California/Oregon Advanced Transportation Systems

Regional Architecture

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GLOSSARY OF ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
APCD	Air Pollution Control District
AQMD	Air Quality Management District
ARTIC	Advanced Rural Technology Integration Center
ATIS	Advanced Traveler Information Systems
Caltrans	California Department of Transportation
CCTV	Closed-Circuit Television
CHIN	California Highway Information Network
CHP	California Highway Patrol
COATS	California/Oregon Advanced Transportation Systems
COG	Council of Governments
CVAS	Commercial Vehicle Administration Subsystem
CVC	Commercial Vehicle Check
CVO	Commercial Vehicle Operations
DART	Dimensional Associates Resources and Training
DSRC	Dedicated Short Range Communications
EM	Emergency Management
EMS	Emergency Medical Services
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HTCRS	Highway Travel Conditions Reporting System
IEEE	Institute of Electrical and Electronics Engineers
IFTA	International Fuel Tax Agreement
IRP	International Registration Plan
ISP	Information Service Provider
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems
LTC	Local Transportation Commission
MCMIS	Motor Carrier Management Information System
MPO	Metropolitan Planning Organization
NTCIP	National Transportation Communications for ITS Protocol
ODOT	Oregon Department of Transportation
OSP	Oregon State Police
RTPA	Regional Transportation Planning Agency

RWIS	Road Weather Information System
SAE	Society of Automotive Engineers
SAFER	Safety and Fitness Electronic Records
SOVA	Southern Oregon Visitors Association
TC	Transportation Commission
TCIP	Transit Communications Interface Protocol
TEA-21	Transportation Equity Act for the 21st Century
TM	Traffic Management
TMC	Traffic Management Center
TOC	Transportation Operations Center
TRMS	Transit Management Subsystem
VMS	Variable Message Sign
WTI	Western Transportation Institute at Montana State University – Bozeman

ABSTRACT

This report presents the regional intelligent transportation systems (ITS) architecture developed as a part of the California/Oregon Advanced Transportation Systems (COATS) project. The purpose of the architecture is to define a framework for how various systems and stakeholders within the COATS study region will interact in order to meet regional transportation challenges.

The COATS regional architecture follows the guidelines of the National ITS Architecture; therefore, this report provides a brief conceptual overview of the National ITS Architecture. Following this, the report describes efforts that were used to collect the inputs that were needed to develop the regional architecture. These include the Legacy Systems Report, the Conditions and Performance Report, the Project Infrastructure Report, the Traveler Needs Survey, several outreach and architecture workshops, and a Market Package Exercise.

The regional architecture has a number of components. It includes a high-level architecture for the COATS region. This architecture is further delineated at the subregional level in three subregional architectures. There are subregional architectures for southern Oregon, north central California, and the northern California coast, each of which has architecture flow diagrams included in this report. The regional architecture and related subregional architectures were developed through the U.S. Department of Transportation's Turbo Architecture software package. The COATS Regional Architecture is designed to reflect the dynamic characteristics of the ITS architecture development process so all the databases are maintained in an electronic format for easy updating and revisions.

A project-level architecture is defined for the COATS early winner project, the Bi-State Traveler Safety and Incident Management System, which is centered around Siskiyou Pass. This is a segment of Interstate 5 that stretches from Yreka, California in the south to Medford, Oregon in the north. The project level architecture provides an example of how the high-level architecture may be used in developing projects and illustrates the opportunities for bi-state partnership and cooperation.

This report documents the first steps in the development of the ITS architecture for the COATS region. Next steps in the architecture development process include a major validation of the data and information flows by regional and subregional stakeholders, as well as updating the infrastructure reports to reflect changes as technology is implemented. This report will serve as background for the COATS ITS Strategic Deployment Plan.

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1 INTRODUCTION

Intelligent Transportation Systems (ITS) are developing rapidly, but the implementation of these advanced technologies in rural areas has not advanced as quickly as it has in more urbanized areas. Two reasons for this are a lack of awareness by local officials and stakeholders of the technological opportunities, and the lack of a mechanism for setting local and regional priorities for the implementation of systems that may benefit the traveling public, as well as state and local officials. In order for the benefits of ITS to be realized in rural areas, these barriers need to be overcome at a regional level.

This need led to the creation of an ITS planning, deployment and evaluation initiative called the California/Oregon Advanced Transportation Systems (COATS) project. The purpose of COATS is to encourage regional, public and private sector cooperation between California and Oregon organizations to better facilitate the planning and implementation of advanced technology for the region's transportation system. The approximate area of focus is between Redding, California and Eugene, Oregon. Figure 1-1 is a map of the COATS study area. This area provides a test bed for research, development, demonstration and deployment of rural ITS technologies and systems to "make rural travel safe, dependable and convenient." (1)

The purpose of this report is to define an ITS architecture for the COATS region that may serve as a master blueprint for an integrated, multi-modal intelligent transportation system to address transportation challenges in the study area. The architecture clarifies how organizations, both public and private, can work together to deliver a safer, more efficient and convenient transportation system to the rural traveler through deployment of ITS improvements. This report describes the regional architecture in a manner that is consistent with both the National ITS Architecture and the transportation needs of the COATS region.

In addition to the regional architecture, this report documents the process by which the architecture was developed, and suggests rural extensions to the National ITS Architecture that were necessary to support COATS Regional Architecture. Beyond a regional architecture, subregional architectures are presented for three subregions within the study area. In addition, a more-detailed, project-level architecture is presented for the early winner project at Siskiyou Pass, to illustrate how this architecture can highlight the need for improved coordination between organizations across the state border.

This document describes the initial development of the architecture and is the first step in the sustained planning and integration effort that underlies most of the cited benefits of having a regional architecture. The architecture itself, however, will require validation and updating over time to more accurately reflect local needs. To facilitate this future validation effort, an Internet-accessible database was created using the U.S. Department of Transportation's Turbo Architecture software package. The database allows many different views and focused reports from the regional architecture to be generated, which should facilitate its use and maintenance in the future.

Figure 1-1: COATS Study Area Boundaries.

2 DEFINITION OF ARCHITECTURE

An ITS architecture provides a conceptual framework for the design and operation of intelligent transportation systems. It is neither a system design nor a design concept; rather, it defines the framework around which multiple design approaches can be developed, each one specifically tailored to meet the needs of individual stakeholders, while maintaining the benefits of a common architecture. The architecture defines:

- the functions, such as gathering traffic information, that must be performed to implement a given user service;
- the physical entities or subsystems where these functions reside, such as the roadside or the vehicle;
- the interfaces/information flows between the physical subsystems; and
- the communication requirements for the information flows (e.g., wireline or wireless).

In addition, the architecture identifies and specifies the requirements for the standards needed to support national and regional interoperability, as well as product standards needed to support economy of scale considerations in deployment.

2.1 National Architecture

The National ITS Architecture, developed under contract with the U.S. Department of Transportation, is the standard for describing the interrelationship of organizations and systems under specific ITS projects. The architecture may be considered from three primary views:

- the logical architecture, which presents a functional view of ITS;
- the physical architecture, which partitions the functions reflected within the logical architecture into systems and subsystems where functions are actually performed; and
- communications, which connect the various systems.

The following sections will describe each of these components in more detail.

2.1.1 Model of ITS Functions (Logical Architecture)

One critical element in the successful deployment of ITS is to explicitly consider what the ITS technologies are supposed to accomplish. In the architecture, this is primarily reflected in the logical architecture.

The logical architecture serves to present a functional view of the ITS user services, which in turn represent what ITS should accomplish from a user's perspective. The National ITS Architecture defines the logical architecture as being divorced from likely implementations and physical interface requirements. By doing this, the architecture is open and flexible enough to handle most legacy systems, and does not inordinately constrain the market into certain technologies. At a more detailed level, the logical architecture defines the functions or process specifications that are required to perform ITS user services, and the information or data flows that need to be exchanged between these functions.

The first step in developing a logical architecture is to define a boundary separating those elements that are inside the architecture from those that are not. This is critical because ITS systems typically include many stakeholders who perform many functions not directly related to the transportation system. Therefore, an ITS architecture that does not appropriately define a boundary quickly becomes unmanageable without any accompanying benefit. Those entities that are external to the architecture are called terminators. The following are some examples of how a boundary is defined for the logical architecture.

- Travelers are considered to be external to the architecture, but the equipment that they use to obtain information (such as a variable message sign) or provide inputs to other systems (such as the vehicle's speed) is inside. In other words, the architecture defines the functions ITS must perform in support of a traveler's requirements, not the functions of the traveler. The decision processes employed by a traveler in deciding how to undertake a particular trip – such as mode, route, time of departure – are not included within the architecture boundary.

- A financial institution that processes tolls is outside of the architecture, whereas the ITS components that detect vehicles and collect tolls are inside the architecture.

- Existing broadcast media for the transmission of traveler information, such as radio and television, are outside of the architecture, but the elements that provide ITS traveler information to the media are inside.

- Communications within the rail infrastructure – between the cab and the dispatch center, for example – are outside the architecture but the support for the highway-rail interface is inside.

Functions that are to be performed by the intelligent transportation system are selected to represent the requirements of stakeholders and users. These functions are decomposed until they can be mapped to user service requirements that are identified in the National ITS Architecture. These user service requirements, in turn, may be decomposed and tailored in order to develop functional specifications for planned ITS technologies.

Figure 2-1 shows a simplified top-level data flow diagram. The circles represent functions, which may be decomposed into lower levels of detail, and rectangles represent terminators, some of which were described earlier. The lines between functions, and between functions and entities external to the architecture, represent data flows, with arrows indicating the direction of data flow. The data flows may also decomposed. The lowest level of detail of functions and data flows may be used to define detailed functional requirements for new ITS deployments, which is critical to any ITS planning effort.

2.1.2 Model of ITS Physical Entities (Physical Architecture)

The logical architecture is useful in developing functional specifications, but it does not provide any information about where functions are to be performed. Therefore, the National ITS Architecture defines a physical architecture, which distributes the functions defined by the

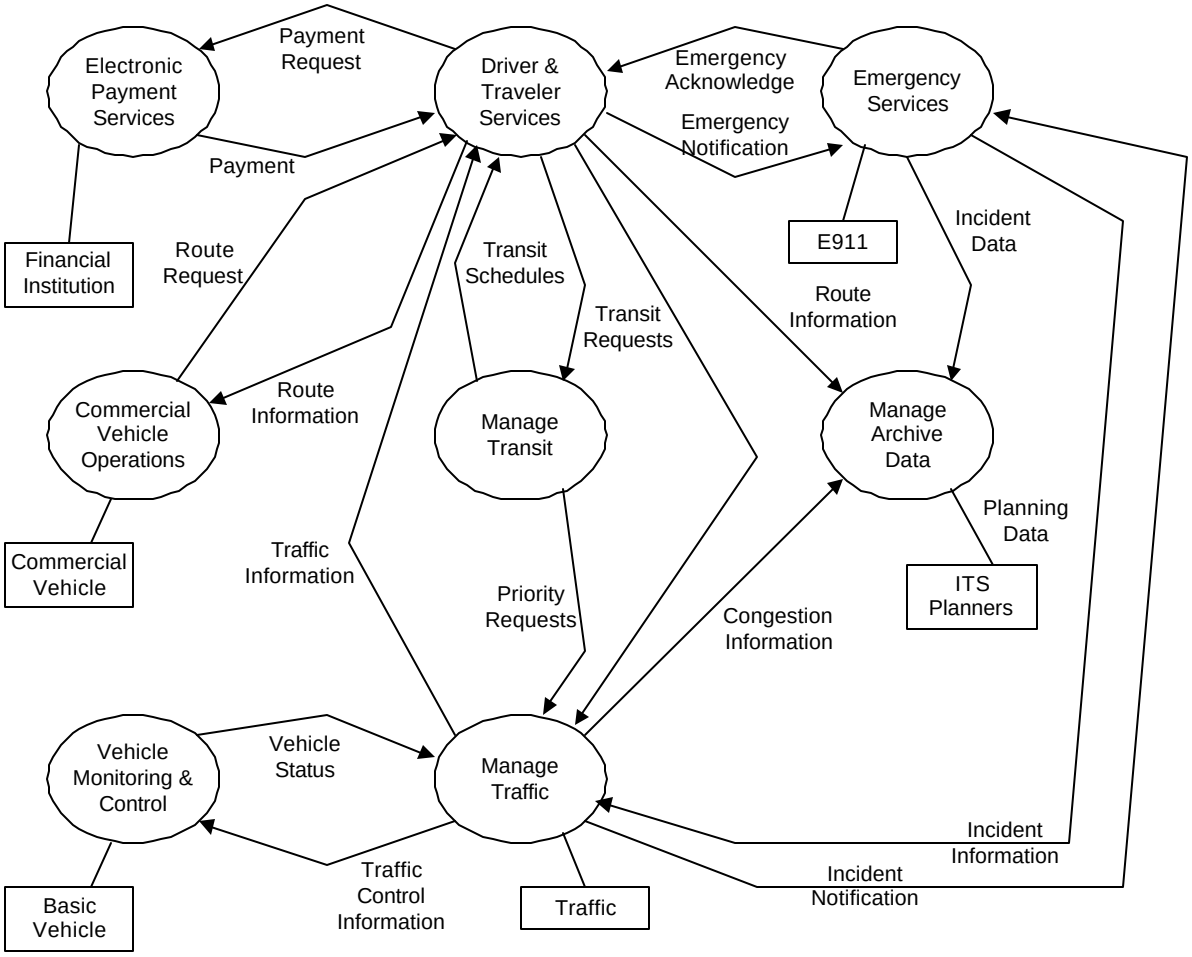

Figure 2-1: Top-Level Data Flow Diagram.

logical architecture into systems and subsystems, based on the similarity of functions and the location where functions are to be performed.

A high-level diagram of the physical architecture, commonly referred to as a "sausage diagram," is shown in Figure 2-2. The physical architecture defines four types of systems:

- center subsystems, which deal with those functions normally assigned to public/private administrative, management, or planning agencies;
- roadside subsystems, which involve the deployment of sensors, signals, programmable signs, or other interfaces with travelers and vehicles that must be positioned in a roadside location;
- vehicle subsystems, which are installed in a vehicle; and
- traveler subsystems, which provide interfaces to travelers.

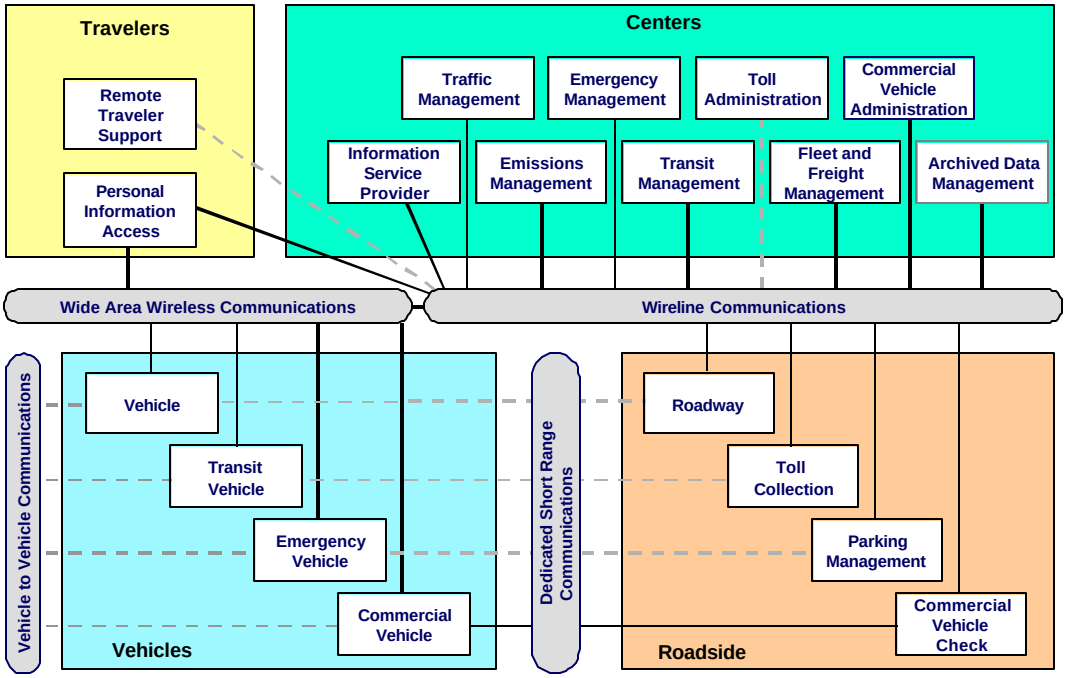

Figure 2-2: High-Level Diagram of Physical Architecture.

These four types of systems are partitioned into nineteen subsystems. The specific choice of nineteen subsystems represents a lower level of partitioning of functions that is intended to capture all anticipated subsystem boundaries for the present, and twenty years into the future.

Subsystems are physical only in a relative sense. They can be aggregated, with several subsystems located in the same physical space, such as a traffic management center being collocated with a highway patrol dispatch office. The subsystems may also be replicated, with multiple organizations performing the functions of a given subsystem. This may occur within a small geographic area where, for example, several different organizations may assist in emergency management functions. This can also occur due to the overlapping of geographic jurisdictions as, for example, different parts of the roadside ITS infrastructure in a particular county may be operated and maintained by state, county or city transportation departments.

Subsystems may be decomposed into equipment packages, which are deployment-oriented pieces within a given subsystem. Equipment packages are defined to support analyses and deployment, and they represent the smallest units within a subsystem that might be purchased. For example, the emergency management subsystem includes five equipment packages: emergency call-taking, emergency data collection, emergency dispatch, emergency response management, and mayday support. There are approximately 140 equipment packages defined in the National ITS Architecture, providing a broad range of options for staged implementation.

2.1.3 Communications

The National ITS Architecture also provides the framework that ties the transportation and telecommunication worlds together to enable the development and effective implementation of the broad range of ITS user services. There are multiple communications options available to the system designer. The flexibility in choosing between various options allows each implementer the ability to select the specific technology that meets local, regional, or national needs. The architecture identifies and assesses the capabilities of candidate communications technologies, but it does not select or recommend "winning" systems and technologies.

The National ITS Architecture defines four communication media types to support the communications requirements between the nineteen subsystems in the physical architecture. These media types are:

- wireline communications (fixed-point to fixed-point),
- wide-area wireless communications (fixed-point to mobile),
- dedicated short-range communications (fixed-point to mobile), and
- vehicle-to-vehicle (mobile to mobile).

Wireline media, as defined in the architecture, could include a wireless communication technology, such as a microwave link between a roadside sensor and a remote regional server. The important factor in dividing communications technologies is whether the source and/or recipient are fixed or mobile. Three of the four media types are exclusively wireless media; these are distinguished as follows.

- Wide-area wireless communications and dedicated short-range communications are distinguished by range and area of coverage. Wide-area wireless communications are appropriate for instances where information is disseminated to users who are not located near the source of transmission and who require seamless coverage. An example of this type of coverage would be broadcast transmission received over AM or FM radio.

- Dedicated short-range communications is concerned with information transfer at a localized level between a mobile source and a fixed point. Applications using this media could include parking fee collection and commercial vehicle credential checks.

- Vehicle-to-vehicle communications refer to media between two mobile sources. At a very primitive level, this could include a cellular telephone call between two vehicles. The National ITS Architecture envisions this as being required to support automated highway system applications, and more specifically, intersection collision avoidance applications.

