CENTRAL LANE
INTELLIGENT TRANSPORTATION SYSTEMS PLAN

2021

PREPARED FOR:

DKS
720 SW WASHINGTON STREET, SUITE 500, PORTLAND, OR 97205 • 503.243.3500 • DKSASSOCIATES.COM

SHAPING A SMARTER TRANSPORTATION EXPERIENCE™ AN EMPLOYEE-OWNED COMPANY

PLAN TABLE OF CONTENTS

GLOSSARY OF ACRONYMS

APS = Accessible Pedestrian Signals

ATC = Advanced Transportation Controller

ARTS = All Roads Transportation Safety

ARC = American Red Cross

ATSPM = Automated Signal Performance Measure

BRT = Bus Rapid Transit

CLMPO = Central Lane Metropolitan Planning Organization

CCTV = Closed Circuit Television

CPD = Coburg Police Department

CAD = Computer-Aided Dispatch

EOC = Emergency Management Operations Center

EVP = Emergency Vehicle Preemption

EPD = Eugene Police Department

EWEB = Eugene Water and Electric Board

GIS = Geographic Information System

IR = Incident Response

ITS = Intelligent Transportation Systems

IGA = Intergovernmental Agreement

LCOG = Lane Council of Governments

LCSO = Lane County Sheriff's Office

LTD = Lane Transit District

MTBF = Mean Time Between Failures

MDT = Mobile Data Terminals

ARC-IT = National ITS Reference Architecture

NWTOC = Northwest Traffic Operation Center

ODOT = Oregon Department of Transportation

OSP = Oregon State Police

OTMS = Oregon Traffic Monitoring System

PTZ = Pan/Tilt/Zoom

PAN = Public Agency Network

RRFB = Rectangular Rapid Flashing Beacon

RWIS = Road Weather Information System

SPIS = Safety Priority Index System

S&DS = Senior & Disabled Services

SPaT = Signal Phase and Timing

SPD = Springfield Police Department

SUB = Springfield Utility Board

SOS = Stadium Operations and Security

TPAR = Temporary Pedestrian Accessible Route

TOD = Time of Day

TIM = Traffic Incident Management

TMC = Traffic Management Center

TSP = Transit Signal Priority

VMS = Variable Message Signs

EXECUTIVE SUMMARY
CENTRAL LANE ITS PLAN

AUGUST 2021

PREPARED FOR:

720 SW WASHINGTON STREET, SUITE 500, PORTLAND, OR 97205 • 503.243.3500 • DKSASSOCIATES.COM

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

Intelligent Transportation Systems (ITS) leverage technology and support systems to help achieve a safer and more effective, equitable, and multimodal transportation system for the mobility of people, goods, and services. This plan outlines the future of ITS deployment for Central Lane Metropolitan Planning Organization (CLMPO) area roadway owners, operators, and end users.

The 2021 ITS Plan provides an Executive Summary and the following chapters:

- Chapter 1 – Current Conditions
- Chapter 2 – User Needs
- Chapter 3 – ITS Architecture
- Chapter 4 – Communications Plan
- Chapter 5 – Deployment Plan

Chapter 1 includes a summary of systems, technologies, and Intelligent Transportation System (ITS) practices already in place. Chapter 2 includes a summary of transportation system ITS-related user needs gathered from stakeholders. Chapter 3 includes an introduction to the National ITS Architecture and the region's concept of operations, 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.

The development of this plan was led by the Lane Council of Governments (LCOG). This effort is consistent with the Regional Transportation Plan and Congestion Management Plan Update process that is occurring concurrently with the development of this plan. The consistency between the three plans ensures that the ITS strategies recommended in this planning effort are integrated, complimentary, and conform with National ITS Architecture and applicable standards. This plan will be used by agencies and partners for local and regional planning, project funding, and implementation.

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

ITS applications leverage technology and support systems to improve the safety and mobility of the transportation system in the CLMPO area at a lower impact and cost than adding more lanes. ITS employs technology, processes, and systems to achieve these goals. LCOG and its partner agencies have successfully employed ITS for many years, regionally collaborating on effective management of the transportation system.

The 2021 ITS Plan was developed with the participation and input from the Cities of Eugene, Springfield, and Coburg, in addition to the Oregon Department of Transportation, Lane County, and Lane Transit District.

STUDY AREA

The ITS plan covers all county and city roads in the CLMPO area, as shown in Figure ES-1. Additionally, the plan includes signals that are owned and maintained by the cities and by the county.

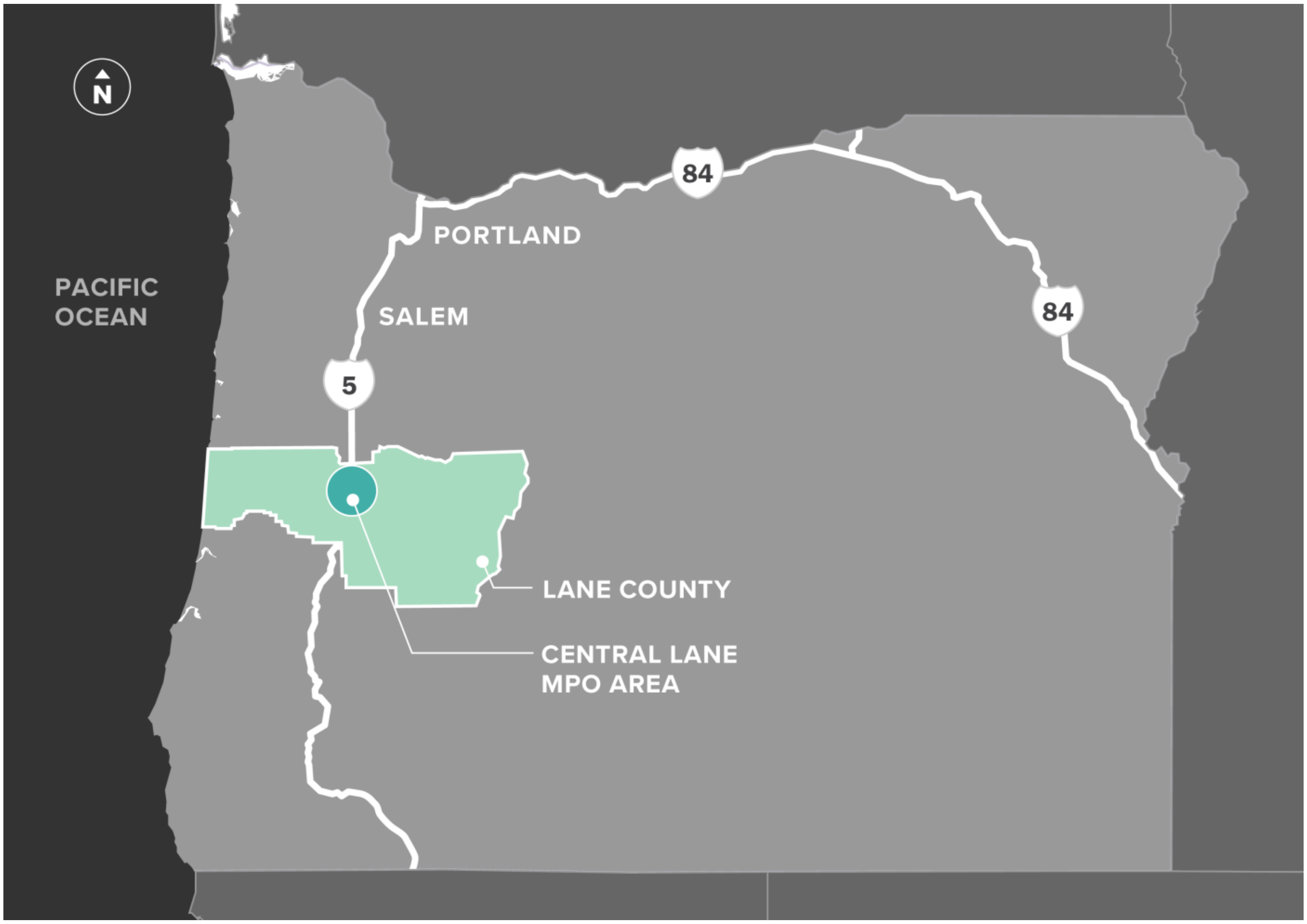


FIGURE ES-1: CENTRAL LANE ITS PLAN STUDY AREA

ITS 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 the CLMPO area transportation system is prepared for increased traffic and meeting customer expectations of safety, mobility, wide varieties of mode choice, the ability to address equity, and to provide and receive transportation related information. The ITS projects and practices fall under the six categories described in Table ES-1 below.

TABLE ES-1: CATEGORIES OF ITS PROJECTS/PRACTICES

CATEGORY OF PROJECT/PRACTICE	PROJECT/PRACTICE
TRAFFIC MANAGEMENT AND OPERATIONS	• Advanced Transportation Controller (ATC) upgrades • Automated Signal Performance Measures (ATSPMs) • Traffic Signal Control Plan for multimodal management • Distributed/virtual Traffic Operations Center that links jurisdictions together • Signal Phase and Timing (SPaT) data shared with TripCheck • Intersection safety analytics system • Connected vehicle technology for bicycle and pedestrian safety • Bicycle detection and counting • Bicycle signal timing • Enhanced pedestrian signal timings • Accessible pedestrian signals (APS) • Ramp metering • Active traffic management/variable speeds • Integrated corridor management • Communications infrastructure gap closure • Traffic monitoring cameras • Advanced railroad grade crossing information • Connected Vehicle Applications to improve operations, prioritizing people, safety, and community benefits • Use count/travel time sensors for RITIS • NextGen Transit Signal Priority (TSP) Options • Dynamic/adaptive signal timing

CATEGORY OF PROJECT/PRACTICE	PROJECT/PRACTICE
PUBLIC TRANSPORTATION MANAGEMENT	• Expand opportunities for transit signal priority • Transit queue jumps • Flexible park and rides during special events • Support the deployment of traveler information and transit technologies at park and ride lots • Multi-modal travel coordination • Real-time transit arrival information • Data sharing for trip planning • Data sharing with Traffic Management Center (TMC) for capacity • Use corridor congestion and travel time data to optimize service • Evaluate opportunities to provide transit priority on non- Bus Rapid Transit (BRT) routes including TSP and queue jumps • Modifications to park and ride locations to accommodate micromobility • Use data gathering on buses to inform route development
TRAVELER INFORMATION	• Variable message signs • Regional parking information systems • Communicating/data sharing with 3rd party providers • Parking availability and guidance • Trip Planning
INCIDENT AND EMERGENCY MANAGEMENT	• Centralized emergency vehicle preemption (EVP) • Information about roadway constraints on diversion routes • Scenario planning for emergency response • Route planning for emergencies and special events • Technology for detour routes: portable or permanent Variable Message Signs (VMS) on arterials and highways, route notifications to 3rd party trip planning provide (detour routes, evacuation routes) deploy portables, or permanent signs, or traveler information, VMS on arterials • Monitoring cameras on incident response vehicles • Emergency information dissemination • Evaluate the need for flood warning systems • Develop encroachments and special events permits related to ITS and traffic control • Improve coordination between 3rd party routing for preferred detour routes
MAINTENANCE AND CONSTRUCTION MANAGEMENT	• Smart work zone system (en route warnings) • Region-wide construction work zone management and monitoring • Infrastructure monitoring technology • Follow Oregon Department of Transportation (ODOT) Temporary Pedestrian Accessible Route (TPAR) standards to develop construction detour management plans that maintain access all system users (ped, bike, transit, micromobility)

CATEGORY OF PROJECT/PRACTICE	PROJECT/PRACTICE
DATA MANAGEMENT AND PERFORMANCE MEASUREMENT	• Regional data warehouse for data sharing • Application of analytics to identify crashes and/or potential crash locations • Automated data collection and automated performance reporting • Travel time monitoring system • Set up processes, agreements, and communications for open data sharing (including video) with statewide clearinghouses and regional partners • Identify opportunities for data integration with third-party transportation data providers • Develop processes and agreements to use data collected on transit to improve corridor operations • On-time Transit Performance

PROJECT RECOMMENDATIONS

A total of thirty-one ITS projects were identified by the stakeholders. Detailed project descriptions, locations, and costs are summarized in the 2021 ITS Plan.

PROPOSED PROJECTS

Projects are distributed across the CLMPO area based on need and application. Responsibility for project funding is assigned to the lead agency; however, a variety of funding tools and partnerships are likely to create the resources to implement these projects. The cost estimates of the projects by each ITS category and region are given in Table ES-2 and Figure ES-2. Project descriptions are provided in the Deployment Plan.

TABLE ES-2: ITS COST ESTIMATES BY LEAD AGENCY

COST BY GEOGRAPHIC AREA	CAPITAL COST
ALL AGENCIES	$17,263,000
ODOT	$23,660,000
LANE TRANSIT DISTRICT	$5,565,000
LANE COUNTY	$1,040,000
CITY OF EUGENE	$7,980,000
CITY OF SPRINGFIELD	$1,020,000

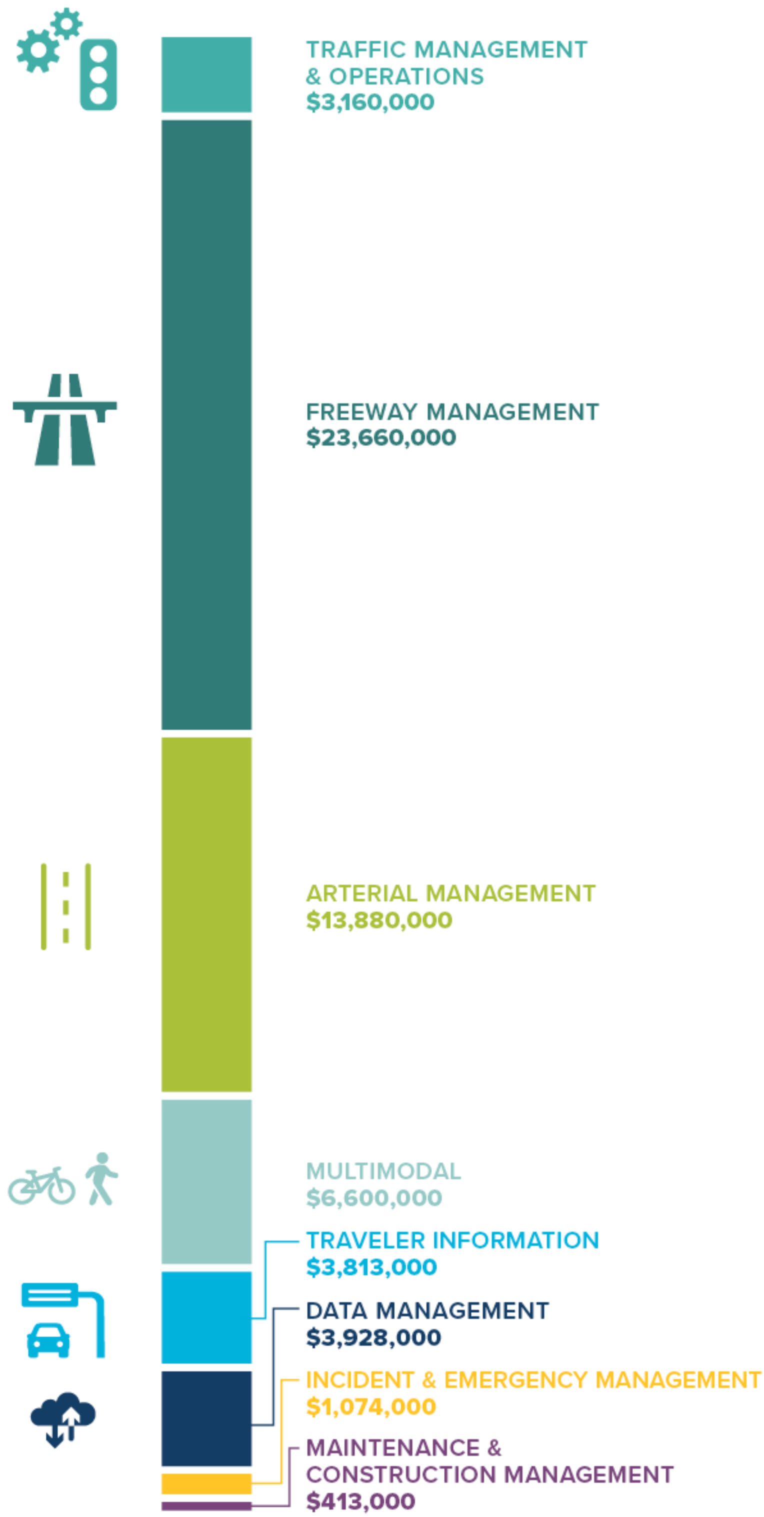


FIGURE ES-2. ITS COST ESTIMATES BY CATEGORY

CHAPTER 1 – CENTRAL LANE ITS PLAN UPDATE

CURRENT CONDITIONS

AUGUST 2021

PREPARED FOR:

720 SW WASHINGTON STREET, SUITE 500, PORTLAND, OR 97205 • 503.243.3500 • DKSASSOCIATES.COM

CHAPTER 1: TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The purpose of this chapter is to provide an overview of the current transportation system conditions as they relate to Intelligent Transportation Systems (ITS) in the Central Lane Metropolitan Planning Organization (MPO) area and develop an inventory of physical, operational, traffic safety, and travel characteristics of the transportation corridors in the study area. This inventory includes a summary of the following:

- Study area
- Traffic conditions summary
- Transit operations
- Traffic signal control
- ITS elements
- Communications network characteristics
- Emergency management
- Incident management
- Traveler information

STUDY AREA

The CLMPO area is located within Lane County, Oregon, as shown in Figure 1. Figure 2 provides a more detailed illustration of the CLMPO study area, which includes the City of Eugene, the City of Springfield, and the City of Coburg.

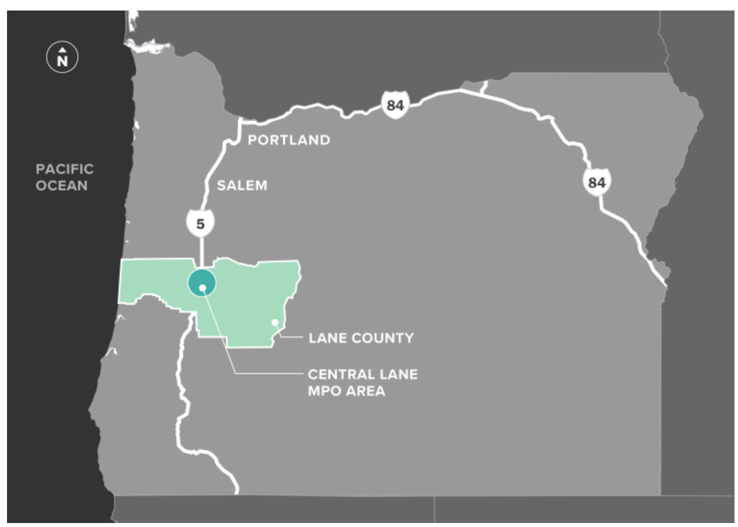
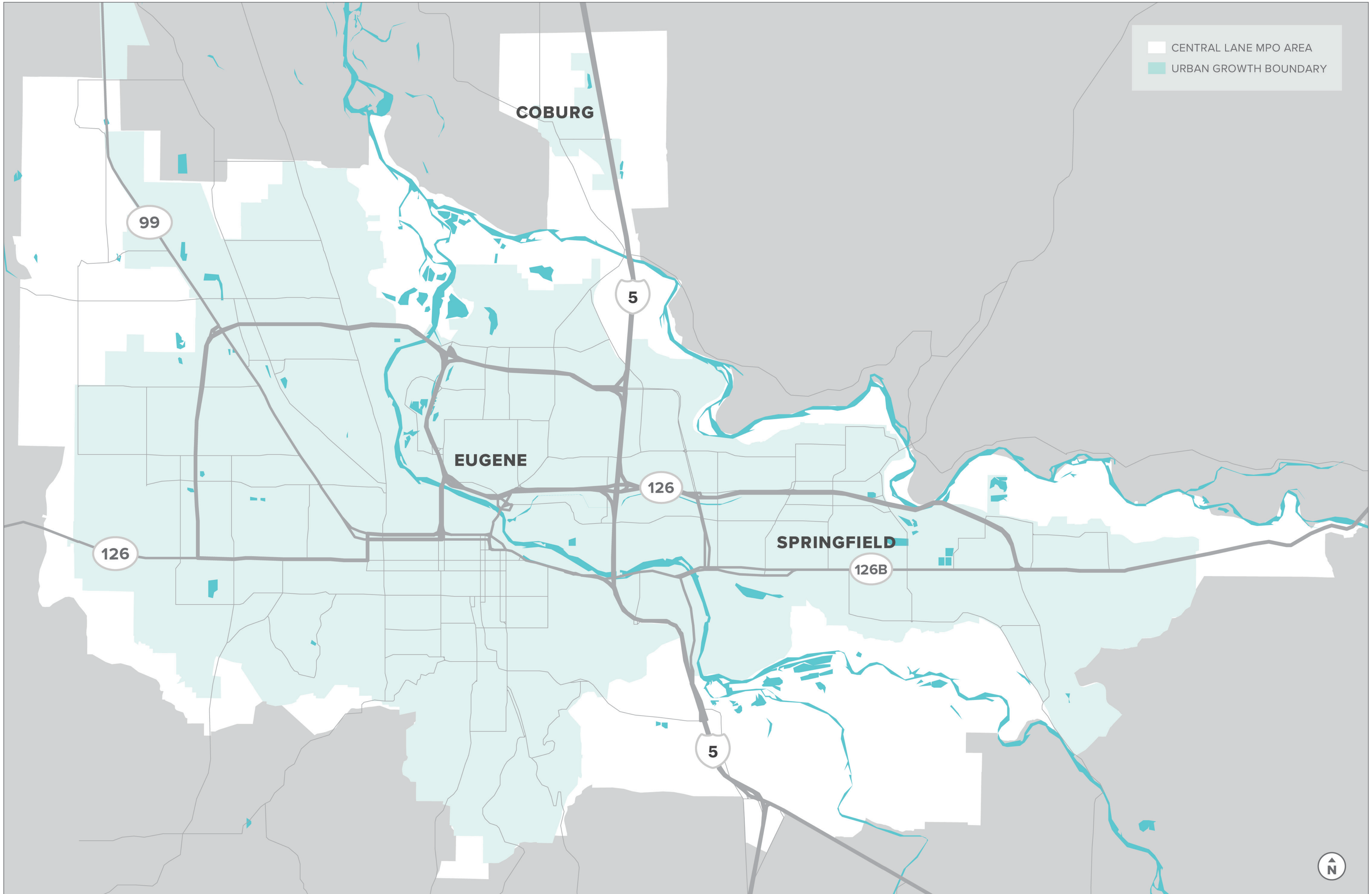


FIGURE 1. REGIONAL CONTEXT

FIGURE 2. CLMPO STUDY AREA



TRAFFIC CONDITIONS SUMMARY

The following section highlights traffic conditions in the study area that will be considered while developing the ITS Plan. Both congested corridors, freight corridors, and high collision locations provide the greatest opportunities to implement ITS field elements that will produce a noticeable benefit.

CONGESTION IN THE STUDY AREA

Figure 3 highlights the congested corridors in the study area as identified by the analysis completed in the Regional Transportation Plan. Congestion is typically categorized as either non-recurrent or recurrent. Incidents or random events result in non-recurrent congestion. Recurrent congestion occurs repeatedly at the same location, such as at key bottlenecks during the peak periods. Volume-to-capacity ratios help determine locations where traffic flows are near or at capacity on a consistent basis, indicating recurrent congestion. More details on the volume-to-capacity congestion level designations for the CLMPO area are provided in the Regional Transportation Plan.[1]

Most of the study area corridors have locations of recurrent peak period congestion today in the morning and/or evening peak periods. The primary locations for recurrent congestion are centered on three of the five bridges crossing the Willamette River (Ferry Street Bridge, I-105, and Beltline Road). Figure 3 illustrates existing recurrent congestion and key bottleneck locations for the peak periods.

CONGESTION MANAGEMENT

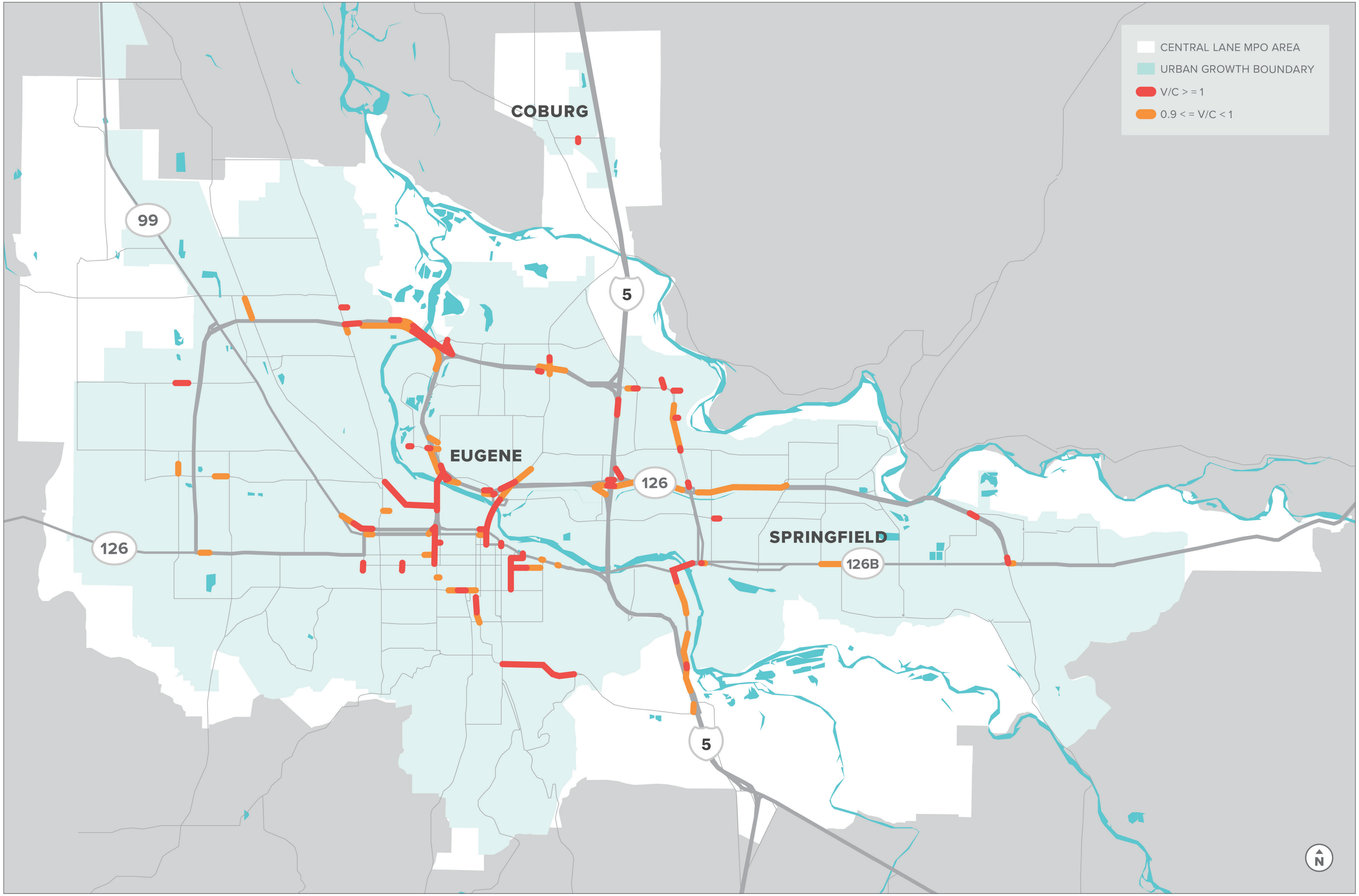
A Congestion Management Plan was developed as a component of the Regional Transportation Plan update. The purpose of the plan is to monitor system congestion through the collection of transportation data and analysis of performance measures that will result in an annual report. This report will be used by decision makers to identify cost-effective methods for relieving congestion and improving mobility. The performance measures that will be used in the annual report are described in more detail in the Regional Transportation Plan.[2]

---

[1] See Regional Transportation Plan.

