lower john day

intelligent transportation systems plan

OCTOBER 2021

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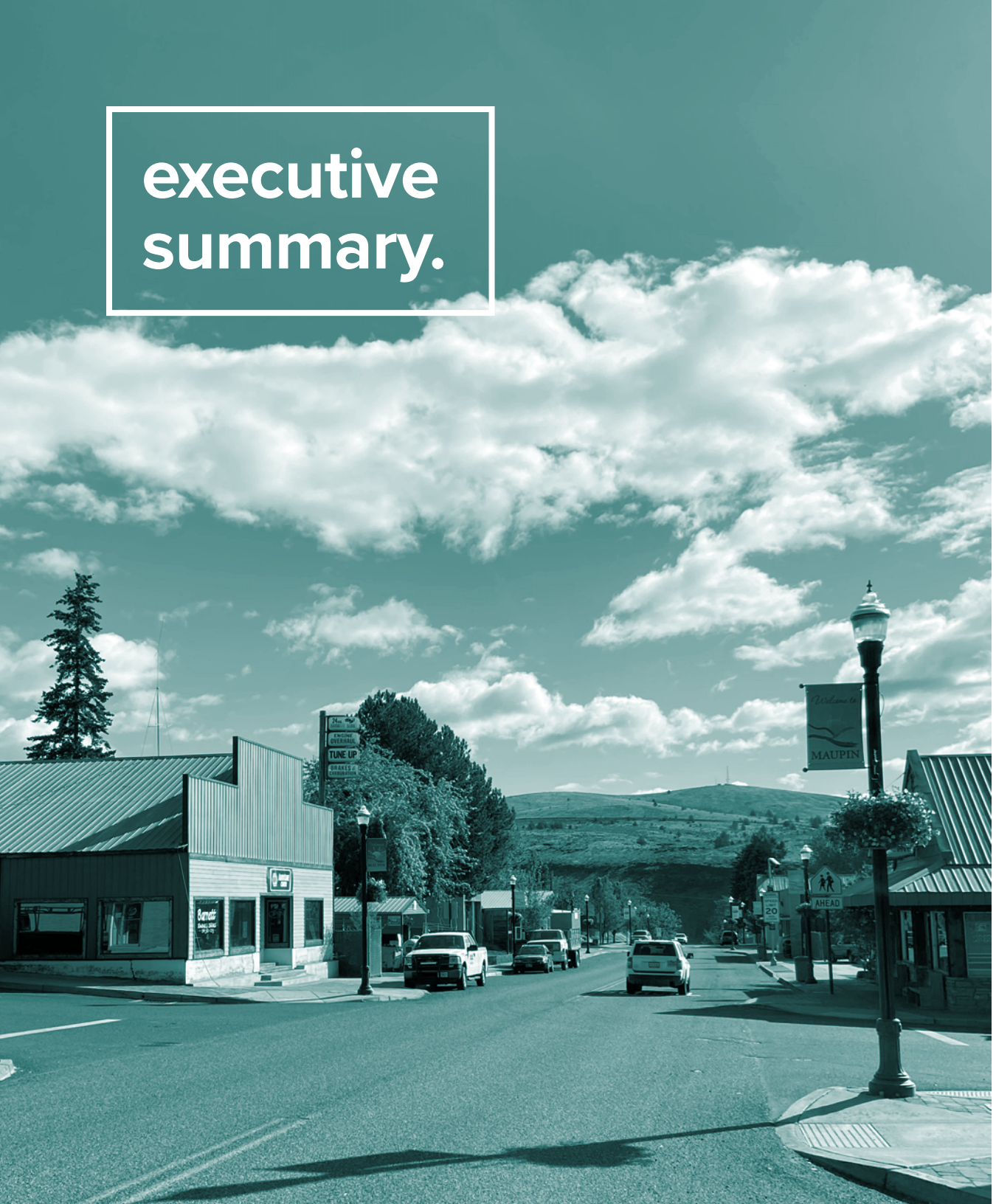


The Lower John Day Intelligent Transportation Systems (ITS) Plan identifies and prioritizes ITS investments that address the needs, goals, and objectives of the region over the next several years.

introduction.

ITS strategies augment the transportation system with technologies to improve safety and reduce delays.

As funding becomes available, this document will serve as a guide to help determine which strategies to implement, where they apply, and how they will operate. The regional nature of the project list may facilitate joint funding efforts between cities, counties, and ODOT.

Due to rapidly changing technology, ITS plans should be treated as living documents with updates occurring every five years or more frequently if necessary.

plan organization.

The 2021 ITS Plan is organized by the following chapters:

1. **CURRENT CONDITIONS**
2. **VISION, GOALS, AND OBJECTIVES**
3. **USER NEEDS ASSESSMENT**
4. **COMMUNICATIONS PLAN**
5. **ITS DEPLOYMENT PLAN**

Chapter 1 includes a summary of systems, technologies, and Intelligent Transportation System (ITS) practices already in place. Chapter 2 documents the Vision, Goals and Objectives of the plan. Chapter 3 describes the stakeholder process and user needs. Chapter 4 outlines the communications plan that will support transportation requirements for data and video transmission, and Chapter 5 includes the proposed projects along with high-level cost estimates, descriptions, and a map.

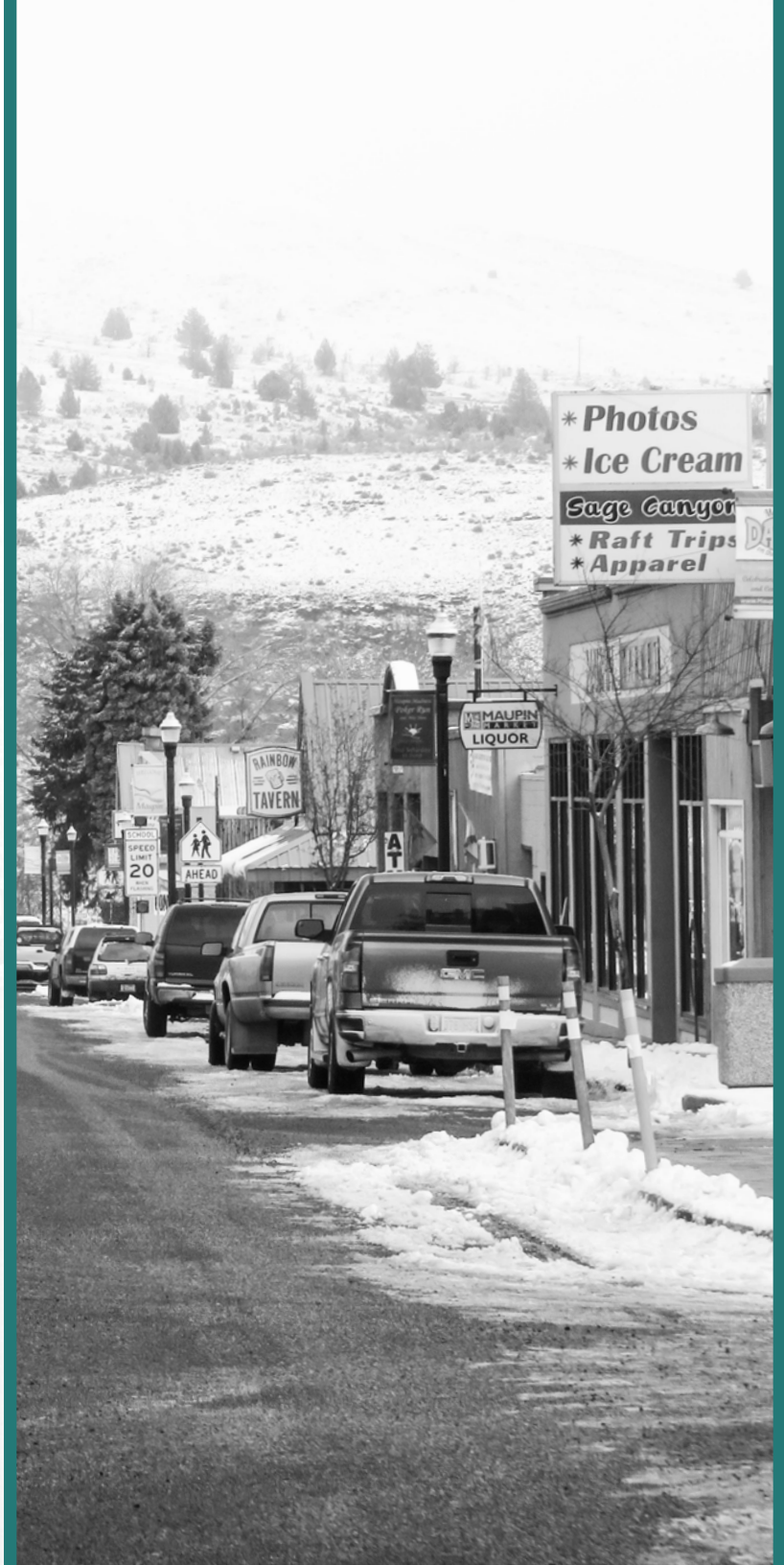
making the case for ITS in rural areas.

ITS strategies improve the safety, operation, and efficiency of the transportation network at a lower cost, and often more quickly, than large capacity solutions. ITS strategies were first deployed in urban areas to address severe congestion but can be uniquely effective in rural areas. Specifically in rural areas, road safety and mobility are impacted by weather, topography, limited route options, limited availability of alternatives to automobile travel, and limited traveler information. When crashes and large weather events occur, they create the potential for lengthy delays, long detours, and severe crashes. This can be detrimental to freight, tourism, and communities who rely on vehicles for travel. Large events can also impact pedestrian, bicycle, and transit options, including the ability to access the transportation system from remote areas.

ITS solutions can be helpful to rural areas by:

- providing location specific solutions for safety and communications
- automating information about remote issues, such as flooding
- automating safety or operational response, such as identifying icy conditions, activating a warning flasher, activating variable speeds, or closing a flood gate
- optimizing the use of personnel, equipment, and assets
- providing real-time information to travelers to manage demand in major seasonal destinations

Rural ITS infrastructure aims to improve quality of life for rural residents and travelers by facilitating safer, more secure, available, and more efficient movement of people and goods.



Strategies Included in the ITS Plan

This plan identifies projects and practices that build on well-established partnerships, and encourages expansion to new opportunities, ensuring that transportation operators in the Lower John Day area can:

- Improve the safety of the transportation system
- Improve the monitoring and management of the transportation system
- Provide improved traveler information
- Develop and deploy cost efficient ITS infrastructure
- Integrate regional ITS projects with those of local and regional partners

To address the specific needs identified by stakeholders in the development of the ITS Plan, several ITS strategies were compiled into an “ITS Toolbox” organized by the six goals of the plan. The toolbox can be found in Chapter 5 (ITS Deployment Plan).

Stakeholder Collaboration

The development of this plan was a collaborative process led by the ODOT and stakeholders located within Gilliam, Sherman, Wasco, and Wheeler counties. The general study area is shown in Figure 1. The plan focuses on both the urban and rural areas of the region and offers ITS strategies to improve transportation throughout the four counties. A full list of stakeholders is included in Chapter 3 of the plan. The unique set of stakeholders ranging from county and city representatives, public transportation agencies, county judges, and state DOTs contributed to a planning process that both identified common needs throughout the four-county area, as well as distinctive issues with specific solutions for each participating stakeholder. This plan will be used by agencies and their partners for local and regional planning, project funding, and implementation.

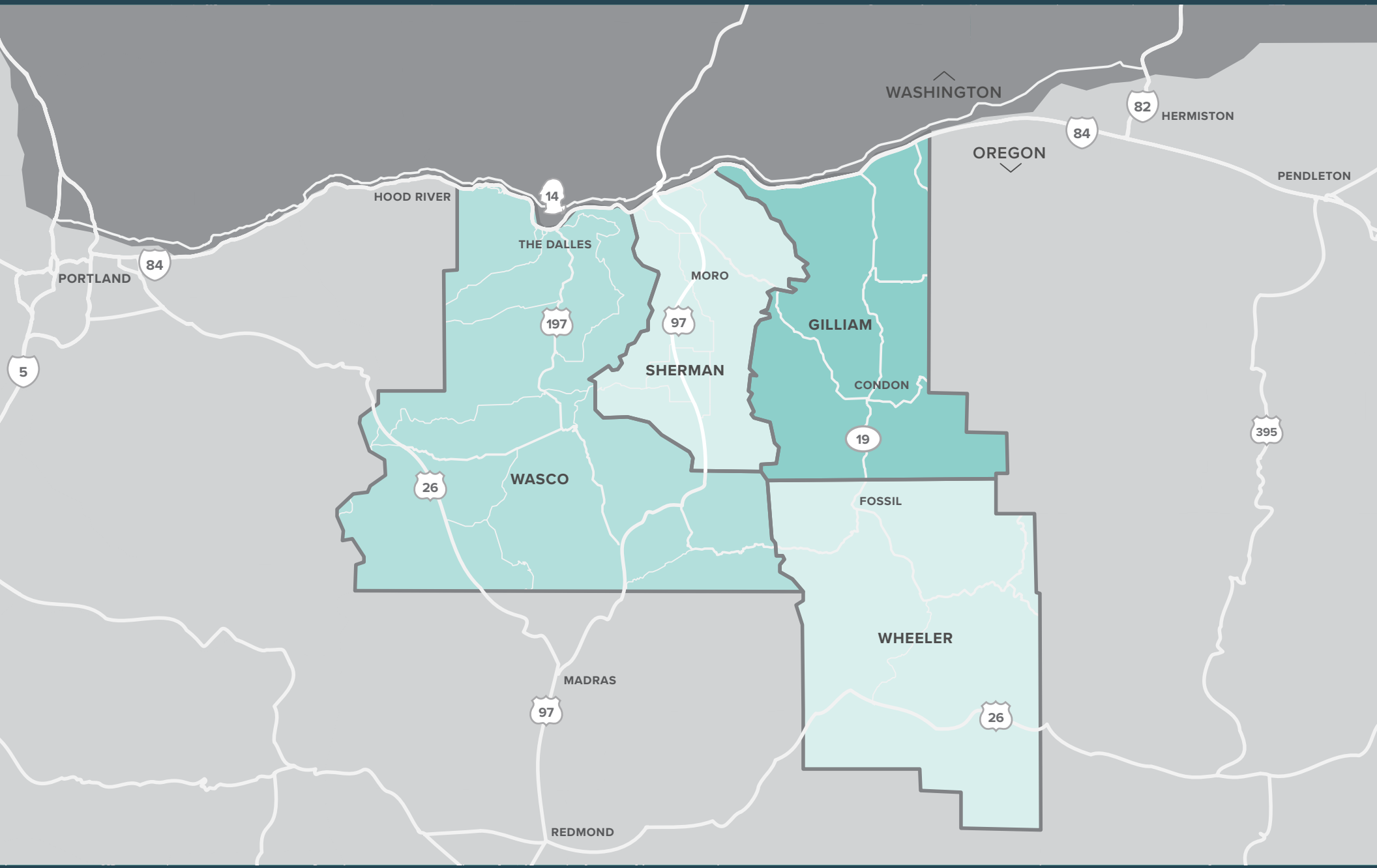


FIGURE 1. LOWER JOHN DAY ITS PLAN STUDY AREA

Relation to Local Agency Planning and Funding Processes

The projects identified in this ITS Plan are encouraged to be incorporated into local comprehensive planning updates within the four-county area to increase funding opportunities. The Lower John Day Area Commission on Transportation (ACT) meets quarterly to review funding opportunities including the State Transportation Improvements Program (STIP) and grants, and projects included in comprehensive plans are preferred. The comprehensive plans, supporting transportation plans, and transportation studies in the region support the safety and mobility objectives, and the equity and economic outcomes that ITS solutions provide. The addition of specific ITS projects to the county plans will indicate action toward these goals, showing commitment to funding entities. A few examples of existing plan language that supports ITS solutions are captured here:

"Continue to work with ODOT to identify and implement measures that will reduce the incidence and severity of motor vehicle crashes..." [1]

WASCO COUNTY 2040 COMPREHENSIVE PLAN, 2020

"...improve transportation services, increase efficiency of service delivery, and expand outreach to meet growing needs." [2]

2020-2024 SHERMAN COUNTY COORDINATED HUMAN SERVICES TRANSPORTATION PLAN

"To incorporate safety and efficiency factors in transportation system design to allow people and goods to travel conveniently." [3]

MORROW COUNTY COMPREHENSIVE PLAN, TRANSPORTATION GOAL 12

Recommends *"enhanced coordination between transportation services and key agencies/organizations"* serving Wheeler County. [4]

WHEELER COUNTY PUBLIC TRANSPORTATION NEEDS ASSESSMENT, 2013

1 Wasco County 2040 Comprehensive Plan, 2020

2 2020-2024 Sherman County Coordinated Human Services Transportation Plan

3 Morrow County Comprehensive Plan, Transportation Goal 12

4 Wheeler County Public Transportation Needs Assessment, 2013

project recommendations.

A total of twenty-nine ITS projects were identified by the stakeholders. Detailed project descriptions, locations, and costs are summarized in the Deployment Plan chapter (Chapter 5) of the ITS Plan. The project list is not prioritized because all projects will bring value, and experience shows funding ITS projects is in large part opportunistic and champion driven. ITS projects are typically constructed in conjunction with other projects, with discretionary funds, and by grants.

Projects are distributed across the Lower John Day area based on need and application. Not all projects proposed in the plan include physical infrastructure. Some of the projects identified are system based and involve technology upgrades rather than physical installations. In some cases, design and siting work needs to be completed before a project can be constructed. Some actions recommend interagency coordination to improve communication and planning. Finally, some of the recommendations are planning level studies to select a preferred option that can be advanced to project development.

Notably, capital costs shown for each project are intended to be illustrative of the magnitude of each project's cost. Cost estimates for projects that include physical components, such as the addition of cameras or signs, were based on current industry estimates for Oregon, and include contingencies. Cost estimates for studies or coordination were estimated based on typical consultant contracts for similarly sized studies or efforts. When projects are selected for implementation, the cost estimates should be reassessed based on more detailed project definitions and potential changes in unit prices based on broader economic activity.

Table 1 provides a breakdown of the estimated capital cost for each geographic county area. It does not indicate which agency is responsible for funding projects. As discussed previously, ITS projects are often funded as a part of other projects, by grants, and benefit from a multijurisdictional effort. Table 2 shows the proposed projects as related to their ITS strategy. The highest cost project grouping is for Traveler Information because this project set includes the addition of variable message signs along I-84.