One of the fundamental guiding philosophies in the development of the National ITS Architecture has been to build upon existing and emerging transportation and communication infrastructures in its design. This minimizes the risk and cost of deployment. Consequently, the decision on optimal communications media for specific ITS applications may be governed by functionality and cost rather than an arbitrarily selected technology. This is especially critical for

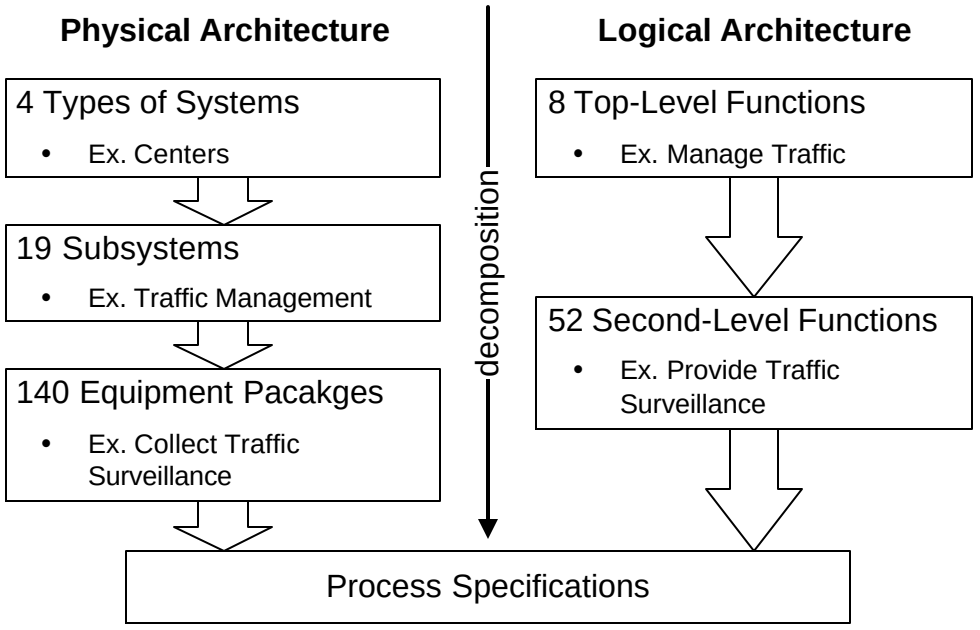

Figure 2-3: Relationship Between Physical and Logical Architectures.

the rural COATS region, where many communications media taken for granted in urban environments have spotty areas of coverage.

2.1.4 Integration of Architecture Layers

The logical, physical and communications aspects of the architecture do not represent separate architectures; rather, they represent different views of the same entity. Figure 2-3 shows how the logical and physical architectures, when decomposed far enough, will reflect the same underlying ITS functionality.

2.2 Regional Architecture

The National ITS Architecture is designed to be implemented at a sub-national level – state, regional or local. The remainder of this report will describe how the National ITS Architecture was used in developing a regional architecture for the COATS study area. The benefits of a regional architecture that demonstrates conformance with the National ITS Architecture include the following.

- Section 5206(e) of the Transportation Equity Act for the 21st Century (TEA-21) requires that ITS projects using funds from the Highway Trust Fund conform to the National ITS Architecture and standards. The COATS Regional Architecture presented in this report meets or exceeds the interim policy guidance for architecture conformity from US DOT, maximizing the opportunity to leverage federal funding.

- A regional architecture facilitates regional integration. It helps agencies and other stakeholders to identify and plan for the many integration and information sharing opportunities which ITS offers.

- A regional architecture that conforms with the National ITS Architecture (including appropriate ITS standards) enables other ITS systems that will be developed for use throughout the U.S. to operate with systems in the COATS region.

- Transportation improvements in the region are typically made incrementally as funding becomes available for various project components. A regional architecture provides guidance for how these projects should fit together, improving interoperability between the projects, making efficient use of scarce resources, and facilitating future ITS expansion in the region.

These benefits will only be realized if the regional architecture is used in planning projects for the region and adapted as requirements change in the future. Therefore, developing a regional architecture for the COATS study area is critical to the project's long-term success.

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3 METHODOLOGY

The value of developing a regional ITS architecture having been established in the previous chapter, this chapter describes the methodology that was used for developing the COATS architecture.

The activities that contributed to the development of the COATS Regional Architecture are shown in Figure 3-1. The three main activities have included identification of the stakeholders and systems, definition of regional needs and challenges, and crafting of a regional architecture. Each of these activities will be discussed in greater detail in this chapter.

3.1 Identification of Systems and Stakeholders in the COATS Region

As shown in Figure 3-2, an ongoing activity required in the development of the regional architecture is engaging stakeholders and building consensus. The stakeholder base in the COATS region is much broader than in many other ITS architectures, and this is a reflection of the character of the COATS project and region. Consequently, identification of stakeholders and systems has been an ongoing process throughout the COATS project.

The first significant stakeholder outreach was a series of workshops held at the beginning

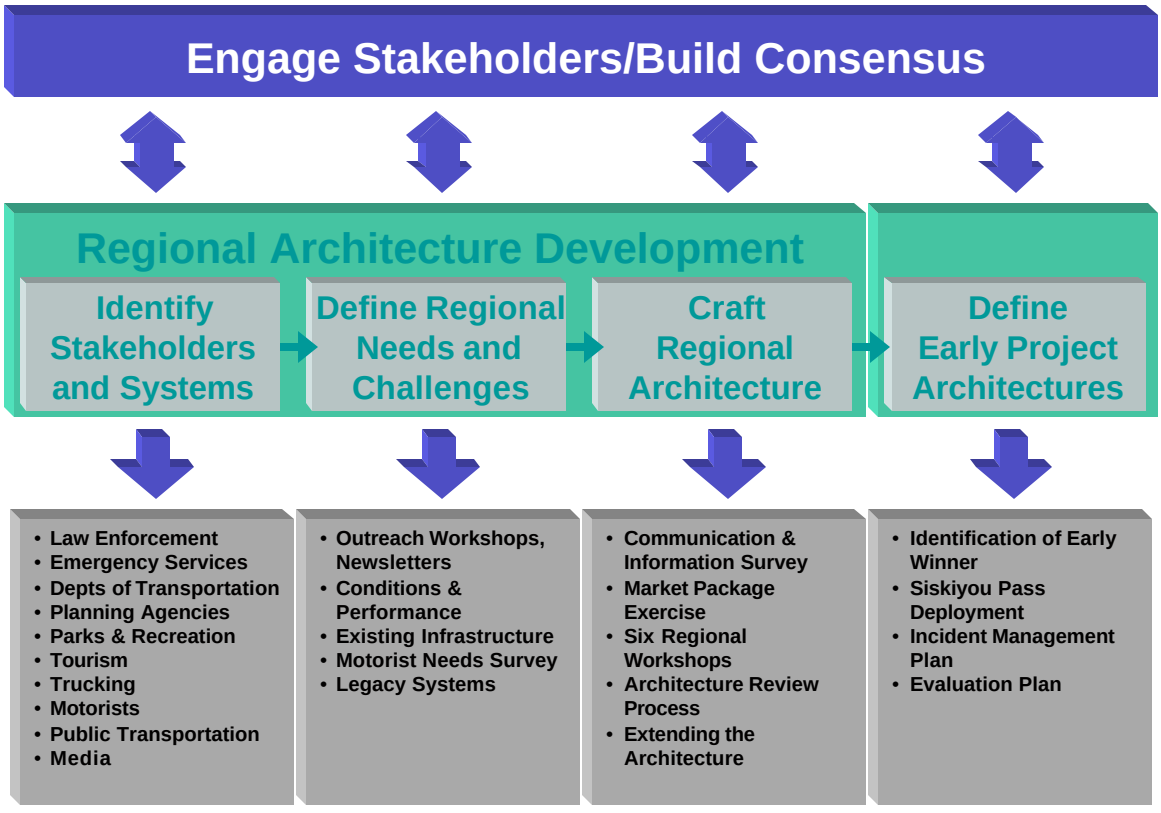

Figure 3-1: Methodology for Developing the COATS Regional Architecture.

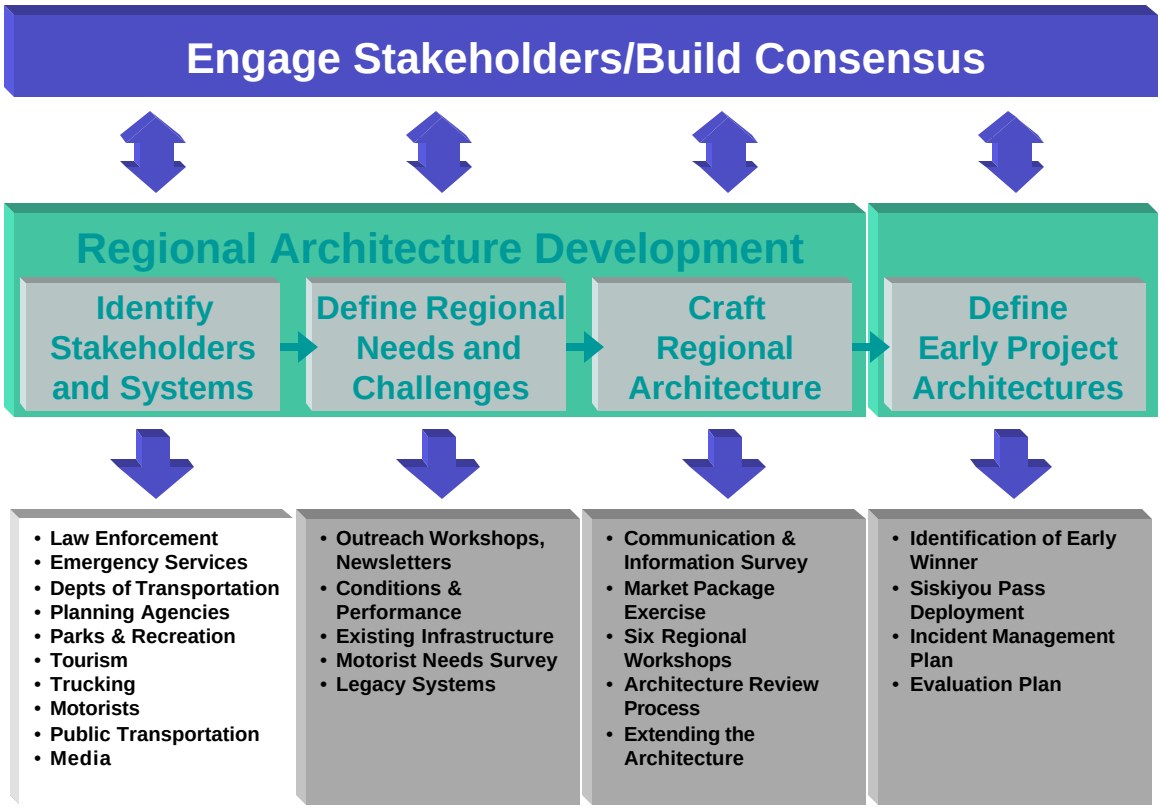

Figure 3-2: Identifying Stakeholders and Systems.

of the COATS project (2). The purpose of these workshops was to familiarize stakeholders with ITS and the COATS Project, as well as to validate needs and challenges in the COATS region.

Four stakeholder outreach workshops were held throughout the COATS study area; workshop locations and dates are summarized in Table 3-1. These workshops were intended to familiarize stakeholders with potential ITS applications as well as to familiarize the project's sponsors, the California and Oregon Departments of Transportation (Caltrans and ODOT, respectively) and the Western Transportation Institute (WTI) with the issues that are perceived to be problematic throughout the region. Outreach workshops were conducted in conjunction with regular Steering Committee meetings. Staff worked with state, local, and regional transportation stakeholders to identify appropriate workshop attendees. Invitations to the workshops were issued by letter and followed up with phone calls to key persons to optimize workshop participation. Caltrans and ODOT staff also did outreach presentations prior to the workshops to increase participation.

Table 3-1: Stakeholder Outreach Workshop Locations.

Location	Date
Medford, Oregon	December 10, 1998
Redding, California	February 4, 1999
Eureka, California	February 5, 1999
Bend, Oregon	March 31, 1999

Subsequent outreach efforts, such as other Steering Committee meetings and architecture workshops, sought to expand the circle of identified stakeholders and systems in the COATS region.

Through these efforts, existing and future systems in the region were identified along with the public agencies and private interests that are responsible for each system's operation and maintenance. These identified systems and stakeholders were mapped to the National ITS Architecture. By definition, the COATS Regional Architecture is based on the systems that exist in the region today. Building on this established base, the regional architecture defines how these existing or legacy systems can be integrated with each other and with future systems. Since the regional architecture is so dependent on the inventory of what exists and what is planned for the region, the definition of a regional architecture begins with an inventory of the existing and future systems that will be deployed. These systems together provide the advanced transportation services that will be offered in the COATS region. These systems, and the stakeholders who are responsible for their operation and maintenance, are the heart of the regional architecture.

A high-level stakeholder list and a system inventory by major ITS stakeholder area is presented in the following Table 3-2. Each stakeholder group is mapped to the corresponding National ITS Architecture entity. A list of systems for each stakeholder group is also tabulated. Where possible, the mapping is maintained at a high level, mapping general categories of agencies (e.g., State Departments of Transportation) to corresponding elements in the National ITS Architecture. This level of abstraction allows the regional architecture to be more easily maintained and understood. It also highlights the common interfaces and requirements that are shared by stakeholders in the region.

In general, it is better to define a few general interfaces that accommodate the range of regional implementations rather than specifying a unique architecture connection for each physical interface that may be implemented. The objective is to identify the major classes of systems and system interfaces in the region.

For purposes of discussion, the COATS architecture is organized at three levels:

- the COATS region as a whole;
- three subregional architectures – southern Oregon, north central California, and the northern California coast; and
- the early winner project architecture, focused on Siskiyou Pass.

The subregional systems include city, county and state dispatch centers for departments of transportation or public works, operations and maintenance, regional traffic control centers, law enforcement, fire and rescue, emergency management, 911 emergency communication centers, hazardous materials (HAZMAT), and emergency medical services. In the COATS region there are also specific local stakeholders in the subregions. For example, in the coastal areas, the U.S. Coast Guard may be the lead agency in emergency management, and in northern California, the California Department of Forestry is a lead agency in fire emergency management. Other regional systems include ITS infrastructure for Commercial Vehicle Operations (CVO) such as weigh-in-motion, Oregon's Green Light weight station preclearance system, and other

Table 3-2: A High-Level Stakeholder List by Major ITS Stakeholder Area.

Stakeholder Groups	Architecture Groups	Systems
Law Enforcement • Highway Patrol • State Police • County Sheriffs • City Police	Emergency Management	• Law Enforcement Dispatch Systems • 911 Communication Centers • Emergency Coordinators
Emergency Services • Fire/Rescue • Ambulance – Emergency Medical Services • Hospitals/Clinics • HAZMAT • Towing	Emergency Management	• Emergency Operations • Fire District Dispatch • Emergency Medical Dispatch
	Emergency Vehicle	
Depts of Transportation • State: Operations and Maintenance • City: Operations and Maintenance • Traffic/Transportation Management Centers • Transportation Operation Centers	Traffic Management	• Traffic Management Centers • Advanced Rural Technology Integration Centers • Transportation Operations Centers
	Roadway: Construction and Maintenance	• Dispatch Centers
Planning Agencies • Regional Transp. Planning Agencies • Metropolitan Planning Organizations • Bureau of Land Management • U.S. Forest Service • Bureau of Indian Affairs	Information Service Users	• Visitor Information Services
Parks and Recreation • National Parks • State Parks • City and County • Recreation Areas (ski resorts, summer resorts)	Information Service Providers and Users	• Visitor Information Services • Traveler Information Resources
Tourism • State and Local Visitor Centers	Information Service Providers and Users	• Visitor Information Services • Traveler Information Resources
Trucking • California Trucking Association • Green Light • HELP	Commercial Vehicle Operations	• Carrier Dispatch • Green Light • IRP Clearinghouse • IFTA Clearinghouse
Motorists • AAA • Insurance Agencies	Information Service Providers and Users	• Mayday Systems • Vehicle Information Systems • Vehicle Safety Systems
Public Transportation • Local bus: Fixed route, school bus • Demand Responsive Service (HHS, DoED seniors) • TDM: Rideshare, Shuttles • Inter-City (over-the-road coaches) • AMTRAK • Regional Air Carriers • Parking Management	Transit Management	• Transit Dispatch
	Transit Vehicle	• Vehicle Information Systems • Vehicle Safety Systems
	Transit Operator	• Transit Dispatch
	Multimodal Service Provider	• Traveler Information Resources
Media • Radio, Television • CCTV, Internet, Newspaper	Media	• TV and Radio Stations
	Information Provider	• Traveler Information Resources

credentialing systems. The Commercial Vehicle Operations along the Interstate 5 corridor are part of another major ITS initiative covering several western states and therefore are not covered in this project[1]. There are a number of major tourist destinations in the COATS region, including State and National Parks and Monuments as well as several scenic byways. The Visitor Information Services and Traveler Information Resources systems meet the needs of the stakeholders associated with planning agencies, parks and recreation organizations, tourism, public transportation, and the media. A number of systems are associated with public transportation services including fixed-route, demand-responsive, inter-city and intermodal transportation services. These systems include: transit dispatch, vehicle information systems, vehicle safety systems, as well as traveler information resources. In the future, the motorists in the COATS region will also have several systems available, including Mayday systems, vehicle information systems and vehicle safety systems.

3.2 Define Regional Needs and Challenges

There were five work products and associated activities that were used as a basis for defining the regional needs and challenges. These include the Legacy Systems Report, Conditions and Performance Report, the Project Infrastructure Report, Traveler Needs Survey as well as the outreach workshops (Figure 3-3). A short summary of each of these activities is provided below.

3.2.1 Legacy Systems Report

The Legacy Systems Report (3) summarizes existing transportation systems and planned transportation improvements within the COATS region and includes them in GIS maps. The term "legacy" includes not only existing transportation systems, projects and programs, but also those systems which, at the time of publication, were not yet built but were planned and had committed funding.

The three main steps in developing the Legacy Systems Report were to: 1) make contacts and gather information regarding legacy systems, 2) review and organize information and 3) tabulate and geographically map important transportation systems/solutions. Information collected from project participants and stakeholders was organized into two main categories: advanced technology-related projects, programs and improvements, and traditional projects, programs and improvements. The traditional projects, programs, and improvements were divided into three categories: highway, intermodal, and commercial vehicle operations. The appendices in the Technical Memorandum contain the organized data from the surveys and personal interviews. Maps were formed using this information to show the geographic locations of these technologies.

Information contained in this report cannot, by itself, be used to make recommendations regarding the implementation of ITS-related projects and programs. Rather, this information was gathered to document previous and future efforts to avoid duplication of programs or projects.

[1] There is a placeholder for the CVO-related architecture in the COATS architecture. See Section 4.4 for more detail.

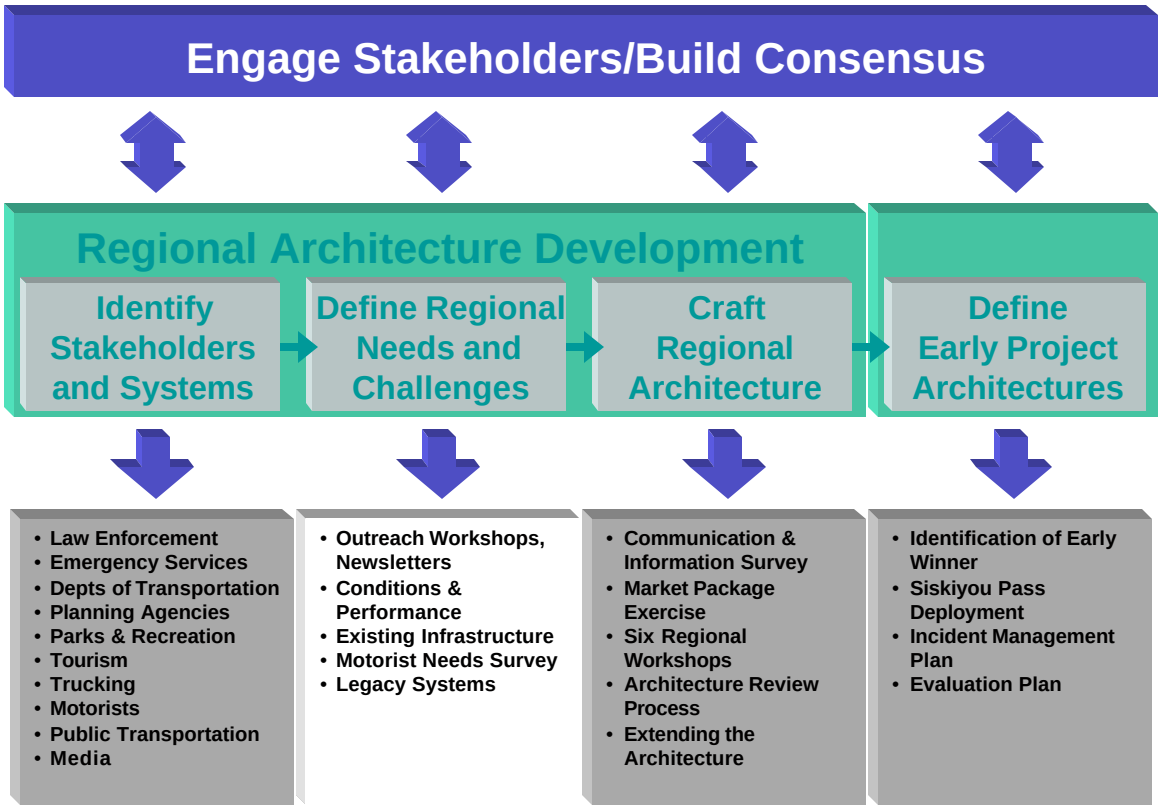

Figure 3-3: Defining Regional Needs and Challenges.