[2] See Regional Transportation Plan.

FIGURE 3. CONGESTED CORRIDORS WITHIN THE STUDY AREA



FREIGHT MOVEMENT

Freight arrives, departs, or passes through the CLMPO area via truck, train, and air. Most commercial vehicle traffic uses state highways, while train traffic travels along the Union Pacific Railroad tracks and the Portland & Western Railroad tracks. Tracks generally parallel OR-126, OR-58, and Highway 99. A large amount of commercial vehicle activity takes place on Interstate 5, Interstate 105, OR-126E, OR-58, Beltline Highway (OR-569), Delta Highway, and Highway 99. Traffic on these roadways, designated as Freight Routes in the Oregon Highway Plan, varies from over 15 percent trucks (Interstate 5) to just under 5 percent trucks (OR-126E in Springfield).

CRASH PATTERNS IN THE STUDY AREA

In addition to congestion within the study area, problem locations that would benefit from the implementation of ITS devices are identified through an assessment of collision data. ODOT has developed a methodology for identifying safety corridors and for ranking specific locations based on a three-year crash history. Local jurisdictions in the CLMPO area use similar methods for analysis. Figure 4 and Figure 5 highlight crash patterns in the CLMPO area. 2019 data was added as it became available for this planning effort.

To identify locations with high collision rates, ODOT has developed a Safety Priority Index System (SPIS). For every 0.10-mile section of roadway, a score is given based on three years of collision data with weighting for crash frequency, rate, and severity. Three or more injury collisions or one or more fatal collisions must have occurred at the same location over the previous three years for a location to be considered a SPIS site. ODOT identifies the top 10 percent SPIS sites every year and evaluates those locations for safety problems.[3]

To help fund safety improvements in the CLMPO area and across the state, ODOT is managing the All Roads Transportation Safety (ARTS) Program. This program encourages collaboration between local roadway jurisdictions and ODOT to increase awareness of safety on all roads, promote best practices for infrastructure safety, compliment behavioral safety efforts, and focus limited resources to reduce fatal and serious injury crashes in the state of Oregon. Tracking hot spots and systemic roadway departure, intersection, and bicycle/pedestrian crash locations is essential for jurisdictions in the CLMPO area to be competitive for the ARTS Program funding.

---

[3] SPIS locations in the CLMPO area can be found using ODOT's TransGIS mapping interface: https://gis.odot.state.or.us/transgis/

FIGURE 4. STUDY AREA CRASH PATTERNS (2016-2019)

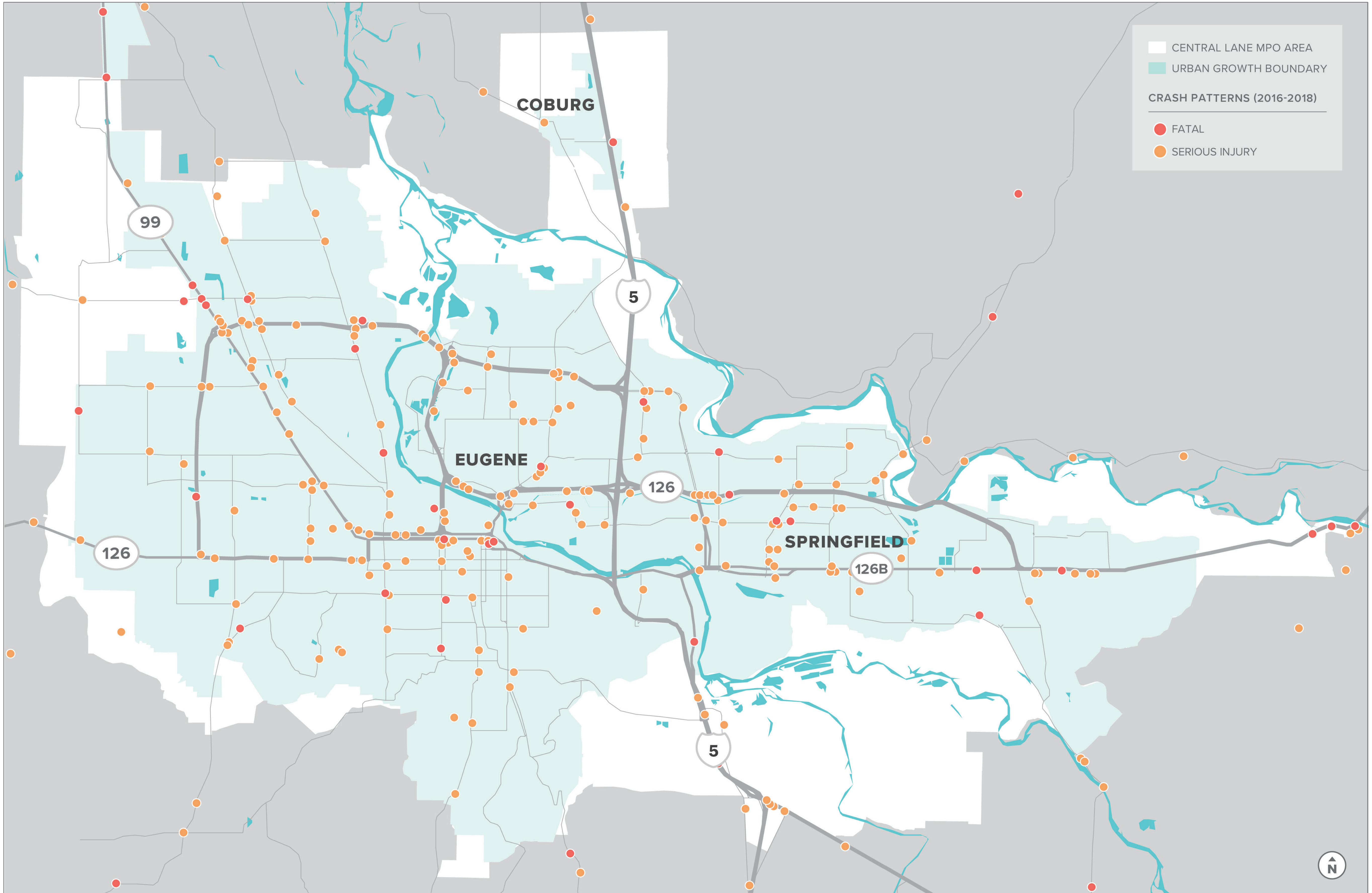
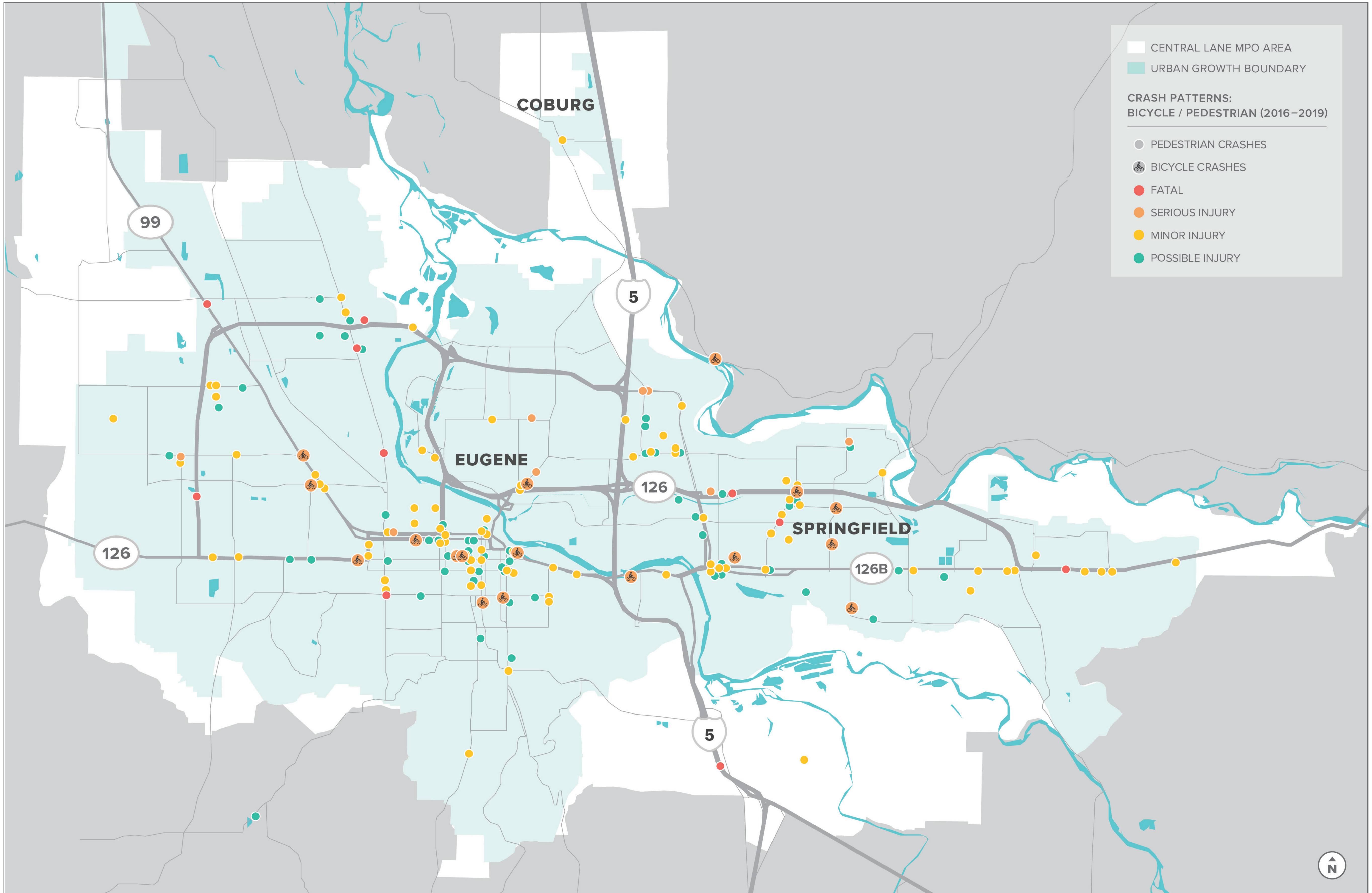


FIGURE 5. STUDY AREA CRASH PATTERNS - BICYCLE AND PEDESTRIAN (2016-2019)



TRANSIT OPERATIONS

Lane Transit District (LTD) provides fixed route bus and paratransit service for the region and shuttles for special events such as University of Oregon football games, the Lane County Fair and the Oregon Country Fair. The highest concentration of fixed-route service is within the CLMPO area, where buses operate on all major arterials. Figure 6 shows the urban LTD bus routes, transit stations, and park-and-ride lot locations.

Since the last ITS Plan Update, LTD has implemented three bus rapid transit (BRT) lines throughout the CLMPO area called EmX. The Franklin EmX line uses block signaling while the other lines have migrated using a GPS system (GTT Opticom). GTT will be the system of choice for the next few years. Each line has signal priority and a dedicated corridor where possible. LTD is also investigating signal priority and queue-jumping capabilities for their fixed-route service.

LTD has also implemented the following technologies since the last ITS Plan Update:

- Electronic Fare Collection (TouchPass)
- Real-time passenger information at EmX stops
- Automatic Passenger Counting (Infrared sensor system)
- Computer Aided Dispatch

TRANSIT AND REGIONAL COORDINATION EFFORTS

LTD frequently participates in several regional coordination efforts. These include sending representatives to Emergency Operations Centers during a declared emergency within the County and providing transportation for major recreational events both at the University of Oregon and for the Lane County Fair and Oregon Country Fair.

The primary University events that LTD provides service for are University of Oregon football games, where shuttle buses run from existing park and ride facilities to Autzen stadium four hours ahead of the game. The shuttle buses are paid for partially by the University and are also used to transport patrons, athletes, and media from local area hotels to the stadium. Transit service for other community and sports events are established with the organization of each event (including track and field events).

SENIOR SERVICES AND PARATRANSIT

LTD accommodates many people with special needs through their paratransit services called RideSource.[4] In addition, the Senior & Disabled Services (S&DS) department of LCOG provides a RideSource program for seniors with special needs who are unable to use LTD bus services. They

[4] RideSource operates regularly Monday through Saturday for essential trips only, and trips must be scheduled the day prior. This service is available for people who are unable to use the bus due to a disability. (Source: https://www.ltd.org/ridesource/)

provide door-to-door service to and from medical appointments. LTD also allows reasonable modifications, or changes and exceptions to policies, practices, and procedures that allow individuals with disabilities to have equitable access to programs, services and activities through their Reasonable Modification Policy. This procedure ensures that people with disabilities are provide equitable and effective opportunities and access to public transportation services. Individuals interested must describe what they need in order to access LTD services via an online Reasonable Modification Request Form or by calling LTD's Customer Service Center.

LONG-DISTANCE TRANSIT SERVICE

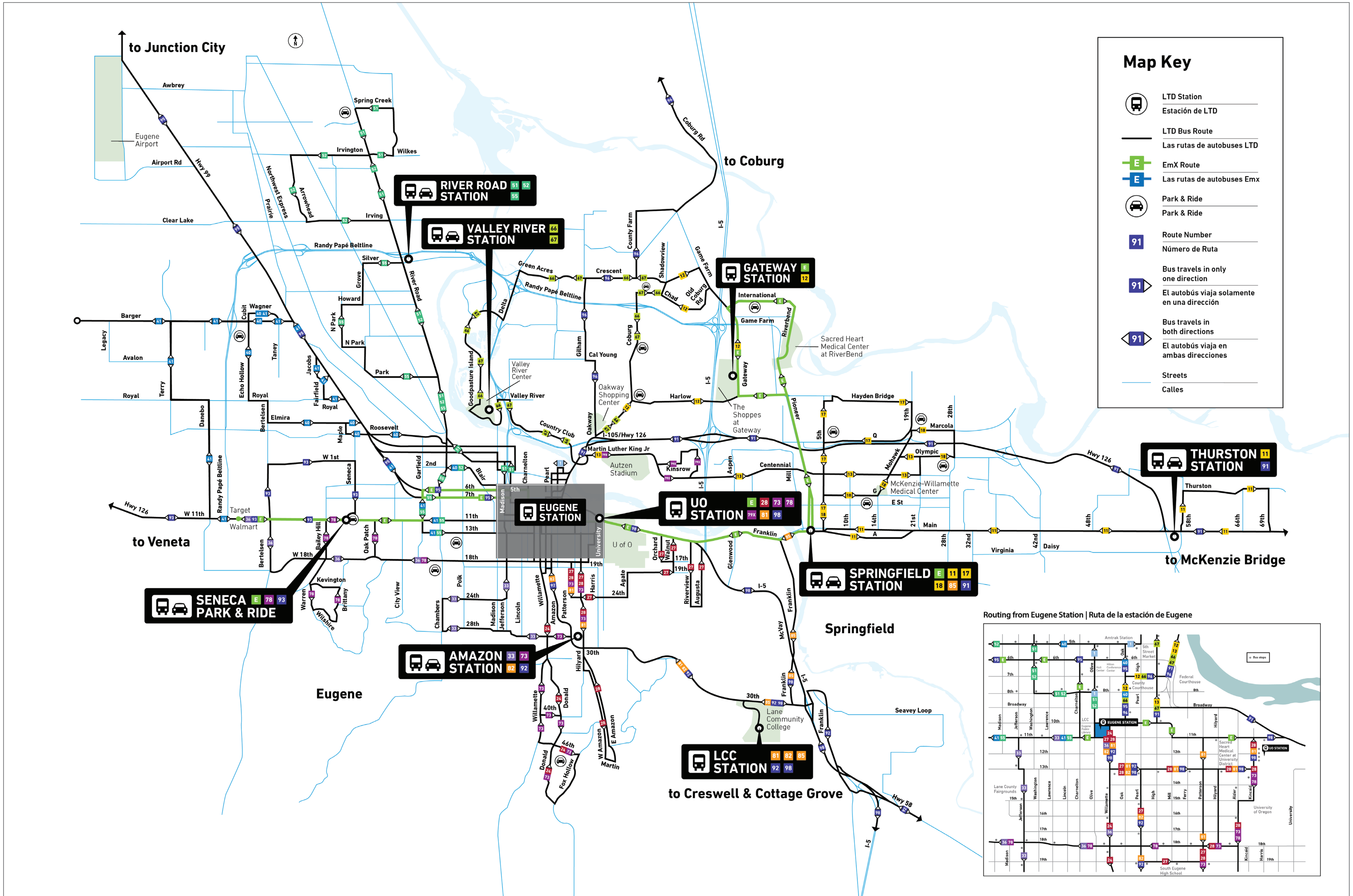
Greyhound provides long-distance bus service in and out of the CLMPO area. There is a Greyhound station in downtown Springfield that services Greyhound routes along I-5. An Amtrak train station is also located in downtown Eugene and serves as a departure and arrival point for two Amtrak train routes. LTD provides several bus routes to the Amtrak station.

Several additional bus services provide regional connections for the CLMPO area.[5] The BoltBus provides express bus line services with multiple stops between Eugene, Portland, Seattle, and Vancouver, British Columbia, Canada. Each passenger has access to free standard Wi-Fi and power outlets. Passengers can catch the Bolt Bus from the 5th Street Market in downtown Eugene. The FlixBus also provides service up and down the west coast with similar features as the BoltBus.

For travel within Lane County, the Link Lane bus service provides connections between the CLMPO area, Florence, and Yachats (the Oregon Coast). The Link Lane service is provided by LCOG in partnership with the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians and is funded by Oregon's Statewide Transportation Improvement Fund.

[5] BoltBus (https://www.boltbus.com/), FlixBus (https://www.flixbus.com/), Link Lane (https://link-lane.org/)

FIGURE 6. LANE TRANSIT DISTRICT BUS ROUTES, STATIONS, AND PARK AND RIDE LOTS



TRAFFIC SIGNALS

Figure 7 shows the location of all traffic signals in the CLMPO area color coded by jurisdiction. Table 1 summarizes the number of traffic signals, controller type, video detection software, coordinated signal system capabilities, and emergency vehicle preemption capabilities for each agency.

TABLE 1. TRAFFIC SIGNAL INVENTORY

	# OF SIGNALS	CONTROLLER TYPE	VIDEO DETECTION SOFTWARE	CENTRAL SIGNAL SYSTEM	# SIGNALS CONNECTED TO CENTRAL SIGNAL SYSTEM	EMERGENCY PREEMPTION
ODOT	47*	170 and ATC	Loops, video, radar		34	Yes
LANE COUNTY	21	2070	Loops, video, radar	No	4	Yes
CITY OF COBURG	*Maintained and operated by Lane County*					
CITY OF EUGENE	263	170 and ATC	Loops, video, thermal, radar	Combination of Transparity and QuicNet	225	Opticom
CITY OF SPRINGFIELD	39	170		QuicNet	34	

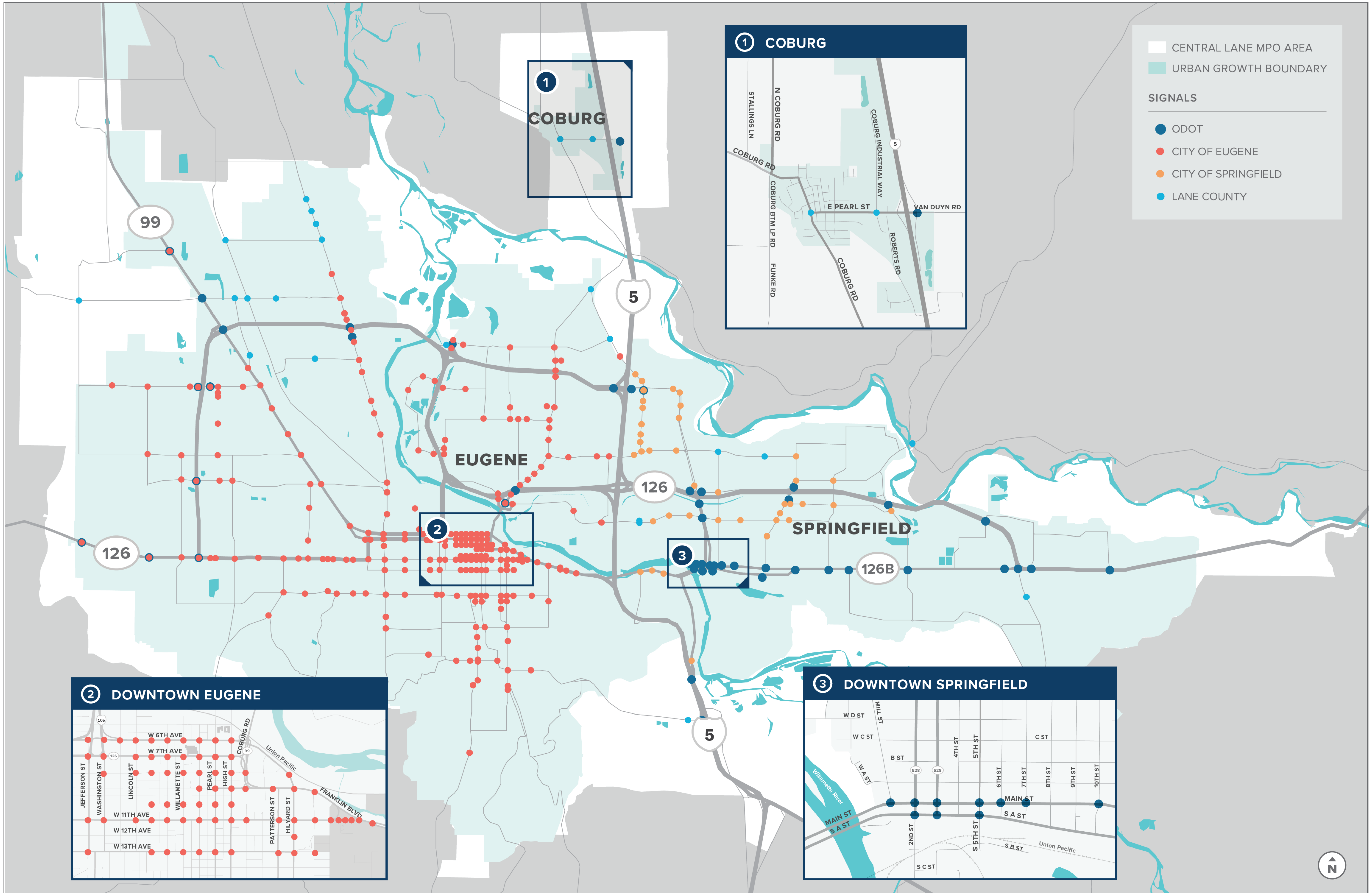
*Within the CLMPO area.

In general, most signals throughout the region are running on Time of Day (TOD) and/or coordinated signal timing plans. The agencies have considered transitioning to adaptive or responsive signal timing but have not deemed it feasible at this time. Notably, while all signals in the region are capable of emergency preemption, transit signal priority on non-BRT corridors is limited and would require upgrades to the current preemption systems.

Significant special events in the region such as University of Oregon football games or concerts at Autzen Stadium or Matt Knight Arena require a joint effort between the cities, county, and ODOT. In general, on the day of the event the City of Eugene works with the Eugene Police Department to provide traffic control near the stadium. The City of Springfield uses signal timing modifications and dynamic and static message signs rather than police officers to control traffic. On gamedays, all agencies are represented at the Stadium Operations and Security (SOS) room that overlooks the stadium. Although all agencies use their own radio system, the SOS room allows them to coordinate amongst each other.

An inventory of the types of communication that is used at each agency's traffic signal is described in the next section.

FIGURE 7. STUDY AREA TRAFFIC SIGNAL BY OWNER



COMMUNICATIONS EQUIPMENT

The communications system is one of the most critical components in the deployment of ITS infrastructure. A fully built out and connected system enables local agencies 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. The current communications network in the CLMPO area is limited but expanding. Table 2 describes the preferred method of communications for each agency in the region.

TABLE 2. CURRENT COMMUNICATIONS INFRASTRUCTURE FOR EACH AGENCY

	CURRENT COMMUNICATION TYPE	DESIRED COMMUNICATION TYPE
ODOT	Copper, Ethernet, radio, Fiber, Cellular	Fiber, cellular, Ethernet, radio
LANE COUNTY	No communications to any signals	
CITY OF COBURG	*Maintained and operated by Lane County*	
CITY OF EUGENE	Copper twisted-pair wire, fiber, radio	Radio, fiber, copper
CITY OF SPRINGFIELD	Blend of radio and copper	Radio, copper

Most signals within the CLMPO area are on central signal control by jurisdiction. In general, no communications connections are currently in place to view video feeds from signals or other ITS devices from a remote location.

