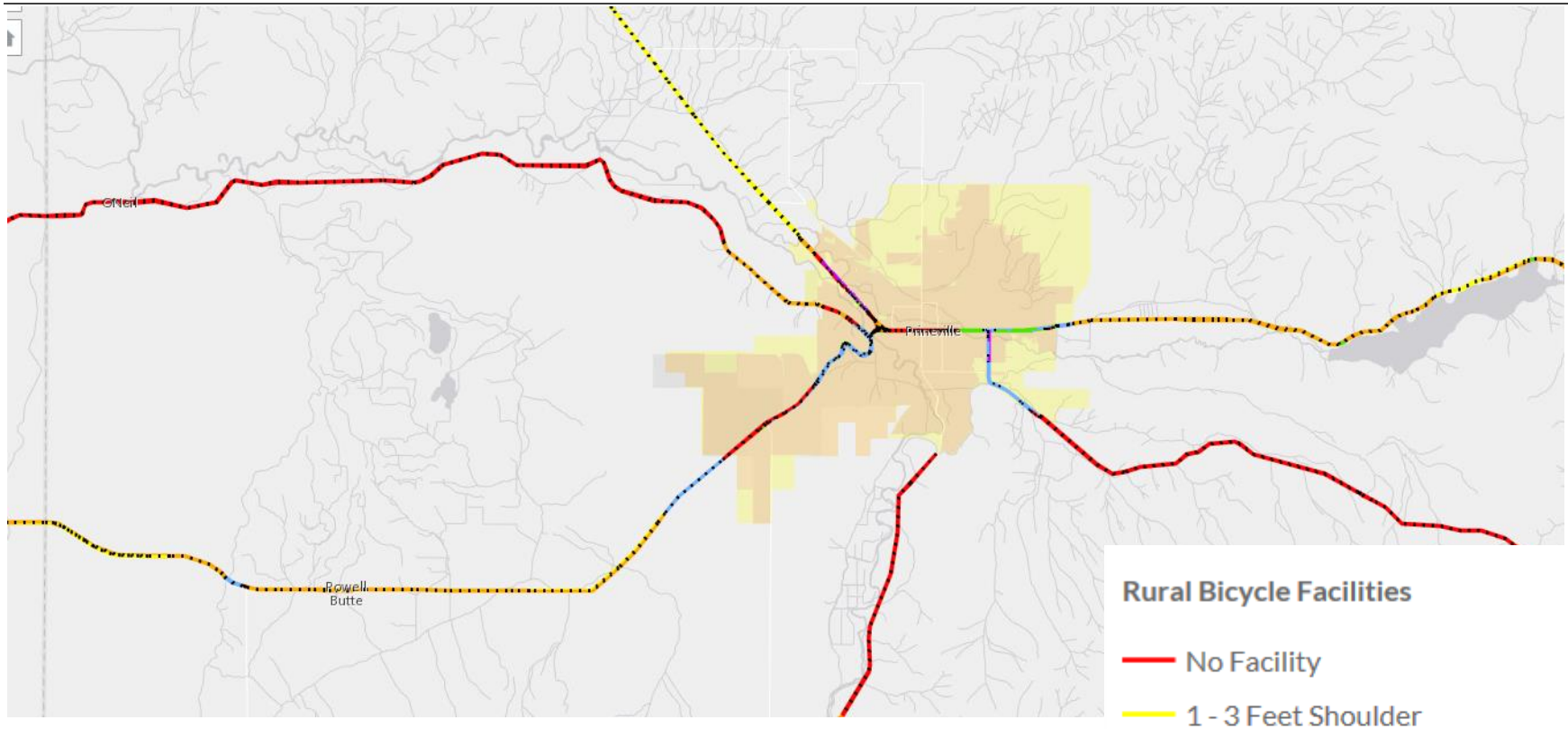


Figure 23. Active Transportation Needs Inventory Analysis: Bicycle Inventory (As of January 2017)

PUBLIC TRANSPORTATION SYSTEM

Cascades East Transit (CET) provides public transportation within Crook County. The CET Dial-A-Ride program provides prescheduled rides to those in the service area, which includes most of Prineville and some parts of unincorporated Crook County adjacent to the City of Prineville. There is one CET vehicle serving the Prineville area, and service is provided from 7:00 AM to 5:30 PM on weekdays. From July 2015 through June 2016 CET provided 7,750 rides within the Prineville service area. Of those, 2,603 were for elderly or disabled persons.

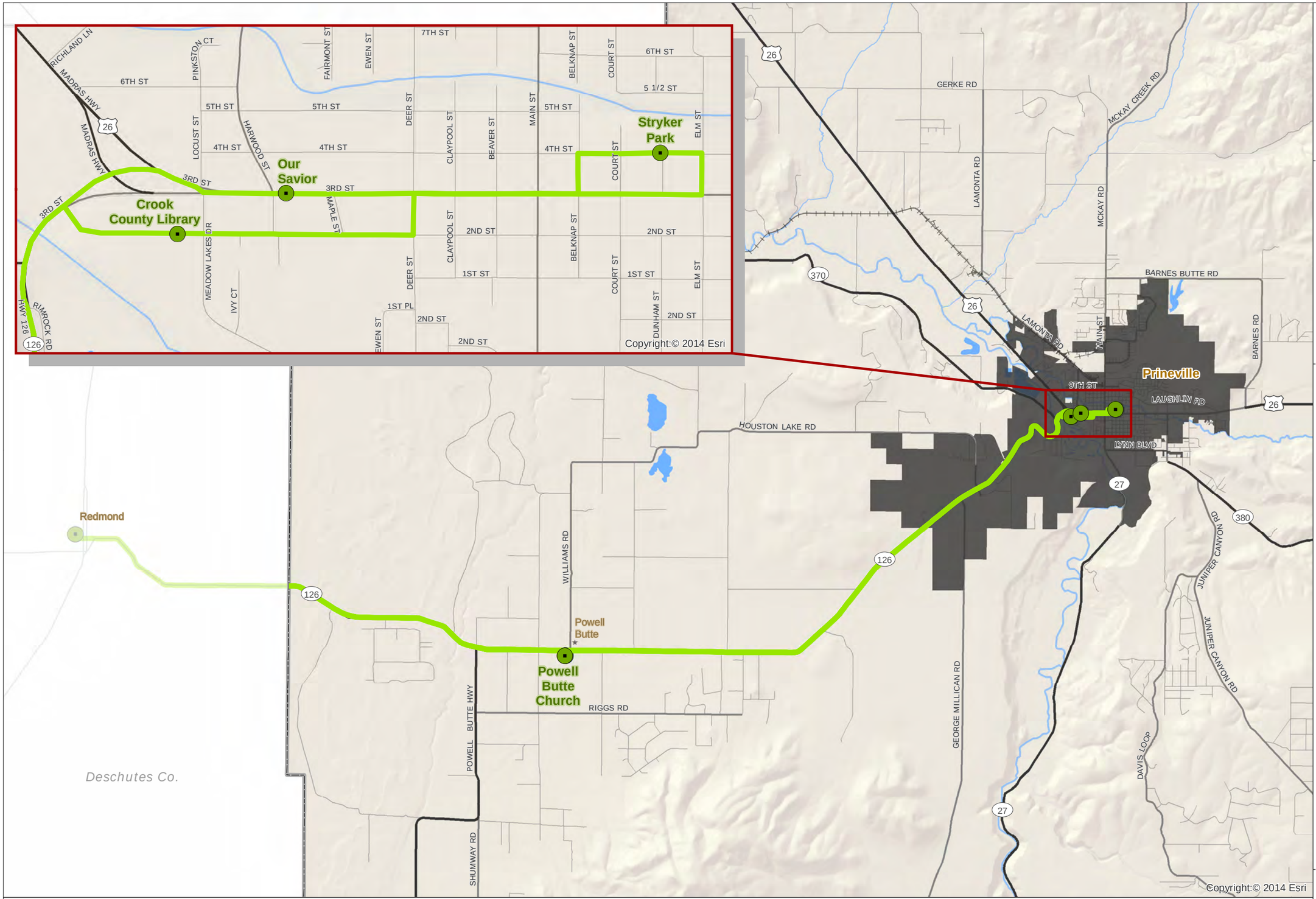
In addition, the CET fixed Route 26 provides bus service from Prineville to Redmond on weekdays and includes a stop in Powell Butte, as shown in Figure 24. The new community connector system is intended to begin operating on February 6th, 2017. The initial community connector schedule, which is subject change, is shown in Table 15.

Table 15: Route 26 Service Timetable

Redmond Library	Powell Butte Church	Crook Co. Library	Stryker Park	Stryker Park	3rd @ Harwood	Powell Butte Church	Redmond Library
6:03	-	6:28	6:32	6:42	6:45	6:58	7:11
7:22	-	7:47	7:51	8:01	8:04	8:17	8:30
14:45	14:58	15:11	15:15	15:25	15:28	-	15:53
16:05	16:18	16:31	16:35	16:45	16:48	-	17:13
17:50	18:03	18:16	18:20	18:30	18:33	-	18:58

Two buses will serve Route 26 from Redmond to Prineville. These buses will also serve Route 24, which provides service between Redmond and Bend. This will ensure that the schedules are coordinated to allow individuals to travel between Bend and Prineville.

CET drivers are employed by the Central Oregon Intergovernmental Council, the operator of Cascades East Transit. Funding for service in Crook County occurs through a variety of sources including fares, the Crook County General Fund, the City of Prineville General Fund, Oregon Special Transportation Funds (STF), and federal 5310 funds (assisting with transportation of seniors and individuals with disabilities), 5311 (assisting with transportation in rural areas), and 5311F (assisting with transportation within inner city areas) program funds. In the future, CET hopes to work toward a higher level of service in Crook County by increasing the frequency and length of service between Prineville and Redmond/Bend and improving accessibility for residents in more rural areas of the County.



Public Transportation

- Stops
- Routes

Transportation

- Railroad
- Major Roads (26)
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Routes and Stops provided by COIC
Map created by CC GIS - Revised 1/24/2017

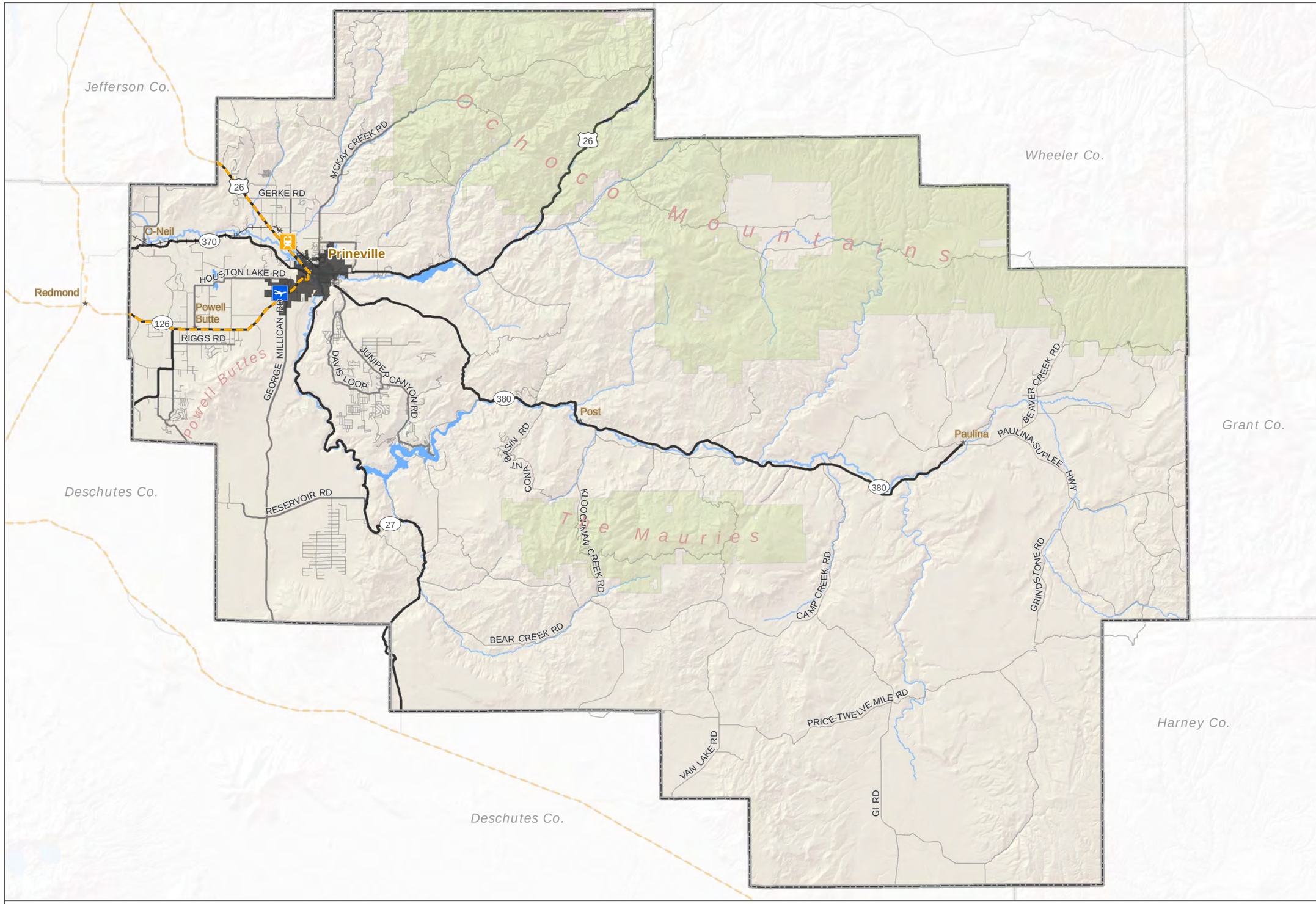
2 Miles
2 Kilometers

Crook County GIS

Crook County TSP
Figure 24 - 1
Public Transportation

TRUCK FREIGHT ROUTES

There are two designated freight routes in the study area, Highway 26 and Highway 126, as shown in Figure 25. Freight is also transported on a number of other roadways to access industrial locations within the County. Powell Butte Highway serves a connection between Bend and Prineville and therefore may experience higher freight volumes than other roadways. In addition, Millican Road is a common truck route that connects to the industrial land on the eastern side of Prineville.



ODOT Freight Routes

Transportation

- Railroad
- Major Roads (26)
- Arterial Roads
- Minor Roads

Base Layers

- Train Depot
- Prineville Airport
- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Freight Routes provided by ODOT
Map created by CC GIS - Revised 1/25/2017

10 Miles
10 Kilometers

Crook County GIS

Crook County TSP
Figure 25 - 1
ODOT Freight Routes

RAIL SYSTEM

The City of Prineville Railway (COPR) operates a Class III shortline freight railroad. This is the only railroad in Crook County. The railroad carries a variety of products including consumer and forest products, chemicals, and building materials. Service operates on an as-needed basis Monday through Friday. The train operates at 10 to 20 miles per hour. The tracks are in good conditions with the main line meeting Federal Rail Administration (FRA) Class 2 standards. The COPR shortline connects with Class I railroads in Redmond on the Oregon Trunk Line that runs from the Columbia River to Klamath Falls.

The existing railroad ends west of the Main Street 10th Street intersection north of down town Prineville. The Prineville Freight Depot (PFD) provides intermodal connection and is intended to compliment the services offered by the COPR. It is located adjacent to the COPR mainline, three miles west of Prineville. The PFD provides a regional multi-modal transportation hub that provides Central Oregon with transload, reload, storage and managed distribution.There is no passenger service for residents of Crook County. The nearest passenger service is available on Amtrak, with a passenger station in Chemult.

AIR TRANSPORTATION SYSTEM

The Prineville/Crook County airport occupies 940 acres and is located approximately three miles SW of the City of Prineville. It is primarily used by corporate light jet and turbine traffic for general aviation/business purposes. It also facilitates fire support helicopters and fixed wing operations. The Airport is classified as a Class IV, Community General Aviation Airport, by the Oregon Department of Aviation. It accommodates general aviation users and local business activities and has 2,500 or more annual operations or more than ten aircraft based on site.

The airport has main and secondary paved runways. The main runway (28-10) is 5,750 feet long by 75 feet wide. According to a January 2013 report by the Federal Aviation Administration (FAA), the runway is in “good” condition. The secondary runway (33-15) is 4,000 feet long by 40 feet wide and is in “fair” condition according to the 2013 FAA report. The airport is part of the National Plan of integrated Airport systems (NPIAS), and is eligible for federal funding. The airport is currently in the process of updating the facility master plan. The master plan is currently under review by the Federal Aviation Administration.

According to the Oregon Department of Aviation, Crook County is also served by several private airstrips:

- Blue Mountain Ranch Airport - 4 Miles Northwest of Paulina
- Dry Creek Airpark- 7.5 Miles South/Southeast of Prineville
- Goering Ranches Airport- 3 Miles Northeast of Alfalfa
- Pioneer Memorial Hospital HP- North Edge of Prineville
- River Run Ranch AP- 8 Miles East of Redmond

- Robeck Landing HP- 8.1 Miles East/Northeast of Powell Butte
- Shotgun Ranch Airport/Keeney- 8 Miles East of Post
- Tailwheel AP- 3 Miles Southeast of Prineville

Commercial passenger air service is available at the Redmond Airport, about 20 miles west of Prineville.

INTERMODAL CONNECTIONS

Intermodal connections for passenger service exist in the form of transit, pedestrian and bicycle, and automobile connections. Intermodal connections for freight exist in the form of rail, truck, and air transport connections. This section describes those connections.

Freight Transport

Most freight transportation in Crook County occurs by airplane, train, or truck. The Prineville Freight Depot (PFD) and Prineville/Crook County airport, both mentioned above, are intermodal connection hubs in the county. The PFD is located off of Highway 26, which is classified as a freight route. Access is provided by Bus Evans Road. Additionally, the Prineville/Crook County airport is located off of Highway 126, which is also classified as a freight route. Highway 126 and George Millican Road both serve industrial areas, providing freight connections for trucks.

Passenger Transport

CET bus route 26 provides a stop in Powell Butte at the Powell Butte church. This location acts as a Park-and-Ride location for riders. In addition, this stop allows for pedestrians and bicyclists to connect to transit. All CET buses provide bicycle racks on the front of the buses that can accommodate at least two bicycles. Bicyclists are allowed to bring their bicycles on the bus in the case that the provided racks are full.

BRIDGE CONDITIONS

ODOT maintains an inventory of bridge conditions within the County. This table is provided in Attachment C and includes a list of all bridges within the study area. Each bridge is given a sufficiency rating, a measure between 0 and 100 calculated by the Federal Highway Administration (FHWA), based on factors such as condition, materials, load capacity, and geometry (i.e., dimensions). FHWA uses the rating as a tool to prioritize the allocation of funds for bridge repairs. In general, bridges with a sufficiency rating of less than 50 are given priority. The sufficiency rating is used to identify deficiencies, which may include structural issues or functional issues. For example, older bridges may be narrow and not designed to the same width or height clearance of today's standards. Therefore, a sufficiency rating does not necessarily indicate a structural issue.

There is only one bridge in unincorporated Crook County with a sufficiency rating of less than 50. Bridge 13C24, located on SE Weigand Road (County Road 211) at the crossing of the irrigation ditch, has a sufficiency rating of 38.8. ODOT has identified this bridge as structurally deficient.

Bridge 19083 on County Road 221 over Paulina Creek has a sufficiency rating of 89.2 but is considered functionally obsolete and needs a replacement.

FUNDING INVENTORY & ANALYSIS

Roadways within Crook County fall under the jurisdiction of the County, ODOT, and other private or public entities. This section discusses the County's existing funding revenue sources for transportation capital improvement projects as well as operations and maintenance activities.

Table 16 presents the total road funds budget for the 2015/2016 and 2016/2017 years and provides information on revenue sources and funding for capital improvements. Crook County's total road funds budget, as presented in the table, has a total of approximately $22 million per year. Approximately two million dollars is distributed to personnel services each year, and approximately five million dollars is used to cover materials and services each year. The majority of the remaining funds are used to cover capital projects or reserved for future expenses.

Table 16.Crook County Road Funds Budget from 2015-2017

	2015/2016	2016/2017
Beginning balance/interest	$18,075,000	$19,976,134
Licenses, permits, fee	17,000	15,000
Intergovernmental payments	50,000	-
Misc. revenue	-	7,000
Reimbursed revenue	16,000	16,000
State revenue	2,000,000	2,207,908
Federal shared revenue	1,001,200	1,200
Interfund loan	285,500	106,000
TOTAL REVENUE	**$21,444,700**	**$22,329,242**
Personnel services	$1,618,485	$1,751,307
Materials and services	4,951,820	4,223,100
Capital outlay	14,574,395	2,235
Transfers out	-	247,120
Contingency	300,000	300,000
Interfund loan	-	-
Reserved for future expense	-	13,572,715
TOTAL EXPENSE	**$21,444,700**	**$20,096,477**

Table extracted from Technical Memorandum #1

CONCLUSION

The assessment of the current land use and transportation system conditions identified the following findings:

- Multiple jurisdictions own and manage the public access roadway system within Crook County, including the Oregon Department of Transportation (ODOT), Crook County, US Forest Service, Bureau of Land Management, and private entities.
- State roadways include US Route 26, Oregon Highway 126, Oregon Highway 370, Oregon Highway 380, and Oregon Highway 27, which statewide and regional connections to Crook County.
- Existing traffic volume does not exceed capacity at the three study intersections or the 21 roadway segments studied.
- No segments or intersections were identified in the top five percent of the 2015 SPIS list.
- General county-wide crash trends indicate high frequency of rear-end and fixed object crashes. Winter weather and roadway conditions also appears to contribute to the crashes.
- Juniper Canyon Road has a high crash rate and a trend of fixed object crash types.
- No sidewalks exist in unincorporated Crook County.
- Bicycles typically ride in the travel lane or shoulders, when available, throughout the County. Highway 27, Highway 26 (east of Prineville), McKay Creek Road, Highway 370, Lamonta Road, Alfalfa Road, Shumway Road, and parts of Houston Lake Road are all popular roadways for bicyclists, based on Strava data. Many of these, including Alfalfa Road, Shumway Road, Highway 370, and Highway 27, do not have paved shoulders.
- Transit service is provided through one fixed route that connects Prineville to Redmond with a stop in Powell Butte. Limited dial-a-ride service is available in some areas of the County.
- Freight traffic travel occurs mostly by truck and rail. The Prineville Freight Depot and Prineville/Crook County airport both support intermodal connections, and Highway 26 (west of Prineville) and Highway 126 both serve as dedicated freight routes.
- The City of Prineville Railway provides the only rail service in the County, which connects with Class I railroads in Redmond.
- The Prineville/Crook County Airport accommodates general aviation users and local business activities. The Redmond Airport, west of Crook County, serves commercial passenger flights.
- The County's road budget typically averages approximately 22 million dollars per year. Approximately 14 million dollars per year is available for capital projects.

These conclusions will be discussed with the Technical Advisory Committee and Public Advisory Committee and used to inform the alternatives considered for the TSP.

4. TECHNICAL MEMO #4
FUTURE CONDITIONS

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
354 SW Upper Terrace Drive, Suite 101, Bend, Oregon 97702 P 541.312.8300 F 541.312.4585

TECHNICAL MEMORANDUM #4

Crook County Transportation System Plan Update

DRAFT Future Conditions Memorandum

Date: January 26, 2017 Project #: 20189

To: Ann Beier, Crook County
Devin Hearing, ODOT

From: Marc Butorac, PE; Ashleigh Ludwig, PE, AICP; Camilla Dartnell

This memorandum estimates year 2036 future transportation system conditions and identifies transportation system needs based on projected population and employment demographics of Crook County. Transportation needs were also identified for multi-modal elements of the transportation system.

DEVELOPMENT OF YEAR 2036 TRAFFIC FORECASTS

This section documents the population and employment projections and develops the transportation forecasts for the County.

Population and Employment Projections

Existing and future year population estimates were developed and summarized in Technical Memorandum #3: Existing Conditions and are presented in Table 1.

Table 1. Population Projections

Year	Population Projections		
	Crook County (Total)**	Unincorporated Area	Prineville
2010*	20,978	11,725	9,253
2016**	21,580	11,935	9,645
2020	21,678	10,145	11,533
2025	22,404	10,470	11,935
2030	23,222	10,806	12,416
2035	23,916	11,071	12,845
2040	24,543	11,305	13,238

*2010 population totals are based on the 2010 census data.
** 2016 population totals are based on PSU population estimates published in December 2016, while population projections for 2020-2040 are based on PSU population projections published in June 2015.

As shown in the table, the population projections prepared by PSU estimate a 13.7 percent increase in total Crook County population between 2016 and 2040, or approximately 0.6 percent increase per year. Based on this growth rate, the estimated total population in Crook County for future year 2036 is 24,170. With this anticipated growth, it will be important to provide opportunities to support economic development within the unincorporated area and support connections to Prineville, Redmond, and the surrounding region.

Based on the State of Oregon Employment Department's historic employment estimates, the total non-farm employment estimates in Crook County decreased by approximately 20 percent between 2006 and 2016, as shown in Figure 1. The majority of this decrease in employment occurred in the private employment sector during the recession between 2007 and 2010. In recent years, the total non-farm employment has begun increasing trends. The employment estimates have increased by a total of approximately six percent between 2011 and 2016.

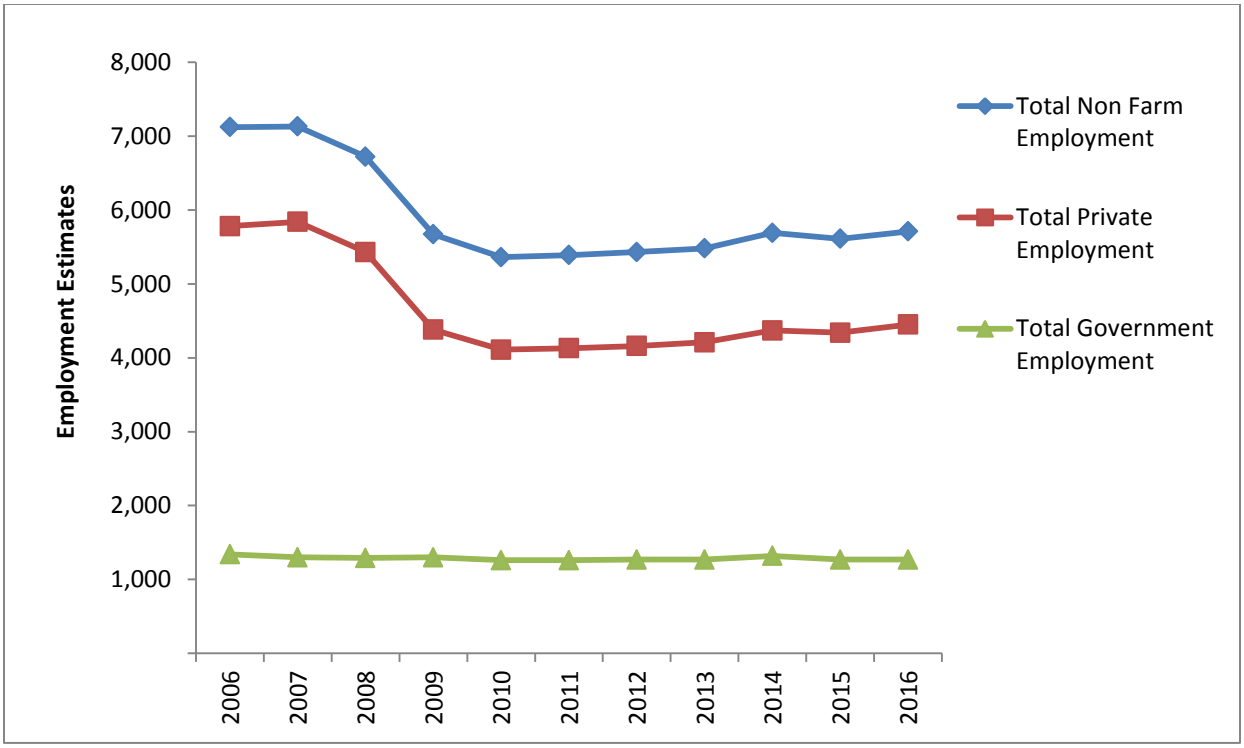


Figure 1. Summary History of Crook County Employment Estimates

Figure 2 illustrates the breakdown of non-farm employment by industry for the year 2016. The largest industry was trade, transportation, and utilities with approximately 1,400 employees. Government, manufacturing, education and health services, and leisure and hospitality are also large industries in Crook County.

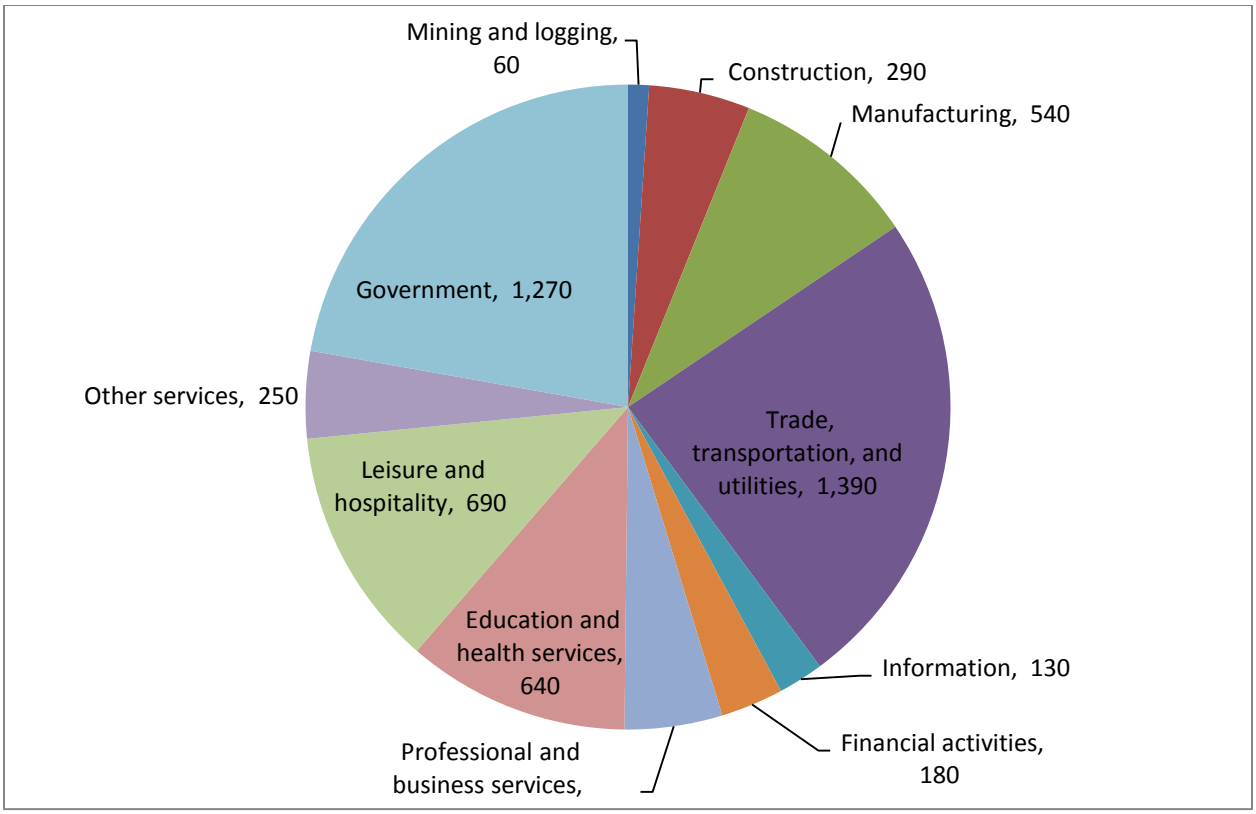


Figure 2. 2016 Non-Farm Employment Estimates by Industry

Traffic Forecast Projections

Future (2036) traffic volumes were developed using Oregon Department of Transportation's (ODOT's) historical trends method, which relies on historic traffic volumes to develop an annual growth rate. ODOT maintains Future Volumes Tables that summarize current and future year traffic volumes for state roadways. Based on guidance from ODOT's Analysis Procedure Manual (APM), the projected average annual growth is 1.6 percent for all Crook County roadways. This estimate was developed based on an average growth rate for state highways in Crook County. Estimates with an R-squared valued below 0.75 were excluded from the calculations.

The calculated 1.6 percent growth rate assumed which is substantially lower than the eight percent growth that the OR 126 corridor plan assumed. The OR 126 corridor plan accounted for five approved destination resorts and a large amount of undeveloped industrial land. The corridor plan also acknowledged that this estimate was high but assumed a conservative analysis. Since the corridor plan was completed in 2012, only one destination resort has progressed and the industrial land has already begun to build out.

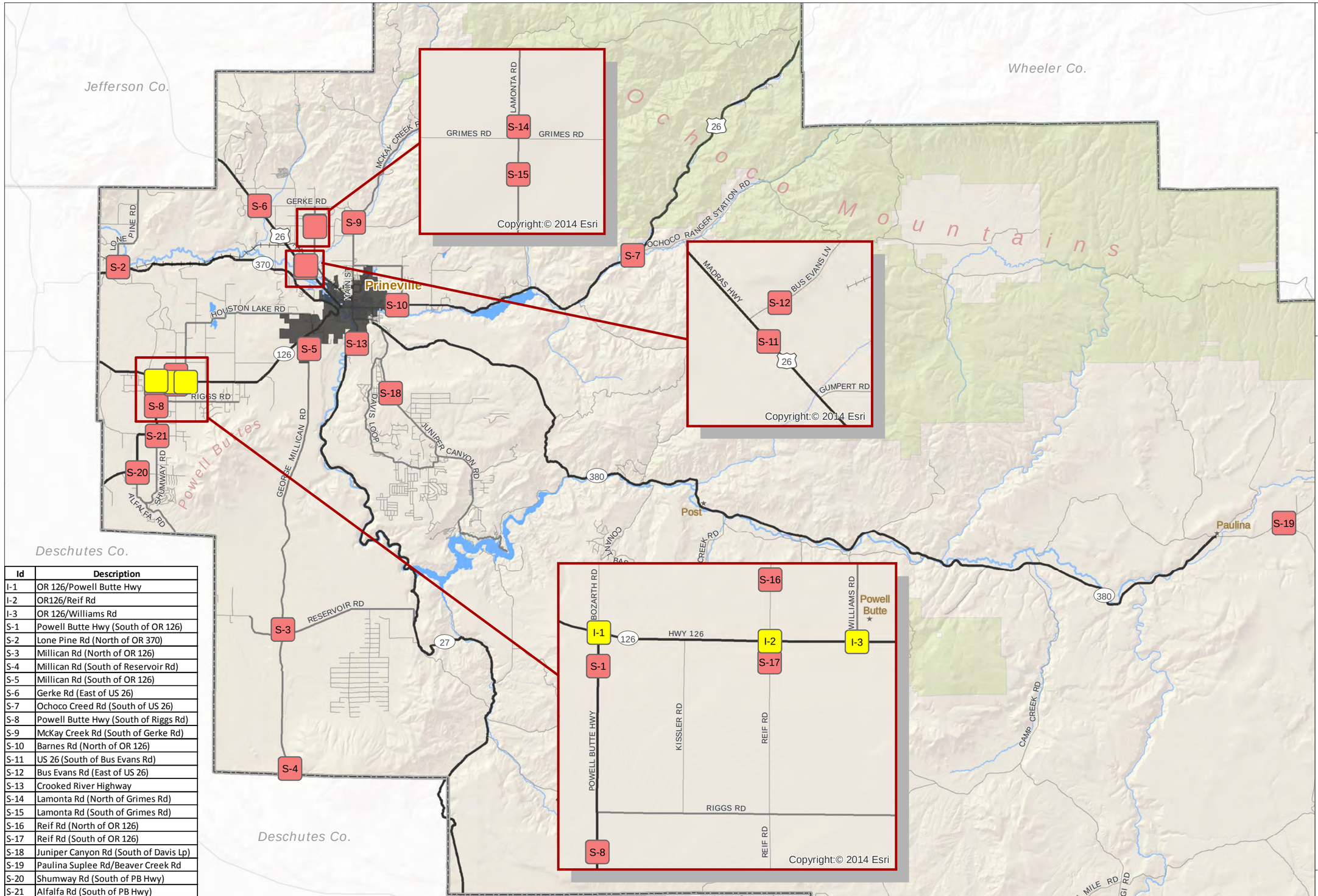
Attachment A provides the traffic volumes and projections for the locations that were used to develop the growth rate.