TABLE 1. ITS PROJECT COST ESTIMATES BY GEOGRAPHIC AREA

COST BY GEOGRAPHIC AREA	CAPITAL COST
TOTAL PROJECTS COMBINED	$19,282,000
AREAWIDE/ MULTI-COUNTY PROJECTS	$13,619,000
GILLIAM COUNTY AREA	$852,000
SHERMAN COUNTY AREA	$1,066,000
WASCO COUNTY AREA	$2,848,000
WHEELER COUNTY AREA	$897,000

TABLE 2. ITS PROJECT COST BY STRATEGY TYPE

COST BY GEOGRAPHIC AREA	CAPITAL COST
TRAFIC MANAGEMENT AND OPERATIONS	$1,833,000
SAFETY	$1,122,000
MULTIMODAL	$950,000
TRAVELER INFORMATION	$14,877,000
DATA MANAGEMENT	$100,000
INCIDENT & EMERGENCY MANAGEMENT	$400,000

actions for implementing the ITS plan.

The following actions are proposed to advance the implementation of the projects identified in this ITS plan. ITS projects are most often implemented in opportunistic ways because they can be built incrementally. For example, fiber might be installed as part of a separate project, and when funding becomes available, cameras are installed.

- Include ITS projects and studies in local planning documents
- Present the ITS Plan to the Lower John Day ACT and request funding support through the STIP
- Continue coordination between ODOT and the Lower John Day agencies for emergency and incident management, perhaps implementing a regional Traffic Incident Management team to serve as a group to advance ITS projects
- Seek opportunities to implement ITS in conjunction with other projects, such as including communications infrastructure during capital project development
- Seek grant funding for ITS projects and communications infrastructure
- Track the Oregon Broadband Strategy and implementation, seeking opportunities to increase communications technologies to the Lower John Day region

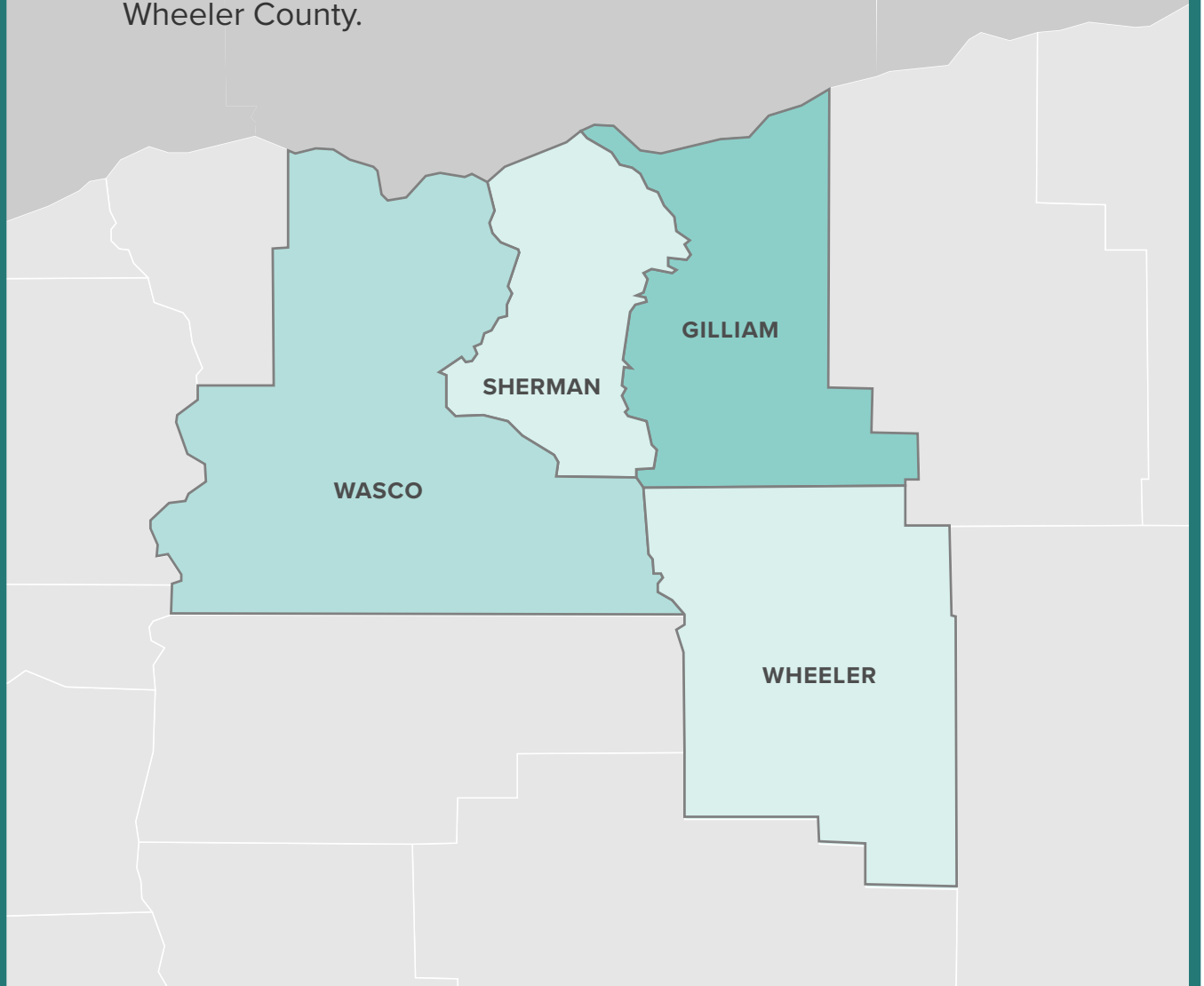
existing conditions.

1

The documentation of the existing ITS infrastructure sets the foundation for defining system needs and developing a project list to be used for ODOT and the four counties as funding becomes available.

introduction.

The following chapter provides an overview of the current transportation system conditions in the Lower John Day Area Commission on Transportation (ACT) that encompasses four counties: Gilliam County, Sherman County, Wasco County, and Wheeler County.



This chapter will describe an inventory of the physical, operational, traffic safety, and travel characteristics of key project transportation corridors in the study area. The inventory includes a summary of the following:

- **KEY REGIONAL CORRIDORS**
- **HIGH CRASH LOCATIONS**
- **TRANSIT OPERATIONS**
- **INTELLIGENT TRANSPORTATION SYSTEM (ITS) ELEMENTS**
- **COMMUNICATIONS NETWORK**
- **EMERGENCY AND INCIDENT MANAGEMENT**
- **FREIGHT MOVEMENT**
- **TRAVELER INFORMATION**

The general study area, including all four counties, is shown in Figure 2 on the following page. Maps throughout the remainder of the chapter will be zoomed in to each county to show the breakdown of the above listed items. Eight key regional corridors are also highlighted in Table 3, summarizing volume trends in 2019.

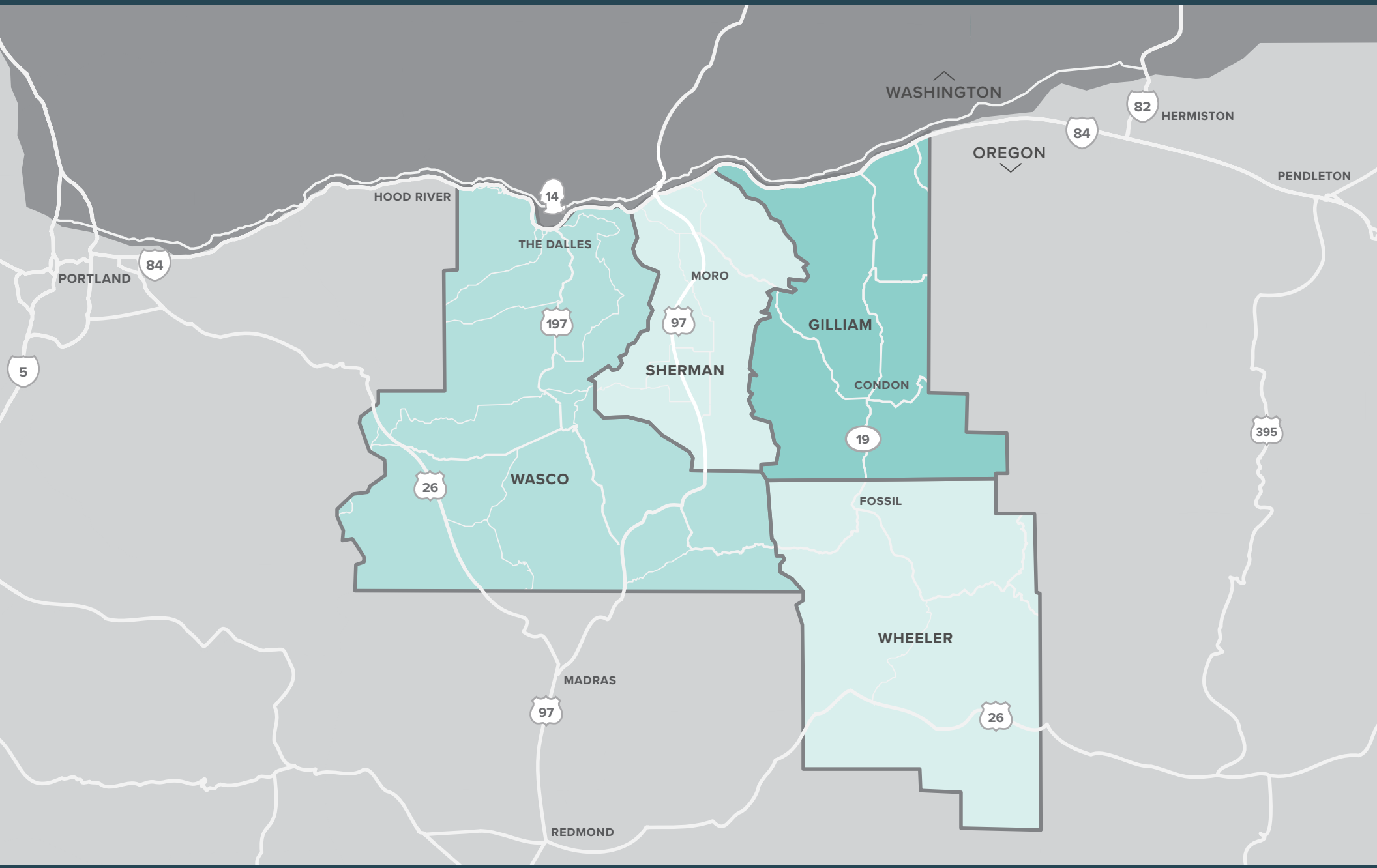


FIGURE 2. STUDY AREA

TABLE 3. KEY REGIONAL CORRIDOR TRENDS

CORRIDOR	LIMITS		COUNTY	APPROXIMATE TRAFFIC FLOW RANGE (AADT*)	APPROXIMATE TRUCK PERCENTAGE
INTERSTATE 84	MP 67.7 – MP 149.5	West of The Dalles	Wasco	20,001-30,000	25%
		The Dalles to US-97	Wasco Sherman	15,001-20,000	35-40%
		US-97 to Boardman	Sherman Gilliam	10,001-15000	35-40%
HIGHWAY 197	MP 0.79 – MP 67.0	The Dalles to Dufur	Wasco	2,501-5,000	15-20%
		Dufur to Maupin		1,001-2500	15-20%
		Maupin to US-97 Junction		0-1,000	27%
HIGHWAY 97	MP 0.0 – MP 74.8	Biggs Junction to Wasco	Sherman	5,001-10,000	45%
		Wasco to Moro		1,001-2,500	45%
		Moro to Grass Valley		2,501-5,000	45%
		Grass Valley to Hwy 293 Junction	Sherman Wasco	1,001-2,500	50-55%
US 26	MP 62.2 – MP 96.5	Western Wasco County border to southern Wasco County border	Wasco	2,501-5,000	20-30%
	MP 49.9 – MP 96.9	Western Wheeler County border to eastern Wheeler County border	Wheeler	0-1,000	30-35%
HIGHWAY 216	MP 0.0 – MP 28.4	Tygh Valley to Grass Valley	Wasco	0-1,000	30-35%
HIGHWAY 19	MP 0.0 – MP 104.7	Arlington to Kimberly	Gilliam Wheeler	0-1,000	25-50%
HIGHWAY 206	MP 0.0 – MP 54.8	Wasco to eastern Gilliam County border	Sherman Gilliam	0-1,000	30-35%
WA STATE ROUTE 14	MP 63.5 – MP 180.7	Bingen to I-97 Junction I-82 Junction	Klickitat (WA)	2,501-5,000	12-14%
		I-97 Junction to SR 221 Junction I-82 Junction	Klickitat (WA) Benton (WA)	0-2,500	20-50%
		SR 221 Junction to I-82 Junction	Klickitat (WA)	2,501-5,000	30-40%

** AADT = Average Annual Daily Traffic. Both AADT values and Truck Percentage values obtained from ODOT TransGIS interface and WSDOT Traffic GeoPortal.*

*** Washington State Route 14 is not geographically located within the Lower John Day ACT, however, it will be included in this planning process due to it's interdependency with I-84 during major events (weather, disaster, detour, etc.).*

high level safety review.

Methodical deployment of ITS can be extremely beneficial for roadways with safety concerns. In general, because of the regional nature of this planning effort, the following safety review will focus on a higher-level review of crash patterns and will recommend ITS solutions for safety risk areas.

Figure 3 details the crashes that occurred between 2016 and 2018 within the study area. Fatal, serious injury, and bicycle and pedestrian related crashes are highlighted to emphasize which roadways need particular attention regarding safety. Table 4 also provides a summary of crashes within each county. Crashes in this high-level safety review are located on both the state and local roadway networks.

TABLE 4. HIGH LEVEL SAFETY REVIEW BY COUNTY

COUNTY	TOTAL CRASHES	FATAL CRASHES	SERIOUS INJURY CRASHES	CRASH TYPE TRENDS
GILLIAM	214	7	7	• Fixed Object most common crash type (including 3 fatal) • "Too Fast" most common crash cause (over 85 crashes) • Three head-on fatal crashes • Majority of crashes occur on I-84
SHERMAN	285	4	14	• Fixed Object most common crash type (including 1 fatal) • "Too Fast" most common crash cause (over 100 crashes) • Two head-on fatal crashes • Majority of crashes occurred on I-84 and US-97 • One SPIS[1] location is identified for 2015-2017 crashes on US-97 just south of Kent. This location is in the 95th-percentile of SPIS scores
WASCO	1,290	23	45	• Fixed Object most common crash type (including 13 fatal) • "Too Fast" most common crash cause (over 300 crashes) • Six head-on fatal crashes • 14 pedestrian involved crashes (3 serious injury) • Several fatal crashes occurred on both US-26 and I-84
WHEELER	87	3	4	• Fixed Object most common crash type • Two head-on fatal crashes • "Other" or "Too Fast" most common crash cause • One SPIS location is identified for 2015-2017 crashes on Highway 19 east of Fossil. This location is in the 85th percentile of SPIS scores

SPIS = ODOT's Safety Priority Index System intended to alert transportation officials to public roadway segments exhibiting unusually high occurrence of crashes. The higher the SPIS score, the higher the potential safety needs for the identified roadway segment.

FIGURE 3. FATAL AND SERIOUS INJURY CRASHES (2016-2018)

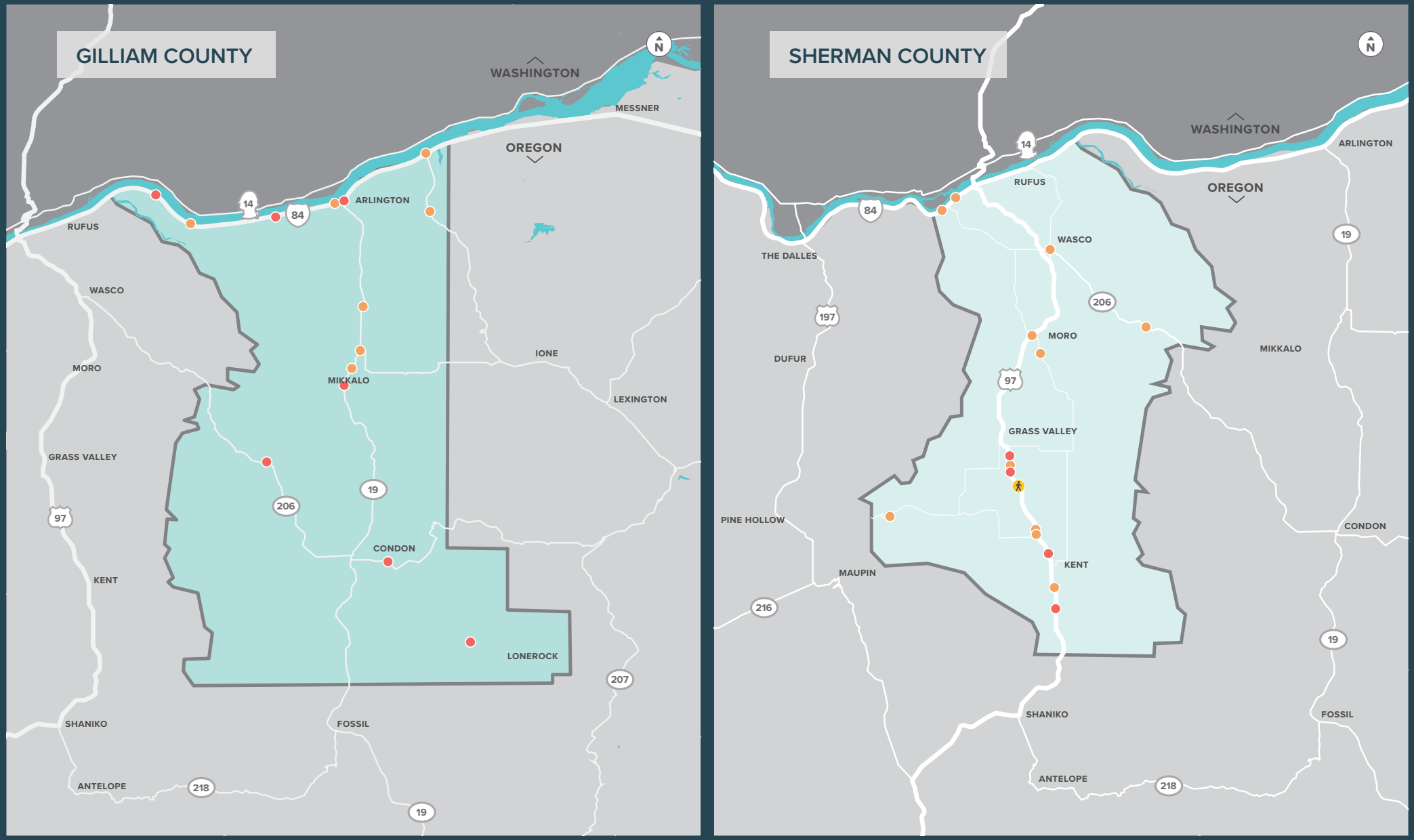
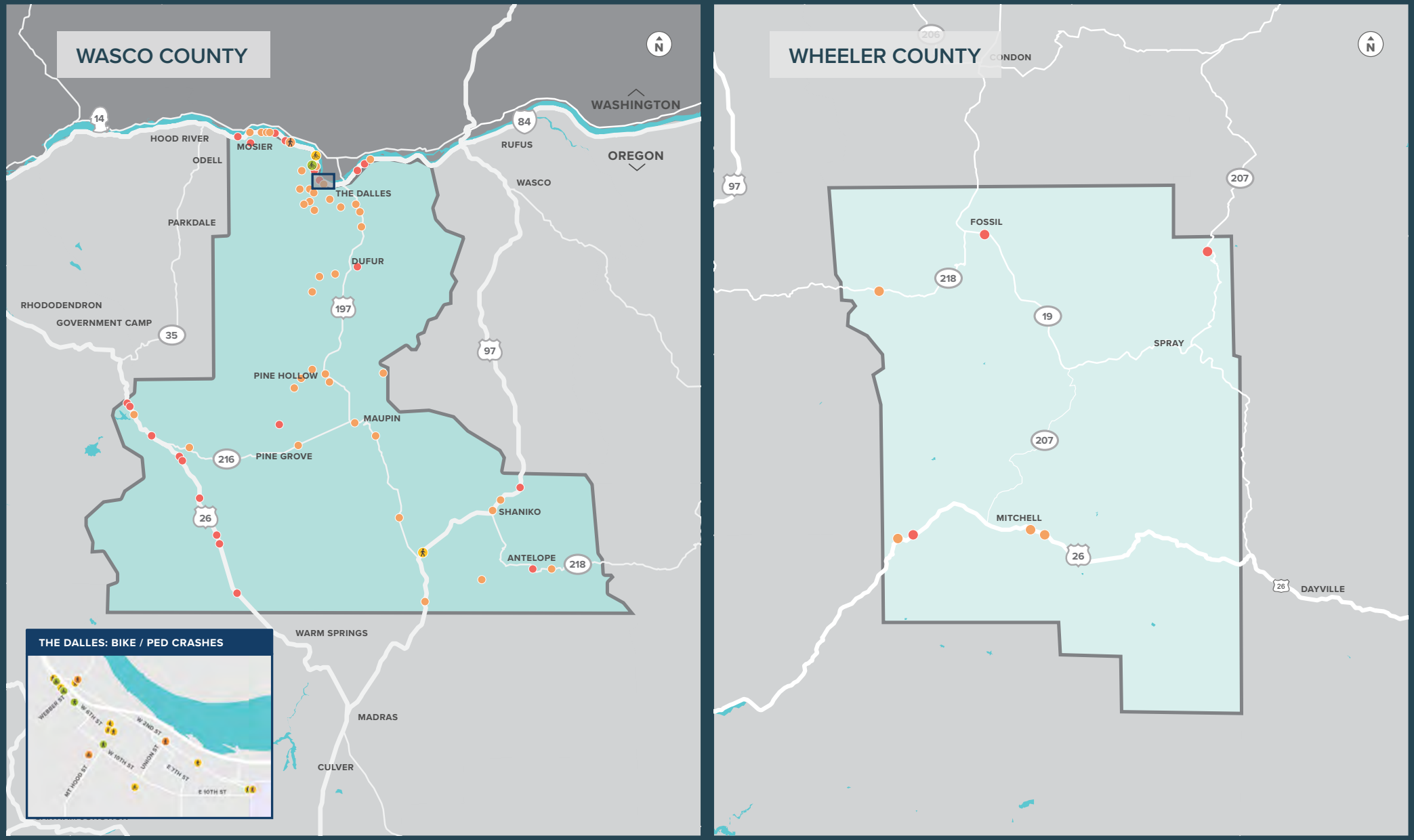


