



# Chapter 4: CONCEPT OF OPERATIONS

## 4.1 INTRODUCTION

The purpose of this chapter is to describe the Concept of Operations for Eugene-Springfield. The Concept of Operations defines the roles and responsibilities of the participating key stakeholder agencies, and identifies information flows between the agencies. This chapter is divided into two main sections:

- **Concept of Operations:** A high-level overall Concept of Operations was developed as a database defining the roles, relationships, and information flows between the primary participating agencies, and the extended stakeholders.
- **Program Area Concept of Operations:** This section describes the roles, responsibilities and information flows by program area for Eugene-Springfield's ITS implementation plan. A schematic illustrating the information flows and a responsibility matrix is provided for each of the seven Program Areas. The seven Program Areas are:
  - Traffic Operations & Management
  - Traveler Information
  - Incident Management
  - Public Transportation Management
  - Emergency Management
  - Information Management
  - Maintenance & Construction Management

### 4.1.1 Approach

In the National ITS Architecture, market packages include a depiction of the relationship and data flow between different entities providing the “service” implemented by the deployment of the market package. For example, the incident management system market package includes an exchange of information between traffic management and emergency management centers. This implies that a Concept of Operations and an institutional relationship be established between the two organizations that are cooperating, while the “service” implemented is the new video signal(s) or data flow(s) that assist both parties with their operations. Therefore, the identification of which market packages are and will be deployed in Eugene-Springfield led the way to defining the Concept of Operations. Additionally, information used to develop the Concept of Operations was gathered in interviews with the stakeholder agencies regarding their current and desired level of operational interaction with other transportation and safety agencies.

## 4.2 CONCEPT OF OPERATIONS OVERVIEW

The purpose of the Concept of Operations is to describe the roles and responsibilities of the participating transportation and public safety agencies, and to discuss the resources that each agency will apply or contribute in the deployment of ITS projects. The words “roles” and “responsibilities” are referred to often in the Concept of Operations, and can be defined as:

- Roles: the part that each agency plays in each program area, such as lead, support or no involvement
- Responsibilities: includes more definition of the agencies responsibilities for design, implementation, operation and maintenance, and the level of information, status, and control sharing among the entities.

The reasons for developing a Concept of Operations include the following:

- Maintain conformance with U.S. Department of Transportation (U.S. DOT) guidelines for the development of a Regional ITS Architecture.
- Identify the requirements of and laying the groundwork for, the necessary institutional agreements, such as Memoranda of Understanding (MOU's) and Inter-Governmental Agreements (IGA's).
- Identify outstanding issues, agreements, and relationships to be developed by the Steering Committee.
- Identify suggestions for continued regional coordination and cooperation during implementation of the Regional ITS Architecture and ITS projects.

Relationships between agencies embody two main components:

- The roles and responsibilities that each agency plays in the relationship, and
- The kinds of information that are shared between the agencies.

### 4.2.1 Agency Roles and Responsibilities

Eight types of agency-to-agency relationships define the range of potential institutional interactions that might occur between two organizations during the deployment of an ITS application.

Table 4-1 defines the eight agency-to-agency relationship types, and includes an example of each type of relationship. The relationships are listed from lowest to highest level of interaction, with the top row in the table being the lowest level of interaction. The types of relationships begin at no interaction (level 1 or independent) and progress through consultation and cooperation (levels 2 and 3), where joint efforts are undertaken but electronic information is not exchanged up to information and control sharing (levels 4 and 5) where increasing levels of information exchange and device control are provided. The remaining relationships (levels 6-8) cover the levels of responsibilities for operation and maintenance.

**Table 4-1. Agency-to-Agency Relationships**

	<b>Relationship</b>	<b>Definition</b>	<b>“From/To” Example</b>
1	Independent	Parties operate independently with no interaction.	No interaction.
2	Consultation	One party confers with another party, in accordance with an established process, about an anticipated action and then keeps that party informed about the actions taken. No electronic sharing of information.	FROM agency provides information on activities to interested TO agencies.
3	Cooperation	The parties involved in carrying out the planning, project development and operations processes work together to achieve common goals or objectives. No electronic sharing of information.	Both agencies cooperate in the development and execution of common plans, projects, and operational procedures.
4	Information Sharing	The electronic exchange of data and device status information between parties, for the purposes of coordinated operations, planning, and analysis.	FROM agency will provide status, data, and/or video information from the FROM agency’s field devices (e.g. detectors) to the TO agency.
5	Control Sharing	The ability, through operational agreements, to allow for one party to control another party’s field devices to properly respond to incident, event, weather, or traffic conditions.	FROM agency is allowed by the TO agency to control the TO agency’s field devices-(e.g. dynamic message sign, select signal timing patterns for specified defined occurrences).
6	Only Operational Responsibility Shifted	One party operates the field equipment of a second party on a full time basis.	FROM agency will operate the field devices of the TO agency (e.g. County operates a City’s traffic signals but the City is responsible for maintenance and repairs.)
7	Only Maintenance Responsibility Shifted	One party maintains the field equipment of a second party.	FROM agency maintains the field devices of the TO agency, but the TO agency is responsible for operations.
8	Full Responsibility Shifted	One party has full responsibility for the field equipment of a second party including operations and preventative and emergency maintenance.	FROM agency operates and maintains the field devices of the TO agency.

**4.2.2 Information Flows**

Along with these eight agency-to-agency relationships, there are several types of information flows that are typical for agency-to-agency exchange. Table 4-2 describes the five primary types of information flows relevant to intelligent transportation systems.

While the architecture defines information flows by specific market packages at a detailed level, the Concept of Operations rolls those up into higher-level agency-to-agency flows that include data, video, status, request and control.

**Table 4-2. Information Flow Definitions**

Information Flows	Definition	“From/To” Example
Data	The dissemination of data gathered from one party’s field devices to another party. Data can include, but is not limited to, traffic, weather, parking, transit data, etc.	FROM agency sends data to the TO agency’s field devices
Video	The dissemination of live video and still images from one party’s field camera’s to another party.	FROM agency sends live video and still images to the TO agency
Status	The ability for one party to monitor another parties field devices, and receive such information as current signal timing/response plan, current message sets, etc.	FROM agency sends status information on its devices to the TO agency
Request	The ability for one party to solicit either data or a command change, such as DMS messaging or signal timings, from another party.	FROM agency requests information or action from the TO agency
Control	The ability for one party to control another party’s field devices. Control can include but is not limited to, changing DMS messaging, changing traffic signal timings, camera control, etc.	FROM agency issues control instruction to the TO agency’s field devices

**4.2.3 Concept of Operations Database**

The relationship and information flow between each key stakeholder have been identified based upon the agency-to-agency relationships and information flows defined above. The information has been input into a database with the following characteristics:

- From Agency
- To Agency
- Relationship
- Information Flow
- Verified with Agency

The relationships and flows are characterized as:

- Existing (relationship has been established or information flow is operational)
- Planned (relationship will be established or information flow is planned)
- Consider (relationship or information flow will be considered in the future)

This database defines the overall Concept of Operations for the region and is included as Appendix N.