FUTURE TRAFFIC CONDITIONS AND NEEDS

The forecast 2036 traffic operations are summarized in the following sections. The technical analysis of the forecast 2036 transportation system is based on ADT for roadway segments and 30th highest hour traffic volume forecasts for intersections. Figure 3 shows the locations of the study intersections and study segments.

Year 2036 Forecast Traffic Volumes

The calculated 1.6 percent annual growth rate was applied to existing 2016 volumes to estimate forecast year 2036 traffic volumes. Figure 4 shows the added traffic at the study intersections and segments.



Id	Description
I-1	OR 126/Powell Butte Hwy
I-2	OR126/Reif Rd
I-3	OR 126/Williams Rd
S-1	Powell Butte Hwy (South of OR 126)
S-2	Lone Pine Rd (North of OR 370)
S-3	Millican Rd (North of OR 126)
S-4	Millican Rd (South of Reservoir Rd)
S-5	Millican Rd (South of OR 126)
S-6	Gerke Rd (East of US 26)
S-7	Ochoco Creed Rd (South of US 26)
S-8	Powell Butte Hwy (South of Riggs Rd)
S-9	McKay Creek Rd (South of Gerke Rd)
S-10	Barnes Rd (North of OR 126)
S-11	US 26 (South of Bus Evans Rd)
S-12	Bus Evans Rd (East of US 26)
S-13	Crooked River Highway
S-14	Lamonta Rd (North of Grimes Rd)
S-15	Lamonta Rd (South of Grimes Rd)
S-16	Reif Rd (North of OR 126)
S-17	Reif Rd (South of OR 126)
S-18	Juniper Canyon Rd (South of Davis Lp)
S-19	Paulina Suplee Rd/Beaver Creek Rd
S-20	Shumway Rd (South of PB Hwy)
S-21	Alfalfa Rd (South of PB Hwy)

Study Areas

- Study Intersection
- Study Segment

Transportation

- Railroad
- Major Roads
- Arterial Roads
- Minor Roads

Base Layers

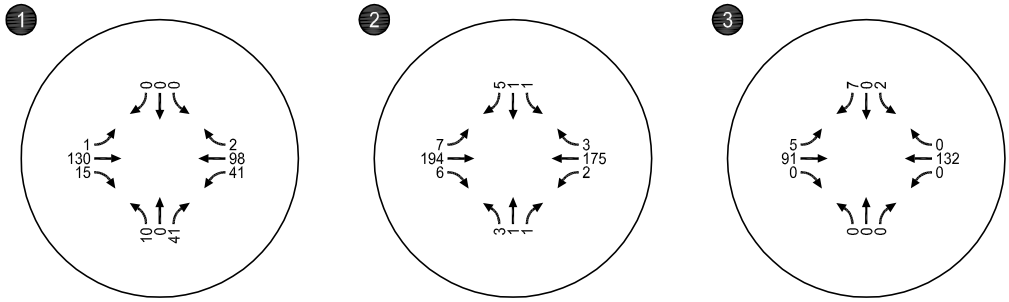
- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Study Area data provided by Kittleson
Map created by CC GIS - Revised 1/24/2017

10 Miles
10 Kilometers

Crook County GIS

Crook County TSP
Figure 3 - 1
Study Areas Overview



Traffic Volume Growth (2016-2036) at Study Intersections
Crook County, Oregon

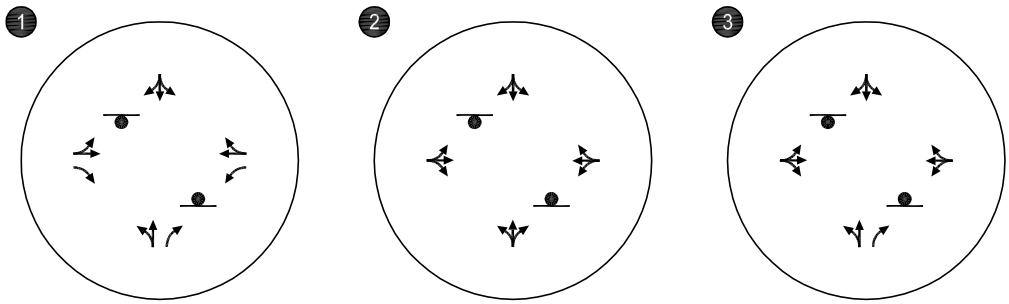
Figure **4**

Year 2036 Forecast Intersection Operations

Forecast year 2036 transportation system capacity analysis was conducted based on forecasted traffic volumes. The operational results indicate that no operational improvements are anticipated to meet State, County, or City operational standards for each respective facility in 2036.

The future conditions operational analysis was conducted based on the peak 15-minute period of traffic flow at each study intersection. Figure 5 illustrates the lane configurations and traffic control devices used in the future conditions analysis. No changes to the existing lane configurations and traffic control devices (as summarized in Technical Memorandum #3) were incorporated in this analysis because there are no planned improvements at the intersections.

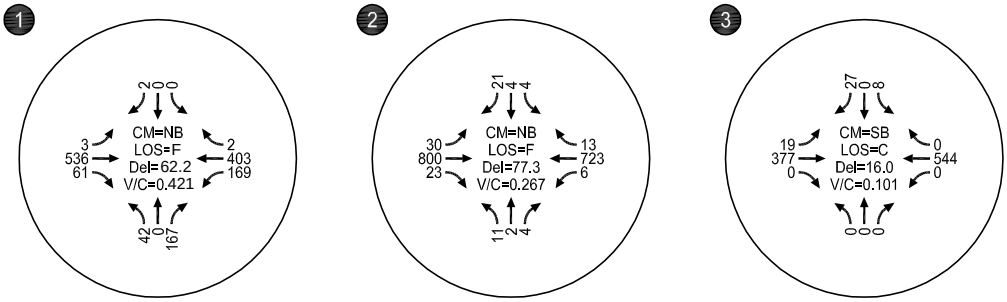
Figure 6 summarizes the 2036 30th highest hour traffic volumes and the resulting intersection operations. The minor street northbound approach at the intersection of OR 126/Reif Road is expected to operate with a level-of-service F and an average approach delay of 77 seconds due to the increase in through traffic on OR 126. However, the volume-to-capacity (v/c) ratio is 0.27, indicating that the intersection continues to meet County and ODOT standards. The other two study intersections meet County and ODOT targets in 2036 as well. Performance standards for intersections were summarized in Technical Memorandum #3. Attachment B includes the operational analysis worksheets for the study intersections.



2036 Lane Configurations and Traffic Control Devices
Crook County, Oregon

Figure **5**

Oregon Department of Transportation



Forecasted 2036 Intersection Traffic Volumes and Operations
Crook County, Oregon

Figure **6**

Year 2036 Forecast Roadway Segment Operations

Using the forecast volumes, the 21 roadway study segments were analyzed to determine how they are expected to perform in 2036. Table 2 summarizes the forecasted 2036 traffic volumes and resulting operations. None of the roadway segments are expected to experience traffic growth that would result in over capacity conditions.

Table 2. 2036 Roadway Segment Operations

ID	Roadway	Location Description	Seasonally-Adjusted Peak Hour Count (2036)	PHF*	Two-Way Demand Flow	Critical Flow Rate	Units	Calculated V/C Ratio
1	Powell Butte Highway	Riggs Road to OR 126	754	0.95	794	2000	pc/h	0.40
2	Lone Pine Road	OR 370 to Smith Rock Way	152	0.95	160	1500	pc/h	0.11
3	Millican Road	Reservoir Road to South Prineville City Limits	102	0.95	108	1500	pc/h	0.07
4	Millican Road	Reservoir Road to South County Limits	78	0.95	82	1500	pc/h	0.05
5	Millican Road	South Prineville City Limits to OR 126	244	0.95	257	1500	pc/h	0.17
6	Gerke Road	US 26 to Lamonta Road	39	0.95	41	1500	pc/h	0.03
7	Ochoco Creek Road	US 26 to Canyon Creek Road	19	0.95	20	1500	pc/h	0.01
8	Powell Butte Highway	West County Limit to Riggs Road	646	0.95	680	2000	pc/h	0.34
9	McKay Road	Gerke Road to Barnes Butte Road	150	0.95	158	1500	pc/h	0.11
10	Barnes Road	US 26 to Wainwright Road	178	0.95	187	1500	pc/h	0.12
11	US 26	Bus Evans Road to Gumpert Road	397	0.95	418	2000	pc/h	0.21
12	Bus Evans Road	US 26 to Elliott Lane	47	0.95	49	1500	pc/h	0.03
13	Crooked River Highway	South Prineville City Limits to Reservoir Road	48	0.95	51	1500	pc/h	0.03
14	Lamonta Road	Gerke Road to Grimes Road	79	0.95	84	1500	pc/h	0.06
15	Lamonta Road	Grimes Road to Gumpert Road	68	0.95	72	1500	pc/h	0.05
16	Reif Road	OR 126 to Twin Lakes Ranch Road	86	0.95	91	1500	pc/h	0.06
17	Reif Road	Riggs Road to OR 126	51	0.95	54	1500	pc/h	0.04
18	SE Juniper Canyon Road	OR 380 to South Davis Loop	285	0.95	300	1500	pc/h	0.20
19	Beaver Creek Road	Paulina Suplee Road to Puett Road	137	0.95	145	1500	pc/h	0.10
20	Shumway Road	Powell Butte Highway to Alfalfa Road	173	0.95	182	1500	pc/h	0.12
21	Alfalfa Road	Powell Butte Highway to Brasada Ranch Road	129	0.95	136	1500	pc/h	0.09

*ADT = Average Daily Traffic volume

^PHF = Peak Hour Factor, a ratio of the total hourly traffic volumes to the peak 15-minute traffic flow

pc/h = passenger cars per hour

V/C = volume-to-capacity

TRANSPORTATION SYSTEM NEEDS

Based on the existing and future conditions assessment, field observations, and input from the PAC/TAC, the following section identifies needs for roadways, safety enhancements, pedestrians, bicyclists, transit, freight, aviation, rail, and bridges. Figure 7 illustrates the locations of these needs.

Roadway Needs

Although the study roadways and intersections in Crook County are anticipated to operate within acceptable targets, several roadway needs were identified. The following list provides roadway needs:

- R-1: Juniper Canyon Secondary Access - Provide secondary access to the Juniper Canyon residential area to provide alternate route for emergency access in the event of a natural disaster or blockage of the primary access road.
- R-2: Farm Equipment Usage and Mitigation Opportunities - Identify roadways with high demand for movement of farm equipment and evaluate options to support the movement of farm equipment and minimize conflicts between traffic and equipment.
- R-3: Improved Recreational Access - Improve roadways that provide access to recreation destinations such as the Prineville Reservoir. Visitors have begun using the alternate routes to reach these destinations more frequently. Many of these alternate routes are not designed to handle the increase in traffic and may need roadway improvements to support the traffic growth.
- R-4: Industrial Areas Access - Improve roadway connections to industrial areas to encourage further economic development. Although not designated as statewide freight routes, several roads such as Millican Road and Houston Lake Road are important connections to these sites and must be able to accommodate large freight trucks.
- R-5: Improved Wayfinding - Improve signage for major destinations. Crook County's tourism industry is growing. Visitors are attracted to the destination resort (Brasada Ranch), bicycle tourism routes, reservoirs, rivers, scenic drivers, and state parks. Clear signage is needed to these attractions.
- R-6: Jurisdictional Transfer Guidance and Opportunities - Provide guidance on the procedure for transitioning County roads to City roads during potential future annexation events.
- R-7: Secondary Prineville Airport Access - Evaluate the ability to add a secondary access to the Prineville airport.

Transportation Safety Needs

Although there were no locations in Crook County identified in the more recent (2015) Safety Priority Index System, there are several key locations where improvements or countermeasures may be applied to reduce crash frequency and severity. The following list includes identified safety needs.

- S-1: Systemic Treatments - Develop a plan for systemic treatments to address County-wide trends that were identified in the crash data. These trends included roadway departure crashes, intersection-related crashes at minor street intersections on higher speed facilities, and crashes on snow and ice covered roads. These efforts should be coordinated with ODOT's ARTS projects within Crook County, as summarized in Technical Memorandum #3.
- S-2: Juniper Canyon Road Countermeasures - Evaluate countermeasures for Juniper Canyon Road, which has a high crash rate with many fixed object crashes. PAC members have expressed concern about safety on this road in locations with steep grades during times of snow and ice.
- S-3: Other Systemic Treatment Considerations - Evaluate potential treatments at additional segments that were identified with high crash rates. These may be addressed through systemic treatments as well.
    - Gerke Road
    - Ochoco Creek Road
    - McKay Road
    - US 26
    - Lamonta Road
    - Reif Road
    - Shumway Road
- S-4: Traffic Calming/Speed Reduction Considerations - Evaluate the opportunity to use traffic calming to reduce the number and severity of crashes along roadways that serve rural communities, residential areas, employment areas, locations with frequent driveways, and locations that carry higher volumes of pedestrians and bicyclists. Specific roadways where this should be considered include:
    - OR 126 in Powell Butte,
    - Alfalfa Road near Brasada Ranch
    - Willard Road near the Alfalfa Community Center and Alfalfa Store
    - Crooked River Highway through the river canyon recreation area
    - Juniper Canyon Road
    - Davis Loop Road
- S-5: Alternative Emergency Access Routes - Identify other potential rural locations that lack secondary emergency access and identify potential alternate routes to serve these locations.

Pedestrian Needs

Crook County currently does not have any sidewalks outside of incorporated areas. As documented in Technical Memorandum #3, some roadways have narrow shoulders that may be used by pedestrians. With a predicted increase in population in Crook County and a growing tourism industry, sidewalks should be added in some key locations. Pedestrian needs within Crook County include:

- P-1: Powell Butte Pedestrian Improvements - Develop a sidewalk system within Powell Butte, along OR 126 and Williams Road. The community includes several key attractions including a school, church, and country store. In addition, OR 126 bisects the community, carrying high traffic volumes and speeds.
- P-2: Pedestrian Crossing Enhancements - Evaluate locations that are in need of enhanced pedestrian crossings. These may include crossings within Powell Butte, crossings to connect existing and future recreational trails, and crossings in the vicinity of tourist attractions such as campgrounds and destination resorts.
- P-3: Pedestrian Facilities in Recreational Areas - Improve pedestrian connections to recreational destinations such as the Ochoco National Forest, reservoirs, and trail systems where appropriate. Locations along roadways that are near trail connections to the City of Prineville are candidates for pedestrian connections.
- P-4: Wayfinding - Improve signage to inform visitors and residents of the trail system connections.
- P-5: New Pedestrian Routes - Identify additional priority gaps on the state highway and county roadway systems where pedestrian facilities are needed. These may include sidewalks, separated trails, or wide paved shoulders. This effort should be coordinated with the ongoing ODOT Active Transportation Inventory and Needs project, which is in the process of developing a list of prioritized locations for improvements.

Bicycle Needs

Crook County is a popular location for recreational cycling. As documented in Technical Memorandum #3, some state highways have shoulders that can accommodate bicyclists. On other roads, cyclists share the lane with vehicles. In addition to recreational cyclists, the County also serves a number of bicyclists who commute into Prineville or other communities by bicycle. The County's bicycle system should provide options for users of all levels to improve comfort and safety.

Bicycle needs within Crook County include:

- B-1: Designated Bicycle Route System - Identify a designated bicycle route system for the County based on roadway and traffic conditions, existing travel patterns, the County's current proposed bicycle lanes, and connections to destinations and employment centers. The network should improve access to the recreation areas within the County. This system would include signage, and roadways within the system would be prioritized for roadway

improvements to accommodate bicyclists. Existing Strava data, presented in Technical Memorandum #3, identified the following roads as popular routes:

  - Highway 27
  - Highway 26 (east of Prineville)
  - McKay Creek Road
  - Highway 370
  - Lamonta Road
  - Alfalfa Road
  - Shumway Road
  - Houston Lake Road

- B-2: Bicycle Improvements - Identify roadways within the County's proposed bicycle route system that need improvements to accommodate bicycle traffic.
- B-3: Bicycle Support Hubs - Identify locations where bicycle rest areas and repair stations are needed to support the routes.
- B-4: Roadway Standard Updates - Update County roadway cross-section standards to provide bicycle facilities on these key routes.

Transit Needs

Crook County currently has a dial-a-ride system and one fixed bus route run by Cascades East Transit (CET), as summarized in Technical Memorandum #3. Future transit needs include an improved level of service in Crook County, especially for the disabled and low income populations, which have grown more rapidly than other areas also served by CET. The following enhancements should be considered to provide the increased the level of service:

- T-1: Expanded Prineville-Redmond/Bend Service - Increase frequency and length of service between Prineville and Redmond/Bend, while maintaining the stop in Powell Butte;
- T-2: Fixed Route Enhancements - Increase service in Prineville with eventual deviated fixed route or a purely fixed route to provide connections to more destinations;
- T-3: Dial-a-Ride Enhancements - Improve accessibility for residents in rural Crook County through a larger service area for dial-a-ride service;
- T-4: Community Outreach - Educate the community about connections available within Redmond and Prineville to reach key destinations such as COCC, the Redmond Airport, the hospital, and additional locations within Bend.

Freight Needs

Highway 26 (west of Prineville) and Highway 126 are identified freight routes in Crook County. Other roads, especially those that serve industrial areas such as Millican Road and Houston Lake Road, also provide key local and regional connections. In addition, several County roads provide access between the freight depot and the state highway system.

The freight needs within Crook County are summarized below:

- F-1: Local Freight Routes - The County should identify a local freight route system to serve the industrial areas and freight depot. These roads should be improved to standards to accommodate freight traffic.
- F-2: Oversized Loads - PAC members also indicated that many oversized loads travel through Crook County on the freight system as part of their regional journey between Arizona and Washington. The County would like to identify these routes and improvements that are needed to support frequent oversized loads.
- F-3: Height Restrictions on US 26 - Currently, constraints from a railroad bridge over Highway 26 immediately south of Elliott Lane diverts oversized loads onto smaller, local roads. The cost and ability to widen and increase the height of the railroad bridge should be evaluated, or alternative routes should be considered.

Aviation Needs

The Prineville/Crook County Airport currently serves general aviation/business purposes. It is also used to facilitate fire support helicopters and fixed wing operations. The County is interested in identifying a secondary access location to the Prineville airport.

The Redmond Airport, approximately 20 miles west of Prineville, provides commercial passenger service. OR 126 provides the connection to Redmond Airport via Veterans Way and Airport Way.

Aviation needs include the following:

- A-1: Airport Connection Options: Education programs may be needed to inform residents about alternate modes available for reaching the airport, including transit and shuttle options.

Rail Needs

The City of Prineville Railway (COPR) operates freight rail service in Crook County. There is no passenger service provided in Crook County. The Prineville Freight Depot (PFD) provides intermodal connection services. The PRD is served by Bus Evans Road and Lamonta Road. These roads, as well as their connections to the freight system, may need upgrades to serve the freight traffic and should be identified in the local freight routes identified in need F-1.

Bridge Needs

The bridge conditions inventory, summarized in Technical Memorandum #3, identified two existing bridge needs. These are identified below.

- BR-1: Weigand Road Bridge - This bridge, located on SE Weigand Road at the crossing of the irrigation ditch has been identified as structurally deficient, with a sufficiency rating under 50, and needs replacement.
- BR-2: County Road 221 Bridge - The bridge on County Road 221 over Paulina Creek has been identified as functionally obsolete and needs replacement.

Figure 7. Summary of Needs

TRANSPORTATION PLANNED FUNDING SOURCES

Historic Funding Sources

Capital projects as well as operations and maintenance of roadways within Crook County are funded through the Crook County Transportation Budget, which relies on a variety of sources as summarized in the budget provided in Technical Memorandum #3. The total transportation revenue budget for the fiscal year (FY) 2015/2016 was approximately $21 million. However, the majority of this revenue was beginning balance or interest funds. Approximately $3.4 million was received in revenue during the 2015/2016 FY. The majority of the $21 million in total revenue is spent on capital outlay projects or reserved for future expenses each year. Approximately $6.5 million is spent each year on personnel services, materials and services, and contingency, indicating a need for additional funding sources if the balance in the reserves fund decreases in the future.

In addition, the County has a large number of rural County roadways to maintain. Continued funding for maintenance will be necessary to maintain the current status of the roadways. In addition, the County has identified a need for new funding sources to maintain and replace County bridges.

Potential Funding Sources

The majority of the County's current funding revenue comes from state and federal revenue, as summarized in Technical Memorandum #3. With the potential for declining state and federal revenue in the future, the County will need to identify new funding sources to help maintain transportation revenue for roadway maintenance and to improve infrastructure. The County is currently spending more per year than they are bringing in through funding sources. With an adequate reserve balance, they are able to support the difference. However, this further indicates the need for additional funding sources in the future. Potential new funding sources are summarized in Table 3.

Table 3 is not an all-inclusive list of alternative funding sources. Each of these financing tools requires focused research to ensure that it is the right fit for the community, and can be closely match with achieving the objectives of the TSP update.

Table 3. Potential Funding Sources

Funding Source	Description	Benefits
User Fee	Fees tacked onto a monthly utility bill or tied to the annual registration of a vehicle to pay for improvements, expansion, and maintenance to the street system. This may be a more equitable assessment given the varying fuel efficiency of vehicles. Regardless of fuel efficiency, passenger vehicles do equal damage to the street system. The cost of implementing such a system could be prohibitive given the need to track the number of vehicle miles traveled in every vehicle. Additionally, a user fee specific to a single jurisdiction does not account for the street use from vehicles registered in other jurisdictions.	Primarily Street Improvements
Street Utility Fees/Road Maintenance Fee	The fee is based on the number of trips a particular land use generates and is usually collected through a regular utility bill. For the communities in Oregon that have adopted this approach, it provides a stable source of revenue to pay for street maintenance allowing for safe and efficient movement of people, goods, and services.	System-wide transportation facilities including: • Streets • Sidewalks • Bike lanes • Trails
Local Fuel Tax	A local tax assessed on fuel purchased within the jurisdiction that has assessed the tax. Some would argue that this tax is unfair given the increased fuel efficiency of today's vehicles. On the other hand, the tax could potentially generate revenue while encouraging fuel efficiency and lessening impacts to the environment.	Primarily Street Improvements
Systems Development Charges (SDCs)	SDCs are fees assessed on development for their impacts on public infrastructure. Funds must be used for capacity enhancing improvements as defined in ORS 223.304.	System-wide transportation facilities including: • Streets • Sidewalks • Bike lanes • Trails • Transit
Stormwater SDCs, Grants, and Loans	SDCs, Grants, and Loans obtained for the purposes of making improvements to stormwater management facilities. Some jurisdictions in Oregon have used these tools to finance the construction and maintenance of Green Streets. Stormwater SDCs also need to fund capacity enhancing improvements as defined in ORS 223.304.	Primarily Street Improvements

Funding Source	Description	Benefits
Local Sales Tax	A tax assessed on the purchase of goods and services within a specific location. A sales tax could be assessed only on auto-related goods and services to generate revenue for transportation-related improvements.	System-wide transportation facilities including: • Streets • Sidewalks • Bike lanes • Trails • Transit
Optional Tax	A tax that is paid at the option of the taxpayer to fund improvements. Usually not a legislative requirement to pay the tax and paid at the time other taxes are collected, optional taxes are usually less controversial and easily collected since they require the taxpayer to decide whether or not to pay the additional tax.	System-wide transportation facilities including: • Streets • Sidewalks • Bike lanes • Trails • Transit
Sponsorship	Financial backing of a public-interest program or project by a firm, as a means of enhancing its corporate image. This has been used by local transit providers to help offset the cost of providing transit services and maintaining transit related improvements.	Transit Facilities
Public/Private Partnerships	Public/private partnerships are agreements between public and private partners that can benefit from the same improvements. They have been used in several places around the country to provide public transportation amenities within the public right-of-way in exchange for operational revenue from the facilities. These partnerships could be used to provide services such as charging stations, public parking lots, or bicycle lockers.	System-wide transportation facilities including: • Streets • Sidewalks • Bike lanes • Trails • Transit
Tax Increment Financing (TIF)	A tool cities use to create special districts (tax increment areas) and to make public improvements within those districts that will generate private-sector development. During a defined period, the tax base is frozen at the predevelopment level. Property taxes for that period can be waived or continue to be paid, but taxes derived from increases in assessed values (the tax increment) resulting from new development either go into a special fund created to retire bonds issued to originate the development or leverage future improvements. A number of small-to-medium sized communities in Oregon have implemented, or are considering implementing, urban renewal districts that will result in a TIF revenue stream.	System-wide transportation facilities including: • Streets • Sidewalks • Bike lanes • Trails • Transit

SUMMARY AND NEXT STEPS

The assessment of future land use and transportation system conditions identified the following:

- Annual growth rates were applied to existing 2016 traffic volumes to forecast 2036 traffic volumes. The annual growth rate of 1.6 percent was calculated using ODOT's historical volumes method.
- All study intersections were forecast to operate within acceptable targets. However, the northbound minor street approach to the intersection of OR 126/Reif Road is expected to experience average delays over 50 seconds due to increasing traffic on OR 126.
- The forecast v/c ratios on the study segments within Crook County are forecast to be equal to or less than 0.4 on all study segments.
- Several systemic safety issues were documented based on crash trends and will be evaluated for countermeasures to help reduce these crash types:
    - Roadway departure crashes, particularly at horizontal curves throughout the County
    - Intersection related crashes at minor intersections along higher speed facilities
    - Winter weather related crashes
- Several roadway study segments were identified with crash rates above the statewide average for similar facilities. These include the following:
    - Juniper Canyon Road
    - Gerke Road
    - Ochoco Creek Road
    - McKay Road
    - US 26
    - Lamonta Road
    - Reif Road
    - Shumway Road
- Unincorporated Crook County lacks sidewalks. Priority locations for adding pedestrian facilities, including sidewalks, enhanced crossings, shoulders, or trails, will include Powell Butte, Alfalfa, connections to recreation areas, connections to Prineville's trail network, and connections within residential communities.
- A bicycle system that identifies and prioritizes bike routes throughout the County is needed to support recreational and commuter bicycle traffic. These routes will be based on existing usage, proposed routes, roadway and traffic characteristics, and connections to attractions. Roadways within these routes will be identified for improvements and signage.
- The dial-a-ride transit service should be expanded to serve all residents of Crook County.
- A local freight system is needed to provide connections between statewide freight routes and industrial areas or intermodal hubs.
- Two bridges are identified for replacement due to being structural deficient or functionally obsolete.

- Crook County's roadway expenditures currently exceed the annual incoming revenue. In order to support continued maintenance and fund future improvements, additional funding sources will need to be considered.

These needs will be reviewed with the Technical and Public Advisory Committees on February 7, 2017. The needs will be revised based on input from the advisory committees and the public and then used to inform the development of future alternatives.

5. TECHNICAL MEMO #5
ALTERNATIVES ANALYSIS

KITTELSON & ASSOCIATES
354 SW UPPER TERRACE DRIVE, SUITE 101
BEND, OR 97702
P 541.312.8300

TECHNICAL MEMORANDUM #5

Crook County Transportation System Plan Update

Alternatives Analysis and Preferred Plan Memorandum

Project #: 20189

Date: August 2017

To: Ann Beier, Crook County
Devin Hearing, ODOT

From: Marc Butorac, PE; Ashleigh Ludwig, AICP; Camilla Dartnell

This memorandum provides an overview of the alternatives evaluated for the Crook County Transportation System Plan (TSP) Update and outlines the draft preferred Transportation System Plan. The plan includes recommended projects, policies, programs studies to address needs identified in Technical Memorandums #3 (Existing Conditions) and #4 (Future Conditions), and updated roadway design standards to guide future roadway projects. In addition, all projects included in the 2005 Crook County TSP and OR 126 Corridor Facility Plan were reviewed for completion or continued viability. Completed projects were removed from the project list, and remaining projects were either carried forward to the recommended project list in this TSP or removed if no longer relevant. Attachment A provides a summary of the 2005 TSP projects, indicating whether they were completed, removed, or carried forward.

Overall, this memorandum includes updated roadway design standards, evaluation criteria for project scoring, project alternatives list, and the future transportation funding plan. The proposed alternatives fall within the following categories:

- Roadway alternatives
- Freight alternatives
- Safety alternatives
- Bicycle and pedestrian alternatives
- Transit alternatives
- Bridge alternatives

ROADWAY DESIGN STANDARDS UPDATE

Currently, when roads are constructed or reconstructed in Crook County, the roadway design standards in Crook County Code Exhibits C and D of Section 17.36 are used to define the right-of-way cross-section and roadway design cross-section according to functional classification, average daily traffic (ADT), and status as a freight route. However, Exhibits C and D provide incompatible and somewhat conflicting information related to roadway, travel lane, and shoulder width. Exhibit C establishes right-of-way standards, including lane widths and shoulder widths, based upon functional

classification, but Exhibit D establishes roadbed width and standards according to ADT. There is no guidance for which standard to follow when the two exhibits provide conflicting information. For example, if a roadway is classified as a minor collector and has an ADT of approximately 150 vehicles, it should have 11' lane widths and 4'-8' shoulders according to Exhibit C, but it should have 12' lane widths and 2' paved shoulders according to Exhibit D. The existing standards are provided in Attachment C for reference.

This TSP update will modify and combine the cross section and roadbed standards to provide consistent guidance. The recommended revised standards, provided in Attachment D, reflect slight modifications to the standards that currently exist in Exhibit D. The County indicated that these standards are currently defaulted to; therefore, standards in Exhibit C will be dropped from the County code. The Exhibit D standards have been modified to clarify that "PADT" refers to "Future ADT" for the roadway.

Bicycle Network Design Standards

In addition, new shoulder width recommendations are proposed to provide guidance on the appropriate width of bicycle shoulders on bicycle routes. These recommendations are intended to apply to roads identified as part of the bicycle network in this TSP update. This guidance is based on Table 3-1 in the Federal Highway Administration (FHWA) Small Towns and Rural Multimodal Network Guide and provides recommended shoulder widths based on roadway functional classification, traffic volume, and vehicle travel speed, as shown in Table 1.

Table 1. Recommended Shoulder Width for Bicycle Routes[1]

Functional Classification	Volume (AADT)	Speed (mi/h)	Recommended Minimum Paved Shoulder Width (ft)
Minor Collector	up to 1,100	35	5 ft
Major Collector	up to 2,600	45	6.5 ft
Minor Arterial	up to 6,000	55	7 ft
Principal Arterial	up to 8,500	65	8 ft

Locations or situations with geographic constraints or financial constraints may exist that do not allow the recommended shoulder widths to be carried throughout the entire bike route length. In those situations, shoulder widening should be prioritized at key locations such as hill climbs, horizontal or vertical curves, and in and around unincorporated communities.

[1] Table 3-1: Recommended Minimum Paved Shoulder Widths by Roadway Conditions from FHWA's Small Town and Rural Multimodal Networks guide

Roadway Design with Prineville Urban Growth Boundary

Currently, when the City of Prineville expands via annexation, those annexed roadways often have different cross sections and roadway designs than existing roads within the city. To help prepare roadways for annexation and provide transition between unincorporated Crook County and the City of Prineville, roadways within the UGB should be constructed to be consistent with City of Prineville roadway standards whenever a roadway is being constructed, reconstructed, or relocated. Additionally, City of Prineville/Crook County Urban Growth Management Agreement should be revisited and updated to improve the ease of transfer of lands and facilities between the jurisdictions.

EVALUATION CRITERIA

Alternatives were prioritized based on evaluation criteria developed from the project goals and objectives, as summarized in Technical Memorandum #2. As stated in Technical Memorandum #2, goals and objectives were developed based on the previous TSP, Crook County's Comprehensive Plan, and County and ODOT input. Evaluation criteria were then created to provide a method of evaluating the goals and objectives quantitatively. Attachment B contains the evaluation criteria matrix, which summarizes how each alternative scored.

Alternatives were assigned a relative priority of high, medium, or low based on the following factors:

- Results of the evaluation criteria assessment;
- Analysis and data driven needs as identified in Technical Memorandums #3 and #4;
- Input from the technical and public project advisory committees and the public;
- Relative ease of implementation.

The draft preferred plan and priorities was reviewed by the Technical Advisory Committee and Public Advisory Committee at their third joint project meeting on April 18, 2017. Priorities were then revised based on the input received. Due to funding restrictions, an additional priority of "vision" was added. Meeting minutes from this meeting are provided in Attachment E.