3.2.2 Conditions and Performance Report

The Conditions and Performance Report, which in combination with the Legacy Systems Report comprises Technical Memorandum One, identifies and defines potential transportation challenges within the COATS study area (4). The report provides an overview of the major transportation challenges in the region, and identifies a geographic area of focus for each of the challenges. These challenges include safety problems, congestion, freight movement, incident response, mobility, tourism, environmental impacts and deteriorating infrastructure.

3.2.3 Traveler Needs Survey

A traveler needs survey was conducted as an early task in the COATS project (5, 6). The specific objectives of the survey were to determine:

- what information the rural traveler needs and wants,
- the medium through which information would be presented to the traveler, and
- where the traveler would want this information presented.

The survey's purpose was to identify and investigate the transportation and information needs of motorists in northern California and southern Oregon[2]. In addition, the survey investigated traveler acceptance of ITS applications and new user services throughout the study area. The results, along with other information, allow decisions to be made as to what technologies could be applied to the roadway or in surrounding areas to help disseminate information to the traveler. Understanding the information needs of travelers, as well as their willingness to use new ITS-related systems, was one of the objectives of the COATS project.

3.2.4 Project Infrastructure Report

The purpose of the Project Infrastructure Report was to propose a list of potential advanced technology infrastructure enhancements that can be implemented in the COATS study area (7). The report considered input from organizations within the project limits responsible for transportation, enforcement, tourism, commercial vehicle operations, transit and fleet management, and incorporated their needs in order to prioritize infrastructure, early winner projects and ultimately strategic deployment. The report details the potential ITS infrastructure elements within the project limits. For each infrastructure element, this report provides:

- a description of the proposed ITS technology,
- a list of objectives that the technology attempts to address,
- location selection criteria,
- maps of potential locations, and
- an appendix detailing locations of recommended deployment shown on the maps.

Potential infrastructure elements were identified based on the qualitative (e.g. stakeholder input) and quantitative (3, 4) challenges identified in other project tasks.

To ensure that locations for infrastructure have the greatest potential benefit, many of the criteria used to find locations are based on previously identified challenges. The locations were occasionally modified to reflect stakeholder and steering committee input on problem areas.

3.2.5 Outreach Workshops

Through the outreach workshop sessions, stakeholders provided information for Caltrans, ODOT and WTI that was helpful in validating regional transportation needs. WTI analyzed this information in order to develop rural ITS early winner project candidates (8). ITS applications selected for demonstration are those identified in the COATS effort as the most viable ITS candidates for early deployment.

The stakeholders were divided into groups based on their area of interest. The groups that were formed focused on Safety and Emergency Services, Travel and Tourism, Operations and Maintenance, or Commercial Vehicle Operations. The groups were asked to list the challenges that they perceived existed in their area. Based upon these challenges, the stakeholders were asked to list the opportunities that they felt existed to remedy the various problems.

[2] The project team did not look at the needs of travelers who use other modes, such as rail or inter-city bus. Trying to reach travelers of other modes was beyond the resources and scope of the study.

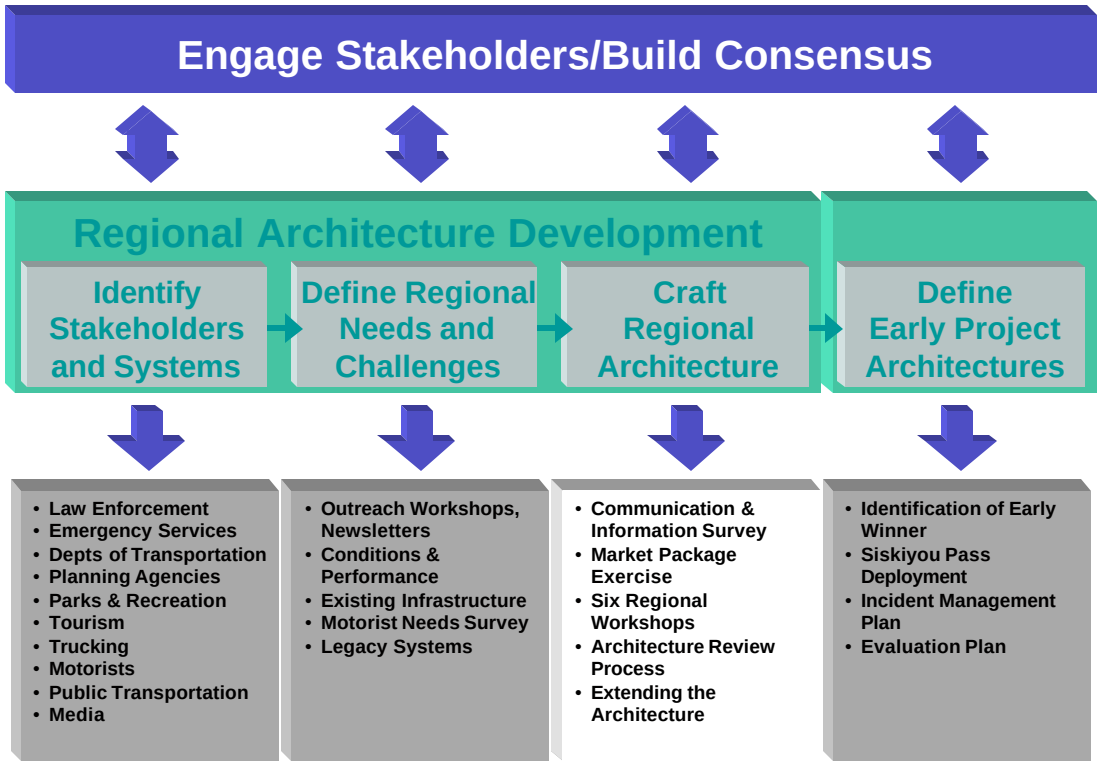

Figure 3-4: Crafting the COATS Regional Architecture.

3.3 Crafting the Architecture

The crafting of the regional architecture involved three major activities, as shown in Figure 3-4: the Market Package Exercise, the Communication and Information Survey, and the six regional architecture workshops. These activities were conducted after the identification of stakeholders and systems and the definition of regional needs and challenges.

3.3.1 COATS Market Packages

The National ITS Architecture defines 65 market packages that represent a range of potential ITS implementations that address specific transportation challenges. "Broadcast Traveler Information," "Road Weather Information Systems," and "Transit Vehicle Tracking" are examples of the market packages that have been defined. The market packages combine this service-oriented view of ITS with a detailed identification of the pieces of the National ITS Architecture that are required to implement these services. For instance, the "Broadcast Traveler Information" market package identifies the pieces of the architecture that collect traveler information and broadcast this information, and the devices used by the travelers to receive these broadcasts. This combination of service-oriented and architecture-oriented views makes the market packages a useful entry point to the National ITS Architecture definition. They provide an accessible, service-oriented view of the potential for ITS that can be used to build consensus on what needs to be done in a region. This service-oriented view is easily converted into a more

technical architecture view because of the connectivity between market packages and architecture definition. The market packages are used in this chapter as a convenient way to define the transportation services that the COATS Regional Architecture will provide.

Members of the Steering Committee reviewed the market packages identified in the National ITS Architecture and selected a set of priority market packages that best address the COATS regional challenges. Table 3-3 lists all of the market packages, indicating which packages were prioritized by Steering Committee members. The data compiled in the table are from COATS Steering Committee members, where "O" refers to Oregon respondents, "C" refers to California respondents, and "O/C" refers to respondents from both Oregon and California. As can be seen, there was substantial agreement between the two states' respondents.

Responses to this Market Package Exercise were tabulated in order to develop a priority listing of the market packages, as shown in Table 3-4. Higher rankings indicate that a market package has greater applicability for the COATS region than other market packages. Steering Committee members from both Oregon and California were in agreement on the priority ranking of the market packages.

From the information provided by the stakeholders, a comparison was made between the feedback given from the various methods of data collection. The methods included the Traveler Needs Survey, the Market Package Exercise, the Project Infrastructure Report, as well as the stakeholder workshops. The result of this comparison is summarized in Table 3-5. The table consists of the ITS opportunities that surfaced from the various exercises conducted.

The opportunities were assigned a score of importance with respect to the other opportunities that were considered, with lower numbers indicating a higher priority. The rankings varied according to the methods of the exercise. The Traveler Needs Survey results were easily quantified based on the averages of the survey responses. The Market Package Exercise also allowed for an absolute ranking based on the score that each market package received. The stakeholder outreach, however, was not scored so the ranking of the opportunities was not easily achievable. The items were assigned either a ranking of 1 or 2 depending on whether a particular opportunity was recognized by at least three of the four workshops.

3.3.2 Communication & Information Survey

In October 1999, a survey was distributed to key stakeholders in the COATS region to identify their existing and desired information exchange activities with other organizations. (The survey form is included as Appendix A.) The survey was intended to have responding organizations identify:

- how they currently receive and provide various types of transportation information, and
- how they would like to receive and provide these types of information in the future.

Respondents were asked to list organizations and/or technologies along with their associated communication methods for each of several types of transportation-related

Table 3-3: Market Package Responses.

National ITS Architecture Designation	COATS Regional Stakeholder Groups O = Oregon Stakeholder Respondents C = California Stakeholder Respondents O/C = Both Oregon and California Stakeholder Respondents	Law Enforcement and Emergency Services	Transportation Agencies	Planning Agencies	Tourism	Trucking	Public Transportation
APTS1	Transit Vehicle Tracking		O/C				C
APTS2	Transit Fixed-Route Operations		C				C
APTS3	Demand Response Transit Operations		O				O/C
APTS4	Transit Passenger and Fare Management		C				
APTS5	Transit Security		O				C
APTS6	Transit Maintenance		O				O/C
APTS7	Multi-modal Coordination						C
APTS8	Transit Traveler Information		C				C
ATIS1	Broadcast Traveler Information	C	O/C	O/C	O/C	C	O
ATIS2	Interactive Traveler Information	C	O/C		O/C		O/C
ATIS3	Autonomous Route Guidance		C				C
ATIS4	Dynamic Route Guidance	O					
ATIS5	ISP Based Route Guidance						
ATIS6	Integrated Transportation Management/Route Guidance	C					C
ATIS7	Yellow Pages and Reservation		C		O/C		
ATIS8	Dynamic Ridesharing	O	O/C		O/C		O/C
ATIS9	In Vehicle Signing		O				C
ATMS1	Network Surveillance		O/C				C
ATMS2	Probe Surveillance		O/C	O/C		C	
ATMS3	Surface Street Control		O				
ATMS4	Freeway Control		O				
ATMS5	HOV Lane Management						
ATMS6	Traffic Information Dissemination		O/C	O/C	O/C	C	C
ATMS7	Regional Traffic Control		O/C	O/C			
ATMS8	Incident Management System	O	O/C	O/C	O/C		
ATMS9	Traffic Prediction and Demand Management						
ATMS10	Electronic Toll Collection						
ATMS11	Emissions Monitoring and Management						
ATMS12	Virtual TMC and Smart Probe Data		O/C				
ATMS13	Standard Railroad Grade Crossing		C				
ATMS14	Advanced Railroad Grade Crossing						
ATMS15	Railroad Operations Coordination						
ATMS16	Parking Facility Management		C				
ATMS17	Reversible Lane Management						
ATMS18	Road Weather Information System	O/C	O/C	O	O	C	O/C
AVSS1	Vehicle Safety Monitoring	O					
AVSS2	Driver Safety Monitoring	O					
AVSS3	Longitudinal Safety Warning	O					C
AVSS4	Lateral Safety Warning	O					C
AVSS5	Intersection Safety Warning	O/C	O				

Table 3-3: Market Package Responses (cont.).

National ITS Architecture Designation	COATS Regional Stakeholder Groups O = Oregon Stakeholder Respondents C = California Stakeholder Respondents O/C = Both Oregon and California Stakeholder Respondents	Law Enforcement and Emergency Services	Transportation Agencies	Planning Agencies	Tourism	Trucking	Public Transportation
AVSS6	Pre-Crash Restraint Deployment						
AVSS7	Driver Visibility Improvement	O					C
AVSS8	Advanced Vehicle Longitudinal Control	O					
AVSS9	Advanced Vehicle Lateral Control						
AVSS10	Intersection Collision Avoidance		O				
AVSS11	Automated Highway System						
CVO1	Fleet Administration		C				C
CVO2	Freight Administration		O/C				
CVO3	Electronic Clearance	O	O/C	O/C		O/C	O
CVO4	CV Administrative Processes	O	O/C				
CVO5	International Border Electronic Clearance						
CVO6	Weigh-In-Motion	O	O/C	O/C		O/C	
CVO7	Roadside CVO Safety	O	O/C				
CVO8	On-board CVO Safety	O					
CVO9	CVO Fleet Maintenance	O	C				C
CVO10	HAZMAT Management	O	O/C				
EM1	Emergency Response	O/C	O/C				C
EM2	Emergency Routing	O	O/C			C	C
EM3	Mayday Support	O/C	O/C	O/C			C
ITS1	ITS Planning		O/C				
ARTS1	Animal/Vehicle Collision Countermeasures	O/C	C				
ARTS2	Emergency Vehicle Maintenance						
ARTS3	Dynamic Warning Systems	O/C	O/C				C
ARTS4	Safe Speed Advisory	O	O/C		O/C		
ARTS5	Mobile Traffic Management/Enforcement	O	O/C				C

Table 3-4: Priority Listing of COATS Market Packages.

NSA Nos.		NSA Market Package Title	Priority	NSA Nos.		NSA Market Package Title	Priority
35	atms18	Road Weather Information Systems	16	61	arts1	Anim./Veh. Crash Countermeasures	8
9	atis1	Broadcast Traveler Information	15	63	arts3	Dynamic Warning Systems	8
23	atms06	Traffic Information Dissemination	13	18	atms01	Network Surveillance	7
25	atms08	Incident Management System	10	19	atms02	Probe Surveillance	7
59	em3	Mayday Support	10	1	apts1	Transit Vehicle Tracking	7
64	arts4	Safe Speed Advisory	10	65	arts5	Mobile Traffic Mgmt/Enforcement	7
10	atis2	Interactive Traveler Information	9	29	atms12	Virtual TMC and Smart Probe Data	6
49	cvo03	Electronic Clearance	9	56	cvo10	HAZMAT Management	5
57	em1	Emergency Response	9	58	em2	Emergency Routing	5
52	cvo06	Weigh-In-Motion	8	60	its1	ITS Planning	5

Legend: NSA Nos. = National System Architecture Market Package Identification Numbers. Higher priority numbers indicate higher priority.

Table 3-5: Comparison of ITS Technology Rankings.

	Traveler Needs Survey	*Market Package Exercise*	*Stakeholder Outreach*	*Steering Committee*
1-800 Travel Advisory Telephone	5		2	10
1-800 Reporting Telephone	2		2	
Call Boxes			2	11
Cellular Phone Coverage	6			
Variable Message Signs	4		1	9
Automated Flood Warning				6
Dynamic Warning VMS	1	6		7
Automated Visibility Warning				12
Safe Speed Advisory		4		
Animal Vehicle Collision Warning		6		
In-Vehicle Device for Low Visibility	7			
In-Vehicle Device for Accident Avoidance	8			
In-Vehicle Control			2	
In-Vehicle Mayday Device			2	
In-Vehicle Traveler information	12			
Incident Management System		5		1
Emergency Response		5		
HAZMAT On Board Mayday			1	
Mayday Support		4		
Road Weather Information System		1	1	2
Broadcast Traveler Information		2		
Highway Advisory Radio	3		1	3
Tourist Radio Channel	9			
Advisory Television			2	8
Closed Circuit Television			2	4
Traffic Information		3	2	
Interactive Traveler Information		5		
Kiosks	10		1	5
Locally Televised Traveler Information	11			
Smart Cards - Tourist Behavior			2	
Regional Internet Server / Web Site			1	
Education			1	
Electronic Clearance		6		
Automated Enforcement - Cameras			2	
Weigh-in-Motion		7		
Probe Surveillance		7		
Network Surveillance		7		
Mobile Traffic Management/Enforcement		7		
Regional Transportation Planning			2	

numbers represent ranking of importance (low number = high importance)

information. The survey was distributed to dozens of organizations in both California and Oregon, representing a broad mix of stakeholders.

In reviewing survey responses, it was evident that these would not be adequate by themselves to develop a regional architecture. One problem was that the response rate was lower than what would be appropriate for developing a comprehensive regional architecture: of 216 surveys mailed out, there were 72 responses, representing a 33 percent response rate. Moreover, among the surveys that were received, some were incomplete, and others were vague in defining technologies and/or organizations. Follow-up telephone calls to selected stakeholders identified by the Steering Committee and Regional Teams improved the quality of the data received, such that the responses yielded a helpful starting point for understanding the communications and information needs of stakeholders in the COATS region.

3.3.3 Regional Workshops

A series of six architecture workshops was held in order to build upon the results gathered in the Communication and Information Survey. Workshop sites and dates are shown in Table 3-6. The purpose of these workshops was twofold:

- to confirm information flows and stakeholders identified in the survey, and
- to identify missing information flows and stakeholders.

Table 3-6: Architecture Workshop Locations.

Location	Date
Coos Bay, Oregon	March 1, 2000
Klamath Falls, Oregon	March 22, 2000
Redding, California	April 10, 2000
Eureka, California	April 11, 2000
Ukiah, California	April 13, 2000
Medford, Oregon	April 24, 2000

This is largely parallel to the information that was requested in the survey. It was felt that the workshops would improve upon the results of the survey in two primary ways. First, the workshops would attract stakeholders who did not receive or respond to the survey. Second, by assembling participants from a broad cross-section of transportation, law enforcement, transit, emergency management and response, tourism and other organizations, the workshops could spawn discussion that would help to identify information needs not originally considered. Invitations for each workshop were extended by standard mail to stakeholders identified by Caltrans and ODOT staff. A list of stakeholders in attendance at each workshop is provided as Appendix B.

The workshop format consisted of an educational component as well as a discussion component. The educational and outreach segment was necessary in part because these workshops represented the first COATS meetings in two of the cities, Klamath Falls and Ukiah. It was also necessary because many workshop participants had little or no familiarity with the COATS project or ITS before the workshop. This segment of the workshop consisted of a series of presentations discussing needs and challenges identified in the COATS study area, as well as how ITS may be used to address those challenges.