### 4.3 PROGRAM AREA CONCEPT OF OPERATIONS

For each program area, a flow diagram depicting the exchange of information is provided in the following subsection. These diagrams illustrate the flow of information between the various agencies and stakeholders providing ITS services in the region.

In addition, responsibility matrices are presented that further define the roles and responsibilities of each of the key stakeholder agencies for the following set of activities<sup>1</sup>:

- **Design:** Including the design of equipment, hardware, software and systems required under each Program Area.
- **Construction:** Includes the construction or installation of equipment, hardware, software and systems required under each Program Area.
- **System Development and Integration:** Includes responsibility for development of new software interfaces and integration between systems to support each Program Area.
- **Operational Planning:** Includes each agency’s role in defining Operational Planning process and procedures to support ongoing operations and future expansion of each Program Area.
- **Operations:** Includes each agency’s role in actual Operations of the equipment and systems in each Program Area.
- **Maintenance:** Includes each agency’s role in maintenance of the equipment, hardware, software, and systems in each Program Area.

#### 4.3.1 Traffic Operations & Management

The Traffic Operations & 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. It should be noted, that due to the geography of the region and the current distribution of traffic signals, there is not a near-term need for regional traffic signal coordination or control.

Figure 4-1 and Table 4-3 are the flow diagram and responsibility matrix for Traffic Operations & Management, respectively.

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<sup>1</sup> Under each activity an agency may be identified as the activity lead for the entire regional consortium or just for its “agency owned” equipment. Alternatively, they may simply be identified as participating in the regional effort, or not involved at all in that activity.



**Table 4-3. Traffic Operations & Management Responsibility Matrix**

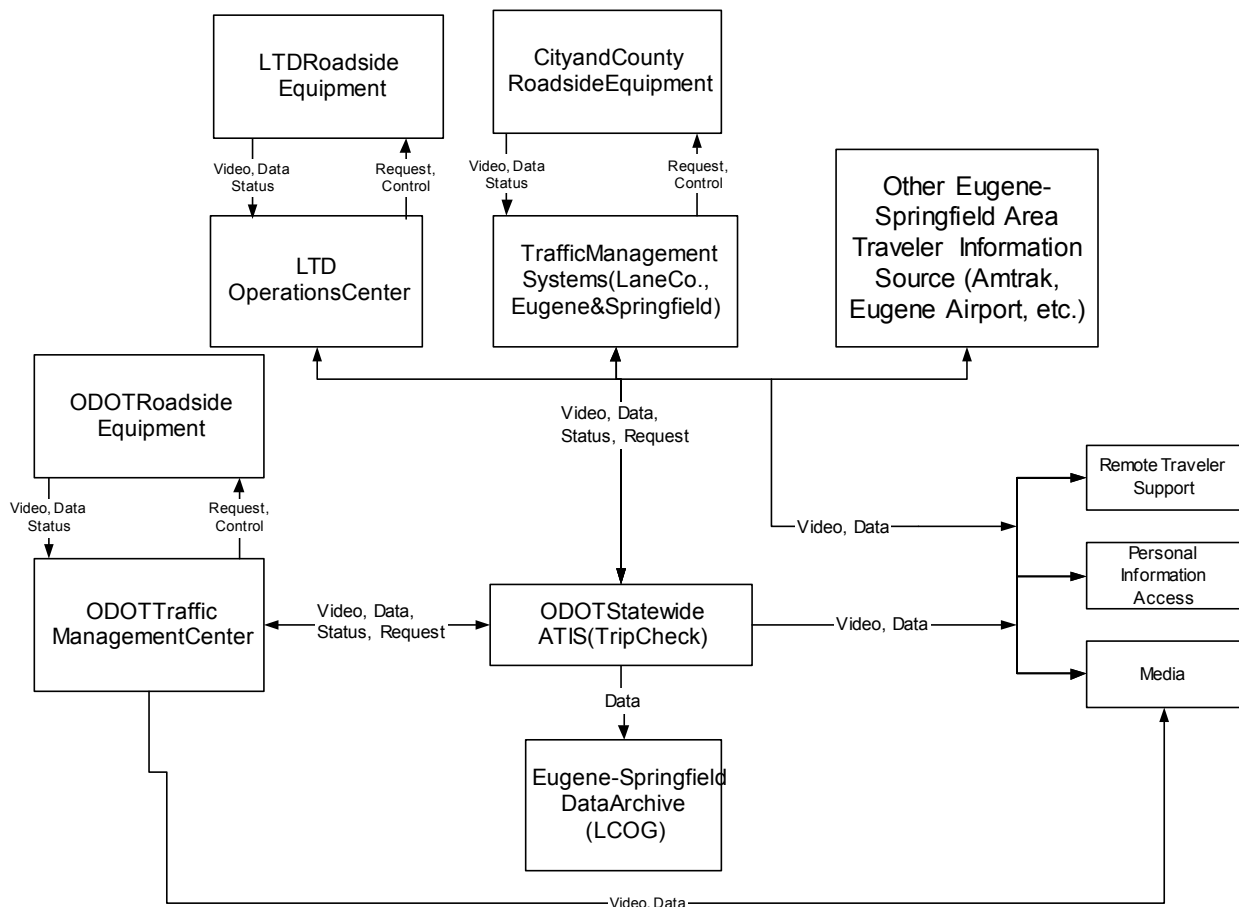
Area	LCOG	City of Eugene	City of Springfield	Lane County	ODOT
<b>Design</b>	<ul style="list-style-type: none"> <li>Co-lead development of functional, interface and communication requirements for regional data warehouse</li> <li>Participate in development of Center-to-Center requirements for data and control</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> <li>Design upgrade of traffic controllers<sup>2</sup> within jurisdiction</li> <li>Design other traffic control devices (DMS, CCTV, etc.) within jurisdiction</li> <li>Design traffic surveillance and detection systems within jurisdiction</li> <li>Design associated communications to support field devices</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> <li>Design upgrade of traffic controllers<sup>2</sup> within jurisdiction</li> <li>Design other traffic control devices (DMS, CCTV, etc.) within jurisdiction</li> <li>Design traffic surveillance and detection systems within jurisdiction</li> <li>Design associated communications to support field devices</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> <li>Design upgrade of traffic controllers<sup>2</sup> within jurisdiction</li> <li>Design other traffic control devices (DMS, CCTV, etc.) within jurisdiction</li> <li>Design traffic surveillance and detection systems within jurisdiction</li> <li>Design associated communications to support field devices</li> </ul>	<ul style="list-style-type: none"> <li>Co-lead development of functional, interface and communication requirements for regional data warehouse</li> <li>Design upgrade of traffic controllers and monitoring capability along roadways under its jurisdiction</li> <li>Design other traffic control devices (VMS, HAR, ramp meters, etc.) along roadways under its jurisdiction</li> <li>Design traffic surveillance and detection systems along roadways under its jurisdiction</li> <li>Design associated communications to support field devices</li> </ul>