FIGURE 3 (CONT). FATAL AND SERIOUS INJURY CRASHES (2016-2018)



- FATAL INJURY
- SERIOUS INJURY
- PEDESTRIAN CRASH
- BICYCLE CRASH

transit operations.

Demand Response services provided by Sherman, Gilliam and Wheeler County: Public transit in the planning area includes demand response service throughout Wasco, Wheeler, Sherman, and Gilliam Counties as well as deviated fixed route in The Dalles and intercity services along the I-84 corridor.

The Mid-Columbia Economic Development District (MCEDD) provides transit services in Wasco County while Sherman, Gilliam and Wheeler Counties all provide county-wide transit services as a program within each county. The Gorge Translink Alliance is a forum for partnership and coordination of these independently-operated services.

the LINK public transit.

The LINK public transit provides fixed route, Dial-a-Ride service, shopping and appointment shuttles, and regional connections. Each service is described in more detail below:

Deviated Fixed Route

Operates on a loop to key destinations in the The Dalles Monday through Friday from 7:00AM – 6:00PM. The LINK will deviate up to one-quarter of a mile from the established route. Riders may request route deviation by calling the day prior to the desired trip. Rides are $1.50 each.

Dial-a-Ride Service

Provides door-to-door public transportation Monday through Friday from 6:00AM – 6:00PM and Saturday from 9:00AM – 4:00PM. Riders are picked up from The Dalles, Dufur, Mosier, Celilo and points in unincorporated Wasco County. Rides are $1.50 each way.

The Dalles Shopping Bus

Provides door-to-door service to grocery stores and shopping centers in The Dalles on Mondays and Wednesdays from 10:00AM – 2:00PM. The bus visits Hood River on the 3rd Wednesday of each month. Rides are $3.00 for unlimited stops with no shopping bag limit and drivers will help load and unload bags under 25 pounds.

South County Shuttle

Operates every Tuesday picking up riders in Maupin, Tygh Valley, and Dufur for a few hours of shopping and appointments in The Dalles. Riders must call in advance to schedule door-to-door service. Round trip rides are $5.00 for pick ups in Maupin and Tygh Valley and $3.00 round trip rides for pick ups in Dufur.

Celilo-Lone Pine Shuttle

Provides service every Friday between Celilo Village and Lone Pine (Native American communities on the Columbia River and in south Wasco County) and The Dalles for shopping and appointments. Riders are encouraged to book ahead. The service is $3.00 round trip.

The LINK provides regional connections with the following transportation providers:

Columbia Area Transit: Provides service from Hood River to Portland.

Mount Adams Transportation Service: Provides service to Goldendale from The Dalles.

Greyhound: Provides service to Hood River, Portland, and destinations east of The Dalles.

sherman, gilliam, and wheeler county community transit.

Sherman County, Gilliam County, and Wheeler County provide similar Community Transit public bus transportation services throughout their respective counties for shopping and medical appointments. Service is also provided to Portland and other cities for medical appointments and special scheduled events from Sherman County Community Transit. Priority is given to seniors and disabled persons, with service for all others as space allows. Veterans' medical rides are also provided by appointment. There are no required fares, however donations are accepted and encouraged from all riders. All rides must be reserved 24 to 48 hours in advance.

The counties receive ODOT Special Transportation Funds (STF), Statewide Transportation Improvement Funds (STIF), Federal 5310 Capital Funds, and State/Federal Discretionary Grant Funding to enable their transit service.

gorge translink alliance.

The Gorge Translink Alliance is a conglomerate of rural transportation providers, human services organizations and public planning agencies. Their goal is to develop a seamless network of transportation services within the Mid-Columbia River Gorge area and between Portland and Vancouver. Members of the Gorge Translink alliance include:

- **Columbia Area Transit (Hood River County)**
- **The LINK (Wasco County)**
- **Sherman County Community Transit (Sherman County)**
- **Mt Adams Transportation Services (Klickitat County, WA)**
- **Skamania County Public Transit (Skamania County, WA)**
- **Southwest Washington Regional Transportation Council**
- **Human Services Council 1 Call/1 Click Trip Resource Center**
- **Southwest Washington Agency on Aging & Disabilities**
- **Oregon Department of Transportation**
- **Washington Department of Transportation**

The Gorge Translink Alliance can provide assistance in deciding which service to use and how to make connections between counties. Phone numbers and email addresses from the MCEDD are provided on the website.

transit ITS elements.

Transit providers in the Lower John Day region have limited transit technology due to the scale of services required. Apart from The LINK operated by MCEDD, transit programs are run by county staff and are demand response services with a one-person dispatch who answers the phone. The Link supports mobile tickets through the HopThru app and is partnering with other regional fixed-route providers to implement a shared e-fare program. Rider usage of HopThru (e-fare) has been limited.[1]

Drivers communicate with dispatch and destinations via cell phone, which can be a challenge in the rural county areas where cell service is unreliable. The ODOT Public Transit Department (PTD) has a contract with Trillium to keep the General Transit Feed Specification (GTFS) updated for fixed routes, but not for Dial-a-Ride services.

Viable short-term transit technology investments were recently identified as part of a technology assessment for The LINK. A summary of the recommended transit technology priorities is detailed in the *Relevant Documents and Planning Efforts* section at the end of this chapter.

1 Technology Assessment for The LINK in Wasco County, Funded by the Oregon Department of Transportation and Prepared by Full Path Transit Technology, October 2020.

intelligent transportation system elements.

Several ITS devices are currently being operated and maintained throughout the Lower John Day area. The following sections describe the existing ITS devices that are shown in Figure 4. Many of the items below typically require a detailed engineering study or concept of operations to implement. This plan will identify the opportunity for additional installation of ITS devices but will not go into the detail of analysis that is required for implementation. Most devices require State Roadway Traffic Engineer approval.

Closed Circuit Television (CCTV) Cameras

Several Closed Circuit Television (CCTV) cameras are located throughout the four county area. Not all cameras have the ability to pan, tilt, and zoom. Cameras are used to monitor traffic and can be tied to publicly available traveler information sites such as ODOT's TripCheck (see *Traveler Information* section below).

Ramp Meters

There are not currently any ramp meters within the four-county area. Ramp meters are used to control the flow of traffic onto limited access highways, such as I-84, to mitigate congestion. Within the study area, the most significant congestion is experienced more frequently in The Dalles and periodically throughout the rest of the four-county area when road closures and weather incidents and crashes occur.

Variable Message Signs (VMS)

Currently, ODOT operates and maintains Variable Message Signs (VMS) on I-84 and US-97 in Sherman County and on US-26 in Wasco County. VMS can be used to provide traveler information on weather incidents, crashes, road closures, detours, public safety alerts, and more. There are two types of VMS: one will convey messages and the other is used to show a condition.

Fixed VMS are commonly co-located with other ITS devices such as RWIS (definition below) and CCTVs. Portable VMS are used by ODOT and each County for temporary service. These require maintenance workers to manually drive them out to locations in need. VMS require approval of a State Traffic Roadway Engineer on state highways only, local jurisdictions manage their own approval and installation process.

Variable Speed Signs (VSS)

Variable Speed Signs enable speed limits to be changed dynamically in response to traffic and weather conditions. These indications can warn drivers that congestion or roadway weather conditions are ahead to allow for better preparation as they approach the slow down. There are currently no VSS locations within the four counties, however, there are several VSS on US 26 just west of Wasco County on Mt. Hood that could be extended into this area. VSS require approval of a State Traffic Roadway Engineer on state highways only; local jurisdictions manage their own approval and installation process.

Road Weather Information Systems (RWIS)

A Road Weather Information System is placed in the field to collect data from numerous environmental sensors and communicate the data back to the County, ODOT, and to the public via TripCheck (see Traveler Information section). Measurements from these stations include atmospheric, pavement, and/or water level conditions. RWIS devices are an important element of the intelligent transportation system within the study area, as weather events are usually more severe during the wintertime and can affect travel. RWIS devices are also important for monitoring microclimates, or smaller geographic areas where weather differs from the climate of the surrounding area, which exist throughout the region.

Speed Limit Sign Beacon – School Zone

Beacons are added to school speed limit signs to draw attention to the sign when the school speed limit is in effect. Several jurisdictions throughout the four counties use school zone flashers. Flashing beacons on school speed zone signs do not require State Traffic Roadway Engineer approval, however, the school speed zone itself does.[1] Notably, installation still requires engineering analysis to justify the need for this device.

Flashing Treatments

Flashing treatments are warning lights that are used at marked crosswalks or intersections to draw attention to pedestrians or other vehicles entering the intersection. Types of flashing treatments include Rectangular Rapid-Flashing Beacons (RRFBs), Pedestrian Hybrid Beacons (PHBs), and Intersection Warning Systems. They often blink in varying patterns to capture driver awareness. Some flashers at crosswalks can be pedestrian-actuated, but more recent advancements in technology use passive detection of pedestrians to activate the beacons. Other beacons can rely on roadway detection (specifically for intersection warning systems). Several jurisdictions throughout the four counties use flashing treatments. Notably, installation requires engineering analysis to justify the need for this device. Flashing treatments require approval of a State Traffic Roadway Engineer on state highways only; local jurisdictions manage their own approval and installation process.

1 This applies for school speed zones on State highways only. Local jurisdictions manage their own school speed zones.

Vehicle Speed Feedback Sign

Speed feedback signs are interactive signs that are used in conjunction with posted speed signs to measure driver speed while passing the sign. The purpose of the feedback is to encourage drivers to reduce vehicle speeds to match the posted speeds, and often the interactive sign will flash or display a targeted message such as “SLOW DOWN” if a driver is traveling over a certain speed threshold. Several jurisdictions throughout the four counties use speed feedback signs. Notably, installation requires engineering analysis to justify the need for this device and the approval of a Region Traffic Roadway Engineer on state highways.

Curve Warning Sign

Similar to a vehicle speed feedback sign, a curve warning sign notifies drivers of upcoming curves in the roadway that require modified speeds and special attention. The active warning is triggered when vehicles are exceeding the advisory speed as they approach the curve. Several curve warning signs are placed throughout the four counties, however, none of them have active warnings. State Traffic Roadway Engineer approval is required for installation of activated curve warning signs on state highways.

Probe Data

With the rise in Bluetooth-equipped devices in cell phones and in-car systems, Bluetooth probe sensor systems can be used to measure traffic presence, density, flow, and long-term comparative traffic analysis. The system typically includes monitoring of Bluetooth probe devices within radio proximity which is can be used for real time travel time monitoring and stored for future analysis and use. This data can also be used to measure the impact of traffic disrupting events by reporting average travel time, travel time index, and identify locations that experience higher-than-average disruptions. There are two primary methods for agencies to obtain Bluetooth probe data: putting out their own in field sensors or purchasing the data from third-party providers. Statewide, ODOT is not pursuing in-field Bluetooth sensors, and therefore there are not currently Bluetooth sensors within the four-county area. ODOT has purchased access to the RITIS data platform that compiles real-time travel time data across the entire state. With ODOT’s access, the counties and local agencies may also use the platform. ODOT will continue to expand the use of probe data interfaces as their outputs are further verified.

FIGURE 4. EXISTING INTELLIGENT TRANSPORTATION SYSTEM DEVICES

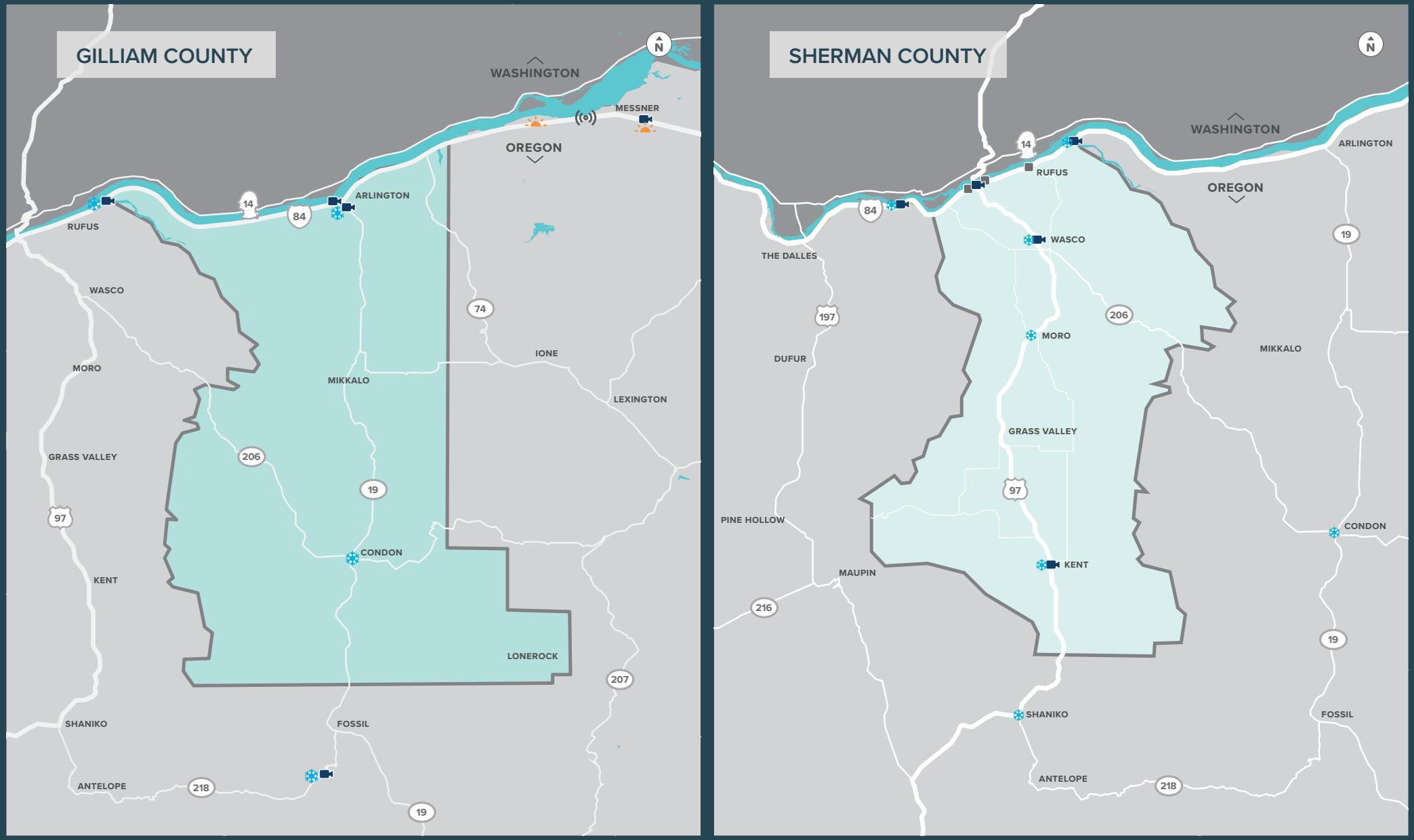
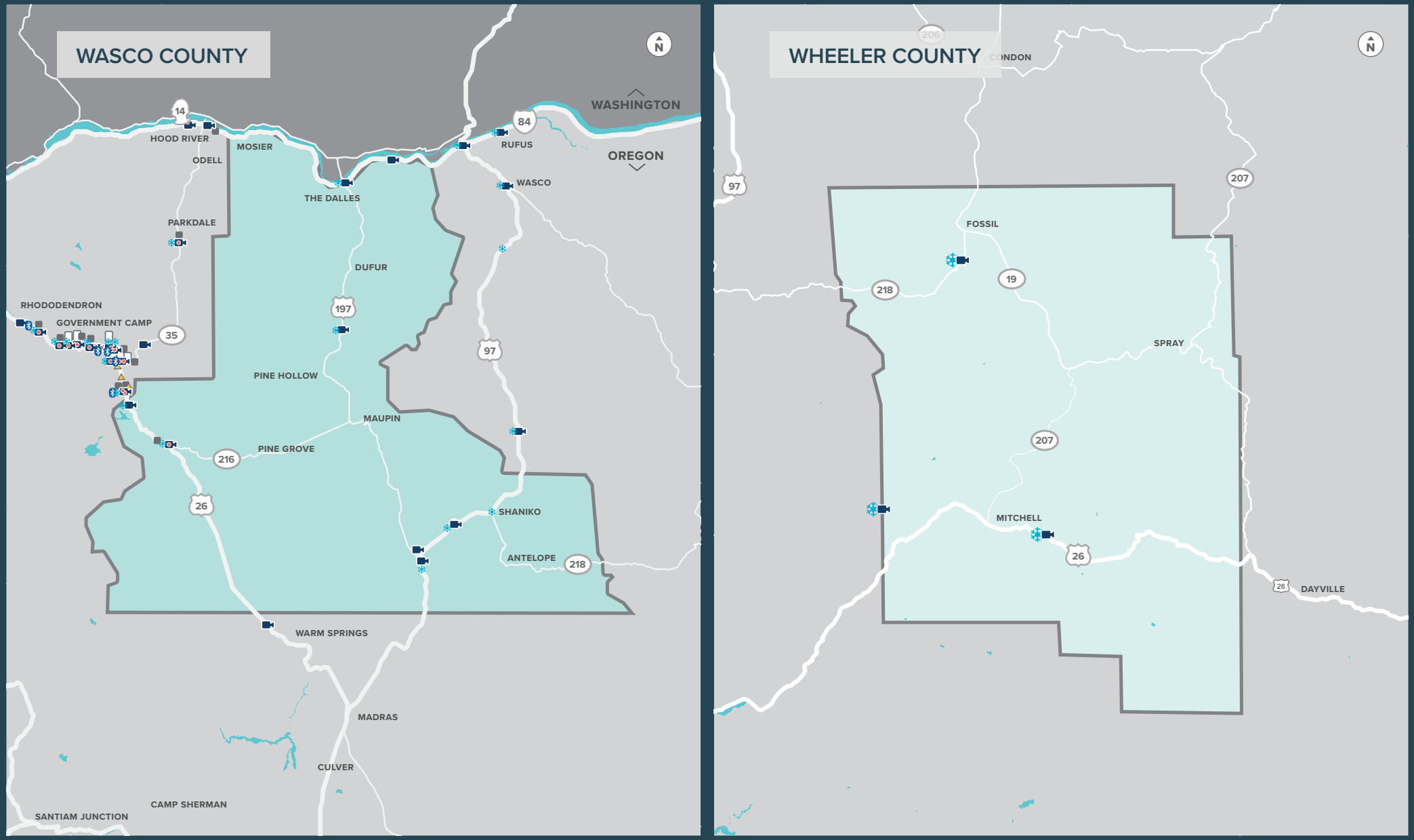