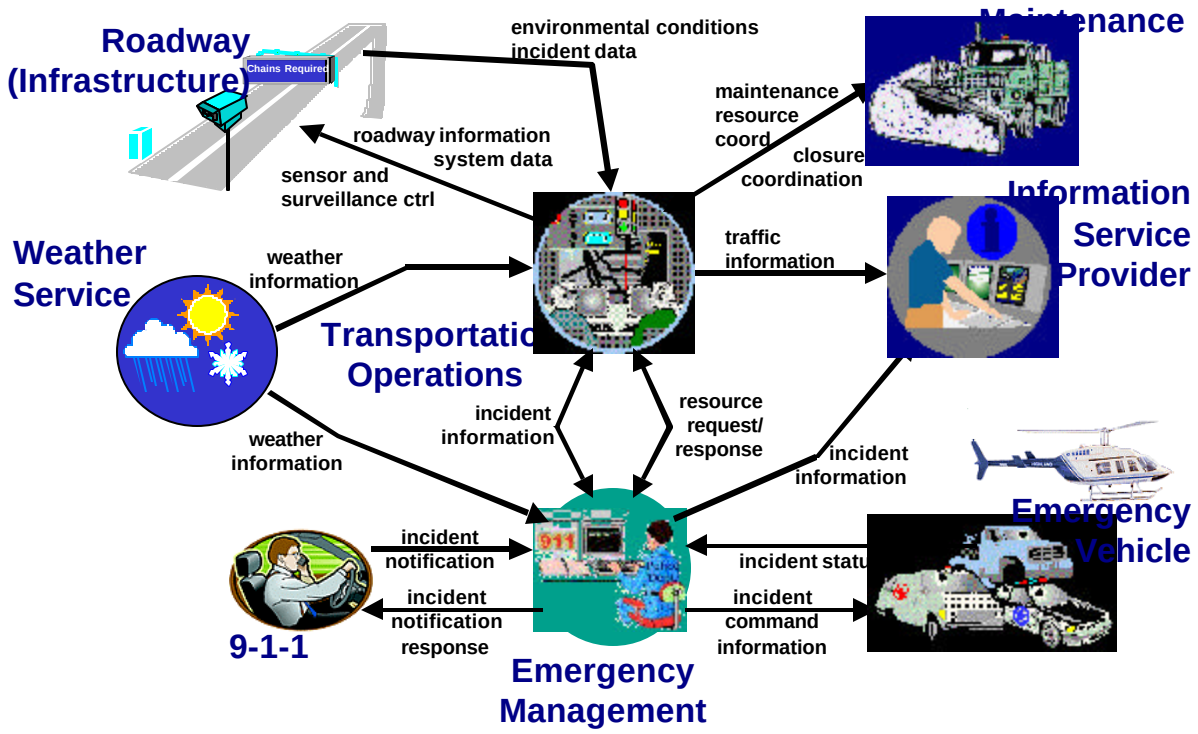

Figure 3-5: Non-Planned Event Scenario.

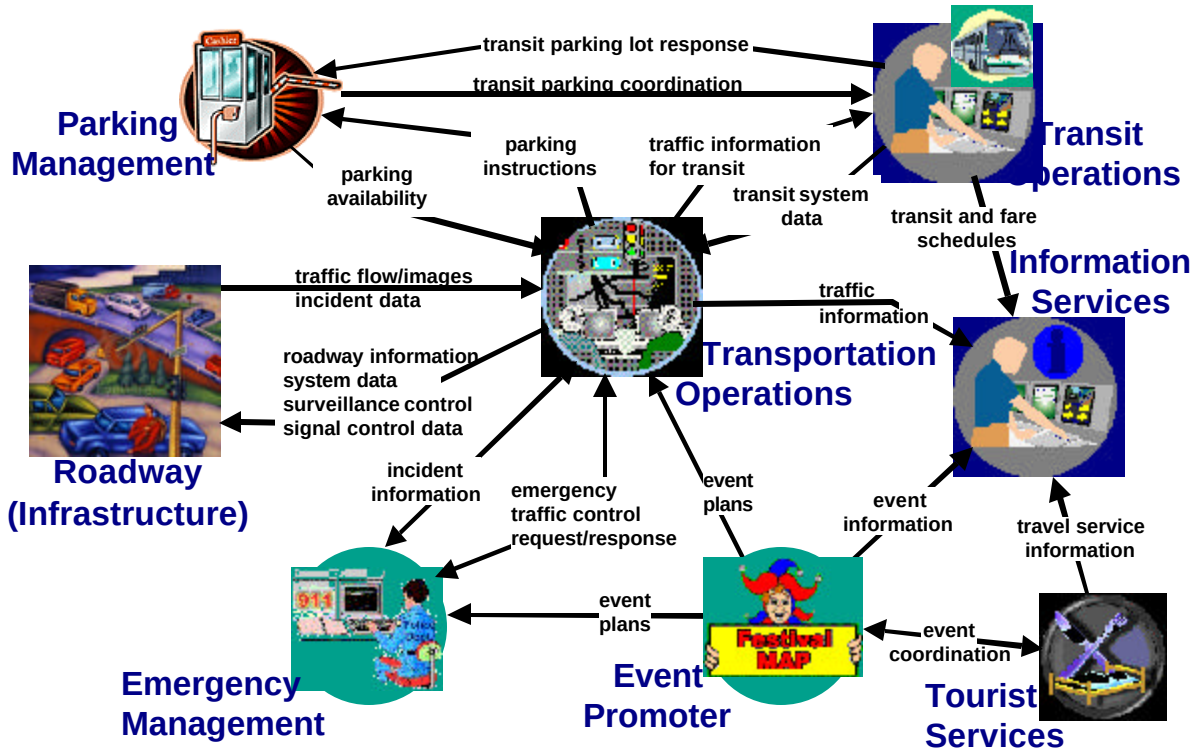

Figure 3-6: Planned Event Scenario.

To guide the discussion, two scenarios – a non-planned event (such as a weather-related traffic incident) and a planned event (such as a summer festival) – were presented (Figures 3-5 and 3-6). The purpose of the scenarios was to provide a real-world, tangible setting to assist stakeholders in assessing their communication and information needs. For each scenario, a vision was presented based on subsystems from the National ITS Architecture, presenting how organizations could work together to keep travelers informed and to collect operational data. After presenting the vision, a moderated discussion sought to identify each organization's informational needs and their organization's informational availability. In addition to generating information useful in compiling a regional architecture, these discussions served to open or improve communications channels between organizations that often do not sit in the same room.

Subsequent to this, a list of stakeholders identified through previous outreach and research efforts was presented to workshop attendees for their review. Stakeholders were organized according to the National ITS Architecture's nineteen subsystems. This review helped to ensure that all pertinent parties were accounted for in the development of the regional architecture.

The educational and outreach benefit of these six workshops is difficult to assess, although it was clear that both the understanding and interest level of stakeholders in the COATS project increased as a direct result of the workshops. Some of the primary benefits of these workshops for completing the regional architecture include the following.

- It brought a sharper focus on the local impacts of regional needs and challenges that had been identified through earlier COATS work tasks.
- It confirmed that data obtained through the communication and information survey was reliable and essentially complete.
- It demonstrated that a highly detailed regional architecture would be difficult to obtain without significant additional time and resources, due to the multiplicity of local organizations, especially for law enforcement, emergency response and planning.

3.3.4 Architecture Review Process

The initial draft architecture was based strictly on the National ITS Architecture and did not provide any customization based on regional needs. A draft architecture was complete by June 2000 and presented to the Steering Committee for review and comment. It was hoped that the review process would help to identify missing stakeholders and subsystems, and to add or delete information data flows as necessary.

ODOT conducted internal review of many subsystems with which it had some operational familiarity. WTI conducted two outreach workshops for Caltrans staff – one in Redding and one in Eureka – to assist in a similar review process. Additional feedback was received from one Steering Committee member.

3.3.5 Extending the Architecture

As a result of the review process, it was determined that significant extensions to the National ITS Architecture would be required in order for it to most completely reflect actual information exchange relationships between various subsystems. In mapping existing and future systems to the National ITS Architecture, it was found that there were several systems for which no adequate architecture counterpart has yet been defined at a national level. This has occurred because the National ITS Architecture has been designed to function around traditionally urban ITS deployments. The National ITS Architecture therefore places less emphasis on roadway maintenance and weather, which are among the primary concerns of COATS stakeholders. Table 3-7 lists the extensions to the National ITS Architecture that were deemed necessary to appropriately define the COATS Regional Architecture.

Table 3-7: COATS Entity Extensions to National ITS Architecture.

Name	Description	Class	Type
Maintenance Dispatch Office	This is a center which serves to coordinate maintenance vehicles for planned and non-planned maintenance activities. The center will help to coordinate actions between different vehicles in order to effectively clear incidents, perform winter maintenance, and manage traffic control.	Center	System
Maintenance Vehicles	These are vehicles used by maintenance personnel in performing their work activities. They will include some sort of voice communications system to a central dispatch center, and will typically have means of communicating with other maintenance vehicles. Some maintenance vehicles may have the capability of communicating with emergency response personnel via CB radio. Maintenance vehicles may be equipped with automatic vehicle location technology for dispatching and tracking purposes.	Vehicle	System
Other Maintenance Dispatch Office	Representing another maintenance dispatch office, this subsystem is intended to provide a source and destination for ITS data flows between peer (e.g. inter-regional) maintenance dispatch functions. It enables maintenance activities to be coordinated across different jurisdictional areas.	Center	System
Other Maintenance Vehicles	These are vehicles used by maintenance personnel in performing their work activities that may not, on a particular action, communicate directly with the maintenance dispatch office. These vehicles will maintain the capability of communicating with the dispatch center, but this is not shown in order to preserve simplicity.	Vehicle	System
Permitting Office	This office provides various external parties with access to highway right-of-way through a permitting process. It is responsible for processing the paperwork associated with permit requests and disseminating this information to local districts.	Center	System
Public Information Office	This entity provides relevant travel information to local broadcast and print media through telephone, fax or e-mail. Information provided is typically near real-time, such as extended road closures, or planned, such as construction projects.	Center	System

In addition to these additional subsystems, several extensions to the National ITS Architecture were required in order to define all required information data flows. These are indicated in Table 3-8. In some cases, these information data flows are already included in the National ITS Architecture, but have different subsystems identified for the source and destination of the information flow. In other cases, completely new information data flows were identified, often with some of the subsystems with which the COATS Regional Architecture was extended.

Table 3-8: COATS Flow Extensions to National ITS Architecture.

Flow Name	Description	From	To
construction activity status	Information about impending construction projects coordinated at a statewide level and distributed to districts.	Construction and Maintenance	Maintenance Dispatch Office**
incident data*	Data and imagery from the roadside supporting incident detection and verification.	Roadway Subsystem	Emergency Management
		Roadway Subsystem	Maintenance Dispatch Office**
incident information*	Notification of existence of incident and expected severity, location, time and nature of incident.	Maintenance Dispatch Office**	Information Service Provider
		Traffic Management	Information Service Provider
incident response vehicle coordination	Communication between vehicles involved in emergency or incident response activities. This communication is essential to reducing the impact of incidents, especially road closures, on travelers. It may require several different communication media, as this will typically span over many jurisdictional lines.	Emergency Vehicle Subsystem	Emergency Vehicle Subsystem
		Emergency Vehicle Subsystem	Maintenance Vehicles**
		Maintenance Vehicles**	Emergency Vehicle Subsystem
localized weather information	Select weather information (e.g. wind, precipitation, humidity, temperature, etc.) that may be used to active a local weather warning system. The information is transmitted between a field-based weather data station and a collocated traveler advisory system.	Weather Service	Weather Warning Systems**
maintenance activity coordination	Information communicated from the maintenance dispatch center to maintenance vehicles to coordinate maintenance activities. This could include information about locations of activities, resource deployment status, and any actions which should be taken.	Maintenance Dispatch Office**	Maintenance Vehicles**
maintenance activity information	Information about non-planned and planned road conditions that may affect travel conditions, including construction-related lane closures and detours, and weather-related events.	Maintenance Dispatch Office**	Information Service Provider

* - Existing flow in National ITS Architecture with different source and/or destination
** - Architecture extension

Table 3-8: COATS Flow Extensions to National ITS Architecture (cont.).

Flow Name	Description	From	To
maintenance activity status	Any communication sent from maintenance vehicles back to the maintenance dispatch office. This would include information about the current status of the action, expected duration of an action, and the need for additional resources.	Maintenance Vehicles**	Maintenance Dispatch Office**
maintenance dispatch office coordination	Information communicated between different maintenance dispatch centers regarding locations of critical maintenance actions, like road closures, detours, winter road maintenance, etc.	Maintenance Dispatch Office**	Other Maintenance Dispatch Office**
		Other Maintenance Dispatch Office**	Maintenance Dispatch Office**
maintenance vehicle coordination	Any type of vehicle to vehicle communication between maintenance vehicles.	Maintenance Vehicles**	Other Maintenance Vehicles**
		Other Maintenance Vehicles**	Maintenance Vehicles**
maintenance vehicle location	Information transmitted from maintenance vehicles to the maintenance dispatch office, characterizing the vehicle's location.	Maintenance Vehicles**	Maintenance Dispatch Office**
media information request*	Request from the media for current transportation information.	Media	Public Information Office**
permit request	Information about the date, time and nature of activities permitted on the right-of-way.	Permitting Office**	Traffic Management
permit support request	Information provided to maintenance staff to assist in permits for right-of-way access granted by the permitting agency. This would include date, time and location of requests for infringement of highway right-of-way, along with details about any precautions that maintenance staff should undertake to protect the traveling public, maintenance staff, and those authorized onto the right-of-way, including traffic cones, VMS messages, flaggers, etc.	Permitting Office**	Maintenance Dispatch Office**
permit support request confirmation	Maintenance dispatch offices confirm that information regarding a specific permit request has been understood, and that any maintenance tasks required to protect the traveling public and permittees will be undertaken.	Maintenance Dispatch Office**	Permitting Office**

* - Existing flow in National ITS Architecture with different source and/or destination
** - Architecture extension

Table 3-8: COATS Flow Extensions to National ITS Architecture (cont.).

Flow Name	Description	From	To
road construction information for transit	Information regarding construction activities which may affect transit service, requiring long-term realignment of routes and/or delay to transit users.	Construction and Maintenance	Transit Management
		Traffic Management	Transit Management
seismic conditions	Current seismic conditions as measured by remote sensors and communicated by supporting field equipment.	Roadway Subsystem	Traffic Management
traffic images*	High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.	Roadway Subsystem	Emergency Management
		Roadway Subsystem	Maintenance Dispatch Office**
traffic information for media*	Report of current traffic conditions, incidents, maintenance activities and other traffic-related information prepared for public dissemination through the media.	Public Information Office**	Media
weather information coordination	Information exchange between agencies who are collecting weather-related information, including generalized atmospheric and precipitation conditions, as well as local stream gauge readings.	Traffic Management	Construction and Maintenance
		Traffic Management	Other TM
		Traffic Management	Weather Service
		Weather Service	Traffic Management

* - Existing flow in National ITS Architecture with different source and/or destination
** - Architecture extension

4 THE COATS REGIONAL ARCHITECTURE

It was decided that the recently released Turbo Architecture 1.0 software package, prepared under contract for the U.S. Department of Transportation would be used to facilitate the development of a regional architecture. This software reflects version 3.0 of the National ITS Architecture. It allows the user to develop an inventory of systems and stakeholders, identify applicable market packages, and customize data flows. Of particular value to the COATS project, given the architecture extensions identified earlier, is the program's capacity to extend the national architecture, through adding subsystems and/or information data flows.

The Turbo Architecture database developed for the COATS project has the following characteristics:

- 169 subsystems;
- 17 market packages;
- over 700 architecture interconnects; and
- over 2,100 information data flows.

The COATS Regional Architecture has the following characteristics.

- It *does* focus on the major system and institutional boundaries in the region. This emphasis is because optimal system performance can only be achieved when the overall system works as well at the jurisdictional boundaries as it does everywhere else.

- It *does* address conformance with the National ITS Architecture. The regional architecture is defined to the architecture flow level, which should be adequate to demonstrate conformance with the National ITS Architecture. Note that this regional architecture was developed as part of an overall strategic planning effort. As such, the architecture was not developed in detail comparable to that which might result from a dedicated architecture development effort. The core architecture that was developed can be extended and elaborated by on-going larger-scale statewide architecture efforts.

- It *does* provide a long-term view that can guide ITS planning and project development in the region. Many systems and interfaces that are identified in the regional architecture have not yet been implemented.

- It *does* encourage better cooperation between agencies, by highlighting the ways that they can more effectively use and share data to meet the needs of travelers in the region.

- It *does* include subsystems that may not be used by any of the market packages specified for the COATS study area, such as various CVO-related applications. This recognizes that this architecture be eventually merged with other architectures where these market packages are considered to be more critical.

- It *does not* define the internal design for individual systems in the region, since internal design decisions are better left to the implementing agencies and their contractors.

- It *does not* alter the existing institutional arrangements or the authority of participating agencies. A fundamental requirement of the regional architecture is to operate within the existing institutional framework in the region.

- It *does not* mandate specific technology choices in the region. The regional stakeholders may consider technology agreements, but these extend beyond the fundamentally technology-neutral framework defined by the regional architecture.

Several different depictions of the COATS architecture were developed through Turbo Architecture in the course of this project. The architecture includes high-level "sausage diagram" renderings of the architecture to the architecture flow level presentation that defines hundreds of information flows. The different levels of presentation are each suited to different audiences and applications.

The purpose of this chapter is to present the COATS Regional Architecture in a top-down manner, beginning with a high-level "sausage diagram" that is approachable and familiar, particularly for those with previous exposure to the National ITS Architecture. As the chapter progresses, additional detail is added to this general framework to provide a more detailed description of the systems in the region and a framework for integrating these systems together into a cohesive, scalable transportation network that will cost-effectively meet the needs of the region.

4.1 Defining the Regional Architecture for COATS

The COATS Regional Architecture is a master blueprint for an integrated, multimodal intelligent transportation system. The architecture identifies the major systems in the region and defines the interfaces between these systems. It clarifies how organizations can work together to deliver better safety, efficiency, and convenience to the rural traveler through deployment of ITS improvements.

The regional architecture was developed with participation from many sectors, including transportation, tourism, law enforcement, emergency management, transit and the private sector, that operate and use the transportation systems in the region. These regional partners, through the COATS Steering Committee and Regional Teams, have identified the central requirements for the regional architecture. This collaborative effort will continue as the regional architecture is reviewed, refined and adapted to meet changing needs and evolving preferences in the future.