IDENTIFICATION OF ROADWAY ALTERNATIVES

Table 2 presents the list of roadway alternatives developed to address identified roadway needs. This list includes widening projects, intersection redesign projects, roadway extension projects, overlay projects, reconstruction projects, realignment projects, and access closure projects. These projects are included to improve the overall road system in the County by providing new roadway connections, redirecting roadway access points, realigning the existing roadway, or improving the condition of the existing roadway. As identified in Technical Memorandum #4, no operational capacity issues are expected in the system within the planning horizon. The intersection improvement projects listed in Table 2 are therefore not highly prioritized. Many of these projects were carried forward from previous planning efforts to prepare the county for any changes in expected growth within the planning horizon, especially from destination resorts. Table 2 also provides project

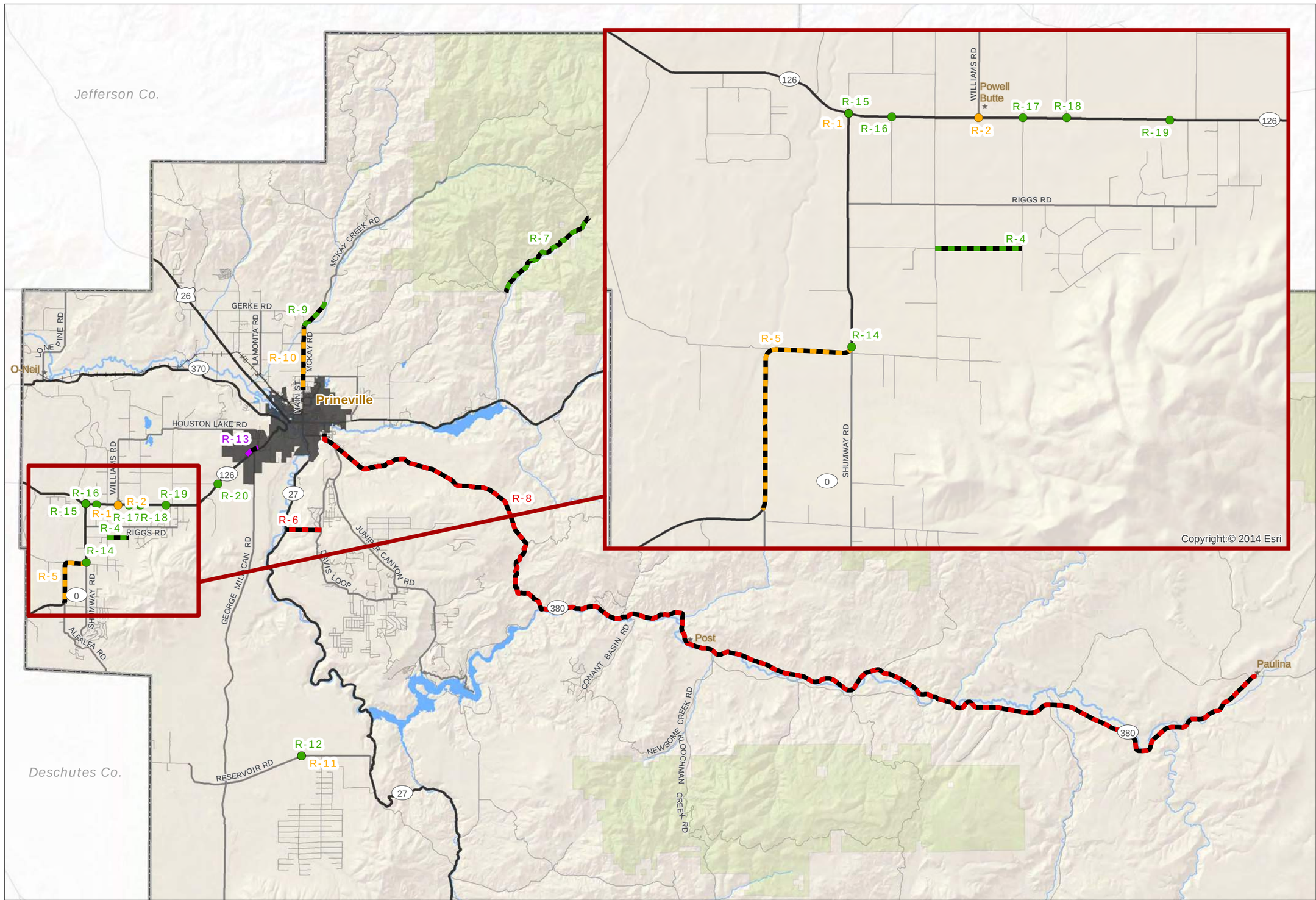
planning level cost estimates. These are planning level cost estimates that do not include right-of-way. As appropriate, all cost estimates in this memorandum with the exception of transit cost estimates include clearing and grubbing, excavation, embankment, materials, mobilization, traffic control, professional architecture/engineering fees, construction management fees, and contingency fees. The funding partners indicate which agencies or organizations are anticipated to contribute to the cost of the project. Figure 1 provides a map of the roadway alternatives listed in Table 2. These alternatives are symbolized based on their priority.

Table 2. Roadway Alternatives

Project ID	Project Name	Project Description	Project Source	Cost Estimate	Expected County Contribution	Funding Partners				Priority
						Forest Service	ODOT	County	City of Prineville	
R-1	Powell Butte Highway and OR 126 roundabout	Install multilane roundabout with gradually increasing curve and illumination/treatments to facilitate deceleration. Must consider farm and freight vehicles, bicyclists, and pedestrians.	OR 126 Corridor Plan	$3,500,000	$385,000		X	X		Medium
R-2	Williams Road and OR 126 intersection realignment	Convert existing intersection to two offset T intersections by relocating the access on the southern side of OR 126 to help with access management and to help the community develop off of the main roadway	OR 126 Corridor Plan	$4,900,000	$1,225,000		X	X		Medium
R-3	Row intentionally left blank		2005 TSP	$2,000,000	$ -					N/A
R-4	Copley Road extension	Connect Copley Road as a minor collector to Weigand Road.	2005 TSP	$3,100,000	$3,100,000			X		Low
R-5	Powell Butte Highway realignment	Realign the 90 degree turns at Alfalfa Road and Shumway Road by continuing Powell Butte Highway south along Shumway Road, and using an appropriate 50 mph curve to connect back to the existing Powell Butte Highway alignment.	2005 TSP	$4,600,000	$4,600,000			X		Medium
R-6	Davis Road to OR 27 connection	Construct an additional minor collector roadway connection from the rural residential area of Juniper Canyon.	2005 TSP	$12,500,000	$12,500,000			X		High
R-7	Mill Creek Road (OR PFH 99)	Widen the Forest Service portion of the road to the County standard to total 26 feet and have a 22-foot asphalt surface. Culvert placement and size would be evaluated, and new culverts would be added and existing ones resized to meet drainage needs. Pave the Stein Pillar parking lot would also be paved and add an informational kiosk added. Begins at end of pavement on CR 122 and extends northeast for 3.2 miles to the forest boundary. From here, CR 122 becomes FR 33, and the project extends another 2.3 miles through the national forest to the junction of FR 33 and 3300-300 (Wildcat Campground Entrance).	2005 TSP	$10,500,000	$ -	X				Low
R-8	Overlay OR 380	Overlay/repave OR 380 from Prineville city limits to Paulina.	Identified need	$16,700,000	$ -		X			High
R-9	Overlay McKay Creek Road	Overlay McKay Creek Road from gravel pit to Gerke Road.	Identified need	$500,000	$500,000			X		Low
R-10	Overlay McKay Road	Overlay McKay Road from Gerke Road to the city limits.	Identified need	$1,300,000	$1,300,000			X		Medium

Project ID	Project Name	Project Description	Project Source	Cost Estimate	Expected County Contribution	Funding Partners				Priority
						Forest Service	ODOT	County	City of Prineville	
R-11	Reservoir Road signage	Install horizontal curve warning signage and add no passing signs approximately 4,800 feet west of Cascade Way near the blind hill.	Identified need	$1,000	$1,000			X		Medium
R-12	Reservoir Road blind hill reconstruction	Reconstruct road to improve sight distance at the blind hill.	Identified need	$5,700,000	$5,700,000			X		Low
R-13	Secondary Prineville airport access[2]	Construct a major collector roadway according to the City of Prineville standards to connect Airport Road to Tom McCall Road.	OR 126 Corridor Plan	$	$ -				X	N/A
R-14	Left turn lane at Powell Butte Highway and Shumway Road	Install a southbound left-turn lane at the intersection of Shumway Road and Powell Butte Highway. This project may include an intersection reconstruction to create a t-intersection.	Identified need	$110,000	$110,000			X		Low
R-15	OR 126 access modification from Bozarth Road	Address the public access point from the minor road to OR 126 (Project unnecessary if project R-1 occurs)	OR 126 Corridor Plan	$5,000	$2,500		X	X		Low
R-16	OR 126 access modification from Kissler Road	Address the public access point from the minor road to OR 126.	OR 126 Corridor Plan	$5,000	$2,500		X	X		Low
R-17	OR 126 access modification from Copley Road	Address the public access point from the minor road to OR 126.	OR 126 Corridor Plan	$5,000	$2,500		X	X		Low
R-18	OR 126 access modification from Minson Road	Address the public access point from the minor road to OR 126.	OR 126 Corridor Plan	$5,000	$2,500		X	X		Low
R-19	OR 126 access modification from DA Yates	Address the public access point from the minor road to OR 126.	OR 126 Corridor Plan	$5,000	$2,500		X	X		Low
R-20	OR 126 access modification from Wiley Road	Address the public access point from the minor road to OR 126.	OR 126 Corridor Plan	$5,000	$2,500		X	X		Low

[2] This project is located within the City of Prineville, and currently is shown on the City of Prineville's TSP as a future major collector. However, there is not a specific project in the TSP to complete the roadway. The City of Prineville TSP may be amended to incorporate this project.



Project Areas

- Medium Priority Roadway Project
- Low Priority Roadway Project
- Vision Roadway Project
- High Priority Roadway Project
- Medium Priority Roadway Project
- Low Priority Roadway Project
- Within Prineville City Limits

Transportation

- Railroad
- Major Roads
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Data created by Kittleson and Crook County GIS
Map created by CC GIS - Revised 4/13/2017

10 Miles
10 Kilometers

Crook County GIS

Crook County TSP
Figure - 1
Roadway Alternatives

Table 3 provides an overview of the expected County contribution to the roadway projects by cost and priority. Although the majority of the projects are medium, low, or vision projects, the Davis Road connection to OR 27 is shown as a high priority projects and is estimated to cost between $10 and $15 million, resulting in high cost for the high priority project category.

Table 3. Roadway Alternatives County Contribution Cost Summary

High Priority	Medium Priority	Low Priority	Total
$12,500,000	$7,511,000	$9,425,000	$29,436,000

FREIGHT ALTERNATIVES

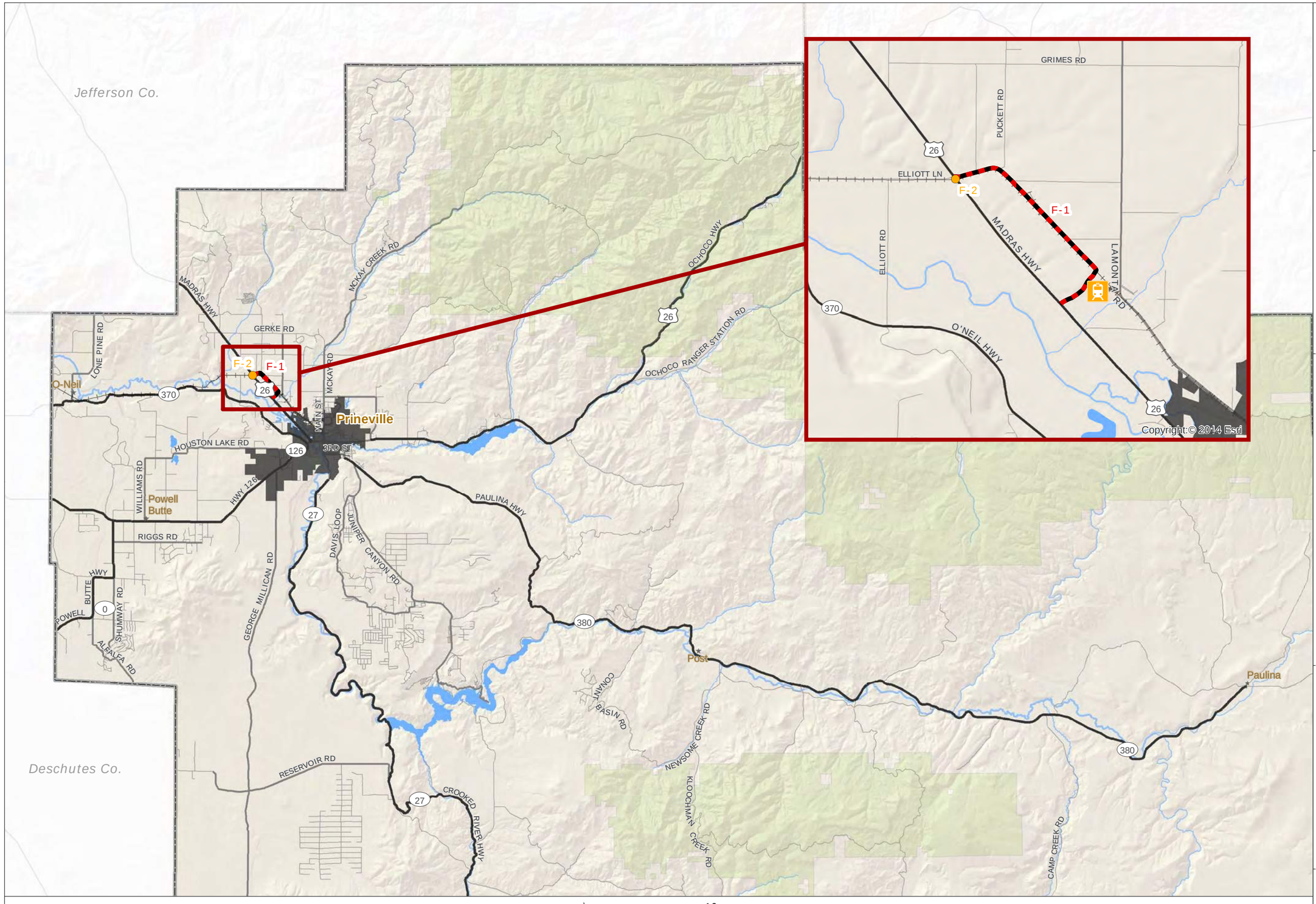
Table 4 presents the freight alternatives developed through this TSP update to address identified needs. As outlined in Technical Memorandum #4, the railroad trestle over US 26 creates height restrictions that prevent oversized freight transport on US 26. However, this section of US 26 serves as an important freight connection along the west coast. Currently, the oversized freight trucks divert onto Bus Evans Road and Elliot Lane to circumvent the railroad trestle. In addition, Bus Evans Road and Elliott Lane provide access to the Prineville Freight Depot.

The recommended freight alternatives include reconstructing Elliot Lane and Bus Evans to freight route standards. The upgrades would serve freight traffic accessing the freight depot as well as the oversized loads that must divert to avoid the height restrictions on US 26. In addition, a feasibility study is recommended to evaluate the feasibility and cost of reconstructing the railroad trestle or lowering US 26 to allow trucks and loads of all sizes to pass beneath the trestle.

Table 4 provides a summary of the freight alternatives by cost and priority, and Table 5 indicates cost, priority, and which organizations or agencies are expected to contribute to the cost for each project. These are planning level cost estimates and do not include right-of-way costs. Additionally, Figure 2 provides a map of the freight alternatives broken down by priority.

Table 4. Freight Alternatives

Project ID	Project Name	Project Description	Cost Estimate	Expected County Contribution	Funding Partners				
					Forest Service	ODOT	County	City of Prineville	Priority
F-1	Reconstruct Bus Evans Road and Elliott Lane to freight route standards	Reconstruct Bus Evans Road and Elliot Lane to freight route standards, with 12' lanes, 2' shoulders on each side, including 17.14' of rock shoulder, and the appropriate roadway base. This project may include an intersection improvement at Bus Evans Road and US 26.	$10,000,000	$5,000,000		X	X		High
F-2	US 26 railroad bridge feasibility study	Conduct a feasibility study regarding the reconstruction of US 26 railroad bridge or lowering of OR 126 to accommodate oversized loads on US 26.	$20,000	$ -		X		X	Medium



Project Areas

- Medium Priority Freight Project
- High Priority Freight Project

Transportation

- Railroad
- Major Roads
- Arterial Roads
- Minor Roads

Base Layers

- Train Depot
- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Data created by Kittleson and Crook County GIS
Map created by CC GIS - Revised 4/13/2017

10 Miles
10 Kilometers

Crook County TSP
Figure - 2
Freight Alternatives

Table 5. Freight Alternatives County Contribution Cost Summary

High Priority	Medium Priority	Low Priority	Total
$5,000,000	$0	$0	$5,000,000

SAFETY ALTERNATIVES

Table 6 presents the safety alternatives that were developed to address identified safety needs. Safety needs were determined through input from the public, advisory committees, and Crook County staff, as well as evaluation of the ODOT All Roads Transportation Safety (ARTS) program projects, ODOT Roadway Departure Implementation Plan, ODOT intersection Implementation Plan, and ODOT Pedestrian and Bicycle Implementation Plan, and evaluation of 2010-2014 reported crashes within Crook County, as summarized in Technical Memorandum #3. The ODOT ARTS program produced no hotspot or pedestrian and bicycle projects in unincorporated Crook County, but roadway departure and intersection projects were identified and incorporated into the alternatives list.

The majority of crashes within the study period in Crook County were roadway departure crashes and overturned vehicle crashes, as shown in Technical Memorandum #3. Low cost, systemic treatments including alignment delineation, edgeline and centerline rumble strips, edgeline striping, speed feedback signs, curve pavement markings, and curve warning signs are included in the proposed alternatives to address these crash types throughout the County. Several ARTS projects, including alignment delineation on Juniper Canyon Road, alignment delineation and edgeline striping on Davis Loop Road, signage and pavement markings at horizontal curves on Juniper Canyon Road, pavement markings at horizontal curves on Davis Loop Road, and pavement markings at horizontal curves on Powell Butte Road also include these low-cost systemic treatments. Additionally, when any ODOT facility is upgraded, repaved, or reconstructed, alignment delineation, edgeline and centerline rumble strips, and edgeline striping should be considered.

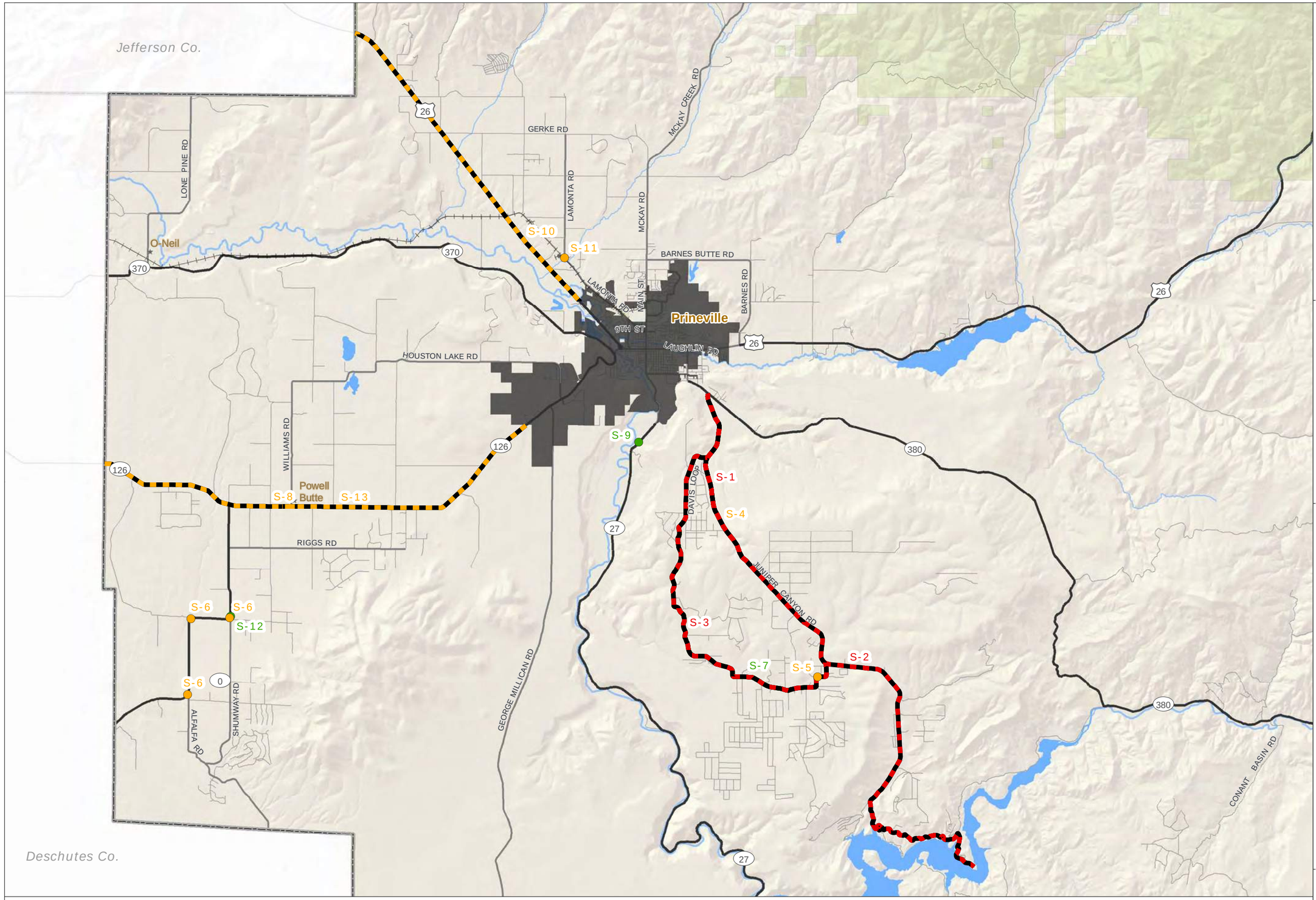
The alternatives also include several projects to address issues at locations with high crash frequency or severity, including intersection warning signage at the intersection of Shumway Road and Powell Butte Highway, and recommendations including a variable speed limit on Juniper Canyon Road. Juniper Canyon Road has a high crash rate and was also identified by members of the public and advisory committees as a perceived safety issue. According to the public and advisory committees, the steep grade on Juniper Canyon Road paired with winter weather conditions and drivers traveling at high speeds make it difficult for drivers to slow down and maintain their lane. The variable speed limit sign would allow for the speed limit to be reduced as needed based on weather conditions. The County is supportive of the addition of a variable speed limit on Juniper Canyon Road.

Table 6 provides a summary of the safety alternatives by cost and priority, and Table 7 indicates the summary of expected County cost and priority. These are planning level cost estimates and do not include right-of-way costs. Figure 3 provides a map of the safety alternatives broken down by priority.

Table 6: Safety Alternatives

Project ID	Project Name	Project Description	ARTS or ODOT screening project?	Cost Estimate	Expected County Contribution	Funding Partners				
						Forest Service	ODOT	County	City of Prineville	Priority
S-1	Juniper Canyon Road variable speed limit	Implement variable speed limit signs that will change based on weather conditions.	N/A	$75,000	$75,000			X		High
S-2	Juniper Canyon Road alignment delineation	Add raised pavement markers to delineate alignment of the roadway for night driving on Juniper Canyon Road; add edgeline rumble strips to Juniper Canyon Road to reduce roadway departure crashes.	ARTS Roadway Departure Project & ODOT Roadway Departure Screening Project	$84,000	$84,000			X		High
S-3	Davis Road alignment delineation and edgeline striping	Add raised pavement markers and edgeline striping to delineate alignment of the roadway for night driving on Davis Loop Road.	ODOT Roadway Departure Screening Project	$46,000	$46,000			X		High
S-4	Juniper Canyon Road horizontal curve signage and markings	Add or enhance curve warning signs and pavement markings per recommendation of ODOT's Roadway Departure Screening Plan.	ARTS Roadway Departure Project & ODOT Roadway Departure Screening Project	$2,000	$2,000			X		Medium
S-5	Davis Loop Road horizontal curve pavement markings	Add or enhance curve warning signs and pavement markings per recommendation of ODOT's Roadway Departure Screening Plan. for horizontal curves at SE Manning Road and SE Olsen Lane; also, replace sign prior to horizontal curve with Manning Road (traveling southbound on Davis Loop Road).	ODOT Roadway Departure Screening Project	$2,000	$2,000			X		Medium
S-6	Powell Butte Road horizontal curves pavement markings	Add or enhance curve warning signs and pavement markings per recommendation of ODOT's Roadway Departure Screening Plan.	ODOT Roadway Departure Screening Project	$2,000	$2,000			X		Medium
S-7	Davis Loop Road tree removal	Remove trees within the clear zone on Davis Loop Road as appropriate to reduce fixed object crashes with trees.	ODOT Roadway Departure Screening Project	$600,000	$600,000			X		Low
S-8	Powell Butte (OR 126) traffic calming/speed reductions	Install/maintain speed feedback signs and narrow lane striping to 11' lanes.	N/A	$34,000	$ -		X			Medium
S-9	Crooked River Highway speed feedback signs	Install a speed feedback sign on Crooked River Highway through River Canyon Recreational Area to deter speeding.	N/A	$15,000	$ -		X			Low
S-10	US 26 systemic safety treatments	Add edgeline rumble strips to reduce roadway departure crashes.	N/A	$25,000	$ -		X			Medium
S-11	Lamonta Road horizontal curve signage, speed feedback sign, and delineators at bend	Add oversized advanced fluorescent yellow curve warning signs with advisory speed plates beneath the advanced warning signs on Lamonta Road near NW Rye Lane.	N/A	$33,000	$33,000			X		Medium
S-12	Shumway Road intersection signage	Add intersection ahead signs on Shumway near intersection with Powell Butte and Bussett Road (signage on each of the four legs).	ODOT Intersection Screening Project	$3,000	$3,000			X		Low

Project ID	Project Name	Project Description	ARTS or ODOT screening project?	Cost Estimate	Expected County Contribution	Funding Partners				
						Forest Service	ODOT	County	City of Prineville	Priority
S-13	OR 126 systemic safety treatments	Addition of rumble strips on fog line and centerline on OR 126.	N/A	$50,000	$ -		X			Medium
S-14	Systemic safety intersection treatment on OR 126	Upgrade un-signalized intersection signs at intersections of OR 126 and Reif Road as well as OR 126 and Copley Road.	ARTS Intersection Project	$3,000	$1,500		X	X		Medium
S-15	McKay Road and Gerke Road paved shoulders	Widen McKay Road from 32 ft to 36 ft to bring it up to future bicycle route standards (7 ft shoulders). Coordinate with projects R-11 and R-12 for efficiency. McKay Road provides connectivity to the City of Prineville, specifically to Main Street, which currently has bicycle lanes. Serves residential areas just north of the city limits. This is redundant to project PB-13 and will also serve as bicyclists and pedestrians on McKay Road and Gerke Road.	N/A	N/A- Vision Project	N/A- Vision Project			X		Vision



Project Areas

- Medium Priority
- Low Priority
- High Priority
- Medium Priority
- Low Priority

Transportation

- Railroad
- Major Roads
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Data created by Kittleson and Crook County GIS
Map created by CC GIS - Revised 4/13/2017

5 Miles
5 Kilometers

Crook County GIS

Crook County TSP
Figure - 3
Safety Alternatives

Table 7. Safety Alternatives County Cost Summary

High Priority	Medium Priority	Low Priority	Total
$205,000	$40,500	$603,000	$848,500

BICYCLE AND PEDESTRIAN ALTERNATIVES

Table 8 presents the bicycle and pedestrian alternatives developed to address identified needs. Bicycle and pedestrian facilities within Crook County are needed for recreational usage and active transportation connections to Prineville and between communities.

The recommended alternatives are primarily composed of bicycle routes. The roadways identified for shoulder bikeways should be designed according to the bicycle route recommended shoulder widths provided in the roadway design standards update section of this memorandum. To improve roadways to meet these standards, most of the identified roadways require widening.

Table 8 provides a summary of the bicycle and pedestrian alternatives by cost and priority, and Table 9 indicates the expected County cost and priority for the pedestrian and bicycle alternatives. These are planning level cost estimates and do not include right-of-way costs. Based on the high relative costs associated with high priority projects, it is suggested that County staff and the advisory committees look to reallocated projects as part of the next step to provide a little more balance between high, medium, and low priority projects.

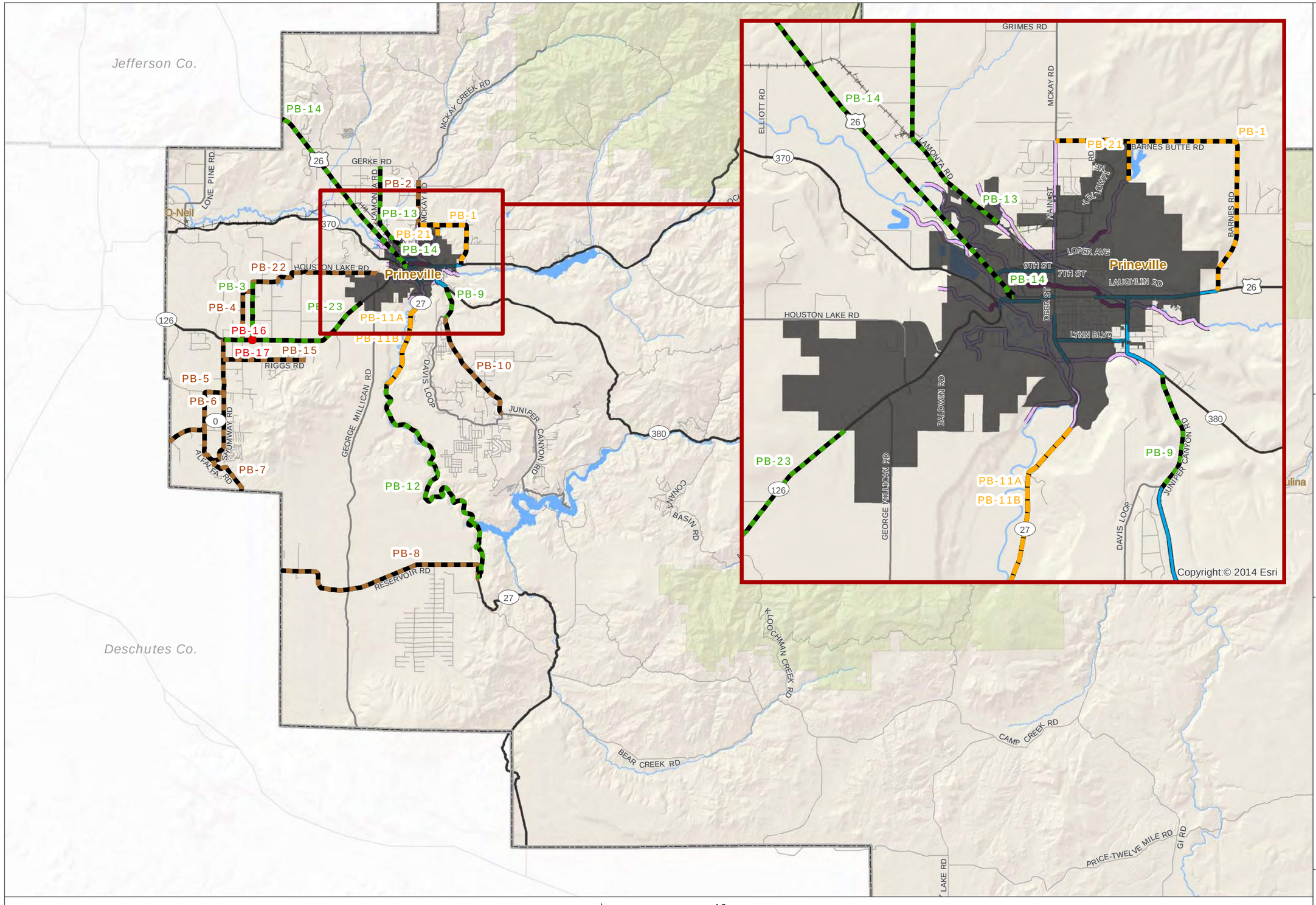
Figure 4 provides a map of the bicycle and pedestrian alternatives broken down by priority.

Table 8: Bicycle and Pedestrian Alternatives

Project ID	Project Type	Project Name	Project Description	Cost Estimate	Expected County Contribution	Funding Partners					Priority
						Forest Service	ODOT	County	City of Prineville	Private	
PB-1	Paved shoulders	Barnes Butte Road paved shoulders	Add paved shoulders to Barnes Butte Road to increase roadway width from 22 ft to 36 ft to bring it up to future bicycle network standards (7 ft shoulders). Barnes Butte Road is a standard rural road, but is close to city limits and a new school, and has evidence of high ridership based on Strava data. It is close in proximity to the City of Prineville, and is intended to connect to the multiuse path PB-21 for connectivity to future trails in Prineville. The bridge on Barnes Butte Road will also need replacement; however, the provided cost estimate does not include these additions.	$7,000,000	$7,000,000			X			Medium
PB-2	Paved shoulders	McKay Road paved shoulders	Widen McKay Road from 32 ft to 36 ft to bring it up to future bicycle route standards (7 ft shoulders). Coordinate with projects R-11 and R-12 for efficiency. McKay Road provides connectivity to the City of Prineville, specifically to Main Street, which currently has bicycle lanes. Serves residential areas just north of the city limits. This will also serve as a safety treatment to address the crash trends on McKay Road.	$6,800,000	$6,800,000			X			Vision
PB-3	Paved shoulders	Williams Road paved shoulders	Widen Williams Road from 25 ft to 36 ft to bring it up to future bicycle route standards (7 ft shoulders). Williams Road provides connectivity into Powell Butte community and provides access to the Powell Butte bus stop.	$4,000,000	$4,000,000			X			Low
PB-4	Paved shoulders	Reif Road paved shoulders	Widen Reif Road from 22 ft to 36 ft to bring it up to future bicycle route standards (7 ft shoulders).	$4,400,000	$4,400,000			X			Vision
PB-5	Paved shoulders	Powell Butte Highway paved shoulders	Widen Powell Butte Highway from 26 ft to 38 ft to bring it up to future bicycle route standards (7 ft shoulders).	$10,600,000	$10,600,000			X			Vision
PB-6	Paved shoulders	Shumway Road paved shoulders	Widen Shumway Road from 24 ft to 36 ft to bring it up to future bicycle route standards (7 ft shoulders).	$5,500,000	$5,500,000			X			Vision
PB-7	Paved shoulders	Alfalfa Road paved shoulders	Widen Alfalfa Road from 24 ft to 36 ft to bring it up to future bicycle route standards (7 ft shoulders).	$6,000,000	$6,000,000			X			Vision
PB-8	Paved shoulders	Reservoir Road paved shoulders	Widen Reservoir Road and Williard Road from 24 ft to 36 ft to bring them up to future bicycle route standards (7 ft shoulders).	$6,000,000	$6,000,000			X			Vision
PB-9	Paved shoulders	Juniper Canyon Road (north) paved shoulders	Widen Juniper Canyon Road from 27ft to 38 ft from OR 380 to Davis Loop Road North to bring it up to future bicycle route standards (7 ft shoulders).	$2,300,000	$2,300,000			X			Low
PB-10	Paved shoulders	Juniper Canyon Road (south) paved shoulders	Widen Juniper Canyon Road from 28 ft to 38 ft from Davis Loop Road North to Davis Loop Road South to bring it up to future bicycle route standards (7 ft shoulders).	$7,900,000	$7,900,000			X			Vision
PB-11A	Paved shoulders	OR 27 (north) paved shoulders	Add or widen paved shoulders to bring OR 27 up to future bicycle route standards from Prineville to MP 6.7. The roadway width of OR 27 currently varies, but the provided cost estimate is based upon widening the	$7,300,000	$ -		X				Medium

Project ID	Project Type	Project Name	Project Description	Cost Estimate	Expected County Contribution	Funding Partners					Priority
						Forest Service	ODOT	County	City of Prineville	Private	
			roadway from 24 ft to 38 ft to bring it up to future bicycle route standards (7 ft shoulders). This is an alternative to PB-11B below and is necessary due to high bicyclist ridership along this roadway.								
PB-11B	Multiuse path	OR 27 multiuse path parallel to OR 27	Add 10' wide multiuse path parallel to OR 27 to connect with planned path in Prineville. This is an alternative to PB-11A above and is necessary due to high bicyclist ridership along this roadway.	$3,000,000	$330,000		X	X			Medium
PB-12	Study	OR 27 (south) shoulder feasibility study	Perform a feasibility study to determine appropriate pedestrian and bicycle facilities or enhancements through Crooked River Canyon on OR 27 south of MP 6.7 to Reservoir Road. This is a separate project from PB-13 and PB-14 due to expected physical constraints along this portion of OR 27.	$20,000	$20,000		X				Low
PB-13	Paved shoulders	Lamonta Road paved shoulders	Widen Lamonta Road from 30 ft to 38 ft to bring it up to future bicycle route standards (7ft shoulders) and connect to Prineville future bicycle lanes.	$5,700,000	$5,700,000			X			Low
PB14A	Paved shoulders	US 26 (Madras Highway) paved shoulders	Widen OR 26 from 30 ft to 38 ft to bring OR 26 up to future bicycle route standards (7ft shoulders).	$12,500,000	$ -		X				Low
PB-14B	Multiuse path	US 26 (Madras Highway) multi-use path	Extend existing multiuse path north west to the County line parallel to US 26.	$5,100,000	$561,000		X	X			Low
PB-15	Multiuse path	Riggs Road SW multiuse path	Add a bike/pedestrian path along the south side of the roadway.	$3,300,000	$3,300,000			X			Vision
PB-16	Other	Powell Butte lighting	Install lighting on OR 126 within Powell Butte.	$238,000	$ -		X				High
PB-17	Pedestrian Crossing	OR 126 enhanced pedestrian crossing in Powell Butte	Install an enhanced pedestrian crossing with a rectangular rapid flashing beacon (RRFB) on OR 126 within Powell Butte.	$19,000	$ -		X				High
PB-18	Other	Bicycle support hub	Construct a bicycle hub, or "Rest stop," for hikers, bicyclists, recreationalists, and community members along the OR 27 scenic bikeway corridor; provide small shelter, information kiosk (map/community calendar), bicycle tool station, and bench/sitting area.	$20,000	$ -		X			X	Medium
PB-19	Signage	Bicycle signage	Install wayfinding signage to Prineville Reservoir, Prineville, and any other major destinations and install "Bicycle Route" and "Bicycles on Roadway" signage.	$5,000	$2,500		X	X			High
PB-20	Other	Bandit Springs rest area	Construct a walkway and drinking water system.	$100,000	$ -	X	X				Low

Project ID	Project Type	Project Name	Project Description	Cost Estimate	Expected County Contribution	Funding Partners					
						Forest Service	ODOT	County	City of Prineville	Private	Priority
PB-21	Multiuse path	Barnes Butte multi-use trail connection	Construct a multiuse trail to connect the planned Ironhorse multiuse trail in Prineville to Barnes Butte Road.					X			Medium



Project Areas

- High Priority Bike/Ped Project
- High Priority Bike/Ped Project
- Medium Priority Bike/Ped Project
- Low Priority Bike/Ped Project
- Vision Bike/Ped Project
- Prineville TSP Proposed Trails
- Prineville TSP Existing Trails
- Existing Bicycle Shoulder

Transportation

- Railroad
- Major Roads (26)
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Data created by Kittleson and Crook County GIS
Map created by CC GIS - Revised 4/28/2017

10 Miles
10 Kilometers

Crook County TSP
Figure - 4
Bike/Ped Alternatives

Table 9. Bicycle and Pedestrian Alternatives County Cost Summary

High Priority	Medium Priority	Low Priority	Total
$2,500	$7,330,000	$12,581,000	$50,500,000

TRANSIT ALTERNATIVES

Currently transit service within Crook County is provided by Cascades East Transit (CET). There is one bus stop in unincorporated Crook County serviced by the Route 26 bus which provides connections to Prineville, Redmond, and Bend. Dial-A-Ride service in unincorporated Crook County is limited and only provided for select areas located near the City of Prineville. CET also provides scheduled twice a day service to Juniper Canyon using the Dial-A-Ride vehicle. Juniper Canyon has a higher population density than much of the rest of unincorporated Crook County. This twice a day service allows those living in Juniper Canyon to be able to go to and from Prineville to access essential destinations, which may include the grocery store and hospital.