PUBLIC AGENCY NETWORK (PAN)

Multiple agencies in the CLMPO area have created a cooperative network called the Public Agency Network (PAN) to share fiber resources and maximize connectivity in the region. PAN membership includes the City of Eugene, the City of Springfield, the City of Coburg, Lane County, Lane Council of Governments, Lane Transit District, Lane Community College, Eugene Water and Electric Board (EWEB), Springfield Utility Board (SUB), Eugene School District 4J, University of Oregon, ODOT, and the Oregon Department of Administrative Services (DAS). Where PAN dark fiber is available, leasing PAN facilities for transportation may be a worthwhile alternative for center-to-center communications or field communications as opposed to installing all new communications infrastructure.

INTELLIGENT TRANSPORTATION SYSTEM AND DEVICES

In addition to traffic signals, other ITS devices are used to actively manage and monitor traffic and weather conditions in the CLMPO area. Figure 8 shows the location of existing ITS devices in the region, and Table 3 indicates the owners and quantities of each type of device.

TABLE 3. ITS DEVICES OPERATED BY JURISDICTION

	CCTV*	VMS	DYNAMIC FLASHERS**	PEDESTRIAN SIGNAL	RWIS
ODOT	18	11	-	-	3
LANE COUNTY	-	-	6	2	-
CITY OF COBURG	-	-	-	-	-
CITY OF EUGENE	15	-	44	-	3
CITY OF SPRINGFIELD	-	-	35	6	-

* CCTV = Closed Circuit Television

** Dynamic Flashers include speed feedback signs, school zone flashers, and rectangular rapid flashing beacons (RRFBs).

In addition to the ITS devices listed above, ODOT also operates 5 ramp meters, 9 radar traffic sensors and 7 travel time sensors in the Eugene-Springfield area. There is also a Queue Warning system on Delta Highway, with sensors and a VMS on Delta Highway as shown in Figure 8.

CCTVs (Closed Circuit Televisions) in the region are centrally controlled by each agency. As mentioned in the Communications Infrastructure section, communications connections are not currently in place to enable operators to view video feeds from remote locations. All other ITS devices owned by local agencies are not centrally controlled.

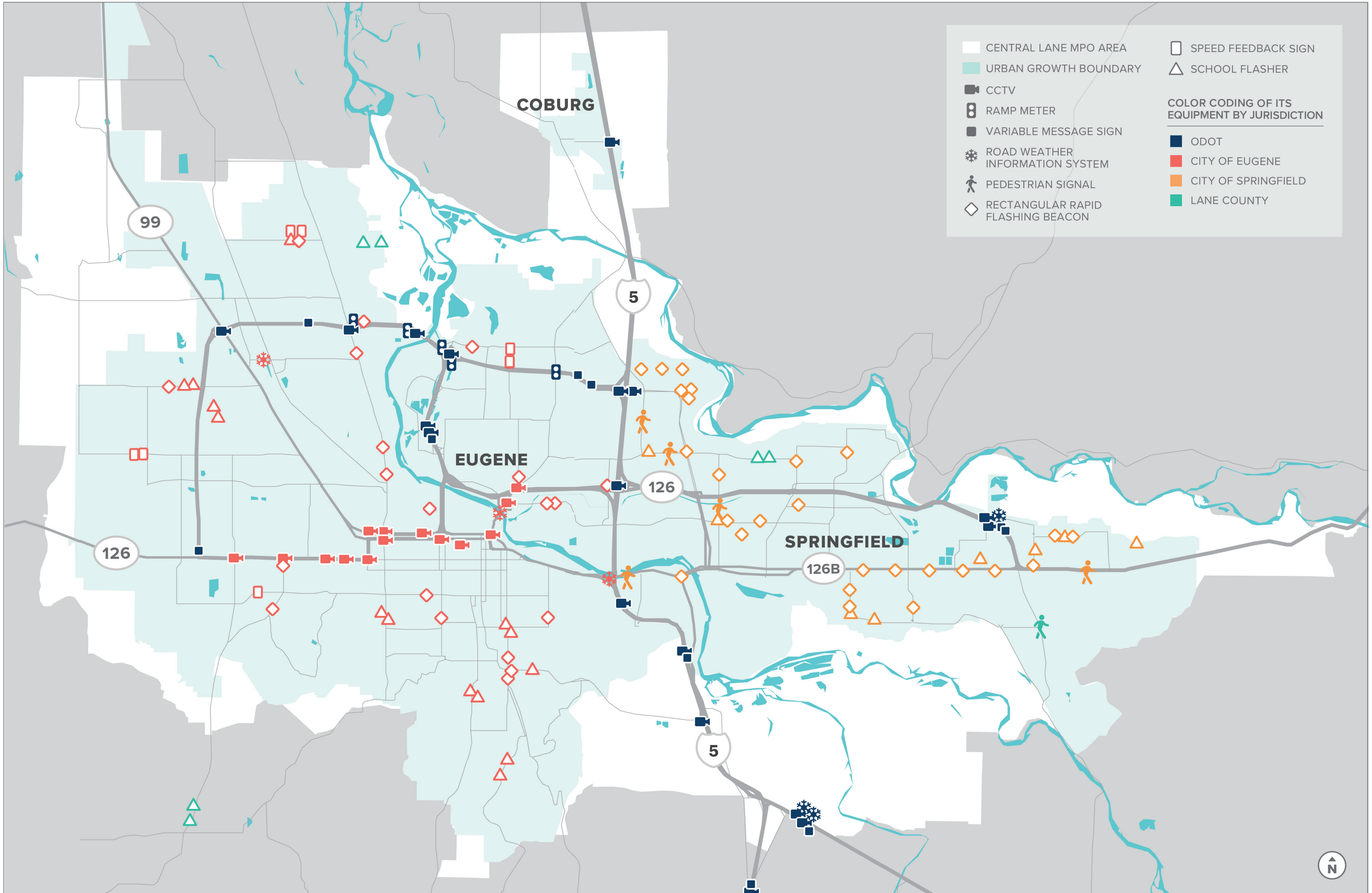
TRANSPORTATION OPERATIONS CENTER (TOC)

ODOT currently operates a Transportation Operations Center in Salem, Oregon a little over one hour to the north of the CLMPO area. The TOC provides a regional point of contact for 24x7 monitoring of transportation system operations and coordination of transportation related communications and services among internal and external customers. It can monitor the system

activities with other response agencies. Each local agency has staff dedicated to transportation operations within their jurisdictions, but do not have dedicated transportation operations centers with ODOT’s capabilities.

In general, operators must manage field devices using a variety of software packages and monitoring to dispatch maintenance and incident management crews to respond to traffic or weather-related events in the region. A more detailed summary of the primary functions performed by operators is described in the glossary.

FIGURE 8: INTELLIGENT TRANSPORATATION SYSTEM DEVICES



EMERGENCY MANAGEMENT

One of the primary benefits of a connected ITS is the enhanced ability to recognize when an emergency situation has occurred on a roadway and quickly and efficiently dispatch the appropriate first responders to the site as well as inform incoming travelers that an event has occurred. Figure 9 illustrates the emergency management facilities and hospitals in the CLMPO area. The following subsections will describe the general components of the emergency management system that currently exists in the region.

911 CENTERS

Central Lane Communication (Central Lane 911) performs call-taking services for a majority of regional police agencies, dispatching services for the Eugene Police Department, and both call-taking and dispatch services for the Eugene Fire and EMS Department, Springfield Life & Fire Safety, and 19 rural fire districts. The Oregon State Police, Lane County Sherriff's Office, Springfield Police Department, and Coburg Police Department provide their own dispatch services. Central Lane Communications utilizes a computer-aided dispatch (CAD) system that maps addresses and transmits other information and data to mobile data terminals (MDT) outfitted in some police and fire vehicles.

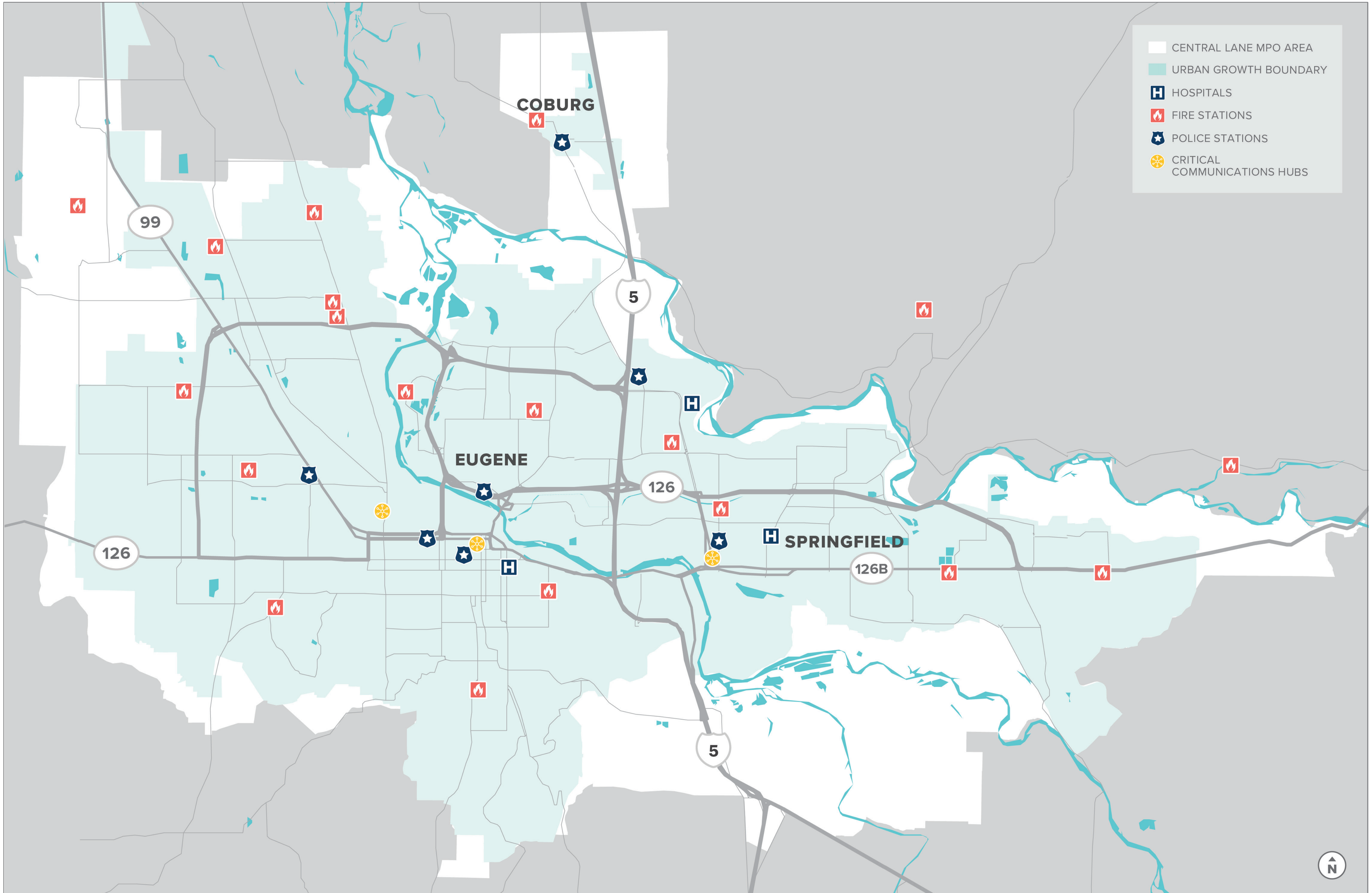
POLICE, FIRE, AND MEDICAL SERVICES

There are several police, fire, and medical agencies that operate within the CLMPO area as depicted in Figure 9. In general, the Oregon State Police (OSP) are responsible for patrolling the local state highways, the Lane County Sheriff's Office (LCSO) monitors County roadways, and the Eugene Police Department (EPD), Springfield Police Department (SPD), and Coburg Police Department (CPD) handle all other roadways within their city limits. The Eugene Fire & EMS Department and the Springfield Fire and Life Safety Department take care of almost all the fire and emergency medical services throughout the region. The Coburg Fire District handles fire emergencies in the City of Coburg and other rural fire districts are responsible for fire services on the outskirts of the metropolitan area.

AGENCY COMMUNICATIONS

A common radio frequency is not currently utilized by the various emergency management agencies in the CLMPO area, making it difficult to maintain contact between agencies. Both the Eugene and Springfield Police Departments are on a digital frequency, while other agencies use an analog frequency. A regional Interoperability Committee is assessing the feasibility of implementing a common radio frequency. This committee involves all of the local emergency management agencies. To aid this effort, ODOT has added inter-operational channels to each district's radio program that is available for local agencies to use.

FIGURE 9: EMERGENCY MANAGEMENT FACILITIES AND HOSPITALS



MAJOR EMERGENCIES AND DISASTERS

In the event of major emergencies or disasters such as floods, earthquakes, winter storms, wildfires, or pandemic conditions, the Lane County Sheriff's Office is the lead agency for emergency management. During an emergency, the Emergency Operations Center (EOC) is activated and local transportation personnel are responsible for coordinating with the EOC to maintain accessible transportation routes to shelters and to re-route traffic as necessary. When multi-county evacuations occur, the state handles the evacuation and follows protocol from the State of Oregon Emergency Management Plan.[6]

The American Red Cross (ARC) is responsible for providing shelters, which typically include public schools, churches, local hotels, or other locations. ARC determines which shelter locations to use based on each particular emergency situation.

ROADWAY INCIDENT MANAGEMENT

ODOT District 5 operates an incident response (IR) program to address traffic congestion and delays caused by incidents in CLMPO area roadways. Incident response vehicles are equipped with electronic message boards, temporary traffic control devices, flat tire repair gear, gasoline, jumper cables, water, and other essentials for rescuing disabled vehicles and getting them on the move again. Two portable dynamic message signs are also available and typically used when major incidents occur.

When an incident occurs in the CLMPO area, the ODOT IR team is alerted about the incident and typically supports the local police agency in charge at the incident location. ODOT maintenance crews sometimes aid the IR team to manage detour routes or help at the incident location.

TRAVELER INFORMATION

ODOT collects and provides most of the traveler information for the CLMPO area. They provide real-time traveler information primarily through the TripCheck website and social media accounts. Real-time traveler information includes road conditions, construction activity, weather reports, and camera images. Local agencies can contribute to ODOT's TripCheck website via the Local Entry Tool. Currently, most agencies in the CLMPO area have access to add information about construction projects and other events to TripCheck. Additionally, City of Eugene owned camera feeds are shown on TripCheck.

Local agencies also provide information about construction and traffic events through their individual agency websites and social media outlets.

---

[6] Lane County Emergency Operations Plan, last updated 2019, https://lanecounty.org/UserFiles/Servers/Server_3585797/File/Government/County%20Departments/Emergency%20Management/2019_EOP%20Base%20Plan_Final.pdf

RELEVANT DOCUMENTS

Projects identified in the following long-range plans are relevant to this plan's update and will be considered in the development of the deployment plan:

- Lane County Transportation System Plan, September 2017
- *Future* Lane County Communications Plan (Request For Proposal expected in 2021)
- *Future* Lane County Emergency Management Plan (in progress)
- Lane Transit District Long Range Transit Plan, March 2014
- *Future* Lane Transit District Transit Tomorrow Plan/Program (in process)
- City of Coburg Transportation System Plan, October 2013
- City of Eugene Transportation System Plan, February 2017
- City of Springfield Transportation System Plan, project list amended in January 2020
- ODOT Statewide Transportation Improvement Program (STIP) – three-year capital improvement programs for state and federally funded projects

CHAPTER 2 – CENTRAL LANE ITS PLAN UPDATE

MISSION, GOALS, OBJECTIVES, AND ITS IDENTIFIED SYSTEM NEEDS

AUGUST 2021

PREPARED FOR:

DKS

720 SW WASHINGTON STREET, SUITE 500, PORTLAND, OR 97205 • 503.243.3500 • DKSASSOCIATES.COM

CHAPTER 2: TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

This chapter details a review of the regional intelligent transportation system (ITS) mission, goals, objectives, and ITS identified system needs for the Central Lane Metropolitan Organization (CLMPO) area. The content was primarily gathered from project stakeholders through a one joint workshop and several key stakeholder interviews. The mission, goals, objectives, and assessment of current and future ITS system needs are related to the following key themes of intelligent transportation systems:

- Traffic Operations and Management
- Public Transportation Management
- Traveler Information
- Incident & Emergency Management
- Maintenance & Construction Management
- Data Management & Performance Measurement

Each section of this chapter will be used to develop of a comprehensive list of projects that will be listed in the deployment plan chapter.

STAKEHOLDER INVOLVEMENT

To ensure the success and utility of CLMPO's regional ITS Plan, a coalition of stakeholders were asked to provide input and build consensus on the future of the regional system. Stakeholders are defined as jurisdictional partners who own and manage the infrastructure, including:

- Lane Council of Governments (LCOG)
- City of Eugene
- City of Springfield
- City of Coburg
- Lane County
- Lane Transit District (LTD)
- Oregon Department of Transportation (ODOT)

Stakeholders attended a workshop to collaborate from a regionwide perspective. The workshop included a review of the mission, goals, objectives, and ITS needs identified in the 2004 ITS Plan, confirmation of what remained relevant, discussion of updated mission language, goals, objectives, and updated ITS needs that should be reflected in the plan update. The workshop was followed by personal interviews with key stakeholders to expand upon and/or further illustrate what had been discussed during the workshop, as well as any additional needs related to their respective jurisdictions.

As expected with a regional stakeholder group, needs varied between jurisdictions. As a result, the ITS identified system needs identified in this document may not apply to all stakeholders.

PROJECT MISSION, GOALS, AND OBJECTIVES

Project stakeholders developed a mission statement and accompanying goals and objectives to guide the development and ultimate deployment of ITS in the CLMPO area.

MISSION STATEMENT

Improve the safety, health, security, and movement of goods, people, and services for all modes of the transportation network by using advanced technologies, establishing agency coordination, maximizing existing system capacity and infrastructure, and providing real time traveler information.

GOALS AND OBJECTIVES

Table 1 describes the goals and objectives for this ITS Plan.

Goals in the context of this plan are guiding statements that set local priorities for the implementation of ITS in the region. They establish the overall implementation direction for agencies involved in the development of this plan, and are typically value statements.

Objectives in the context of this plan are ways to meet the established goal. They are typically action-oriented strategies and are intended to be specific, attainable, and measurable. Objectives can be met through a variety of actions.

TABLE 1: ITS PLAN GOALS AND OBJECTIVES

GOAL	OBJECTIVES
1. IMPROVE THE SAFETY AND SECURITY OF THE TRANSPORTATION SYSTEM	• Reduce crashes impacting all people (walking, biking, driving, etc.) • Improve emergency response times • Coordinate security response with other local and regional agencies • Coordinate evacuation strategies with other local and regional agencies • Identify and support redundant networks and services to improve emergency preparedness • Implement and maintain ITS-related technology and strategies that proactively work to prevent incidents from occurring • Reduce the conflict between people using different modes of transportation
2. IMPROVE THE EFFICIENCY OF THE TRANSPORTATION SYSTEM	• Optimize travel time • Enhance travel time reliability • Reduce fuel consumption • Reduce environmental impacts of delays • Improve maintenance and operations efficiencies • Incorporate emerging transportation technologies, prioritizing people, safety, and community benefit

3. PROVIDE IMPROVED TRAVELER INFORMATION	• Provide real-time traveler information for all people using the transportation system
	• Provide real-time road condition and weather information at key regional facilities
	• Continue to support centralized systems that provide the following regional and local traveler information:
	  o Advance and real-time information about construction activities and work zone
	  o Real-time incident information
	• Continue to adapt and expand the variety of media used to share regional and local traveler information based on the needs and tendencies of people using the regional transportation system
	• Continue to expand infrastructure displaying traveler information prior to travel decision points

GOAL	OBJECTIVES
4. DEVELOP AND DEPLOY COST EFFICIENT ITS INFRASTRUCTURE	• Where possible, deploy systems that are integrated with existing ITS infrastructure • Deploy systems that are integrated with future transportation infrastructure improvements • Deploy systems with a high benefit-to-cost ratio, with emphasis on cost effective equipment to add the greatest value possible • Deploy systems that maximize the use of existing infrastructure • Integrate deployments with existing and ongoing local and regional projects • Coordinate funding opportunities • Deploy sustainable ITS infrastructure that can be maintained long term
5. INTEGRATE REGIONAL ITS PROJECTS WITH LOCAL AND REGIONAL PARTNER	• Share infrastructure resources between local and regional agencies • Continue to coordinate and integrate projects with other agencies • Create and build public and private partnerships for ITS deployment, operations, and maintenance • Promote interoperability for systems and devices to effectively manage the system • Continue to provide educational opportunities for all local and regional partners to align a regionwide ITS vision following the completion of this planning effort •
6. MONITOR TRANSPORTATION PERFORMANCE MEASURES	• Make transportation data accessible between jurisdictions • Collect and record transportation data, such as traffic volume, speed, loop occupancy, and incident data • Maintain a geographic information system (GIS) database of the transportation infrastructure, including ITS devices • Make use of robust third-party performance measurement solutions to provide performance measure aggregation and analytics tools such as dashboards

SUMMARY OF ITS SYSTEM NEEDS

This section contains a summary of the ITS identified system needs for the CLMPO area based on input from stakeholders.

The needs are grouped into the following six categories, representing key themes for ITS:

1. Transportation Operations and Management
2. Public Transportation Management
3. Traveler Information
4. Incident, Emergency, and Event Management
5. Maintenance and Construction Management
6. Data Management and Performance Measurement

Some of the needs identified below may apply to multiple categories, and any duplicates are likely the result of comments from separate stakeholders. The ITS identified system needs contained in this section will be mapped to the national ITS architecture service packages (Chapter 3) prior to determining applicable CLMPO area ITS projects.

TRAFFIC OPERATIONS AND MANAGEMENT

Stakeholders identified the following needs related to traffic operations and management:

- Remotely manage and control traffic signals
- Develop robust traffic signal control plan management capabilities to address a wide range of multimodal operational needs
- Monitor and control pedestrian and bicycle crossing aspects of traffic signals in order to facilitate safe crossings at intersection
- Improve signal operations and detection of all modes using information from connected vehicles and advanced infrastructure detection
- Communicate signal phase and timing data to connected vehicles to facilitate improved movement through intersections
- Develop a distributed/virtual Traffic Operations Center (TOC)
- Deploy cameras for surveillance and real-time visual information
- Integrate agency-owned count and travel time sensors with third party data sources
- Actively manage highway traffic with ramp metering, variable speed limits, queue/congestion warning systems, lane management systems, etc.
- Access real-time information, specifically with respect to traffic congestion and weather conditions
- Implement responsive signal timing
- Expand bicycle detection throughout the region
- Provide interagency access to camera images

PUBLIC TRANSPORTATION MANAGEMENT

Stakeholders identified the following needs related to public transportation management:

- Integrate with micro mobility services
- Expand the number of corridors with transit signal priority and queue jumps
- Expand real-time transit information signs at key locations
- Provide near real-time transit arrival information at high frequency, high volume bus stops
- Maintain travel time reliability on transit corridors
- Incorporate arterial traffic (and saturation levels) and connected vehicle data to optimize transit service operations
- Improve accuracy of passenger counting and other technology systems on the vehicle
- Provide more data between the vehicle and the operations center (automated vehicle location, upgraded passenger count technology, operating parameters, maintenance)
- Share transit data with Traffic Management Centers (TMCs)
- Use transit vehicles as traffic probes to collect speed data

TRAVELER INFORMATION

Stakeholders identified the following needs related to traveler information:

- Inform as much of the traveling public as quickly as possible using a wide variety of means, including interfacing with third party
- Integrate local agency traveler information sources with regional systems
- Provide en route traveler information using dynamic message signs, specifically at critical decision-making points on area freeways
- Monitor and report on parking availability in lots, garages, and other parking areas and facilities
- Share availability, capacity, and other data related to bikeshare, scootershare and general micromobility
- Integrate payment options for multiple modes
- Share regional transportation system information at points of entry in major areas (airport, plazas, etc.)
- Display traveler information on ODOT's TripCheck web site
- Automate system to alert media of incidents, weather conditions, etc.
- Incorporate real-time transit information

INCIDENT, EMERGENCY, AND EVENT MANAGEMENT

Stakeholders identified the following needs related to incident and emergency management:

- Incorporate Traffic Incident Management (TIM) Team observations and input when determining locations for new Closed-Circuit Television (CCTV) cameras and dynamic warning systems
- Coordinate with other emergency management operations centers (EOCs) to support emergency response
- Identify opportunities to automate TIM response processes

- Add a two-way link to commercial vehicle operators
- Provide real-time traffic and incident condition information at 911 centers and with the public
- Optimize traffic management for major events
- Share video monitoring systems between multiple agencies and law enforcement, while also managing controls for each type of viewer
- Adjust staffing levels of incident responders to match population increases
- Implement regional-EOC system (co-located, virtual)
- Identify key emergency evacuation routes that are consistent across jurisdictions
- Coordinate disaster preparedness planning for Cascadia earthquake or other major natural disasters
- Enhance alternate routes used for incident diversions with fixed route guide signs or dynamic message signs
- Identify common radio frequencies that can be shared by emergency management agencies, emergency operations centers, incident response teams, and transit agencies
- Take steps towards Vision Zero
- Support future efforts to evaluate the COVID-19 pandemic's impacts on the transportation system and the people using it

MAINTENANCE AND CONSTRUCTION MANAGEMENT

Stakeholders identified the following needs related to maintenance and construction management:

- Monitor the condition of transportation-related infrastructure using both fixed and vehicle-based infrastructure monitoring sensors
- Coordinate maintenance and construction activities with traffic and other management agencies
- Inform multimodal travelers of upcoming work zones, including information on detours, reduced speeds, lanes affected, and delays
- Access real time accurate weather information, particularly when it is icy
- Upgrade work zone management techniques to include technology and reduce risk of construction workers
- Improve consideration of pedestrians and bicyclists in developing detours and alternate routes, ensuring equitable space for all modes
- Evaluate ways to manage private development construction projects within typical jurisdictional oversight capabilities
- Develop encroachment and special event permits related to ITS and traffic control
- Improve coordination between third party routing (google, apple, etc.) companies for preferred detour routes

DATA MANAGEMENT AND PERFORMANCE MEASUREMENT

Stakeholders identified the following needs related to data management and performance measurement:

- Use ITS-collected data to determine the carrying capacity and demand of a corridor for all modes
- Understand the saturation of the corridor to strategize efficient public transit service
- Explore using a GIS program for incident response plans
- Aggregate and archive data collected throughout the region
- Use transportation-related data to support traffic data analysis, performance monitoring, planning, and reporting
- Automate data collection of volumes, speeds, occupancy, vehicle classifications, incidents, preemption calls, etc.
- Collect and archive parking and ridesharing data
- Integrate third-party vehicle data to support performance monitoring, infrastructure conditions reporting, and environmental monitoring
- Define common performance measures that can be measured and shared between partner agencies
- Promote data sharing and coordination to provide seamless micro mobility options
- Implement and manage an accessible user portal
- Update existing Intergovernmental Agreements (IGAs) to include signal performance measures
- Maintain fluid communication with ODOT and other agencies
- Monitor, collect data, and share ongoing information about air quality

ADDITIONAL SYSTEM NEEDS

In addition to the categories listed above, stakeholders identified the following potential project strategies:

- Statewide tracking of bicycling performance measures
- Improve availability of rail and air travel options
- Identify linkages to the statewide ITS plan
- Tie ITS plan to statewide multimodal performance measures
- Incorporate freight needs
- Improve coordination between projects at strategic locations to include ITS technology

PROPOSED STRATEGIES

The needs identified above can be addressed through ITS general strategies and project types (hereafter called "strategies" as identified in this section). Proposed strategies in this section are organized by functional area and will be refined and used as a basis to define specific projects for the Deployment Plan. Note that although some strategies may fall under more than one category, for simplification strategies are listed only once.