One of the most striking challenges about the COATS region is that, while it is geographically contiguous, it is intersected by dozens of jurisdictional boundaries. These boundaries reflect the geographic areas of responsibility for many stakeholders in the region. Accordingly, the study area was subdivided into three subregions, as shown in Figure 4-1, to try to reflect these areas of responsibility. These subregions include:

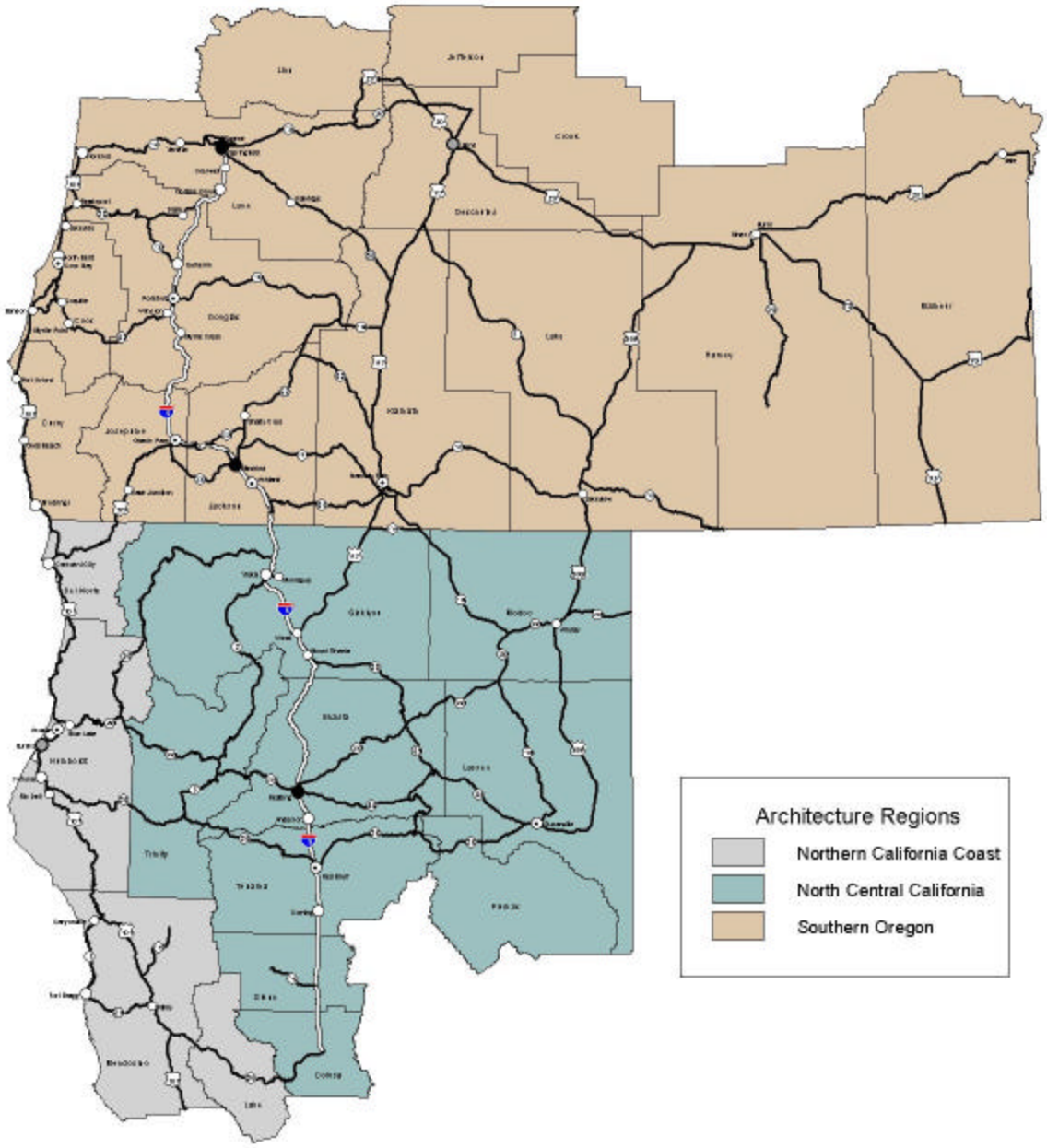

Figure 4-1: COATS Architecture Subregions.

- southern Oregon,
- north central California, and
- northern California coast.

The COATS Regional Architecture spans and integrates these three subregional architectures. More than a simple aggregation, the COATS Regional Architecture also provides an overarching framework for the subregions. This unifying structure works on two levels. First, it identifies common systems and interfaces that are implemented in all subregions (see section

4.2), and second, it provides a plan for interconnecting the subregions where this makes sense (see section 4.3).

4.2 Common Systems and Interfaces

As an initial introduction to the COATS Regional Architecture, the systems in the three subregions can be recast into a "sausage diagram" based on the mapping between regional systems and the National ITS Architecture. The sausage diagram is a mainstay of National ITS Architecture presentations and has been widely adopted as a useful way to present major systems and communications interconnects at the highest level.

Figure 4-2 highlights the elements of the National ITS Architecture sausage diagram that are applicable to the COATS region. The figure shows that most of the subsystems and the majority of the communications interconnects defined in the National ITS Architecture have application in the COATS region. All of these subsystems are included in the current detailed regional architecture definition for the COATS region except for the Toll Administration and Toll Collection subsystems. By correlating the systems in all the COATS subregions with the National ITS Architecture sausage diagram, like systems are grouped together.

The standard National ITS Architecture sausage diagram has a couple of key limitations.

- The standard sausage diagram only shows the 19 subsystems. It does not include, by definition, any extensions to the architecture that are appropriate for a given region. For this reason, Figure 4-2 was amended to include additional subsystems identified through extending the architecture.

- The standard sausage diagram omits the National ITS Architecture terminators, some of which are very important to the COATS Regional Architecture. This limitation was preserved in order to preserve the simplicity of the sausage diagram.

- The sausage diagram also shows a deceptively simple, fully networked communications system that connects every subsystem with every other on a single region-wide backbone. The COATS Regional Architecture does not require such complete connectivity between systems; in fact, a partitioned network that limits access to various systems and assets is important from a practical standpoint.

To address these issues, the high-level regional interconnect diagram in Figure 4-3 can provide a more detailed view of how the systems in each region can be integrated. It shows how the general classes of systems that are implemented in every subregion within COATS are interconnected. It offers a more complete view than the sausage diagram of the types of systems in the region and the potential connectivity between these systems. The general connection strategy is a structure of several sub-networks that are interconnected through defined gateways to improve information sharing across the region without sacrificing the performance, reliability, and security of the most safety-critical portions of the network.

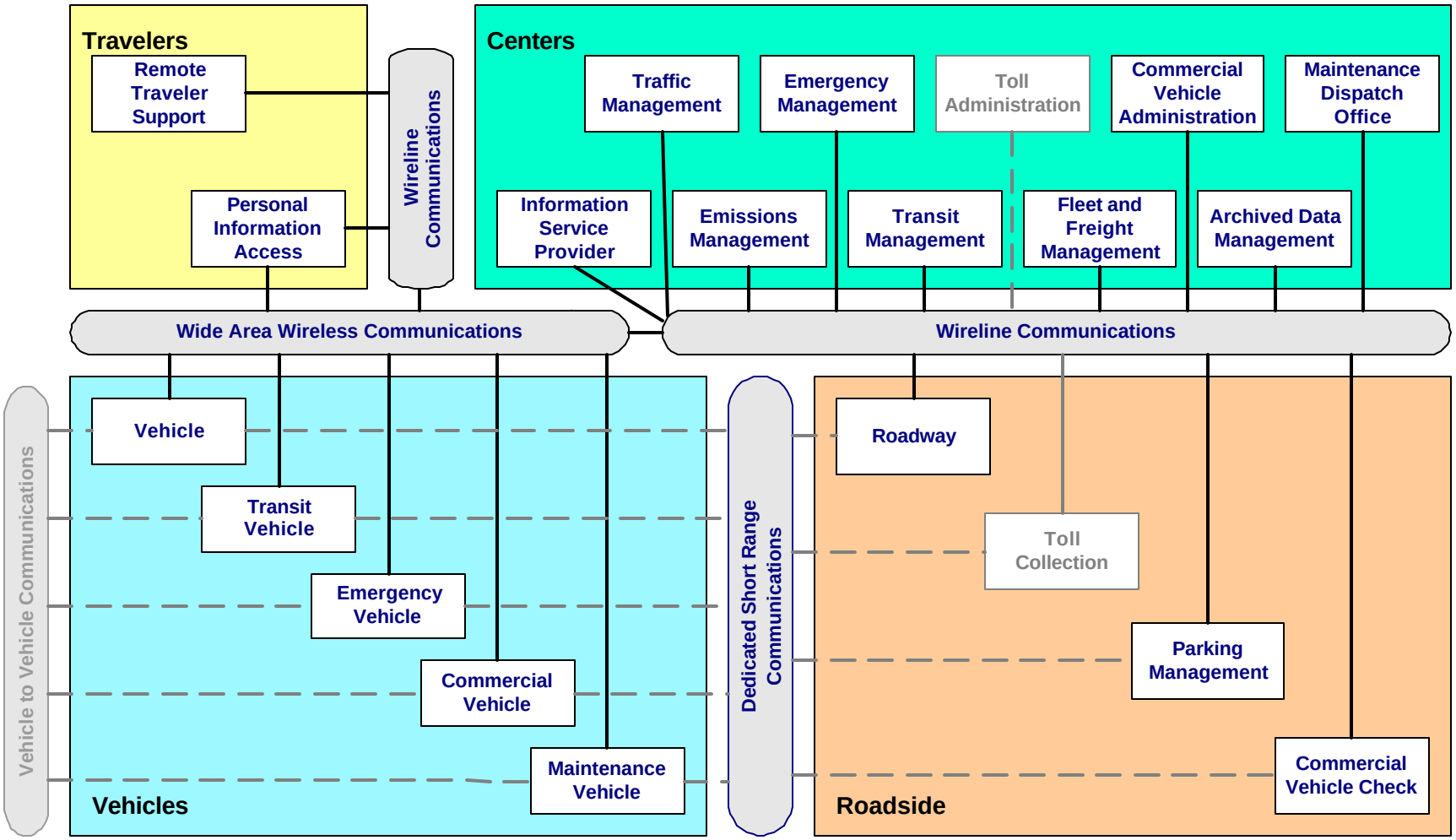

Figure 4-2: Subsystems and Interconnects Applicable to the COATS Region.

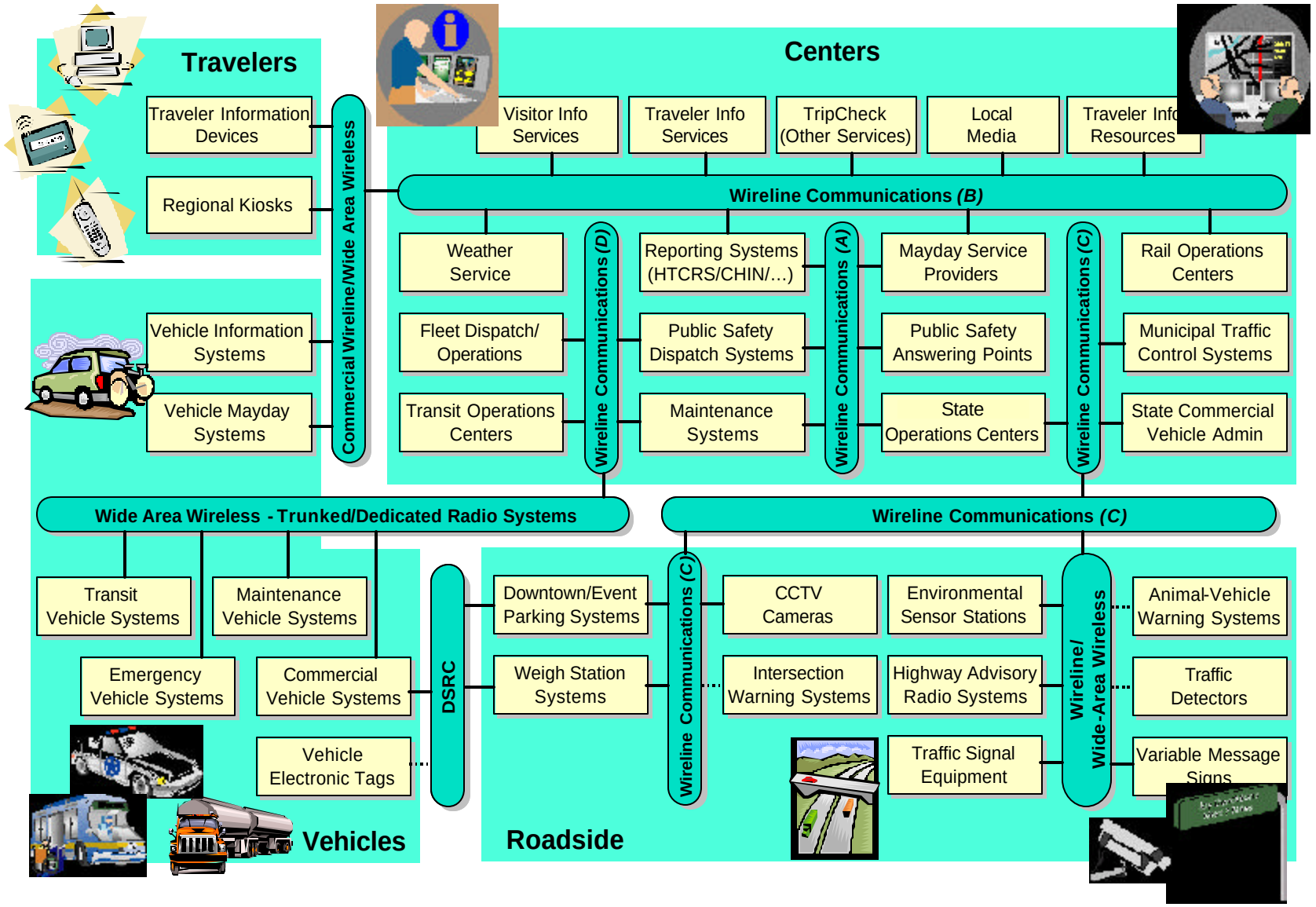

Figure 4-3: COATS Regional Architecture Systems and Interconnects.

Table 4-1: COATS Regional Architecture Interconnect Definitions.

Interconnect	Definition
Commercial Wireline/Wireless Networks	This interconnect represents the communications channels that connect information providers in the COATS region with their customers. A variety of commercial wireline and wireless communications systems can provide these connections today; on-going technical innovation in this dynamic, market-driven area suggest that new communications options will be offered in the future. Beyond accommodating the information services and delivery mechanisms that develop as marketable products for the region and a general endorsement of those services that are supported by open standards, the regional architecture is not prescriptive for this interconnect since it is strongly influenced by larger market forces. The objective is not to constrain the number of systems that are deployed in the region, but to encourage private sector participation by making public domain information available to information service providers and developing clear policies that encourage broad participation in the region. Wireline communications systems that are available in the COATS region include the traditional circuit-switched telephone system (analog today with increasing numbers of higher-speed digital options for the consumer in the future) and cable systems in the larger cities. Perhaps the most relevant wireless media for the region are FM subcarrier and cellular communications in the near term and satellite communications when increasing competition makes this option more affordable.
DSRC	Dedicated Short Range Communications (DSRC) is a short-range airlink used for close-proximity (less than 50-100 feet) transmissions between a mobile user and a base station. This type of interconnect has many applications in ITS wherever location-specific communication with a vehicle is required. The applications for DSRC that are envisioned in the COATS region are initially limited to mainline screening of commercial vehicles at weigh stations. As depicted, the same communications technologies could also be applied to make parking and other traveler/user fee collections more convenient and efficient in the future. The regional architecture suggests that the emerging ITS standards for these interconnects be adopted and applied in the region.
Wide-Area Wireless – Trunked/Dedicated Radio Systems	This wireless infrastructure includes the 800 MHz radio systems, specialized mobile radio systems, and other wide-area wireless infrastructure that enables vehicle fleet communications for public safety, maintenance, commercial vehicle, and transit fleets in the region. While primarily viewed as voice communications systems today, data applications will increasingly be supported by these systems in the future. The regional architecture suggests use of industry standards for these communications where they are available. Emerging Transit Communications Interface Protocol (TCIP) standards should be reviewed for use in the transit fleet communications deployments. Although ITS standards work has not yet been initiated for emergency vehicle fleets, interagency agreements and implementations may be considered to facilitate incident command systems and resource sharing for large incidents which require the involvement of many agencies in the COATS region.

Table 4-1: COATS Regional Architecture Interconnect Definitions (cont.).

Interconnect	Definition
Wireline/Wide-Area Wireless	Often, wireline communications infrastructure is simply not available at likely deployment locations for roadside ITS infrastructure like variable message signs, highway advisory radio, and environmental sensor stations. The cost-effective alternative for relatively low-bandwidth applications is to use wireless communications to support this field equipment. This interconnect represents the radio systems and cellular infrastructure that will cost-effectively support limited bandwidth communications with remote field equipment.
Wireline Communications (A)	Safety-critical incident management communications between public safety, transportation, and other allied agencies is supported by this access-restricted network. Since regional agencies rely on this interconnect to coordinate incident management, this communications system should be reliable, secure, and offer deterministic performance. The regional architecture uses bridge systems like the Highway Travel Conditions Reporting System (HTCRS), the California Highway Information Network (CHIN), and successor highway conditions reporting systems to shield this network from direct traveler information requests and serve as a filter that preserves privacy and security of the communications on the network. Wireless as well as traditional wireline communications links will be used for this interconnect, in order to support communications with command posts, staging areas, and other remote command centers that may be established for larger incidents under unified command systems. The Institute of Electrical and Electronics Engineers (IEEE) Incident Management Message Sets, Institute of Transportation Engineers (ITE) Traffic Management Data Dictionary and External TMC Communications standards are among the key standards that apply to this interconnect that are recommended by the regional architecture.
Wireline Communications (B)	This wireline infrastructure makes current transportation information available to information service providers and other stakeholders who desire real-time transportation information, but do not have the direct operations role that would give them access to Wireline Communications (A). While adequate performance and reliability that is scalable to meet future needs is important here, it is less imperative than with Wireline Communications (A). Only data that has been cleansed to support data privacy principles is made available on this network. In the regional architecture, a service like ODOT's TripCheck is a key source for this traveler information that has been sanitized from the operations version of the same information where necessary. In addition to incident data and other real-time information, this interconnect also makes available more static visitor and traveler information as a resource to information service providers in the region. This interface can be implemented using one or more of the many alternative existing public or private networks that may physically include wireless (e.g. microwave) as well as wireline infrastructure. This interconnect is supported primarily by the Society of Automotive Engineers (SAE) Advanced Traveler Information Systems (ATIS) Data Dictionary and Message Set standards.

Table 4-1: COATS Regional Architecture Interconnect Definitions (cont.).

Interconnect	Definition
Wireline Communications (C)	This wireline infrastructure connects centers with distributed field equipment that is monitored and controlled by the center. Since this interface enables the monitoring and control of field equipment, access to this interface must be restricted to those authorized to control the field equipment. In the COATS region, this interconnect allows the remote monitoring and control of roadside devices including variable message signs, highway advisory radio, closed-circuit television (CCTV) cameras, etc. The same class of communications interconnect integrates commercial vehicle administration centers with weigh stations. This interface can be implemented using any of the alternative existing public or private networks that may physically include wireless (e.g. microwave) as well as wireline infrastructure. Where relatively inexpensive low-bandwidth wireless communications alternatives are an option, the regional architecture explicitly shows a connection from "Wireline Communications (C)" to "Wireline/Wide Area Wireless." This reflects the likely scenario where wireline communications is used to carry message traffic between the center and the transceiver that often is remotely located to achieve the best line of sight and coverage. The National Transportation Communications for ITS Protocol (NTCIP) standards activities have already published a number of standards that address the interface to traffic management field equipment. The regional architecture suggests that these standards be used for future implementations in the region to avoid proprietary alternatives and ultimately achieve economies of scale by using standards in the region that will be broadly adopted across the United States.
Wireline Communications (D)	This wireline infrastructure connects the fleet dispatcher operating at a fixed point with the trunked and/or dedicated radio systems that provide the wireless connection to the vehicle fleet. This may represent a fairly short run to a building-top antenna or more extensive use of public or private wireline networks for access to remotely located transceivers or trunked radio services. The regional architecture levies no specific requirements for these "dispatcher to antenna" links.

Figure 4-3 includes a number of interconnects that are more specific than the four basic interconnects (Wireline, Wide Area Wireless, Dedicated Short Range Communications [DSRC], and Vehicle to Vehicle) defined by the National ITS Architecture. For example, several different "wireline" interconnects are defined to segregate the different applications for fixed point to fixed point communications in the region. This separation is important because different wireline communications applications have different reliability, security, and performance constraints. Each of the interconnects in the graphic are described in more detail in Table 4-1.

4.3 Subregion Interconnects

In the preceding section, a generalized view of the way the systems connect to one another in a COATS subregion was defined. For typical, day-to-day operations, the scope of concern and the breadth of communications connectivity need not expand beyond this generalized subregional view. In order to support broader regional transportation services and to support localized transportation services at subregional boundaries, this section establishes a general plan for connecting the COATS subregions.

There are two major factors that require an overarching layer of communications connectivity between the COATS subregions.

1. There are heavily traveled routes that connect the COATS subregions, such as Interstate 5, US Routes 97, 101, and 199, California Routes 20 and 299. If the COATS architecture is to work as well at these subregional boundaries as it does elsewhere, then the COATS architecture must allow for communications between agencies that manage the transportation system on each side of these subregional boundaries. Perhaps the best of many examples is the Siskiyou Pass section of Interstate 5 that connects the southern Oregon and north central California subregions, the location of the COATS early winner project. To best manage projects that improve transportation efficiency and safety along these connecting routes, the managing agencies in adjacent subregions must be interconnected.