<b>Construction</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Manage upgrade of traffic controllers within jurisdiction</li> <li>Manage installation of traffic surveillance, detection and control devices</li> <li>Manage construction of communications to field devices</li> </ul>	<ul style="list-style-type: none"> <li>Manage upgrade of traffic controllers within jurisdiction</li> <li>Manage installation of traffic surveillance, detection and control devices</li> <li>Manage construction of communications to field devices</li> </ul>	<ul style="list-style-type: none"> <li>Manage upgrade of traffic controllers within jurisdiction</li> <li>Manage installation of traffic surveillance, detection and control devices</li> <li>Manage construction of communications to field devices</li> </ul>	<ul style="list-style-type: none"> <li>Manage upgrade of traffic controllers along roadways under its jurisdiction</li> <li>Manage installation of traffic surveillance, detection and control devices</li> <li>Manage construction of communications to field devices</li> </ul>
<b>System Development &amp; Integration</b>	<ul style="list-style-type: none"> <li>Develop regional data warehouse</li> <li>Integrate data sources from other agencies</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> <li>Integrate traffic management systems with ODOT TOCS and ATMS systems as applicable</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> <li>Integrate traffic management systems with ODOT TOCS and ATMS systems as applicable</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> <li>Integrate traffic management systems with ODOT TOCS and ATMS systems as applicable</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> <li>Integrate TOCS and ATMS systems with other regional agency traffic management systems</li> </ul>
<b>Operational Planning</b>	<ul style="list-style-type: none"> <li>Lead develop of operational plan for collection and retrieval of data from regional data warehouse</li> <li>Expand traffic forecasting and modeling capabilities with additional data</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> <li>Lead development of traffic signal plans within jurisdiction</li> <li>Participate in regional operational planning of field devices and communications network</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> <li>Lead development of traffic signal plans within jurisdiction</li> <li>Participate in regional operational planning of field devices and communications network</li> </ul>	<ul style="list-style-type: none"> <li>Lead development of traffic signal plans within jurisdiction</li> <li>Participate in regional data warehouse development</li> <li>Participate in regional operational planning of field devices and communications network</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of traffic signal plans along roadways under its jurisdiction</li> <li>Participate in regional operational planning of field devices and communications network</li> <li>Participate in regional data warehouse development</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>Operate regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Operate traffic control system including portion of Lane County and ODOT system</li> <li>Operate surveillance, detection and control devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Operate traffic control system including portion of Lane County and ODOT system</li> <li>Operate surveillance, detection and control devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Operate traffic control system within jurisdiction</li> <li>Operate surveillance, detection and control devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Operate surveillance, detection and control devices along roadways under its jurisdiction except roadways where current agreements transfer operations and maintenance functions to local agencies</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>Maintain regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Maintain agency traffic control system</li> <li>Maintain surveillance, detection and control field devices and communications network</li> </ul>	<ul style="list-style-type: none"> <li>Maintain agency traffic control system</li> <li>Maintain surveillance, detection and control field devices and communications network</li> </ul>	<ul style="list-style-type: none"> <li>Maintain agency traffic control system</li> <li>Maintain surveillance, detection and control field devices and communications network</li> </ul>	<ul style="list-style-type: none"> <li>Maintain surveillance, detection and control field devices and communications network</li> </ul>