FIGURE 4 (CONT). EXISTING INTELLIGENT TRANSPORTATION SYSTEM DEVICES



communications network.

ITS devices in the field are able to receive and transmit information via a communications network and associated electrical power network.

There are several different ways to build out communications to field devices, including but not limited to radio, cellular telephone, twisted-pair copper, and fiber optic cables connected through secure routing systems. Communication technology can be owned by both public agencies and private third-party companies, which can be beneficial for the connection of agency ITS devices but requires agreements and standards for connection to be in place.

The communications network is one of the most critical components in the deployment of ITS infrastructure for local agencies because it enables them to monitor, control, and operate traffic management devices from remote locations and share information in real time between operations centers to effectively manage the movement of passengers and goods and respond to incidents. Communication infrastructure may be owned and operated by different agencies and may require an Intergovernmental Agreement (IGA) for use to identify operation and maintenance responsibilities. Some traffic management devices require a license per location. Where these central systems are shared between agencies an enterprise license may be the best option to cover all individual agencies. This option may also require an IGA to share the licenses.

The Communications Plan chapter of this report will provide additional information on how to leverage existing future partnerships to build out the communications infrastructure in the Lower John Day area.

emergency/ incident management.

Each county has their own system for responding to emergency situations.

ODOT also operates an incident response program on state highways within the four counties, but they are often not using the same radio frequency as local responders. Coordination between agencies occurs on an ad hoc basis, without formalized incident response or detour routes that cross multiple jurisdictions. The need for a more consistent and documented coordination plan for emergency and incident response will be discussed in greater detail in the User Needs Chapter.

established incident management plans and practices.

ODOT

ODOT operates an incident response program on highways throughout the state, including the Lower John Day area. A statewide Traffic Incident Management Strategic Plan provides overall guidance for ODOT's incident management teams.[1] ODOT also invites local public works agencies to become a part of the Oregon Public Works Emergency Response Cooperative Assistance agreement. The agreement enables public works agencies to support each other during emergencies, provides mechanisms to connect agencies that are in need of resources and expertise with agencies that are able to assist, and sets up the documentation required to seek maximum reimbursement possible from appropriate federal agencies.

In addition, ODOT helps to deliver a nationally developed Traffic Incident Management (TIM) training program to personnel across the responder spectrum with the goal of building a stronger and more coordinated response team at the local level. The training is free and details a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible. Trainers are provided from the statewide ODOT office.

Detour routes for I-84 and US-26 are established within ODOT but are not commonly shared with adjacent agencies. The detour routes for I-84 include highways within the Lower John Day Area, using US-26, US-97, and US-197.

Neighboring counties to the south of the four-county area have active TIM teams. Wheeler County currently participates in the Jefferson County TIM team.

WSDOT

The Washington State DOT has an Emergency Operations Plan to identify the relevant policies, responsibilities, and procedures during a major emergency.[2] In addition to overall best practices for emergency operations, it details standard operating procedures for several different types of events including but not limited to wildland fires and severe storms. Detour routes are established at a region-wide level, however, WSDOT does not have established detour plans for incidents on SR 14 specifically.

WSDOT's Commercial Vehicle Pass System (CVPS) coordinates efforts to keep freight moving, usually during winter weather events. The CVPS allows emergency managers to categorize and prioritize emergency and essential goods during major disruptions and closures to give first priority to disaster relief supplies. Freight traffic needs to apply for a Detour Pass to use emergency detour routes when WSDOT activates the CVPS. Passes can be applied for online.

1 Oregon Traffic Incident Management Strategic Plan, prepared by DKS Associates in partnership with Oregon Department of Transportation and Oregon State Police, December 2015.

2 Emergency Operations Plan, Washington State Department of Transportation Maintenance Office of Emergency Management, May 2011.

frontier regional 911 dispatch.

Frontier Regional 911 is a regional dispatch center covering Gilliam, Jefferson, Sherman, and Wheeler Counties. The structure of emergency managers and first responders vary between counties and local cities, and often rely on maintenance workers or other operations employees to act as first responders.

Citizens can sign up to be alerted about emergencies and other important community news with the Emergency Alert Program.

wasco county 911 communications center.

The Wasco County Sheriff operates the 911 Communications Center for all of Wasco County. The center receives all 911 calls from within Wasco County except for the portion of the county on the Warm Springs Indian Reservation. The center also receives business calls for several emergency response agencies after normal business hours.

fire and rescue districts.

Mid-Columbia Fire & Rescue

Emergency response in northern Wasco County is provided by Mid-Columbia Fire and Rescue. They are physically located in The Dalles, the primary city served by MCFR. Services include hostile fire events (residential, commercial, vehicle and wildland), advance life support ambulance transport service, non-emergency transport, hazardous materials operational response, service calls and other hazardous conditions, technical rescue, low and steep angle rescue, public education, and fire prevention and code enforcement under the Oregon Fire Code.

Oregon Department of Forestry (ODF) Fire Protection Program

Firefighting and forestland protection at the statewide level is provided by the ODF Fire Protection Program, covering 16 million acres of forest across the state. ODF is part of an extensive fire protection network that includes landowner resources, contact crews and aircraft, adults in custody crews, and agreements with public agencies across Oregon, the US, and British Columbia. This program is particularly important for the protected forested land throughout Gilliam, Wasco, and Wheeler counties.[1] The Lower John Day ACT area is served by ODF offices in The Dalles and Prineville.

1 Sherman County does not have protected forestland. It is the only county in the state to not have classified forestland. https://www.oregon.gov/odf/Documents/fire/forestlandclassification/Status_Map.pdf

Other fire and rescue districts within the Lower John Day area include:

1 **GILLIAM COUNTY**

North Gilliam County Rural Fire Protection District (Arlington), South Gilliam County Rural Fire and Protection District (Condon)

2 **SHERMAN COUNTY**

South Sherman Fire District (Grass Valley), Moro Rural Fire Protection District, Rufus Volunteer Fire Department, North Sherman County Rural Fire Protection District (Wasco)

3 **WASCO COUNTY**

Antelope Fire Department, Dufur Volunteer Fire and Ambulance, Juniper Flat Rural Fire Protection District (Maupin), Mosier Fire District, Pine Hollow Fire Department, Wamic Rural Fire Protection District

4 **WHEELER COUNTY**

Fossil Volunteer Fire Department, Mitchell Volunteer Fire Department, Wheeler Point Volunteer Fire Department, Spray Volunteer Fire Department

freight movement.

Freight arrives, departs, or passes through the Lower John Day area via truck and train. Most commercial vehicle traffic utilizes state highways, while train traffic travels along the Burlington Northern-Santa Fe Railroad tracks that generally parallel Highway 97 and Interstate 84. The Palouse River & Coulee City Railroad also traverses the study area, primarily in Gilliam County. The most heavily used routes for commercial vehicle activity are on Interstate 84, Highway 97, and US-26. Traffic on these roadways, designated as Freight Routes in the Oregon Highway Plan, consists of 15 to 25 percent trucks.

traveler information.

ODOT provides most of the traveler information for the Lower John Day area, primarily through the TripCheck website.

In addition, counties and ODOT use social media accounts to spread traveler information. Social media efforts throughout the region are not formally coordinated.

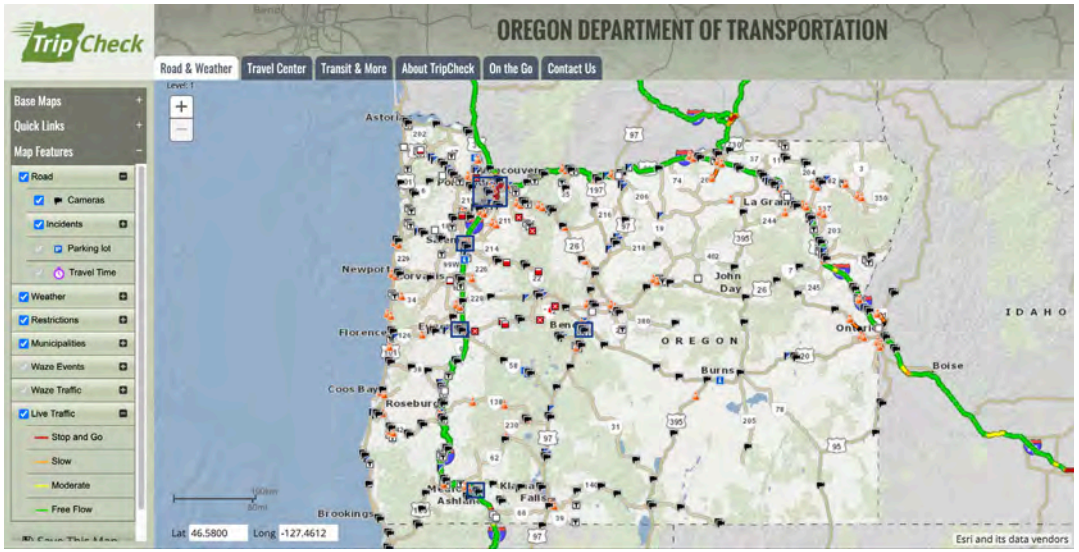
tripcheck.

ODOT's TripCheck is a collection of traveler information systems that provide central locations for distribution of traveler information. TripCheck includes the ODOT website (www.tripcheck.com), TripCheck Traveler Information Portal and TripCheck Local Entry.

TripCheck Website

TripCheck.com includes camera images, road conditions, weather information, incident maps, travel times and construction activity for the state. ODOT continues to add information to TripCheck as new equipment is deployed, and the system is currently serving as a central site for accessing local City and County roadway information. A screenshot of the TripCheck landing page available to the public is shown in Figure 5.

FIGURE 5. ODOT TRIPCHECK LANDING PAGE



TripCheck Traveler Information Portal

TripCheck Traveler Information Portal (TTIP) is a data exchange system that collects traveler information from multiple sources, and provides a data portal to subscribers, formatting the consolidated data as standardized traveler information messages. It enables the sharing of real-time information from multiple sources to any subscriber who is interested in the current status of the roadway system. Multiple providers (public and private) can access the information free of charge and can tailor it for their uses. Local agencies can make their traveler information data available through TTIP using the proper data standards.

TripCheck Local Entry (TLE)

TripCheck Local Entry (TLE) is a website that allows local jurisdictions to enter information about events such as incidents or construction activities in their area that might affect traffic flow. TLE provides direct access to TripCheck.com for posting real-time information on the TripCheck website.

relevant documents and planning efforts.

There are several existing statewide and ODOT Region 4 planning efforts and documents that directly relate to the development of this ITS plan for the Lower John Day area. This ITS Plan is a continuation of plans developed for Statewide program goals and adjacent area TSMO efforts.

THESE EFFORTS INCLUDE:

- **Oregon ITS Architecture Report**
- **ODOT Operations Program Performance Management Plan**
- **ODOT Operations Program Plan**
- **Deschutes County ITS Plan, ODOT Region 4**
- **Klamath County ITS Plan, ODOT Region 4**
- **ODOT Broadband Strategy**

Oregon ITS Architecture Report

This report documents the Oregon Statewide ITS Architecture. ODOT and the FHWA collectively developed the plan, with the outcome being a long-termed phased deployment of ITS projects including advanced technologies and management techniques aimed to improve the safety and efficiency of the transportation system. The architecture provides a framework of policies, procedures, and strategies to integrate the state's existing resources to effectively meet future statewide transportation needs and expectations. Elements of the report include:

- Overview of the National ITS Architecture
- Systems engineering
- Geographic boundary, timeframe, and scope of the Oregon Statewide ITS Architecture
- ITS stakeholders within the state
- Inventory of existing and planned systems
- User services needed in the state
- Market packages that address user services
- Interconnects between systems
- Operations concept plan
- ITS standards
- Project sequencing
- Maintenance plan
- Future considerations

The report was last updated in 2017.

ODOT Operations Program Performance Management Plan

This report details the top priority performance measures to guide management and operations on Oregon's transportation system. The plan documents metrics that are currently in use, and proposes additional metrics for future implementation. Elements of the report include:

- Traffic Incident Management (TIM)
- Transportation Operations Center (TOC) Management
- Mobility
- Traffic Signal Management
- Traveler Information
- Asset Management
- Work Management

This report was updated in June 2021.

ODOT Operations Program Plan

The Operations Program Plan addressed transportation challenges and system gaps in Oregon by recommending management and operations solutions. The solutions are strengthened by the policy context and business case for TSMO.

The report was completed in August 2018.

Deschutes County ITS Plan, ODOT Region 4

ODOT worked collaboratively with Deschutes County and the cities of Bend, Sisters, Redmond, and La Pine, emergency services, Cascades East Transit, Mt. Bachelor, Inc., and the US Forest Service to identify technology solutions to improve safety and management of the transportation system. This ITS plan incorporates newly identified needs and operations in the county, embraces advanced technology, prepares for emerging technologies, and provides support for a more integrated, collaborative system of operations and management.

The report was completed in April 2020.

Klamath County ITS Plan, ODOT Region 4

The Klamath County ITS Plan focuses on improving the operations and safety for the Klamath County roadway network. The development of the plan included collaborative efforts between ODOT, Klamath County, City of Klamath Falls, and the FHWA. It focuses on both the urban and rural areas of the county, with the key goals being to improve the safety and efficiency of the transportation system, improve multi-modal traveler information, and to improve partnerships between agencies that operate the transportation network.

The report was completed in July 2016.

ODOT Broadband Strategy

The ODOT Broadband Strategy, discussed previously as a planning effort relevant to this ITS plan, will provide critical direction to communications infrastructure in the Lower John Day Region.

vision, goals, and objectives.

2

To guide the development and ultimate deployment of intelligent transportation systems in the Lower John Day area, the following chapter will document a vision and accompanying goals and objectives.

vision.

The Lower John Day ITS Plan seeks to optimize the existing transportation network by improving the mobility, safety, and reliability of multi-jurisdictional roadways in Gilliam, Sherman, Wasco, and Wheeler counties by using advanced technologies, establishing agency coordination, and providing real time traveler information.

goals and objectives.

The goals and objectives of the ITS Plan are intended to guide implementation of ITS in the four-county area to achieve the vision. In general, the themes of each goal in this ITS Plan are consistent with the other ITS Plans in ODOT's Region 4 (Deschutes County ITS Plan and Klamath County ITS Plan). This is to ensure consistency in operating and maintaining the state transportation network.

Improve the safety of our transportation system

Improve the monitoring and management of our transportation system

Provide improved traveler information

Develop and deploy cost efficient ITS infrastructure

Integrate regional ITS projects with those of local and regional partners

goals and objectives.

Improve the safety of our transportation system

- Reduce emergency response times
- Reduce frequency, duration, and effects of incidents
- Coordinate incident/security response with local and regional agencies
- Coordinate detour strategies with local and regional agencies

Improve the monitoring and management of our transportation system

- Improve maintenance and operations efficiencies
- Provide weather and road information to transportation agencies to coordinate snow and ice removal
- Account for and incorporate emerging transportation technologies and business models
- Monitor the transportation network using intelligent transportation systems to inform mobility, safety, reliability, and equity-based performance measures

Provide improved traveler information

- Provide real-time traveler information for all users of the transportation system
- Provide real-time road condition and weather information at key regional facilities
- Provide advance and real-time information about construction activities and work zones
- Provide real-time incident information
- Disseminate regional and local traveler information by a variety of media
- Provide travel information prior to travel decision points
- Explore communication with third-party traveler information companies on routing and detours

goals and objectives.