TRAFFIC OPERATIONS AND MANAGEMENT STRATEGIES

- Advanced Transportation Controller (ATC) upgrades
- Automated Signal Performance Measures (ATSPMs)
- Traffic Signal Control Plan for multimodal management
- Distributed/virtual Traffic Operations Center that links jurisdictions together
- Signal Phase and Timing (SPaT) data shared with TripCheck
- Intersection safety analytics system
- Connected vehicle technology for bicycle and pedestrian safety
- Bicycle detection and counting
- Bicycle signal timing
- Enhanced pedestrian signal timings
- Accessible pedestrian signals (APS)
- Ramp metering
- Active traffic management/variable speeds
- Integrated corridor management
- Communications infrastructure gap closure
- Traffic monitoring cameras
- Advanced railroad grade crossing information
- Connected Vehicle Applications to improve operations, prioritizing people, safety, and community benefits
- Use count/travel time sensors for RITIS
- NextGen Transit Signal Priority (TSP) Options
- Dynamic/adaptive signal timing

PUBLIC TRANSPORTATION MANAGEMENT STRATEGIES

- Expand opportunities for transit signal priority
- Transit queue jumps
- Flexible park and rides during special events
- Support the deployment of traveler information and transit technologies at park and ride lots
- Multi-modal travel coordination
- Real-time transit arrival information
- Data sharing for trip planning
- Data sharing with TMC for capacity
- Use corridor congestion and travel time data to optimize service

- Evaluate opportunities to provide transit priority on non- BRT routes including TSP and queue jumps
- Modifications to park and ride locations to accommodate micromobility
- Use data gathering on buses to inform route development

TRAVELER INFORMATION STRATEGIES

- Variable message signs
- Regional parking information systems
- Communicating/data sharing with 3rd party providers
- Parking availability and guidance
- Trip Planning

INCIDENT, EMERGENCY, AND EVENT MANAGEMENT STRATEGIES

- Centralized emergency vehicle preemption (EVP)
- Information about roadway constraints on diversion routes
- Scenario planning for emergency response
- Route planning for emergencies and special events
- Technology for detour routes: portable or permanent VMS on arterials and highways, route notifications to 3rd party trip planning provide (detour routes, evacuation routes) deploy portables, or permanent signs, or traveler information, VMS on arterials
- Monitoring cameras on incident response vehicles
- Emergency information dissemination
- Evaluate the need for flood warning systems
- Develop encroachments and special events permits related to ITS and traffic control
- Improve coordination between 3rd party routing for preferred detour routes

MAINTENANCE & CONSTRUCTION MANAGEMENT STRATEGIES

- Smart work zone system (en route warnings)
- Region-wide construction work zone management and monitoring
- Infrastructure monitoring technology
- Follow ODOT Temporary Pedestrian Accessible Route (TPAR) standards to develop construction detour management plans that maintain access all system users (ped, bike, transit, micromobility)

DATA MANAGEMENT & PERFORMANCE MEASUREMENT STRATEGIES

- Regional data warehouse for data sharing
- Application of analytics to identify crashes and/or potential crash locations

- Automated data collection and automated performance reporting
- Travel time monitoring system
- Set up processes, agreements, and communications for open data sharing (including video) with statewide clearinghouses and regional partners
- Identify opportunities for data integration with third-party transportation data providers
- Develop processes and agreements to use data collected on transit to improve corridor operations
- On-time Transit Performance

CHAPTER 3 – CENTRAL LANE ITS PLAN UPDATE

REGIONAL ITS ARCHITECTURE AND OPERATIONAL CONCEPT

AUGUST 2021

PREPARED FOR:

720 SW WASHINGTON STREET, SUITE 500, PORTLAND, OR 97205 • 503.243.3500 • DKSASSOCIATES.COM

CHAPTER 3: TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The Regional Intelligent Transportation System (ITS) Architecture is a planning tool that provides an overall vision and conceptual framework for implementing ITS systematically in the Central Lane Metropolitan Planning Organization (CLMPO) area. It conforms to the U.S. DOT National ITS Architecture (version 9.0)[1] and complements the Oregon Statewide ITS Architecture, developed and maintained by the Oregon Department of Transportation (ODOT), where elements overlap.

This chapter introduces the National ITS Architecture, provides an overview and highlights of the CLMPO Regional ITS Architecture, and presents the region's concept of operations, which illustrates the core regional operational strategies and how agencies and systems interact to deliver them.

WHAT IS AN ARCHITECTURE?

The Architecture helps ensure that ITS projects throughout a region are consistent with existing and planned projects and with long-term regional plans. For ITS projects the architecture helps develop institutional agreement and technical integration of systems on local, regional, and even national levels. For long-range planning the architecture helps identify operational improvement strategies that are complementary or that can be used in lieu of traditional capital improvement strategies.

At its core, an architecture provides a set of rules that facilitate the building of systems that can communicate and be interoperable with one another once built. For example, if a transportation agency wants to clear incidents faster, the architecture defines a function to monitor roadways and identifies the interconnection and information flows between the roadway, the traffic operations center, and the emergency management center needed to provide responders with incident information. The architecture provides the framework for the process but does not define technology or management techniques.

The development of the Regional ITS Architecture for the CLMPO area is a timely component of the overall project identification and strategic planning process.

NATIONAL ITS ARCHITECTURE

The U.S. Department of Transportation developed the National ITS Architecture to ensure that intelligent transportation systems deployed around the country can communicate with one another and share information to maximize the return of investment in ITS.

[1] https://local.iteris.com/arc-it/

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) published a Final Rule and Policy[2] that all agencies seeking federal funding for ITS projects must develop a regional architecture that is compliant with the National ITS Architecture and be able to demonstrate that the funded project was included in said architecture. The National ITS Reference Architecture (ARC-IT) is now in Version 9.0 and has continued to evolve as ITS has expanded and evolved.

ARC-IT provides a common framework for planning, defining, and integrating intelligent transportation systems. It is a mature product that reflects the contributions of a broad cross-section of the ITS community (transportation practitioners, systems engineers, system developers, technology specialists, etc.).

The architecture defines:

- The **functions** (e.g., gather traffic information or request a route) that are required for ITS applications
- The **physical entities** or subsystems where these functions reside (e.g., the roadside or the vehicle)
- The **information flows** that connect these functions and physical subsystems together into an integrated system

Regional architectures are not intended to specify the particular technologies that will be used in ITS deployments; they are instead used to define the functions that technologies must perform. The architecture provides structure for defining general ITS functional requirements during the planning and design process.

PRIMARY ARCHITECTURE COMPONENTS

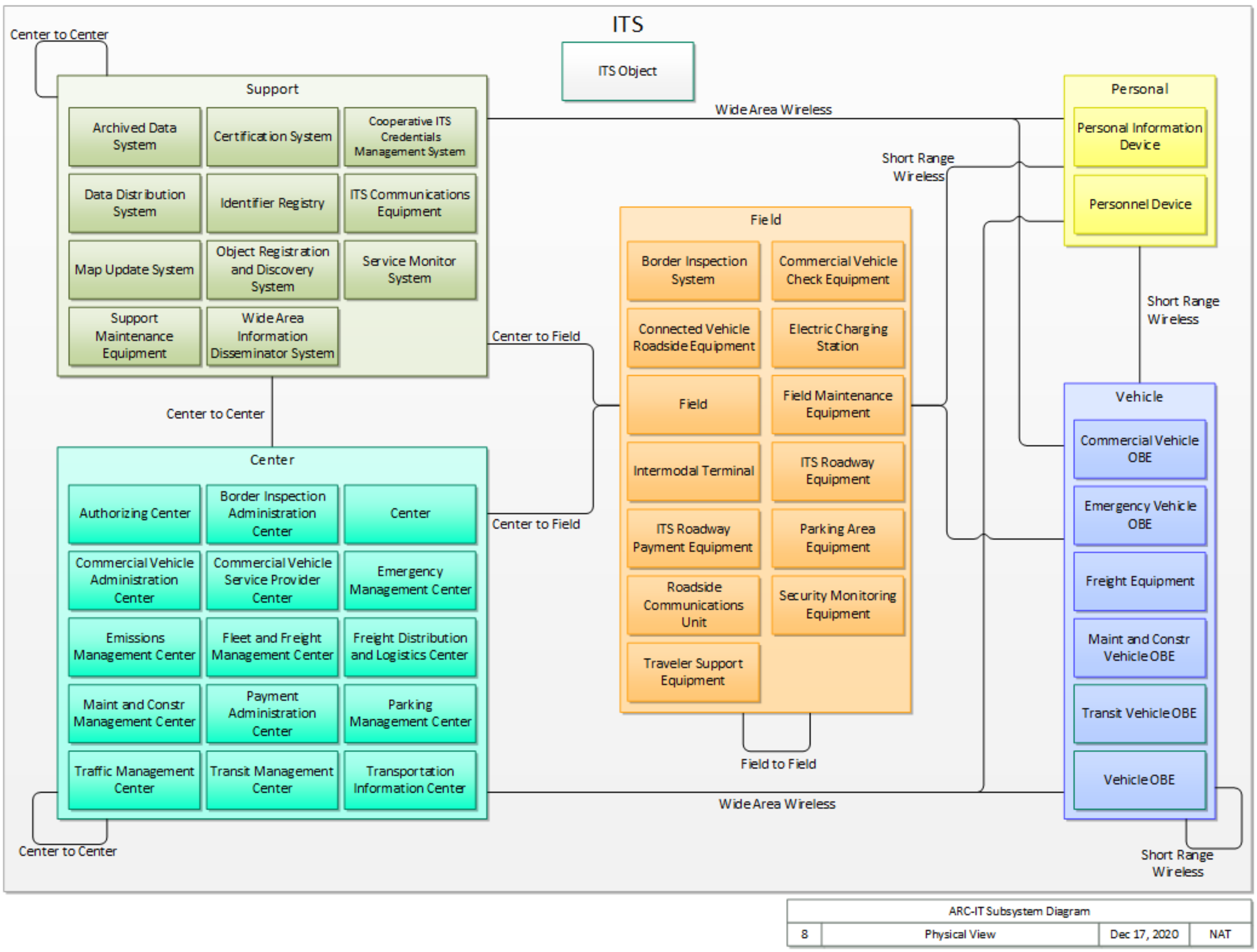
The physical architecture provides a framework for the physical elements of ITS. These elements include automobiles, people, computers, buses, trucks, etc. Figure 1, adapted from the most recent version of ARC-IT, illustrates the complete set of physical components available in the National ITS Architecture.

The physical elements are broken into large groups called subsystem classes. These are categories that describe what their member physical entities (subsystems) do. The five major subsystem classes are:

1. **Personal Subsystems:** Systems or applications that provide information to travelers (e.g., personal information devices)
2. **Center Subsystems:** Systems or applications that process and use information to control the transportation network (e.g., signal timing)

[2] Intelligent Transportation System Architecture and Standards: Final Rule. FHWA Docket No. FHWA-99-5899. U.S. Department of Transportation, Federal Highway Administration, Jan. 8, 2001

3. **Vehicle Subsystems:** Systems or applications that provide driver information and safety on vehicle platforms (e.g., in-vehicle signing)
4. **Field Subsystems:** Systems or applications deployed in the field that collect transportation data and are ideally controlled from a center (e.g., traffic signals)
5. **Support Subsystems:** Systems or applications that provide data management services to support operations (e.g., archived data system)



(https://local.iteris.com/arc-it/html/viewpoints/physical.html)

FIGURE 1. PHYSICAL VIEW OF THE NATIONAL ITS REFERENCE ARCHITECTURE (ARC-IT 9.0)

CLMPO REGIONAL ITS ARCHITECTURE

OVERVIEW

The CLMPO Regional ITS Architecture describes the planned ITS services and functions, incorporates the relevant subsystems and organizations, and describes the information exchanges planned or existing between them. These relationships are illustrated by tailoring specific National ITS Architecture diagrams, called service package diagrams. From these tailored diagrams, a deployment plan structure is established that provides a basis for long-term transportation planning in the region. ITS Projects are then mainstreamed into the planning process where stakeholder buy-in and project promotion can easily occur with all stakeholders in agreement.

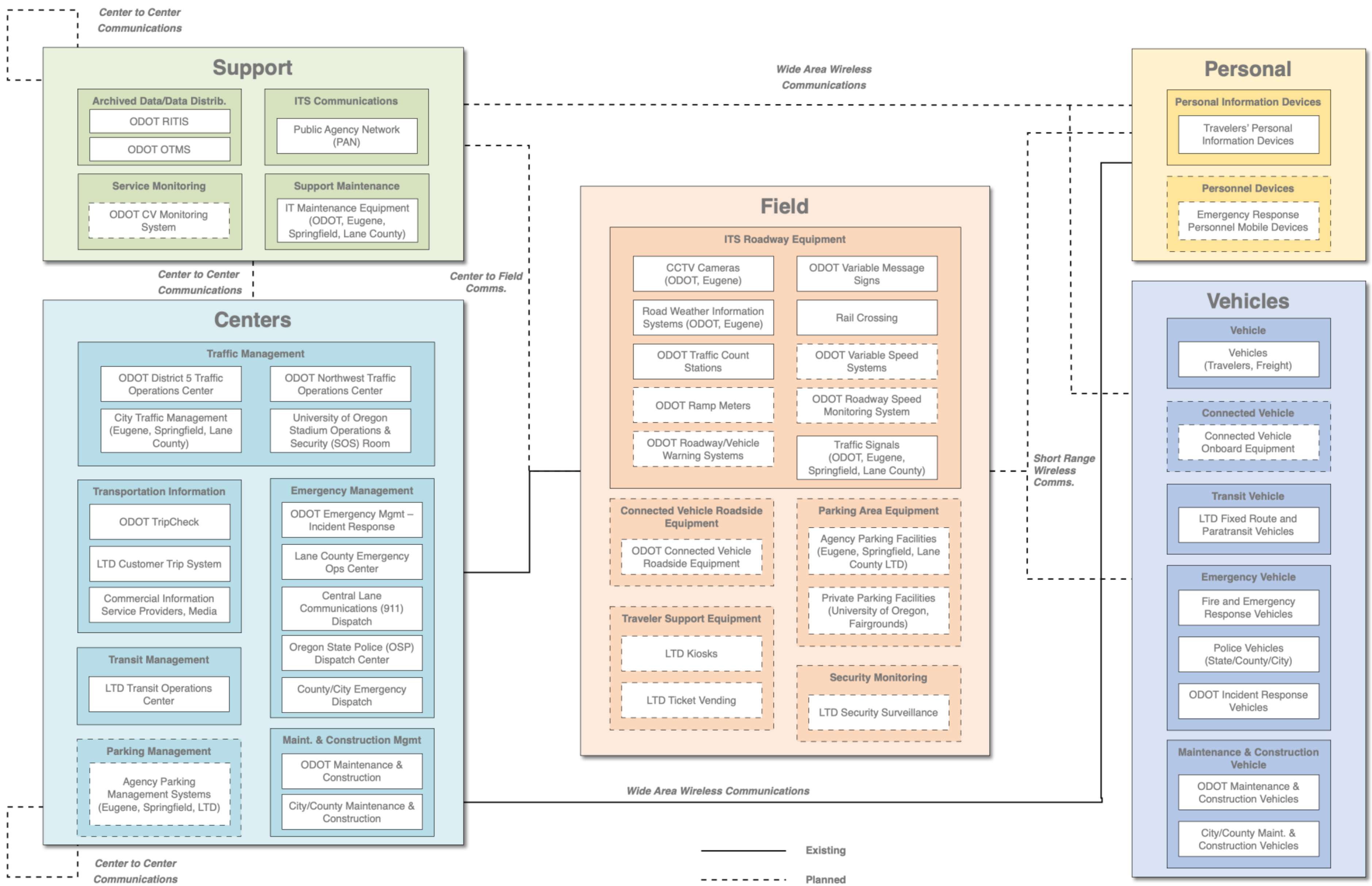
Another purpose of the CLMPO Regional ITS Architecture is to describe how individual ITS projects/applications work together as a system. This is represented by concept of operations diagrams organized by strategic functional areas.

Error! Reference source not found. illustrates the CLMPO physical architecture. It groups the m ajor physical elements into five classes (Support, Centers, Field, Personal, and Vehicles) and indicates how these elements communicate with one another. Elements shown with solid outline are existing; dashed outline indicates planned.

RAD-IT ARCHITECTURE DATABASE

The CLMPO Regional ITS Architecture was developed using RAD-IT (version 9.0), a software application for developing regional and project-level ITS Architectures that are compliant with Version 9 of the National ITS Reference Architecture. The benefit of using RAD-IT Architecture to create and store an ITS Architecture is that the architecture is developed using a standardized format that can be easily "handed off" from the original developer to subsequent users who will be updating and maintaining the architecture. Customized diagrams and reports can be easily created by the user and shared with colleagues during the detailed design of individual ITS applications and projects.

CLMPO Regional ITS Architecture



For this 2020-2021 update, the stakeholders, system inventory, service packages, information flows and standards were all reviewed and evaluated for relevancy. The updated information was gathered through the stakeholder needs assessment process.

ARCHITECTURE DEVELOPMENT PROCESS

In developing the Regional ITS Architecture with the RAD-IT tool, the following steps were conducted:

1. **Initial Information:** A general description, time frame, and geographical scope of the region were entered into the RAD-IT database.

2. **Inventory of Systems and Stakeholders:** The region's existing and planned ITS inventory, as documented through the Existing Conditions chapter, were used as input to the RAD-IT database. Relevant National ITS Architecture subsystem(s), terminator(s) and a primary stakeholder were assigned to each inventory element. The ITS Inventory and mapping to National ITS Architecture elements provides the basis for each step that follows in the architecture development. The ITS Inventory was compiled at an overview level and not an "equipment" level, for the purpose of keeping the database at a manageable, usable size. Refer to *ITS Stakeholders and Inventory* for a listing of project stakeholders and their associated inventory elements.

3. **Selection of Service Packages:** Based upon the ITS Inventory, and an understanding of planned and needed ITS applications in the region, Service Packages from the National ITS Architecture were selected for inclusion in the Regional ITS Architecture and relevant ITS inventory elements assigned to each Service Packages. Refer to *Selected Service Packages* for a listing and discussion of the region's selected Services Packages.

4. **ITS Functionality:** ITS functional areas, related ITS elements, and general system functional requirements were selected in support of the existing and planned ITS in the region.

5. **Interconnects and Flows Customization:** An ITS Architecture defines flows of information that are exchanged between subsystems. A key task in RAD-IT is customizing the selection of flows between subsystems so that the appropriate flows are included as part of the architecture database. This information may then be output by the user as customized Physical Architecture flow diagrams.

An important benefit of using RAD-IT is the wide range of options for preparing customized diagrams and reports based upon the regional ITS architecture developed during this process. These reports and diagrams can be "filtered" to focus on selected ITS elements, depending on the needs of the user.

USING THE ARCHITECTURE

The ITS Architecture should be a living document that is updated as things change. Common reasons the CLMPO Regional ITS Architecture may need updating include:

- A stakeholder identifies a new strategy/ITS service that could be implemented to meet a need
- A stakeholder needs to show a project architecture as part of a project being implemented
- FHWA updates the National ITS Architecture with new service packages or information flows that should be included in the region's architecture
- A stakeholder implements a new inventory element not previously identified

The following describes responsibilities for who updates the Architecture and when:

- **Who?** ODOT will be the keeper and maintainer of the architecture. ODOT will coordinate with local agencies to gather information on new projects and/or other updates that are needed.
- **When?** Once per year. This annual update will coincide with the yearly GIS-based ITS inventory update.

Updates to the Statewide ITS Architecture, maintained by ODOT, should be reviewed to determine if and when updates are needed to the CLMPO Regional ITS Architecture where there is overlap between the elements in both architectures.

RELATIONSHIP TO OTHER ITS ARCHITECTURES

The CLMPO Regional ITS Architecture is consistent with the National ITS Architecture. The other related architecture is the ODOT Statewide ITS Architecture, which should be coordinated with as ITS technologies are planned and deployed in the region.

Coordination between the regional and statewide ITS architectures enables region and state stakeholders to identify potential opportunities for integration and data exchange. Additionally, with an awareness of other key architectures, critical information flows can be designed to ensure that uniform, accurate information is available across jurisdictional boundaries.

CONCEPT OF OPERATIONS

This section presents the Concept of Operations for the Central Lane MPO region, which describes how the region's stakeholders and systems work together to implement operations services, and the specific roles and responsibilities of each regional partner in delivering those services.

An operational concept is a required component of a regional ITS architecture per the FHWA Final Rule 940 and FTA Policy. This section documents the operational concept development approach and agency roles and responsibilities for the key regional ITS service areas.

The main objectives of the Concept of Operations are to:

- Provide an overview of the primary functional areas in the CLMPO region
- Identify stakeholder roles and responsibilities in the implementation of regional ITS systems and strategies
- Illustrate how ITS systems, agency personnel, and other resources interact as a basis for developing the updated ITS Architecture

OPERATIONAL CONCEPT DEVELOPMENT APPROACH

The operational concept was developed based on input from the project stakeholders and agency partners and the documents developed to date, including the Existing ITS Infrastructure, Needs Assessment, and ITS Vision. Stakeholder interviews and ITS documentation provided insight into stakeholder roles and responsibilities as well as key agency interactions. The results discussed in the operational concept may not represent all of the potential interactions, but present key relationships, roles and responsibilities, and information flows.

OPERATIONAL CONCEPT SERVICE AREAS

The operational concept is organized into six Service Areas that support the CLMPO region's ITS vision and is summarized in high-level information flow diagrams. Each Service Area covers a particular aspect of the management and operation of the regional transportation system.

The Service Areas are:

- Traffic Operations and Management
- Public Transportation Management
- Traveler Information
- Incident and Emergency Management
- Maintenance and Construction Management
- Data Management and Performance Reporting

TRAFFIC OPERATIONS AND MANAGEMENT

The Traffic Operations and Management Concept of Operations focuses on the regional exchange of information between agencies for the purpose of relieving congestion and providing each participating agency with a "wide view" of the conditions on the road network – that is, conditions that are outside of their jurisdiction but still impact roadways under their management. Specifically, this Concept of Operations, as depicted in the following diagram and matrix, provides for data exchange (such as signal timing plans) between Eugene, Springfield, Lane County, and ODOT. Video exchanges occur between the cities and ODOT as well. All agencies are shown as electronically linked to roadside equipment along roadway for which they have management responsibility, which may include signals, vehicle detectors, ramp meters, and cameras.

Figure 2 shows the flow diagram for the Traffic Operations and Management concept.

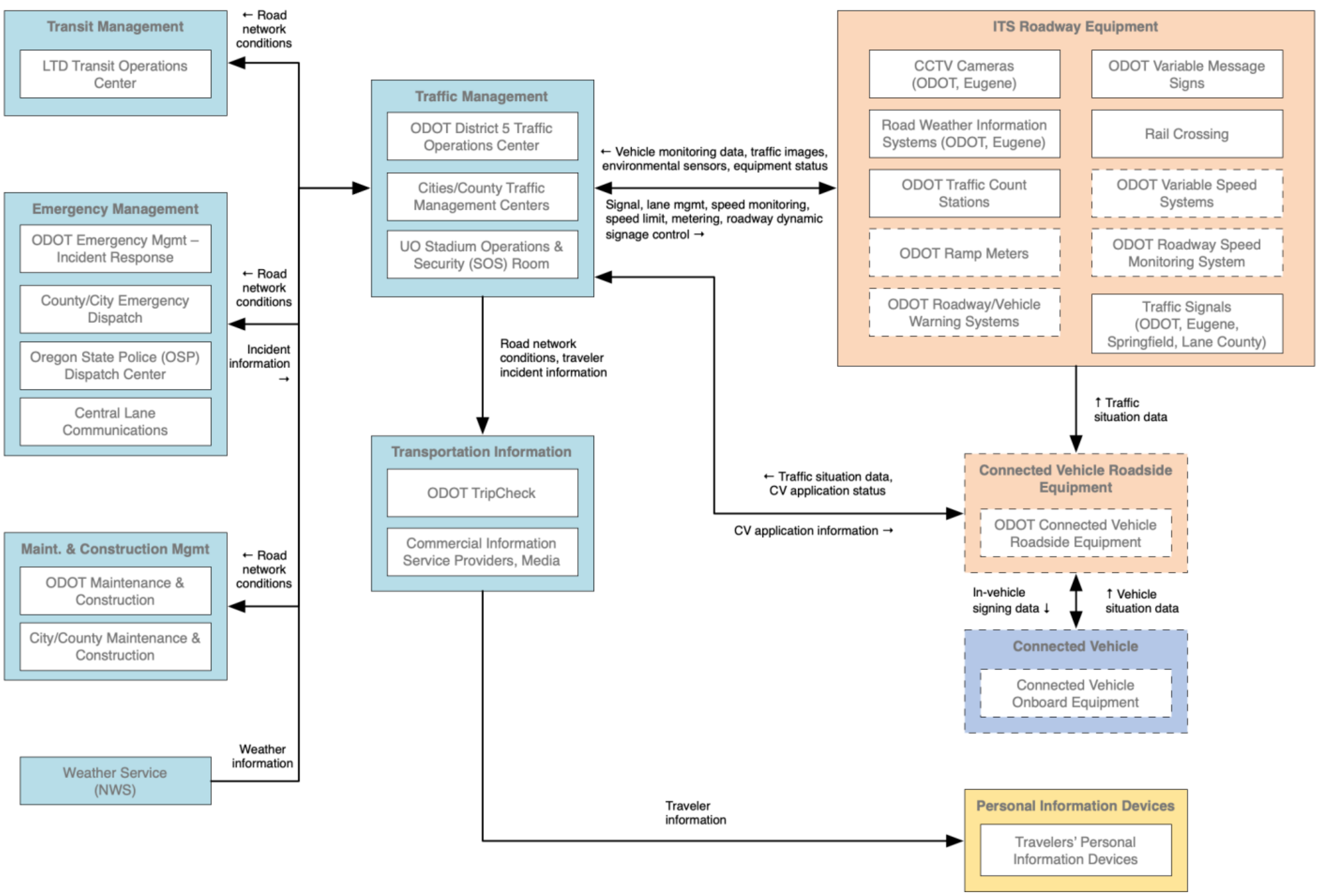


FIGURE 2. TRAFFIC OPERATIONS AND MANAGEMENT - INFORMATION FLOW DIAGRAM

PUBLIC TRANSPORTATION MANAGEMENT

Lane Transit District (LTD) is the primary agency in this Concept of Operations for Public Transportation Management. LTD is shown interacting with Central Lane Communications for security support, as well as communicating with local traffic management systems for information regarding road network conditions or closures. Applications such as information to bus stop and transit center information display devices, electronic fare collection, Transit Signal Priority/Bus Rapid Transit, and security video feeds to the transit center are also represented.