<sup>2</sup> If required to support future functionality and system integration.

### 4.3.2 Traveler Information

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. Other jurisdictions may also provide limited traveler information directly to the public. This Concept of Operations includes the interface to Trip Check for the purpose of distributing regional traveler information collected from agency field devices (i.e. cameras, count stations, and DMS).

Figure 4-2 and Table 4-4 are the flow diagram and responsibility matrix for Traveler Information, respectively.



**Figure 4-2. Traveler Information Flow Diagram**

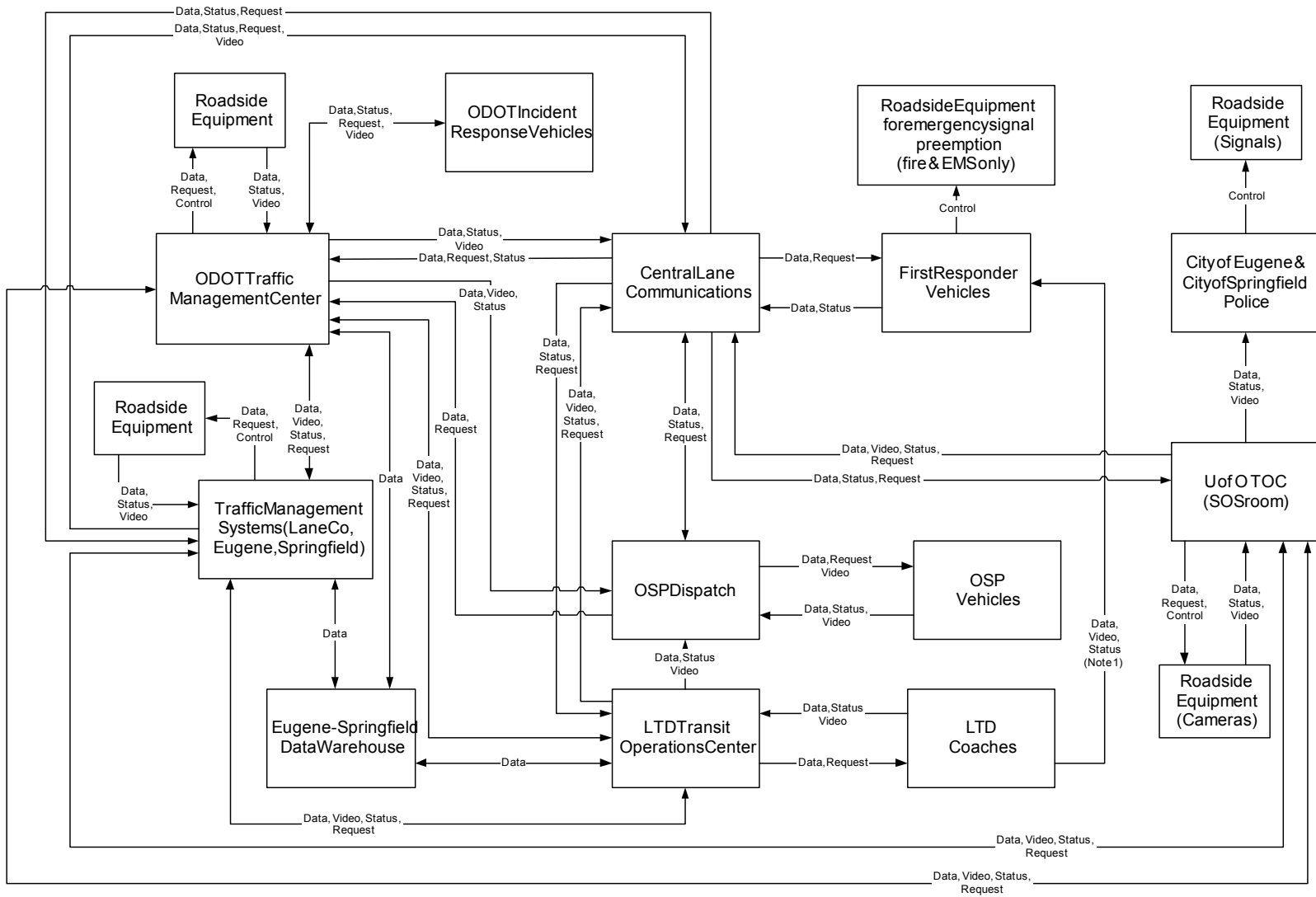
**Table 4-4. Traveler Information Responsibility Matrix**

Area	LCOG	City of Eugene	City of Springfield	Lane County	ODOT	LTD
<b>Design</b>	<ul style="list-style-type: none"> <li>Participate in development of interfaces to ODOT TripCheck</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of interfaces to ODOT TripCheck</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of interfaces to ODOT TripCheck</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of interfaces to ODOT TripCheck</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Design expansion of TripCheck for Eugene-Springfield local information</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of interfaces to ODOT TripCheck and Transit Trip Planning Website</li> <li>Develop LTD ATIS</li> <li>Design transit stop and center remote traveler information devices</li> <li>Design to allow sharing of data and video</li> </ul>
<b>Construction</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Construct systems to collect traveler information (data and video) within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Construct systems to collect traveler information (data and video) within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Construct systems to collect traveler information (data and video) within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Construct systems to collect traveler information (data and video) within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Construct transit stop and center remote traveler information devices</li> </ul>
<b>System Development &amp; Integration</b>	<ul style="list-style-type: none"> <li>Implement interfaces to ODOT TripCheck and interface to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Implement interfaces to ODOT TripCheck and interface to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Implement interfaces to ODOT TripCheck and interface to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Implement interfaces to ODOT TripCheck and interface to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Implement expansions to ODOT TripCheck and interface to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Develop LTD ATIS (expanded website and customer service capabilities)</li> <li>Implement interfaces to ODOT TripCheck, Transit Trip Planning, and interface to regional data warehouse</li> </ul>
<b>Operational Planning</b>	<ul style="list-style-type: none"> <li>Participate in development of operational plan and interagency agreements for providing traveler information in the Eugene area</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of operational plan and interagency agreements for providing traveler information in the Eugene area</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of operational plan and interagency agreements for providing traveler information in the Eugene area</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of operational plan and interagency agreements for providing traveler information in the Eugene area</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of operational plan and interagency agreements for providing traveler information in the Eugene area</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of operational plan and interagency agreements for providing traveler information in the Eugene area</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>TBD</li> <li>Recommend: Operate regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Operate agency owned systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Operate agency owned systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Operate agency owned systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Operate ODOT ATIS</li> <li>Operate agency owned systems providing data and video.</li> <li>TBD</li> <li>Recommend: Alternate to operate regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Operate LTD ATIS</li> <li>Operate transit stop and center remote traveler information devices</li> <li>Operate agency owned systems providing data and video.</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>TBD</li> <li>Recommend: Maintain regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Maintain any agency owned systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain any agency owned systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain any agency owned systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain ODOT ATIS</li> <li>TBD</li> <li>Recommend: Alternate to maintain regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Maintain LTD ATIS</li> <li>Maintain transit stop and center remote traveler information devices</li> <li>Maintain any agency owned systems providing data and video.</li> </ul>

### **4.3.3 Incident Management**

Incident management involves coordination between multiple transportation and safety agencies to clear roadway incidents quickly and minimize congestion. Incident management can also include implementing traffic management strategies on alternate routes to minimize delay for vehicles diverting to bypass the incident. This Concept of Operations for incident management also addresses planned events, such as football games. Today, ODOT uses a number of strategies to respond to incidents in Eugene-Springfield. ODOT patrols the regions major roadways with incident response vehicles. In addition, alternate routes have been identified for Interstate 5 in the event of a freeway closure, although no permanent traffic management field devices have been deployed on the alternate routes. The Incident Management Concept of Operations for Eugene-Springfield focuses on expanding links between regional and statewide agencies so as to provide better incident detection, response, tracking, and clearance.

Figure 4-3 and Table 4-5 are the flow diagram and responsibility matrix for Incident Management, respectively.



Note 1: Not a real-time data transfer. "Black box" data transfer policies to be reviewed.