Develop and deploy cost efficient ITS infrastructure

- Deploy systems that are integrated and maximize the use of existing and planned ITS infrastructure
- Deploy systems that are integrated with future transportation infrastructure improvements
- Deploy systems with a high benefit-to-cost ratio, as measured by existing tools to the best of their ability
- Prioritize maintenance and operations solutions, focusing on asset management
- Emphasize intentional and equitable system deployment
- Integrate deployments with other local and regional projects
- Coordinate funding opportunities
- Coordinate deployment with existing and future planning efforts on the local, regional, and state levels

Integrate regional ITS projects with local and regional partners

- Build consensus among the stakeholders
- Share infrastructure resources between local and regional agencies
- Create and build public and private partnerships for ITS deployment, operations, and maintenance
- Incorporate vision and outcomes of regionwide ITS deployment, operations, and maintenance into local comprehensive plan updates and amendment processes

user needs.

3

The assessment of current and future transportation needs provides a basis for the development and evaluation of potential ITS projects.

introduction.

The following chapter contains a summary of transportation system user needs for the Lower John Day region. The user needs are based on input gathered from various stakeholder meetings designed to solicit multi-jurisdictional input from this large study area.

The *Stakeholders and System Users* section lists the stakeholders and key system users for the Lower John Day ITS Plan. These groups had the opportunity to participate in individual interviews to identify and confirm issues and needs that ITS technology might help address. The *Summary of User Needs* section highlights feedback from the stakeholders, organized by the goal areas for this plan:

Safety

Monitoring and Managing the System

Traveler Information

Cost Efficient ITS Infrastructure

Integration with Local and Regional Partners

This chapter describes direct connections between this plan and ODOT's statewide Operations Program Mission and Goals and Oregon's Transportation Plan Goals and Policies.

Based on the needs identified, this chapter provides a set of strategies to help frame the list of deployment plan projects. The strategies are assigned to one or more goal areas, and are also mapped to the following traditional categories of ITS implementation strategies:

- **TRAFFIC OPERATIONS AND MANAGEMENT**
- **PUBLIC TRANSPORTATION MANAGEMENT**
- **TRAVELER INFORMATION**
- **INCIDENT AND EMERGENCY MANAGEMENT**
- **MAINTENANCE AND CONSTRUCTION MANAGEMENT**
- **DATA MANAGEMENT AND PERFORMANCE MANAGEMENT**

stakeholders and system users.

To ensure the success of a regional ITS Plan for the Lower John Day region, a coalition of stakeholders and system users was created to gather input and build consensus on regional needs. A project kick-off meeting was held in September 2020 to introduce all stakeholders to the project. Following the kick-off meeting, personal interviews were scheduled with smaller groups of stakeholders to discuss and verify transportation needs in their respective jurisdictions.

Stakeholders invited to be a part of this planning effort include:

- **Gilliam County**
  - City of Arlington
  - City of Condon
  - City of Lonerock
- **Sherman County**
  - City of Wasco
  - City of Grass Valley
  - City of Rufus
  - City of Moro
- **Wheeler County**
  - City of Spray
  - City of Fossil
  - City of Mitchell
- **Wasco County**
  - City of The Dalles
  - City of Mosier
  - City of Antelope
  - City of Dufur
  - City of Maupin
  - City of Rufus
  - City of Shaniko
- **Mid-Columbia Economic Development District (MCEDD)**
- **Washington Department of Transportation (WSDOT)**
- **Oregon Department of Transportation (ODOT)**
  - Region 1
  - Region 4
  - Region 5
  - District 9
  - District 12
- **Confederated Tribes of Warm Springs**

Due to the COVID-19 pandemic, the kick-off meeting and stakeholder interviews were held virtually. Not all stakeholder jurisdictions listed above were able to attend the stakeholder interviews, however, they were included in the review process of the chapters of this plan.

Input from stakeholders was given significant value in the development of this plan, given that one of the goals is to integrate with local and regional partners. The plan provides a unique opportunity for ODOT and its partners to coordinate investments and management of the transportation system for a safer and more efficient experience for road users. Additional effort is expected to occur within the planning sectors of each jurisdiction listed as a stakeholder to further integrate the user needs and deployment plan with their respective long range planning documents and vision.

connections to ODOT's guiding documents.

This ITS Plan was developed in alignment with goals that already exist within ODOT. This alignment ensures that any implementation of ITS projects from this planning effort are reflective of the overall agency direction for ODOT. Table 5 directly connects the goals identified for this ITS Plan to relevant Oregon Transportation Plan Goals and ODOT's Operation Program Mission and Goals.[1]

1 ODOT Operations Program Plan, August 2018.

TABLE 5. DIRECT CONNECTIONS TO ODOT'S GUIDING DOCUMENTS

PLAN	STATEMENT TYPE	LANGUAGE	APPLICABLE ITS PLAN GOAL AREA
OTP	GOAL 2: MANAGEMENT OF THE SYSTEM	To improve the efficiency of the transportation system by optimizing the existing transportation capacity with improved operations and maintenance.	Monitoring and Managing the System Cost Efficient ITS Infrastructure
OTP	GOAL 5: SAFETY AND SECURITY	To plan, build, operate, and maintain the transportation system so that it is safe and secure.	Safety
OTP	GOAL 7: COORDINATION, COMMUNICATION, AND COOPERATION	To pursue coordination, communication, and cooperation among transportation users, providers and those most affected by transportation activities to align interests, remove barriers, and bring innovative solutions so the transportation system functions as one system.	Traveler Information Integration with Local and Regional Partners
OPS PROG PLAN	MISSION	Move people and goods safely and efficiently.	Safety Monitoring and Managing the System
OPS PROG PLAN	GOAL	Integrate Operations into the appropriate agency projects, policies, plans, and procedures.	Integration with Local and Regional Partners
OPS PROG PLAN	GOAL	Optimize the efficiency and safety of the existing multimodal transportation system.	Monitoring and Managing the System Safety
OPS PROG PLAN	GOAL	Be agile in identifying, adopting, and accommodating effective operations technology and strategies.	Cost Efficient ITS Infrastructure
OPS PROG PLAN	GOAL	Promote safe and efficient travel through communication of accurate and timely transportation system status information and collaboration with public and private partners.	Traveler Information Integration with Local and Regional Partners
OPS PROG PLAN	GOAL	Utilize performance-based strategies to drive operations planning and decision making.	Monitoring and Managing the System Cost Efficient ITS Infrastructure
OPS PROG PLAN	GOAL	Achieve a sustainable Operations Program supported by good asset management practices.	Monitoring and Managing the System Cost Efficient ITS Infrastructure

summary of user needs.

The following section contains a summary of transportation system user needs for the Lower John Day area based on input gathered from the stakeholder interviews. They will be organized by the plan's goal areas:

- Safety
- Monitoring and Managing the System
- Traveler Information
- Cost Efficient ITS Infrastructure
- Integration with Local and Regional Partners

Specific spot locations for user needs identified in stakeholder interviews are shown in Figure 6.

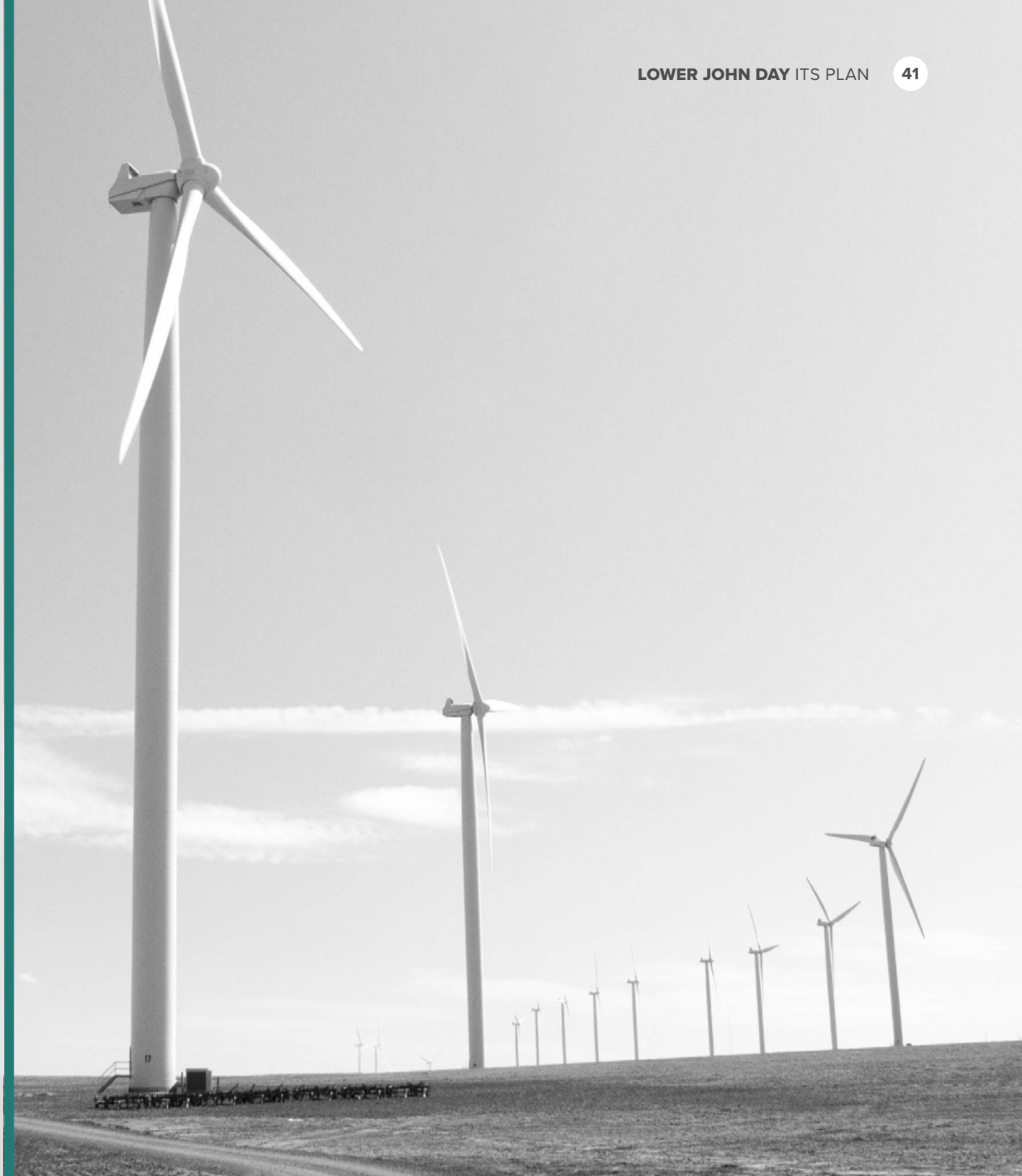


FIGURE 6. STAKEHOLDER IDENTIFIED USER NEEDS

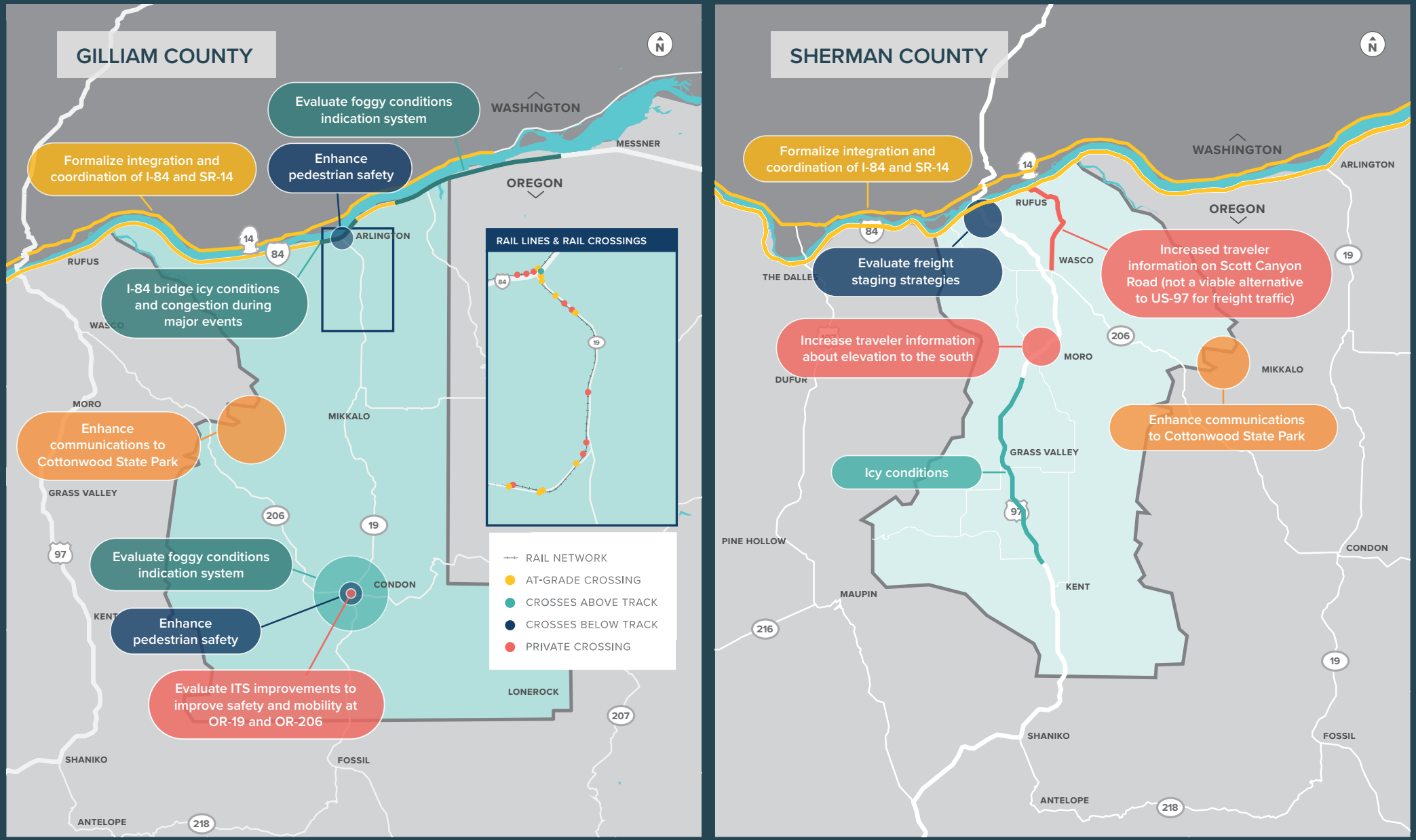
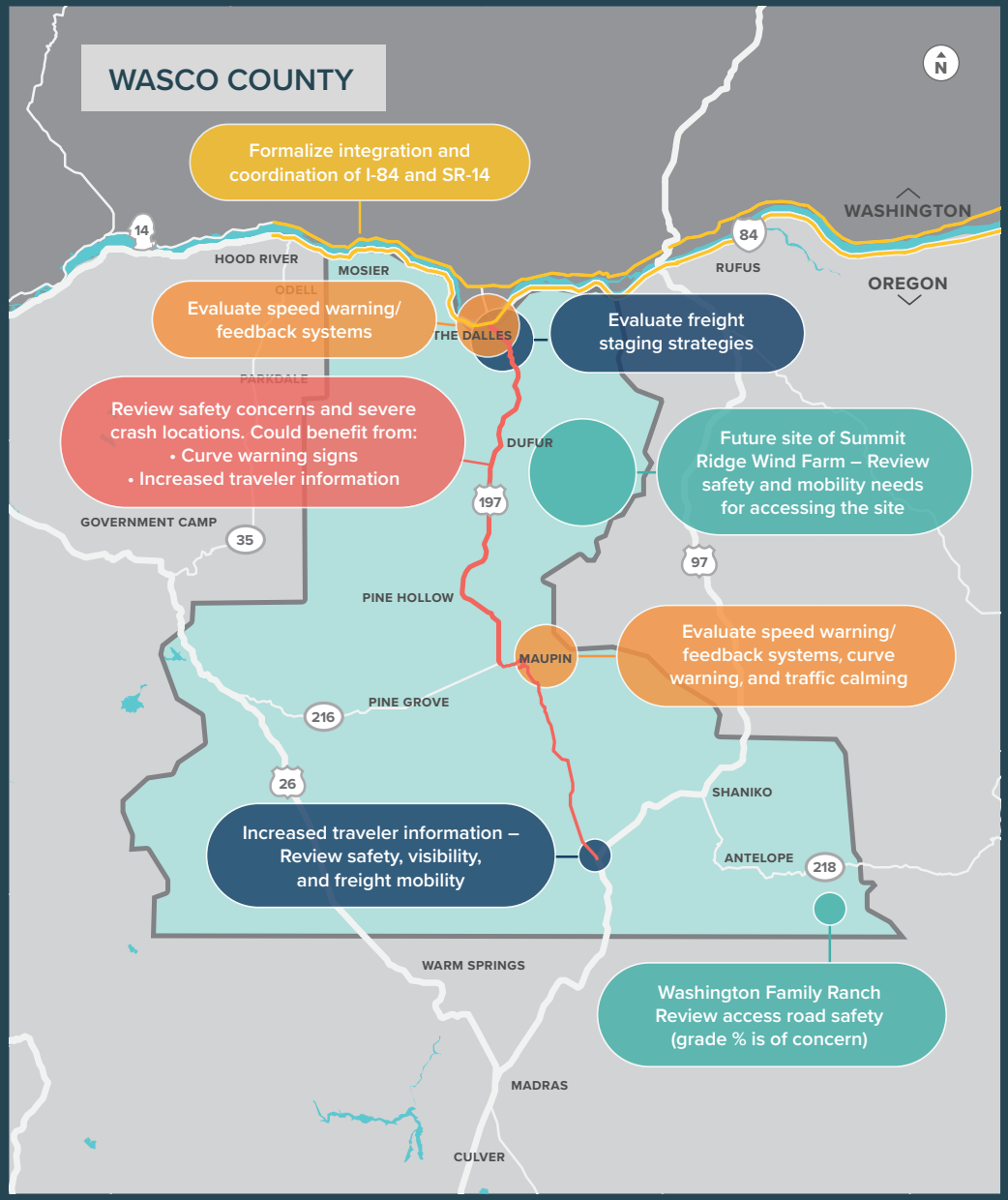
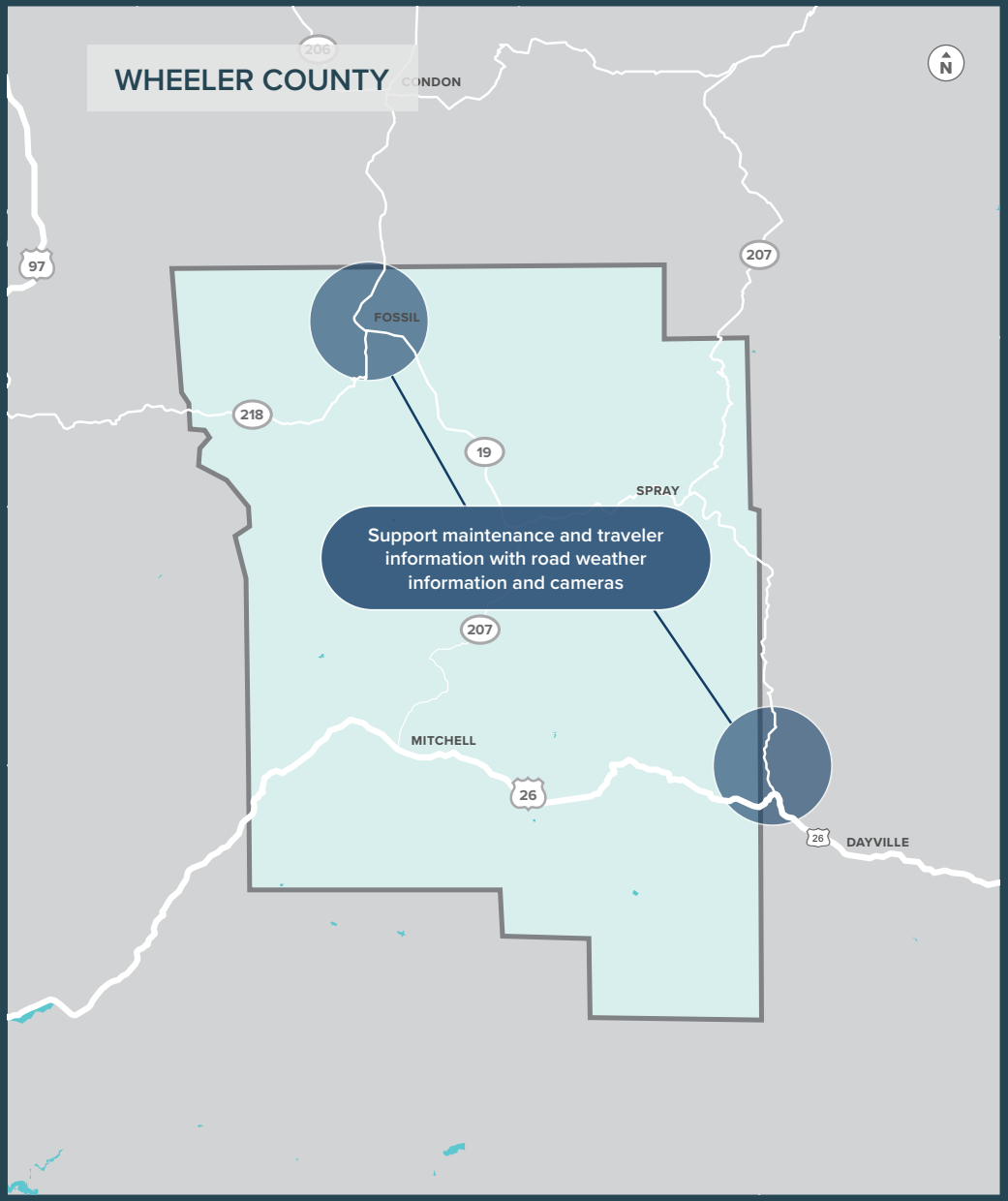