2. There are important services – most notably incident management and traveler information – that require a broader, region-wide view of the transportation system. For incident management, for example, specific region-wide scenarios (as shown in Figures 3-5 and 3-6) were used to derive requirements during the architecture workshops. In order to respond to incidents that have impacts encompassing more than one COATS subregion, information sharing between subregions is important. Today, voice communications are used to support inter-regional coordination of agencies during major incidents. While these voice channels will always exist, they will increasingly be supplemented by data communications in the future. For traveler information, travelers desire to receive information seamlessly without respect to state or county boundaries. This is an area that will require significant data communications to be truly effective.

Figure 4-4 shows the general connections between subregions that have been identified through the COATS project. As shown, the Medford Transportation Operations Center (TOC) and the Eureka and Redding Advanced Rural Technology Integration Centers (ARTIC) have been identified as regional hubs for southern Oregon and northern California, respectively. These operations centers connect to satellite systems in their respective states. This state-level integration allows coordination across subregions within each state. The regional hubs also connect to each other to support communications between transportation agencies in southern Oregon and northern California for coordinating traveler information, large-scale incident management and CVO operations coordination. The specific centers that communicate are ODOT's Medford TOC and Caltrans' Eureka and Redding ARTICs and the California Highway Patrol (CHP) and Oregon State Police (OSP) dispatch centers. These subregional interconnects support safety-critical, operational applications and, as such, should be afforded the same levels of service and reliability as specified for Wireline Communications (A) in the previous section. It should be noted that ODOT and OSP are co-located at the Medford TOC; however, in Redding and Eureka, the ARTICs and the CHP dispatch centers are not co-located.

In addition to these connections between operational centers, the media will also broadcast travel advisories throughout the region. For example, if there is an incident on the Oregon side of the Siskiyou Pass, the incident information is entered and disseminated through ODOT's Web-based TripCheck traveler information system. This information can be picked up by the media,

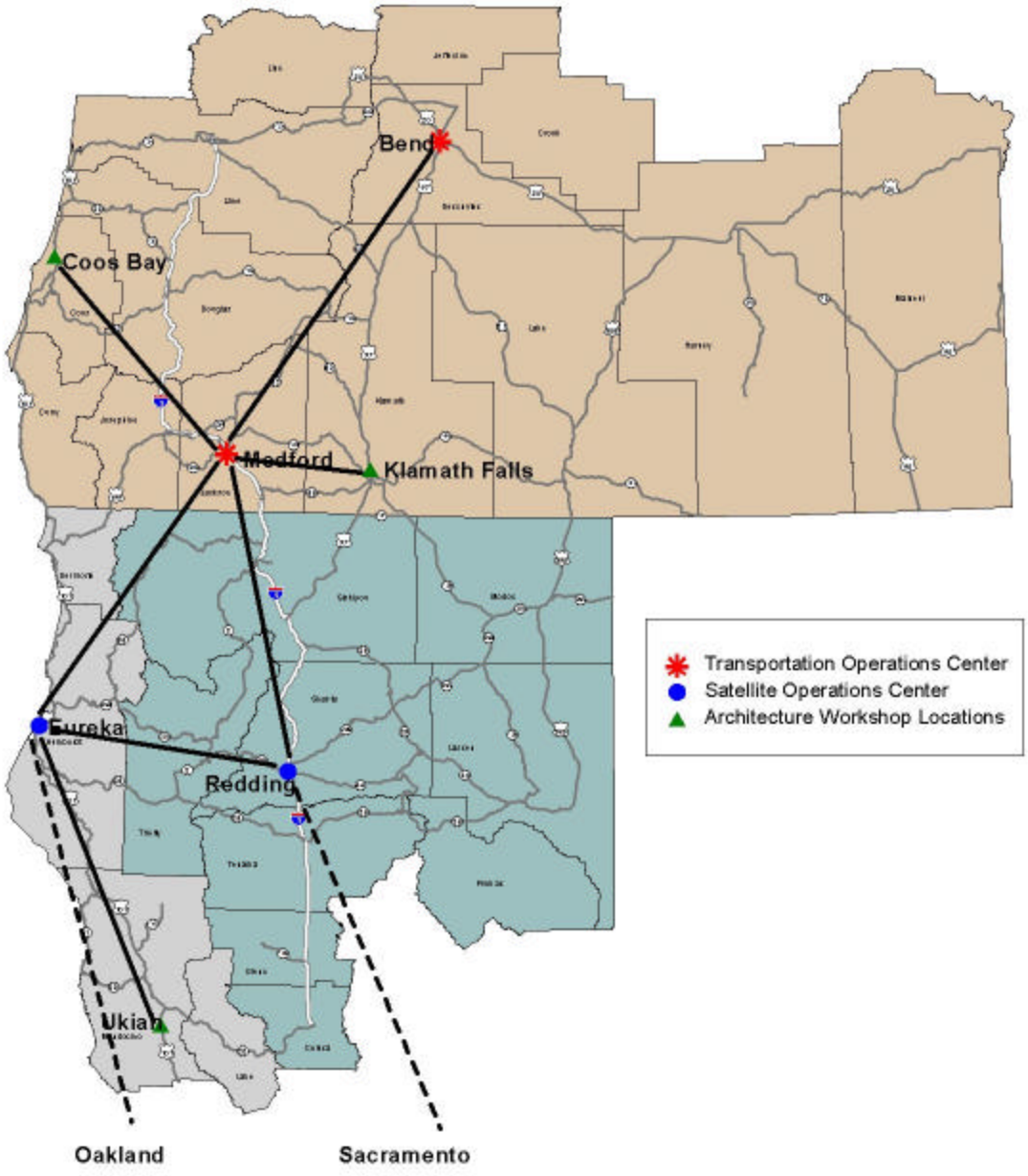

Figure 4-4: COATS Regional Interconnects.

which will broadcast advisories with coverage extending to the southern approaches to the Siskiyou Pass in northern California.

4.4 Subregional Architectures

As was mentioned in the beginning of this chapter, the COATS Regional Architecture was divided into three subregions to better map the unique relationships between stakeholders in each part of the COATS region.

To accommodate this subregional division, the Turbo Architecture database includes one regional architecture (encompassing all of the COATS regional inventory and interface definitions) and three subregional architectures, one for each identified COATS subregion. This allows the COATS architecture to be viewed from an overall regional perspective as well as a subregional perspective. This section provides a detailed definition of each subregional architecture based on products derived from the Turbo Architecture database.

Before moving on to the detailed subregional architecture definitions, a few clarifications are in order.

- Where it makes sense, the COATS ITS inventory was defined as a relatively short list of general classes of systems, rather than as a detailed enumeration of every individual system in this expansive region. For example, instead of enumerating every law enforcement dispatch system in the COATS inventory, more general "Area Police Dispatch" elements were defined, each of which represents more than one specific dispatch system.

  Defining a more general ITS inventory has two benefits. It substantially simplifies the architecture model since detailed interfaces for every specific system (e.g., every municipal police dispatch system) are not required. This facilitates architecture development when detailed input from every system owner in the region is not available, and it increases the likelihood that the model will be maintained in the future since less effort will be required.

  Second, it underscores the fact that all specific systems represented by the more general inventory elements should integrate into the overall COATS architecture in a consistent fashion, using common standards where possible.

  The drawback to generalization is that the specific dispatch system for a particular municipal police department is not individually identified in the inventory. This does not affect the validity or usefulness of the architecture in any substantial way. Furthermore, in further architecture development, the generalization may be relaxed if an individual system has distinctively different interface requirements.

  Even with this generalization, each element definition includes a comprehensive list of the specific systems that are represented by it. This means that every COATS architecture stakeholder should find a general element that represents their system and also find a specific reference to their system in the definition for that element.

- The detailed architecture that is defined in this section should be viewed as "draft" since it has not been subjected to detailed review with the affected stakeholders at this time. During development of this draft architecture, all likely interfaces and architecture flows were retained so that they can be offered as options to stakeholders in future architecture reviews. This approach ensures that the widest array of connectivity options is included in the draft architecture for consideration by stakeholders. Not every option will be retained; many will be deleted during a detailed stakeholder review. This means that the architecture currently includes a superset of the ITS integration opportunities that will ultimately be selected and implemented in the COATS region.

- The COATS architecture inventory includes many elements that are relevant to more than one subregion. In these cases, the inventory element is included in each relevant subregional architecture. This creates some redundancy between the subregional architectures, but this redundancy is necessary to show a complete architecture for each subregion.

- Although they are included as placeholders in the Turbo Architecture database, this report does not include the commercial vehicle-related portions of the COATS architecture. This omission recognizes that the CVO architecture is largely being developed through larger state, multi-state, and national CVO ITS initiatives. The CVO portions of the COATS architecture may be directly accessed using Turbo Architecture software.

- To further focus the architecture presentation, the subregional architectures that are presented isolate those potential systems and interfaces that are relevant to the high priority market packages identified in Chapter 3. This means that the details associated with many ancillary systems (e.g., emissions monitoring in northern California) are not included. These other systems may be added in the future.

An inventory and a detailed set of architecture flow "context diagrams" have been developed for each inventory element. The inventory is included as Appendix C; the context flow diagrams for the region are included as Appendix D.

4.4.1 Southern Oregon

The southern Oregon regional architecture covers the counties of Coos, Curry, Douglas, Jackson, Josephine, Klamath and Lake. Although the following counties are in the COATS region they were not included in the southern Oregon architecture: Crook, Deschutes, Harney, Jefferson, Lane, Linn and Malheur. The major cities included the subregional architecture include Medford, Grants Pass, Roseburg, Klamath Falls, Ashland, Coos Bay, Central Point, North Bend, Florence, Brookings, Reedsport, Coquille, Winston and Lakeview.

The southern Oregon subregion combines the findings of the three architecture workshops in Oregon. This aggregation was determined to be beneficial to concurrent efforts by ODOT to develop a statewide ITS architecture. It was anticipated that the boundary of the COATS architecture on the Oregon side would extend to the boundary of the rest of ODOT's statewide architecture. This results in the following consequences.

- ODOT's Bend and Salem TOCs are treated as terminators in the COATS Regional Architecture – i.e. systems that are outside of the boundary of this architecture. Within the COATS region, the Bend TOC is currently responsible for the southeastern portion of Oregon. It is anticipated that when a TOC is built in eastern Oregon that the Bend TOC's area of responsibility will shift so that it will be responsible for Klamath Falls, which is currently under the jurisdiction of the Medford TOC. The Salem TOC is responsible for only Lane County within the COATS region. It is anticipated that, in both cases, statewide ITS architecture efforts will be able to provide more detailed information about the relationship of these TOCs to other local systems and stakeholders.

- To preserve the local detail gained during the architecture workshops, systems were made less generalized than they were in the California subregions. For example, instead of having a "Southern Oregon City Police Dispatch System," separate police dispatch systems were designated for Coos Bay-area cities, Klamath Falls-area cities, and Medford-area cities.

Table 4-2 lists all identified inventory elements for this subregion as defined in the Turbo Architecture database for COATS. This inventory was reviewed and derived from input received during the COATS architecture workshops in Coos Bay, Medford, and Klamath Falls.

Table 4-2: Southern Oregon Inventory.

Element Name	Status	Description
1-800-977-ODOT	Existing	This toll-free number provides current road conditions from all areas within Oregon by touchtone phone (outside of Oregon, this is available at 503-588-2941). The service is provided by ODOT. This may be superceded by 511 at a later date.
Airline Schedule Operations	Existing	Includes Ascot, Horizon, Skywest, United and other airlines offering regular scheduled passenger service.
Amtrak Schedule Operations	Existing	This is the operational entity that provides static and real-time Amtrak schedule information for the COATS architecture.
COATS Kiosks	Planned	This is a planned system which would provide real-time traveler and tourism information to travelers throughout the COATS region.
Commercial Vehicle (Onboard) Systems	Existing	This subsystem resides in a commercial vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations. The Commercial Vehicle Subsystem provides two-way communications between the commercial vehicle drivers, their fleet managers, and roadside officials, and provides HAZMAT response teams with timely and accurate cargo contents information after a vehicle incident.
Commercial Vehicle Driver	Existing	This terminator represents the human entity that operates vehicles transporting goods including both long haul trucks and local pick up and delivery vans.
Commercial Vehicles	Existing	The actual commercial vehicle along with the special aspects of large commercial vehicles and vehicles designed to carry cargo that extend beyond the characteristics defined for the Basic Vehicle. This terminator thus represents a special type of Basic Vehicle that is used to transport goods or services which are operated by professional drivers, typically administered as part of a larger fleet, and regulated by a Commercial Vehicle Manager.
Coos Bay-Area City Traffic Control Equip	Existing	This includes traffic equipment maintained by the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, and Roseburg.
Coos Bay-Area City Traffic Control Systems	Existing	This includes traffic management activities for the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, Brookings, Port Orford, Gold Beach, Bandon, Myrtle Point, Elkton, Sutherland, Myrtle Creek, and Wells Creek.
Coos Bay-Area County Maintenance Systems	Existing	This includes Coos County, Curry County, Douglas County and Lane County Maintenance Department systems.
Coos Bay-Area E-911 Comm Centers	Existing	This includes the two communications centers each in Coos and Curry Counties.
Coos Bay-Area EMS Provider Dispatch	Existing	This includes the broad range of private EMS, ambulance and air evacuation providers that serve the Coos Bay area, including Bay Cities Ambulance, Coquille Valley Ambulance, Lower Umpqua EMS, Medic 4 Ambulance, Myrtle Point, Curry County EMS, and Del Norte.
Coos Bay-Area EMS Vehicles	Existing	This includes the broad range of private EMS, ambulance and air evacuation vehicles that serve the Coos Bay area, including Bay Cities Ambulance, Coquille Valley Ambulance, Lower Umpqua EMS, Medic 4 Ambulance, Myrtle Point, Curry County EMS, and Del Norte.

Table 4-2: Southern Oregon Inventory (cont.).

Element Name	Status	Description
Coos Bay-Area Fire and Rescue Dispatch	Existing	This includes fire and rescue dispatch centers for Coos Bay, North Bend, Florence, Reedsport, Coquille, Hauser, East Bay, Millington, and Charleston. (The last four cities are volunteer.)
Coos Bay-Area Fire and Rescue Vehicles	Existing	This includes fire and rescue vehicles serving Coos Bay, North Bend, Florence, Reedsport, Coquille, Hauser, East Bay, Millington, and Charleston. (The last four cities are volunteer.)
Coos Bay-Area Paratransit Dispatch	Existing	Includes Curry-Coos County Transit System, Senior Transportation.
Coos Bay-Area Paratransit Vehicles	Existing	Includes Curry-Coos County Transit System, Senior Transportation.
Coos Bay-Area Planning Agencies	Existing	This includes various city and county planning agencies that may have use for archived data, including but not limited to the Umpqua Regional Council of Governments.
Coos Bay-Area Police and Sheriff Dispatch	Existing	This includes the police departments for the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, Brookings, Port Orford, Gold Beach, Bandon, Myrtle Point, Elkton, Sutherland, Myrtle Creek, and Wells Creek. This also includes county sheriffs from Coos, Curry and Douglas Counties, as well as tribal police.
Coos Bay-Area Police and Sheriff Vehicles	Existing	This includes law enforcement vehicles for the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, Brookings, Port Orford, Gold Beach, Bandon, Myrtle Point, Elkton, Sutherland, Myrtle Creek, and Wells Creek. This also includes county sheriffs from Coos, Curry and Douglas Counties, as well as tribal police.
Coos Bay-Area Radio Stations and Newspapers	Existing	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the radio and print media intended for human, rather than system, processing and interpretation.
Coos Bay-Area Towing/Recovery	Existing	This includes the private tow dispatch systems that clear incidents in the Coos Bay area. This includes numerous individual operators that serve in the region.
Coos Bay-Area Traveler Information Resources	Existing	This includes Parks and Recreation Departments for the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, and Roseburg; the Bureau of Land Management; U.S. Forest Service; Oregon Parks & Recreation; Coos County Bikeway Committee; Coos County and Curry County Parks; Bandon Dunes Recreational Area; as well as area hotels, restaurants, gas stations, shopping, etc.
Coos Bay-Area Visitor Information Services	Existing	This includes City Chambers of Commerce, Central Oregon Coast Association, Southern Oregon Visitors Association, Oregon Tourism Commission, Oregon Lodging Association, and Coos Bay-North Bend Tourism Promotion Bureau.
CVO Inspector	Existing	This terminator represents the human entities who perform regulatory inspection of Commercial Vehicles in the field. CVO Inspectors support the roadside inspection, weighing, and checking of credentials either through automated preclearance or manual methods.

Table 4-2: Southern Oregon Inventory (cont.).

Element Name	Status	Description
DEQ Medford Regional Office	Existing	DEQ is responsible for protecting and enhancing Oregon's water and air quality, for cleaning up spills and releases of hazardous materials, and for managing the proper disposal of solid and hazardous wastes. DEQ operates a vehicle inspection program in the Rogue Valley to make sure cars are maintained properly to reduce emissions.
Downtown Parking District	Existing	This district covers the downtown Klamath Falls area.
Drivers	Existing	This terminator represents the human entity that operates a licensed vehicle on the roadway. Included are operators of private, Transit, Commercial, and Emergency vehicles where the data being sent or received is not particular to the type of vehicle. Thus this external originates driver requests and receives driver information that reflects the interactions which might be useful to all drivers, regardless of vehicle classification.
Green Light Admin System	Existing	The Green Light program equips trucks with small pager-like devices called transponders. Transponders allow trucks to identify themselves while they're weighed at high speed by sensors and scales in the highway. A truck equipped with a Green Light transponder can go past an Oregon weigh station at normal cruising speed, instead of pulling off the highway and lining up to weigh at static scales.
Highway Travel Conditions Reporting System	Existing	This is an ODOT-run interface in which information about road closures, construction activities and traffic incidents can be entered. The database is accessible in a variety of formats, including a Web-based format (TripCheck) and an 800-number.
IFTA Clearinghouse	Existing	This is a national clearinghouse designed to allocate fuel taxes between multiple states for motor carrier activities across jurisdictional lines, in accordance with the International Fuel Tax Agreement.
Inter-City Transit	Existing	This includes dispatch systems for Amtrak ThruWay Bus, Coastline Enterprises, Greyhound, North Coast Railroad and Porter Stage Lines.
Inter-City Transit Vehicles	Existing	This includes transit vehicles for Amtrak ThruWay Bus, Coastline Enterprises, Greyhound, and Porter Stage Lines.
Klamath Falls-Area City Traffic Control Equip	Existing	This includes traffic control equipment owned and operated by the cities of Klamath Falls and Lakeview.
Klamath Falls-Area City Traffic Control Systems	Existing	This includes the traffic control systems operated by the cities of Klamath Falls and Lakeview.
Klamath Falls-Area County Maintenance	Existing	This includes the maintenance systems (road maintenance, snow removal, etc.) operated in Klamath and Lake Counties.
Klamath Falls-Area E-911 Comm Centers	Existing	This represents the public safety answering point for Klamath County that receives 911 calls.
Klamath Falls-Area EMS Provider Dispatch	Existing	This includes the broad range of private EMS, ambulance and air evacuation providers that serve the Klamath Falls area, including Klamath County Emergency Services.

Table 4-2: Southern Oregon Inventory (cont.).