Figure 4-3. Incident Management Flow Diagram

**Table 4-5. Incident Management Responsibility Matrix**

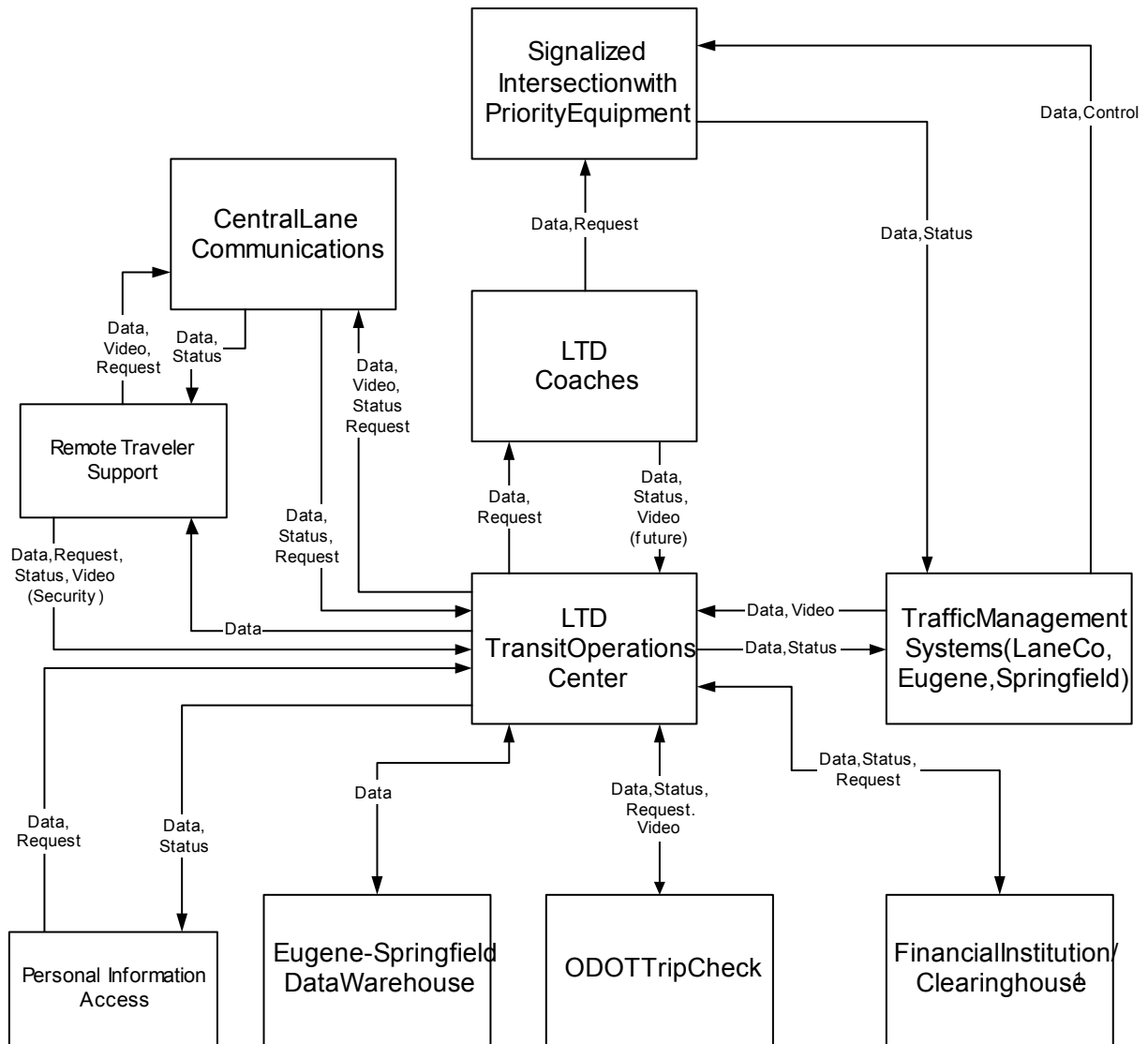
Area	OSP	Central Lane Communications (911)	Emergency Service Providers	LCOG	LTD	City of Eugene	City of Springfield	Lane County	ODOT
<b>Design</b>	<ul style="list-style-type: none"> <li>TBD</li> <li>Recommend:                             <ul style="list-style-type: none"> <li>Joint Lead for development CAD-to-ODOT TMC and CAD-to-CAD<sup>3</sup> requirements for data sharing</li> <li>Joint Lead for CAD interface requirements</li> <li>Participate in development of Center to Center requirements for data and video</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> <li>Recommend:                             <ul style="list-style-type: none"> <li>Joint Lead for development of CAD-to-ODOT TMC and CAD-to-CAD requirements for data sharing</li> <li>Joint Lead for CAD interface requirements</li> <li>Participate in development of Center to Center requirements for data and video</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of CAD interface requirements</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of Center to Center requirements for data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of Center to Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of Center to Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of Center to Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of Center to Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> <li>Recommend:                             <ul style="list-style-type: none"> <li>Joint Lead for development of CAD to ODOT TMC requirements for data sharing</li> <li>Lead development of Center to Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul> </li> </ul>
<b>Construction</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices</li> </ul>
<b>System Development &amp; Integration</b>	<ul style="list-style-type: none"> <li>Development of CAD-to-ODOT TMC and CAD-to-CAD interface for data sharing</li> <li>Develop CAD interface</li> </ul>	<ul style="list-style-type: none"> <li>Development of CAD-to-ODOT TMC and CAD-to-CAD interface for data sharing</li> <li>Develop CAD interface</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Joint Lead in the development of regional data warehouse</li> <li>Integrate data sources from other agencies</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Joint Lead in the development of regional data warehouse</li> <li>Development of CAD to ODOT TMC interface for data sharing</li> <li>Implement C2C connection</li> </ul>
<b>Operational Planning</b>	<ul style="list-style-type: none"> <li>Joint Lead for development of incident management plan</li> </ul>	<ul style="list-style-type: none"> <li>Joint Lead for development of incident management plan</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of incident management plan</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of incident management plan</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of incident management plan</li> </ul>	<ul style="list-style-type: none"> <li>Joint Lead in development of incident management plan</li> </ul>	<ul style="list-style-type: none"> <li>Joint Lead in development of incident management plan</li> </ul>	<ul style="list-style-type: none"> <li>Joint Lead in development of incident management plan</li> </ul>	<ul style="list-style-type: none"> <li>Joint Lead for development of incident management plan</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>Manage incidents as required</li> </ul>	<ul style="list-style-type: none"> <li>Manage incidents as required</li> </ul>	<ul style="list-style-type: none"> <li>Manage incidents as required</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Participate in incident response as required</li> <li>Operate systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in incident response as required</li> <li>Operate systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in incident response as required</li> <li>Operate systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in incident response as required</li> <li>Operate systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in incident response as required</li> <li>Operate incident response vehicles</li> <li>Operate systems providing data and video.</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>Maintain CAD system</li> </ul>	<ul style="list-style-type: none"> <li>Maintain CAD system</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain signal pre-emption equipment</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain signal pre-emption equipment</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain signal pre-emption equipment</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain signal pre-emption equipment</li> </ul>

<sup>3</sup> Interface between OSP CAD system and Central Lane Communications CAD system, if applicable.