Figure 3 shows the information flow diagram for the Public Transportation Management concept.

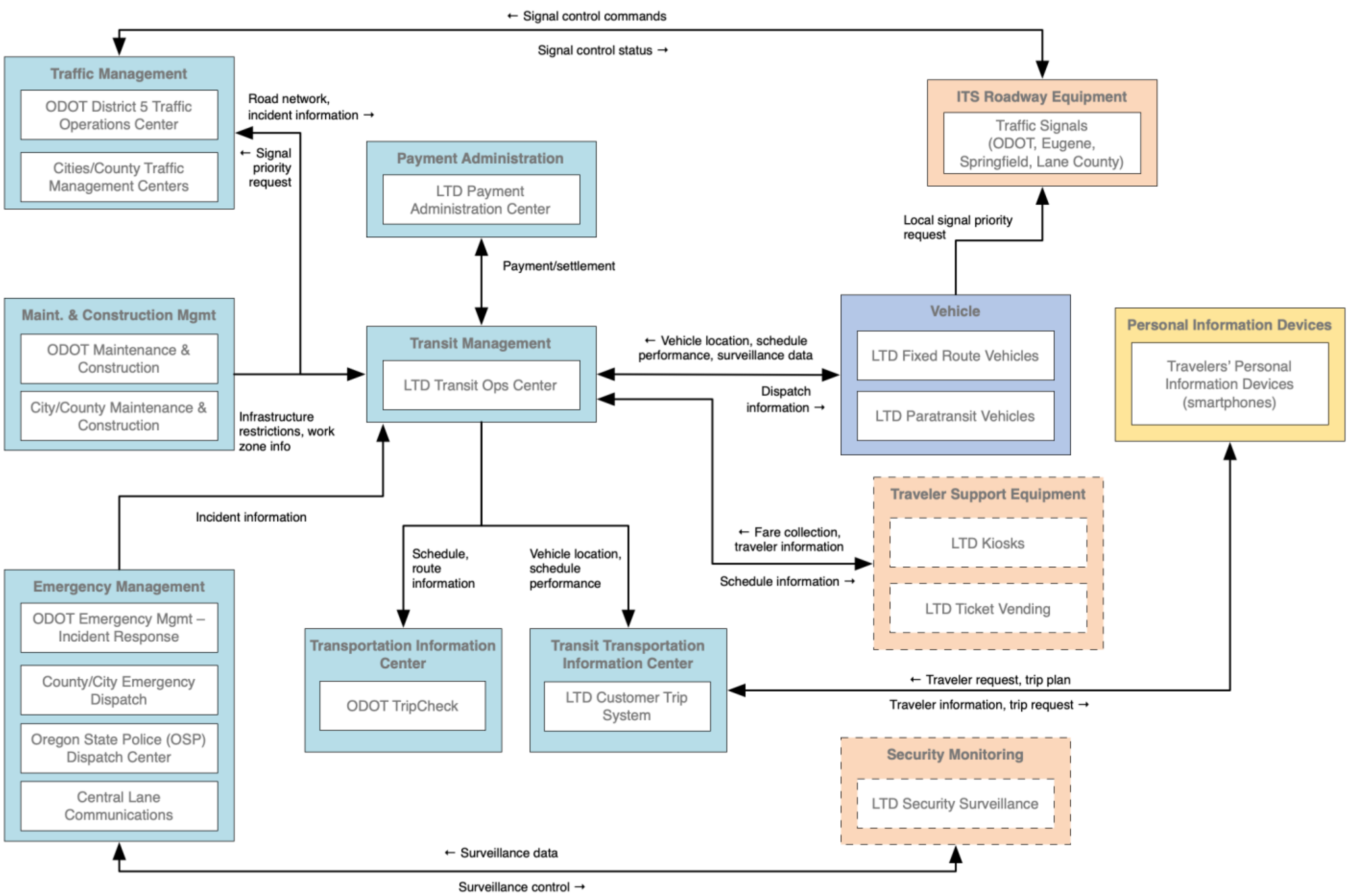


FIGURE 3. PUBLIC TRANSPORTATION MANAGEMENT - INFORMATION FLOW DIAGRAM.

TRAVELER INFORMATION

Roadway traveler information for the CLMPO region aims at providing interregional and local travelers with real-time and accurate information about their journey before or during their trip.

ODOT's TripCheck web site is the primary source of statewide traveler information. For Eugene-Springfield, traveler information for the cities and Lane County, as well as Lane Transit District schedule and service information, would be made available to the public via TripCheck (rather than seeking to develop an independent Eugene-Springfield ATIS). Lane Transit District would continue to provide traveler information directly to its riders through mobile applications, Twitter, and kiosks at major stops. Other jurisdictions may also provide limited traveler information directly to the public. This Concept of Operations includes the interface to TripCheck for the purpose of distributing regional traveler information collected from agency field devices (e.g., cameras, count stations, and DMS).

Figure 4 shows the information flow diagram for the Traveler Information concept.

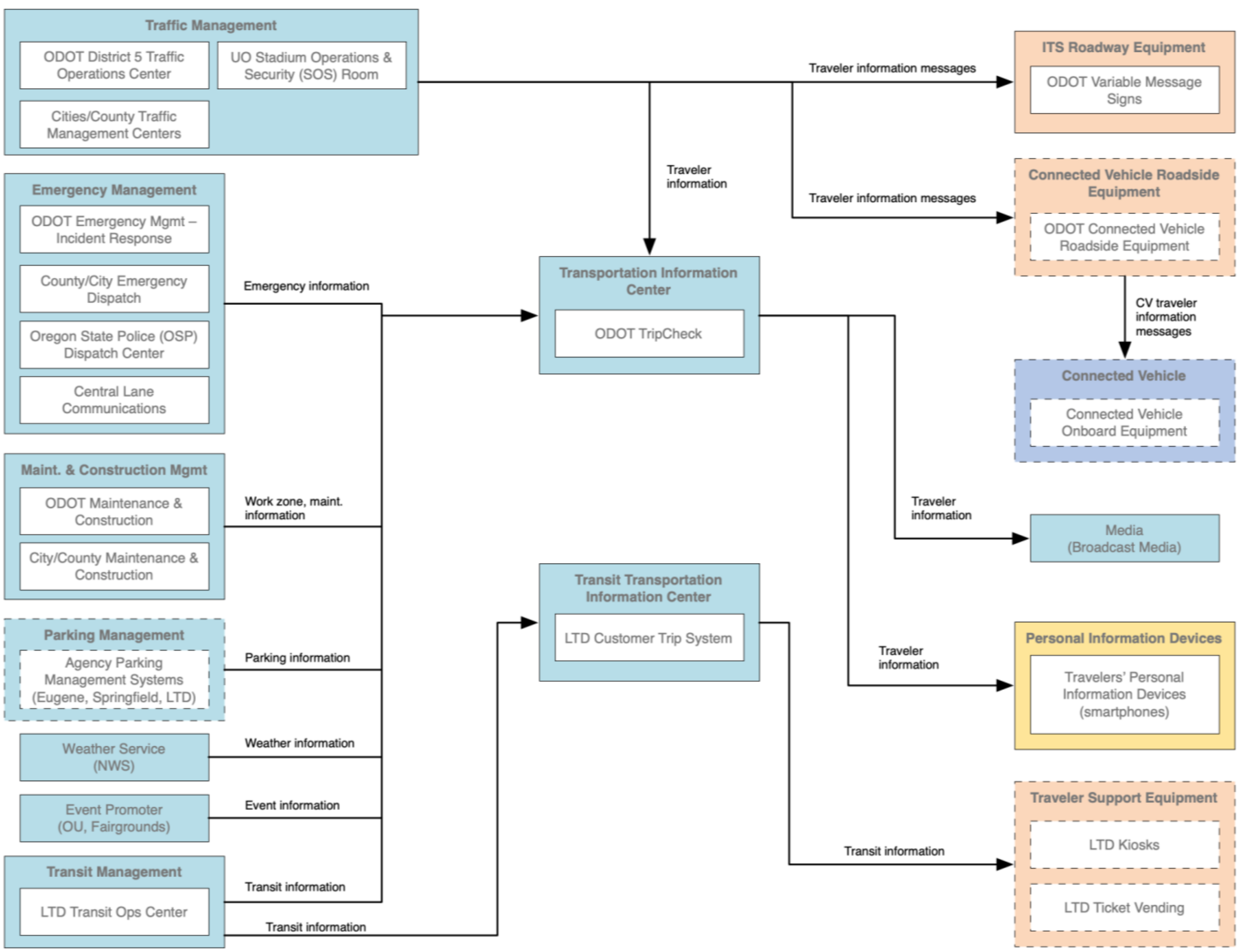


FIGURE 4. TRAVELER INFORMATION - INFORMATION FLOW DIAGRAM.

INCIDENT AND EMERGENCY MANAGEMENT

The Emergency Management Center physical object, which includes Central Lane Communications, is shown in the flow diagram as the central element for Emergency Management in the region. Central Lane Communications' role within the emergency management function involves interfacing with both statewide and regional agencies in response to emergencies occurring anywhere in the region or, potentially, emergencies outside of the region that may still impact the regional transportation network and safety.

The Concept of Operations includes functionality for video to be sent to Emergency Management Centers from emergency and incident response vehicles and to city and county traffic management systems. The concept also includes information sharing between ODOT incident response vehicles, local police vehicles, and Oregon State Patrol vehicles.

Figure 5 shows the flow diagram for the Incident and Emergency Management concept.

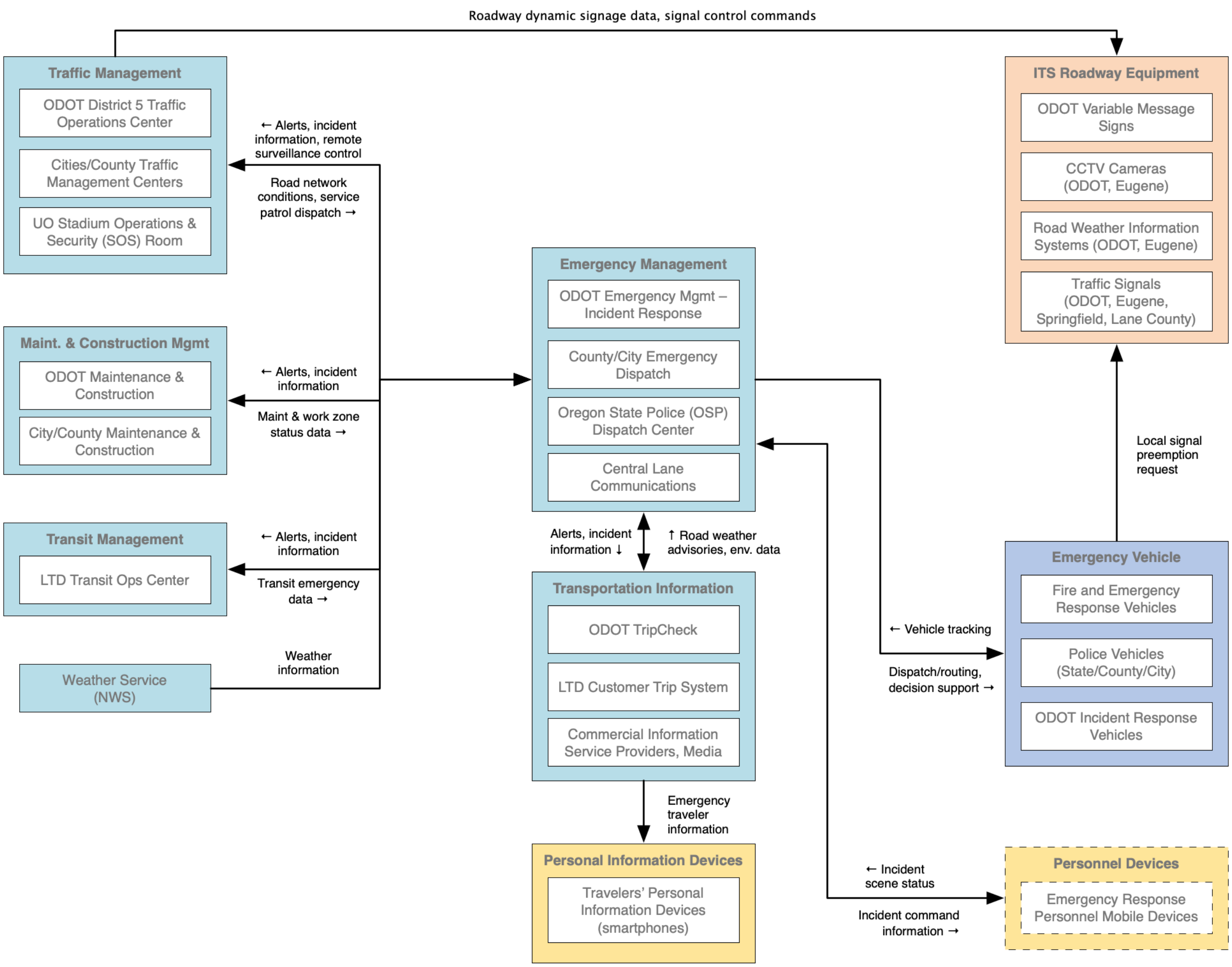


FIGURE 5. INCIDENT AND EMERGENCY MANAGEMENT - INFORMATION FLOW DIAGRAM.

MAINTENANCE AND CONSTRUCTION MANAGEMENT

The Maintenance and Construction Concept of Operations focuses on the exchange of roadway maintenance and construction schedules between agencies, including alerts to the media and Lane Transit District. These information exchanges help to ensure that other agencies can plan for impacts to their road networks as a result of road or lane closures in another jurisdiction. "Maintenance" includes routine maintenance of roadways and both ITS and non-ITS equipment, as well as activities specifically related to inclement weather such as snowplowing and ice removal.

Also included as part of Maintenance and Construction Management are electronic linkages to maintenance vehicles for dispatch and location tracking. Roadside equipment information links include control of cameras to verify conditions and also data from devices such as automatic anti-icing or ice detectors on bridges or roadways.

ODOT TripCheck is a primary source of weather and road conditions information for travelers.

Figure 6 shows the information flow diagram for the Maintenance and Construction Management concept.

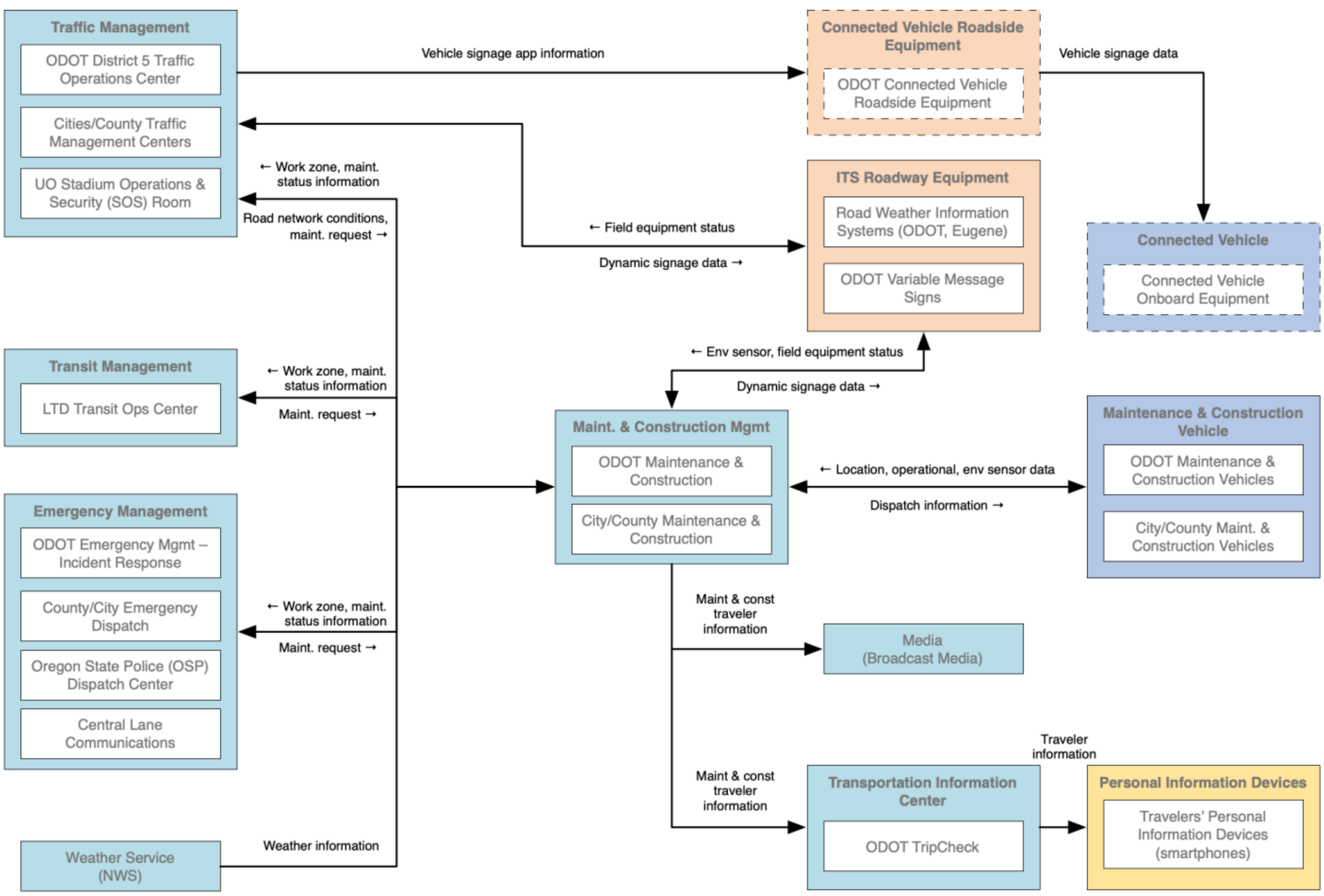


FIGURE 6. MAINTENANCE AND CONSTRUCTION MANAGEMENT - INFORMATION FLOW DIAGRAM.

DATA MANAGEMENT AND PERFORMANCE REPORTING

The Data Management and Performance Reporting Concept of Operations covers the collection, short-term storage, and eventual archiving of regional transportation data. This data may range from the real-time data used to inform TripCheck, to yearlong accumulations of traffic count data available for further analysis. The collection of diverse types of data will require coordination with existing and future management procedures and policies. The concept can be implemented by a solo agency or region (such as CLMPO), or it may be operated as a data repository that collects and "warehouses" data from multiple agencies and sources for further analysis.

The concept identifies ODOT Regional Integrated Transportation Information System (RITIS) as the region's primary archived data and performance reporting system. RITIS is the statewide automated data sharing, dissemination, and archiving system that includes many performance measures, dashboards, and visual analytics tools that can be used to gain situational awareness, measure system performance, and communicate information between agencies and the general public. ODOT's new Oregon Traffic Monitoring System (OTMS) is the implementation of the MS2 traffic counting database that allows agencies access to ODOT traffic counts as well as uploading local traffic count data. Figure 7 shows the information flow diagram for the Data Management and Performance Reporting concept.

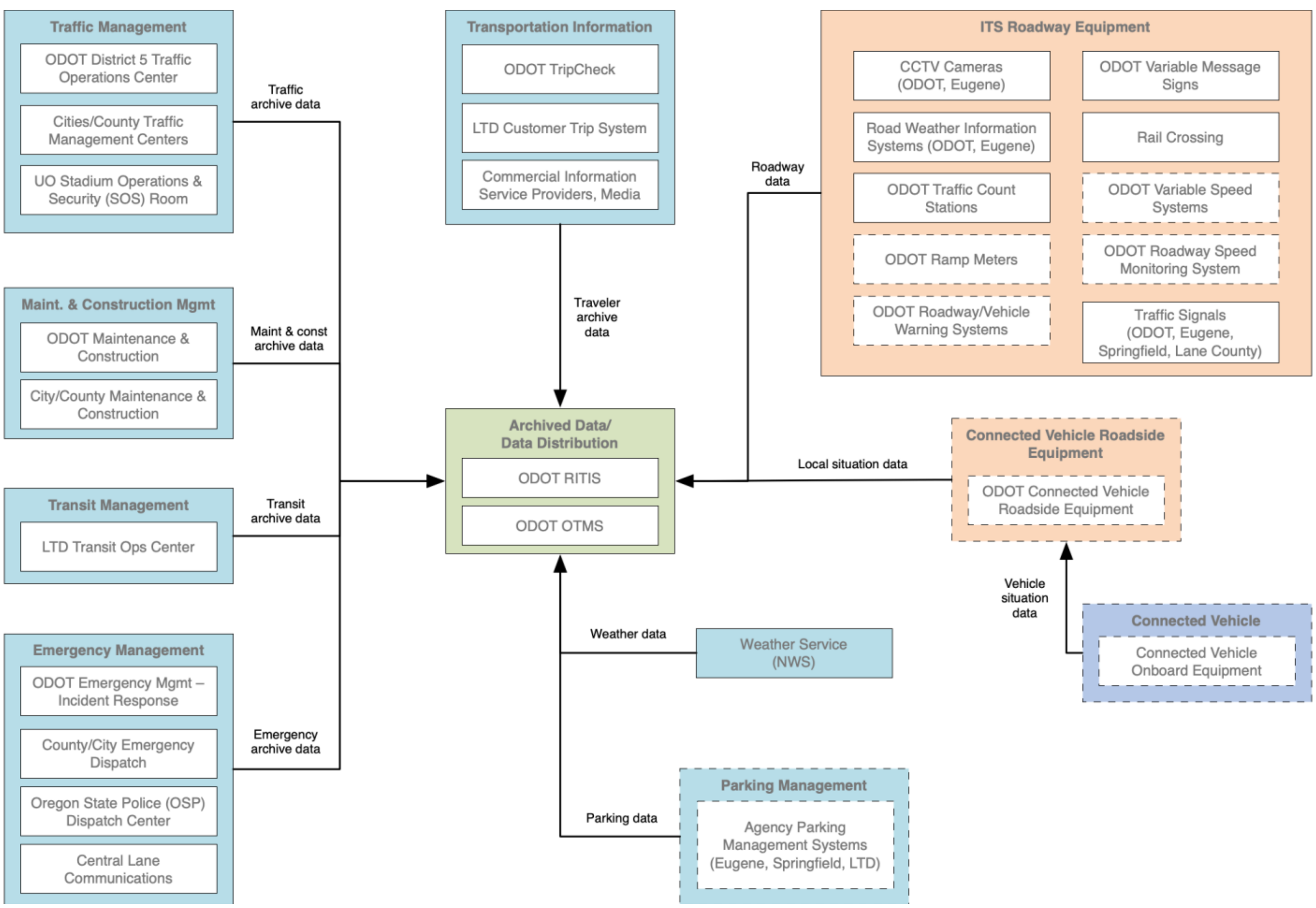


FIGURE 7. DATA MANAGEMENT AND PERFORMANCE REPORTING - INFORMATION FLOW DIAGRAM

ITS STAKEHOLDERS AND INVENTORY

An inventory of existing and planned transportation systems operated by regional stakeholders is the basis for the CLMPO ITS Architecture. The transportation system inventory was developed based on input from regional stakeholders. The inventory includes a list of ITS elements and the associated stakeholder responsible for system operation.

This section describes the region's surface transportation inventory elements. A transportation element can be a center, vehicle, traveler, field, or support equipment. In order to reduce the complexity of the architecture, some transportation elements with like functionality have been grouped together. Each transportation inventory element is mapped to at least one National ITS Architecture entity.

TABLE 1. ITS STAKEHOLDERS AND INVENTORY ELEMENTS.