Element Name	Status	Description
Klamath Falls-Area EMS Vehicles	Existing	This includes the broad range of private EMS, ambulance and air evacuation vehicles that serve the Klamath Falls area, including Klamath County Emergency Services.
Klamath Falls-Area Fire Dispatch	Existing	This includes Klamath County, Lake County and Keno Rural Fire Districts.
Klamath Falls-Area Fire Vehicles	Existing	This includes Klamath County, Lake County and Keno Rural Fire Districts.
Klamath Falls-Area Fixed Route Dispatch	Existing	This includes all fixed-route transit systems serving the greater Klamath Falls area, including Basin Transit Service Transportation District.
Klamath Falls-Area Fixed Route Vehicles	Existing	This includes transit vehicles operating on fixed-route transit systems in the greater Klamath Falls area, including Basin Transit Service Transportation District.
Klamath Falls-Area Paratransit Dispatch	Existing	This includes Red Ball Stage Lines Transit Dispatch Operations.
Klamath Falls-Area Paratransit Vehicles	Existing	This includes Red Ball Stage Lines Transit.
Klamath Falls-Area Planning Agencies	Existing	This includes city and county planning agencies that may use data archived from ITS.
Klamath Falls-Area Police and Sheriff Dispatch	Existing	This includes the cities of Klamath Falls and Lakeview. This also includes county sheriffs' dispatch operations in Klamath County and Lake County.
Klamath Falls-Area Police and Sheriff Vehicles	Existing	This includes law enforcement vehicles for the cities of Klamath Falls and Lakeview, and for county sheriffs in Klamath and Lake Counties.
Klamath Falls-Area Towing/Recovery	Existing	This includes the private tow dispatch systems that clear incidents in the Klamath Falls area. This includes numerous individual operators that serve in the region.
Klamath Falls-Area Traveler Information Resources	Existing	This includes Collier State Park, Crater Lake National Park, Klamath Falls Parks & Recreation, Kla-Mo-Ya Casino, Lava Beds National Monument, Running Y Ranch, and Winema National Forest. It also includes area hotels, restaurants, gas stations, shopping, etc.
Klamath Falls-Area TV, Radio Stations and Newspapers	Existing	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the analog TV, radio and print media intended for human, rather than system, processing and interpretation.
Klamath Falls-Area Visitor Information Services	Existing	This includes Klamath County Department of Tourism, Klamath Falls Chamber of Commerce, and Lakeview Chamber of Commerce.
Mayday Service Provider	Existing	Service centers that provide Mayday and other special concierge services for their clients. These centers will typically be outside the COATS region, but will interact with local agencies when their client's have an emergency in the region. Current examples of this system include the service centers operated by GM (OnStar), ATX Technologies (Ford and others), and AAA.

Table 4-2: Southern Oregon Inventory (cont.).

Element Name	Status	Description
MCMIS	Existing	MCMIS contains information on the safety fitness of commercial motor carriers and hazardous material shippers subject to the Federal Motor Carrier Safety Regulations and the Hazardous Materials Regulations. This information is available to the general public through the MCMIS Data Dissemination Program.
Medford-Area City Traffic Control Equip	Existing	This includes field equipment for the cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston.
Medford-Area City Traffic Control Systems	Existing	This includes traffic control systems for the cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston that are owned and operated by the respective Public Works Departments for each city.
Medford-Area County Maintenance Systems	Existing	This includes the highway maintenance systems for Douglas County, Jackson County, and Josephine County.
Medford-Area E-911 Comm Centers	Existing	This includes public safety answering points for the greater Medford area, including Douglas Co. 911 Comm Center, Jackson Co. 911 Comm Center, Josephine Co. 911 Comm Center, Myrtle Creek Comm Center, Medford Comm Center, Ashland Comm Center, and Southern Oregon Regional Communications Center.
Medford-Area EMS Provider Dispatch	Existing	This includes Douglas County Emergency Services, Jackson County Emergency Management, Josephine County Emergency Services, Mercy Flights and Pacific Flights.
Medford-Area EMS Vehicles	Existing	This includes vehicles operated by Douglas County Emergency Services, Jackson County Emergency Management, Josephine County Emergency Services, Mercy Flights and Pacific Flights.
Medford-Area Fire/Rescue Dispatch	Existing	This includes the Fire/Rescue Dispatch Operations in the Medford region including county fire districts (Douglas, Jackson, and Josephine County) and municipal fire departments (Cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, Winston, and Wolf Creek).
Medford-Area Fire/Rescue Vehicles	Existing	This includes the Fire/Rescue vehicles in the Medford region including those owned by county fire districts (Douglas, Jackson, and Josephine County) and municipal fire departments (Cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, Winston, and Wolf Creek).
Medford-Area Fixed Route Dispatch	Existing	This includes all fixed-route transit systems serving the greater Medford area, including Rogue Valley Transportation District and Roseburg Transit.
Medford-Area Fixed Route Vehicles	Existing	This includes transit vehicles operating on fixed-route transit systems in the greater Medford area, including Rogue Valley Transportation District and Roseburg Transit.
Medford-Area Paratransit Dispatch	Existing	This includes private shuttle services (e.g., Airport Transit) and public services (Southern Oregon Transportation) that provide door-to-door transit services in the Medford area.
Medford-Area Paratransit Vehicles	Existing	This includes private shuttle services (e.g., Airport Transit) and public services (Southern Oregon Transportation) that provide door-to-door transit services in the Medford area.

Table 4-2: Southern Oregon Inventory (cont.).

Element Name	Status	Description
Medford-Area Planning Agencies	Existing	This includes various city and county planning agencies that may have use for archived data, including but not limited to the Rogue Valley Council of Governments.
Medford-Area Police and Sheriff Dispatch	Existing	This includes the local police department dispatch systems operating in the cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston. This also includes county sheriffs for Jackson and Josephine Counties.
Medford-Area Police and Sheriff Vehicles	Existing	This includes law enforcement vehicles serving the cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston. This also includes county sheriff vehicles for Jackson and Josephine Counties.
Medford-Area Towing/Recovery	Existing	This includes the private tow dispatch systems that clear incidents in the Medford area. This includes numerous individual operators that serve in the region.
Medford-Area Traveler Information Resources	Existing	This includes the State Parks and Recreation Department, parks and recreation departments for Douglas County, Jackson County, and Josephine County, the City Parks and Recreation areas for the cities in the region (Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston), Oregon Caves National Monument, Shakespeare Festival, Britt Festival, and Seven Feathers Casino. It also includes area hotels, restaurants, gas stations, shopping, etc.
Medford-Area TV and Radio Stations	Existing	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the analog TV, radio and print media intended for human, rather than system, processing and interpretation.
Medford-Area Visitor Centers	Existing	This includes visitor centers in Medford and Ashland.
Medford-Area Visitor Information Services	Existing	This includes the systems operated by Oregon Tourism Commission, Chambers of Commerce and other organizations that provide tourist information for the local region.
Motor Carrier Dispatch and Back Office Systems	Existing	These provide the capability for commercial drivers and dispatchers to receive real-time routing information and access databases containing vehicle and cargo locations as well as carrier, vehicle, cargo, and driver information.
ODOT Bend TOC	Existing	This center is at the periphery of the COATS region. It provides traffic control capabilities for the ODOT-operated facilities in eastern Oregon.
ODOT Communications Division	Existing	The Communications Division produces and/or oversees ODOT's internal and external communications, including the agency's Internet site. It has offices located in each of ODOT's five regions to provide information to local news media outlets.
ODOT Field Equip (Medford TOC)	Existing	This includes the environmental sensors, variable message signs, HAR, signals, traffic detectors, and any other field equipment and instrumentation operated by ODOT Region 3.
ODOT Maintenance Districts (Medford TOC)	Existing	Covers the resource management and dispatch systems operated by ODOT maintenance districts in Coos Bay, Roseburg, Medford and Klamath Falls.

Table 4-2: Southern Oregon Inventory (cont.).

Element Name	Status	Description
ODOT Maintenance Vehicles (Medford TOC)	Existing	These ODOT vehicles are responsible for maintenance activities, including setting up road closures, assisting in incident removal, and performing winter maintenance. It is assumed that there is seamless communication between the vehicle and its driver, who will actually be directing and performing the maintenance activity.
ODOT Medford TOC	Existing	The ODOT Transportation Operations Center in Medford plays a central role in the COATS architecture. It connects to centers in Bend and Salem and Caltrans centers in Eureka and Redding.
ODOT RWIS Server	Existing	This is a central, statewide server which collects data from each of the state's regional RWIS servers.
ODOT Salem TOC	Existing	This center is at the periphery of the COATS region. It provides traffic control capabilities for the ODOT-operated facilities in the Lane, Linn and Marion Counties portion of the COATS region.
ODOT Statewide Planning	Existing	This includes all divisions within ODOT that will use archived data.
ODOT Weather Warning System	Existing	These are driver advisory systems which are activated based on certain meteorological conditions or thresholds (e.g. high wind, icy bridge, etc.). They process information provided by a localized weather station and provide a warning to motorists when specified conditions arise.
Oregon Weigh Stations	Existing	These are locations where commercial vehicles may be weighed and inspected.
OSP Dispatch	Existing	The Oregon State Police operates several dispatch/communications centers in southern Oregon, all of which operate on a common computer-aided dispatch system for tracking call and response activities. These are often collocated with ODOT facilities for improved incident management, although ODOT and OSP staff will have differing roles in incident management.
OSP Vehicles	Existing	Oregon State Police vehicles.
Other Weather Data	Existing	This terminator refers to weather information received from the National Weather Service or state agencies which also have weather-related information. This could include fully equipped weather stations, isolated stream gauges, or other similar technologies.
SAFER	Existing	SAFER provides carrier, vehicle, and driver safety and credential information to fixed and mobile roadside inspection stations. This information will allow the roadside inspector to select vehicles and/or drivers for inspection based on the number of prior carrier inspections, as well as carrier, vehicle, and driver safety and credential historical information.
SOVA Kiosks	Existing	These kiosks will be upgraded to be Web-based with potential access to TripCheck and other traveler information services in the Southern Oregon region.
Transit Users	Existing	This terminator represents the human entities using Public Transit vehicles. They may be in the act of embarking or debarking the vehicles and are thus sensed for the purpose of determining passenger loading and fares, or on the vehicles and able to request and receive information.

Table 4-2: Southern Oregon Inventory (cont.).

Element Name	Status	Description
Traveler Information Devices	Planned	These are personal devices which may be used to access real-time transportation information.
Travelers	Existing	This terminator represents any individual (human) who uses transportation services. At the time that data is passed to or from the terminator the individual is neither a driver, pedestrian, or transit user. This means that the data provided is that for pre-trip planning or multi-modal personal guidance and includes their requests for assistance in an emergency. Subsequent to receipt of pre-trip information, a Traveler may become a vehicle driver, passenger, transit user, or pedestrian.
TripCheck	Existing	TripCheck is the latest version of ODOT's travel information Internet Web site. Its goal is to provide the best travel information possible in a way that is easy to access. TripCheck uses maps extensively, providing users with a convenient interface and a fast way to navigate the site. It includes roadway incident maps, camera images, RWIS information, and other features.
Vehicle Information Systems	Existing	These are devices installed in passenger vehicles that support access to digital traveler information. A wide range of evolving technologies are available.
Vehicle Mayday Systems	Existing	These are devices installed in passenger vehicles that provide Mayday services to the vehicle occupants. In many cases, these systems are integrated with Vehicle Information Systems (see related Inventory entry).
Vehicles	Existing	This terminator represents the basic vehicle platform that interfaces with and hosts ITS electronics. The Basic Vehicle terminator provides an interface to drive train, driver convenience and entertainment systems, and other non-ITS electronics on-board the vehicle. This interface allows general vehicle systems (e.g., the stereo speaker system) to be shared by ITS and non-ITS systems. It also allows monitoring and control of the vehicle platform for advanced vehicle control system applications.
Virtual Transit Mall	Planned	This is a Web-based service that will coordinate Oregon's 200-plus transit providers in order to offer: greater access to transit information, statewide trip planning, improved connections between providers, and enhanced transit planning data.

4.4.2 North Central California

The north central California regional architecture covers Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties. This includes the cities of Redding, Susanville, Red Bluff, Anderson, Yreka, Willows, Corning, Orland, Mount Shasta, Alturas and Weed. Table 4-3 lists all identified inventory elements for this subregion as defined in the Turbo Architecture database. This inventory was reviewed and derived from input received during the COATS architecture workshop in Redding.

Table 4-3: North Central California Inventory.

Element Name	Status	Description
1-800-427-ROAD	Existing	This is a toll-free number run by Caltrans which provides current road conditions information. This may be superceded by 511 at a later date.
Airline Schedule Operations	Existing	Includes Ascot, Horizon, Skywest, United and other airlines offering regular scheduled passenger service.
Amtrak Schedule Operations	Existing	This is the operational entity that provides static and real-time Amtrak schedule information for the COATS architecture.
California Highway Information Web Page	Existing	This interactive Web-based service (http://www.dot.ca.gov/hq/roadinfo) provides key road construction, detour and closure information based on user-specified route numbers.
California Weigh Stations	Existing	These are locations where commercial vehicles may be weighed and inspected.
Caltrans District 2 Public Affairs	Existing	This office is responsible for communicating with local media all news regarding key Caltrans activities in District 2. It may be used to disseminate information about road closures, ongoing construction projects, and other activities that may affect highway travel.
Caltrans Field Equip District 2 (Redding)	Existing	This includes the environmental sensors, variable message signs, HAR, signals, traffic detectors, and any other field equipment and instrumentation operated by Caltrans District 2.
Caltrans HQ Construction Program	Existing	This program is responsible for implementing the state's highway construction program. It will provide information to local districts about future construction projects as they are introduced.
Caltrans HQ Permits	Existing	The Encroachment Permits department is a part of the office of development services within Caltrans' Traffic Operations program. As the responsible department for protecting the public's investment in the State highway system, the permits office reviews all requests from utility companies, developers, volunteers, nonprofit organizations, etc., desiring to conduct various activities within the right of way. Such activities could include for example: construction of highway improvements, driveway installation and maintenance, highway landscaping and graffiti removal, commercial filming, special events such as parades commemorating an event, e.g. Independence Day.
Caltrans HQ Traffic	Existing	This office is responsible for coordinating the state's transportation management centers, facilitating data exchange and interoperability. It will also serve as a repository for field data collected at districts across the state.
Caltrans Maintenance District 2 (Redding)	Existing	Covers the resource management and dispatch systems operated by Caltrans District 2.
Caltrans Maintenance District 2 (Redding) Vehicles	Existing	These Caltrans vehicles are responsible for maintenance activities, including setting up road closures, assisting in incident removal, and performing winter maintenance. It is assumed that there is seamless communication between the vehicle and its driver, who will actually be directing and performing the maintenance activity.

Table 4-3: North Central California Inventory (cont.).

Element Name	Status	Description
Caltrans RWIS	Existing	These are RWIS stations maintained by Caltrans for providing information on atmospheric and pavement temperature conditions at remote sites. Information from these sites is helpful for maintenance officials in making maintenance decisions.
Caltrans Weather Warning Systems	Existing	These are driver advisory systems which are activated based on certain meteorological conditions or thresholds (e.g. high wind, icy bridge, etc.). They process information provided by a localized weather station and provide a warning to motorists when specified conditions arise.
Caltrans/CHP Redding ARTIC	Existing	This ARTIC (Advanced Rural Technology Integration Center) coordinates transportation operations for north central California, serving Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties. It is a Tier 3 Satellite Operation Center which is connected to the Sacramento TMC.
Caltrans/CHP Sacramento Regional TMC	Existing	This Tier 1 TMC is tied to Tier 2 (Urban) TMCs in Stockton and Fresno and Tier 3 Satellite Operation Centers in Redding and Kingvale
CHIN	Existing	The California Highway Information Network provides daily adverse travel conditions information. Information is made available to telephone and Internet.
CHP Northern District Dispatch and 911 Centers	Existing	This placeholder includes the Redding, Susanville and Yreka dispatch centers. These centers are responsible for CHP offices in Alturas, Cottonwood, Mt. Shasta, Quincy, Redding, Red Bluff, Susanville, Trinity River, and Yreka, as well as Dunsmuir Grade Inspection Facility.
CHP Vehicles	Existing	California Highway Patrol vehicles.
COATS Kiosks	Planned	This is a planned system which would provide real-time traveler and tourism information to travelers throughout the COATS region.
Commercial Vehicle (Onboard) Systems	Existing	This subsystem resides in a commercial vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations. The Commercial Vehicle Subsystem provides two-way communications between the commercial vehicle drivers, their fleet managers, and roadside officials, and provides HAZMAT response teams with timely and accurate cargo contents information after a vehicle incident.
Commercial Vehicle Driver	Existing	This terminator represents the human entity that operates vehicles transporting goods including both long haul trucks and local pick up and delivery vans.
Commercial Vehicles	Existing	The actual commercial vehicle along with the special aspects of large commercial vehicles and vehicles designed to carry cargo that extend beyond the characteristics defined for the Basic Vehicle. This terminator thus represents a special type of Basic Vehicle that is used to transport goods or services which are operated by professional drivers, typically administered as part of a larger fleet, and regulated by a Commercial Vehicle Manager.

Table 4-3: North Central California Inventory (cont.).

Element Name	Status	Description
CVO Inspector	Existing	This terminator represents the human entities who perform regulatory inspection of Commercial Vehicles in the field. CVO Inspectors support the roadside inspection, weighing, and checking of credentials either through automated preclearance or manual methods.
Drivers	Existing	This terminator represents the human entity that operates a licensed vehicle on the roadway. Included are operators of private, Transit, Commercial, and Emergency vehicles where the data being sent or received is not particular to the type of vehicle. Thus this external originates driver requests and receives driver information that reflects the interactions which might be useful to all drivers, regardless of vehicle classification.
HELP	Existing	HELP (Heavy Vehicle Electronic License Plate, Inc.), is a non-profit partnership between motor carriers and government agencies (including Caltrans) whose mission is to develop and deploy advanced technology systems to create a cooperative operating and regulatory environment which improves the efficient and safe movement of commercial vehicles and the performance of highway systems.
Inter-City Transit	Existing	This includes dispatch systems for Amtrak ThruWay Bus, Coastline Enterprises, Greyhound, North Coast Railroad and Porter Stage Lines.
Inter-City Transit Vehicles	Existing	This includes transit vehicles for Amtrak ThruWay Bus, Coastline Enterprises, Greyhound, and Porter Stage Lines.
IRP Clearinghouse	Existing	This is a registration reciprocity agreement among jurisdictions in the United States and Canada which provides for payment of license fees on the basis of fleet miles operated in various jurisdictions
Mayday Service Provider	Existing	Service centers that provide Mayday and other special concierge services for their clients. These centers will typically be outside the COATS region, but will interact with local agencies when their client's have an emergency in the region. Current examples of this system include the service centers operated by GM (OnStar), ATX Technologies (Ford and others), and AAA.
MCMIS	Existing	MCMIS contains information on the safety fitness of commercial motor carriers and hazardous material shippers subject to the Federal Motor Carrier Safety Regulations and the Hazardous Materials Regulations. This information is available to the general public through the MCMIS Data Dissemination Program.
Motor Carrier Dispatch and Back Office Systems	Existing	These provide the capability for commercial drivers and dispatchers to receive real-time routing information and access databases containing vehicle and cargo locations as well as carrier, vehicle, cargo, and driver information.
Other Weather Data	Existing	This terminator refers to weather information received from the National Weather Service or state agencies which also have weather-related information. This could include fully equipped weather stations, isolated stream gauges, or other similar technologies.

Table 4-3: North Central California Inventory (cont.).