#### **4.3.4 Public Transportation Management**

Lane Transit District 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. Future 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. LTD would like to post more transit information to ODOT's TripCheck site, and this link is also included. One possibility would be to post real-time bus schedule information following LTD's implementation of Automatic Vehicle Location systems on their coaches. The link to Personal Information Access represents information flows to users of the agency's web site.

Figure 4-4 and Table 4-6 are the flow diagram and responsibility matrix for Public Transportation Management, respectively.



<sup>1</sup>May not be required depending on system configuration

**Figure 4-4. Public Transportation Management Flow Diagram**

**Table 4-6. Public Transportation Management Responsibility Matrix**

Area	LTD	City of Eugene	City of Springfield	Lane County	ODOT	LCOG
<b>Design</b>	<ul style="list-style-type: none"> <li>Develop on-board, central, and traveler information requirements for transit management system</li> <li>Design transit stop and center equipment installations</li> <li>Lead development of regional approach to Transit Signal Priority (TSP) deployment including exchange of data on TSP activity</li> </ul>	<ul style="list-style-type: none"> <li>Design to allow sharing of data and video (generally covered under other Program Areas)</li> <li>Participate in development of regional approach to TSP deployment</li> <li>Design TSP installations at agency intersections</li> </ul>	<ul style="list-style-type: none"> <li>Design to allow sharing of data and video (generally covered under other Program Areas)</li> <li>Participate in development of regional approach to TSP deployment</li> <li>Design TSP installations at agency intersections</li> </ul>	<ul style="list-style-type: none"> <li>Design to allow sharing of data and video (generally covered under other Program Areas)</li> <li>Participate in development of regional approach to TSP deployment</li> <li>Design TSP installations at agency intersections</li> </ul>	<ul style="list-style-type: none"> <li>Design to allow sharing of data and video (generally covered under other Program Areas)</li> <li>Participate in development of regional approach to TSP deployment</li> <li>Design TSP installations at agency intersections</li> </ul>	<ul style="list-style-type: none"> <li>Lead development of functional, interface and communication requirements for regional data warehouse</li> <li>Participate in development of regional approach to TSP deployment</li> </ul>
<b>Construction</b>	<ul style="list-style-type: none"> <li>Install on-board equipment</li> <li>Install transit stop and center equipment</li> </ul>	<ul style="list-style-type: none"> <li>Construct TSP installations with jurisdiction</li> <li>Manage construction of other field devices within municipal jurisdiction (generally covered under other Program Areas)</li> </ul>	<ul style="list-style-type: none"> <li>Construct TSP installations with jurisdiction</li> <li>Manage construction of other field devices within municipal jurisdiction (generally covered under other Program Areas)</li> </ul>	<ul style="list-style-type: none"> <li>Construct TSP installations with jurisdiction</li> <li>Manage construction of other field devices within municipal jurisdiction (generally covered under other Program Areas)</li> </ul>	<ul style="list-style-type: none"> <li>Construct TSP installations with jurisdiction</li> <li>Manage construction of field devices within municipal jurisdiction (generally covered under other Program Areas)</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>System Development &amp; Integration</b>	<ul style="list-style-type: none"> <li>Develop transit management system</li> <li>Integrate on-board equipment and develop TSP data exchange with traffic management centers and regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> <li>Implement interface for TSP data exchange</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> <li>Implement interface for TSP data exchange</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> <li>Implement interface for TSP data exchange</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> <li>Implement interface for TSP data exchange</li> </ul>	<ul style="list-style-type: none"> <li>Develop regional data warehouse</li> <li>Integrate data sources from other agencies</li> </ul>
<b>Operational Planning</b>	<ul style="list-style-type: none"> <li>Lead development of operational and management for transit</li> <li>Lead development of TSP operational rules including priority schemes and bus driver responsibilities</li> <li>Develop maintenance agreement with municipalities</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of TSP operational rules</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of TSP operational rules</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of TSP operational rules</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of TSP operational rules</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of TSP operational rules</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>Operate transit management system</li> <li>Operate on-board equipment</li> <li>Operate transit stop equipment</li> <li>Monitor TSP usage</li> </ul>	<ul style="list-style-type: none"> <li>Operate systems providing data and video.</li> <li>Operate traffic control signals providing TSP</li> </ul>	<ul style="list-style-type: none"> <li>Operate systems providing data and video.</li> <li>Operate traffic control signals providing TSP</li> </ul>	<ul style="list-style-type: none"> <li>Operate systems providing data and video.</li> <li>Operate traffic control signals providing TSP</li> </ul>	<ul style="list-style-type: none"> <li>Operate systems providing data and video.</li> <li>Operate traffic control signals</li> </ul>	<ul style="list-style-type: none"> <li>Operate regional data warehouse</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>Maintain transit management system</li> <li>Maintain on-board equipment</li> <li>Maintain roadside BRT equipment</li> <li>Maintain transit stop equipment</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain roadside TSP equipment on traffic signals</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain roadside TSP equipment on traffic signals</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain roadside TSP equipment on traffic signals</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain roadside TSP equipment</li> </ul>	<ul style="list-style-type: none"> <li>Maintain regional data warehouse</li> </ul>

### **4.3.5 Emergency Management**

Central Lane Communications is shown in the flow diagram as the central element for Emergency Management in the region. Central Lane Communications' role 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 future functionality for video to be sent to Central Lane Communications and the Emergency Operations Centers from emergency vehicles and 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 4-5 and Table 4-7 are the flow diagram and responsibility matrix for Emergency Management, respectively.