FIGURE 6 (CONT). STAKEHOLDER IDENTIFIED USER NEEDS





Safety

User needs identified by stakeholders related to safety include:

- Opportunity to capitalize on ODOT All Roads Transportation Safety (ARTS) Program for safety projects throughout the region
- Increased coordination of incident response between jurisdictions, including more formalized pre-planning scenarios
- Increase coordination with WSDOT and SR 14 for situational detour routes
- Application of regulatory or advisory variable speed signs to manage incident and weather events
- Evaluate potential ITS solutions at the following locations that were identified with safety concerns:
  - Address the following in Condon:
    - Foggy conditions
    - Speed control on the State highways through town (Main St/Hwy 19 @ the Park, Hwy 2016/Walnut St, specifically at crossings near schools and parks)
    - Pedestrian safety along Main Street/Hwy 19 from Spring Street to Trimble St (specifically at Bayard/Washington)
  - Maupin (roadway curves)
  - Roadways south of Moro (icy conditions)
  - Roadways south of Grass Valley (foggy and icy conditions)
  - Rail crossings at waste management facility in Arlington (unsafe driving behavior at crossings)
  - I-84 bridge in Arlington (icy conditions and congestion during major events)
  - 3-way stop at OR-19 and OR-206 in Condon (traffic control upgrade)
  - Additional sidewalks in Condon and Arlington (pedestrian safety)
  - Highway 197 in Wasco County limits (windy roads and severe crash locations)
  - Rural Wasco County roads (recreational bicycling conflicts with heavy vehicles)
  - Intersection of Highway 197 and US 97 (limited visibility, significant amount of heavy vehicle traffic)
  - Wasco County Washington Family Ranch driveway (grade challenges)
  - I-84 boundary with Region 5 (foggy conditions)
- Lack of redundancy in emergency evacuation routes
- Limited availability of emergency services throughout the Lower John Day region, especially outside of The Dalles
- Lack of Traffic Incident Management (TIM) group

Monitoring and Managing the System

User needs identified by stakeholders related to monitoring and managing the system include:

- Increased remote monitoring of the system to negate the reliance on maintenance workers to field verify issues. Cameras and RWIS would be beneficial at the following locations:
  - Condon
  - I-84 bridge in Arlington
  - Rail crossings in Arlington
  - Fossil
  - Picture Gorge (near the John Day River)
- Increased remote monitoring of severe and dangerous weather conditions that are common:
  - Icy road/snow conditions
  - Foggy conditions
  - Wildfire events
- Additional control of traffic approaching rail crossings and/or additional warning systems
- Evaluation of speed control techniques in The Dalles
- Evaluation of speed control techniques entering Maupin on Highway 197
- Increased monitoring of weather and road conditions on mountain passes in Wheeler County
- Increase fiber optic network to better communicate with devices in the field, troubleshoot issues remotely, and prepare the region for the future of connected and autonomous vehicles
- Coordinate with ODOT Region 5 on their automatic ramp gate systems along I-84 outside of the project area, particularly near Boardman and the north east county area

Traveler Information

User needs identified by stakeholders related to traveler information include:

- General increase in traveler information regarding parallel routes, closures or congestion, weather information, and detour route information
- Increased information at traveler decision points throughout the four-county area to provide drivers as much information as possible before selecting a route and/or warning them what to expect ahead. These locations include:
  - Highway 197 and Highway 97 junction
  - Several locations along Highway 197
  - Bridge locations over the Columbia on both I-84 and SR-14
  - I-84 near Boardman
  - Additional locations on I-84 and on county roads that feed into I-84
  - Grass Valley area
  - Highway 206 at Cottonwood State Park
  - Scott Canyon Road (alternative to US 97)
- Increased traveler information at rest stops, potentially signage directing travelers to a web-based application rather than physical traveler information kiosks
- Priorities for ODOT District 9:
  - VMS at various locations to support District Closure Plan where PCMS are often used:
    - WB I-84 – Prior to Exit 87
    - EB OR 216 at US 197
    - EB OR 216 at US 26
    - NB US 97 at US 197
    - Top of Ramp at EB I-84 at M.P. 87
  - CCTV at various locations to support operational awareness and provide traveler information along key corridors:
    - OR 216 at US 197
    - OR 216 at US 26
- Coordinated planning for the placement of Variable Message Signs to optimize operations during key events
- Evaluate communication solutions that warn drivers on county roads of slow-moving users ahead
- Evaluate communications solutions to deter freight vehicles from traveling down remote, unpaved, unpredictable roads that currently result in a significant number of rescues
- Continuation of using and integrating social media to crowdsource and disperse traveler information

Cost Efficient ITS Infrastructure

User needs identified by stakeholders related to cost efficient ITS infrastructure include:

- Capitalize on potential partnership opportunities for fiber optic network with private companies (Facebook, Google, local utility networks, etc.)
- Additional infrastructure to enhance communication between first responders and maintenance crews to prevent extra work
- Leverage opportunities to use a variety of funding sources (STIP, CIP, Quick-Fix, ARTS, SRTS, etc.) to implement ITS infrastructure
- Ensure that infrastructure identified in the plan is both cost efficient a nd contributing to equitable and comfortable transportation options for getting people to goods and services
- Acknowledgment of the funding levels of maintenance, operations, and asset management
- Continuation of exploring partnership opportunities with incoming developments or existing businesses to share the funding of planning and implementation of ITS devices
- Balance the rural nature of the county with technology advancements
- Recommend ITS improvements with the future of 5G technology in mind

Integration with Local and Regional Partners

User needs identified by stakeholders related to integration with local and regional partners include:

- Incorporate WSDOT Emergency Operations Plan
- Establish multijurisdictional Traffic Incident Management (TIM) consortium
- Integrate detour routes at the planning level between SR-14 and I-84
- Coordinate ITS improvements with Region 5 I-84 Corridor Management Project
- Increase coordination between first responders and ODOT
- Increase coordination with ODOT Region 1
- Integrate ITS Plan with the following planning efforts occurring in the near future:
  - City of Mosier Comprehensive Plan Update
  - City of Maupin Highway 197 Urban Design and Multimodal Upgrade
  - Wheeler County TSP Update
  - Wasco County TSP Update
- Evaluate freight staging strategies in The Dalles, Biggs Junction
- Increase coordination between jurisdictions to build redundancy in emergency evacuation routes and establish scenarios for realistic detour routes
- Include input from Warm Springs Reservation for any changes recommended for US-97 impacting the Reservation
- On a regional level, anticipate increased level of tourism as Wasco County zoning changes are made to include a destination/resort overlay
- Evaluate transportation impacts of construction of wind turbine farm in Wasco County

applicable ITS strategies.

This section describes applicable strategies for deployment of ITS devices in the Lower John Day region. The following tables detail strategies within the traditional categories of ITS implementation strategies, mapped to the goals of this plan.

TABLE 6. TRAFFIC OPERATIONS AND MANAGEMENT ITS STRATEGIES

Safety

- Connected vehicle technology for bicycle and pedestrian safety
- Enhanced pedestrian signals
- Active traffic management/ variable speeds
- Detour route management
- Traffic monitoring cameras
- Advanced railroad grade crossing information

Traveler Information

- Detour route management
- Traffic monitoring cameras
- Advanced railroad grade crossing information

Cost Efficient Infrastructure

- Integrated corridor management
- Detour route management
- Communications infrastructure gap closure
- Traffic monitoring cameras

Monitoring & Management

- Truck signal priority
- Active traffic management/ variable speeds
- Integrated corridor management
- Detour route management
- Communications infrastructure gap closure
- Traffic monitoring cameras
- Advanced railroad grade crossing information

Integration with Partners

- Truck signal priority
- Connected vehicle technology for bicycle and pedestrian safety
- Enhanced pedestrian signals
- Active traffic management/ variable speeds
- Integrated corridor management
- Detour route management
- Communications infrastructure gap closure
- Traffic monitoring cameras
- Advanced railroad grade crossing information

TABLE 7. PUBLIC TRANSPORTATION MANAGEMENT ITS STRATEGIES

Monitoring & Management

- Flexible Park-and-Rides during special events

Traveler Information

- Flexible Park-and-Rides during special events
- Real-time transit arrival information
- Data sharing for trip planning
- Multimodal travel coordination

Cost Efficient Infrastructure

- Transit pass bundled with other products
- Electronic payment system enhancements

Integration with Partners

- Flexible Park-and-Rides during special events
- Real-time transit arrival information
- Transit pass bundled with other products
- Electronic payment system enhancements
- Data sharing for trip planning
- Multimodal travel coordination

TABLE 8. TRAVELER INFORMATION ITS STRATEGIES

Safety

- Variable message signs

Monitoring & Management

- Variable message signs
- Regional parking information systems
- Communicating / data sharing with 3rd party providers

Traveler Information

- Variable message signs
- Regional parking information systems
- Communicating / data sharing with 3rd party providers
- Trip planning

Cost Efficient Infrastructure

- Communicating / data sharing with 3rd party providers

Integration with Partners

- Regional parking information systems
- Communicating / data sharing with 3rd party providers
- Trip planning

TABLE 9. INCIDENT AND EMERGENCY MANAGEMENT ITS STRATEGIES

Safety

- Information about roadway constraints on diversion routes
- Scenario planning for emergency response
- Route planning for emergencies and special events
- Coordination with public transportation for emergency response and special events
- Technology for detour routes (VMS, route notifications to 3rd party trip planners, permanent signage, etc.)
- Monitoring cameras on incident response vehicles
- Emergency information dissemination
- Improve coordination between 3rd party routing for preferred detour routes

Traveler Information

- Information about roadway constraints on diversion routes
- Scenario planning for emergency response
- Route planning for emergencies and special events
- Coordination with public transportation for emergency response and special events
- Technology for detour routes (VMS, route notifications to 3rd party trip planners, permanent signage, etc.)
- Monitoring cameras on incident response vehicles
- Emergency information dissemination
- Improve coordination between 3rd party routing for preferred detour routes

Integration with Partners

- Information about roadway constraints on diversion routes
- Scenario planning for emergency response
- Route planning for emergencies and special events
- Coordination with public transportation for emergency response and special events
- Technology for detour routes (VMS, route notifications to 3rd party trip planners, permanent signage, etc.)
- Monitoring cameras on incident response vehicles
- Emergency information dissemination
- Improve coordination between 3rd party routing for preferred detour routes

Monitoring & Management

- Technology for detour routes (VMS, route notifications to 3rd party trip planners, permanent signage, etc.)
- Improve coordination between 3rd party routing for preferred detour routes

Cost Efficient Infrastructure

- Technology for detour routes (VMS, route notifications to 3rd party trip planners, permanent signage, etc.)

TABLE 10. MAINTENANCE AND CONSTRUCTION MANAGEMENT ITS STRATEGIES

Safety

- Smart work zone systems
- Region-wide construction work zone management and monitoring
- Enhanced snow plow operations
- Winter road status sharing information system

Monitoring & Management

- Region-wide construction work zone management and monitoring
- Infrastructure monitoring technology
- Enhanced snow plow operations
- Winter road status sharing information system

Traveler Information

- Smart work zone systems
- Region-wide construction work zone management and monitoring
- Winter road status sharing information system

Cost Efficient Infrastructure

- Smart work zone systems
- Infrastructure monitoring technology
- Enhanced snow plow operations
- Winter road status sharing information system

Integration with Partners

- Region-wide construction work zone management and monitoring
- Winter road status sharing information system

TABLE 11. DATA MANAGEMENT & PERFORMANCE MEASUREMENT ITS STRATEGIES

Monitoring & Management

- Automated data collection
- Open transportation data sharing with regional partner agencies
- Data integration with 3rd party transportation data providers
- Traffic monitoring video sharing with other agencies

Traveler Information

- Automated data collection
- Traffic monitoring video sharing with other agencies

Cost Efficient Infrastructure

- Automated data collection
- Data integration with 3rd party transportation data providers
- Traffic monitoring video sharing with other agencies

Integration with Partners

- Open transportation data sharing with regional partner agencies
- Data integration with 3rd party transportation data providers
- Traffic monitoring video sharing with other agencies

communication plan.

4

The communications network supports connectivity required for ITS technologies between selected points in the region.

introduction.

This chapter outlines the communication plan for the Lower John Day region to support transportation infrastructure. The chapter includes an overview of existing communications in the region and identifies opportunities where new communications would provide a significant benefit.

There are several benefits to having an extensive communications network and connected ITS devices:

- Transportation operators can use equipment to collect real-time data to efficiently assess traffic safety conditions
- With real-time data, transportation operators can relay critical information to the public to allow travelers to make informed route decisions
- Transportation operators and maintenance workers can efficiently check the status of equipment, including its real-time functionality, maintenance, and repair

In addition to the direct benefits to agencies who own and operate transportation infrastructure, a connected communications network can:

- Provide the opportunity for public agencies to partner with private service providers to share conduit
- Establish future potential to combine infrastructure to increase community access to high-speed internet

statewide broadband development.

The ODOT Broadband Strategy, discussed previously as a planning effort relevant to this ITS plan, will provide critical direction to communications infrastructure in the Lower John Day Region.

communications technology.

The communications network is the backbone of an ITS plan, providing connections between transportation management technologies so that information can be shared and acted on.

The network includes the transmission technology and the connection points. Transmission technology includes fiber, wireless and fiber broadband, cellular, and radio, and connects technology including signal controllers, pedestrian flashing lights, video cameras, variable message signs, and communications centers such as traffic management centers, emergency services, and public agencies.

When connecting with a communication center, such as ODOT's traffic operations center, security is a primary concern because the center controls signals, variable message signs, and other traffic control and information devices. ODOT requires a secure network switch and firewall rules to connect. Local agencies may require intergovernmental agreements (IGAs) to provide ODOT access to local devices.

The following section describes the communications options and identifies a preferred method.

Twisted Pair Copper

Twisted pair copper cable was the original physical plant used for communication networks. The most significant drawback of twisted pair plant is the narrow bandwidth it can provide. Although compression techniques have greatly improved data speeds, they are still generally limited to low-speed data unless costly multiplexing equipment is utilized. In many cases it may be feasible to intercept twisted pair cables with fiber optic cable and connect low data ITS devices that are not located on the backbone or distribution routes using the existing twisted pair cables. Some technologies that may be considered support video over twisted pair copper, with varying degrees of quality and performance.

Using twisted pair copper plant in this manner could provide a cost-effective method of serving some local, low data devices. It would also reduce the overall length of the twisted pair route, improving transmission quality.

Wireless

As the roadway right-of-way has become increasingly congested with cable plant, wireless systems have increased in suitability. Recent developments are making these systems more cost effective and increasing the bandwidth that they can carry. Many options exist for low-speed systems that do not require FCC licensing to operate. This simplifies their deployment but does not reserve a particular frequency for use. In urban areas there is the increasing risk of interference between systems in use.