STAKEHOLDER	ELEMENT CLASS	ELEMENT NAME	STATUS
BROADCAST MEDIA	Center	Broadcast Media	Existing
CENTRAL LANE COMMUNICATIONS (911) GROUP	Center	Central Lane Communications (911) Group Dispatch Center	Existing
CENTRAL LANE COMMUNICATIONS (911) GROUP	Vehicle	Central Lane Communications (911) Group Police and Fire Vehicles	Existing
CITY OF COBURG	Center	City of Coburg Maintenance and Construction Management	Planned
CITY OF COBURG	Support	City of Coburg Data Mart	Planned
CITY OF EUGENE	Center	City of Eugene Maintenance and Construction Management	Planned
CITY OF EUGENE	Center	City of Eugene Parking Management Center	Planned
CITY OF EUGENE	Center	City of Eugene Traffic Management Center	Planned
CITY OF EUGENE	Field	City of Eugene CCTV	Existing
CITY OF EUGENE	Field	City of Eugene Field Equipment	Existing
CITY OF EUGENE	Field	City of Eugene Parking Facilities	Planned
CITY OF EUGENE	Field	City of Eugene Railroad Flashing Beacon	Existing

STAKEHOLDER	ELEMENT CLASS	ELEMENT NAME	STATUS
CITY OF EUGENE	Field	City of Eugene RWIS	Existing
CITY OF EUGENE	Field	City of Eugene School Flasher	Existing
CITY OF EUGENE	Field	City of Eugene Speed Feedback Sign	Existing
CITY OF EUGENE	Field	City of Eugene Traffic Signal	Existing
CITY OF EUGENE	Support	City of Eugene Data Mart	Planned
CITY OF SPRINGFIELD	Center	City of Springfield Maintenance and Construction Management	Planned
CITY OF SPRINGFIELD	Center	City of Springfield Parking Management Center	Planned
CITY OF SPRINGFIELD	Center	City of Springfield Traffic Management Center	Planned
CITY OF SPRINGFIELD	Field	City of Springfield Field Equipment	Existing
CITY OF SPRINGFIELD	Field	City of Springfield Ped Signal	Existing
CITY OF SPRINGFIELD	Field	City of Springfield Railroad Flashing Beacon	Existing
CITY OF SPRINGFIELD	Field	City of Springfield School Flasher	Existing
CITY OF SPRINGFIELD	Field	City of Springfield Traffic Signal	Existing
CITY OF SPRINGFIELD	Field	Springfield Parking Facilities	Planned
CITY OF SPRINGFIELD	Support	City of Springfield Data Mart	Planned
CV OEM	Center	CV OEM Vehicle Service Center	Planned
HEAVY RAIL OPERATORS	Field	Heavy Rail Wayside Equipment	Planned
LANE COUNTY	Center	Lane County Maintenance and Construction Management	Planned
LANE COUNTY	Center	Lane County Parking Management Center	Planned

STAKEHOLDER	ELEMENT CLASS	ELEMENT NAME	STATUS
LANE COUNTY	Center	Lane County Special Event Promoter System	Planned
LANE COUNTY	Center	Lane County Traffic Management Center	Planned
LANE COUNTY	Field	Lane County Field Equipment	Existing
LANE COUNTY	Field	Lane County Parking Facilities	Planned
LANE COUNTY	Field	Lane County Ped Signal	Existing
LANE COUNTY	Field	Lane County School Flasher	Existing
LANE COUNTY	Field	Lane County Traffic Signal	Existing
LANE COUNTY	Support	Lane County Data Mart	Planned
LANE TRANSIT DISTRICT (LTD)	Center	LTD Customer Trip Request System	Planned
LANE TRANSIT DISTRICT (LTD)	Center	LTD Operations Center	Existing
LANE TRANSIT DISTRICT (LTD)	Center	LTD Parking Management Center	Planned
LANE TRANSIT DISTRICT (LTD)	Field	LTD Field Equipment	Planned
LANE TRANSIT DISTRICT (LTD)	Field	LTD Parking Facilities	Planned
LANE TRANSIT DISTRICT (LTD)	Field	LTD Security Monitoring Equipment	Planned
LANE TRANSIT DISTRICT (LTD)	Vehicle	LTD Fixed Route Vehicle	Existing
LANE TRANSIT DISTRICT (LTD)	Vehicle	LTD Fixed Route Vehicle Onboard Equipment	Existing
LANE TRANSIT DISTRICT (LTD)	Vehicle	LTD Paratransit Vehicle	Existing
LANE TRANSIT DISTRICT (LTD)	Vehicle	LTD Paratransit Vehicle Onboard Equipment	Existing
LANE TRANSIT DISTRICT (LTD)	Vehicle	LTD Special Event Shuttle	Existing

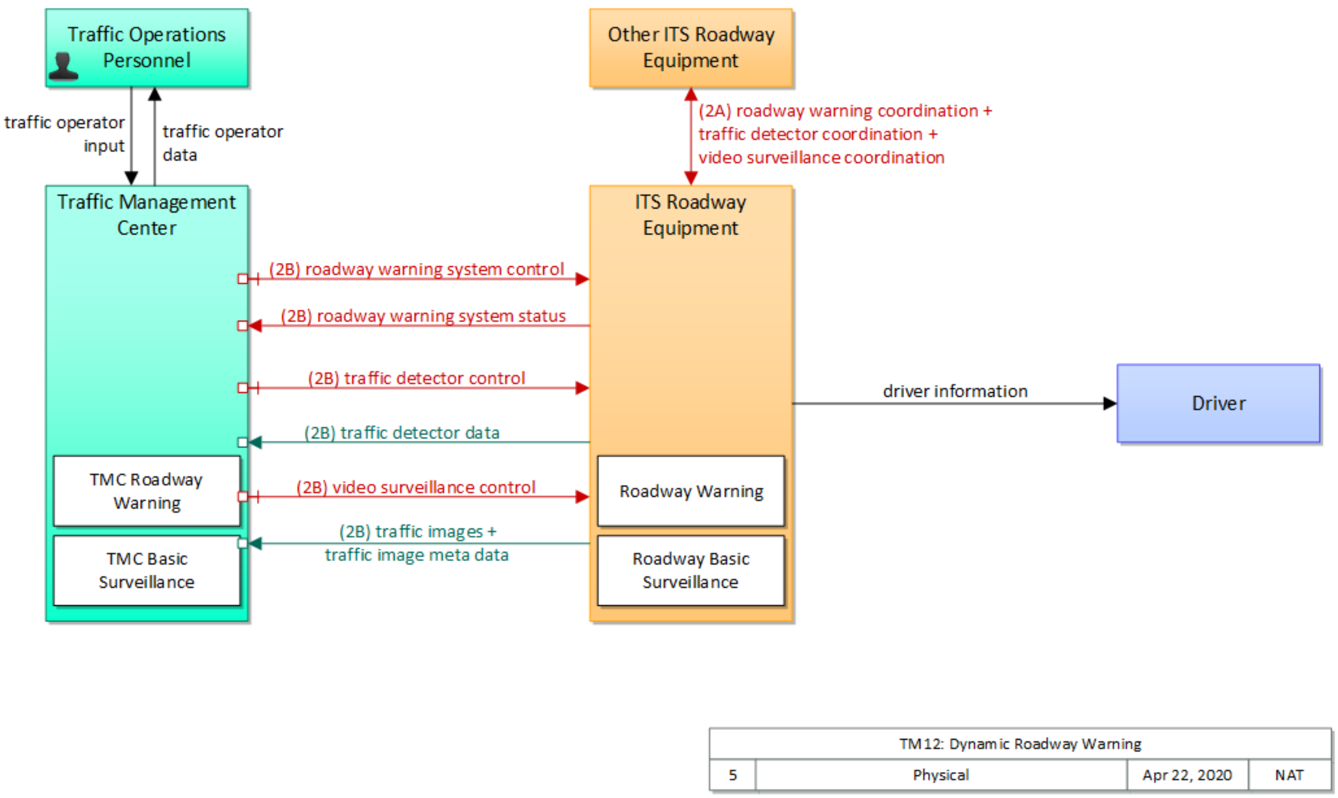
STAKEHOLDER	ELEMENT CLASS	ELEMENT NAME	STATUS
NATIONAL WEATHER SERVICE	Center	NWS Weather Service System	Planned
ODOT	Center	ODOT Northwest Transportation Operations Center	Existing
ODOT	Center	ODOT TripCheck	Existing
ODOT	Support	ODOT RITIS	Existing
ODOT	Support	ODOT OTMS	Existing
ODOT DISTRICT 5	Center	ODOT District 5 Maintenance and Construction Management	Existing
ODOT DISTRICT 5	Center	ODOT District 5 Transportation Operations Center	Existing
ODOT DISTRICT 5	Field	ODOT District 5 CCTV	Existing
ODOT DISTRICT 5	Field	ODOT District 5 CV Roadside Equipment	Planned
ODOT DISTRICT 5	Field	ODOT District 5 Field Equipment	Existing
ODOT DISTRICT 5	Field	ODOT District 5 Field Maintenance Equipment	Existing
ODOT DISTRICT 5	Field	ODOT District 5 Ramp Meter	Planned
ODOT DISTRICT 5	Field	ODOT District 5 RWIS	Existing
ODOT DISTRICT 5	Field	ODOT District 5 Traffic Detector	Existing
ODOT DISTRICT 5	Field	ODOT District 5 Traffic Signal	Existing
ODOT DISTRICT 5	Field	ODOT District 5 VMS	Planned
ODOT DISTRICT 5	Field	ODOT District 5-Coburg Field Equipment	Existing
ODOT DISTRICT 5	Field	ODOT District 5-Coburg Traffic Signal	Existing
ODOT DISTRICT 5	Support	ODOT District 5 CV Monitoring System	Planned
ODOT DISTRICT 5	Support	ODOT District 5 Data Mart	Planned
ODOT DISTRICT 5	Support	ODOT District 5 TOC Maintenance Equipment	Existing

STAKEHOLDER	ELEMENT CLASS	ELEMENT NAME	STATUS
ODOT DISTRICT 5	Vehicle	ODOT District 5 Incident Response Vehicle	Existing
ODOT DISTRICT 5	Vehicle	ODOT District 5 Incident Response Vehicle Onboard Equipment	Existing
ODOT DISTRICT 5	Vehicle	ODOT District 5 Maintenance and Construction Vehicle OBE	Existing
PAYMENT INSTITUTION (GENERIC)	Center	Payment Administration Center (generic)	Planned
SOCIAL MEDIA	Center	Social Media	Planned
TRAVELERS	Personal	Payment Card	Planned
TRAVELERS	Personal	Personal Traveler Information Device	Planned
TRAVELERS	Personal	Traveler	Existing
TRAVELERS	Vehicle	Commercial Vehicle	Existing
TRAVELERS	Vehicle	Commercial Vehicle Driver	Planned
TRAVELERS	Vehicle	Commercial Vehicle Onboard Equipment	Planned
TRAVELERS	Vehicle	Connected Vehicle OBE	Planned
TRAVELERS	Vehicle	Driver	Existing
TRAVELERS	Vehicle	Vehicle	Existing
UNIVERSITY OF OREGON	Center	University of Oregon Parking Management Center	Planned
UNIVERSITY OF OREGON	Field	University of Oregon Parking Facilities	Planned

SELECTED SERVICE PACKAGES

SERVICE PACKAGES OVERVIEW

Service Packages provide an accessible, deployment-oriented perspective to the National Architecture. Service Packages group various elements of the physical architecture (subsystems, equipment packages, architecture flows, and terminators) together to provide a specific ITS service. A key step in the Regional ITS Architecture development process is selecting which Service Packages are applicable to the region and the status of deployment (existing or planned) of each. From that point, the Service Packages are reviewed individually to determine which physical architecture components in each are applicable to the region.



https://local.iteris.com/arc-it/html/servicepackages/sp140.html#tab-3

FIGURE 8. "TM12 DYNAMIC ROADWAY WARNING" SERVICE PACKAGE ADAPTED FROM THE NATIONAL ITS ARCHITECTURE

SERVICE PACKAGES SELECTED FOR THE CLMPO ITS ARCHITECTURE

Based on the operational needs identified by regional stakeholders, the following Service Packages from the National ITS Architecture were selected to be included in the CLMPO ITS Architecture. These selections are summarized in the tables on the following pages, organized by Service Area.

TABLE 2. SELECTED SERVICE PACKAGES.

SERVICE PACKAGE	SERVICE PACKAGE NAME	REMARKS
DATA MANAGEMENT		
DM01	ITS Data Warehouse	Related to project TM-01 (RITIS)
DM02	Performance Monitoring	Related to project TM-01 (RITIS)
MAINTENANCE AND CONSTRUCTION		
MC01	Maintenance and Construction Vehicle and Equipment Tracking	Reflects typical functions; existing in previous architecture
MC04	Winter Maintenance	Reflects typical functions; existing in previous architecture
MC05	Roadway Maintenance and Construction	Reflects typical functions; existing in previous architecture
MC06	Work Zone Management	Reflects typical functions; existing in previous architecture
MC08	Maintenance and Construction Activity Coordination	Links to MC-01 and new Incident Management to coordinate regional maintenance, construction, special event activities
PARKING MANAGEMENT		
PM01	Parking Space Management	Links to TI-01 to do smart parking at major facilities
PM02	Smart Park and Ride System	Links to proposed new Special Event Management System project TI-20 to do parking management for special events
PM03	Parking Electronic Payment	Existing in previous architecture
PM04	Regional Parking Management	Links to proposed new Special Event Management System project TI-20 to do parking management for special events
PUBLIC SAFETY		

SERVICE PACKAGE	SERVICE PACKAGE NAME	REMARKS
PS01	Emergency Call-Taking and Dispatch	Central Lane Communications 911 dispatch functions
PS02	Emergency Response	Related to new Emergency Management project IM-01; reflects typical functions; existing in previous architecture
PS03	Emergency Vehicle Preemption	Reflects typical functions; existing in previous architecture
PS08	Roadway Service Patrols	Reflects existing freeway service patrol operations
PS10	Wide-Area Alert	Links to proposed new Emergency Management projects IM-02 and IM-03 to provide info during emergency events
PS11	Early Warning System	Links to proposed new Emergency Management project IM-06 to provide info during emergency events
PS12	Disaster Response and Recovery	Links to proposed new Incident Management project IM-03 to provide disaster response planning
PS13	Evacuation and Reentry Management	Links to IM-03 to do evacuation route planning
PUBLIC TRANSPORTATION		
PT01	Transit Vehicle Tracking	Reflects typical functions; existing in previous architecture
PT02	Transit Fixed-Route Operations	Reflects typical functions; existing in previous architecture
PT03	Dynamic Transit Operations	Reflects typical functions; existing in previous architecture
PT04	Transit Fare Collection Management	Links to MM-02 to deploy electronic payment for whole fleet
PT05	Transit Security	Links to MM-05 (sharing surveillance video)
PT06	Transit Fleet Management	Reflects typical functions; existing in previous architecture

SERVICE PACKAGE	SERVICE PACKAGE NAME	REMARKS
PT07	Transit Passenger Counting	Links to MM-03 and MM-04
PT08	Transit Traveler Information	Links to MM-01 and new Multi Modal to deploy RT bus info at stations
PT09	Transit Signal Priority	Links to proposed new multimodal project MM-07 to deploy Next-Gen TSP in Eugene/Springfield
SUPPORT		
SU01	Connected Vehicle System Monitoring and Management	Reflects typical core functionality relevant to future connected vehicle applications
SU03	Data Distribution	Links to TM-01 (RITIS)
TRAFFIC MANAGEMENT		
TM01	Infrastructure-Based Traffic Surveillance	Reflects typical functions; existing in previous architecture
TM02	Vehicle-Based Traffic Surveillance	Existing in previous architecture
TM03	Traffic Signal Control	Relates to new Traffic Operation project TM-03; reflects typical functions; existing in previous architecture
TM05	Traffic Metering	Links to TM-02
TM06	Traffic Information Dissemination	Links to TM-02
TM07	Regional Traffic Management	Links to TM-02
TM08	Traffic Incident Management System	Reflects typical functions; existing in previous architecture
TM12	Dynamic Roadway Warning	Relevant to any dynamic warning messages (not related to speed limit), like queue warn
TM13	Standard Railroad Grade Crossing	Reflects typical functions; existing in previous architecture
TM14	Advanced Railroad Grade Crossing	Related to TM-20 to do Advanced Railroad At-Grade Crossings
TM16	Reversible Lane Management	Reflects typical functions; existing in previous architecture

SERVICE PACKAGE	SERVICE PACKAGE NAME	REMARKS
TM17	Speed Warning and Enforcement	Related to new Traffic Operation project TM-18; reflects typical functions; existing in previous architecture
TM20	Variable Speed Limits	Reflects typical functions supporting ODOT's statewide Active Traffic Management program
TRAVELER INFORMATION		
TI01	Broadcast Traveler Information	Related to new Traveler Information project TI-03; reflects typical functions; existing in previous architecture
TI02	Personalized Traveler Information	Reflects typical functions; existing in previous architecture
TI07	In-Vehicle Signage	Reflects typical functionality for CV deployments
VEHICLE SAFETY		
VS05	Curve Speed Warning	Links to TM-02 curve warning project
VS08	Queue Warning	Links to projects TM-03 through 07
VS09	Reduced Speed Zone Warning / Lane Closure	In previous architecture
WEATHER		
WX01	Weather Data Collection	Reflects typical functions; existing in previous architecture
WX02	Weather Information Processing and Distribution	Reflects typical functions; existing in previous architecture

CHAPTER 4 – CENTRAL LANE ITS PLAN UPDATE

COMMUNICATIONS PLAN

AUGUST 2021

PREPARED FOR:

720 SW WASHINGTON STREET, SUITE 500, PORTLAND, OR 97205 • 503.243.3500 • DKSASSOCIATES.COM

CHAPTER 4: TABLE OF CONTENTS

INTRODUCTION

The following chapter outlines the communications plan for the region that will support transportation requirements for data and video transmission. The communications network will support connectivity required for ITS deployment between selected points in the region. It will provide a backbone communications system, as well as a distribution network to reach the individual devices or control locations. The basic purpose of the communications network is to provide the links between various end points on the network. These end points are distributed across the region and can include everything from a video camera to a central traffic signal system server.

This chapter contains four primary sections: Existing Communications Infrastructure, Communications Requirements, Network Architecture, and Communications Plan Recommendations.

COMMUNICATION PLAN GUIDELINES

There are several guiding principles that were used in the development of this communications plan. These principles must also be considered during the detailed design:

- Reliability: The system must provide a high level of reliability, achieved using components with a high mean time between failures (MTBF), combined with a redundancy in the network design.
- Growth: The network must be expected to grow gracefully. This requires the incorporation of a reasonable amount of unused capacity and a design approach that allows extra capacity to be provided by upgrading the transmission equipment.
- Standards: Communications protocols and component selection must use widely accepted standards that minimize ongoing operations and maintenance costs.
- Flexibility: The network configuration must be designed to maximize flexibility to accommodate future changes, rearrangements, and equipment changes.
- Decentralized: As the network supports several agencies, it must be configured around several centers of control, and allow the control location to be changed according to current needs. This will support the concept of a virtual operations center.

EXISTING AND PLANNED COMMUNICATION INFRASTRUCTURE

PUBLIC AGENCY NETWORK (PAN)

The Eugene-Springfield PAN is an intergovernmental cooperative network allowing multiple agencies to share fiber resources and maximize cost effective utilization of existing infrastructure. The Lane Council of Governments acts as the administrative and fiscal agent for the PAN, whose other members include:

- City of Eugene
- City of Springfield
- City of Coburg

- Lane County
- Lane Council of Governments
- Lane Transit District (LTD)
- Lane Community College
- Eugene Water and Electric Board (EWEB)
- Springfield Utility Board (SUB)
- Eugene School District 4J
- University of Oregon
- Oregon Department of Transportation
- Oregon Department of Administrative Services

ODOT

Most of the Oregon Department of Transportation's traffic signals are connected using twisted pair cable plant. Many are maintained by either the City of Eugene or City of Springfield through their existing copper wire infrastructure.

ODOT has multiple existing ITS devices on I-5, I-105 and the Beltline Highway. These devices are all connected utilizing EWEB fiber. ODOT has also established a high-bandwidth fiber optic connection between its Eugene facilities, and their statewide network, including the Northwest Traffic Operation Center (NWTOC) in Salem. The fiber backbone terminates locally at the University of Oregon and accesses other local agency fiber to reach the ODOT facility in Glenwood. ODOT also has access through an agreement with LTD to additional fiber infrastructure.

CITY OF EUGENE

The City of Eugene has an extensive network of twisted-pair copper plant used for signal interconnect on the majority of the signals throughout the city. The City of Eugene is currently using mostly twisted pair copper and some fiber optic communication to ITS devices. A number of devices also used 3G cellular technology that is no longer supported with the upgrade to 5G. Eugene is in the process of adding wireless communication to replace the 3G cellular communication as well as connecting all remaining signals and ITS devices to their network. This process will continue over the next few years. The City of Eugene also plans to add conduit and/or fiber optic cable on corridor projects. Subsequent phasing and priority corridors are still in preliminary planning stages.

The City of Eugene has acquired some fiber optic cable through agreements with LTD. While the City of Eugene is a member of PAN, it does not currently use any of the PAN infrastructure for traffic data exchange.

CITY OF SPRINGFIELD

The City of Springfield has an extensive network of 12-pair twisted-pair copper plant used for signal interconnect. Springfield is in the process of adding wireless communication to connect all remaining signals and ITS devices to their network that will be completed in the next few months. The City of Springfield is a member of the PAN but does not currently use any of the PAN infrastructure for traffic data exchange.

LANE COUNTY

Lane County has mostly isolated signalized intersections and does not currently have traffic signal interconnect. The County is a member of PAN and the County office is connected to the PAN network. Lane County is in the process of developing a communication plan for its entire area which will guide implementation of connections to County infrastructure within the study area of this ITS plan.

LANE TRANSIT DISTRICT

LTD utilizes a radio network to communicate (voice and data) with the bus operators. The two data channels on this network are used to collect real-time vehicle location and passenger count data as part of LTD's ITS and Computer Aided Dispatch (CAD) system.

LTD also uses a wireless network for large batch data files such as schedule updates and voice annunciation files. This network supports short distance communications and includes wireless antennas in the maintenance yard. LTD is also a member of the PAN.

COMMUNICATIONS REQUIREMENTS

This section considers the end devices and centers to be supported on the network and the associated requirements for local communication facilities. All these devices and centers, considered as a group, form the communication requirements for the region, which must be supported by the communication network. The network must be designed to support the various communication needs of the region now and in the future.

TRAFFIC SIGNALS

Traffic Signals in the region are operated by four separate entities. Communication to traffic signals requires a data channel between the traffic signal system computer and the controller for each intersection.

Vehicle detection data may be collected through the traffic signal controllers or standalone vehicle detection sites. For planning purposes, the communication requirements are identical with those of a traffic signal controller. The majority of vehicle detection occurs at signalized intersections and is handled by the signal controller. There are also several existing video detection sites in Eugene and Springfield.

CCTV VIDEO

Video CCTV monitoring requires transmission of a video signal, as well as a data channel for camera control. In most systems the camera control, used to provide pan/tilt/zoom (PTZ) and focus can be digitized in an IP video stream or carried as a separate low speed data channel.

A key element of a regional ITS operation is typically the use of center-to-center links. These links provide for sharing of video and data, and in some cases allow for the control of a complete control center from a backup location. Many jurisdictions are constructing emergency operations centers that typically use ITS video and data, and these requirements should also be anticipated.

DMS SIGNS

DMS or Arterial signing is a common ITS element that is added to many systems. The signs typically communicate using RS 232 communication that are NTCIP compliant and do not require a lot of bandwidth.

OTHER TRAFFIC SUBSYSTEMS

Other low data devices, such as road weather information systems, traffic beacons and highway advisory radio systems have similar communications requirements to the DMS devices.

TRANSIT SIGNAL PRIORITY

Most transit signal priority systems use local communication between a roadside sensor and the traffic signal controller. The roadside sensor identifies the location of a transit vehicle and may provide signal priority as required.

A more centralized monitoring approach is being proposed, where the location of the transit vehicles is tracked, and the signal priorities changed system-wide in response to the congestion experienced by these vehicles. Such systems require field detectors that use wireless communication with transit vehicles to collect location information. They also require fast, reliable communication and a near-real time traffic signal control system.

OTHER TRANSIT SUBSYSTEMS

A number of systems are available for "next bus arrival," providing time and/or routing information to transit riders for the next bus to arrive. Many of these systems operate using wireless technologies, but they could also use the wireline communication network if it is available. It is also possible that at strategic points in the region, there will be communication links to the transit vehicles. Although the final link to the vehicle would use wireless technology, the communication backbone would support the link between a wireless antenna site and the control center.

NETWORK ARCHITECTURE

The network architecture describes the configurations and communication protocols for a system. This section provides available options at a high level, including brief consideration of the strengths and weaknesses of each option.

BACKBONE/DISTRIBUTION

The communication backbone can carry all types of the data traffic in the system. The backbone interconnects multiple nodes, which are central locations where the information can be inserted onto or removed from the backbone.

The distribution portion of the network provides a connection between the backbone node and a group of ITS devices or buildings. The distribution typically consists of a fiber optic cable running down the municipal road allowance from the node location, but it may also be an existing twisted pair cable or wireless link.

DISTRIBUTION TECHNOLOGY

The plant level considers the physical plant used to interconnect points on the network. In traditional networks this would include the cable (fiber or twisted pair) between devices, but in recent years, the introduction of wireless technologies has also allowed wireless equipment to provide a plant level link.

TWISTED PAIR

Twisted pair 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.

The region has a good quality twisted pair network that operates the traffic signal system. In many cases it may be feasible to intercept the twisted pair cables with the fiber optic distribution 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, with varying degrees of quality and performance.

Utilization of the twisted pair 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.

FIBER

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.

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. 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.

COMMUNICATIONS PLAN RECOMMENDATIONS

This section describes the communication plan recommendations and the process used to reach these recommendations. The methodology used starts with the areas to be connected, addresses the configuration to be used, and develops a logical plan to serve the entire area.

The recommendation described is for a high-level conceptual design of the network because agencies are at different stages of development of their communications planning and implementation. As such, this plan should be considered a guide, and not a final design. It is further recommended that as each network segment enters planning and detailed design, all options be considered for connecting centers and field devices, including:

- Building new fiber optic cable
- Using existing twisted pair or other copper plant
- Leasing communications services from public or private providers
- Implementing new or leasing wireless communications services

Detailed cost estimating was not performed due to the conceptual design status of these recommendations. Recommendations are based on industry experience, and a higher-level analysis combining the ability to meet requirements, cost, technical maturity, availability of equipment and services and agency input.

PHYSICAL TOPOLOGY

A two-tiered communication network is recommended for the region, consisting of a highspeed backbone and a local distribution network. Distribution networks will carry the communication from field devices to a field node location where it will be combined into one aggregate signal that is carried on a pair of fibers in the backbone. This approach allows the backbone to be built with redundancy so that equipment failures or fiber cable cuts do not result in a complete loss of communication.

The backbone should also have a node in each operations center or traffic system equipment location, to allow data to be accessed on the backbone, and to facilitate center-to-center communication. Physical redundancy in the backbone network is strongly recommended whenever possible.

MESH CONFIGURATION

While the individual agency communication corridors do not support redundancy as standalone corridors, when they are considered as a group, they provide the opportunity to construct a redundant network. This network is geographically a mesh that would allow most sections to be configured with redundancy. A mesh network is well suited to the technology that is proposed. As it is unlikely that the network would be built in a single stage, it is expected that sections of this network would operate in a linear fashion with limited redundancy until the full network is deployed. A mesh network accommodates this approach without the need to reconfigure the system as new segments are constructed.