**Table 4-7. Emergency Management Responsibility Matrix**

Area	OSP	Central Lane Communications (911)	Emergency Service Providers	EOCs	ODOT	LTD	City of Eugene	City of Springfield	Lane County	LCOG	
<b>Design</b>	<ul style="list-style-type: none"> <li>TBD</li> <li>Recommend:                             <ul style="list-style-type: none"> <li>Joint Lead for development of CAD-to-TMC and CAD-to-CAD<sup>4</sup> requirements for data sharing</li> <li>Participate in development of Center to Center requirements for data and video</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> <li>Recommend:                             <ul style="list-style-type: none"> <li>Joint Lead for development of CAD-to-TMC and CAD-to-CAD requirements for data sharing</li> <li>Participate in development of Center-to-Center requirements for data and video</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Participate in development CAD interface requirements</li> </ul>	<ul style="list-style-type: none"> <li>Determine Center-to-Center requirements for data and video to support emergency operations</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> <li>Recommend:                             <ul style="list-style-type: none"> <li>Joint Lead for development of CAD to TMC requirements for data sharing</li> <li>Lead development of Center to Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of Center-to-Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of Center-to-Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of Center-to-Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of Center-to-Center requirements for data and video</li> <li>Design to allow sharing of data and video</li> </ul>	<ul style="list-style-type: none"> <li>Facilitate development of CAD to ODOT TMC requirements for data sharing</li> <li>Participate in development of Center to Center requirements for data and video</li> </ul>	
<b>Construction</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Install communications infrastructure in EOC to support data and video needs</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of field devices within jurisdiction</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	
<b>System Development &amp; Integration</b>	<ul style="list-style-type: none"> <li>Development of CAD-to-ODOT TMC and CAD-to-TMC and CAD-to-CAD interface for data sharing</li> <li>Develop CAD interface</li> </ul>	<ul style="list-style-type: none"> <li>Development of CAD-to-ODOT TMC and CAD-to-TMC and CAD-to-CAD interface for data sharing</li> <li>Develop CAD interface</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Development of CAD to ODOT TMC interface for data sharing</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Implement C2C connection</li> </ul>	<ul style="list-style-type: none"> <li>Develop regional data warehouse</li> <li>Integrate data sources from other agencies</li> </ul>
<b>Operational Planning</b>	<ul style="list-style-type: none"> <li>Joint Lead for development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Joint Lead for development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Joint Lead for development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of emergency management plan including Incident Command Structure</li> </ul>	<ul style="list-style-type: none"> <li>Participate in development of emergency management plan including Incident Command Structure</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>Manage emergency response as required</li> </ul>	<ul style="list-style-type: none"> <li>Manage emergency response as required</li> </ul>	<ul style="list-style-type: none"> <li>Manage emergency response as required</li> </ul>	<ul style="list-style-type: none"> <li>Manage emergency response as required</li> </ul>	<ul style="list-style-type: none"> <li>Participate in emergency response as required</li> <li>Operate incident response vehicles</li> <li>Operate systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in emergency response as required</li> <li>Operate systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in emergency response as required</li> <li>Operate systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in emergency response as required</li> <li>Operate systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in emergency response as required</li> <li>Operate systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Operate regional data warehouse</li> </ul>	
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>Maintain CAD system</li> </ul>	<ul style="list-style-type: none"> <li>Maintain CAD system</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain signal pre-emption equipment</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain signal pre-emption equipment</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain signal pre-emption equipment</li> </ul>	<ul style="list-style-type: none"> <li>Maintain systems providing data and video.</li> <li>Maintain signal pre-emption equipment</li> </ul>	<ul style="list-style-type: none"> <li>Maintain regional data warehouse</li> </ul>	

<sup>4</sup> Interface between OSP CAD system and Central Lane Communications CAD system, if applicable.



**Table 4-8. Information Management Responsibility Matrix**

Area	LCOG	City of Eugene	City of Springfield	Lane County	ODOT
<b>Design</b>	<ul style="list-style-type: none"> <li>Lead development of functional, interface and communication requirements for regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> </ul>
<b>Construction</b>	<ul style="list-style-type: none"> <li>Install data warehouse hardware and software equipment</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of communications segments to support regional information sharing</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of communications segments to support regional information sharing</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of communications segments to support regional information sharing</li> </ul>	<ul style="list-style-type: none"> <li>Manage construction of communications segments to support regional information sharing</li> </ul>
<b>System Development &amp; Integration</b>	<ul style="list-style-type: none"> <li>Develop regional data warehouse</li> <li>Integrate data sources from other agencies</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> </ul>	<ul style="list-style-type: none"> <li>Implement regional data warehouse interface</li> </ul>
<b>Operational Planning</b>	<ul style="list-style-type: none"> <li>Lead develop of operational plan for collection and retrieval of data from regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> </ul>	<ul style="list-style-type: none"> <li>Participate in regional data warehouse development</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>Operate regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Operate devices that provide data to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Operate devices that provide data to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Operate devices that provide data to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Operate devices that provide data to regional data warehouse</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>Maintain regional data warehouse</li> <li>Maintain communications infrastructure that connects to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Maintain devices that provide data to regional data warehouse</li> <li>Maintain communications infrastructure that connects to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Maintain devices that provide data to regional data warehouse</li> <li>Maintain communications infrastructure that connects to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Maintain devices that provide data to regional data warehouse</li> <li>Maintain communications infrastructure that connects to regional data warehouse</li> </ul>	<ul style="list-style-type: none"> <li>Maintain devices that provide data to regional data warehouse</li> <li>Maintain communications infrastructure that connects to regional data warehouse</li> </ul>

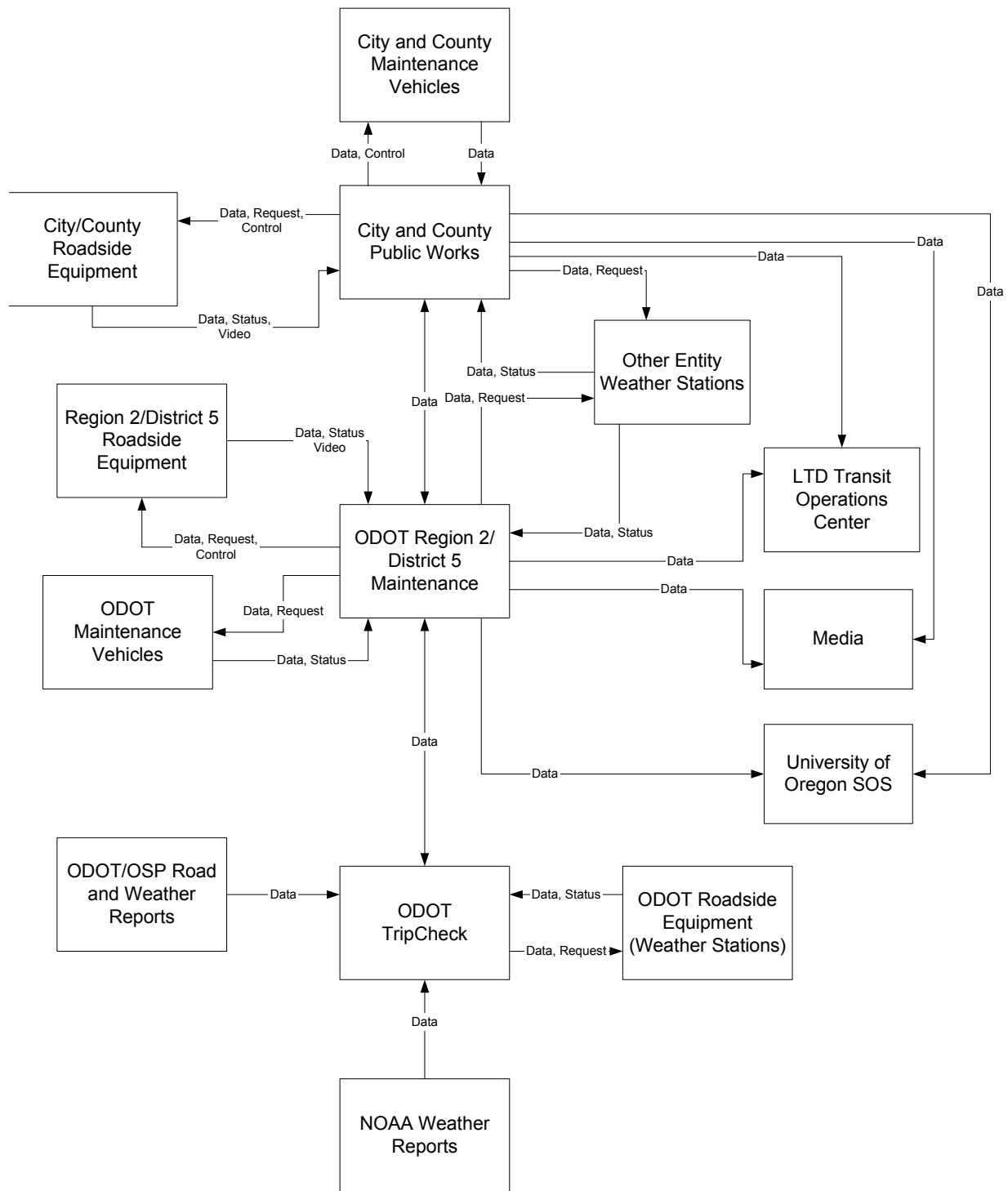
### **4.3.7 Maintenance and Construction Management**