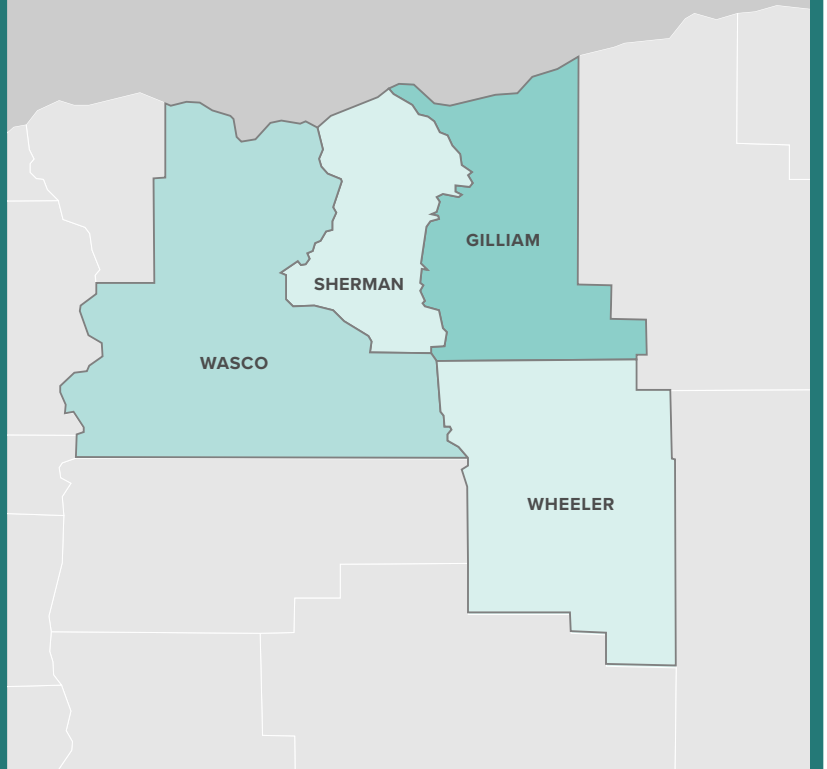
Some agencies use frequencies reserved for public safety for wireless transmissions but are still experiencing interference with other wireless operators. However, when compared to the high cost of cable installation, wireless systems are a viable choice. It is expected that they can provide the greatest cost benefit for low-speed links in congested areas and could be considered for short haul communication to ITS devices. Wireless communications may also be considered for remote, low data devices and possibly for phased implementation.

Fiber (Preferred)

Fiber optic cable has become the preferred choice of physical plant installations for ITS systems. Fiber optic systems can carry very large bandwidth on a single fiber and cost-effective transmission systems are available for CCTV video signals. Fiber has the advantage of low signal loss, allowing signals to be carried large distances without repeaters.

existing communication infrastructure.

Several virtual meetings and phone calls were conducted with individual county administrative judges and commissioners to gain an understanding of the current state of communication infrastructure within each county in the Lower John Day region. The following sections provide a summary of these conversations.



challenges and opportunities.

Area Wide

Communications infrastructure in the Lower John Day region is significant compared to what is typically found in rural areas. This is due to the commitment of local leaders to secure Covid related grant money for the expansion of internet service to support workers and students in their communities. Cell coverage throughout the Lower John Day region is relatively complete along the north side of the region near I-84 and is reduced as one moves south away from the freeway. Cellular coverage maps provided by OpenSignal.com (includes all cell providers) show that the cell service follows major highways and clusters at towns. Gaps in service appear where there is a significant distance between towns, in canyons, and in mountainous areas.

Most cities have WiFi connections and good coverage to the households within the cities, but additional city-to-city communications are needed along transportation routes in all four counties.

All four counties receive first responder communication support from Frontier Telenet.

Frontier Telnet is an independent governmental agency authorized by the Oregon Public Utility Commission to provide telecommunications services in rural Oregon. The agency was created under Oregon Revised Statutes Chapter 190 (ORS 190) and is controlled by a board of directors made up of the Wheeler, Sherman, and Gilliam County judges.

Gilliam County

Communications throughout Gilliam County are well connected within the limits of each city. Three internet service providers are available throughout the region: CenturyLink, Arlington TV, and Gorge Net. Areas of the County that are closer to I-84 have better access to communications infrastructure, as other areas of the county have interrupted signal due to the mountainous terrain. Communications between towns is somewhat limited, however a middle mile fiber line currently connects Condon and Arlington along Highway 19. Future needs of Gilliam County include providing additional middle line fiber connections between towns.

Sherman County

Communications is available throughout most of Sherman County. The county has successfully used grain elevators and existing cell towers to expand the communications network within and between towns and employs temporary cell repeater trailers to improve coverage. Cottonwood State Park is an area identified for improved communications. A tower is planned for this area.

Wasco County

Wasco County has communications infrastructure available within city limits and along the I-84 corridor. Specifically, the City of The Dalles, the City of Dufur, and the City of Maupin have extensive communications network access. The terrain throughout the county hampers wireless communications, however, there are key locations outside of city limits the County would like to prioritize in future expansions of the communications network to improve safety including the interchanges of OR 216/US 26, and US 197/US 97.

Wheeler County

Communications networks outside of populated areas are limited in Wheeler County. Communications networks exist within the city limits of Fossil, Spray, and Mitchell, but are limited outside of populated areas in Wheeler County. There are currently no specific plans to improve communications throughout the rest of the county, however, there is a need to expand wireless coverage to support maintenance workers and improvements to the traveler information system.

project implementation.

Several different types of projects are recommended in the Deployment Plan chapter of the ITS Plan. To better serve the needs of the four counties and to improve their ability to actively monitor, manage, and operate the transportation network, each project implemented from this planning effort should be reviewed on a site-specific basis for potential inclusion of communications infrastructure.

Generally, fiber optic communications are preferred for fast, reliable information transmission. Considering communications infrastructure may require altering project specifications, however, the project design team should consider the benefits of a connected communications network before making final decisions.

deployment plan.

5

The ITS Deployment Plan identifies the activities, programs, and projects for the Lower John Day region. The projects were selected to meet the specific needs of the region with the input of the local agency partners.

introduction.

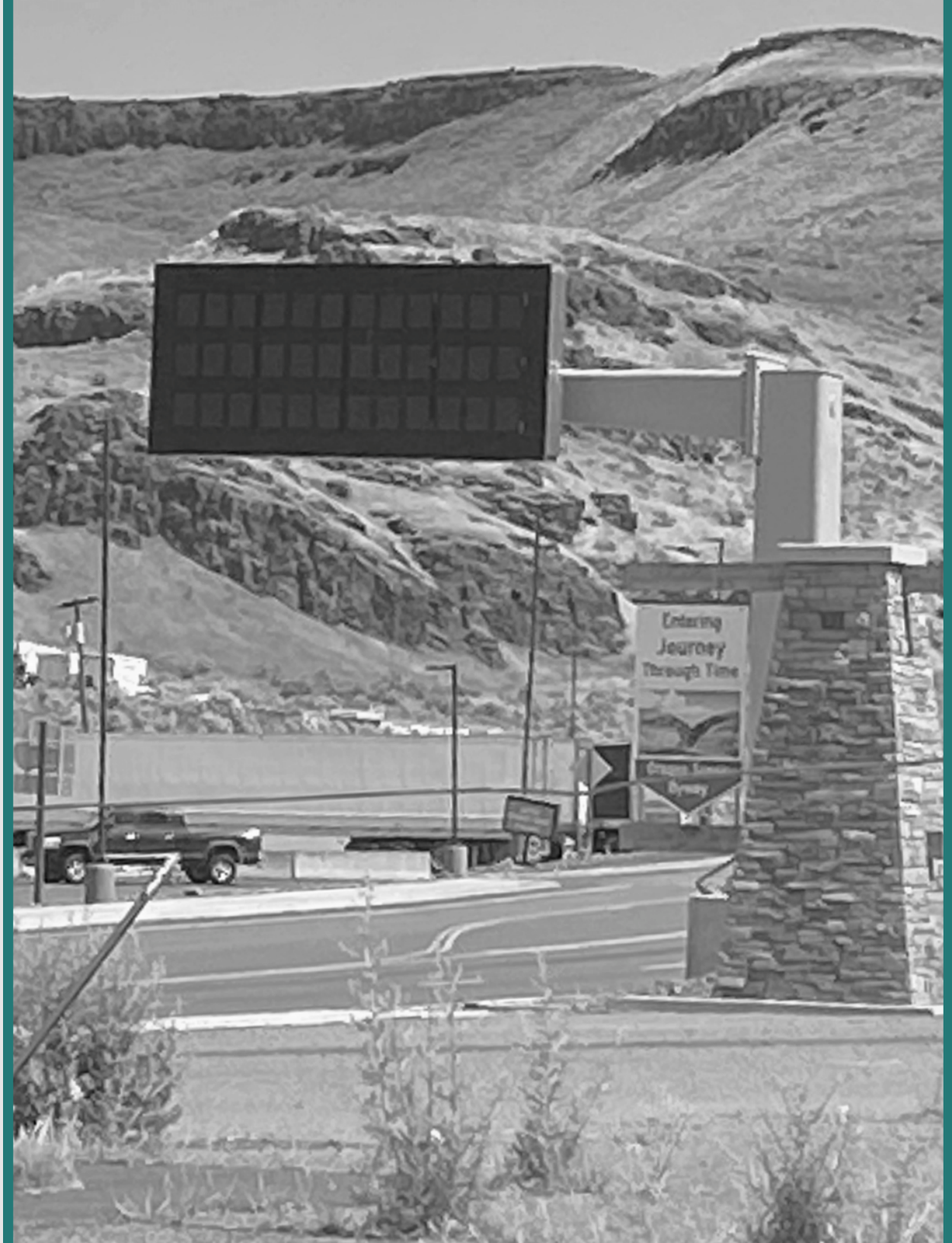
The Deployment Plan projects are mapped to the ITS Plan's Goals and ITS Implementation Strategies (see *Mission, Goals, and Objectives Chapter* for more detail).

The list of projects includes the following types of projects:

- Physical infrastructure such as signs and cameras
- Studies to further evaluate an issue to identify the most cost effective and appropriate solution, such as pedestrian safety and intersection safety
- Coordination efforts such as an area wide Traffic Incident Management team

Technology projects may need the development of a concept of operations to identify the specific installation and application details. The cost estimates for each project include these details.

The following sections summarize how the Deployment Plan should be used, provides a toolkit of ITS strategies relevant for this region, details the ITS Plan project list, and maps projects with physical infrastructure by county.



use of the deployment plan.

Deployment Plan Chapter of the ITS Plan is intended to identify projects that meet the region's needs over the next several years. The most critical piece of the Deployment Plan Chapter is the Project List, which was developed based on stakeholder identified needs and aligned with the established vision for the region. Ultimately, the project list is illustrative in nature and should be used to guide funding and identify which stakeholders should be involved in each effort.

Projects in the list vary greatly due to the ever-evolving nature of technology and transportation. Some projects have details about what type of infrastructure would be needed at specific locations, while others are dependent on additional study to determine the appropriate systems, technology, and/or scale of deployment. Many of these projects will need to go through a systems engineering process.

Stories from the ITS Plan Stakeholder Engagement

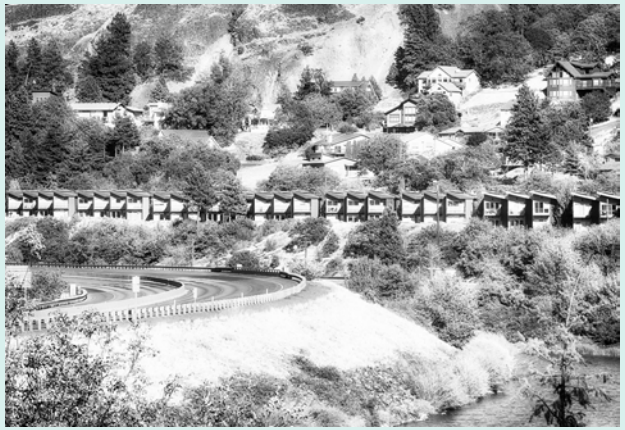
Improving Pedestrian Safety in Condon

The city of Condon sits at the interchange of OR 206 and OR 19, serving a current population of 685. The Condon School District is building a new elementary school directly across Main Street (OR 19) from a daycare center. Children will be walking between the daycare center and school, crossing Main Street. The TAC requested that additional safety measures be put in place at this location, and in general along Main Street. Given the connected nature of the pedestrian system in this area, the TAC recommends a Condon Pedestrian Crossing Study to identify specific areas of need, in addition to the school/daycare crossing location, and appropriate solutions. One technology that is particularly effective at improving pedestrian safety is Rectangular Rapid Flashing Beacons (RRFBs), which display a bright set of flashing lights toward the roadway to indicate that a pedestrian is crossing.

Alerting Drivers about Weather Conditions in Grass Valley

Sherman County is a rural county with rugged mountainous terrain, with one major state highway (US 97) running through the county. Traffic on US 97 consists of freight traffic, and recreational traffic going to the Cottonwood Canyon State Park, or to ski resorts in central Oregon. A key issue known to locals is that the roadway climate changes drastically south of the town of Moro. The road can be clear in Moro, but Grass Valley can be icy and treacherous. This can be dangerous to drivers unfamiliar with the area. The TAC recommends installing Road Weather Information System (RWIS) technology in and around Grass Valley to identify icy and foggy conditions. The RWIS system would be paired with traveler information such as variable message signs near Biggs Junction and Moro to alert drivers to changing conditions.

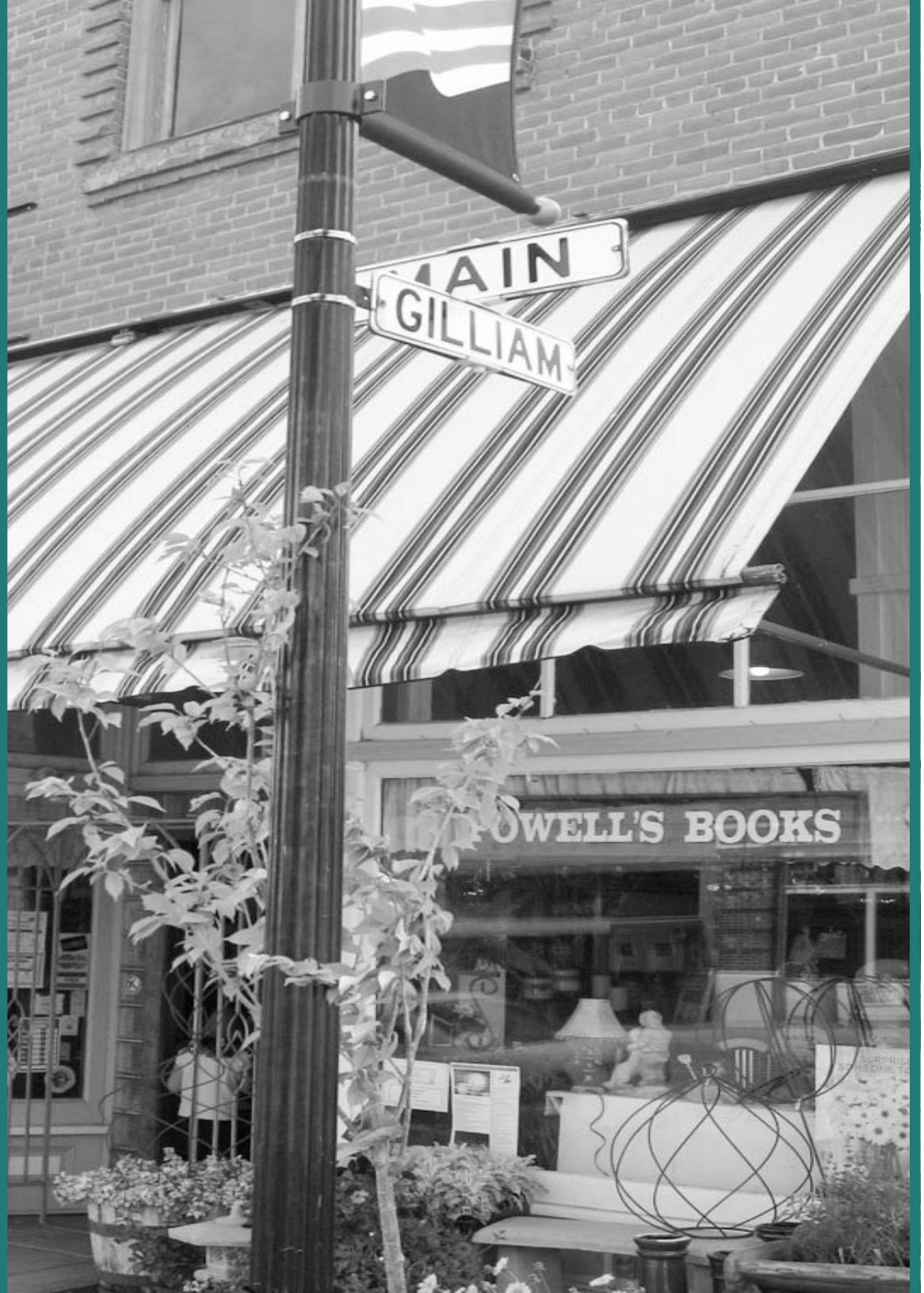
Improve Safety for Bicycles on Rural Roadways



Wasco County representatives were concerned about the conflicts between bicycles and vehicles on rural roadways in the county. For example, US 30 is used by recreational cyclists and agricultural vehicles. The roadway curves through hills, increasing the potential for conflict. The TAC recommended that the County work with bike advocacy groups and agricultural representatives to bring awareness to the issue. Solutions may include static signs at key areas with solar powered beacons, and a count system. A similar project was completed at relatively low cost on McKenzie Pass.

Support Maintenance Crews and Travelers with Weather Information

Wheeler County is rural and rugged, with challenging weather-related road conditions. The County identified the need for information about road conditions so maintenance crews know where to focus their work, and to inform travelers of roadway conditions. The TAC proposed that three additional weather stations, cameras, and electronic message boards are deployed to support maintenance crews and travelers.



funding the projects in this ITS plan.

Funding ITS projects often takes a different approach than funding larger capacity projects. Because ITS projects are generally less expensive than capacity building projects, departments may be able to use discretionary funds, apply for grants, or include portions of ITS projects within the scope of a more substantial project. For example, communications such as fiber, or even just the conduit for fiber, may be included in a roadway project so that when the ITS project is built, communications will be in place. Typically, ITS projects are funded through partnerships of multiple agencies because both agencies benefit from the communications, safety and mobility aspects of the projects. The regional nature of this list may facilitate joint funding efforts between cities, counties, and ODOT.

Local Agency Comprehensive Planning

Incorporating the projects identified in this chapter into local comprehensive planning efforts of jurisdictions within the four-county area will increase the opportunities for receiving funding through programs or grants. ODOT's Region 4 transportation planners provide support to local agencies during comprehensive planning updates, and transportation engineers provide support for strategizing funding pursuits.

toolbox of ITS strategies.

Table 12 presents a toolbox of ITS strategies to address the identified issues and needs of the Lower John Day region. The strategies are provided for each of the ITS Plan goals. These strategies were presented to the TAC and considered for their application to solve specific challenges in the area. Ultimately, not all strategies were included in the project list.