COMMUNICATIONS TECHNOLOGY

PLANT LEVEL

At the plant level, the preferred technology is fiber optic cable. The fiber may be owned by one of the agencies or leased as dark fibers from others. Leased channels on the PAN network would also fulfill the same requirement. A combination of any of these technologies could be used to support the backbone network. The existing twisted pair cable and wireless systems may be used for the distribution from the node to the field device.

VIDEO TRANSMISSION

It is recommended that the video signals on the network be transported as IP video. To support implementation of the virtual control center concept video must be converted to IP data at some point in the network. By using IP video transmission throughout the network, the video is converted to IP traffic at the camera location and can be easily routed to users at any point on the network.

BACKBONE

Gigabit Ethernet transmission is recommended for backbone transmission. The primary reasons for this recommendation are as follows: The opportunity to use leased services provides the greatest cost benefit when all services are carried on one backbone. This is possible with GigE and IP Video. The mesh network of the geographical areas served is well suited to GigE deployment. GigE will support transmission of the recommended IP Video without any additional transmission equipment. GigE will directly support NTCIP standards for center-to-center communication, as well as NTCIP communication over Ethernet to field devices.

CHAPTER 5 – CENTRAL LANE ITS PLAN UPDATE

DEPLOYMENT PLAN

AUGUST 2021

PREPARED FOR:

720 SW WASHINGTON STREET, SUITE 500, PORTLAND, OR 97205 • 503.243.3500 • DKSASSOCIATES.COM

CHAPTER 5: TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The following chapter presents the updated ITS Deployment Plan for the CLMPO area. The plan includes a range of ITS projects that address the needs of the region based on several stakeholder interviews throughout the duration of the project development process. The following sections describe how the plan should be used, revisit the goals of the ITS Plan, and provide the project list for the region with planning level cost estimates.

USE OF THE DEPLOYMENT PLAN

The 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.

Several considerations should be understood when carrying out projects identified in the Deployment Plan:

- Does the project purpose align with the goals identified in the regional transportation plan?
- Who is this project benefiting? Does this project create any burdens?
- Are there any other transportation planning or design projects that can be combined with the deployment of this project?
- Who should be involved in the decision-making process for this project? Agency stakeholders? The general public? Specific groups of the public?

In addition to the questions above, each project should align with the goals identified by stakeholders in this planning effort. The next section will briefly describe the Goals of the plan for easy reference.

PLAN GOALS

Each project in the deployment plan project list aligns with at least one of the goals of the ITS Plan, as shown in Table 1 below.

TABLE 1. ITS PLAN GOALS

1	Improve the safety and security of the transportation system.
2	Improve the efficiency of the transportation system.
3	Provide improved traveler information.
4	Develop and deploy cost efficient ITS infrastructure.
5	Integrate regional ITS projects with local and regional partners.
6	Monitor transportation performance measures.

DEPLOYMENT PLAN PROJECTS

The deployment plan projects were identified to address the needs of the CLMPO area as identified in the Current Conditions and User Needs chapters of this plan. Figure 1 illustrates the proposed Deployment Plan projects that involve physical infrastructure installation. Not all projects are shown on the map because some projects are:

- System based and involve technology upgrades rather than physical installations, or
- Specific locations have not yet been identified for the deployment of a proposed solution.

The project list, as shown in Table 2, details project number, project title, a brief description, lead agency, illustrative cost, associated strategy, and which ITS Plan goals are addressed. Brief, approximately one-page write-ups on each project or project area are also included after the project table.

COST ESTIMATE OVERVIEW

Notably, the capital costs listed in the project list table for each project are intended to be illustrative of the magnitude of each project’s cost. The cost estimate will likely need refinement at the time of implementation and project development. The variety of projects included in this plan also impacted the level of accuracy of the cost estimates. For example, a project that would include the installation of physical assets in the field is easier to quantify than a system-type project that integrates software or services with emerging technologies.

FIGURE 1: ITS DEPLOYMENT PLAN - SPECIFIC LOCATION BASED PROJECTS

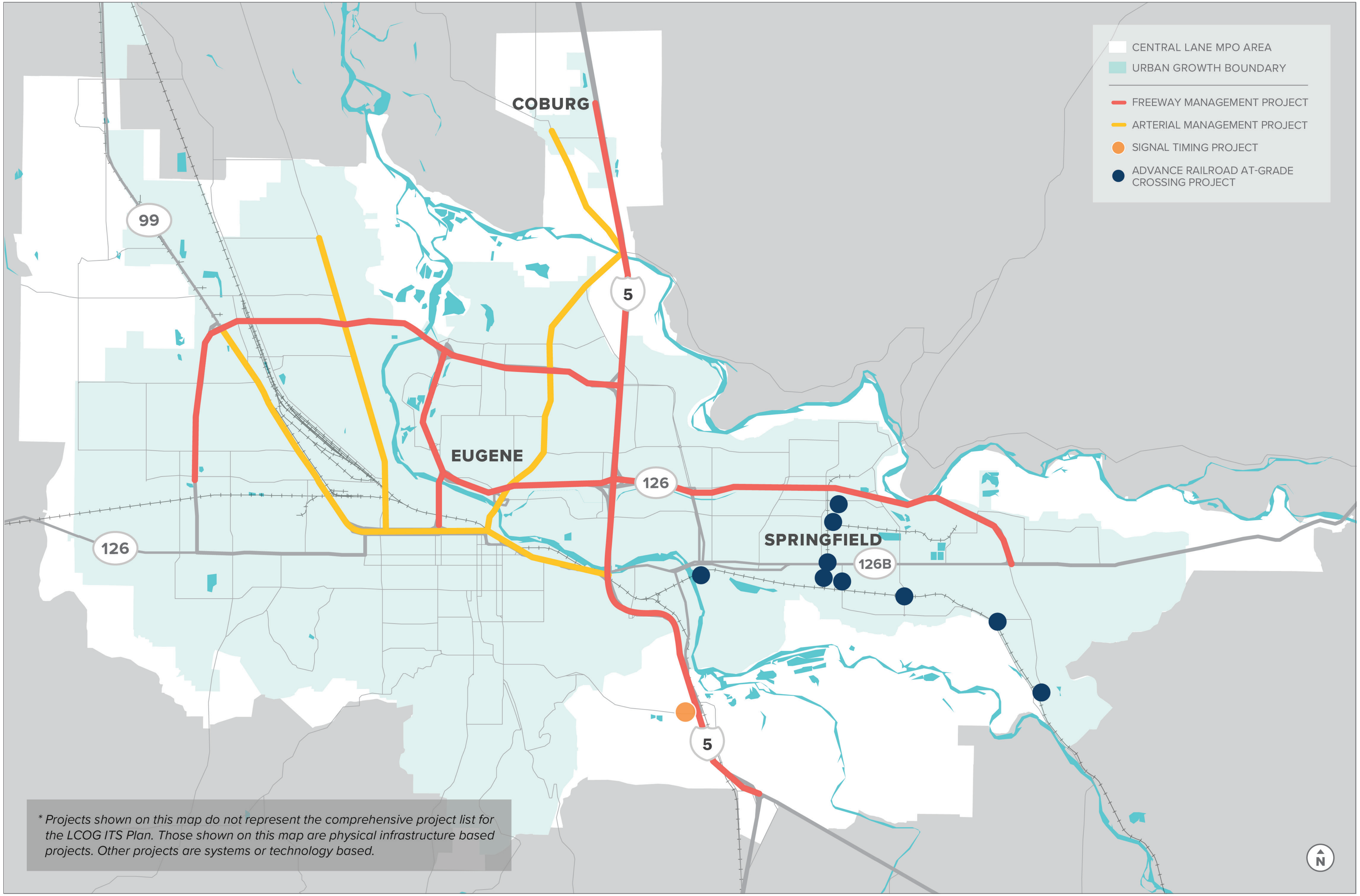


TABLE 2. ITS PLAN PROJECT LIST

PROJECT NO.	PROJECT TITLE[1]	DESCRIPTION	LEAD AGENCY	PLANNING LEVEL COST	STRATEGY	ITS PLAN GOALS ADDRESSED
FM-01	I-5 ACTIVE TRANSPORTATION MANAGEMENT	Installation of traffic operational systems on I-5 from Goshen to Coburg	ODOT	$3.28M	Freeway Management	1, 2, 3
FM-02	BELTLINE HIGHWAY ACTIVE TRANSPORTATION MANAGEMENT	Installation of traffic operational systems on Beltline Highway from I-5 to Roosevelt Boulevard	ODOT	$5.46M	Freeway Management	1, 2, 3
FM-03	EUGENE-SPRINGFIELD HIGHWAY (OR126) ACTIVE TRANSPORTATION MANAGEMENT	Installation of traffic operational systems on OR126 from I-5 to Main Street (Springfield)	ODOT	$5.24M	Freeway Management	1, 2, 3
FM-04	I-105 ACTIVE TRANSPORTATION MANAGEMENT	Installation of traffic operational systems on I-105 from I-5 to OR99	ODOT	$4.36M	Freeway Management	1, 2, 3
FM-05	DELTA HIGHWAY ACTIVE TRANSPORTATION MANAGEMENT	Installation of traffic operational systems on Delta Highway from I-105 to Beltline Highway	ODOT	$3.48M	Freeway Management	1, 2, 3
AM-01	PACIFIC HIGHWAY (OR99) ARTERIAL ACTIVE TRAFFIC MANAGEMENT SYSTEM	Installation of traffic operational systems on Pacific Highway (OR99) from Beltline Highway to I-5	ODOT	$1.84M	Arterial Corridor Management	1, 2, 4, 5

[1] Active Transportation Demand Management is defined by the FHWA as the dynamic management, control, and influence of travel demand, traffic demand, and traffic flow of transportation facilities. Through the use of available tools and assets, traffic flow is managed and traveler behavior is influenced in real-time to achieve operational objectives, such as preventing or delaying breakdown conditions, improving safety, promoting sustainable travel modes, reducing emissions, or maximizing efficiency.

PROJECT NO.	PROJECT TITLE[1]	DESCRIPTION	LEAD AGENCY	PLANNING LEVEL COST	STRATEGY	ITS PLAN GOALS ADDRESSED
AM-02	RIVER ROAD ARTERIAL ACTIVE TRAFFIC MANAGEMENT SYSTEM	Installation of traffic operational systems on River Road from OR99 to Irvington Drive/Wilkes Drive	Eugene	$2.08M	Arterial Corridor Management	1, 2, 4, 5
AM-03	COBURG ROAD ARTERIAL ACTIVE TRAFFIC MANAGEMENT SYSTEM	Installation of traffic operational systems on Coburg Road from Pearl Street to OR99	Eugene	$2.08M	Arterial Corridor Management	1, 2, 4, 5
TM-01	REGIONAL VIRTUAL TRAFFIC OPERATION CENTER	Develop center-to-center (C2C) communications between agency traffic management centers and emergency operations centers (EOC)	Multi-Agency	$750K	Traffic Management & Operations	2, 3, 4, 5
TM-02	UPGRADE CENTRAL SIGNAL SYSTEM	Upgrade central traffic signal system, and integrate with regional ATMS	Multi-Agency	$1.10M	Traffic Management & Operations	2, 4, 5
TM-03	TRAFFIC SIGNAL OPERATION ENHANCEMENTS	Upgrade legacy traffic signal controllers to ATC signal controllers. Implement advanced signal operations on select corridors	Multi-Agency	$1.50M	Traffic Management & Operations	2, 4
TM-04	30TH AVENUE SIGNAL TIMING	Signal timing coordination at McVey/I-5 Ramp and Eldon Shafer Drive (Lane Community College)	Multi-Agency	$40K	Traffic Management & Operations	2, 5
TM-05	COMMUNICATION NETWORK UPGRADES	Upgrade communication plans to meet future needs of the agencies (microwave/cellular/fiber)	Multi-Agency	$840K	Traffic Management & Operations	4, 5
TM-06	ACTIVE SIGN UPGRADE	Provide communication to existing speed feedback signs/rectangular rapid flashing beacons (RRFB)/school zone flashers	Multi-Agency	$100K	Traffic Management & Operations	2, 4

PROJECT NO.	PROJECT TITLE[1]	DESCRIPTION	LEAD AGENCY	PLANNING LEVEL COST	STRATEGY	ITS PLAN GOALS ADDRESSED
TM-07	LANE COUNTY COMMUNICATIONS	Implement communications to Lane County signal and Intelligent Transportation System (ITS) devices	Lane County	$1.00M	Traffic Management & Operations	1, 2, 4, 5
TM-08	ADVANCE RAILROAD CROSSING WARNING SYSTEMS	Install train detection and warning systems at multiple at-grade crossings	Springfield	$1.02M	Traffic Management & Operations	1, 2, 3
MM-01	REAL TIME CUSTOMER INFORMATION	Deploy real-time dynamic message signs at key locations such as transit centers and major stops	Lane Transit District	$800K	Multimodal Operations	3, 4
MM-02	ELECTRONIC FARE COLLECTION	Improve and Expand the electronic fare collection system on Lane Transit District buses	Lane Transit District	$1.00M	Multimodal Operations	2, 4
MM-03	TRANSIT MANAGEMENT SYSTEM UPGRADE	Replace lifecycle equipment on Lane Transit District buses including AVL, CAD, and APC system	Lane Transit District	$2.00M	Multimodal Operations	2, 4
MM-04	PARATRANSIT SYSTEM UPGRADE	Upgrade technology on paratransit vehicles including AVL and CAD	Lane Transit District	$750K	Multimodal Operations	2, 4
MM-05	TRANSIT SYSTEM SECURITY	Implementation of surveillance video from transit stations and buses back to Lane Transit District dispatch	Lane Transit District	$1.50M	Multimodal Operations	1, 4
MM-06	BUS RAPID TRANSIT EXPANSION	Expand EmX service on an additional corridor in Eugene	Multi-Agency	$2.00M	Multimodal Operations	2, 5
MM-07	TRANSIT SIGNAL PRIORITY	Implement next generation transit signal priority on EmX and major bus routes in Eugene	Eugene	$950K	Multimodal Operations	2, 4, 5

PROJECT NO.	PROJECT TITLE[1]	DESCRIPTION	LEAD AGENCY	PLANNING LEVEL COST	STRATEGY	ITS PLAN GOALS ADDRESSED
MM-08	FREIGHT MOBILITY	Enhanced detections systems on freight corridors to provide truck priority	Multi-Agency	$450K	Multimodal Operations	1, 2, 4
TI-01	ADVANCED PARKING MANAGEMENT AND INFORMATION	Implement smart parking at major parking facilities – including parking sensors, parking information message boards at key approaches	Multi-Agency	$750K	Traveler Information	2, 3, 4
TI-02	ARTERIAL TRAVELER INFORMATION	Integrate travel information from all jurisdictions into real time (travel time/delays). Provide travel time through mobile application and dynamic signs on major arterial corridors	Multi-Agency	$3.00M	Traveler Information	2, 3, 4, 5
DM-01	PERFORMANCE REPORTING	Develop automated data collection and performance reporting system, including transit performance monitoring	Multi-Agency	$600K	Data Collection & Management	6
DM-02	DATA MANAGEMENT – ATSPM, SAFETY ANALYTICS	Upgrade signal controllers, communication, enhance detection and cameras to collect and archive operational data for analysis tools and safety analytics	Multi-Agency	$2.50M	Data Collection & Management	1, 2, 6
IM-01	INCIDENT MANAGEMENT OPERATIONAL PLANS	Develop transportation-specific incident management operational and evacuation plans that includes protocols for field devices	Multi-Agency	$300K	Incident & Emergency Management	1, 2, 5
IM-02	SPECIAL EVENT MANAGEMENT SYSTEMS	Management of special events to include signal timing plans, portable dynamic message signs, parking management and interface with U of O operation center	Multi-Agency	$750K	Incident & Emergency Management	2, 3, 5
MC-01	MAINTENANCE, CONSTRUCTION, AND WORK ZONE MANAGEMENT	Develop an information system that contains details about regionwide maintenance and construction activities including work zone management and monitoring	Multi-Agency	$850K	Maintenance & Construction Management	2, 3, 5

The following pages provide one-page summaries of the projects listed in the table above. Some projects were grouped into categories based on similar purposes and outcomes, therefore, a one-page summary of a category can effectively describe the nature of several projects. Though a category may cover several projects, associated costs for each project are still separated.

The one-page summaries include the project objective, description, stakeholders, communications requirements, costs, operations and maintenance needs, user needs addressed, and benefits.

PROJECT NUMBERS FM-01 THROUGH FM-05	ACTIVE TRANSPORTATION MANAGEMENT
OBJECTIVE	Deploy systems and devices to better manage controlled access facilities (freeways) to reduce crashes, improve travel time reliability, and reduce travel times.
DESCRIPTION	Active Transportation Management (ATM) uses a combination of sensors, devices, and systems to manage the freeway facility. This combined system allows for monitoring and managing by providing queue warning, ramp metering, variable speed, weather warning, and traveler information. Some components of an ATM system include: • Closed Circuit Television (CCTV) cameras • Dynamic Message Signs (DMS) • Ramp Meters • Variable Speed Limits • Traffic and road weather sensors • Communications from equipment to controller

STAKEHOLDER(S)	ODOT, Lane County, Lane Transit District, Eugene, Springfield, Coburg
COMMUNICATIONS REQUIREMENTS	Communications is needed between field devices, sensors and controllers, and to traffic operation center.
COST	FM-01: I-5 - $3,280,000 for project deployment FM-02: Beltline Highway - $5,460,000 for project deployment FM-03: Eugene-Springfield (OR126) - $5,240,000 for project deployment FM-04: I-105 - $4,360,000 for project deployment FM-05: Delta Highway - $3,480,000 for project deployment
OPERATIONS & MAINTENANCE	Requires training staff to operate ATM system. Maintenance duties will include upkeep of field sensors and devices.
NEEDS ADDRESSED	• Reduce crashes • Improve travel time
BENEFITS	• Improves safety • Increases travel time reliability • Provides traveler information

PROJECT NUMBER AM-01 THROUGH AM-03	ARTERIAL ACTIVE TRANSPORTATION MANAGEMENT SYSTEM
OBJECTIVE	Develop and deploy a regional arterial surveillance and management system along several corridors.
DESCRIPTION 	This project will deploy additional traffic detection and closed-circuit television (CCTV) systems to provide for traffic responsive corridor management and sharing of roadside subsystems at major decision points within the corridors and provide real-time traveler information along arterial roadways. The use of strategically placed system detectors will provide the capability to collect and store traffic counts and to display congestion information on a traveler information website. The historical count information may be used for planning or to adjust signal timings based on fluctuations in traffic. CCTV camera placement at key intersections provides agency staff with the ability to monitor the roadway for congestion, trouble spots, incidents, equipment failures, and then make real-time adjustments to traffic signal timings. Images from the cameras would be broadcast on the traveler information website for public traveler information. 
STAKEHOLDER(S)	ODOT, Lane County, Lane Transit District, Eugene, Coburg
COMMUNICATIONS REQUIREMENTS	A connection is required between arterial traffic management equipment and the Traffic Operations Centers (TOC) and the ODOT Traffic Operations Center.
COST	AM-01: Pacific Highway (OR99) - $1,840,000 for project deployment AM-02: River Road - $2,080,000 for project deployment AM-03: Coburg Road - $2,080,000 for project deployment
OPERATIONS & MAINTENANCE	Maintenance crews will be responsible for maintaining the new technology (cameras, variable message signs, fiber optic cable, and components).
NEEDS ADDRESSED	• Need remote video and traffic signal status/access to respond to complaints • Need video capabilities at key intersections on major arterials • Need traffic conditions information (i.e., congestion, hazards) • Need to better manage incidents and clear incidents faster • Need to plan alternate corridors for incident response to divert traffic • Need incident signal timing plans • Need variable message signs to provide traveler information
BENEFITS	• Improved safety and efficiency of arterial corridors, therefore reducing delay and emergency response times • More effective traffic management, incident management, and maintenance management • Improved real-time traffic conditions information and traveler information • Increased capacity and throughput during incidents • Reduction in congestion and delay due to incidents

PROJECT NUMBER TM-01	REGIONAL VIRTUAL TRAFFIC OPERATION CENTER
OBJECTIVE	Provide capability to coordinate management of transportation facilities virtually by connecting Traffic Operations Centers together.
DESCRIPTION	Enhanced Center-to-Center (C2C) communication between traffic management centers and emergency operation centers (EOC). Improve interagency video sharing. Enhanced data sharing using RITIS. Integrate with regional EOC's and TripCheck. Enhanced social media information on various platforms during major incidents/natural disasters (wildfires/earthquakes). 
STAKEHOLDER(S)	ODOT, Lane County, Lane Transit District, Eugene, Springfield, Coburg
COMMUNICATIONS REQUIREMENTS	Requires communication between Traffic Operation Centers (TOC) and Emergency Operations Centers (EOC).
COST	$750,000 for project deployment
OPERATIONS & MAINTENANCE	Staffing hours needed to manage the Traffic Operations Centers (TOC).
NEEDS ADDRESSED	• Develop a distributed/virtual Traffic Operations Center (TOC) • Need to be able to manage traffic operations • Provide interagency access to camera images • Need for communications to central signal system for management
BENEFITS	• Coordinated traffic management • Improved travel times and travel time reliability will result from the ability to manage the signal system

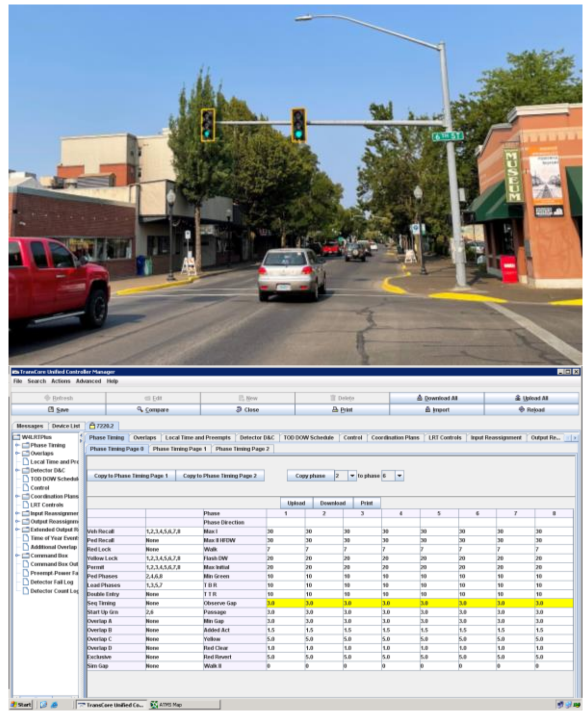
PROJECT NUMBER TM-02	UPGRADE CENTRAL SIGNAL SYSTEM

OBJECTIVE

Provide capability to monitor traffic signals to support regional traffic management strategies

DESCRIPTION

This project will allow remote data collection, analysis, and real-time signal timing changes that respond to current traffic conditions. The remote access enables signal operations engineers to efficiently make timing adjustments that reduce delays during incidents, unplanned events, and/or to respond to citizen comments. Plans may be implemented to respond to congested traffic conditions due to time of day, incidents, special events or adverse weather.



STAKEHOLDER(S)

ODOT, Lane County, Eugene, Springfield

COMMUNICATIONS REQUIREMENTS

Requires communication between central signal system server and traffic signals. May replace existing communications with fiber.

COST

$1,000,000 for project deployment

OPERATIONS & MAINTENANCE

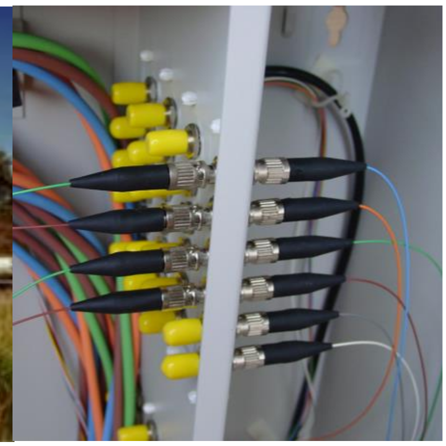
Staffing hours needed to manage the Traffic Operations Center (TOC). Duties would include monitoring traffic signal performance and developing special signal plans in response to incidents and special events.