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. TripCheck receives statewide conditions reports from ODOT and Oregon State Patrol staff, as well as data from their weather stations (none specifically in this study area), and the National Oceanic & Atmospheric Administration (NOAA).

Figure 4-7 and Table 4-9 are the flow diagram and responsibility matrix for Maintenance and Construction Management, respectively.



**Figure 4-7. Maintenance and Construction Management Flow Diagram**

**Table 4-9. Maintenance and Construction Management Responsibility Matrix**

Area	City of Eugene	City of Springfield	Lane County	ODOT	LTD
<b>Design</b>	<ul style="list-style-type: none"> <li>Design work zone safety and maintenance coordination requirements and systems</li> </ul>	<ul style="list-style-type: none"> <li>Design work zone safety and maintenance coordination requirements and systems</li> </ul>	<ul style="list-style-type: none"> <li>Design work zone safety and maintenance coordination requirements and systems</li> </ul>	<ul style="list-style-type: none"> <li>Design work zone safety and maintenance coordination requirements and systems</li> <li>Design maintenance vehicle location tracking and vehicle diagnostics systems</li> <li>Design weather monitoring and auto treatment systems</li> </ul>	<ul style="list-style-type: none"> <li>Design work zone safety and maintenance coordination requirements and systems</li> </ul>
<b>Construction</b>	<ul style="list-style-type: none"> <li>Install work zone safety field equipment</li> </ul>	<ul style="list-style-type: none"> <li>Install work zone safety field equipment</li> </ul>	<ul style="list-style-type: none"> <li>Install work zone safety field equipment</li> </ul>	<ul style="list-style-type: none"> <li>Install work zone safety, vehicle tracking, weather monitoring and automatic treatment field equipment</li> </ul>	<ul style="list-style-type: none"> <li>Install work zone safety field equipment</li> </ul>
<b>System Development &amp; Integration</b>	<ul style="list-style-type: none"> <li>Integrate with ODOT and other agency weather monitoring and maintenance systems as applicable</li> </ul>	<ul style="list-style-type: none"> <li>Integrate with ODOT and other agency weather monitoring and maintenance systems as applicable</li> </ul>	<ul style="list-style-type: none"> <li>Integrate with ODOT and other agency weather monitoring and maintenance systems as applicable</li> </ul>	<ul style="list-style-type: none"> <li>Integrate with TOCS and ATMS systems as required</li> <li>Integrate with other agency weather monitoring and maintenance systems as applicable</li> </ul>	<ul style="list-style-type: none"> <li>Integrate with ODOT and other agency weather monitoring systems as applicable</li> </ul>
<b>Operational Planning</b>	<ul style="list-style-type: none"> <li>Participate in planning to coordinate and inform other agencies of construction and maintenance plans</li> </ul>	<ul style="list-style-type: none"> <li>Participate in planning to coordinate and inform other agencies of construction and maintenance plans</li> </ul>	<ul style="list-style-type: none"> <li>Participate in planning to coordinate and inform other agencies of construction and maintenance plans</li> </ul>	<ul style="list-style-type: none"> <li>Participate in planning to coordinate and inform other agencies of construction and maintenance plans</li> </ul>	<ul style="list-style-type: none"> <li>Participate in planning to coordinate and inform other agencies of construction and maintenance plans</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>Operate work zone safety and maintenance coordination equipment and systems</li> </ul>	<ul style="list-style-type: none"> <li>Operate work zone safety and maintenance coordination equipment and systems</li> </ul>	<ul style="list-style-type: none"> <li>Operate work zone safety and maintenance coordination equipment and systems</li> </ul>	<ul style="list-style-type: none"> <li>Operate work zone safety and maintenance coordination equipment and systems</li> <li>Operate weather monitoring and auto treatment systems</li> <li>Operate maintenance vehicle location tracking and vehicle diagnostics systems</li> </ul>	<ul style="list-style-type: none"> <li>Operate work zone safety and maintenance coordination equipment and systems</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>Maintain work zone safety and maintenance coordination equipment and systems</li> </ul>	<ul style="list-style-type: none"> <li>Maintain work zone safety and maintenance coordination equipment and systems</li> </ul>	<ul style="list-style-type: none"> <li>Maintain work zone safety and maintenance coordination equipment and systems</li> </ul>	<ul style="list-style-type: none"> <li>Maintain work zone safety and maintenance coordination equipment and systems</li> <li>Maintain weather monitoring and auto treatment systems</li> <li>Maintain maintenance vehicle location tracking and vehicle diagnostics systems</li> </ul>	<ul style="list-style-type: none"> <li>Maintain work zone safety and maintenance coordination equipment and systems</li> </ul>