TABLE 12. TOOLBOX OF ITS STRATEGIES FOR EACH GOAL AREA

GOAL	OBJECTIVES	SPECIFIC APPLICATIONS
IMPROVE THE SAFETY OF OUR TRANSPORTATION SYSTEM	• Reduce emergency response times • Reduce frequency, duration, and effects of incidents • Coordinate incident/security response with local and regional agencies • Coordinate detour strategies with local and regional agencies	• Dynamic speed control • Warning signs at high accident locations • PTZ cameras • Permanent and portable variable message signs • Road weather information systems • Variable speed limits • Intersection conflict warning systems • Rail crossing warning systems • Rectangular rapid flashing beacons • Smart work zone systems
IMPROVE THE MONITORING AND MANAGEMENT OF OUR TRANSPORTATION SYSTEM	• Improve maintenance and operations efficiencies • Provide weather information to transportation agencies to coordinate snow and ice removal • Account for and incorporate emerging transportation technologies and business models • Monitor the transportation network using intelligent transportation systems to inform mobility, safety, reliability, and equity-based performance measures • Planning to accommodate the coming connected vehicle ecosystem	• Upgrade signal communication to fiber • Dynamic speed control • PTZ cameras • Install advanced detection • Upgrade school zone flasher communications and power source • Connect signals to central signal system • Upgrade signal technology • Variable speed limits • Road weather information systems

GOAL	OBJECTIVES	SPECIFIC APPLICATIONS
PROVIDE IMPROVED TRAVELER INFORMATION	• Provide real-time traveler information for all users of the transportation system • Provide real-time road condition and weather information at key regional facilities • Provide advance and real-time information about construction activities and work zones • Provide real-time incident information • Disseminate regional and local traveler information by a variety of media • Provide travel information prior to travel decision points • Explore communication with third-party traveler information companies on routing and detours	• Encourage use of TripCheck, TripCheck API, and TripCheck Local Entry (TLE) • Continued use of social networking • Travel time on variable message signs • Road weather information systems • Data sharing • Multimodal travel coordination
DEVELOP AND DEPLOY COST EFFICIENT ITS INFRASTRUCTURE	• Deploy systems that are integrated and maximize the use of existing and planned ITS infrastructure • Deploy systems that are integrated with future transportation infrastructure improvements • Deploy systems with a high benefit-to-cost ratio • Prioritize maintenance and operations solutions, focusing on asset management • Emphasize intentional and equitable system deployment • Integrate deployments with other local and regional projects • Coordinate funding opportunities • Coordinate deployment with existing and future planning efforts on the local, regional, and state levels	• Use Asset Management Systems • PTZ cameras • Upgrade school zone flasher communications and power source • Intersection conflict warning systems • Rectangular rapid flashing beacons
INTEGRATE REGIONAL ITS PROJECTS WITH LOCAL AND REGIONAL PARTNERS	• Build consensus among the stakeholders • Share infrastructure resources between local and regional agencies • Create and build public and private partnerships for ITS deployment, operations, and maintenance • Incorporate vision and outcomes of regionwide ITS deployment, operations, and maintenance into local comprehensive plan updates, transportation system plan updates, and amendment processes	• Establish a local Traffic Incident Management (TIM) group • Formalize coordination of operations • Scenario planning for emergency response

deployment plan projects.

The deployment plan projects are documented in Tables 13 through 17, organized by area. Each project includes a project number, a title, a brief description, and planning level cost estimate. Each project is also identified with an icon referencing the type of ITS strategy(ies) employed. Projects that involve physical infrastructure installation are also mapped Figure 7. Not all projects are mapped on Figure 7, including:

- Planning studies to better understand the appropriate design solution for cost estimating
- Technology upgrades rather than physical installations

cost estimate overview.

Cost estimates were prepared for all plans, studies, and capital projects recommended in this ITS Plan. When projects are being considered for implementation, the cost estimates should be reassessed based on any more detailed project definitions and and/or potential changes in unit prices based on broader economic activity.

Estimates for Plans and Studies

Plans and studies are recommended for challenges identified by the stakeholders that require further investigation to identify the best solution. In the project lists below, such projects will be called a “study” or “plan”. Cost estimates for plans and studies were estimated based on typical consultant contracts for similarly sized studies or efforts.

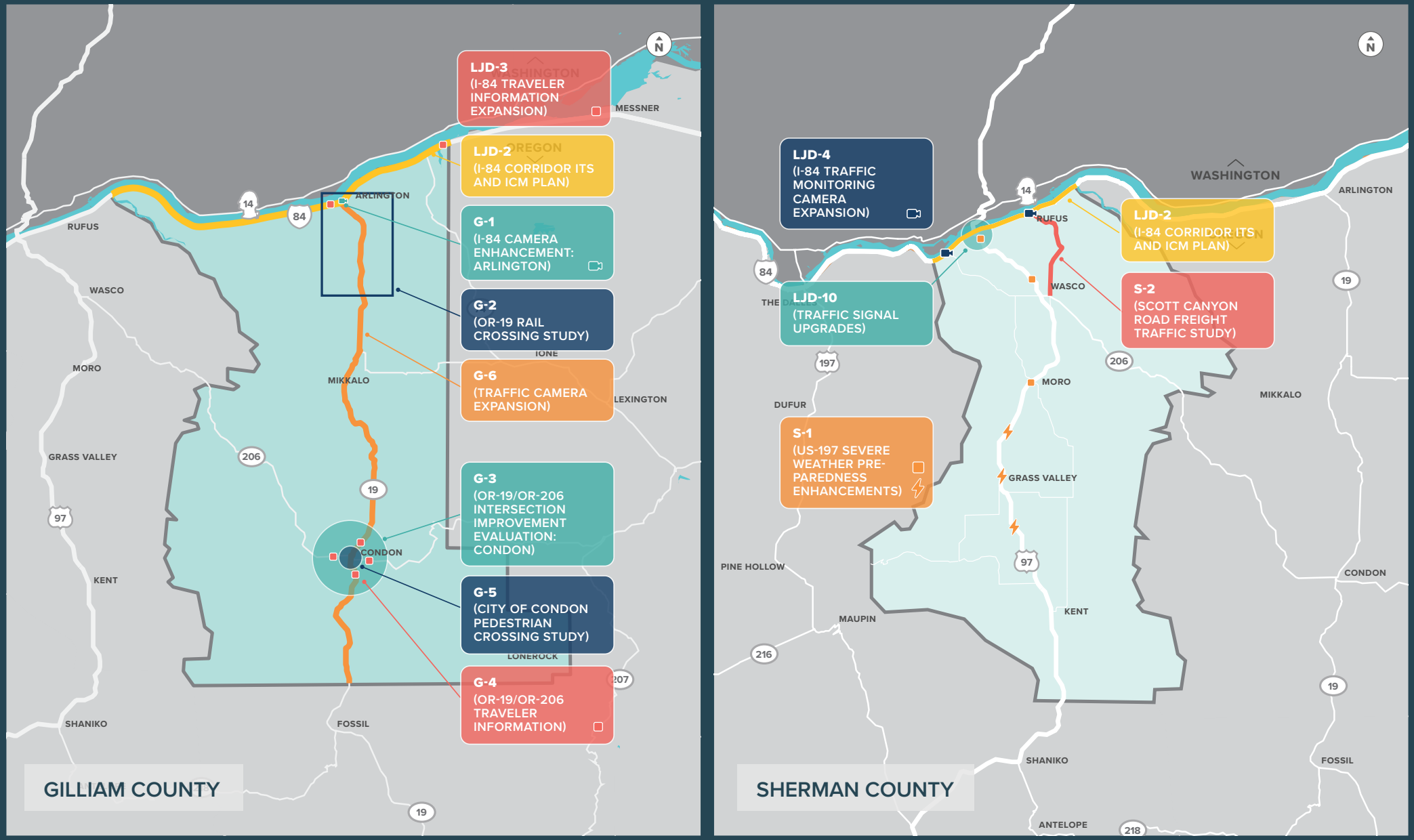
For example, project LJD2, identified in Table 13, titled “I-84 Corridor ITS and ICM Plan,” will evaluate and propose solutions for transportation management issues on I-84 between The Dalles and Biggs Junction. Stakeholders identified two key needs including freight staging on I-84, and better understanding of how Washington’s SR 14 and Oregon’s I-84 might be managed as a pair considering limited bridge crossings of the Columbia River. The proposed plan, LJD2, would evaluate these and other issues related to the integrated management of I-84 and SR 14, and will identify specific ITS projects that support operations. These ITS projects can then be evaluated for future funding opportunities.

Estimates for Capital Projects

Cost estimates for capital projects were based on a continuously updated table of industry estimates for Oregon maintained by DKS Associates. Unique in this timeframe, industry costs have increased unexpectedly with pandemic related shortages of labor and materials. A Pandemic Impact Contingency of 30 percent has been added to the capital projects.

As a deliverable for this task, ODOT received an editable version of the cost estimate worksheet so that engineers may update and modify the costs as needed.

FIGURE 7. DEPLOYMENT PLAN PROJECTS



LOWER JOHN DAY ACT
CAMERA
ROAD WEATHER INFORMATION SYSTEM
SNOW ZONE DRUM SIGN
VARIABLE MESSAGE SIGN
VARIABLE ADVISORY SPEED WARNING SIGN
BEACON
HIGHWAY ADVISORY RADIO
RADAR DETECTOR
BLUETOOTH SENSOR

FIGURE 7 (CONT). EXISTING INTELLIGENT TRANSPORTATION SYSTEM DEVICES

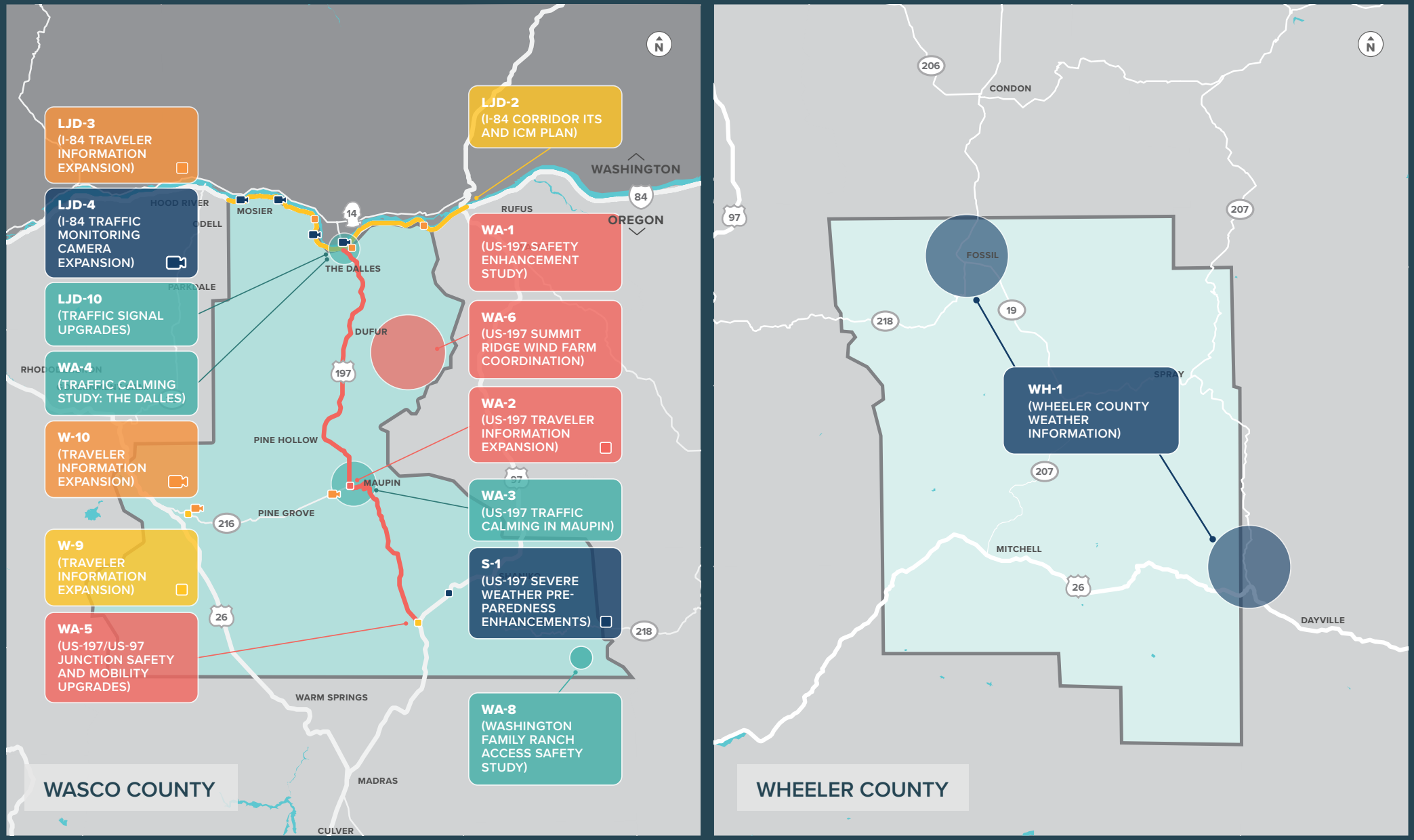


TABLE 13. AREA WIDE PROJECTS THAT APPLY TO ALL COUNTIES

PROJECT	NAME	DESCRIPTION	CAPITAL COSTS	APPLICABLE GOAL AREA
LJD-1	LOWER JOHN DAY ACT TRAFFIC INCIDENT MANAGEMENT TEAM (TIM)	ODOT to initiate and facilitate a Traffic Incident Management team group made up of emergency managers, emergency responders, and traffic operations to provide ongoing coordination for interagency data sharing, traveler information, and emergency management response	$50,000	
LJD-2	I-84 CORRIDOR ITS AND ICM PLAN	Formalize I-84 management in The Dalles and Biggs Junction, including freight staging, integrated corridor operations between I-84 and SR 14	$200,000	
LJD-3	I-84 CORRIDOR TRAVELER INFORMATION EXPANSION	Install VMS and cameras on I-84 to provide more information to travelers for trip planning	$12,029,000	
LJD-4	I-84 CORRIDOR CAMERA EXPANSION	Install cameras at interchanges on I-84 to improve traveler information for travelers and freight (Mosier to Rufus), and to improve transportation operations	$460,000	
LJD-5	EMERGENCY EVACUATION PLANNING	Initiate regionwide interagency planning for emergency evacuation, identify detour routes, identify ITS technologies to support emergency management	$200,000	
LJD-6	FIBER OPTIC NETWORK PARTNERING	Explore public-private partnerships and coordinate with ODOT's broadband strategy to expand fiber communications in the region	$200,000	
LJD-7	FIBER OPTIC COMMUNICATION EXPANSION STUDY	Complete fiber gaps and expand fiber to improve communications between existing fiber and field devices; coordinate with the outcomes of the ODOT broadband strategy	$80,000	
LJD-8	PUBLIC TRANSPORTATION TRIP PLANNING	Evaluate what's needed to streamline and automate trip planning for multimodal travel	$300,000	
LJD-9	DATA INTEGRATION WITH 3RD PARTY DATA PROVIDER	Evaluate how to leverage the capabilities of statewide data resources, RITIS and OTMS, for understanding operations and performing analysis in the region	$100,000	
LJD-10	TRAFFIC SIGNAL UPGRADES	Upgrade the Lower John Day area's twelve traffic signals to ATCs and add enhanced detection to enable better traffic operations management	$713,000	

TABLE 14. GILLIAM COUNTY PROJECTS

PROJECT	NAME	DESCRIPTION	CAPITAL COSTS	APPLICABLE GOAL AREA
G-1	I-84 CAMERA ENHANCEMENT (ARLINGTON)	Replace cameras with PTZs and relocate as needed to ensure visibility	$138,000	
G-2	OR-19 RAIL CROSSING STUDY (CONDON)	Evaluate and identify projects to improve safety, access, and information related to rail crossings	$100,000	
G-3	OR-19/OR-206 INTERSECTION IMPROVEMENT EVALUATION (CONDON)	Identify short-term and long-term solutions for safety and mobility such as conflict warning system	$100,000	
G-4	OR-19/OR-206 TRAVELER INFORMATION (CONDON)	Add VMS or static signs for fog and ice, upgrade RWIS with visibility sensors, install cameras	$322,000	
G-5	CITY OF CONDON PEDESTRIAN CROSSING STUDY	Evaluate and identify solutions to improve pedestrian safety, including near schools	$100,000	
G-6	TRAFFIC CAMERA EXPANSION	Add additional cameras to county line between Gilliam and Wheeler	$92,000	

TABLE 15. SHERMAN COUNTY PROJECTS

PROJECT	NAME	DESCRIPTION	CAPITAL COSTS	APPLICABLE GOAL AREA
S-1	US-97 RWIS ENHANCEMENT	Add RWIS to detect and relay advanced information to travelers about weather hazards in Grass Valley area	$966,000	
S-2	SCOTT CANYON RD FREIGHT TRAFFIC STUDY	Evaluate options to prevent truck diversion to Scott Canyon Road	$100,000	

TABLE 16. WASCO COUNTY PROJECTS

PROJECT	NAME	DESCRIPTION	CAPITAL COSTS	APPLICABLE GOAL AREA
WA-1	US-197 SAFETY ENHANCEMENT STUDY	Evaluate locations for curve and intersection conflict warning systems to improve safety	$200,000	

PROJECT	NAME	DESCRIPTION	CAPITAL COSTS	APPLICABLE GOAL AREA
WA-2	TRAVELER INFORMATION EXPANSION STUDY	Add roadside traveler information signs to improve safety	$100,000	
WA-3	US-197 TRAFFIC CALMING STUDY	Evaluate traffic calming, speed warning and curve warning to improve safety, and options to improve pedestrian safety	$100,000	
WA-4	TRAFFIC CALMING STUDY	Evaluate and identify projects for traffic calming, including speed warning, to improve safety in The Dalles	$100,000	
WA-5	US-197 & US-97 SAFETY/MOBILITY STUDY	Evaluate and identify short-term and long-term safety options for northbound left turn	$200,000	
WA-6	US-197 SUMMIT RIDGE WIND FARM COORDINATION	Coordinate with Summit Ridge Wind Farm to plan for and mitigate the impacts of transporting oversized windfarm equipment to minimize disruptions to all travelers and improve safety	$80,000	
WA-7	RURAL ROADWAY CONFLICT MITIGATION	Evaluate and install options to improve safety for recreational cyclists in the region's agricultural zones	$500,000	
WA-8	WASHINGTON FAMILY RANCH ACCESS SAFETY STUDY	Identify measures to improve the safe access of heavy vehicles to and from the ranch	$50,000	
WA-9	TRAVELER INFORMATION EXPANSION	Install VMS at OR 216/US 26 and US 97/US 197 to warn travelers of unsafe and/or changing conditions	$713,000	
WA-10	TRAVELER INFORMATION EXPANSION	Install CCTV at OR 216/US 26 and US 97/US 197 to provide travelers advanced information about conditions at these intersections, and provide visual information for emergency and transportation managers	$92,000	

TABLE 17. WHEELER COUNTY PROJECTS

PROJECT	NAME	DESCRIPTION	CAPITAL COSTS	APPLICABLE GOAL AREA
WH-1	WHEELER CO WEATHER INFORMATION	Install three RWIS and cameras to support maintenance crews and travelers	$897,000