Rural locations, like unincorporated Crook County, often provide challenges for transit providers. Overall, Crook County has a low population density, but according to studies done by the Central Oregon Intergovernmental Council, Crook County has a much larger percentage of disabled and elderly persons than other rural counties within Central Oregon. These populations are often more reliant on public transportation, but the low population density within Crook County creates challenges for providing public transit options. Transportation network companies (TNC), also known as ridesourcing or ridehailing companies, that pair riders with drivers who operate a non-commercial vehicle have not yet provided service in Crook County. TNCs are most commonly used in urban areas where there is a lot of demand, but TNCs could be very helpful in providing mobility to those who need it in rural areas, too. At least one startup company, Liberty Mobility Now, has begun to focus on providing rides in rural areas. Service for Liberty Mobility Now and other similar companies does not yet exist in Oregon, but Crook County is supportive of expansion of these companies to Crook County.

In addition to providing more transit, providing facilities for people to access transit is equally important. The term “first and last mile connectivity” is sometimes used to describe the ability to access transit, as many of the issues that can prohibit people from using transit involve getting to and from a transit stop or transit hub. Those who are reliant on transit may not have access to a motor vehicle or may not be able to drive a motor vehicle due to age or ability constraints. Providing infrastructure to allow people to walk and bicycle is therefore especially important near transit facilities. There are bicycle and pedestrian projects listed as alternatives for Crook County that will help improve active transportation connectivity to transit. Most notably, PB-17 is a high priority project to provide a pedestrian crossing in the Powell Butte community that will help ensure safe pedestrian crossing of OR-126.

The County should support the current transit service and improvements through the following alternatives, provided in Table 10. These alternatives were developed based on needs identified by the advisory committee and CET staff.

Table 10: Transit Alternatives

Project ID	Project Name	Project Description	Cost Estimate/Description
T-1	Expanded Prineville-Redmond/Bend transit service	Increase frequency and length of service between Prineville and Redmond/Bend, while maintaining the stop in Powell Butte.	$45,000 – addition of one round trip per weekday per year
T-2	Fixed route enhancements	Increase service in Prineville with eventual deviated fixed route or a purely fixed route to provide connections to more destinations.	$200,000- addition of a Dial-A-Ride vehicle and 10 daily service hours for 255 weekdays per year
T-3	Dial-A-Ride enhancements and Transportation Networking Company (TNC) encouragement	Improve accessibility for residents in rural Crook County through a larger service area for dial-a-ride service. Additionally, encourage TNC expansion to Crook County or rural TNC pilot projects to locate in Crook County.	$190,000- addition of a Dial-A-Ride vehicle to serve unincorporated Crook County weekdays between 7:00 am and 5:30 am
T-4	Transit community outreach	Educate the community about connections available within Redmond and Prineville to reach key destinations such as COCC, the Redmond Airport, the hospital, and additional locations within Bend.	$4,000- one event per month at less than $350 per event

BRIDGE ALTERNATIVES

Many of the 111 bridges in Crook County need replacement or repair. Bridges over 20 feet in length are part of the National Bridge Inventory (NBI) database, and are therefore eligible for federal funding for repair or replacement purposes. There are also many non-NBI bridges that need replacement or repair. The County is entirely responsible for the cost of the non-NBI bridge repairs. Historically the County has replaced one non-NBI bridge per year at a cost of approximately $150,000. When replaced, each bridge is built to be at least 21 feet long when possible to be eligible for federal funding in the future. The bridge alternatives include continuing the program of replacing one non-NBI bridge per year. Additionally, the project list includes replacing several NBI bridges that either have low sufficiency ratings or are functionally obsolete, meaning they are not designed to today's standards.

Table 11 provides a summary of the bridge alternatives by cost and priority and indicates which organizations or agencies are expected to contribute to the cost of the project. Table 14 provides a summary of the expected County costs for bridge projects by priority. The two high priority bridge projects include the Weigand Bridge replacement, which is currently funded through a grant the County has received. The additional high priority project is the non-NBI bridge replacement program, which includes one bridge replacement per year at $150,000. This is consistent with the County's current practices.

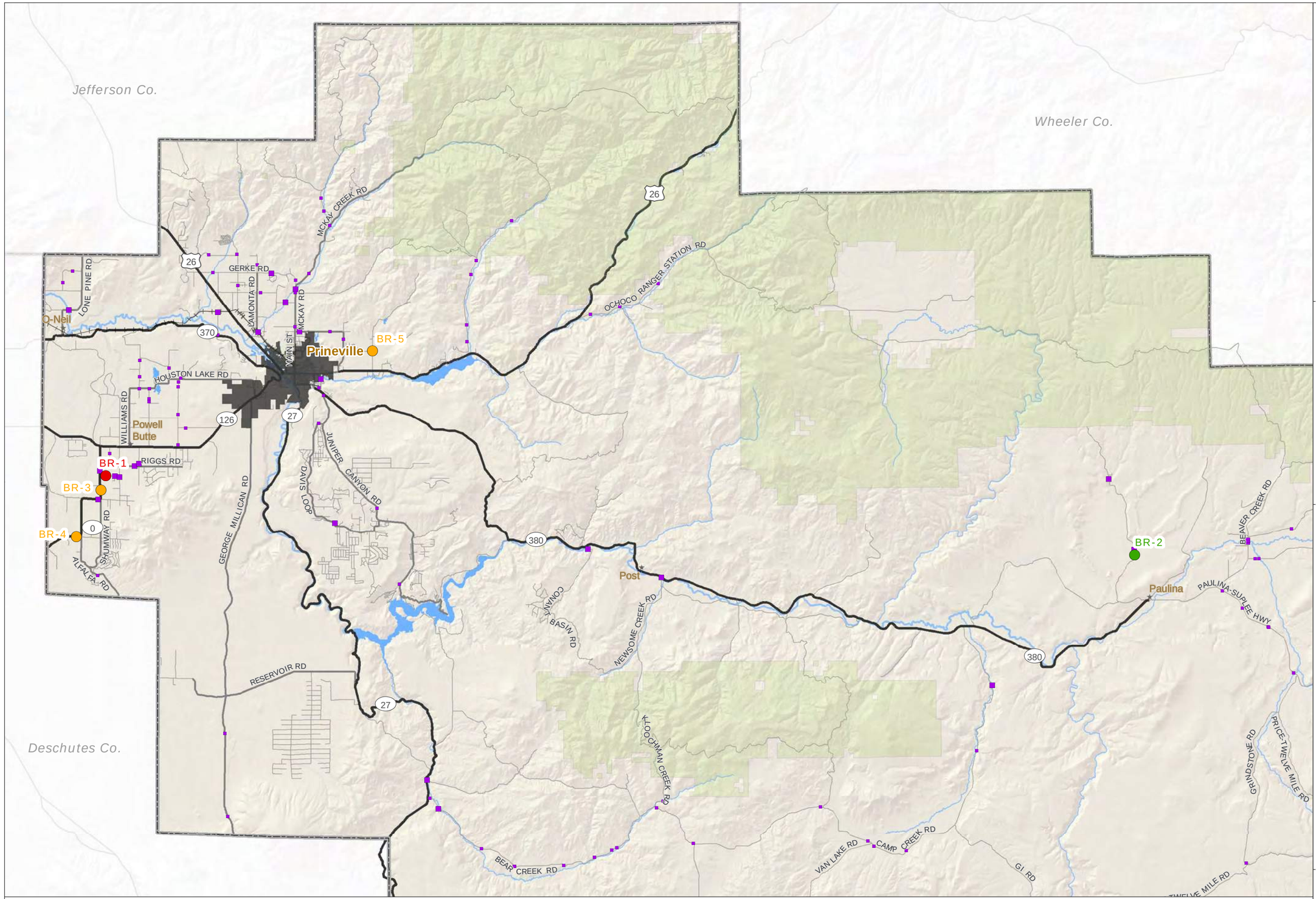
Figure 5 provides a map of the bridge alternatives broken down by priority.

Table 11: Bridge Alternatives

Project ID	Project Name	Project Description	Cost Estimate	Expected County Contribution	Funding Partners					Priority
					Forest Service	ODOT	County	City of Prineville	Private	
BR-1	Weigand Road bridge replacement (NBI Bridge 13C24)	Replace the bridge on Weigand Road at the irrigation ditch crossing due to a low sufficiency rating. (The County has received a grant for this project, which is expected to be constructed in 2018. Therefore, this project is excluded from the County contributions cost summary.)	$1,000,000	$---			X			High
BR-2	County Road 221 bridge over Paulina Creek (NBI Bridge 19083)	Conduct a study to evaluate the cost for replacing or repairing this bridge. The bridge is functionally obsolete.	$20,000	$20,000			X			Low
BR-3	Powell Butte Highway bridge over Powell Butte Canal (NBI Bridge 03291)	Replace the Powell Butte Highway bridge over the Powell Butte Canal.	$1,000,000	$1,000,000			X			Medium
BR-4	Powell Butte Highway bridge over Powell Butte Wasteway (NBI Bridge 03293)	Replace the Powell Butte Highway bridge over the Powell Butte Wasteway.	$1,000,000	$1,000,000			X			Medium
BR-5	Johnson Creek Road NE bridge over Ochoco Main Canal (NBI Bridge 13C06A)	Replace the Johnson Creek Road NE Bridge over the Ochoco Main Canal.	$1,000,000	$1,000,000			X			Medium
BR-6	Non-NBI bridge replacement program	Continue to replace one non-NBI bridge per year at approximately $150,000 per bridge.	$3,000,000	$3,000,000			X			High

Table 12. Bridge Alternatives County Cost Summary

High Priority	Medium Priority	Low Priority	Vision	Total
$3,000,000	$3,000,000	$20,000	$-	$6,020,000



Project Areas

- High Priority Bridge Project
- Medium Priority Bridge Project
- Low Priority Bridge Project
- NBI Briges
- Non-NBI Bridges

Transportation

- Railroad
- Major Roads (26)
- Arterial Roads
- Minor Roads

Base Layers

- Main Rivers
- Lakes and Reservoirs
- County Boundary
- National Forest
- Prineville City Limits

Data created by Kittleson and Crook County GIS
Map created by CC GIS - Revised 4/13/2017

10 Miles
10 Kilometers

Crook County GIS

Crook County TSP
Figure - 5
Bridge Alternatives

INTELLIGENT TRANSPORTATION SYSTEM ALTERNATIVES

Several Intelligent Transportation System (ITS) alternatives were included in the 2005 TSP. These alternatives have been carried forward for consideration in this TSP Update. KAI will work with ODOT to identify recent planning level estimates for these types of installations.

Table 13: ITS Alternatives

Project ID	Project Description
ITS-1	Millican Road – Weight in Motion Scale
ITS-2	OR 126 Parrish and Minson – VMS (Variable Message Sign)
ITS-3	Powell Butte Highway and OR 126 – ATR (Automatic Traffic Recorder) & RWIS (Road Weather Information System) & CCTV (Closed-Circuit Television Camera)
ITS-4	US 26, Ochoco Summit – RWIS & CCTV
ITS-5	Communication Infrastructure Prineville - Redmond

In addition to the previously identified ITS projects, the safety alternative S-1 includes a variable speed limit on Juniper Canyon Road to address safety issues associated with speed and weather. ODOT and Crook County will work out terms for ownership, implementation, and maintenance upon project commencement. Table 6 provides more information about this recommendation.

FUTURE TRANSPORTATION FUNDING PLAN

Crook County faces issues of how to finance operations, maintenance, and capital projects. Presently, approximately $6.5 million is spent each year on personnel services, materials and services, and contingency. Funding, most of which comes from state and federal revenue, is inconsistent and totaled just $2.3 million per year for the fiscal years 2015/2016 and 2016/2017. The remainder of the money that has paid for personnel services, materials and services, contingency, and capital projects has come from previously reserved funds. The 2016/2017 transportation budget has approximately $13.5 million reserved for future expenses, which, assuming consistent revenue of $2.3 million and $6.5 million in expenses each year would last less than three and a half years. This also assumes that no money is put toward capital projects.

Considering capital projects, the total County funding needed to accomplish all of the alternatives summarized in this plan would be approximately $61 million. Table 14 shows the funding break down according to priority and project type. The total funding needed to accomplish all of the high-priority alternatives summarized in this plan would be approximately $21 million.

Table 14: Alternatives County Cost Summary by Priority

Project Category	High Priority	Medium Priority	Low Priority	Total
Roadway	$12,500,000	$7,511,000	$9,425,000	$29,436,000
Freight	$5,000,000	$0	$0	$5,000,000
Safety	$205,000	$40,500	$603,000	$848,500
Pedestrian/Bicycle	$2,500	$7,330,000	$12,581,000	$19,913,500
Bridge	$3,000,000	$3,000,000	$20,000	$6,020,000
Total	**$20,707,500**	**$17,881,500**	**$22,629,000**	**$61,218,000**

Potential strategies for addressing the funding gap in Crook County may generally be grouped into three categories: secure more external funding, identify public/private sponsorship opportunities, and raise local revenue through user fees and taxes. Observations on the use of these strategies are discussed below. They are not all mutually exclusive.

Identify Additional Grant Opportunities

ODOT offers multiple grant opportunities to support transportation projects. The County should identify grants from those summarized in Table 15 that are applicable to their projects. Some of these programs require a local match. The County and cities should begin identifying these programs early in order to plan for the funding necessary to satisfy a local match. Using local dollars as a match for a grant opportunity is a strategy to stretch the local funding even farther.

Table 15: Grant Opportunities

Source ID	Source Title	Award Cycle	Intended Use	Applicable Project Types	Administration Agency	Deadline	Local Match	Website
1	Rivers, Trails, and Conservation Assistance Program	Annual	Technical assistance for recreation and conservation projects.	Shared-use paths	National Park Service	August	None	http://www.nps.gov/ncrc/programs/rtca/contactus/cu_apply.html
2	Highway Safety Improvement Program	Annual	Address safety issues on highways and High Risk Rural Roads.	All	ODOT	Varies	10%	www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/highway _safety_program.shtml
3	Oregon Parks and Recreation Local Government Grants	Annual	Primary use is recreation; transportation allowed. Construction limited to outside road right-of-way, only in public parks or designated recreation areas.	Shared-use paths	OPRD	Varies	20%	http://www.oregon.gov/OPRD/GRANTS/local.shtml
4	Recreational Trails Program	Annual	Recreational trail-related projects, such as hiking, running, bicycling, off-road motorcycling, and all-terrain vehicle riding.	Shared-use paths	OPRD	Varies	20%	http://www.oregon.gov/OPRD/GRANTS/trails.shtml
5	Land and Water Conservation Fund	Annual	Acquire land for public outdoor recreation or develop basic outdoor recreation facilities.	Shared-use paths, bikeways, sidewalks	OPRD	Varies	50%	http://www.oregon.gov/OPRD/GRANTS/lwcf.shtml
6	Statewide Transportation Improvement Program	Biennial	Multi-year, statewide, intermodal program of transportation projects.	Sidewalk, bikeways, crossing improvements	ODOT	Varies	Varies	http://www.oregon.gov/ODOT/HWY/STIP/
7	ATV Grant Program	Annual	Operation and maintenance, law enforcement, emergency medical services, land acquisition, leases, planning, development, and safety education in Oregon's OHV (off-highway vehicle) recreation areas.	Shared-use paths	OPRD	February / April	20%	http://www.oregon.gov/oprd/ATV/pages/grants.aspx
8	Immediate Opportunity Funds	Biennial	Support primary economic development through the construction and improvement of street and roads.	All	ODOT	On-going	50%	http://www.oregon.gov/ODOT/TD/EA/reports/IOF_PolicyGuidelines2015%20doc.pdf
9	Enhance (STIP)	Biennial	Activities that enhance, expand, or improve the transportation system. Projects that improve or enhance the state's multimodal transportation system.	All	ODOT	August	10%	http://www.oregon.gov/ODOT/TD/STIP/Pages/WhatsChanged.aspx
10	ConnectOregon	Biennial	Non-highway transportation projects that promote economic development in Oregon.	Non-highway modes	ODOT	November	20%	http://www.oregon.gov/ODOT/TD/TP/pages/connector.aspx
11	All Roads Transportation Safety (ARTS)	Biennial	Address safety needs on all public roads in Oregon; reduce fatal and serious injury crashes.	All hot spot and systemic safety projects	ODOT	Varies	8%	http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/Pages/ARTS.aspx
12	Transportation and Growth Management Program (TGM)	Annual	Projects that help local communities plan for streets and land use to create more livable communities. Category 1 TGM grants focus on meeting the requirements for the Transportation Planning Rule, while category 2 TGM grants focus on integrated land use and transportation planning , especially active transportation, transit, and multi-modal facilities.	Planning, integrated land use and transportation, active transportation, transit, and multi-modal street facilities.	ODOT	June	12%	https://www.oregon.gov/LCD/TGM/pages/grants.aspx
13	Federal Lands Access Program	Varying for Oregon	Projects that improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands.	All	FHWA	Varies	10.27%	https://flh.fhwa.dot.gov/programs/flap/or/

Public/Private Sponsorship Opportunities

Public/private sponsorships involve a private entity such as a local business owner working with the public agency to fund a project. In return for their investment in the community, these business owners often have recognition for their role, providing a marketing venue for the business. In Crook County, one potential opportunity for this type of partnership is the project for bicycle support hub. Private organizations that sponsor a rest area should have the opportunity to provide an advertisement and map at these locations directing cyclists to their community and business.

Local Taxes and User Fees

Many types of user fees and taxes may be collected to finance road construction and operations. On that premise, it is assumed that the County will need to develop local revenue sources to supplement or replace federal resources if it hopes to maintain current levels of service. It is also assumed that changes in state of federal financing, coupled with efficiency measures are not enough to close the funding gap. Table 16 lists options that the County may wish to consider for funding local roads. The sources include a mix of fees and taxes, some of which if implemented would have implications for other aspects of the County budgets. Some of these fees could also be used to provide a local match to obtain greater federal or state funding, further stretching local dollars.

Table 16: Local Taxes and User Fee Options

Source	Description	Comments
General Fund	Property taxes from the County's permanent tax rate.	Diverting general fund revenue to the Road Fund would have significant consequences for other County services.
Supplemental 5-year Serial Levy	Voter approved property tax levied in addition to the County's permanent tax rate.	A road fund serial levy would have to be approved by voters every five years. A one-time approval would buy time for the County to develop other options. This method could fund operations and capital programs, some of which might reduce future maintenance requirements.
Road Utility Fee	Monthly user fee with revenue dedicated to road operations. May be enacted legislatively but could be challenged and brought to a vote.	This type of fee is becoming more common in cities but would require substantial investment in rate studies, administrative staffing, and software and computer systems to enable the County to collect the revenue. This source is generally better suited to funding operations than for capital improvements, but it may free up existing resources for capital projects.
Road/Local Improvement District	Fee for property owners or users to help fund road or other capital improvement projects	This may be especially useful for non-state facilities that are ineligible for federal or state funding. This type of fee must be approved by the majority of property owners.
Vehicle Registration Fee	An extra fee on all registered motor vehicles in the county. May be authorized legislatively but could be challenged and brought to a vote.	State must be willing to act as a collection agent for the County, otherwise would be easy to implement. This source could fund operations or capital programs.
Motor Vehicle Title Fee	Require that all motor vehicles registered in the county also have their title recorded as personal property with the County.	This would generate two sources of revenue: from the fee itself and from personal property taxes levied on motor vehicles. This could be problematic for renters and would increase taxable property that the assessor must account for.
County Gas Tax	May be enacted legislatively but could be challenged and brought to a vote.	A local-option fuel tax would be easy to collect because the infrastructure is already in place. Would generate revenue for the county from motorists passing through the county. This method could fund operations and capital programs.
Timber Sales	The County may collect a percentage of the revenues from timber sales.	This revenue has been declining for the County during recent years.

ATTACHMENTS:

Attachment A – 2005 TSP Projects

Attachment B - Alternatives Evaluation Matrix

Attachment C - Current Roadway Design Standards

Attachment D – Proposed Roadway Design Standards

Attachment E – Meeting Minutes from TAC/PAC Meeting #3

ATTACHMENT A – 2005 TSP PROJECTS

		2005 TSP Cost Estimate	Status	Carried Forward in TSP Alternatives	Need Input/ Verification
Non-Motorized Improvement Projects					
	Barnes Butte Road - add shoulders	$135,000	Not Complete	Yes	
	Houston Road - add shoulders	$455,000	Assumed Complete		Verify if Complete
	Juniper Canyon Road to Prineville Reservoir - add shoulders	$440,000	Complete		
	McKay Road - Prineville UGB to Gerke Road - add shoulders	$800,000	Not Complete	Yes	
	Combs Flat Road (OR 380) - Laughlin Road to Carey Foster Road	$94,000	Complete		
	Riggs Road SW - add a bike/pedestrian path along the south side of the roadway	$455,000	Not Complete	Yes	
	Millican Road SW - widen shoulder from two feet to four feet and mark as a bike route	TBD	Complete		
	US 26 (Madras Highway) - add shoulders from county line to OR 126	TBD	Unknown	Yes	Verify if Complete
	Lynn Boulevard - add bike lanes and sidewalks from OR 27 to OR 380	TBD	Complete		
Roadway Capital Improvement Project List					
ODOT STIP Projects					
	US 26 from Laughlin Road to Marks Creek Pavement Preservation and Rockfall Correction at Elephant Rock	$2,838,000	Assumed Complete		Verify if Complete
	Beaver Creek Road Junction with Paulina Suplee Road- widening, paving, improving road base, and improving drainage	$4,000,000.00	Complete		
	Crooked River Bridge #02761 (OR 126 in Prineville)	$4,985,000	Located within City Limits		
	Bandit Springs Rest Area - construct a walkway and drinking water system	$100,000	Unknown	Yes	Verify if Complete
	US 26/Harwood Street Intersection Improvements (Prineville)	$298,000	Located within City Limits		
	OR 126 passing lanes from Milepost 4.00 to 6.00 - jurisdictional exchange	$1,950,000	Complete		
City of Prineville Projects					
	Millican Road Overcrossing and Interchange with OR 126	$5,400,000	Replaced by Roundabout, which is Planned for Construction (in City Limits)		
Crook County Projects					
	Oregon 126/Powell Butte Highway Interchange	$5,000,000	Replaced by Roundabout in OR 126 Corridor Plan	Yes	
	Powell Butte Highway Realignment	$2,000,000	Partially Complete	Yes	
	Crestview Road Extension to OR 27	TBD	Not Complete, but not carried forward because located within Prineville and included in City's TSP		
	Davis Road to OR 27 Connection	$10,000,000-$15,000,000	Not Complete	Yes	
	Connect Copley Road to Weigand Road	$350,000	Not Complete	Yes	
	Miscellaneous turn lanes along OR 126 at major intersections (ODOT)	$1,600,000	Project Source was old OR 126 Corridor Plan. Project not carried forward into new OR 126 Corridor plan		
	Widen Houston Lake Road and Parish Lane	TBD	Assumed Complete		Verify if Complete
	Alfalfa Road- realignment to straighten corners	$500,000	Complete		
	Juniper Canyon Road - road cam	$40,000	Complete		
	Juniper Canyon Widening	TBD	Complete		
	Newsom Creek Bridge #13C28	TBD	Complete		
	Paulina Valley Road Bridge #19083	TBD	Not Complete	Yes	
	Johnson Creek Road Bridge #13C06A	TBD	Not Complete	Yes	
	Weigand Road Bridge #13C24- OTIA 3 Project	TBD	Planned for Construction in 2018	Yes	
	OR 126 Widening	TBD	Assumed Complete		Verify if Complete
	Lone Pine Road widening, base, and surface rehabilitation	TBD	Complete		
	Lone Pine Road rail crossing improvement	TBD	Complete		
Oregon Forest Highway Improvement Projects					
	Beaver Creek Road (OR PFH 124)	TBD	Assumed Complete		Verify if Complete
	Mill Creek Road (OR PFH 99)	TBD	Unknown	Yes	Verify if Complete
Crook County ITS Project					
	Millican Road- Weigh in Motion Scale	TBD	Unknown	Yes	Verify if Complete
	OR 126 Parrish and Minson- VMS	TBD	Unknown	Yes	Verify if Complete
	Powell Butte Highway and OR 126- ATR and RWIS and CCTV	TBD	Unknown	Yes	Verify if Complete
	US 26, Ochoco Summit- RWIS and CCTV	TBD	Unknown	Yes	Verify if Complete
	Communication infrastructure Prineville-Redmond	TBD	Unknown	Yes	Verify if Complete

ATTACHMENT B - ALTERNATIVES EVALUATION MATRIX

		R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10	R-11	R-12	R-13	R-14	R-15	R-16	R-17	R-18	R-19	R-20	PB-1	PB-2	PB-3	PB-4	PB-5	PB-6	PB-7	PB-8	PB-9
Evaluation Measures		Powell Butte Highway/OR 126 Roundabout	Williams Road/OR 126 Off-set T intersection	Crestview Road extension	Copley Road extension	Powell Butte Highway realignment	Davis Road to OR 27 Connection	Mill Creek Road (OR PFH 99)	Overlay OR 380	Overlay McKay Creek Road	Overlay McKay Road	Reservoir Road signage for sight distance restriction	Improve sight distance at Reservoir Road blind hill	Secondary Prineville Airport Access	Left turn lane at Powell Butte Highway and Shumway	OR 126 access closure from Bozarth Road	OR 126 access closure from Kissler Road	OR 126 access closure from Copley Road	OR 126 access closure from Minson Road	OR 126 access closure from DA Yates	OR 126 access closure from Wiley Road	Add shoulders to Barnes Butte Road	Add shoulders to McKay Road	Add shoulders to Williams Road	Add shoulders to Reif Road	Add shoulders to Powell Butte Highway	Add shoulders to Shumway Road	Add shoulders to Alfalfa Road	Add shoulders to Reservoir Road	Add shoulders to Juniper Canyon Road (north)
Goal 1: Mobility and Connectivity: Promote a transportation system that links rural communities to key destinations in the County, Prineville, and adjacent Counties, and serves existing and future needs for transporting goods and people throughout.		1	4	3	3	1	4	1	2	1	1	2	2	2	2	-2	-2	-2	-2	-2	-2	2	1	1	1	2	1	1	2	1
1A1	To what extent does the project provide connectivity to future development areas?	0	1	1	1	0	1	0	0	0	0	0	0	0	0	-2	-2	-2	-2	-2	-2	1	0	0	0	0	0	0	0	0
1B1	To what extent does the project improve regional connections?	1	0	0	0	1	1	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
1B2	To what extend does the project improve local access?	0	1	2	2	0	2	1	1	1	1	1	1	1	1	-2	-2	-2	-2	-2	-2	1	1	1	1	1	1	1	1	1
1C1	If the project is located with an unincorporated community, to what extent does it balance local community goals with state highways within the community?	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0
1D1	To what extent does the project improve transit service or connections to transit service within Crook County?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1E1	To what extent does the project provide ADA facilities?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goal 2: Economic Development: Plan a transportation system that supports existing industry and encourages economic development in the County.		3	1	1	1	3	2	4	3	3	3	1	1	1	0	1	1	1	1	1	1	4	4	4	4	4	4	4	5	4
2A1	To what extent does the project support existing industrial, data storage, agricultural, and tourism industry?	1	0	0	1	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
2A2	To what extent does the project support economic diversification in the future?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2B1	To what extent does the project promote railroad freight service?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C1	To what extent does the project improve or maintain OR 26, OR 126, George Millican Road, or other freight routes throughout the County?	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0
2D1	To what extent does the alternative integrate Crook County's industrial areas with the transportation system?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2E1	To what extent does the alternative develop connections to or promote access to major recreational locations, destinations, and key services in the County?	0	0	1	0	1	2	2	1	1	1	1	1	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	2	1
2F1	To what extent does the project improve recreational bicycle routes in Crook County?	0	0	0	0	1	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2
Goal 3: Safety: Provide a transportation system that promotes the safety of current and future travel modes for all users.		7	3	4	4	5	4	5	5	4	5	4	4	3	3	0	0	0	0	0	0	6	6	6	6	6	6	6	6	6
3A1	To what extent does the alternative provide safety and operational improvements for bicyclists?	1	0	0	0	1	0	2	1	0	1	1	1	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2
3B1	To what extent does the alternative improve the transportation facility to meet or comply with standards?	2	2	2	2	1	2	2	2	2	2	1	1	2	2	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2
3C1	To what extent does the alternative reduce the estimated frequency of fatal and serious injury crashes?	2	1	0	0	2	0	1	0	0	0	2	2	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3D1	To what extent does the alternative improve emergency vehicle access?	1	0	2	1	1	2	1	1	1	1	0	0	1	0	-2	-2	-2	-2	-2	-2	0	0	0	0	0	0	0	0	0
3E1	To what extent does the alternative improve safety at or near the intersection of a roadway and railroad?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3F1	To what extent does the alternative use Intelligent Transportation Systems (ITS) to address traffic safety?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3H1	To what extent does the alternative improve the safety of transporting farm equipment within Crook County?	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
3I1	To what extent does the project use traffic calming techniques to encourage appropriate use of roads?	1	0	0	0	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1
Goal 4: Multimodal Users: Provide a multimodal transportation system that permits the safe and efficient transport of people and goods through active modes, which may also provide a benefit in improved health and environment within the County.		8	12	14	10	6	15	7	12	8	8	11	1	2	0	1	1	1	1	1	1	10	10	10	9	8	8	8	8	10
4A1	To what extent does the alternative promote alternative modes, transit/dial-a-ride service, and rideshare/carpool programs?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2
4B1	To what extent does the project support the development of regional public transit opportunities?	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4C1	To what extent does the project promote an interconnected network of bicycle, pedestrian, and transit facilities throughout the County?	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
4D1	To what extent does the alternative consider bicycle or pedestrian facility needs for new roadways or roadway upgrades?	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2
4E1	To what extent does the alternative provide pedestrian and bicycle facilities within unincorporated communities?	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0
4F1	To what extent does the project improve connectivity between bicycle, pedestrian, transit, and vehicle routes?	0	0	1	1	0	2	1	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1
4G1	To what extent does the project connect to the Crook County Parks and Recreation Trail system plans and/or the City of Prineville pedestrian and bicycle system and plans?	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2
4H1	To what extent does the alternative promote pedestrian and bicycle connections to recreational and tourist destinations throughout the County?	0	0	0	0	0	1	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4I1	To what extent does the alternative support widening roadway shoulders for bicycle travel?	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2
4J1	To what extent does the alternative improve connectivity to the Prineville and/or Redmond airports?	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goal 5: Environment: Provide a transportation system that balances transportation services with the need to protect the environment.		1	1	1	1	0	0	-1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
5A1	To what extent does the alternative develop a multi-modal transportation system?	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2
5B1	To what extent does the alternative support acquiring only the minimum roadway widths necessary?	0	0	0			0	0	1	1	1	0	0	0	0							-1	-1	-1	-1	-1	-1	-1	-1	-1
5C1	To what extent does the alternative preserve soil, water, scenic, historic, and cultural resources?	0	0	0	0	0		-1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5D1	To what extent does the project comply with applicable state and federal noise, air, water, and land quality regulations?	1	1			0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