NEEDS ADDRESSED

- Need to be able to manage traffic operations
- Need for communications to central signal system for management
- Need to update communications for improved reliability and bandwidth

BENEFITS

- Improved travel times and travel time reliability will result from the ability to manage the signal system
- Reduces fuel consumption and vehicle emissions

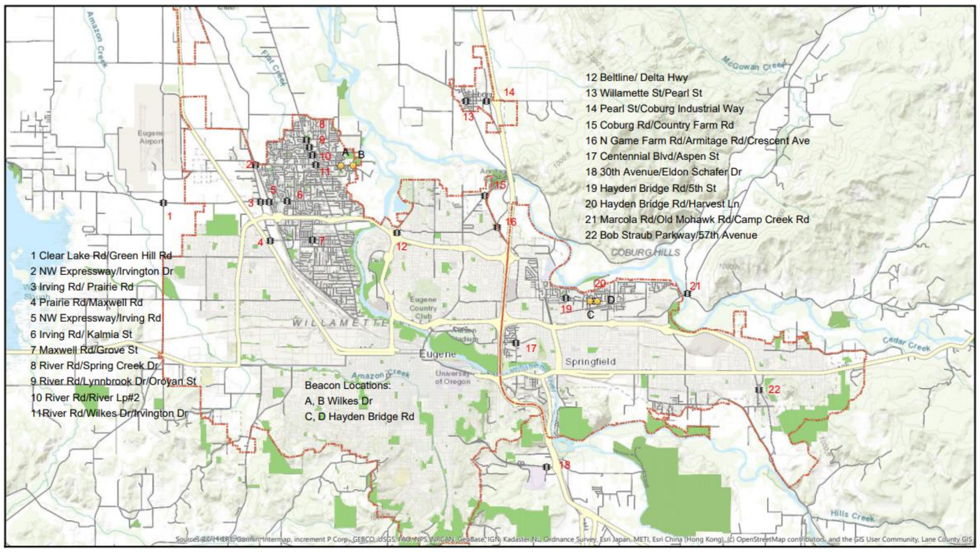
PROJECT NUMBER TM-03	TRAFFIC SIGNAL OPERATION ENHANCEMENTS
OBJECTIVE	Deploy adaptive signal timing that adjusts signal timings to match real-time traffic conditions.
DESCRIPTION	Upgrade from legacy traffic signal controllers to ATC signal controllers. Implement advanced signal operations, such as adaptive signal operations or connections to central signal server, on select corridors.   
STAKEHOLDER(S)	ODOT, Lane County, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	Requires communication between central signal system server and traffic signals. May replace existing communications with fiber. Requires a communications connection between the central signal system server and each traffic signal. In many cases, requires vehicle detection upgrades.
COST	$1,500,000 for project deployment
OPERATIONS & MAINTENANCE	Staffing hours needed to manage the Traffic Operations Center (TOC). Duties would include monitoring traffic signal performance and developing special signal plans in response to incidents and special events. Maintenance includes keeping the software up to date, and upkeep of field devices and communications between field devices and transportation center.
NEEDS ADDRESSED	• Need to be able to manage traffic operations • Need for communications to central signal system for management • Need updated signal timing plans • Need to reduce traffic congestion and delay
BENEFITS	• Improved travel times and travel time reliability will result from the ability to manage the signal system • Reduces fuel consumption and vehicle emissions • Reduction in stops, fuel consumption, and vehicle delay • Improved travel time on major arterials • Ability to monitor and control traffic control systems in real-time from a remote location

PROJECT NUMBER TM-04	30TH AVENUE SIGNAL TIMING
OBJECTIVE	Provide coordinated traffic signal timing on 30th Avenue.
DESCRIPTION	Signal timing coordination at McVey/I-5 SB Ramp and Eldon Shafer Drive (Lane Community College). Includes communication connection between signals.  
STAKEHOLDER(S)	ODOT, Lane County
COMMUNICATIONS REQUIREMENTS	Requires communication between central signal system server and traffic signals. May replace existing communications with fiber.
COST	$40,000 for project deployment
OPERATIONS & MAINTENANCE	Maintenance includes upkeep of field devices and communications between field devices and transportation center.
NEEDS ADDRESSED	• Need to be able to manage traffic operations • Need for communications to central signal system for management
BENEFITS	• Improved travel times and travel time reliability will result from the ability to manage the signal system • Reduces fuel consumption and vehicle emissions

PROJECT NUMBER TM-05	COMMUNICATION NETWORK UPGRADES
OBJECTIVE	Fill in current communications gaps and upgrade existing communication infrastructure
DESCRIPTION	Update communication plans to meet future needs of the agencies-microwave/cellular/fiber.  
STAKEHOLDER(S)	ODOT, Lane County, Lane Transit District, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	Requires communication between traffic operation centers and field ITS devices. May replace existing communications with fiber.
COST	$840,000 for project deployment
OPERATIONS & MAINTENANCE	Maintenance includes upkeep of communications between field devices and transportation center.
NEEDS ADDRESSED	• Need to be able to manage traffic operations • Need for communications to central signal system for management • Need to update communications for improved reliability and bandwidth
BENEFITS	• Reliable communications • Supports virtual TOCs and traffic management

PROJECT NUMBER TM-06	ACTIVE SIGN UPGRADE
OBJECTIVE	Upgrade power and communications to existing speed feedback signs and flashers.
DESCRIPTION	This project will add communications and upgrade to hardwired AC power at existing flashers. It may also add passive pedestrian detection at existing Rectangular Rapid Flashing Beacons (RRFB). Specifically, this project may add: • Wireless communication to existing pedestrian crossing flashers • AC power to existing pedestrian crossing flashers • AC power to existing school zone flashers • Passive detection at midblock pedestrian crossings • Passive detection to existing RRFBs  
STAKEHOLDER(S)	ODOT, Lane County, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	Communications from field devices to traffic operation centers is needed.
COST	$100,000 for project deployment
OPERATIONS & MAINTENANCE	Staffing hours needed initially to install communications and power. Maintenance of upgraded field devices and communications is needed.
NEEDS ADDRESSED	• Need to improve pedestrian safety • Need to improve pedestrian quality of service
BENEFITS	• Reduced maintenance resources needed

PROJECT NUMBER TM-07	LANE COUNTY COMMUNICATIONS
OBJECTIVE	Implement communication to all Lane County ITS devices.
DESCRIPTION	These projects will add communications and upgrade to hardwired AC power at existing flashers. It will also add passive pedestrian detection at existing Rectangular Rapid Flashing Beacons (RRFB). Specifically, these projects will add: • Wireless communication to existing pedestrian crossing flashers • AC power to existing pedestrian crossing flashers • AC power to existing school zone flashers • Passive detection at midblock pedestrian crossings • Passive detection to existing RRFBs



STAKEHOLDER(S)	Lane County
COMMUNICATIONS REQUIREMENTS	Communications from field devices to traffic operation center is needed.
COST	$1,000,000 for project deployment
OPERATIONS & MAINTENANCE	Staffing hours needed to manage the Traffic Operations Centers (TOC). Maintenance crews will be responsible for maintaining the new technology (cameras, sensors, communications, etc.).
NEEDS ADDRESSED	• Improved traffic signal operation • Need to improve pedestrian quality of service
BENEFITS	• Reduced maintenance resources needed • Supports traffic management

PROJECT NUMBER TM-08 — ADVANCE RAILROAD CROSSING WARNING SYSTEM

OBJECTIVE

Deploy driving warning systems at select railroad at-grade crossings

DESCRIPTION

Install automatic train detection system and variable message signs to provide advance information to emergency management personnel and travelers to allow them to make informed decisions about route choice. Locations include:

- 28th/Main Street
- Centennial Blvd east of 28th St
- Olympic Blvd east of 28th St
- S 2nd St south of S A St
- S 5th St south of S A St
- S 32nd St north of Jasper Rd
- Bob Straub Pkwy crossing
- Mt Vernon St crossing
- S 42nd St crossing

STAKEHOLDER(S)

Springfield

COMMUNICATIONS REQUIREMENTS

Communications is needed between variable message signs, field sensors and devices and controller.

COST

$1,020,000 for project deployment

OPERATIONS & MAINTENANCE

Requires training maintenance staff to use new electronic message signs. Maintenance duties will include upkeep of field sensors and devices.

NEEDS ADDRESSED

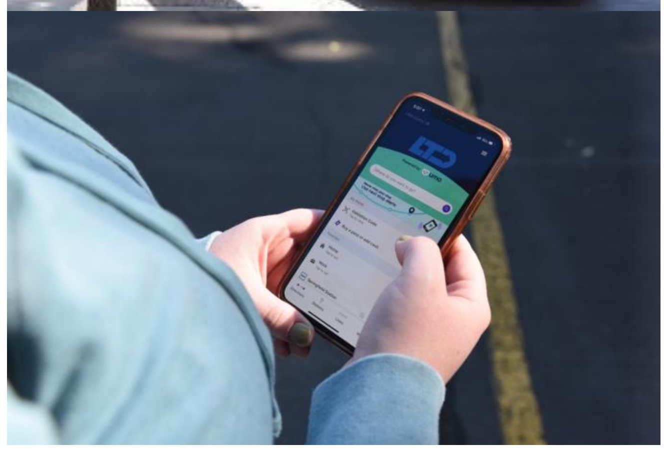
- Need advanced warning of train crossings

BENEFITS

- Reduces crashes and improved safety
- Reduces delay
- Alternate route information for travelers

PROJECT NUMBER MM-01	REAL TIME CUSTOMER INFORMATION
OBJECTIVE	Implement real time transit information to system users.
DESCRIPTION	Deploy real-time dynamic message signs at key locations such as transit centers, park and ride lots, bus stops where multiple routes pass through, and at bus stops with large bus headways.

STAKEHOLDER(S)	Lane Transit District
COMMUNICATIONS REQUIREMENTS	Communications links from the Lane Transit District operations dispatch center to bus fleet and field devices for display.
COST	$800,000 for project deployment
OPERATIONS & MAINTENANCE	Maintenance crews will be responsible for maintaining the ITS equipment and communication network.
NEEDS ADDRESSED	• Need real-time traffic condition information • Provide near real-time transit arrival information at bus stops
BENEFITS	• Real-time or near real-time ability to monitor and evaluate to travel routes and travel time delays that result from planned or unplanned events.

PROJECT NUMBER MM-02	ELECTRONIC FARE COLLECTION
OBJECTIVE	Implement a transit electronic fare collection system.
DESCRIPTION	Improve and expand the electronic fare collection system on Lane Transit District buses. Additional features could include: - Broadened transportation options with a single fare card (trip planning) - Installation of more validators - Interconnectivity with Portland and other regional systems  
STAKEHOLDER(S)	Lane Transit District
COMMUNICATIONS REQUIREMENTS	Communications links from the Lane Transit District operations dispatch center to bus fleet and stations with fare system equipment.
COST	$1,000,000 for project deployment
OPERATIONS & MAINTENANCE	Maintenance crews will be responsible for maintaining the ITS equipment and communication network.
NEEDS ADDRESSED	• Integrate payment options for multiple modes
BENEFITS	• Reduced boarding time

PROJECT NUMBER MM-03	TRANSIT MANAGEMENT SYSTEM UPGRADE
OBJECTIVE	Upgrade transit management system.
DESCRIPTION	Replace lifecycle equipment on Lane Transit District buses such as: - Automated Vehicle Location (AVL) - Computer Aided Dispatch (CAD) - Automated Passenger Counting (APC) System   
STAKEHOLDER(S)	Lane Transit District
COMMUNICATIONS REQUIREMENTS	Communications links from the Lane Transit District operations dispatch center to bus fleet and stations.
COST	$2,000,000 for project deployment
OPERATIONS & MAINTENANCE	Continued operations and maintenance of systems and equipment.
NEEDS ADDRESSED	• Improve accuracy of passenger counting and other technology systems on the vehicle • Share transit data with Traffic Operation Centers (TOCs) • Replace lifecycle equipment • Improve dispatch operations
BENEFITS	• Improved transit operations

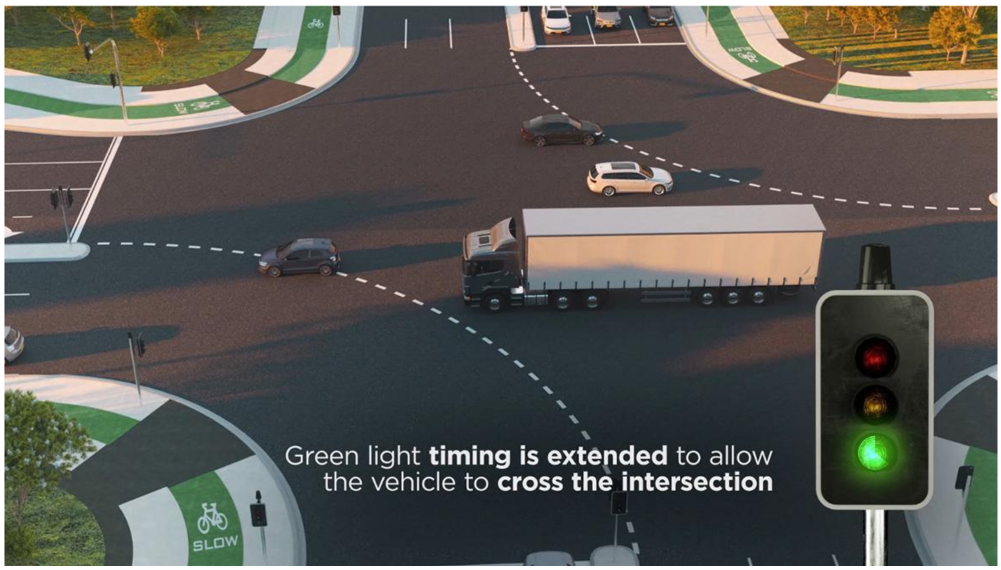
PROJECT NUMBER MM-04	PARATRANSIT SYSTEM UPGRADE
OBJECTIVE	Upgrade paratransit system.
DESCRIPTION	Consider and evaluate upgrades for technology on paratransit vehicles including Automated Vehicle Location (AVL) and Computer Aided Dispatch (CAD).  
STAKEHOLDER(S)	Lane Transit District
COMMUNICATIONS REQUIREMENTS	Communications links from the Lane Transit District operations dispatch center to paratransit bus fleet.
COST	$750,000 for project deployment
OPERATIONS & MAINTENANCE	Continued operations and maintenance of systems and equipment.
NEEDS ADDRESSED	• Improve accuracy of technology systems on the paratransit vehicles • Replace lifecycle equipment • Improve para transit dispatch operations
BENEFITS	• Improved paratransit operations

PROJECT NUMBER MM-05	TRANSIT SYSTEM SECURITY
OBJECTIVE	Upgrade transit security system.
DESCRIPTION	Full implementation of transmitting video images from transit stations and buses back to Lane Transit District dispatch for surveillance capabilities of the stations, roadways, and passengers.

STAKEHOLDER(S)	Lane Transit District
COMMUNICATIONS REQUIREMENTS	Communications links from the Lane Transit District operations dispatch center to bus fleet and stations.
COST	$1,500,000 for project deployment
OPERATIONS & MAINTENANCE	Continued operations and maintenance of systems and new (CCTV) and existing equipment.
NEEDS ADDRESSED	• Bus fleet and station surveillance
BENEFITS	• Improved security of bus fleet and station areas

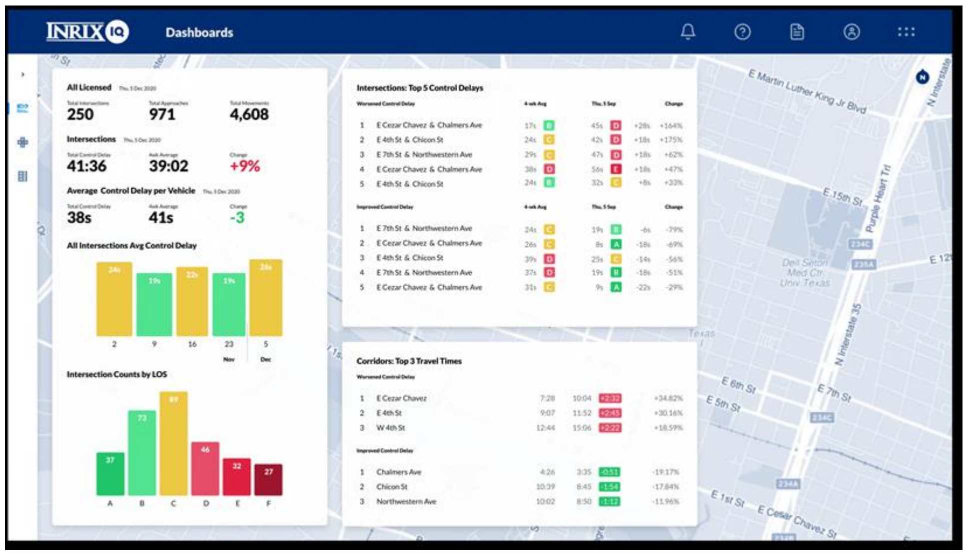
PROJECT NUMBER MM-06	BUS RAPID TRANSIT EXPANSION
OBJECTIVE	Expand bus rapid transit service to an additional corridor.
DESCRIPTION	Expand EmX service to a new corridor in Eugene. This project includes selection of a new route adding stations and associated roadway elements. 
STAKEHOLDER(S)	Lane Transit District, Eugene
COMMUNICATIONS REQUIREMENTS	Communications links from the Lane Transit District operations dispatch center to bus fleet and stations.
COST	$2,000,000 for project deployment
OPERATIONS & MAINTENANCE	Continued operations and maintenance of systems and new and existing equipment.
NEEDS ADDRESSED	• Increase ridership • Reduce transit travel times
BENEFITS	• Transit system expansion • Upgrade transit system operations

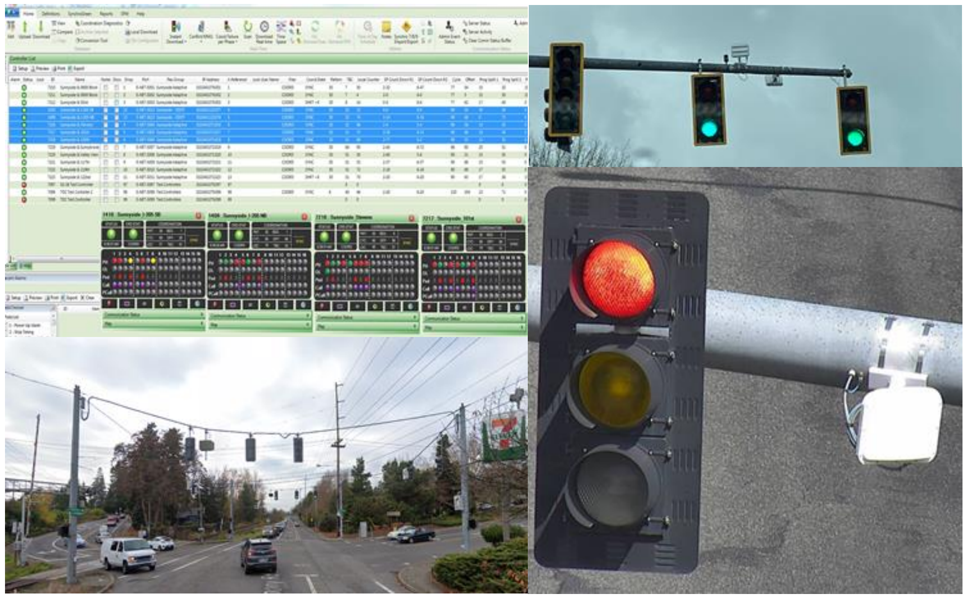
PROJECT NUMBER MM-07	TRANSIT SIGNAL PRIORITY
OBJECTIVE	Provide priority at traffic signals for buses behind schedule to improve transit travel time reliability on corridors with traffic signals.
DESCRIPTION	The project will include the installation of transit signal priority (TSP) emitters on select buses and traffic signal controller software upgrades along the selected corridors to support transit signal priority. Corridors in the region will be selected based on levels of current traffic congestion and transit ridership.  
STAKEHOLDER(S)	ODOT, Lane County, Lane Transit District, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	A communications interface will be needed between each transit vehicle and each traffic signal along a transit priority corridor. Potential interfaces include preemption equipment used by emergency response, loops embedded in the pavement that detect bus presence, radio frequency tags and readers or a central management system that requests priority based on vehicle locations.
COST	$950,000 for project deployment
OPERATIONS & MAINTENANCE	Maintenance includes keeping the software up to date, and upkeep of Opticom detectors and communications.
NEEDS ADDRESSED	• Need reliable transit travel times to promote alternative modes of transportation
BENEFITS	• Reduced transit delay • Schedule adherence and reliability • Reduced operational costs • Enhanced transit service • Increased ridership

PROJECT NUMBER MM-08	FREIGHT MOBILITY
OBJECTIVE	Provide priority at traffic signals for trucks on fright routes to improve safety.
DESCRIPTION	This project includes the use and deployment of detectors at traffic signals to detect trucks and their speeds. Signal controllers would extend green times at the signals if the truck cannot safely stop and to give more time to approach if trucks are detected. 
STAKEHOLDER(S)	ODOT, Lane County, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	A communications interface will be needed between sensors and the traffic signal controller and back to a central signal system.
COST	$450,000 for project deployment
OPERATIONS & MAINTENANCE	Maintenance includes keeping the software up to date, and upkeep of detectors and communications.
NEEDS ADDRESSED	• Reduce crashes • Improve freight travel time
BENEFITS	• Reduced freight delay • Improved safety

PROJECT NUMBER TI-01	ADVANCED PARKING MANAGEMENT AND INFORMATION
OBJECTIVE	Implement a parking management and information system.
DESCRIPTION	Implement smart parking at major parking facilities - including parking sensors, parking information message boards at key approaches. 
STAKEHOLDER(S)	ODOT, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	Communications links from Traffic Operations Centers (TOC) to parking facilities including sensors and variable message signs.
COST	$750,000 for project deployment
OPERATIONS & MAINTENANCE	Maintenance crews will be responsible for maintaining the ITS equipment and communication network.
NEEDS ADDRESSED	• Need real-time traffic condition information • Monitor and report on parking availability in lots, garages, and other parking areas and facilities
BENEFITS	• Real-time parking information for users • Reduced congestion related to events

PROJECT NUMBER TI-02	ARTERIAL TRAVELER INFORMATION
OBJECTIVE	Monitor degradation of travel times from planned or unplanned events. Provide travel time information through permanent Dynamic Message Signs (DMS)
DESCRIPTION	Integrate traveler information from all jurisdictions into real time (travel time/delays). Combine RITIS data with additional count stations. Provide travel time through mobile application and deploy additional arterial Dynamic Message Signs at key locations. 
STAKEHOLDER(S)	ODOT, Lane County, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	Communications links from the Traffic Operations Centers (TOC) to field devices for display on the website. Communications is needed between variable message signs, field sensors and devices and controller.
COST	$3,000,000 for project deployment
OPERATIONS & MAINTENANCE	Operations and maintenance will play a key role in the successful implementation of this project since traveler information must continually be kept up-to-date in order to provide value to website users. The use of software will allow certain types of information to be automatically uploaded to the website while other information may need to be updated manually by key personnel. Requires training maintenance staff to use new electronic message signs. Maintenance duties will include upkeep of field sensors and devices.
NEEDS ADDRESSED	• Need real-time traffic condition information • Need to understand travel routes during planned and unplanned events • Need to understand how travel times are affected during planned and unplanned events • Need to provide arterial travel times • Need to provide travel time variable message signs on arterial roadways
BENEFITS	• Real-time or near real-time ability to monitor and evaluate to travel routes and travel time delays that result from planned or unplanned events. • Provide information for travelers to make informed choices • Improve travel time reliability

PROJECT NUMBER DM-01	PERFORMANCE REPORTING
OBJECTIVE	Develop automated data collection and performance reporting system, including transit performance monitoring
DESCRIPTION	Develop and install an automated performance measure reporting system. Through the use of a dashboard, display information in easily digestible format related to travel time, congestion, quality of signal timing, status of field devices, etc. Performance metrics would come from high resolution traffic signal data, travel time data from existing devices or third-party data, and from an asset management system. 
STAKEHOLDER(S)	ODOT, Lane County, Lane Transit District, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	Communication between Traffic Operations Centers (TOC) and to ITS field devices.
COST	$600,000 for project deployment
OPERATIONS & MAINTENANCE	Staffing hours needed to manage the Traffic Operations Center (TOC). Maintenance crews will be responsible for maintaining the ITS equipment and communication network.
NEEDS ADDRESSED	• Signal performance measures • Create a dashboard of the central signal system • Aggregate and archive data collected throughout the region
BENEFITS	• Improved information for decision makers and operations personnel • Improved traffic operations

PROJECT NUMBER DM-02	DATA MANAGEMENT- ATSPM, SAFETY ANALYTICS
OBJECTIVE	Develop data management system to archive operational data and automated performance reporting system
DESCRIPTION	Upgrade signals at major corridors to ATCs, install communication, enhanced detections and intersection cameras to allow the use of archived operational data, use automated traffic signal performance measures (ATSPM) and safety analytics. 
STAKEHOLDER(S)	ODOT, Lane County, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	Communication between Traffic Operations Centers (TOC) and to ITS field devices.
COST	$2,500,000 for project deployment
OPERATIONS & MAINTENANCE	Staffing hours needed to manage the Traffic Operations Center (TOC). Maintenance crews will be responsible for maintaining the ITS equipment and communication network.
NEEDS ADDRESSED	• Signal performance measures • Create a dashboard of the central signal system • Aggregate and archive data collected throughout the region • Use transportation-related data to support traffic data analysis, performance monitoring, planning, and reporting
BENEFITS	• Improved information for decision makers and operations personnel • Improved signal operation • Improved safety

PROJECT NUMBER IM-01	INCIDENT MANAGEMENT OPERATIONAL PLANS
OBJECTIVE	Develop incident management operational plans
DESCRIPTION	Project includes the development of a transportation-specific incident management operational plan and an evacuation plan in case of a major emergency that includes the operational protocol for field devices, the development of incident signal timing plans on alternate arterial routes, and clearly defined agency roles and responsibilities. This effort will build upon existing multi-functional plans already in existence.

STAKEHOLDER(S)	ODOT, Lane County, Lane Transit District, Eugene, Springfield, Coburg
COMMUNICATIONS REQUIREMENTS	Communication between Traffic Operations Centers (TOC).
COST	$300,000 for project deployment
OPERATIONS & MAINTENANCE	Staffing hours needed to manage the Traffic Operations Center (TOC).
NEEDS ADDRESSED	• Enhance alternate routes used for incident diversions with fixed route guide signs or dynamic message signs • Coordinate with other emergency management operations centers (EOCs) to support emergency response
BENEFITS	• Improved information for decision makers and operations personnel

PROJECT NUMBER IM-02	SPECIAL EVENT MANAGEMENT SYSTEMS
OBJECTIVE	Develop special event management system
DESCRIPTION	Project includes the deployment of signal timing plans, portable dynamic message signs, and parking management for the following special events in Eugene, Springfield, and the larger region. Special events could include: - UO Sporting Events - Lane County Fair - Oregon Country Fair - Eugene Celebration - Other Regional Special Events Provide an interface between the Regional Virtual TOC (ODOT/local EOC), and the UO SOS Room that allows for two-way information sharing, monitoring, and control functions.   
STAKEHOLDER(S)	ODOT, Lane County, Lane Transit District, Eugene, Springfield, Coburg
COMMUNICATIONS REQUIREMENTS	Communication between Traffic Operations Centers (TOC).
COST	$750,000 for project deployment
OPERATIONS & MAINTENANCE	Staffing hours needed to manage the Traffic Operations Center (TOC).
NEEDS ADDRESSED	• Optimize traffic management for major events
BENEFITS	• Improved information for decision makers and operations personnel

PROJECT NUMBER MC-01	MAINTENANCE, CONSTRUCTION, AND WORK ZONE MANAGEMENT
OBJECTIVE	Coordinated maintenance and construction information
DESCRIPTION	Develop an information system that contains details about regionwide maintenance and construction activities by public agencies, utility companies, and private contractors. Provide region-wide construction work zone management and monitoring, including information on construction related roadway closure reporting and monitoring. 
STAKEHOLDER(S)	ODOT, Lane County, Eugene, Springfield
COMMUNICATIONS REQUIREMENTS	Communication between Traffic Operations Centers (TOC)
COST	$850,000 for project deployment
OPERATIONS & MAINTENANCE	Staff needs to enter information into system.
NEEDS ADDRESSED	• Coordinate maintenance and construction activities • Improve safety
BENEFITS	• Improved information for roadway users • Improved coordination with third party routing (Google, WAZE, etc.) companies