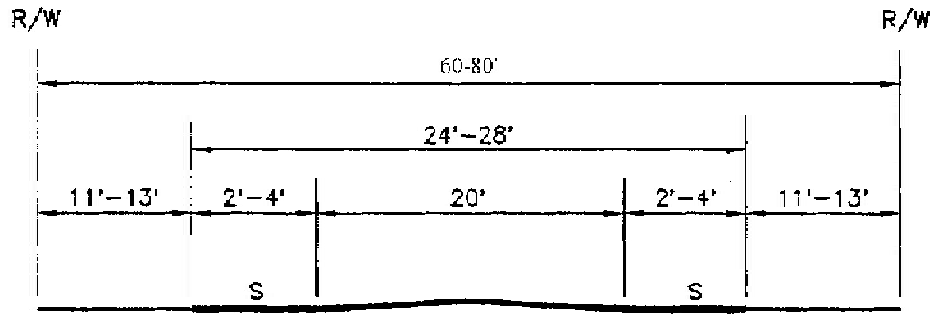
Goal 6: Planning and Funding: Maintain the safety, physical integrity, and function of the County's multi-modal transportation network, consistent with Goal 6 of the OTP.		3	3	3	2	2	3	1	4	3	3	4	0	0	0	1	1	1	1	1	1	3	3	2	2	2	1	1	2	2
6A1	To what extent does the alternative leverage innovative funding sources for transportation improvements?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6B1	To what extent does the alternative conserve and enhance the existing transportation network?	1	2	1	2	2	1	1	1	1	1	2	0	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1	1	1
6C1	To what extent does the alternative increase the life of a facility or delay the need for major capital improvements?	0	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6D1	To what extent does the project encourage coordination between Crook County, ODOT, and the City of Prineville?	2	1	2	0	0	2	0	1	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	1	1	1	0	0	1	1
Goal 7: Equity: Provide access to the transportation system for all users.		0	2	1	1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	4	4	4
7A1	To what extent does the alternative provide transportation mode choices for all users of the transportation system?	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2
7B1	To what extent does the project improve accessibility for those with sociodemographic characteristics that may make them less like to rely on personal motor vehicles, particularly the elderly?	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
7C1	To what extent does the alternative minimize impacts to low income or minority populations?	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
TOTAL SCORE		23	26	27	22	17	30	17	29	20	21	23	8	8	5	1	1	1	1	1	1	1	30	29	28	27	27	25	25	28	28	
Recommended Priority		Vision	Medium	Medium	Low	Medium	High	Low	High	Low	Medium	Medium	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	High	High	Low	Medium	High	High	Medium	High	Medium	

		PB-10	PB-11A	PB-11B	PB-12	PB-13	PB-14	PB-15	PB-16	PB-17	PB-18	PB-19	PB-20	PB-21	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12	S-13	F-1	F-2	F-3
Evaluation Measures		Add shoulders to Juniper Canyon Road (south)	Add shoulders to OR 27	Add multiuse path parallel to OR 27	OR 27 south shoulder feasibility study	Add shoulders to Lamonta Road	Add shoulders to US 26 (Madras Highway)	Add multiuse path to Riggs Road SW	Powell Butte lighting	Powell Butte pedestrian beacon	Bicycle support hub	Bicycle signage	Bandit Springs rest area	Barnes Butte multi-use trail connection	Variable speed limit based on weather conditions on Juniper Canyon Road	Alignment delineation on Juniper Canyon Road	Alignment delineation and edgeline striping on Davis Road	Add signage and markings to horizontal curves on Juniper Canyon Road	Add pavement markings to horizontal curves on Davis Loop Road at SE Manning Road and SE Olsen Ln and add sign prior to horizontal curve with Manning Road (traveling southbound)	Add pavement markings to horizontal curves on Powell Butte Road	Remove trees near the road on Davis Loop Road	Traffic Calming/Speed Reductions in Powell Butte (OR 126)	Speed feedback signs on Crooked River Highway through River Canyon Recreational Area	US 26 systemic safety treatments	Add horizontal curve signage, speed feedback sign, and delineators at bend on Lamonta Road	Shumway Road intersection signage	Systemic safety treatments on OR 126	Reconstruct Bus Evans to freight route standards	Reconstruct Elliott Lane to freight route standards	Reconstruct US 26 railroad bridge
Goal 1: Mobility and Connectivity: Promote a transportation system that links rural communities to key destinations in the County, Prineville, and adjacent Counties, and serves existing and future needs for transporting goods and people throughout.		1	2	1	2	1	2	1	2	4	0	0	2	5	1	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2
1A1	To what extent does the project provide connectivity to future development areas?	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1B1	To what extent does the project improve regional connections?	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
1B2	To what extend does the project improve local access?	1	1	1	1	1	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
1C1	If the project is located with an unincorporated community, to what extent does it balance local community goals with state highways within the community?	0	0	0	0	0	0	0	2	2	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
1D1	To what extent does the project improve transit service or connections to transit service within Crook County?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1E1	To what extent does the project provide ADA facilities?	0	0	0	0	0	0	0	0	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goal 2: Economic Development: Plan a transportation system that supports existing industry and encourages economic development in the County.		4	5	5	5	4	4	4	1	1	6	5	4	4	0	0	0	0	0	0	0	1	0	2	0	0	2	5	5	7
2A1	To what extent does the project support existing industrial, data storage, agricultural, and tourism industry?	1	1	1	1	1	1	1	0	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
2A2	To what extent does the project support economic diversification in the future?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2B1	To what extent does the project promote railroad freight service?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
2C1	To what extent does the project improve or maintain OR 26, OR 126, George Millican Road, or other freight routes throughout the County?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	2	0	2
2D1	To what extent does the alternative integrate Crook County's industrial areas with the transportation system?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2E1	To what extent does the alternative develop connections to or promote access to major recreational locations, destinations, and key services in the County?	1	2	2	2	1	1	1	1	1	2	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
2F1	To what extent does the project improve recreational bicycle routes in Crook County?	2	2	2	2	2	2	2	0	0	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goal 3: Safety: Provide a transportation system that promotes the safety of current and future travel modes for all users.		6	6	6	6	6	6	6	3	3	2	5	1	4	4	4	4	4	4	4	2	4	4	4	3	3	4	5	5	3
3A1	To what extent does the alternative provide safety and operational improvements for bicyclists?	2	2	2	2	2	2	2	1	1	2	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
3B1	To what extent does the alternative improve the transportation facility to meet or comply with standards?	2	2	2	2	2	2	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1
3C1	To what extent does the alternative reduce the estimated frequency of fatal and serious injury crashes?	2	2	2	2	2	2	2	2	2	0	2	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0
3D1	To what extent does the alternative improve emergency vehicle access?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
3E1	To what extent does the alternative improve safety at or near the intersection of a roadway and railroad?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3F1	To what extent does the alternative use Intelligent Transportation Systems (ITS) to address traffic safety?	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
3H1	To what extent does the alternative improve the safety of transporting farm equipment within Crook County?	1	1	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	0	1	1	1	1	1
3I1	To what extent does the project use traffic calming techniques to encourage appropriate use of roads?	-1	-1	0	-1	-1	-1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	2	1	1	1	0	1	0	0	0
Goal 4: Multimodal Users: Provide a multimodal transportation system that permits the safe and efficient transport of people and goods through active modes, which may also provide a benefit in improved health and environment within the County.		9	10	10	10	10	10	9	5	7	5	6	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4A1	To what extent does the alternative promote alternative modes, transit/dial-a-ride service, and rideshare/carpool programs?	2	2	2	2	2	2	2	0	1	1	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4B1	To what extent does the project support the development of regional public transit opportunities?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4C1	To what extent does the project promote an interconnected network of bicycle, pedestrian, and transit facilities throughout the County?	1	1	1	1	1	1	1	1	1	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4D1	To what extent does the alternative consider bicycle or pedestrian facility needs for new roadways or roadway upgrades?	2	2	2	2	2	2	2	1	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4E1	To what extent does the alternative provide pedestrian and bicycle facilities within unincorporated communities?	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4F1	To what extent does the project improve connectivity between bicycle, pedestrian, transit, and vehicle routes?	1	1	1	1	1	1	1	1	1	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4G1	To what extent does the project connect to the Crook County Parks and Recreation Trail system plans and/or the City of Prineville pedestrian and bicycle system and plans?	1	2	2	2	2	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4H1	To what extent does the alternative promote pedestrian and bicycle connections to recreational and tourist destinations throughout the County?	0	0	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4I1	To what extent does the alternative support widening roadway shoulders for bicycle travel?	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4J1	To what extent does the alternative improve connectivity to the Prineville and/or Redmond airports?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goal 5: Environment: Provide a transportation system that balances transportation services with the need to protect the environment.		1	1	3	1	1	1	3	2	2	2	2	2	2	0	0	0	0	0	0	-1	0	0	0	0	0	0	1	1	1
5A1	To what extent does the alternative develop a multi-modal transportation system?	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
5B1	To what extent does the alternative support acquiring only the minimum roadway widths necessary?	-1	-1	1	-1	-1	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5C1	To what extent does the alternative preserve soil, water, scenic, historic, and cultural resources?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0
5D1	To what extent does the project comply with applicable state and federal noise, air, water, and land quality regulations?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

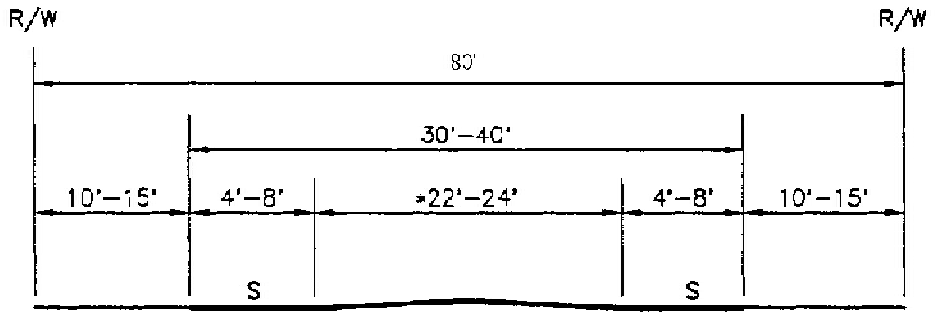
Goal 6: Planning and Funding: Maintain the safety, physical integrity, and function of the County's multi-modal transportation network, consistent with Goal 6 of the OTP.		1	3	3	3	2	3	1	2	2	4	2	2	3	0	0	0	0	0	0	0	0	2	2	2	0	0	2	3	3	4
6A1	To what extent does the alternative leverage innovative funding sources for transportation improvements?	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6B1	To what extent does the alternative conserve and enhance the existing transportation network?	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
6C1	To what extent does the alternative increase the life of a facility or delay the need for major capital improvements?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
6D1	To what extent does the project encourage coordination between Crook County, ODOT, and the City of Prineville?	0	2	2	2	1	2	0	2	2	2	2	0	2	0	0	0	0	0	0	0	0	2	2	2	0	0	2	0	0	2
Goal 7: Equity: Provide access to the transportation system for all users.		4	4	4	4	4	4	4	5	5	4	4	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7A1	To what extent does the alternative provide transportation mode choices for all users of the transportation system?	2	2	2	2	2	2	2	2	2	2	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7B1	To what extent does the project improve accessibility for those with sociodemographic characteristics that may make them less like to rely on personal motor vehicles, particularly the elderly?	1	1	1	1	1	1	1	2	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7C1	To what extent does the alternative minimize impacts to low income or minority populations?	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL SCORE		26	31	32	31	28	30	28	20	24	23	24	17	31	5	4	4	4	4	4	1	9	6	8	3	3	8	16	16	18			
Recommended Priority		Low	High	High	High	Medium	Medium	Low	Low	High	Medium	Medium	Low	Medium	High	High	High	Medium	Medium	Medium	Low	Medium	Low	Medium	Medium	Low	Medium	High	High	Medium			

ATTACHMENT C - CURRENT ROADWAY DESIGN STANDARDS

A. LOCAL STREET

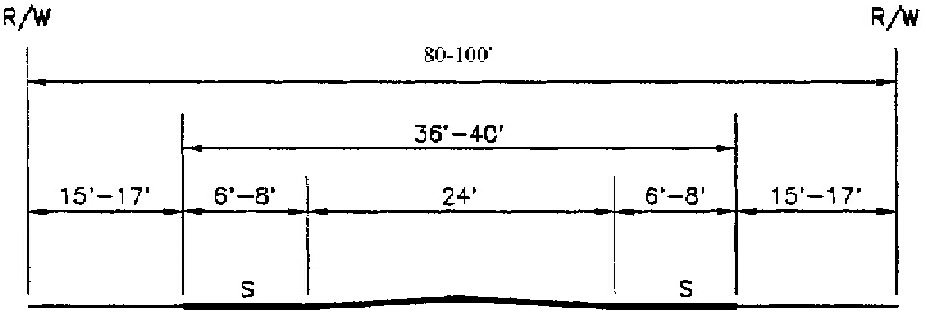


B. COLLECTOR



*Major Collector: 12' Travel Lanes
Minor Collector: 11' Travel Lanes

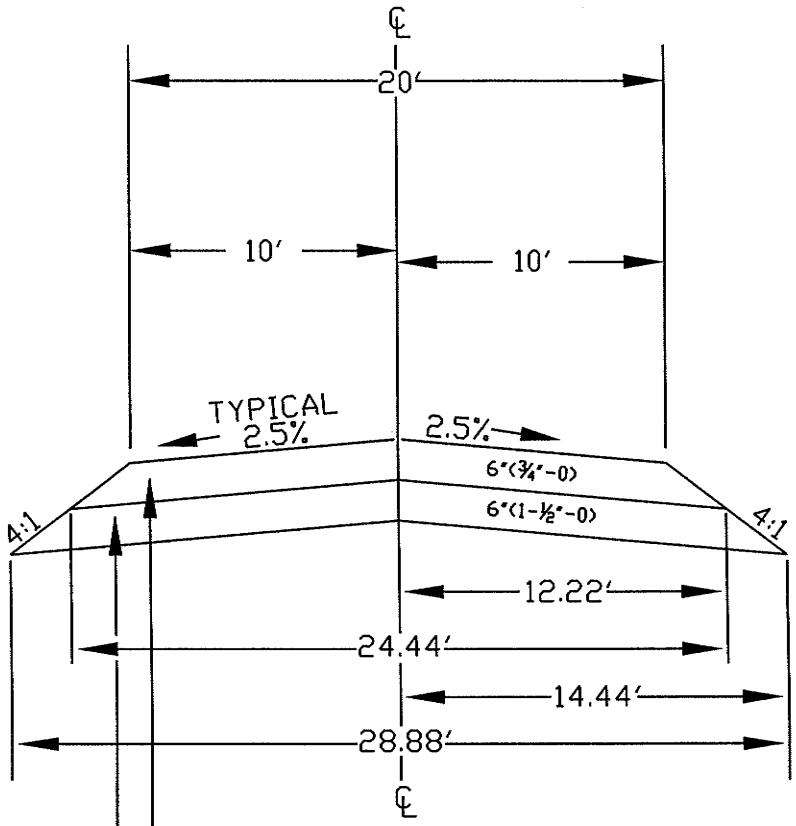
C. ARTERIAL



LEGEND

R/W = RIGHT-OF-WAY LINE
S = SHOULDER

ROADS WITH 0-20 PADT SHALL BE BUILT
ACCORDING TO THE FOLLOWING STANDARD:



-NOT TO SCALE-

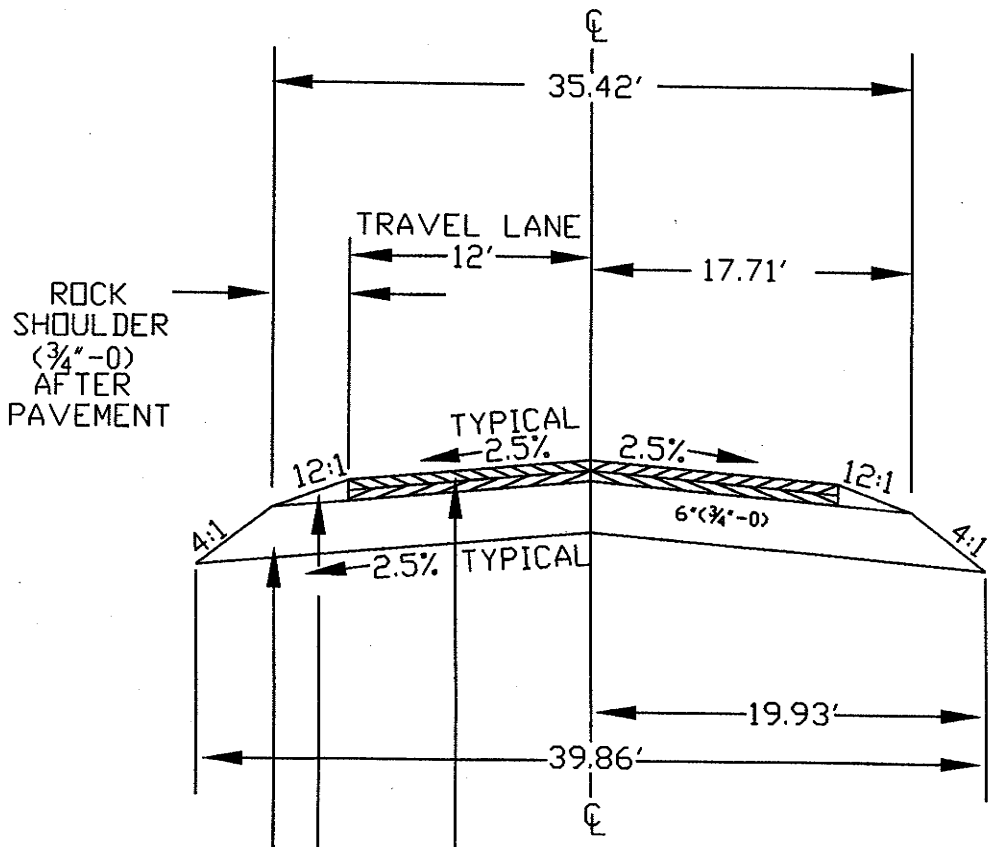
6" COMPACTED DEPTH BASE AGGREGATE
(¾"-0) O.D.O.T. SPECIFICATIONS

6" COMPACTED DEPTH BASE AGGREGATE
(1-½"-0) O.D.O.T. SPECIFICATIONS

DESIGN NOTES:

1. ROCK AND COMPACTION SHALL CONFORM TO OREGON DEPARTMENT OF TRANSPORTATION (O.D.O.T.) SPECIFICATIONS.
2. SHOULDER ROCK FILLET RADIUS AT INTERSECTIONS SHALL BE 15 FEET.
3. DRIVEWAY CULVERTS SHALL BE 18" DIAMETER CORRUGATED METAL PIPE 30 FEET MINIMUM LENGTH UNLESS OTHERWISE APPROVED IN WRITING BY THE CROOK COUNTY ROAD MASTER.
4. ALL CONSTRUCTION SHALL BE SUBJECT TO CROOK COUNTY ROAD MASTER INSPECTION AND APPROVAL.

ROADS WITH 21-99 PADT SHALL BE BUILT
ACCORDING TO THE FOLLOWING STANDARD:



-NOT TO SCALE-

TOTAL - 4" COMPACTED DEPTH ASPHALT CONCRETE PAVEMENT
O.D.O.T. MODIFIED LEVEL 2 HMAC (1/2" MAXIMUM ROCK SIZE) WITH PG BINDER 64-28 BOTH COURSES
INITIAL - CONSTRUCT 2" COMPACTED DEPTH MODIFIED LEVEL 2 HMAC
FINAL - AFTER ONE YEAR OR AT BUILD OUT CONSTRUCT 2" COMPACTED DEPTH MODIFIED LEVEL 2 HMAC

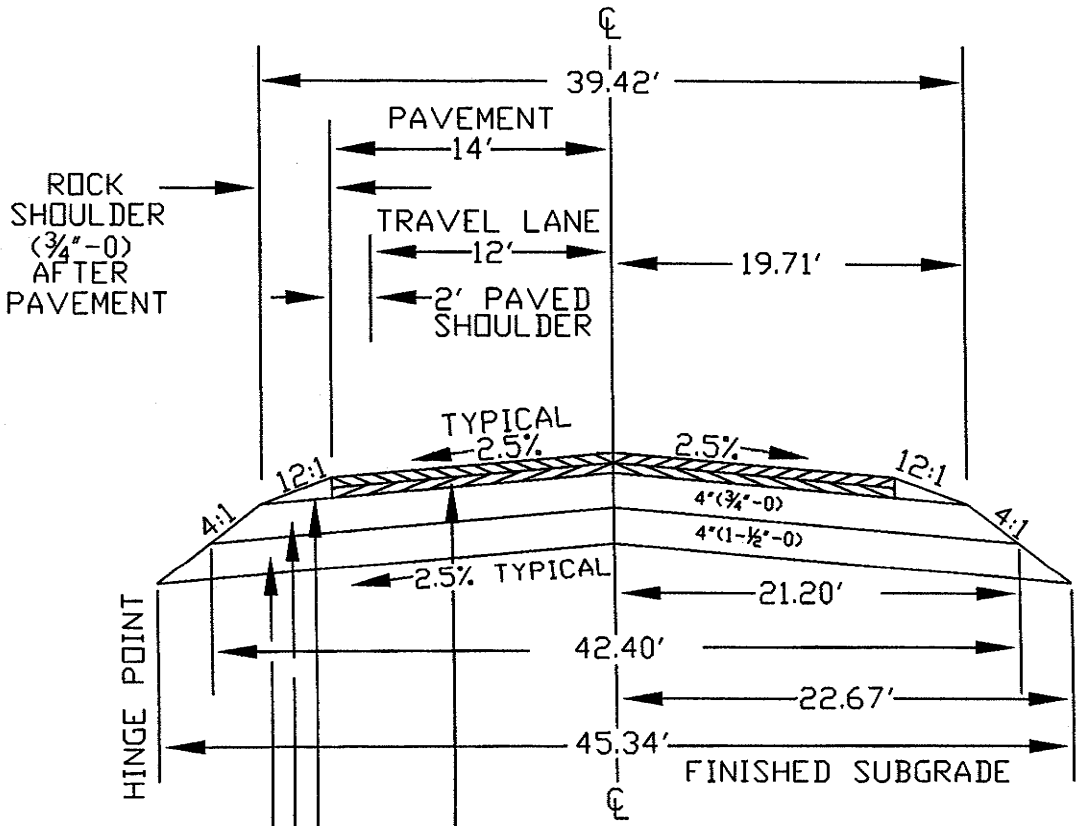
SHOULDER ROCK
(¾"-0) AFTER INITIAL PAVEMENT
RESHAPE SHOULDER FOLLOWING FINAL PAVEMENT

6" COMPACTED DEPTH BASE AGGREGATE
(¾"-0) O.D.O.T. SPECIFICATIONS

DESIGN NOTES:

1. ROCK AND COMPACTION SHALL CONFORM TO OREGON DEPARTMENT OF TRANSPORTATION (O.D.O.T.) SPECIFICATIONS.
2. PAVEMENT FILLET RADIUS AT INTERSECTIONS SHALL BE 20 FEET OR GREATER UNLESS APPROVED BY CROOK COUNTY ROAD MASTER.
3. ALL PHASES OF ROAD CONSTRUCTION SHALL BE COORDINATED WITH ROAD MASTER FOR INSPECTION AND APPROVAL.

COUNTY ROAD – STANDARD
ROADS 100 PADT OR GREATER
TYPICAL SUBGRADE
TYPICAL BASE AND PAVEMENT



-NOT TO SCALE-

TOTAL-4" COMPACTED DEPTH ASPHALT CONCRETE PAVEMENT
O.D.O.T. MODIFIED LEVEL 2 HMAC (1/2" MAXIMUM ROCK SIZE)WITH PG BINDER 64-28
INITIAL - CONSTRUCT-2" COMPACTED DEPTH MODIFIED LEVEL 2 HMAC AFTER ONE YEAR OR BUILD OUT
FINAL - CONSTRUCT 2" COMPACTED DEPTH MODIFIED LEVEL 2 HMAC

SHOULDER ROCK - (¾"-0) CONSTRUCT AFTER INITIAL PAVEMENT - RESHAPE SHOULDER FOLLOWING FINAL PAVEMENT

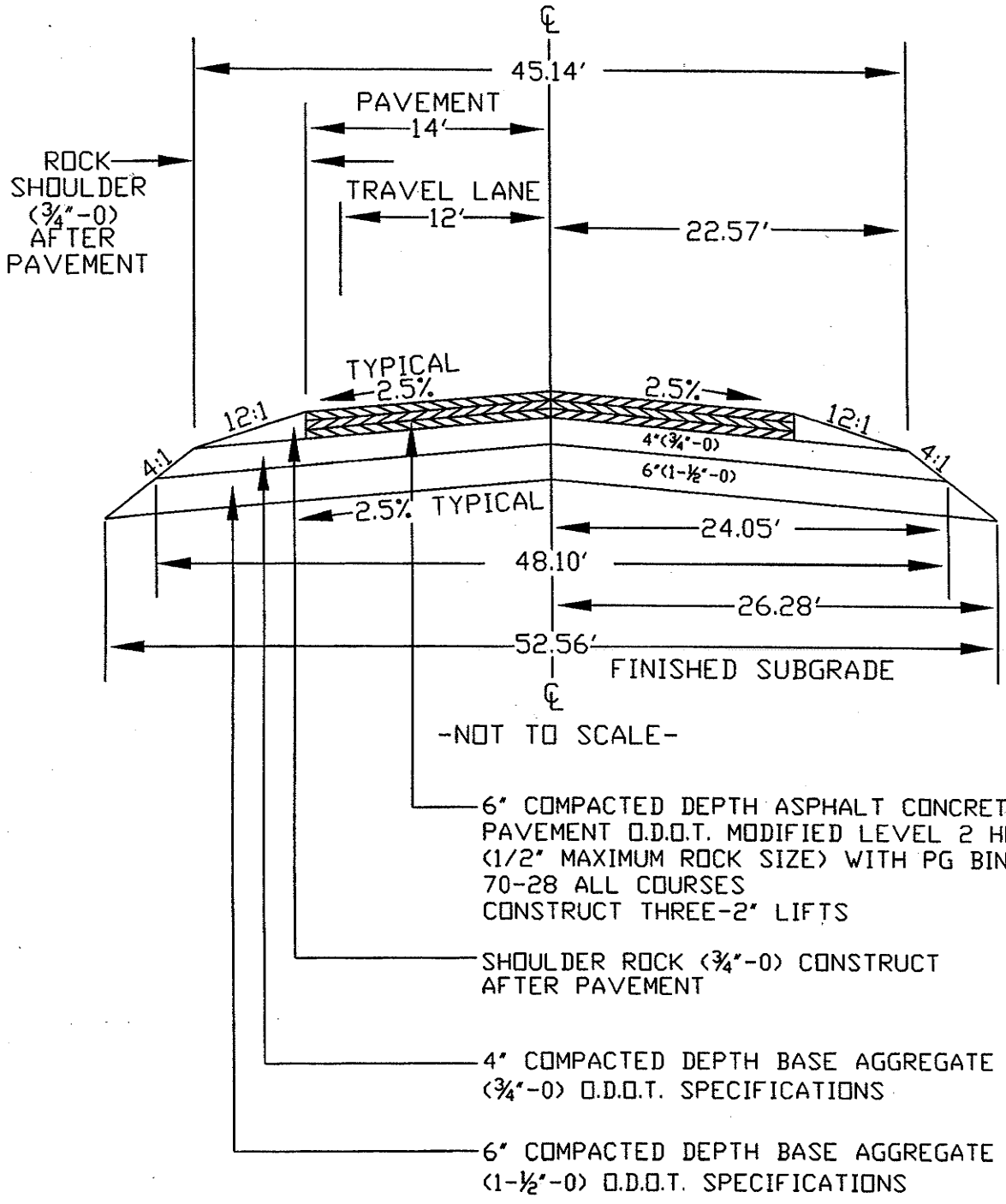
4" COMPACTED DEPTH BASE AGGREGATE (¾"-0) O.D.O.T. SPECIFICATIONS

4" COMPACTED DEPTH BASE AGGREGATE (1-½"-0) O.D.O.T. SPECIFICATIONS

DESIGN NOTES:

1. ROCK AND COMPACTION SHALL CONFORM TO OREGON DEPARTMENT OF TRANSPORTATION (O.D.O.T.) SPECIFICATIONS.
2. PAVEMENT FILLET RADIUS AT INTERSECTIONS SHALL BE 30 FEET OR GREATER UNLESS APPROVED BY CROOK COUNTY ROAD MASTER.
3. TURN LANE WIDTH FOR INTERSECTION DESIGN SHALL BE 14 FEET.
4. ALL PHASES OF ROAD CONSTRUCTION SHALL BE COORDINATED WITH ROAD MASTER FOR INSPECTION AND APPROVAL.

COUNTY ROAD – INDUSTRIAL
TRUCK ROUTE

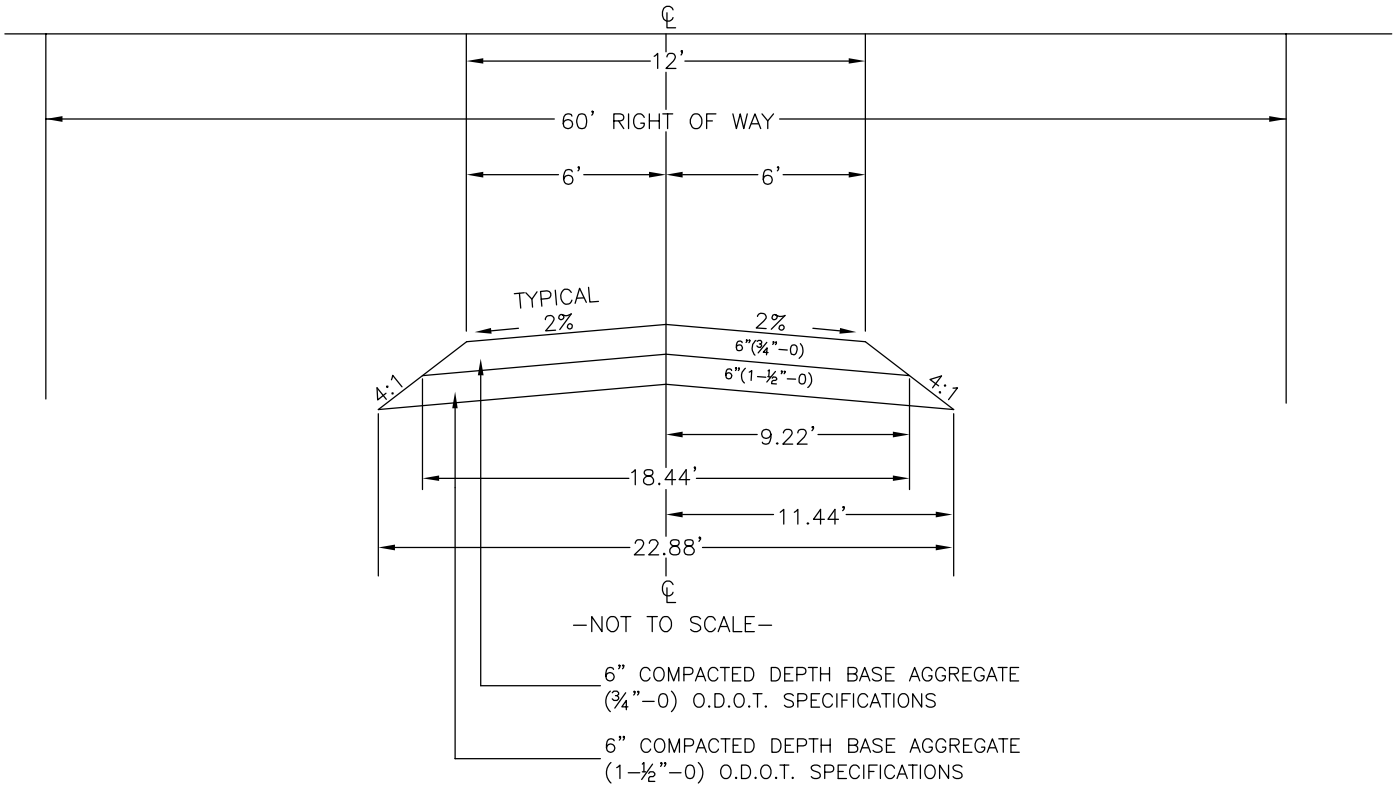


DESIGN NOTES:

1. ROCK AND COMPACTION SHALL CONFORM TO OREGON DEPARTMENT OF TRANSPORTATION (O.D.O.T.) SPECIFICATIONS.
2. PAVEMENT FILLET RADIUS AT INTERSECTIONS SHALL BE 50 FEET OR GREATER UNLESS APPROVED BY CROOK COUNTY ROAD MASTER.
3. TURN LANE WIDTH FOR INTERSECTION DESIGN SHALL BE 14 FEET.
4. ALL PHASES OF ROAD CONSTRUCTION SHALL BE COORDINATED WITH ROAD MASTER FOR INSPECTION AND APPROVAL.

ATTACHMENT D – PROPOSED ROADWAY DESIGN STANDARDS

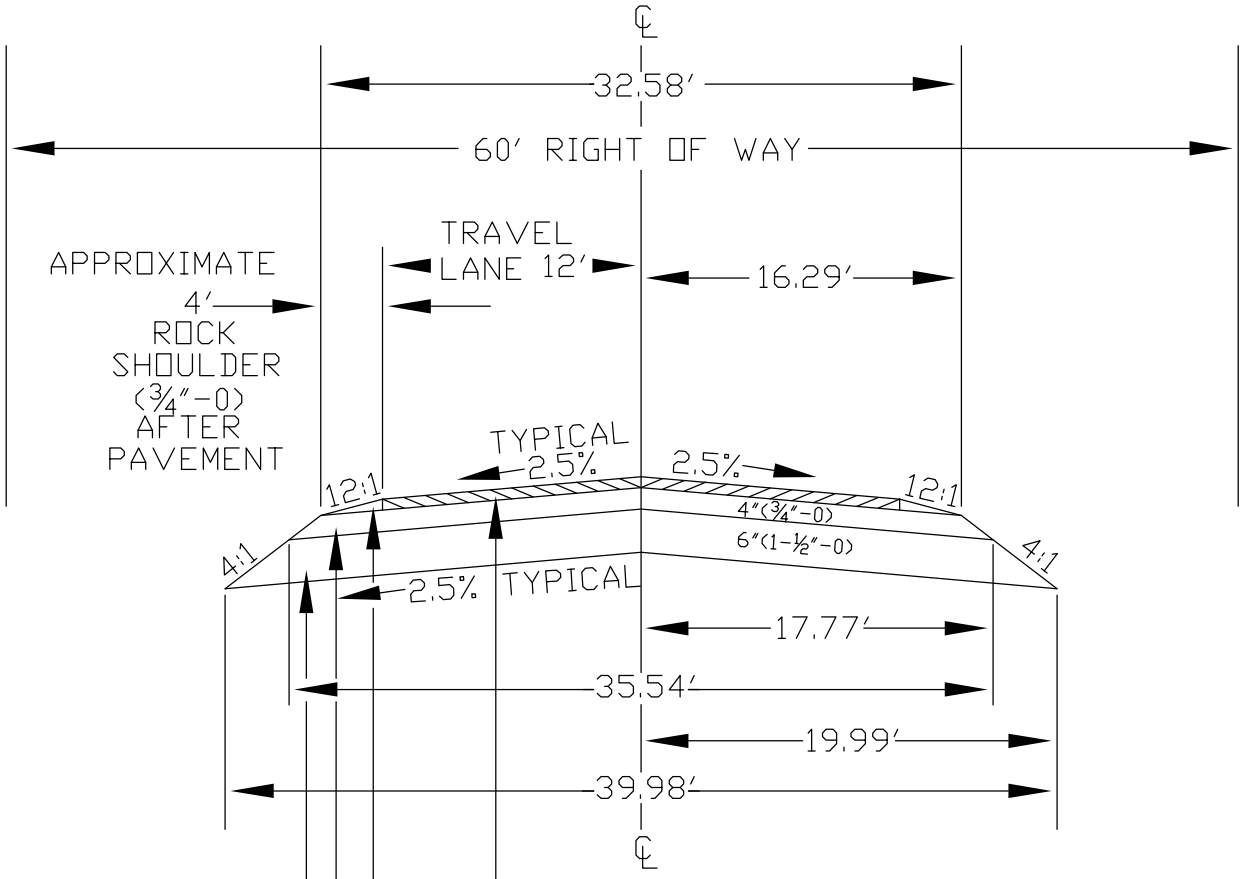
ROADS WITH 0–20 FUTURE ADT SHALL BE BUILT
ACCORDING TO THE FOLLOWING STANDARD:



DESIGN NOTES:

1. ROCK AND COMPACTION SHALL CONFORM TO OREGON DEPARTMENT OF TRANSPORTATION (O.D.O.T.) SPECIFICATIONS.
2. SHOULDER ROCK FILLET RADIUS AT INTERSECTIONS SHALL BE 15 FEET.
3. DRIVEWAY CULVERTS SHALL BE 18" DIAMETER CORRUGATED METAL PIPE 30 FEET MINIMUM LENGTH UNLESS OTHERWISE APPROVED IN WRITING BY THE CROOK COUNTY ROAD MASTER.
4. ALL CONSTRUCTION SHALL BE SUBJECT TO CROOK COUNTY ROAD MASTER FOR INSPECTION AND APPROVAL.
5. TURNOUTS: DRIVEWAYS IN EXCESS OF 200 FEET SHALL REQUIRE A TOTAL WIDTH OF 20'x40' (ADDITIONAL 8' OF WIDTH TO THE EXISTING 12') 25' TAPERS. TURNOUTS WILL BE PROVIDED AT 800 FEET MAXIMUM SPACING OR AT DISTANCES WHICH ENSURE CONTINUOUS VISUAL CONTACT BETWEEN TURNOUTS.

ROADS WITH 21-99 FUTURE ADT SHALL BE BUILT ACCORDING TO THE FOLLOWING STANDARD:



TOTAL-3" COMPACTED DEPTH ASPHALT CONCRETE PAVEMENT
O.D.O.T. STANDARD LEVEL 2 HMAC
INITIAL-CONSTRUCT 2" COMPACTED DEPTH LEVEL 2 HMAC
FINAL-AFTER ONE YEAR OR AT BUILD OUT CONSTRUCT 1" COMPACTED DEPTH MODIFIED LEVEL 2 HMAC (½" MAXIMUM ROCK SIZE)

SHOULDER ROCK
(¾"-0) AFTER INITIAL PAVEMENT RESHAPE SHOULDER FOLLOWING FINAL PAVEMENT

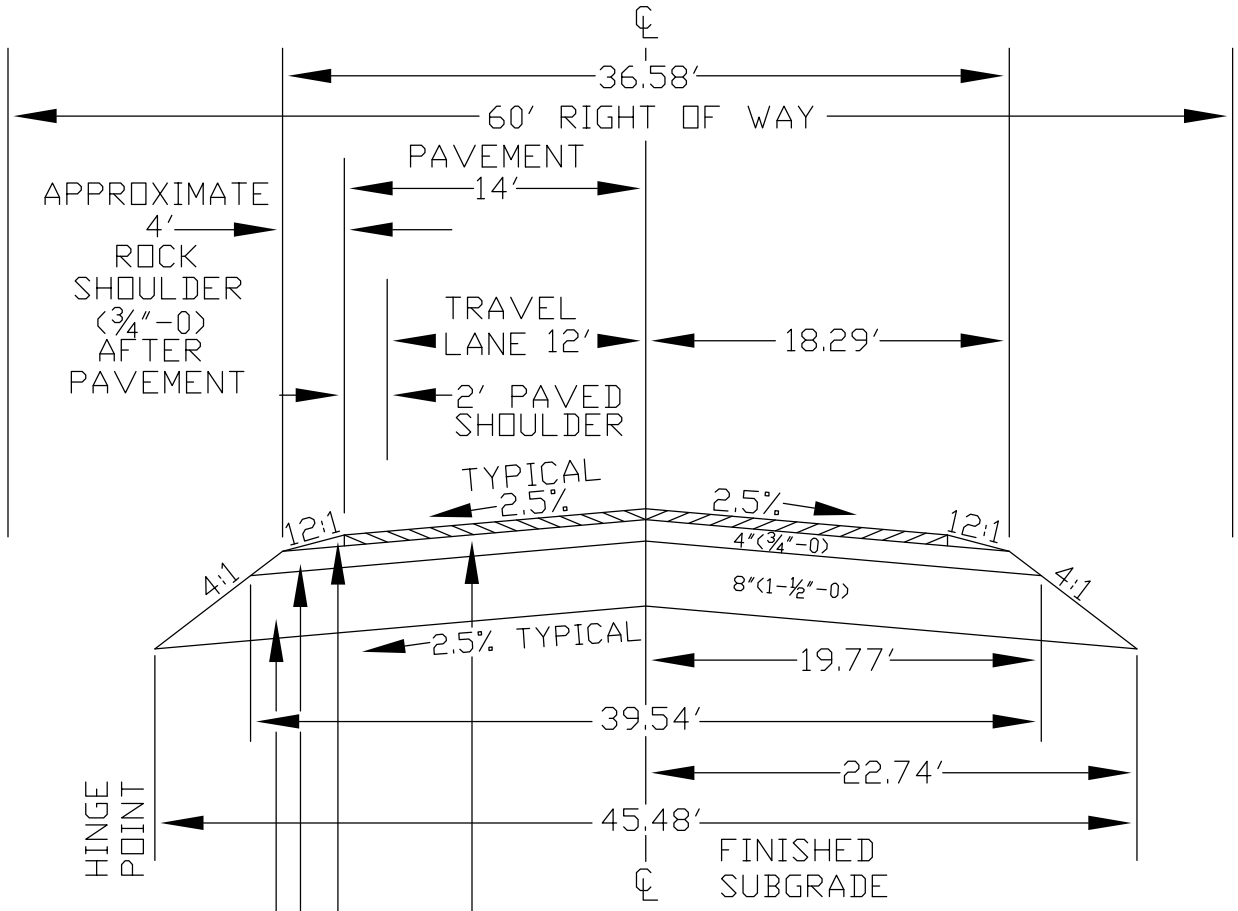
4" COMPACTED DEPTH BASE AGGREGATE
(¾"-0) O.D.O.T. SPECIFICATIONS

6" COMPACTED DEPTH BASE AGGREGATE
(1-½"-0) O.D.O.T. SPECIFICATIONS

DESIGN NOTES:

1. ROCK AND COMPACTION SHALL CONFORM TO OREGON DEPARTMENT OF TRANSPORTATION (O.D.O.T.) SPECIFICATIONS.
2. PAVEMENT FILLET RADIUS AT INTERSECTIONS SHALL BE 20 FEET OR GREATER UNLESS APPROVED BY CROOK COUNTY ROAD MASTER.
3. ALL PHASES OF ROAD CONSTRUCTION SHALL BE COORDINATED WITH ROAD MASTER FOR INSPECTION AND APPROVAL.

COUNTY ROAD – STANDARD
ROADS 100 FUTURE ADT OR GREATER
TYPICAL SUBGRADE
TYPICAL BASE AND PAVEMENT



TOTAL–3″ COMPACTED DEPTH ASPHALT CONCRETE PAVEMENT
O.D.O.T. STANDARD LEVEL 2 HMAC
INITIAL CONSTRUCT–2″ COMPACTED DEPTH LEVEL 2 HMAC
AFTER ONE YEAR OR BUILD OUT
FINAL–CONSTRUCT 1″ COMPACTED DEPTH MODIFIED LEVEL 2 HMAC (½″ MAXIMUM ROCK SIZE)

SHOULDER ROCK
(¾″–0) AFTER INITIAL PAVEMENT
RESHAPE SHOULDER FOLLOWING FINAL PAVEMENT

4″ COMPACTED DEPTH BASE AGGREGATE
(¾″–0) O.D.O.T. SPECIFICATIONS

8″ COMPACTED DEPTH BASE AGGREGATE
(1–½″–0) O.D.O.T. SPECIFICATIONS

DESIGN NOTES:

1. ROCK AND COMPACTION SHALL CONFORM TO OREGON DEPARTMENT OF TRANSPORTATION (O.D.O.T.) SPECIFICATIONS.
2. PAVEMENT FILLET RADIUS AT INTERSECTIONS SHALL BE 30 FEET OR GREATER UNLESS APPROVED BY CROOK COUNTY ROAD MASTER.
3. TURN LANE WIDTH FOR INTERSECTION DESIGN SHALL BE 14 FEET.
4. ALL PHASES OF ROAD CONSTRUCTION SHALL BE COORDINATED WITH ROAD MASTER FOR INSPECTION AND APPROVAL.

ATTACHMENT E – MEETING MINUTES FROM TAC/PAC MEETING #3

Meeting Overview

Crook County Transportation System Plan (TSP)

TAC/PAC Meeting #3

April 18, 2017: 3 p.m. - 5 p.m.

Participants

Devin Hearing	*ODOT Regional Planner and APM*	Jackson Lester	*Central Oregon Intergovernmental Council & Cascades East Transit*
Scott Smith	*City of Prineville Public Works Representative*	Ann Beier	*Crook County Assistant Planning Director*
Bob O'Neal	*Crook County Road Department Representative*	Ashleigh Ludwig	*Kittelson & Associates, Inc.*
Phil Steinbeck	*City of Prineville Planning Director*	Camilla Dartnell	*Kittelson & Associates, Inc.*

Project Overview and Meeting Objectives

Ashleigh gave a brief project overview, reviewed the project schedule, and stated the objectives for the meeting

- Schedule
    - Final TAC/PAC meeting and public openhouse this summer
    - Draft TSP to be completed this summer
    - Adoption through the summer/fall
    - Devin to amend contract for extension through October
- Meeting objectives
    - Confirm identified system alternatives
    - Identify other project alternatives
    - Prioritize system alternatives

Funding Overview

Ashleigh provided a brief overview of the revenue and expenditures for Crook County Transportation

- There is a several million dollar deficit between the revenue and expenses for Crook County Roads Department every year

- Finding new funding sources will be important to maintain normal operations/maintenance and pay wages
- Ann stated that the plan should be honest and explicit about the amount of funding that we have available
- Large scale maintenance projects are captured in the project alternatives list
    - KAI to distinguish between maintenance and capital projects
    - KAI to add a paragraph stating that maintenance projects should take priority

Alternatives

Camilla reminded the group about existing conditions for each transportation mode and walked the group through the alternatives list to gain feedback on the listed projects and their priorities.

- Roadway Alternatives
    - Camilla reminded the group that all study intersections and segments operate acceptably
    - Many of the projects in the roadway category were carried forward from the OR 126 Plan and the 2005 TSP
        - Carrying forward projects from the OR 126 Plan may help mitigate the transportation effects of potential unexpected growth, especially those associated with resort development
    - Alternative R-1: OR 126/Powell Butte Roundabout
        - Marked as medium priority
        - Bob informed the group that many of the crashes associated with this intersections are due to the Post Office access points right next to the intersection
            - The Post Office may expand due to new contract with Amazon
            - Scott informed the group that a few years ago there was talk of potentially moving the Post Office to a new location
            - Devin told the group that we needed to make decisions about this location based on the current built state, as we do not know about the timing or probability improvements or changes occurring to the post office
        - The group agreed to leave the priority at medium based on potential for resort growth to affect it and based on safety
    - Alternative R-2: Converting intersection at Williams Road and OR 126 to two offset T-intersections to help with access management
        - Scott Smith stated that he agreed that it should be kept at medium priority
        - Bob stated that he thought it should be reduced to low priority, as there is not a lot of traffic and not much room for new development at the intersection
    - Alternative R-5: Powell Butte highway realignment (from the 2005 TSP)
        - Scott informed the group that this was a personal priority of someone involved in the 2005 TSP project

        - The group agreed that it should be made a vision project
    - Alternative R-6: Davis Loop Road to OR 27 Connection
        - The group agreed that it should remain at high priority
        - A new commissioner ran on the platform that there would be additional access to Juniper Canyon
        - Leaving it at high priority will help the County secure funding for the connection
    - Alternatives R-11 and R-12- sight distance restriction at blind hill on Reservoir Road
        - The group agreed with the priorities assigned
    - Alternatives R-20 – R-25: Access closures to minor roads from OR 126
        - The group agreed that these should be reworded to say "address" instead of "close" access points
        - The group agreed with the assigned low priority
    - Alternative R-14- Left turn lane from Powell Butte onto Shumway Road
        - The group agreed that this needed to be rephrased as a complete "intersection improvement"
        - The intersection improvement should parallel the work that was done at the Alfalfa intersection
        - The group agreed that the priority should be changed to "medium"
    - Alternatives R-9 and R-10: Overlaying McKay Road and McKay Creek Road
        - Bob stated that the priority should be changed to "high"
        - Bob informed the group that overlaying from the gravel pit to Gerke Road is contracted and will be completed this fiscal year, and Gerke to Grimes should be completed by December
    - Alternative R-8: Overlaying OR 380
        - OR 380 is in poor condition, and it is patched every year
        - It serves Post, Paulina, and connects to Grant County
        - The group agreed that it should remain as high priority
    - Alternative R-13: Secondary access to airport
        - Will be funded by the City, County, and State, but City maintained
        - The group agreed that it is appropriate to leave it as N/A for priority
- Freight Alternatives
    - Alternative F-1:Bus Evans and Elliot Lane reconstruction
        - The group agreed that the reconstruction of Bus Evans and Elliott Lane is high priority
        - Scott informed us that this project should also include an intersection improvement at Bus Evans and OR 26, as it was a condition of the Freight Depot's location there
        - The city should be added as a funding source
    - Alternative F-2: US 26 railroad bridge feasibility study
        - Scott stated that the railroad bridge needs maintenance, and raising the bridge is probably more likely to be done than lowering the road
        - The city should be added as a funding source

        - The group agreed that this should be moved to high priority
- Safety Alternatives
    - Alternative S-1: Juniper Canyon Road variable speed limit signage
        - The group decided that this should include multiple signs, including speed feedback signs
        - Ann stated that we should commit to monitoring crash data after the signs are in place
        - Devin to get information about how variable speed limit signs have worked elsewhere
    - Alternatives S-2 and S-3: Raised pavement markers/rumble strips
        - Bob stated that raised pavement markers won't last because of snow removal and that he does not like rumble strips because they introduce new conflicts to drivers and are dangerous for bicycles and motorcycles
            - Recessed pavement markers may be okay
            - Bob agrees that site improvements may be good, just does not agree with raised markers/rumble strips
    - Alternatives S-10 and S-13: raised pavement markers/rumble strips on ODOT facilities
        - Bob stated that because those are not county roads, these are okay to keep as projects
        - It was pointed out that there are already rumble strips on sections of OR126 that are okay
    - Alternative S-8: Traffic calming/speed reduction in Powell Butte community on OR 126
        - Scott and Bob both acknowledged that research says otherwise, but neither think that narrowing lanes slows traffic
        - Both Scott and Bob were okay with adding the speed feedback signs
    - Alternative S-7: Tree removal on Davis Loop Road
        - Bob agreed that this is an issue, but he informed the group that most of the trees are on private property
            - He said that there are a lot of trees with low hanging limbs that are hit by trucks and blown into the road, but that he did not think they caused a sight distance issue
        - The group agreed that the priority could stay low
- Bicycle and Pedestrian Alternatives
    - Bob stated that he does not want to be legally obligated to add bicycle/pedestrian facilities every time there is a road overlay/repaving project
    - Ann stated that she thinks some of these projects should become vision projects, and reminded the group that they are not encouraging large development in the county outside of the city
    - Alternative PB-1: Barnes Butte Road paved shoulders
        - Bob stated that right-of-way would be very expensive for this route, and that vehicle traffic is low

        - Phil pointed out that the City of Prineville may one day extend out to Barnes Butte Road
    - OR 126 and US 26 (east of Prineville) are part of the transcontinental bike route, most ODOT bicycle funding is for bicycle commuters, not recreational riders
    - Jackson told the group to think about first and last mile connections for transit-providing safe crossings to Powell Butte and connecting residential areas to locations with transit is important
        - The group agreed that this is an important priority
        - We may need to provide crossings in Juniper Canyon
    - Bob stated that there is low vehicle traffic on his daily route from Stillman to Riggs Road
    - The group agreed that bicycle signage should still be a high priority
    - Alternatives PB- 16 and PB 17: lighting and a pedestrian beacon in Powell Butte
        - Ann has received comments from people asking for lighting
        - Both of these projects should be kept as high priority
- Transit Alternatives
    - Jackson explained what the cost estimates for each project includes
    - Jackson informed the group that there are companies and efforts trying to combine Transportation Network Company (TNC) elements to dial-a-ride efforts
    - Jackson asked that a bullet is added to help incorporate TNC elements into the transit service that exists in rural Crook County so that they may be able to take part in a pilot projects
    - There is a company out of Nebraska called Liberty that focuses on mobility for those in rural areas, and works like Uber
    - The group agreed that this is desirable for Crook County
    - Alternative T-4: Outreach
        - This was agreed upon to be very important
    - Jackson informed the group that CET gained money to add a mid-day community connector service trip for non-emergency medical rides
    - Devin reminded the group that transit is an important piece of serving the title VI community
    - It was stated that the transit route map from previous memos should be carried forward for this memo
- Bridges
    - Bob informed the group that the Powell Butte Highway Bridge projects (BR-3 and BR-4) need to be high priority, as they are both functionally obsolete and experience high-use, but that the other bridges have appropriate priorities
- Potential funding sources
    - This will be further discussed next time
    - Bob stated that he wanted to add to Table 16 in the Memo:
        - "Open the forest to logging federal timer contracts to give the roads department funds and prevent wildfires"

Next Steps

Ashleigh shared upcoming dates, reminded the group about the current schedule, and encouraged the group to turn in their completed packets

- Next meeting will be followed by an open house

Oregon Department of Transportation

Crook County TSP TAC/PAC Meeting #3 (April 18, 2017)
Sign-In Sheet

NAME	AGENCY/COMPANY	PHONE	EMAIL
Ann			
Brad Smith			
Bob			
Darin Hearing			
Jackson Lester			
PHIL STEINBECK			

6. FINDINGS MEMORANDUM

MEMORANDUM

Findings of Compliance

Crook County Transportation System Plan Update

DATE	August 29, 2017
TO	Ann Beier, Crook County Community Development
FROM	Darci Rudzinski, Angelo Planning Group
CC	Ashleigh Ludwig, Kittelson & Associates

OVERVIEW

A Planning Commission hearing is scheduled on September 27, 2017 to review the updated Crook County Transportation System Plan (TSP) and related amendments to the Crook County Code (CCC). Upon the Planning Commission's recommendation, the County Court will hold a hearing to adopt the updated TSP as an element of the County's Comprehensive Plan. Updates to the TSP are required to be in compliance with state policies and planning documents. This memorandum includes findings demonstrating that the updated TSP and related implementing code amendments are in compliance with the following:

- Statewide Planning Goals
- Oregon Transportation Plan
- Oregon Highway Plan
- OAR 660 Division 12 Transportation Planning Rule (TPR)
- OAR 734 Division 51 Highway Approaches, Access Control, Spacing Standards and Medians

ANGELO PLANNING GROUP
921 SW Washington Street, Suite 468
Portland, OR 97205
angeloplanning.com
p: 503.224.6974
f: 503.227.3679

FINDINGS OF COMPLIANCE

Statewide Land Use Goals

The County is proposing to adopt an update of the 2005 Crook County (TSP), thereby amending the state-acknowledged Crook County Comprehensive Plan. The following findings demonstrate that the adoption of the updated TSP (August 2017 Draft) is consistent with relevant Statewide Land Use Planning Goals.

Goal 1: Citizen Involvement
Goal 1 requires the development of a citizen involvement program that is widespread, allows two-way communication, provides for citizen involvement through all planning phases, and is understandable, responsive, and funded.

Response: The progress of Crook County TSP update was guided by a Technical Advisory Committee (TAC) and Public Advisory Committee (PAC). Membership consisted of 20 members who represented the interests and expertise of a number of County departments and agencies, as well as the City of Prineville, Prineville-Crook County Chamber of Commerce, Oregon Department of Transportation (ODOT), Central Oregon Intergovernmental Council, Cascades East Transit, and Economic Development of Central Oregon.

The TAC and PAC members were responsible for reviewing technical aspects of the TSP update, including all the technical memoranda, and providing input to represent various agencies, organizations, and community groups. Committee members met jointly four times during the course of the project. In addition to the established advisory committees, two public meetings were held at key junctures in the process. At these public open houses participants were asked to share their knowledge and concerns and comment on existing transportation conditions and future improvement projects, programs, pilot projects, policies, and priorities for the transportation system. County Planning Commission and County Court discussed the Draft TSP and related proposed implementation measures on July 12, 2017 at a joint work session that was open to the public; the Planning Commission had a work session to discuss possible County Code amendments to implement the updated TSP on August 9, 2017. The first public adoption hearing is scheduled before the Planning Commission on September 27, 2017; the County Court will subsequently hold a public hearing and consider the Planning Commission's recommendations.

Goal 2: Land Use Planning
This goal requires that a land use planning process and policy framework be established as a basis for all decisions and actions relating to the use of land. All local governments and state agencies involved in the land use action must coordinate with each other. City, county, state and federal agency and special districts plans and actions related to land use must be consistent with the comprehensive plans of cities and counties and regional plans adopted under Oregon Revised Statues (ORS) Chapter 268.

Response: Existing state, regional, and local plans, policies, standards, and laws relevant to the TSP were reviewed and evaluated to guide the development of the TSP (See Draft TSP Volume II, Technical Memorandum 1: Plans and Policies Review). Coordination between state, regional, and local agencies was accomplished through both the Project Management Team (PMT), which included key County staff members, and the TAC. Members of the TAC that provided guidance on

the development of the TSP included representatives from multiple agencies, which are listed below.

- Crook County Fire and Rescue
- Crook County Health Department
- City of Prineville Planning
- City of Prineville Public Works
- Prineville-Crook County Chamber of Commerce
- Central Oregon Intergovernmental Council & Cascades East Transit
- Economic Development of Central Oregon
- Department of Land Conservation and Development (DLCD)
- Oregon Department of Transportation (ODOT)

Goal 9: Economic Development

This goal requires that local comprehensive plans and policies contribute to a stable and healthy economy in all regions of the state.

Response: Goal 2 of the Draft TSP is Economic Development, the objectives for which help the County plan for a system that supports existing industry and encourages economic development. Objectives direct the County to prioritize improvements on the key freight routes of OR 26, OR 126, improve coordination with the private sector, and encourage recreational and bicycle tourism.

As detailed in the findings under Goal 10, the future conditions analysis supported the need to plan for a transportation system that supports economic development within the unincorporated area and provides connections to Prineville, Redmond, and the surrounding region

Evaluation criteria developed for the update provided a process to evaluate project alternatives relative to TSP goals and objectives in Section 2, including the Economic Development Goal. As a result, there are several key projects in the Draft TSP that will further the County's economic development goals. As shown in Table 3-3, Roadway Plan Elements, and Figure 3-2, Roadway Plan, proposed projects include those that improve existing roadways to enhance access to employment areas and/or improve freight movement. The majority of roadway projects propose design improvements to enhance safety, such as intersection improvements, turn lanes, and realignment to address sight distances. A proposed high priority project to overlay/repave OR 380, improves Paulina residents' commute to jobs in Prineville.

Goal 10: Housing

This goal requires that the County plans provide for the appropriate type, location and phasing of public facilities and services sufficient to support housing development in areas presently developed or undergoing development or redevelopment.

Response: The estimated future travel demand is based on population and employment forecasts in the year 2036, existing travel patterns, and existing and planned/funded transportation improvements. The TSP update project modeled travel demand patterns for the year 2036 to determine where system improvements were needed. The population projections estimate a 13.7 percent increase in total Crook County population between 2016 and 2040, or approximately 0.6

percent increase per year. Based on this growth rate, the estimated total population in Crook County for future year 2036 is 24,170. With this anticipated growth, the future conditions analysis concluded it will be important to provide opportunities to support economic development within the unincorporated area and support connections for County residents to Prineville, Redmond, and the surrounding region (TSP Volume II, Technical Memorandum 4: Future Conditions).

Proposed roadway projects that improve mobility and safety for County residents include constructing an additional connection from the rural residential area of Juniper Canyon to OR 27 (Table 3-3, Roadway Plan Elements). Widening Juniper Canyon Road from 27 ft to 38 ft from OR 380 to Davis Loop Road North to bring it up to future bicycle route standards (7-ft shoulders) is proposed in order to provide multimodal connectivity to the Juniper Canyon residential area, an area higher in population density than much of unincorporated Crook County (Table 6-4, Bicycle Plan Elements).

Two shoulder widening projects that benefit pedestrians and bicyclists traveling to and from residential areas just north of the Prineville city limits entail widening McKay Road from 32 ft to 36 ft and Lamonta Road[1] from 30 ft to 38 ft to bring them up to future bicycle route standards (7-ft shoulders) (see Table 5-2, Safety Plan Elements). In addition, the proposed Barnes Butte multiuse trail connection will provide connectivity from Barnes Butte and the residential area of Wainwright Road to the Prineville multimodal system, enabling bicycling and walking to the Barnes Butte Elementary School.

Pedestrian projects that serve to connect County residents in Powell Butte to services involve enhancements to the Williams Road/OR 126 intersection. Enhancing the existing pedestrian crossing at this location with the lighting and crossing elements summarized in Table 6-1 and shown in Exhibit 6-1 will improve the connection between a school and church on one side of the highway with the community store and gas station on the other side of OR 126.

Goal 11: Public Facilities and Services

Goal 11 requires cities and counties to plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development. The goal requires that urban and rural development be "guided and supported by types and levels of urban and rural public facilities and services appropriate for, but limited to, the needs and requirements of the urban, urbanizable and rural areas to be served."

Response: Transportation facilities, including roadways, bikeways, and sidewalks are considered a primary type of public facility that are managed by public agencies such as Crook County, the City of Prineville, and ODOT.

The Draft TSP reflects existing conditions and future needs for Crook County's transportation system (TSP Volume II, Technical Memorandum 3: Existing Conditions and Technical Memorandum 4:

[1] The proposed improvement on Lamonta Road will connect to connect to the future bicycle lanes planned for the City of Prineville.

Future Conditions). Proposed improvements and implementation measures have been tailored as the means to meet identified future needs while also conforming to County policies and the goals and objectives in Section 2.

The Draft TSP was guided by and developed to be consistent with current transportation goals and policies found in the Comprehensive Plan and other relevant regional and state goals and policies (TSP Volume II, Technical Memorandum 1: Plans and Policies Review).

Goal 12: Transportation

Goal 12 requires cities, counties, metropolitan planning organizations, and ODOT to provide and encourage a "safe, convenient and economic transportation system." This is accomplished through development of Transportation System Plans based on inventories of local, regional and state transportation needs. Goal 12 is implemented through OAR 660, Division 12, also known as the Transportation Planning Rule ("TPR"). The TPR contains numerous requirements governing transportation planning and project development. (See the "OAR 660, Division 12" section of this document for findings of compliance with the TPR.)

Response: The Draft TSP was guided by project goals and objectives that addressed: mobility and connectivity; economic development; safety; multimodal users; environment; planning and funding; and equity. Existing conditions and future transportation needs were analyzed with respect to these goals and objectives. The inventory and analysis of existing and future conditions identified opportunities to improve the transportation system, as documented in the tables and figures under each element of the plan (roadway, freight, safety, pedestrian and bicycle, transit, bridge). These needs were identified in the inventory, by advisory committee members and the public, and through capacity analysis based on projected future traffic volumes. Evaluation criteria, relative to the TSP goals and objectives, were used to evaluate improvement alternatives that could address identified needs. Alternatives were then presented to and refined during discussions with PAC/TAC members.

A major purpose of the Transportation Planning Rule ("TPR," OAR 660 Division 12 that implements Goal 12), is to promote coordination of land use and transportation planning. The updated TSP will be adopted as the transportation element of the County's Comprehensive Plan; TSP adoption will be accomplished through a legislative amendment to the adopted Comprehensive Plan. In addition, the County is proposing to adopt minor Crook County Code amendments to ensure consistency between adopted development requirements and the goals, objectives, and recommendations of the TSP (See Volume 2 Section 8: Implementing Ordinances Memorandum).

Oregon Transportation Plan

The Oregon Transportation Plan (OTP) is the state's long-range, multimodal transportation plan. The OTP is the overarching policy document for a series of modal and topic plans that together form the state transportation system plan (TSP). A local TSP must be consistent with applicable OTP goals and policies. Findings of compatibility will be part of the basis for TSP approval. The following findings demonstrate how the Draft TSP complies with State transportation policy.

POLICY 1.2 – Equity, Efficiency and Travel Choices
It is the policy of the State of Oregon to promote a transportation system with multiple travel choices that are easy to use, reliable, cost-effective and accessible to all potential users, including the transportation disadvantaged.

Response: The Draft TSP is a multi-modal plan and includes many proposed improvements that enhance mobility and safety for all system users – including those that chose not to drive or that are unable to drive. Provisions for street design can be found in Section 3, Roadway Design Standards. Crook County's roadway design standards are based on 20-year future average daily traffic volumes (ADT). Future ADT is used to ensure that roadways are built to accommodate forecasted traffic and will not become obsolete within a few years of construction.

The Pedestrian and Bicycle Plan presents the policies, programs, and projects planned to accommodate and support pedestrian and bicycle travel over the next 20 years. Plan elements were identified based on a review of the 2005 TSP elements, existing pedestrian and bicycle facilities, bicycle route demand data, the ODOT Region 4 Active Transportation Needs Inventory, and input from the advisory committee members and general public.

The Pedestrian and Bicycle Plan identifies improvements to the network of facilities that will improve safety and comfort for pedestrians and bicyclists. Lighting and pedestrian crossing enhancements on OR 126 within Powell Butte constitute the improvements to the pedestrian system (see Draft TSP Table 6-1). The proposed bicycle elements, which address the need to support recreational riders as well as provide connections to the City of Prineville to support commuter bicyclists, are primarily routes that are accommodated through widened shoulders or separated shared-use paths. Several identified elements are shared-use path projects intended to serve both bicyclists and pedestrians. (See Draft TSP Table 6-4 and Figure 6-1.)

The Transit Plan, summarized in Draft TSP Table 7-1, identifies policies, projects, and programmatic recommendations to address the need for serving the rural Crook County community and provide infrastructure to connect to transit stops.

In addition to these TSP elements that promote equity and travel choices, proposed minor amendments to the Crook County Municipal Code are designed to support the development of complete bicycle and pedestrian networks. Proposed amendments include modifications to zoning and subdivision requirements to ensure safe and efficient pedestrian access and circulation internal to a development site and requiring that bicycle parking be provided with new multi-family, commercial, or institutional development. (See Volume 2, Section 8: Implementing Ordinances.)

POLICY 2.1 - Capacity and Operational Efficiency
It is the policy of the State of Oregon to manage the transportation system to improve its capacity and operational efficiency for the long term benefit of people and goods movement.

POLICY 2.2 – Management of Assets
It is the policy of the State of Oregon to manage transportation assets to extend their life and reduce maintenance costs.

Response: The type, condition, and performance of facilities that provide transportation for people, goods, and services is documented in Technical Memorandum 3 – Existing Conditions, in Volume II

of the Draft TSP. Findings based on existing conditions identify existing needs and opportunities to improve the system based on project goals and objectives. Similarly, Technical Memorandum 4 – Future Conditions, also in Volume II, builds on existing conditions findings by anticipating future transportation system needs within the County through the year 2036.

Regulations and standards that are proposed to implement the TSP are designed to preserve and maintain the transportation network include access management Access Management Spacing Standards (Table 3-1). Access management standards for County roadways are based on functional classification and posted speed. These standards regulate vehicular access to County roadways and seek to balance mobility needs with access for auto-users. The access management standards for State facilities in Crook County are governed by OAR 734-051. State standards specific to highways in Crook County are presented in Technical Memorandum #1: Plan and Policy Review (provided in Volume II Technical).

The County currently has requirements for Transportation Impact Analyses (TIA) in the adopted TSP, a tool that can help ensure roadways continue to operate in a manner that is consistent with their identified planned function. Standards for TIAs currently exist in the 2005 TSP, which ensures that proposed amendments to County's plans or ordinances are evaluated for consistency with the TSP. TIA requirements are not included in the Draft TSP. The County is proposing to codify existing TIA requirements, with only minor amendments, in a new Title 18 Zoning chapter. As part of the County Zoning Code, TIA requirements will be clearly associated with approval criteria for proposed changes in zoning, as well as development proposals that may have impacts to the transportation system. The proposed refined regulatory text clarifies requirements and ensures that future development demands and the planned transportation system remain in balance (See Volume 2, Section 8: Implementing Ordinances Memorandum)

POLICY 3.1 – An Integrated and Efficient Freight System
It is the policy of the State of Oregon to promote an integrated, efficient and reliable freight system involving air, barges, pipelines, rail, ships and trucks to provide Oregon a competitive advantage by moving goods faster and more reliably to regional, national and international markets.

POLICY 3.2 – Moving People to Support Economic Vitality
It is the policy of the State of Oregon to develop an integrated system of transportation facilities, services and information so that intrastate, interstate and international travelers can travel easily for business and recreation.

Response: Figure 25 in Technical Memorandum #3: Existing Conditions Memorandum (Draft TSP Volume II) shows the two designated freight routes in the County, Highway 26 and Highway 126. The Freight Plan, Section 4 in the Draft TSP, presents projects that support the County freight system.

Table 4-1 presents the Freight Plan elements in the TSP and Figure 4-1 illustrates their location. The recommended freight plan elements include reconstructing Elliot Lane and Bus Evans to freight route standards. The upgrades would serve freight traffic accessing the freight depot as well as the oversized loads that must divert to avoid the height restrictions on US 26. In addition, a study is recommended to evaluate the feasibility and cost of reconstructing the railroad trestle or lowering US 26 to allow trucks and loads of all sizes to pass beneath the trestle.

POLICY 4.1 - Environmentally Responsible Transportation System
It is the policy of the State of Oregon to provide a transportation system that is environmentally responsible and encourages conservation and protection of natural resources.

Response: Improving the pedestrian and bicycle networks is generally considered to provide the greatest benefit for encouraging non-auto trips, thereby minimizing energy consumption and air quality impacts. The Draft TSP includes Pedestrian and Bicycle plan elements that enhance safety and efficiency for non-motorized traveling. (See Draft TSP Tables 6-1 and 6-4 and Figure 6-1).

Similarly, transit provides an alternative to automobile trips for trips longer than those normally taken on foot or by bicycle. As described in the response to OTP Policy 1.2, Draft TSP Table 7-1 identifies policies, projects, and programmatic recommendations for the Transit system.

POLICY 5.1 – Safety
It is the policy of the State of Oregon to continually improve the safety and security of all modes and transportation facilities for system users including operators, passengers, pedestrians, recipients of goods and services, and property owners.

Response: Transportation alternatives for the County were developed and evaluated to address transportation needs based on current and future forecast conditions, which included a review and analysis of 5-year crash history for all roadways in Crook County (see Table 12 and Figures 13 and 14 in Technical Memorandum #3: Existing Conditions Memorandum, Draft TSP Volume II). The TSP also evaluated transportation facilities using data from Strava, a website and mobile application that allows bicyclists to track their rides, and ODOT's Active Transportation Needs Inventory Analysis to help identify additional areas where safety improvements were necessary.

The Draft TSP identifies transportation improvement projects specific to safety; these can be found in Table 5-2, Safety Plan Elements, and in Figure 5-1, Safety Plan. Safety projects include signage, pavement markings, and safety treatments, such as rumble strips. In addition, many of the roadway, pedestrian, and bicycle improvement projects identified in other parts of the Draft TSP will improve safety along County roadways.

POLICY 7.1 – A Coordinated Transportation System
It is the policy of the State of Oregon to work collaboratively with other jurisdictions and agencies with the objective of removing barriers so the transportation system can function as one system.

Response: The County needs to coordinate with multiple agencies, including ODOT, the City of Prineville, and Cascades East Transit, regarding transportation system planning within the County. As a grant and project manager, ODOT staff has been involved in project management meetings as well as the public meetings addressed under Statewide Goal 1 in this report.

POLICY 7.3 – Public Involvement and Consultation
It is the policy of the State of Oregon to involve Oregonians to the fullest practical extent in transportation planning and implementation in order to deliver a transportation system that meets the diverse needs of the state.

POLICY 7.4 - Environmental Justice
It is the policy of the State of Oregon to provide all Oregonians, regardless of race, culture or income, equal access to transportation decision-making so all Oregonians may fairly share in benefits and burdens and enjoy the same degree of protection from disproportionate adverse impacts.

Response: The Draft TSP planning process included several opportunities for public involvement and input as described in detail in Draft TSP Chapter 1, Plan Development Process, and the findings for Statewide Goal 1 in this report. Information regarding the planning process was made available through the project's website as well as the County's website. Two public meetings were conducted at major milestones during the development of the TSP. An online interactive map where residents and stakeholders could provide comments on specific transportation facilities and areas of concern was provided on the project website was included to allow for additional feedback.

Oregon Highway Plan

The 1999 Oregon Highway Plan (OHP) establishes policies and investment strategies for Oregon's state highway system over a 20-year period and refines the goals and policies found in the OTP. Policies in the OHP emphasize the efficient management of the highway system to increase safety and to extend highway capacity, partnerships with other agencies and local governments, and the use of new techniques to improve road safety and capacity. These policies also link land use and transportation, set standards for highway performance and access management, and emphasize the relationship between state highways and local road, bicycle, pedestrian, transit, rail, and air systems. The Draft TSP meets the State policies as follows:

Policy 1A *(Highway Classification) defines the function of state highways to serve different types of traffic that should be incorporated into and specified through IAMPs.*

Policy 1C *(State Highway Freight System) states the need to balance the movement of goods and services with other uses.*

Response: The state facilities within the County provide district, statewide, and regional connectivity. Each facility is currently regulated according to a functional classification that established their primary function (moving people across the state, regions or providing access to local destinations) and their access management regulations (standards to minimize the number of access points onto highways to preserve capacity). Access management for State facilities is outlined in OAR 734-051, and spacing standards are dependent upon several variables, including average annual daily traffic (AADT) volumes, posted speed, and functional classification. The access management standards for State facilities in Crook County are presented in Technical Memorandum #1: Plan and Policy Review in Volume II of the TSP. OR 126 is classified by ODOT as a Statewide Highway, OR 26 Madras-Prineville is a Regional Highway, and OR 370, OR 27, and OR 380 are classified as a District Highways. Future development along these highways will be required to meet ODOT's highway access spacing standards (see Tables 3 and 4 in Technical Memorandum #1: Plan and Policy Review).

Policy 1B *(Land Use and Transportation) recognizes the need for coordination between state and local jurisdictions.*

Response: As has been described previously in this report, and particularly in response to Statewide

Goals 1 and 2, and OTP Policy 7.1, development of the TSP has involved close coordination between the County, ODOT and other affected stakeholders. In addition, proposed amendments regarding traffic impact studies and mitigation provide a connection between land use development decisions and managing and protecting the County's transportation system (see Volume 2, Section 8: Implementing Ordinances Memorandum).

***Policy 1F** (Highway Mobility Standards) sets mobility standards for ensuring a reliable and acceptable level of mobility on the highway system by identifying necessary improvements that would allow the interchange to function in a manner consistent with OHP mobility standards.*

Response: The Draft TSP analyzed traffic operations at study intersections and roadway segments to determine existing conditions and forecasted travel demand. The analyses were compared to County and ODOT performance standards to identify potential needs for improvement (see Technical Memorandum #3: Existing Conditions and Technical Memorandum #4: Future Conditions in Draft TSP Volume II).

Although the study roadways and intersections in Crook County are anticipated to operate within acceptable targets, several roadway needs identified in Future Conditions Memorandum are recommended in Draft TSP Table 3-3 Roadway Plan Elements. Recommended projects include a roundabout at Powell Butte Highway and OR 126, several access closures from local roadways on to OR 126, and intersection improvements at Williams Road and OR 126.

***Policy 1G** (Major Improvements) requires maintaining performance and improving safety by improving efficiency and management before adding capacity. ODOT works with regional and local governments to address highway performance and safety.*

Response: As summarized in the Roadway Plan of the Draft TSP, capacity projects are limited to those associated with potential growth related to future destination resort siting. County growth is largely dependent upon the development of several potential destination resorts. The OR 126 Corridor Plan addressed resort developments; the Draft TSP includes projects identified in the OR 126 Corridor Plan to accommodate the potential for higher growth associated with destination resorts. In addition, access management spacing standards included in the Roadway Plan improve the efficiency of the transportation system and mitigate the need for adding capacity.

***Policy 2B** (Off-System Improvements) helps local jurisdictions adopt land use and access management policies.*

Response: As noted in the response to Policy 1G, the TSP includes access management standards to manage access to the County road system and State highways to preserve capacity and maintain safety. To ensure that future development adheres to these standards, the County is proposing to amend Title 18 of the Crook County Code to include a new chapter that contains the access management standards proposed in Draft TSP Table 3-1. Access Management Spacing Standards for Crook County Roadways (see Volume 2, Section 8: Implementing Ordinances Memorandum).

***Policy 2F** (Traffic Safety) improves the safety of the highway system.*

Response: As described in the response to OTP Policy 5.1, the TSP update planning process included a review and analysis of 5-year crash history for all roadways in Crook County (see Table 12 and

Figures 13 and 14 in Technical Memorandum #3: Existing Conditions Memorandum, Draft TSP Volume II). The update process also evaluated transportation facilities using data from Strava and ODOT's Active Transportation Needs Inventory Analysis to help identify additional areas where safety improvements were necessary.

Specific safety projects are identified by the Draft TSP and can be found in Table 5-2, Safety Plan Elements, and in Figure 5-1, Safety Plan. Safety projects include signage, pavement markings, and safety treatments, such as rumble strips. In addition, many of the roadway, pedestrian, and bicycle improvement projects identified in other parts of the Draft TSP will improve safety along County roadways.

Policy 3A *(Classification and Spacing Standards) sets access spacing standards for driveways and approaches to the state highway system.*

Policy 3D *(Deviations) establishes general policies and procedures for deviations from adopted access management standards and policies.*

Response: As described in the response to Policy 2B of the OHP, the Draft TSP includes access management standards that maintain and enhance the integrity (i.e., capacity, safety, and level of service) of County roadways. Standards included in the Draft TSP refer to state access management standards for state facilities, consistent with the requirements of OAR 734-051. These standards apply to new development or redevelopment; existing accesses are allowed to remain if the land use does not change. The desired access spacing will gradually be obtained over time, increasing efficiency and safety, as redevelopment occurs.

The County is proposing to codify spacing standards, consistent with the Draft TSP (see Volume 2, Section 8: Implementing Ordinances). In addition, proposed amendments to the Crook County Code will allow for exceptions and adjustments to access spacing standards when certain conditions are met and through specific conditions of approval.

Policy 4A *(Efficiency of Freight Movement) It is the policy of the State of Oregon to maintain and improve the efficiency of freight movement on the state highway system and access to intermodal connections. The State shall seek to balance the needs of long distance and through freight movements with local transportation needs on highway facilities in both urban areas and rural communities.*

Response: Table 4-1 presents the Freight Plan elements in the TSP and Figure 4-1 illustrates their location. Project F-2 is a feasibility study regarding the reconstruction of the US 26 railroad bridge or lowering of US 26 to accommodate oversized loads on US 26. The recommendations of this feasibility study and ultimate improvements would allow trucks and loads of all sizes to pass beneath the trestle, thereby improving freight movement efficiency and capacity on this state facility.

Policy 4B *(Alternative Passenger Modes) It is the policy of the State of Oregon to advance and support alternative passenger transportation systems where travel demand, land use, and other factors indicate the potential for successful and effective development of alternative passenger modes.*

Response: The Draft TSP includes a Pedestrian and Bicycle Plan element that identifies projects to enhance the County's network of facilities for pedestrians and bicyclists.

The Pedestrian and Bicycle Plan presents the policies, programs, and projects planned to accommodate and support pedestrian and bicycle travel over the next 20 years. The high priority projects summarized in Table 6-1 are intended to improve safety and comfort for pedestrians at the crossing of OR 126 and Williams Road. The Draft TSP includes updated recommended paved shoulder width to better provide for cyclists and Table 6-4 includes specific paving projects that conform to these widths. Table 6-4 also proposes two multi-use paths to connect residents in Barnes Butte and the residential area of Wainwright Road and Powell Butte to the Prineville multimodal system. Transit Plan Elements described in Table 7-1 also meet State alternative passenger modes policy objectives through projects that would expand and enhance both fixed-route and dial-a-ride services and enhance the community's awareness of available transit connections.

Other Modal Plans

The State has a number of modal and topic plans that together form the State TSP. In addition to the OHP, which is the modal plan for the State's roadways, the following govern aspects of statewide planning for the transportation system: Oregon Transportation Safety Action Plan; Oregon Bicycle and Pedestrian Plan/ Bicycle and Pedestrian Design Guide; Oregon Public Transportation Plan; Oregon Freight Plan; Oregon State Rail Plan; and Oregon Aviation Plan.

Response: The Draft TSP includes the following modal plans: Roadway, Freight, Pedestrian and Bicycle, and Bridge. The County's modal plans were reviewed and updated to be consistent with State modal plans and to ensure that the relevant State policies and requirements are implemented through the planned local transportation system.

OAR 660 Division 12 Transportation Planning Rule (TPR)

The purpose of the Transportation Planning Rule (TPR) is "to implement Statewide Planning Goal 12 (Transportation) and promote the development of safe, convenient and economic transportation systems that are designed to reduce reliance on the automobile so that the air pollution, traffic and other livability problems faced by urban areas in other parts of the country might be avoided." A major purpose of the TPR is to promote more careful coordination of land use and transportation planning, to ensure that planned land uses are supported by and consistent with planned transportation facilities and improvements.

OAR 660 Division 12 Transportation Planning Rule (TPR)

The TPR contain policies for preparing and implementing a transportation system plan.

Response: The Draft TSP was informed by technical memoranda that document existing and future conditions and includes a roadway classification system and corresponding standards, recommended improvements by mode, and a general funding plan as required by Section -0020 of the TPR. The previously adopted TSP was acknowledged by the Department of Land Conservation and Development and found to be in compliance with the TPR. The 2017 TSP is an update of the acknowledged TSP.

Section -0045 of the TPR requires that local jurisdictions amend their land use regulations to implement the TSP. Elements of the Draft TSP are implemented in the requirements of the Crook County Code. The Code regulates land uses and development within the County and implements the

long-range vision of the Comprehensive Plan, of which the TSP is part. Proposed amendments to the Code are intended to protect the design and function of the transportation network by including or referencing access management and street design standards found in the updated TSP. Proposed amendments also include additional standards for allowing conditions to be applied when warranted by a traffic impact study. In addition, future amendments to the Code would be required to be consistent with the planned function, capacity, and performance standards for land use actions that significantly affect the transportation system, consistent with TPR -0060. (See Volume 2, Section 8: Implementing Ordinances Memorandum).

OAR 734, Division 51. Highway Approaches, Access Control, Spacing Standards, and Medians

OAR 734-051 governs the permitting, management, and standards of approaches to state highways to ensure safe and efficient operation of the state highways. OAR 734-051 policies address the following:

- How to bring existing and future approaches into compliance with access spacing standards, and ensure the safe and efficient operation of the highway;
- The purpose and components of an access management plan; and
- Requirements regarding mitigation, modification, and closure of existing approaches as part of project development.

Response: As described in the response to OHP Policies 3A and 3B, access management standards for state highways will be consistent with state access standards.

7. TRANSPORTATION PLANNING RULE (TPR) CHECKLIST

Transportation Planning Rule (TPR) Checklist

Crook County TSP Update

The following table provides an outline of the TPR provisions that are pertinent to implementation of the TSP through the development code. The outline includes the entire section on implementation (OAR 660-012-0045) and an abridged summary of the requirements of section -0060. The second column in the table provides space to note the location of relevant sections of the Crook County code, where applicable, or notes about the general applicability of each provision to the county. County comments are in plain font, responses by Angelo Planning Group (APG) are in *red italics*. The notes will inform the Draft Implementing Ordinances for implementing the Draft Updated TSP, as specified in Task 7.2 of the Crook County Transportation System Plan Update Work Order Contract.

TPR Requirement	Crook County Code Reference, Notes
OAR 660-012-0045	
(1) Each local government shall amend its land use regulations to implement the TSP.	
(a) The following transportation facilities, services and improvements need not be subject to land use regulations except as necessary to implement the TSP and, under ordinary circumstances do not have a significant impact on land use: (A) Operation, maintenance, and repair of existing transportation facilities identified in the TSP, such as road, bicycle, pedestrian, port, airport and rail facilities, and major regional pipelines and terminals; (B) Dedication of right-of-way, authorization of construction and the construction of facilities and improvements, where the improvements are consistent with clear and objective dimensional standards; (C) Uses permitted outright under ORS 215.213(1)(j) through (m)[1] and 215.283(1)(h) through (k)[2], consistent with the provisions of 660-012-0065[3]; and	Crook County has adopted the provisions of 215.283(1)(h) – (k) in each of the County's three EFU zones (18.16.010, 18.20.010 and 18.24.0100) to allow certain transportation facility development as outright permitted uses. These uses are also allowed as permitted uses in the County's forest zone (Chapter 18.28.020). Transportation facilities are not identified as permitted uses or conditional uses in the County's residential or commercial zones. (The code is silent on these activities on lands not zoned for farm or forest use). This is not addressed in Crook County's zoning code.

[1] (j) Climbing and passing lanes within the right of way existing as of July 1, 1987.
(k) Reconstruction or modification of public roads and highways, including the placement of utility facilities overhead and in the subsurface of public roads and highways along the public right of way, but not including the addition of travel lanes, where no removal or displacement of buildings would occur, or no new land parcels result.
(l) Temporary public road and highway detours that will be abandoned and restored to original condition or use at such time as no longer needed.
(m) Minor betterment of existing public road and highway related facilities, such as maintenance yards, weigh stations and rest areas, within right of way existing as of July 1, 1987, and contiguous public-owned property utilized to support the operation and maintenance of public roads and highways.

[2] (h) Climbing and passing lanes within the right of way existing as of July 1, 1987.
(i) Reconstruction or modification of public roads and highways, including the placement of utility facilities overhead and in the subsurface of public roads and highways along the public right of way, but not including the addition of travel lanes, where no removal or displacement of buildings would occur, or no new land parcels result.
(j) Temporary public road and highway detours that will be abandoned and restored to original condition or use at such time as no longer needed.
(k) Minor betterment of existing public road and highway related facilities such as maintenance yards, weigh stations and rest areas, within right of way existing as of July 1, 1987, and contiguous public-owned property utilized to support the operation and maintenance of public roads and highways.

TPR Requirement	Crook County Code Reference, Notes
(D) Changes in the frequency of transit, rail and airport services.	*Recommendation 1: Permit transportation facilities outright in all zones. Retain existing provisions in farm and forest zones (Chapters 18.16, 18.20, 18.24 and 18.28); draft new section in Chapter 18.124 Supplementary Provisions.*
(b) To the extent, if any, that a transportation facility, service, or improvement concerns the application of a comprehensive plan provision or land use regulation, it may be allowed without further land use review if it is permitted outright or if it is subject to standards that do not require interpretation or the exercise of factual, policy or legal judgment.	This is addressed for farm and forest lands in the County's EFU zones. *This will be addressed in code language related to Recommendation 1: Permit transportation facilities outright in all zones.*
(c) In the event that a transportation facility, service or improvement is determined to have a significant impact on land use or requires interpretation or the exercise of factual, policy or legal judgment, the local government shall provide a review and approval process that is consistent with 660-012-0050. To facilitate implementation of the TSP, each local government shall amend regulations to provide for consolidated review of land use decisions required to permit a transportation project.	This is not explicitly referenced in County code. However, provisions of 660-012 are applied when Goal 3 exceptions are required for new transportation facilities on EFU land. *Recommendation 2: Allow for consolidated review of applications. Draft new section in Chapter 18.172 Administration Provisions.*
(2) Local governments shall adopt land use or subdivision ordinance regulations, consistent with applicable federal and state requirements, to protect transportation facilities corridors and sites for their identified functions. Such regulations shall include:	Crook County Code Chapter 17 applies to subdivision developments. Road design standards are in Chapter 17.36
(a) Access control measures, for example, driveway and public road spacing, median control and signal spacing standards, which are consistent with the functional classification of roads and consistent with limiting development on rural lands to rural uses and densities;	Road approach permits are required by the Crook County Road department to ensure that design standards are met. (Crook County Code Chapter 12.04). The language is fairly general. The road approach application requires more details regarding spacing… *Recommendation 3: Codify access management standards. Draft new chapter in Title 18; add cross-reference in Chapter 17.36 (road design standards).*
(b) Standards to protect the future operations of roads, transitways and major transit corridors	There is nothing explicit in the County Code. Section 7.1.7 of the County's current transportation system plan establishes requirements for transportation impact analysis or transportation assessment letters. Should this be brought into County Code?

[3] OAR 660-012-0065 (Transportation Improvements on Rural Lands); *(1) This rule identifies transportation facilities, services and improvements which may be permitted on rural lands consistent with Goals 3, 4, 11, and 14 without a goal exception.*

TPR Requirement	Crook County Code Reference, Notes
	We might want to reconsider what triggers either of these two types of evaluations. *Recommendation 4: Codify requirements for Transportation Impact Analyses (TIA). Draft new chapter, Title 12 or Title 18; add cross-reference in Chapter 12.04 Road Access. The TIA requirements in the adopted TSP address this requirement, but it is recommended that the thresholds for requiring a TIA be included in the development code. Proposed TIA language will include conditions of approval related to the planned transportation system and standards in the updated TSP.*
(c) Measures to protect public use airports by controlling land uses within airport noise corridors and imaginary surfaces, and by limiting physical hazards to air navigation;	Crook County code Chapter 18.104 establishes an airport obstruction overlay zone. This requires limits on uses within areas surrounding public airports in the County. *This TPR provision is currently addressed by the CCC. No recommended amendments.*
(d) A process for coordinated review of future land use decisions affecting transportation facilities, corridors or sites;	This process is not codified but the County sends notice to ODOT regarding land uses on state highways and the County road department is notified of all new uses requiring County road approaches. *See Recommendation 2: Allow for consolidated review of applications*
(e) A process to apply conditions to development proposals in order to minimize impacts and protect transportation facilities, corridors or sites;	The transportation impact analysis or transportation assessment letter serves as the tool to identify potential impacts to transportation facilities and to link conditions to the potential impacts. *See Recommendation 4: Codify requirements for Transportation Impact Analyses (TIA).*
(f) Regulations to provide notice to public agencies providing transportation facilities and services, MPOs, and ODOT of: (A) Land use applications that require public hearings; (B) Subdivision and partition applications; (C)Other applications which affect private access to roads; and (D)Other applications within airport noise corridor and imaginary surfaces which affect airport operations.	Again, there is nothing specific in County Code to require notice to ODOT, the airport or other transportation entities but we regular provide notice to these agencies. *Recommendation 5: Specify that affected transportation agencies and providers will be provided notice of certain land use applications. Draft revisions to Chapter 18, Administration Provisions, and Section*

TPR Requirement	Crook County Code Reference, Notes
	18.172.070.
g) Regulations assuring amendments to land use designations, densities, and design standards are consistent with the functions, capacities and performance standards of facilities identified in the TSP.	There are regulations in Chapter 17 relating to subdivision development and in 18.116 (destination resorts) relating to functions of transportation facilities. 18.160.030 establishes general conditions for conditional uses in Crook County including (5) authorizing the ability to increase the amount of street dedication, roadway width or improvements within the street right of way. Specific conditional uses in 18.160.050 have detailed requirements regarding access and transportation issues. *This TPR provision is addressed by the CCC provisions above, as well as by 18.170.010(a), which requires consideration of traffic impacts for comp plan/zone map changes.*
(3) Local governments shall adopt land use or subdivision regulations for urban areas and rural communities as set forth below. The purposes of this section are to provide for safe and convenient pedestrian, bicycle and vehicular circulation consistent with access management standards and the function of affected streets, to ensure that new development provides on-site streets and accessways that provide reasonably direct routes for pedestrian and bicycle travel in areas where pedestrian and bicycle travel is likely if connections are provided, and which avoids wherever possible levels of automobile traffic which might interfere with or discourage pedestrian or bicycle travel.	The County has no specific requirements for bike or pedestrian facilities. Design standards in 17.36 apply to subdivisions and address access and street function. Most rural residential developments in Crook County are in rural areas without any destinations to connect to. It might be useful to consider connections to existing bike and pedestrian facilities in Prineville to locations in rural Crook County. *Consideration for specific connections will need to be documented in the TSP bike or pedestrian modal plans. In terms of code requirements, there are some opportunities in the County, however limited, for types of development that should be required to include bicycle and pedestrian facilities. Specific code recommendations are addressed below.*
(a) Bicycle parking facilities as part of new multi-family residential developments of four units or more, new retail, office and institutional developments, and all transit transfer stations and park-and-ride lots.	There are limited opportunities for multi-family development, retail or office development in Crook County. Not clear that a requirement for bike parking makes sense (but worth discussing with TAC/PAC) *Recommendation 6: Require bicycle parking with new multi-family, commercial, or institutional development. Draft new section*

TPR Requirement	Crook County Code Reference, Notes
	in Chapter 18.128, Off-Street Parking.
(b) On-site facilities shall be provided which accommodate safe and convenient pedestrian and bicycle access from within new subdivisions, multi-family developments, planned developments, shopping centers, and commercial districts to adjacent residential areas and transit stops, and to neighborhood activity centers within one-half mile of the development. Single-family residential developments shall generally include streets and accessways. Pedestrian circulation through parking lots should generally be provided in the form of accessways. (A) "Neighborhood activity centers" includes, but is not limited to, existing or planned schools, parks, shopping areas, transit stops or employment centers; (B) Bikeways shall be required along arterials and major collectors. sidewalks shall be required along arterials, collectors and most local streets in urban areas except that sidewalks are not required along controlled access roadways, such as freeways; (C) Cul-de-sacs and other dead-end streets may be used as part of a development plan, consistent with the purposes set forth in this section; (D) Local governments shall establish their own standards or criteria for providing streets and accessways consistent with the purposes of this section. Such measures may include but are not limited to: standards for spacing of streets or accessways; and standards for excessive out-of-direction travel; (E) Streets and accessways need not be required where one or more of the following conditions exist: (i) Physical or topographic conditions make a street or accessway connection impracticable. Such conditions include but are not limited to freeways, railroads, steep slopes, wetlands or other bodies of water where a connection could not reasonably be provided; (ii) Buildings or other existing development on adjacent lands physically preclude a connection now or in the future considering the potential for redevelopment; or (iii) Where streets or accessways would violate provisions of leases, easements, covenants, restrictions or other agreements existing as of May 1, 1995, which preclude a required street or accessway connection.	See above – Maybe need policy language to identify key activity centers. The only areas in rural Crook County that may have activity centers are Powell Butte and Paulina. Powell Butte is divided by Highway 126 and there is not likely to be enough density around the school store to warrant special bike/ped facilities. Paulina has a school and store in a very rural community where there is very little traffic and very low density. I think some policy to link to existing bike/ped facilities in Prineville may make sense. We may look at the subdivision code and include requirements for bike/ped in developments of more than a certain # of units…Most rural residential developments are existing and not connected because of topography *Recommendation 7: Adopt standards for pedestrian access and circulation. Draft new chapter, Title 18 or 12; add provision to 17.40.030 Improvements in subdivisions.* *Recommendation 9: Adopt standards to promote pedestrian connectivity in subdivisions. Draft revisions to Title 17, Chapter 17.36 Design Standards, Section 17.36.0920 Road Standards.*
(c) Off-site road improvements are otherwise required as a condition of development approval, they shall include facilities accommodating convenient pedestrian and bicycle and	*See Recommendations 7 and 9.*

TPR Requirement	Crook County Code Reference, Notes
pedestrian travel, including bicycle ways on arterials and major collectors. [Note: Subsection (d) defines safe and convenient.]	
(e) Internal pedestrian circulation within new office parks and commercial developments shall be provided through clustering of buildings, construction of accessways, walkways and similar techniques.	No property zoned for these uses. *The County does have a limited amount of land zoned for commercial development. Recommendation 7 addresses this provision.*
(4) To support transit in urban areas containing a population greater than 25,000, where the area is already served by a public transit system or where a determination has been made that a public transit system is feasible, local governments shall adopt land use and subdivision regulations as provided in (a)-(g) below:	N/A – no urban areas within County. Limited transit system – probably don't need code modifications *To address this provision, the County should consider requiring transit-related improvements for development adjacent to the following transit services in county:* • *Existing Community Connector fixed-route, with stop at Powell Butte station.* • *Proposed Prineville area Flex-route, which runs through a small area of unincorporated Crook County.*
(a) Transit routes and transit facilities shall be designed to support transit use through provision of bus stops, pullouts and shelters, optimum road geometrics, on-road parking restrictions and similar facilities, as appropriate;	*These standards are the responsibility of Cascades East Transit. The County may want to consider if the transit provider's standards are sufficient to support transit, as required by this provision.*
(b) New retail, office and institutional buildings at or near major transit stops shall provide for convenient pedestrian access to transit through the measures listed in (A) and (B) below. (A) Walkways shall be provided connecting building entrances and streets adjoining the site; (B) Pedestrian connections to adjoining properties shall be provided except where such a connection is impracticable. Pedestrian connections shall connect the on site circulation system to existing or proposed streets, walkways, and driveways that abut the property. Where adjacent properties are undeveloped or have potential for redevelopment, streets, accessways and walkways on site shall be laid out or stubbed to allow for extension to the adjoining property; (C) In addition to (A) and (B) above, on sites at major transit stops provide the following: (i) Either locate buildings within 20 feet of the transit stop, a transit street or an intersecting street or provide	*Recommendation 8: Adopt standards to support access to transit. Draft new chapter, Title 18 or 12; add provision to 17.40.030 Improvements in subdivisions*

TPR Requirement	Crook County Code Reference, Notes
a pedestrian plaza at the transit stop or a street intersection; (ii) A reasonably direct pedestrian connection between the transit stop and building entrances on the site; (iii) A transit passenger landing pad accessible to disabled persons; (iv) An easement or dedication for a passenger shelter if requested by the transit provider; and (v) Lighting at the transit stop.	*Subsection (C)(iii) is addressed by Recommendation 7: Adopt standards for pedestrian access and circulation.*
(c) Local governments may implement (4)(b)(A) and (B) above through the designation of pedestrian districts and adoption of appropriate implementing measures regulating development within pedestrian districts. Pedestrian districts must comply with the requirement of (4)(b)(C) above;	*Pedestrian districts are more appropriate for urban areas. No areas in Crook County would make sense to designate as a pedestrian district.*
(d) Designated employee parking areas in new developments shall provide preferential parking for carpools and vanpools;	*As the county has very little employment land, this provision is not applicable.*
(e) Existing development shall be allowed to redevelop a portion of existing parking areas for transit-oriented uses, including bus stops and pullouts, bus shelters, park and ride stations, transit-oriented developments, and similar facilities, where appropriate;	*See Recommendation 8: Adopt standards to support access to transit.*
(f) Road systems for new development shall be provided that can be adequately served by transit, including provision of pedestrian access to existing and identified future transit routes. This shall include, where appropriate, separate accessways to minimize travel distances;	*See Recommendation 8: Adopt standards to support access to transit.*
(g) Along existing or planned transit routes, designation of types and densities of land uses adequate to support transit.	*Changes to density or use standards are not within the scope of the TSP update. The County may elect to consider these changes with a future planning effort.*
(5) In MPO areas, local governments shall adopt land use and subdivision regulations to reduce reliance on the automobile which:	N/A – not an MPO area. Can look at off street parking requirements in 18.128 to see if they make sense. Some uses allowed in rural part of County (e.g., churches) do not have specific parking requirements. Other uses are very uncommon in the rural County. *Parking requirements are consistent with other small towns or rural counties. Churches seem to be regulated under institutional uses.*
(a) Allow transit-oriented developments (TODs) on lands along transit routes;	*Changes to density or use standards are not within the scope of the TSP update.*

TPR Requirement	Crook County Code Reference, Notes
(b) Implements a demand management program to meet the measurable standards set in the TSP in response to 660-012-0035(4);	*A TDM program should be considered through the TSP update process but is not addressed by proposed development code amendments.*
(c) Implements a parking plan which:	*Existing parking standards are not higher than conventional standards for small towns or rural counties. The land use pattern and transit, bicycle, and pedestrian systems of the County are generally not supportive of reduced parking requirements.*
(A) Achieves a 10% reduction in the number of parking spaces per capita in the MPO area over the planning period. This may be accomplished through a combination of restrictions on development of new parking spaces and requirements that existing parking spaces be redeveloped to other uses;	
(B) Aids in achieving the measurable standards set in the TSP in response to OAR 660-012-0035(4);	
(C) Includes land use and subdivision regulations setting minimum and maximum parking requirements in appropriate locations, such as downtowns, designated regional or community centers, and transit oriented-developments; and	
(D) Is consistent with demand management programs, transit-oriented development requirements and planned transit service.	
(d) As an alternative to (c) above, local governments in an MPO may instead revise ordinance requirements for parking as follows:	*Existing parking standards are not higher than conventional standards for small towns or counties. The land use pattern and transit, bicycle, and pedestrian systems of the County are generally not supportive of reduced parking requirements.*
(A) Reduce minimum off-street parking requirements for all non-residential uses from 1990 levels;	
(B) Allow provision of on-street parking, long-term lease parking, and shared parking to meet minimum off-street parking requirements;	
(C) Establish off-street parking maximums in appropriate locations, such as downtowns, designated regional or community centers, and transit-oriented developments;	
(D) Exempt structured parking and on-street parking from parking maximums;	
(E) Require that parking lots over 3 acres in size provide street-like features along major driveways (including curbs, sidewalks, and street trees or planting strips); and	
(F) Provide for designation of residential parking districts.	

TPR Requirement	Crook County Code Reference, Notes
(e) Require all major industrial, institutional, retail and office developments to provide either a transit stop on site or connection to a transit stop along a transit trunk route when the transit operator requires such an improvement.	*See Recommendation 8: Adopt standards to support access to transit.*
(6) In developing a bicycle and pedestrian circulation plan as required by 660-012-0020(2)(d), local governments shall identify improvements to facilitate bicycle and pedestrian trips to meet local travel needs in developed areas. Appropriate improvements should provide for more direct, convenient and safer bicycle or pedestrian travel within and between residential areas and neighborhood activity centers (i.e., schools, shopping, transit stops). Specific measures include, for example, constructing walkways between cul-de-sacs and adjacent roads, providing walkways between buildings, and providing direct access between adjacent uses.	Again – first step would be identifying activity centers and looking for opportunities to connect areas with rural development in Crook County to existing facilities in the City of Prineville *See Recommendation 7: Adopt standards for pedestrian access and circulation.* *See Recommendation 9: Adopt standards to promote pedestrian connectivity in subdivisions.*
(7) Local governments shall establish standards for local streets and accessways that minimize pavement width and total ROW consistent with the operational needs of the facility. The intent of this requirement is that local governments consider and reduce excessive standards for local streets and accessways in order to reduce the cost of construction, provide for more efficient use of urban land, provide for emergency vehicle access while discouraging inappropriate traffic volumes and speeds, and which accommodate convenient pedestrian and bicycle circulation. Notwithstanding section (1) or (3) of this rule, local street standards adopted to meet this requirement need not be adopted as land use regulations.	See design standards in 17.36. *Recommendation 10: Update road design standards to be consistent with TSP. Replace exhibit or insert TSP references in Title 17, Chapter 17.36 Design Standards, Section 17.36.030 Subdivision roads and public ways, Exhibit C and Exhibit D-1*
OAR 660-12-0060	
Amendments to functional plans, acknowledged comprehensive plans, and land use regulations that significantly affect an existing or planned transportation facility shall assure that allowed land uses are consistent with the identified function, capacity, and performance standards of the facility.	This should be addressed by requirement for TIA or Transp. Assessment letter. May want to examine the triggers and codify the requirements that are currently in the TSP. *Yes, but should stipulate that TIA is required for zone changes. Added this threshold to the list in Recommendation 4*.

8. IMPLEMENTING ORDINANCES MEMORANDUM

PROPOSED CODE LANGUAGE

Proposed code language to implement each recommended amendment in Table 1 is provided below. Underlined text is new, ~~strikeout~~ text indicates proposed removal from adopted code language.

Recommendation 1: Permit transportation facilities outright in all zones

CCC, Title 18, Chapter 18.124 - Supplementary Provisions

18.124.130. Transportation facilities permitted outright. Except where otherwise specifically regulated by this ordinance, the following improvements are permitted outright:

(1) Normal operation, maintenance, repair, and preservation activities of existing transportation facilities.

(2) Installation of culverts, pathways, medians, fencing, guardrails, lighting, and similar types of improvements within the existing right-of-way.

(3) Projects that are consistent with projects identified and planned for in the Transportation System Plan.

(4) Landscaping as part of a transportation facility.

(5) Emergency measure necessary for the safety and protection of property.

(6) Acquisition of right-of-way for public roads, highways, and other transportation improvements designated in the Transportation System Plan.

(7) Construction of a street or road as part of an approved subdivision or land partition consistent with the Crook County Subdivision Ordinance.

Recommendation 2: Allow for consolidated review of applications

CCC, Title 18, Chapter 18.172 - Administration Provisions

18.172.025. Consolidated Review of Applications. When an applicant applies for more than one type of land use or development permit for the same one or more contiguous parcels of land, the proceedings shall be consolidated for review and decision. When proceedings are consolidated, required notices may be consolidated, provided the notice shall identify each application to be decided. When more than one application is reviewed in a hearing, separate findings and decisions shall be made on each application.

Recommendation 3: Codify access management standards

CCC, Title 12, Chapter 12.04 – Road Access

[...]

Section 12.04.075 Access management standards.

(1) All road access applications are subject to the access management standards set forth in Chapter 18.[XX] of this Title.

CCC, Title 18, [New Chapter] - Access Management Standards

(1) **Purpose and Intent.** This section implements the street access policies of the Crook County Transportation System Plan. It is intended to promote safe vehicle access and egress to properties, while maintaining traffic operations in conformance with adopted standards. "Safety," for the purposes of this chapter, extends to all modes of transportation.

(2) **Traffic Impact Analysis Requirements**. The county, in reviewing a development proposal or other action requiring an approach permit, may require a traffic impact analysis, pursuant to Section [*X*], to determine compliance with this code.

(3) **Approach and Driveway Development Standards**. Approaches and driveways shall conform to all the following development standards:

(a) The number of approaches on higher classification streets (e.g., collector and arterial streets) shall be minimized; where practicable, access shall be taken first from a lower classification street.

(b) Approaches shall conform to the spacing standards of subsections (4) and (5) below, and shall conform to minimum sight distance and channelization standards of the roadway authority.

(c) The county road master may limit the number or location of connections to a street, or limit directional travel at an approach to one-way, right-turn only, or other restrictions, where the roadway authority determines that mitigation is required to alleviate safety or traffic operations concerns.

(d) Where the spacing standards of the roadway authority limit the number or location of connections to a street or highway, the county road master may require a driveway extend to one or more edges of a parcel and be designed to allow for future extension and inter-parcel circulation as adjacent properties develop. The county road master may also require the owner(s) of the subject site to record an access easement for future joint use of the approach and driveway as the adjacent property(ies) develop(s).

(e) Where applicable codes require emergency vehicle access, approaches and driveways shall be designed and constructed to accommodate emergency vehicle apparatus and

shall conform to applicable fire protection requirements. The county road master may restrict parking, require signage, or require other public safety improvements pursuant to the recommendations of an emergency service provider.

(f) As applicable, approaches and driveways shall be designed and constructed to accommodate truck/trailer-turning movements.

(g) Where an accessible route is required pursuant to American Disability Act (ADA), approaches and driveways shall meet accessibility requirements where they coincide with an accessible route.

(h) The county road master may require changes to the proposed configuration and design of an approach, including the number of drive aisles or lanes, surfacing, traffic-calming features, allowable turning movements, and other changes or mitigation, to ensure traffic safety and operations.

(i) Where a new approach onto a state highway or a change of use adjacent to a state highway requires ODOT approval, the applicant is responsible for obtaining ODOT approval. The county road master may approve a development conditionally, requiring the applicant first obtain required ODOT permit(s) before commencing development.

(j) Where an approach or driveway crosses a drainage ditch, canal, railroad, or other feature that is under the jurisdiction of another agency, the applicant is responsible for obtaining all required approvals and permits from that agency prior to commencing development.

(k) Where a proposed driveway crosses a culvert or drainage ditch, county road master may require the developer to install a culvert extending under and beyond the edges of the driveway on both sides of it, pursuant to applicable [public works / engineering] design standards.

(l) Except as otherwise required by the applicable roadway authority or waived by the county road master, temporary driveways providing access to a construction site or staging area shall be paved or graveled to prevent tracking of mud onto adjacent paved streets.

(4) **Approach Separation from Street Intersections**. Except as provided by subsection 6, the following minimum distances shall be maintained between approaches and street intersections, where distance is measured from the edge of an approach surface to the edge of the roadway at its ultimate designated width:

(a) On an arterial street: 1 mile, except as required by ODOT, pursuant to Oregon Administrative Rule (OAR) 734-051, for state highways

(b) On a major collector street: 1/2 mile

(c) On a minor collector street: ¼ mile

(d) On a local street: 150 feet

(5) **Approach Spacing.** Except as provided by subsection 6 of this section or as required to maintain street operations and safety, the following minimum distances shall be maintained between approaches, where distance is measured from the edge of one approach to the edge of another:

(a) On an Arterial street: 1,200 feet based on speed limit or posted speed, as applicable, except as otherwise required by ODOT for a state highway, pursuant to Oregon Administrative Rules (OAR) 734-051

(b) On a Major Collector street: 500 feet

(c) On a Minor Collector street: 300 feet

(d) On a local road: Access to each lot permitted

(6) **Exceptions and Adjustments**. The county road master may approve adjustments to the spacing standards in subsections (4) and (5), where an existing connection to a county road does not meet the standards of the roadway authority and the proposed development moves in the direction of code compliance. The county road master may also approve a deviation to the spacing standards on county roads where it can be demonstrated that mitigation measures, such as consolidated access (removal of one access), joint use driveways (more than one property uses same access), directional limitations (e.g., one-way), turning restrictions (e.g., right-in/right-out only), or other mitigation alleviate all traffic operations and safety concerns.

(7) **Joint Use Access Easement and Maintenance Agreement**. Where the county approves a joint use driveway, the property owners shall record an easement with the deed allowing joint use of and cross access between adjacent properties. The owners of the properties agreeing to joint use of the driveway shall record a joint maintenance agreement with the deed, defining maintenance responsibilities of property owners. The applicant shall provide a fully executed copy of the agreement to the county for its records, but the county is not responsible for maintaining the driveway or resolving any dispute between property owners.

Recommendation 4: Codify TIA and TAL requirements

CCC, Title 17, Subdivision – Tentative Plans

17.16.100 Specific approval requirements.

In addition to the requirements set forth by the provisions of this title and applicable local and state regulations, specific requirements for tentative plan approval are as follows:

[…]

(2) No tentative plan for a proposed subdivision shall be approved unless:

(a) The streets and roads are laid out so as to conform to the plats of subdivisions and maps of partitions already approved for adjoining property as to width, improvements, general direction and in all other respects, unless the planning commission determines it is in the public interest to modify the street and road pattern.

(b) Streets and roads to be held for private use are approved by the planning commission and are clearly indicated on the tentative plan and all reservations or restrictions relating to such private streets and roads are set forth thereon, such as ownership and maintenance responsibilities.

(c) The tentative plan complies with the zoning ordinance.

(d) The tentative plan complies with the standards for Traffic Impact Analysis in Section 18.[XX].

CCC, Title 18, [New Chapter] - Transportation Impact Analysis

(1) **Purpose.** The purpose of this section is coordinate the review of land use applications with roadway authorities and to implement Section 660-012-0045(2)(e) of the state Transportation Planning Rule, which requires the county to adopt a process to apply conditions to development proposals in order to minimize impacts and protect transportation facilities. The following provisions also establish when a proposal must be reviewed for potential traffic impacts; when a Transportation Impact Analysis or Transportation Assessment Letter must be submitted with a development application in order to determine whether conditions are needed to minimize impacts to and protect transportation facilities; the required contents of a Transportation Impact Analysis and Transportation Assessment Letter; and who is qualified to prepare the analysis.

(2) **When a Transportation Impact Analysis is Required.** The county or other road authority with jurisdiction may require a Transportation Impact Analysis (TIA) as part of an application for development, a change in use, or a change in access. A TIA shall be required where a change of use or a development would involve one or more of the following:

   (a) The development generates 25 or more peak-hour trips or 250 or more daily trips.

   (b) An access spacing exception is required for the site access driveway(s) and the development generates 10 or more peak-hour trips or 100 or more daily trips.

   (c) The development is expected to impact intersections that are currently operating at the upper limits of the acceptable range of level of service during the peak operating hour.

   (d) The development is expected to significantly impact adjacent roadways and intersections that have previously been identified as high crash locations or areas that contain a high concentration of pedestrians or bicyclists such as school zones.

   (e) A change in zoning or a plan amendment designation.

(f) A TIA is required by ODOT.

(3) **When a Transportation Assessment Letter (TAL) is Required.** If the provisions of (2)(a)-(f) do not apply, the applicant's traffic engineer shall submit a transportation assessment letter to the Crook County planning department demonstrating that the proposed land use action is exempt from TIA requirements. This letter shall outline the trip-generating characteristics of the proposed land use and verify that the site-access driveways or roadways meet Crook County's sight-distance requirements and roadway design standards.

(4) **Preparation of a TIA or TAL.** A professional engineer registered by the State of Oregon, in accordance with the requirements of the road authority, shall prepare the TIA or TAL. If preparing a TIA, the content and methodologies of the analysis shall conform to the requirements of Subsections (5) to (13) of this section.

(5) **Contents of a Transportation Impact Analysis.** As a guide in the preparation of a transportation impact analysis, Crook County recommends the following format be used to document the analysis.

(a) Table of Contents. Listing of all sections, figures, and tables included in the report.

(b) Executive Summary. Summary of the findings and recommendations contained within the report.

(c) Introduction. Proposed land use action, including site location, building square footage, and project scope. Map showing the proposed site, building footprint, access driveways, and parking facilities. Map of the study area, which shows site location and surrounding roadway facilities.

(d) Existing Conditions. Existing site conditions and adjacent land uses. Roadway characteristics (all transportation facilities and modal opportunities located within the study area, including roadway functional classifications, street cross section descriptions, posted speeds, bicycle and pedestrian facilities, on-street parking, and transit facilities). Existing lane configurations and traffic control devices at the study area intersections. Existing traffic volumes and operational analysis of the study area roadways and intersections. Roadway and intersection crash history analysis.

(e) Background Conditions (without the proposed land use action). Approved developments and funded transportation improvements in the study area. Traffic growth assumptions. Addition of traffic from other planned developments. Background traffic volumes and operational analysis.

(f) Full Buildout Traffic Conditions (with the proposed land use action). Description of the proposed development plans. Trip-generation characteristics of the proposed development (including trip reduction documentation). Trip distribution assumptions. Full buildout traffic volumes and intersection operational analysis. Intersection and site-

access driveway queuing analysis. Expected safety impacts. Recommended roadway and intersection mitigations (if necessary).

(g) Site Circulation Review. Evaluate internal site access and circulation. Review pedestrian paths between parking lots and buildings. Ensure adequate throat depth is available at the driveways and that vehicles entering the site do not block the public facilities. Review truck paths for the design vehicle.

(h) Turn Lane Warrant Evaluation. Evaluate the need to provide turn lanes at the site driveways.

(i) Conclusions and Recommendations. Bullet summary of key conclusions and recommendations from the transportation impact analysis.

(j) Appendix. Traffic counts summary sheets, crash analysis summary sheets, and existing/background/full buildout traffic operational analysis worksheets. Other analysis summary sheets such as queuing and signal warrant analyses.

(k) Figures. The following list of figures should be included in the Transportation Impact Analysis: Site Vicinity Map; Existing Lane Configurations and Traffic Control Devices; Existing Traffic Volumes and Levels of Service (all peak hours evaluated); Future Year Background Traffic Volumes and Levels of Service (all peak hours evaluated); Proposed Site Plan; Future Year Assumed Lane Configurations and Traffic Control Devices; Estimated Trip Distribution Pattern; Site-Generated Traffic Volumes (all peak hours evaluated); Full Buildout Traffic Volumes and Levels of Service (all peak hours evaluated).

(6) **Study Area.** The study area shall include, at a minimum, all site-access points and intersections (signalized and unsignalized) adjacent to the proposed site. If the proposed site fronts an arterial or collector street; the study shall include all intersections along the site frontage and within the access spacing distances extending out from the boundary of the site frontage. Beyond the minimum study area, the transportation impact analysis shall evaluate all intersections that receive site-generated trips that comprise at least 10% or more of the total intersection volume. In addition to these requirements, the county road master (or his/her designee) shall determine any additional intersections or roadway links that might be adversely affected as a result of the proposed development. The applicant and the county road master (or his/her designee) will agree on these intersections prior to the start of the transportation impact analysis.

(7) **Study Years to be Analyzed in the Transportation Impact Analysis.** A level-of-service analysis shall be performed for all study roadways and intersections for the following horizon years:

(a) Existing Year. Evaluate all existing study roadways and intersections under existing conditions.

(b) Background Year. Evaluate the study roadways and intersections in the year the proposed land use is expected to be fully built out, without traffic from the proposed land use. This analysis should include traffic from all approved developments that impact the study intersections, or planned developments that are expected to be fully built out in the horizon year.

(c) Full Buildout Year. Evaluate the expected roadway, intersection, and land use conditions resulting from the background growth and the proposed land use action assuming full build-out and occupancy. For phased developments, an analysis shall be performed during each year a phase is expected to be completed.

(d) Twenty-Year Analysis. For all land use actions requesting a Comprehensive Plan Amendment and/or a Zone Change, a long-term level-of-service analysis shall be performed for all study intersections assuming buildout of the proposed site with and without the comprehensive plan designation and/or zoning designation in place. The analysis should be performed using the future year traffic volumes identified in the Transportation System Plan (TSP). If the applicant's traffic engineer proposes to use different future year traffic volumes, justification for not using the TSP volumes must be provided along with documentation of the forecasting methodology.

(8) **Study Time Periods to be Analyzed in the Transportation Impact Analysis.** Within each horizon year, a level-of-service analysis shall be performed for the time period(s) that experience the highest degree of network travel. These periods typically occur during the mid-week (Tuesday through Thursday) morning (7:00 a.m. to 9:00 a.m.), mid-week evening (4:00 p.m. to 6:00 p.m.), and Saturday afternoon (12:00 p.m. to 3:00 p.m.) periods. The transportation impact analysis should always address the weekday a.m. and p.m. peak hours when the proposed lane use action is expected to generate 25 trips or more during the peak time periods. If the applicant can demonstrate that the peak-hour trip generation of the proposed land use action is negligible during one of the two peak study periods and the peak trip generation of the land use action corresponds to the roadway system peak, then only the worst-case study period need be analyzed. Depending on the proposed land use action and the expected trip-generating characteristics of that development, consideration of non-peak travel periods may be appropriate. Examples of land uses that have non-typical trip generating characteristics include schools, movie theaters, and churches. The road master (or his/her designee) and applicant should discuss the potential for additional study periods prior to the start of the transportation impact analysis.

(9) **Traffic Count Requirements.** Once the study periods have been determined, turning movement counts should be collected at all study area intersections to determine the base traffic conditions. These turning movement counts should typically be conducted during the weekday (Tuesday through Thursday) between 7:00 and 9:00 a.m. and between 4:00and 6:00 p.m.,

depending on the proposed land use. Historical turning movement counts may be used if the data are less than 12 months old, but must be factored to meet the existing traffic conditions.

(10) **Trip Generation for the Proposed Development.** To determine the impacts of a proposed development on the surrounding transportation network, the trip-generating characteristics of that development must be estimated. Trip-generating characteristics should be obtained from one of the following acceptable sources:

(a) Institute of Transportation Engineers (ITE) *Trip Generation Manual* (latest edition).

(b) Specific trip generation studies that have been conducted for the particular land use action for the purposes of estimating peak-hour trip-generating characteristics. The road master (or his/her designee) should approve the use of these studies prior to their inclusion in the transportation impact analysis.

(c) In addition to new site-generated trips, several land uses typically generate additional trips that are not added to the adjacent traffic network. These trips include pass-by trips and internal trips and are considered to be separate from the total number of new trips generated by the proposed development. The procedures listed in the most recent version of the *Trip Generation Handbook* (ITE) should be used to account for pass-by and internal trips.

(11) **Trip Distribution.** Estimated site-generated traffic from the proposed development should be distributed and assigned on the existing or proposed arterial/collector street network. Trip distribution methods should be based on a reasonable assumption of local travel patterns and the locations of off-site origin/destination points within the site vicinity. Acceptable trip distribution methods should be based on one of the following procedures:

(a) An analysis of local traffic patterns and intersection turning movement counts gathered within the previous 12 months.

(b) A detailed market study specific to the proposed development and surrounding land uses.

(12) **Intersection Operation Standards.** Crook County evaluates intersection operational performance based on levels of service and "volume-to-capacity" (v/c) ratio. When evaluating the volume-to-capacity ratio, the total traffic demand shall be considered.

(a) Intersection Volume-to-Capacity Analysis. A capacity analysis should be performed at all intersections within the identified study area. The methods identified in the latest edition of the *Highway Capacity Manual*, published by the Transportation Research Board, are to be used for all intersection capacity calculations. Crook County requires that all intersections within the study area must maintain a v/c ratio of 0.95 or less. It should be noted that the mobility standards in the Oregon Highway Plan apply to Oregon Department of Transportation facilities.

(b) Intersection Levels of Service. Crook County requires all intersections within the study area to maintain an acceptable level of service (LOS) upon full buildout of the proposed land use action. LOS calculations for signalized intersections are based on the average control delay per vehicle, while LOS calculations for unsignalized intersections are based on the average control delay and volume-to-capacity ratio for the worst or critical movement. All LOS calculations should be made using the methods identified in the most recent version of the Highway Capacity Manual (or by field studies), published by the Transportation Research Board. The minimum acceptable level of service for signalized intersections is LOS "D". The minimum acceptable level of service for all-way stop controlled intersections and roundabouts is LOS "D". The minimum acceptable level of service for unsignalized two-way stop controlled intersections is LOS "E" or LOS"F" with a v/c ratio of 0.95 or less for the critical movement. Any intersections not operating at these standards will be considered to be unacceptable.

(13) **Review Policy and Procedure.** The following criteria should be used in reviewing a transportation impact analysis as part of a subdivision or site plan review.

(a) The road system is designed to meet the projected traffic demand at full build-out.

(b) Adequate intersection and stopping sight distance is available at all driveways.

(c) Proposed driveways meet the county's access spacing standards in **Title 18, [New Chapter] - Access Management Standards** or sufficient justification is provided to allow a deviation from the spacing standard.

(d) Opportunities for providing joint or crossover access have been pursued.

(e) The site does not rely upon the surrounding roadway network for internal circulation.

(f) The road system provides adequate access to buildings for residents, visitors, deliveries, emergency vehicles, and garbage collection.

(g) A pedestrian path system is provided that links buildings with parking areas, entrances to the development, open space, recreational facilities, and other community facilities consistent with the requirements of **Section [18.XXX.XXX] – Pedestrian Access and Circulation.**

(14) **Conditions of Approval**. In approving an action that requires a Traffic Impact Study, the county may condition approval to ensure that the proposed application will meet operations and safety standards and provide the necessary right-of-way and improvements to develop the future planned transportation system. Conditions of Approval may include, but are not limited to:

(a) Crossover easement agreements for all adjoining parcels to facilitate future access between parcels.

(b) Conditional access permits for new developments which have proposed access points that do not meet the designated access spacing policy and/or have the ability to align with opposing access driveways.

(c) Right-of-way dedications for future planned roadway improvements.

(d) Half-street improvements along site frontages that do not have full-buildout improvements in place at the time of development.

Recommendation 5: Specify noticing requirements for transportation providers

CCC, Title 18, Chapter 18.172 - Administration Provisions.

18.172.070 Notice of public hearing

(3) Notice shall also be given to the following persons or agencies:

(...)

(f) Transportation agencies whose facilities are impacted by the proposed action or jurisdictions or agencies affected by the transportation impacts of future development resulting from the proposal.

Recommendation 6: Require bicycle parking

CCC, Title 18, Chapter 18.128 - Off-Street Parking.

18.128.015 Bicycle Parking

(1) **Applicability.** Excluding uses listed in (2), all proposed development where required new vehicle parking areas number 10 or more spaces must include a designated area for bicycle parking.

(2) **Exemptions.** This section does not apply to single-family and duplex housing, home occupations, and agricultural uses. The county road master may exempt other uses upon finding that, due to the nature of the use or its location, it is unlikely to have any patrons or employees arriving by bicycle.

(3) **Standards.** The minimum number of required bicycle parking spaces shall be:

(a) For all uses subject to **18.128.015**, with the exception of (b) and (c) below, two (2) bicycle spaces for the first 10 motorized vehicle parking areas, plus two (1) additional bicycle spaces for each additional 10 motorized vehicle parking spaces thereafter.

(b) Multi-family Residences. Every residential use of four (4) or more dwelling units shall provide at least one (1) sheltered bicycle parking space for each unit. Sheltered bicycle parking spaces may be located within a garage, storage shed, basement, utility room or similar area. In those instances in which the residential complex has no garage or other

easily accessible storage unit, the required bicycle parking spaces shall be sheltered under an eave, overhang, an independent structure, or similar cover.

(c) Schools. Both private and public schools shall provide two (2) bicycle parking spaces for every classroom. All spaces shall be sheltered under an eave, overhang, independent structure, or similar cover.

(4) **Design.** Unless otherwise identified in (3), bicycle parking shall consist of staple-design steel racks or other county-approved racks, lockers, or storage bins providing a safe and secure means of storing a bicycle.

(5) **Location.** For institutional, employment, and commercial uses, the designated area for bicycle parking shall be within 50 feet of a public entrance.

(6) **Hazards.** Bicycle parking shall not impede or create a hazard to pedestrians or vehicles, and shall be located so as to not conflict with the vision clearance standards of this code.

Recommendation 7: Adopt standards for pedestrian access and circulation

CCC, Title 18, [New Chapter] – Pedestrian and Transit Improvements

Section [18.XXX.XXX] – Pedestrian Access and Circulation

(1) **Purpose and Intent.** This section implements the pedestrian access and connectivity policies of Crook County Transportation System Plan and is intended to ensure development provides for safe, reasonably direct, and convenient pedestrian access and circulation.

(2) **Applicability.** The provisions of this Chapter apply to:

(a) Suburban residential subdivisions, subject to Chapter 18.48 or 18.52;

(b) Destination resorts, subject to Chapter 18.116; and

(c) Planned unit developments, subject to Chapter 17.28.

(3) **Standards.** Developments shall conform to all of the following standards for pedestrian access and circulation:

(a) **Continuous Walkway System.** A pedestrian walkway system shall extend throughout the development site and connect to adjacent existing or planned sidewalks, if any, and to all future phases of the development, as applicable.

(b) **Safe, Direct, and Convenient.** Walkways within developments shall provide safe, reasonably direct, and convenient connections between primary building entrances and all adjacent parking areas, recreational areas, playgrounds, transit stops, and public rights-of-way conforming to the following standards:

i. The walkway is reasonably direct. A walkway is reasonably direct when it follows a route that does not deviate unnecessarily from a straight line or it does not involve a significant amount of out-of-direction travel.

ii. The walkway is designed primarily for pedestrian safety and convenience, meaning it is reasonably free from hazards and provides a reasonably smooth and consistent surface and direct route of travel between destinations. The county road master may require landscape buffering between walkways and adjacent parking lots or driveways to mitigate safety concerns.

iii. The walkway network connects to all primary building entrances consistent with Americans with Disabilities Act (ADA) requirements.

(c) **Vehicle/Walkway Separation.** Except as required for crosswalks, per subsection (d), below, where a walkway abuts a driveway or street it shall be raised six inches and curbed along the edge of the driveway or street. Alternatively, the county road master may approve a walkway abutting a driveway at the same grade as the driveway if the walkway is physically separated from all vehicle-maneuvering areas. An example of such separation is a row of bollards (designed for use in parking areas) with adequate minimum spacing between them to prevent vehicles from entering the walkway.

(d) **Crosswalks.** Where a walkway crosses a parking area or driveway ("crosswalk"), it shall be clearly marked with contrasting paving materials (e.g., pavers, light-color concrete inlay between asphalt, or similar contrasting material) or painted crosswalk striping. The crosswalk may be part of a speed table to improve driver-visibility of pedestrians.

(e) **Walkway Width and Surface.** Walkways shall be constructed of concrete, asphalt, brick or masonry pavers, or other durable surface, as approved by the county road master, and not less than five feet wide. Multi-use paths (i.e., designed for shared use by bicyclists and pedestrians) shall be concrete or asphalt and shall conform to county transportation standards.

CCC, Title 17 - Subdivisions, Chapter 17.36 – Design Standards

17.36.020 Road standards

(…)

(15) **Pedestrian Access and Circulation.** In addition to the access and connectivity standards required by subsection (13) Cul-de-sacs, and (14) Access Ways, subdivisions subject to Chapter 18.48, Chapter 18.52 or Chapter 17.28 shall meet the applicable pedestrian access and circulation standards Title [XX], Chapter [XX] – Pedestrian and Transit Improvements.

Recommendation 8: Adopt standards to promote pedestrian connectivity in subdivisions

CCC, Title 17 - Subdivisions, Chapter 17.36 – Design Standards

17.36.20 Road standards

(…)

(13) **Cul-de-sacs.**

(a) For subdivisions subject to Chapter 18.48, Chapter 18.52 or Chapter 17.28, A cul-de-sac street shall only be permitted where the county road master determines that environmental or topographical constraints, existing development patterns, or compliance with other applicable county requirements preclude a street extension.

(b) Where the county determines that a cul-de-sac is allowed, all of the following standards shall be met:

i. The cul-de-sac shall not exceed a length of 400 feet, except where the county road master determines that topographic or other physical constraints of the site require a longer cul-de-sac. The length of the cul-de-sac shall be measured along the centerline of the roadway from the near side of the intersecting street to the farthest point of the cul-de-sac.

ii. The cul-de-sac shall terminate with a circular or hammer-head turnaround meeting the Uniform Fire Code.

iii. The cul-de-sac shall provide, or not preclude the opportunity to later install, a pedestrian and bicycle access way between it and adjacent developable lands. Such access ways shall conform to subsection (14) of this section.

iv. The Fire Marshal may require a fire gate with a "NOCS" lock to access adjoining properties.

Recommendation 9: Update road design standards to be consistent with TSP

CCC, Title 17 - Subdivisions, Chapter 17.36 – Design Standards

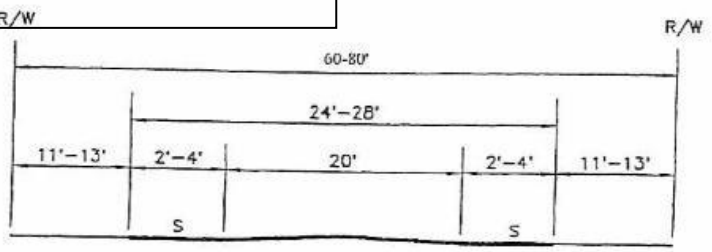
17.36.030 Subdivision roads and public ways.

~~(1) **Right-of-Way.** Road right-of-way shall be as established in Exhibit C (or with respect to EFU-2 and EFU-3 roads as established in [Exhibit D-1]) at the end of this section.~~

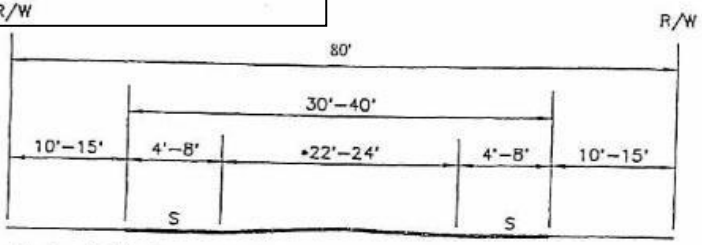
~~(2)~~ (1) **Right-of-Way and Roadbed ~~Width and~~ Standards.** The right-of-way and roadbed ~~width~~ standards shall be determined in accordance with Exhibit D at the end of this section. If a road located in an EFU-2 or EFU-3 zone will not serve more than four residences, the roadbed width and standards shall be determined in accordance with [Exhibit D-1].

[Current figures A-C to be deleted.]

~~A. LOCAL STREET~~

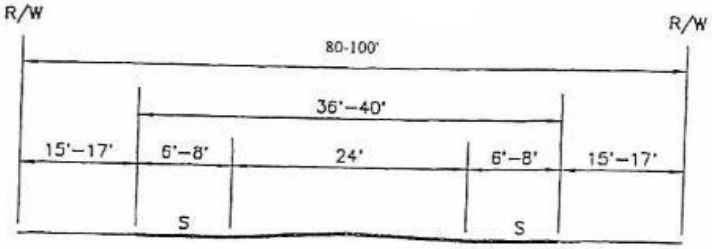


~~B. COLLECTOR~~



*Major Collector: 12' Travel Lanes
Minor Collector: 11' Travel Lanes

~~C. ARTERIAL~~

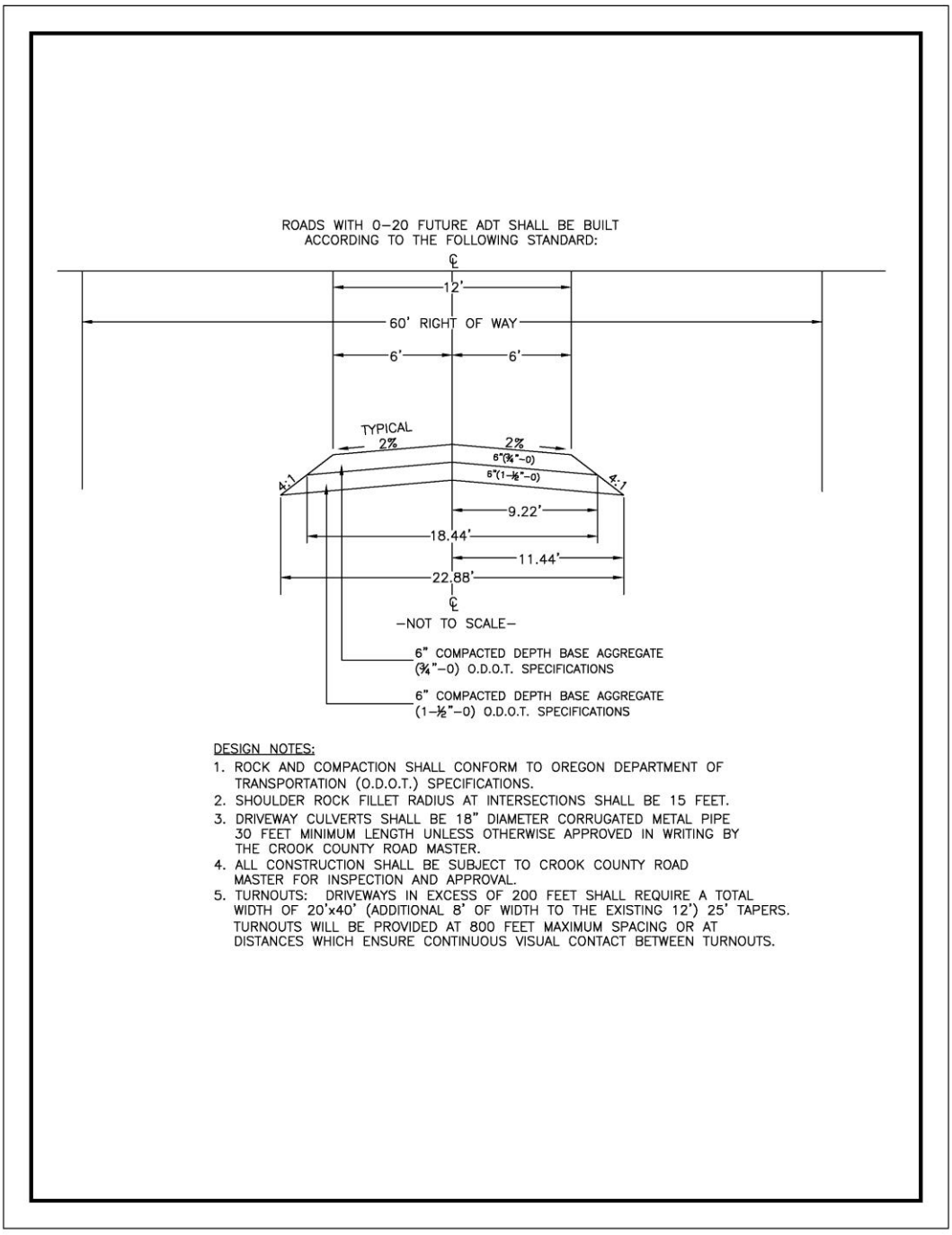


~~LEGEND~~

~~R/W = RIGHT–OF–WAY LINE~~
~~S = SHOULDER~~

Exhibit D

[Current figure to be replaced with figure below.]



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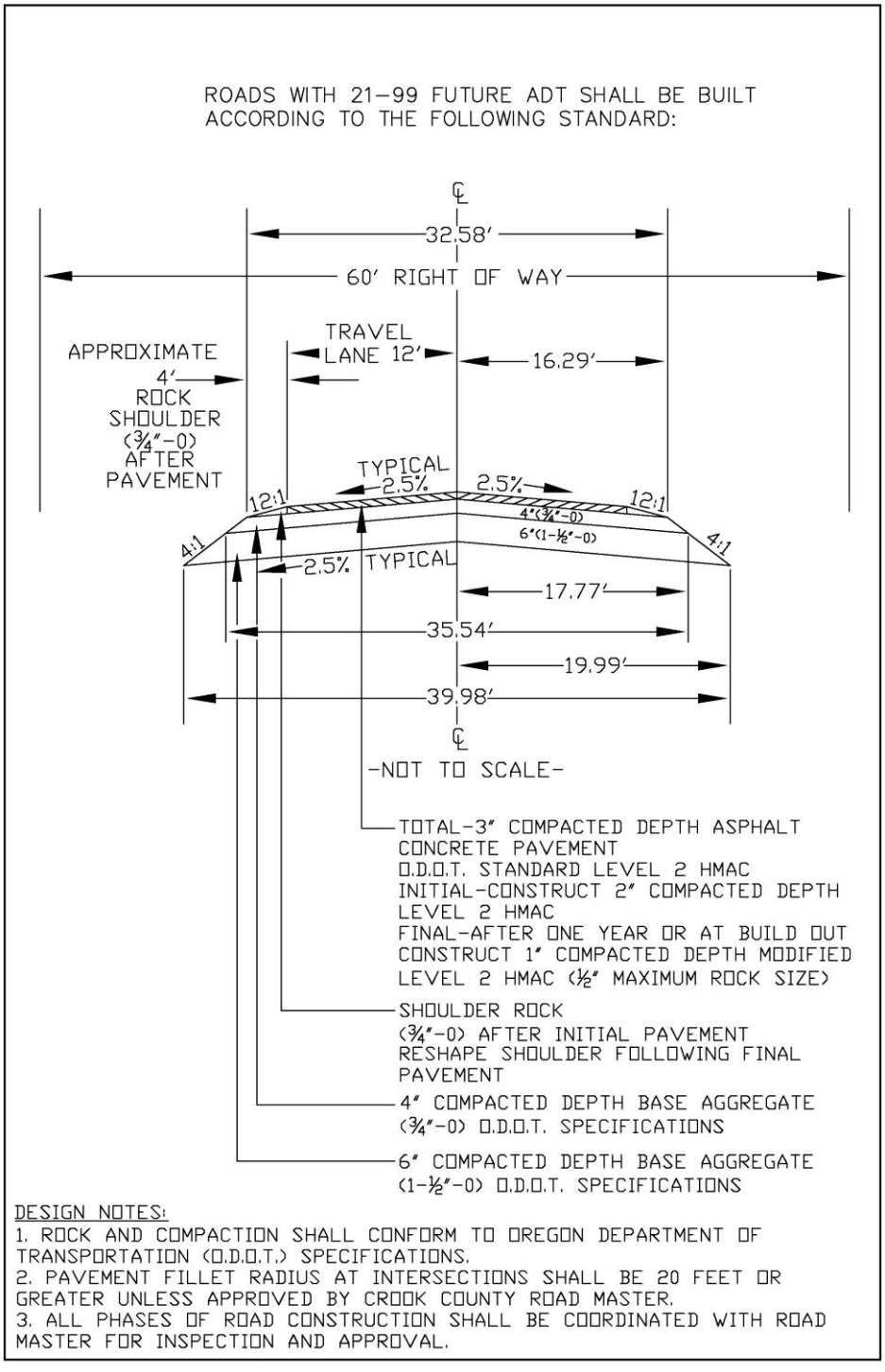

[Current figure to be replaced with figure below.]