Element Name	Status	Description
Redding-Area Air Districts	Existing	This placeholder includes Colusa County APCD, Glenn County APCD, Lassen County APCD, Modoc County APCD, Northern Sierra APCD, Shasta County AQMD, Siskiyou County APCD, and Tehama County APCD
Redding-Area City Traffic Control Equip	Existing	This includes traffic equipment for the cities of Alturas, Anderson , Corning, Mount Shasta, Orland, Red Bluff, Redding, Shasta Lake, Susanville, Weed, Willows, and Yreka.
Redding-Area City Traffic Control Systems	Existing	This includes traffic management functions for the cities of Alturas, Anderson, Corning, Mount Shasta, Orland, Red Bluff, Redding, Shasta Lake, Susanville, Weed, Willows, and Yreka.
Redding-Area County Maintenance Systems	Existing	This includes public works departments for the following counties: Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity.
Redding-Area E-911 Comm Centers	Existing	This includes public safety answering points receiving wireline 911 calls in the Redding area.
Redding-Area EMS Provider Dispatch	Existing	This includes the broad range of private EMS, ambulance, and air evacuation providers that serve the Redding area, including American Med. Response (includes North Valley Ambulance), City of Dorris, Emergency Medical Center, Mount Shasta Ambulance Service, NorCal EMS, Northern Siskiyou Ambulance Service, Shascom, and Trinity County Life Support.
Redding-Area EMS Vehicles	Existing	This includes the broad range of private EMS, ambulance, and air evacuation vehicles that serve the Redding area, including American Med. Response (includes North Valley Ambulance), City of Dorris, Emergency Medical Center, Mount Shasta Ambulance Service, NorCal EMS, Northern Siskiyou Ambulance Service, Shascom and Trinity County Life Support.
Redding-Area Fire Dispatch	Existing	This includes fire departments for the communities of Alturas, Anderson, Corning, Cottonwood, Happy Valley, Jones Valley, Mountain Gate, Mount Shasta, Orland, Red Bluff, Redding, Shasta County, Shasta, Shasta Lake City, Susanville, Weed, Willows, and Yreka. This also includes other agencies that have fire/rescue jurisdiction in certain areas, including California Department of Forestry; County Health Departments (Hazmat), National Park Service, Office of Emergency Services (Hazmat), and US Forest Service.
Redding-Area Fire Vehicles	Existing	This includes vehicles for community fire departments in Alturas, Anderson, Corning, Cottonwood, Happy Valley, Jones Valley, Mountain Gate, Mount Shasta, Orland, Red Bluff, Redding, Shasta County, Shasta, Shasta Lake City, Susanville, Weed, Willows, and Yreka. This also includes vehicles from other agencies that have fire/rescue jurisdiction in certain areas, including California Department of Forestry; County Health Departments (Hazmat), National Park Service, Office of Emergency Services (Hazmat), and US Forest Service.

Table 4-3: North Central California Inventory (cont.).

Element Name	Status	Description
Redding-Area Fixed Route Dispatch	Existing	This includes the following transit systems: Lassen Rural Bus, serving Lassen County; Modoc Sage Stage; Redding Area Bus Authority (RABA) serving Redding and the surrounding communities; Siskiyou County Transit (the Stage) serving the Yreka area; Tehama Area Rural Express (TRAX) serving the Red Bluff area; and Trinity County Transit.
Redding-Area Fixed Route Vehicles	Existing	This includes vehicles operating on the following transit systems: Lassen Rural Bus, serving Lassen County; Modoc Sage Stage; Redding Area Bus Authority (RABA) serving Redding and the surrounding communities; Siskiyou County Transit (the Stage) serving the Yreka area; Tehama Area Rural Express (TRAX) serving the Red Bluff area; and Trinity County Transit.
Redding-Area Municipal Planning Agencies	Existing	These data collection and analysis system(s) provide planning data for cities and towns in Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama and Trinity Counties.
Redding-Area Paratransit Dispatch	Existing	This includes California Association for Coordinated Transit, DART, Lassen Rural Bus, Modoc Senior Citizens/Meals on Wheels
Redding-Area Paratransit Vehicles	Existing	This includes California Association for Coordinated Transit, DART, Lassen Rural Bus, Modoc Senior Citizens/Meals on Wheels
Redding-Area Police and Sheriff Dispatch	Existing	This includes the cities of Alturas, Anderson, Corning, Lake Shastina, Mount Shasta, Orland, Red Bluff, Redding, Susanville, Weed, Willows, and Yreka. This also includes county sheriffs for Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties.
Redding-Area Police and Sheriff Vehicles	Existing	This includes the vehicles for the cities of Alturas, Anderson, Corning, Lake Shastina, Mount Shasta, Orland, Red Bluff, Redding, Susanville, Weed, Willows, and Yreka; and for the county sheriffs for Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties.
Redding-Area Regional Transportation Planning Agencies	Existing	This includes county agencies responsible for transportation planning in the Redding vicinity. This includes the Lassen County Transportation Commission (TC), Modoc County Local Transportation Commission (LTC), Plumas County TC, Shasta County RTPA (also a MPO), Siskiyou County TC, Tehama County TC, and Trinity County TC.
Redding-Area Towing/Recovery	Existing	This includes the private tow dispatch systems that clear incidents in the Redding area. This includes numerous individual operators that serve in the region.
Redding-Area Traveler Information Resources	Existing	This includes Ashland (OR) Shakespeare Festival, BLM-Alturas Resource Area, Castle Crags State Park, Klamath National Forest, Lassen National Forest, Lassen Volcanic National Park, Lavabeds National Monument, Modoc National Forest, Mt. Shasta Ranger Station, Mt. Shasta Ski Park, Redding Recreation Department, Shasta-Trinity National Forest, Turtle Bay Park / Museum, U.S. Forest Service, Whiskeytown National Recreational Area. It also includes area hotels, restaurants, gas stations, shopping, etc.

Table 4-3: North Central California Inventory (cont.).

Element Name	Status	Description
Redding-Area Traveler Information Systems	Planned	These systems collect traveler information from operational sources (e.g., local traffic and public safety agencies/systems), visitor information systems (e.g. chambers of commerce), and local travel destinations (e.g., Parks). This information is then made available to travelers through both broadcast and interactive digital information services through the Internet and other media.
Redding-Area TV and Radio Stations	Existing	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the analog TV, radio and print media intended for human, rather than system, processing and interpretation.
Redding-Area Visitor Information Services	Existing	This includes chambers of commerce in Alturas, Dunsmuir, Redding, Trinity County, Weaverville and Yreka. It also includes Northern California Tourism , Redding Convention and Visitors Bureau, Shasta Cascade Wonderland Association, and Siskiyou County Tourism.
SAFER	Existing	SAFER provides carrier, vehicle, and driver safety and credential information to fixed and mobile roadside inspection stations. This information will allow the roadside inspector to select vehicles and/or drivers for inspection based on the number of prior carrier inspections, as well as carrier, vehicle, and driver safety and credential historical information.
Transit Users	Existing	This terminator represents the human entities using Public Transit vehicles. They may be in the act of embarking or debarking the vehicles and are thus sensed for the purpose of determining passenger loading and fares, or on the vehicles and able to request and receive information.
Traveler Information Devices	Planned	These are personal devices which may be used to access real-time transportation information.
Travelers	Existing	This terminator represents any individual (human) who uses transportation services. At the time that data is passed to or from the terminator the individual is neither a driver, pedestrian, or transit user. This means that the data provided is that for pre-trip planning or multi-modal personal guidance and includes their requests for assistance in an emergency. Subsequent to receipt of pre-trip information, a Traveler may become a vehicle driver, passenger, transit user, or pedestrian.
Vehicle Information Systems	Existing	These are devices installed in passenger vehicles that support access to digital traveler information. A wide range of evolving technologies are available.
Vehicle Mayday Systems	Existing	These are devices installed in passenger vehicles that provide Mayday services to the vehicle occupants. In many cases, these systems are integrated with Vehicle Information Systems (see related Inventory entry).

Table 4-3: North Central California Inventory (cont.).

Element Name	Status	Description
Vehicles	Existing	This terminator represents the basic vehicle platform that interfaces with and hosts ITS electronics. The Basic Vehicle terminator provides an interface to drive train, driver convenience and entertainment systems, and other non-ITS electronics on-board the vehicle. This interface allows general vehicle systems (e.g., the stereo speaker system) to be shared by ITS and non-ITS systems. It also allows monitoring and control of the vehicle platform for advanced vehicle control system applications.

4.4.3 Northern California Coast

The northern California coast subregional architecture covers Humboldt and Del Norte Counties and includes the cities of Eureka, Arcata, Fortuna, Crescent City, Rio Dell, Ferndale, Blue Lake and Trinidad. Table 4-4 lists all identified inventory elements for this subregion as defined in the Turbo Architecture database. This inventory was reviewed and derived from input received during the Eureka architecture workshop.

Table 4-4: Northern California Coast Inventory.

Element Name	Status	Description
1-800-427-ROAD	Existing	This is a toll-free number run by Caltrans which provides current road conditions information. This may be superceded by 511 at a later date.
Airline Schedule Operations	Existing	Includes Ascot, Horizon, Skywest, United and other airlines offering regular scheduled passenger service.
Amtrak Schedule Operations	Existing	This is the operational entity that provides static and real-time Amtrak schedule information for the COATS architecture.
California Highway Information Web Page	Existing	This interactive Web-based service (http://www.dot.ca.gov/hq/roadinfo) provides key road construction, detour and closure information based on user-specified route numbers.
California Weigh Stations	Existing	These are locations where commercial vehicles may be weighed and inspected.
Caltrans District 1 Public Affairs	Existing	This office is responsible for communicating with local media all news regarding key Caltrans activities in District 1. It may be used to disseminate information about road closures, ongoing construction projects, and other activities that may affect highway travel.
Caltrans Field Equip District 1 (Eureka)	Existing	This includes the environmental sensors, variable message signs, HAR, signals, traffic detectors, and any other field equipment and instrumentation operated by Caltrans District 1.
Caltrans HQ Construction Program	Existing	This program is responsible for implementing the state's highway construction program. It will provide information to local districts about future construction projects as they are introduced.
Caltrans HQ Permits	Existing	The Encroachment Permits department is a part of the office of development services within Caltrans' Traffic Operations program. As the responsible department for protecting the public's investment in the State highway system, the permits office reviews all requests from utility companies, developers, volunteers, nonprofit organizations, etc., desiring to conduct various activities within the right of way. Such activities could include for example: construction of highway improvements, driveway installation and maintenance, highway landscaping and graffiti removal, commercial filming, special events such as parades commemorating an event, e.g. Independence Day.
Caltrans HQ Traffic	Existing	This office is responsible for coordinating the state's transportation management centers, facilitating data exchange and interoperability. It will also serve as a repository for field data collected at districts across the state.
Caltrans Maintenance District 1 (Eureka)	Existing	Covers the resource management and dispatch systems operated by Caltrans District 1.
Caltrans Maintenance District 1 (Eureka) Vehicles	Existing	These Caltrans vehicles are responsible for maintenance activities, including setting up road closures, assisting in incident removal, and performing winter maintenance. It is assumed that there is seamless communication between the vehicle and its driver, who will actually be directing and performing the maintenance activity.

Table 4-4: Northern California Coast Inventory (cont.).

Element Name	Status	Description
Caltrans RWIS	Existing	These are RWIS stations maintained by Caltrans for providing information on atmospheric and pavement temperature conditions at remote sites. Information from these sites is helpful for maintenance officials in making maintenance decisions.
Caltrans Weather Warning Systems	Existing	These are driver advisory systems which are activated based on certain meteorological conditions or thresholds (e.g. high wind, icy bridge, etc.). They process information provided by a localized weather station and provide a warning to motorists when specified conditions arise.
Caltrans/CHP Eureka ARTIC	Existing	This ARTIC (Advanced Rural Technology Integration Center) plays a central role in the COATS architecture for managing and monitoring the transportation system in Del Norte, Humboldt, Mendocino and Lake Counties. It is a Tier 3 Satellite Operation Center connected to the Oakland Regional TMC.
Caltrans/CHP Oakland Regional TMC	Existing	This Tier 1 TMC is tied to Tier 3 Satellite Operation Centers in Eureka and San Luis Obispo.
CHIN	Existing	The California Highway Information Network provides daily adverse travel conditions information. Information is made available to telephone and Internet.
CHP Eureka and Humboldt Division Dispatch and 911 Centers	Existing	This includes offices in Crescent City, Humboldt, Garberville, Ukiah and Clearlake.
CHP Vehicles	Existing	California Highway Patrol vehicles.
COATS Kiosks	Planned	This is a planned system which would provide real-time traveler and tourism information to travelers throughout the COATS region.
Commercial Vehicle (Onboard) Systems	Existing	This subsystem resides in a commercial vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations. The Commercial Vehicle Subsystem provides two-way communications between the commercial vehicle drivers, their fleet managers, and roadside officials, and provides HAZMAT response teams with timely and accurate cargo contents information after a vehicle incident.
Commercial Vehicle Driver	Existing	This terminator represents the human entity that operates vehicles transporting goods including both long haul trucks and local pick up and delivery vans.
Commercial Vehicles	Existing	The actual commercial vehicle along with the special aspects of large commercial vehicles and vehicles designed to carry cargo that extend beyond the characteristics defined for the Basic Vehicle. This terminator thus represents a special type of Basic Vehicle that is used to transport goods or services which are operated by professional drivers, typically administered as part of a larger fleet, and regulated by a Commercial Vehicle Manager.
Coos Bay-Area EMS Provider Dispatch	Existing	This includes the broad range of private EMS, ambulance and air evacuation providers that serve the Coos Bay area, including Bay Cities Ambulance, Coquille Valley Ambulance, Lower Umpqua EMS, Medic 4 Ambulance, Myrtle Point, Curry County EMS, and Del Norte.

Table 4-4: Northern California Coast Inventory (cont.).

Element Name	Status	Description
Coos Bay-Area EMS Vehicles	Existing	This includes the broad range of private EMS, ambulance and air evacuation vehicles that serve the Coos Bay area, including Bay Cities Ambulance, Coquille Valley Ambulance, Lower Umpqua EMS, Medic 4 Ambulance, Myrtle Point, Curry County EMS, and Del Norte.
CVO Inspector	Existing	This terminator represents the human entities who perform regulatory inspection of Commercial Vehicles in the field. CVO Inspectors support the roadside inspection, weighing, and checking of credentials either through automated preclearance or manual methods.
Drivers	Existing	This terminator represents the human entity that operates a licensed vehicle on the roadway. Included are operators of private, Transit, Commercial, and Emergency vehicles where the data being sent or received is not particular to the type of vehicle. Thus this external originates driver requests and receives driver information that reflects the interactions which might be useful to all drivers, regardless of vehicle classification.
Eureka-Area Air Districts	Existing	This includes various districts responsible for air quality management, including the North Coast Unified AQMD (responsible for Del Norte, Humboldt and Trinity Counties), the Lake County AQMD and the Mendocino County AQMD.
Eureka-Area City Traffic Control Equip	Existing	This includes the field equipment owned and operated by the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Lakeport, Point Arena, Rio Dell, Trinidad. Ukiah and Willits.
Eureka-Area City Traffic Control Systems	Existing	This includes the traffic management functions performed by the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Lakeport, Point Arena, Rio Dell, Trinidad. Ukiah and Willits.
Eureka-Area County Maintenance Systems	Existing	This includes public works or transportation departments for Del Norte, Humboldt, Lake and Mendocino Counties.
Eureka-Area E-911 Comm Centers	Existing	This includes the wireline public safety answering points on the northern California coast, including but not limited to a center in Curry County, Oregon which provides service to northern Del Norte County.
Eureka-Area EMS Provider Dispatch	Existing	This includes the broad range of private EMS, ambulance and air evacuation providers, including Arcata Mad River Ambulance Inc, City Ambulance of Eureka, City of Lakeport, Coast Guard, Del Norte Air Ambulance, Hoopa Ambulance, Medivac (CalSTAR), Mendocino Coast Hospital Ambulance, North Coast EMS, North Pacific Emergency Services, Redwood Empire Life Support, and Ukiah Ambulance.
Eureka-Area EMS Vehicles	Existing	This includes the broad range of private EMS, ambulance and air evacuation vehicles, including those operated by Arcata Mad River Ambulance Inc, City Ambulance of Eureka, City of Lakeport, Coast Guard, Del Norte Air Ambulance, Hoopa Ambulance, Medivac (CalSTAR), Mendocino Coast Hospital Ambulance, North Coast EMS, North Pacific Emergency Services, Redwood Empire Life Support, and Ukiah Ambulance.

Table 4-4: Northern California Coast Inventory (cont.).

Element Name	Status	Description
Eureka-Area Fire and Rescue Dispatch	Existing	This includes dispatch functions provided for Arcata Fire District, Blue Lake Fire District, Brooktrails Fire Dept , California Department of Forestry, Clearlake Fire District, Coast Guard (Clear Lake), Coast Guard (Fort Bragg), Crescent City Volunteer Fire Department, Eureka Fire District, Ferndale Fire District, Fort Bragg Fire Department, Fortuna Fire District, Garberville Rescue, Lakeport Fire Dept, Redwood Valley Fire District, Samoa Peninsula Fire District, South Trinity Area Rescue, Ukiah Fire Dept, Ukiah Valley Fire District, Upper Lake Fire District, and Willits Fire Department. This also includes California Fish & Game, National Park Service, U.S. Fish & Wildlife and U.S. Forest Service.
Eureka-Area Fire and Rescue Vehicles	Existing	This includes vehicles owned by Arcata Fire District, Blue Lake Fire District, Brooktrails Fire Dept , California Department of Forestry, Clearlake Fire District, Coast Guard (Clear Lake), Coast Guard (Fort Bragg), Crescent City Volunteer Fire Department, Eureka Fire District, Ferndale Fire District, Fort Bragg Fire Department, Fortuna Fire District, Garberville Rescue, Lakeport Fire Dept, Redwood Valley Fire District, Samoa Peninsula Fire District, South Trinity Area Rescue, Ukiah Fire Dept, Ukiah Valley Fire District, Upper Lake Fire District, and Willits Fire Department. This also includes California Fish & Game, National Park Service, U.S. Fish & Wildlife and U.S. Forest Service.
Eureka-Area Fixed Route Dispatch	Existing	This includes dispatch and management operations for the following transit systems: Arcata-Mad River Transit System, which serves Arcata and Eureka; Eureka Transit Service (run by Humboldt Transit Authority), which provides service to Eureka; Mendocino Transit Authority, which connects cities in Mendocino County; Redwood Coast Transit, which serves Crescent City; and Redwood Transit System (Humboldt Transit Authority), which goes throughout Humboldt County.
Eureka-Area Fixed Route Vehicles	Existing	This includes transit vehicles for the following transit systems: Arcata-Mad River Transit System, which serves Arcata and Eureka; Eureka Transit Service (run by Humboldt Transit Authority), which provides service to Eureka; Mendocino Transit Authority, which connects cities in Mendocino County; Redwood Coast Transit, which serves Crescent City; and Redwood Transit System (Humboldt Transit Authority), which goes throughout Humboldt County.
Eureka-Area Municipal Planning Agencies	Existing	This includes planning divisions for the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Hoopa, Lakeport, Point Arena, Rio Dell, Trinidad, Ukiah, and Willits.
Eureka-Area Paratransit Dispatch	Existing	This includes various paratransit dispatch operations, including Coastal Cab, Crescent City Paratransit Services, Door to Door Airporter, Fortuna Senior Bus, Lake Transit Authority, Mendocino Limousine, Mendocino Transit Authority, Redwood Dial A Ride, Yellow Cab. This also includes various senior centers (such as in Mendocino County) that each have paratransit services.

Table 4-4: Northern California Coast Inventory (cont.).

Element Name	Status	Description
Eureka-Area Paratransit Vehicles	Existing	This includes transit vehicles to support paratransit operations, including Coastal Cab, Crescent City Paratransit Services, Door to Door Airporter, Fortuna Senior Bus, Lake Transit Authority, Mendocino Limousine, Mendocino Transit Authority, Redwood Dial A Ride, Yellow Cab. This also includes various senior centers (such as in Mendocino County) that each have paratransit services.
Eureka-Area Police and Sheriff Dispatch	Existing	This includes law enforcement agencies for the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Lakeport, Point Arena, Rio Dell, Trinidad, Ukiah and Willits, and for the Hoopa Tribe. It also includes county sheriff's offices for Del Norte, Humboldt, Lake and Mendocino Counties. This also includes various other law enforcement agencies with specialized jurisdictions, such as California Department of Forestry, California Fish & Game, National Park Service, and the U.S. Forest Service.
Eureka-Area Police and Sheriff Vehicles	Existing	This includes vehicles used for law enforcement by the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Lakeport, Point Arena, Rio Dell, Trinidad, Ukiah and Willits, and for the Hoopa Tribe. It also includes county sheriff's vehicles for Del Norte, Humboldt, Lake and Mendocino Counties. This also includes vehicles associated with various other law enforcement agencies with specialized jurisdictions, such as California Department of Forestry, California Fish & Game, National Park Service, and the U.S. Forest Service.
Eureka-Area Regional Transportation Planning Agencies	Existing	This includes organizations responsible for transportation planning along the northern California coast, including the Del Norte Local Transportation Commission (LTC); the Humboldt County Association of Governments; the Lake Council of Governments; and the Mendocino Council of Governments.
Eureka-Area Towing/Recovery	Existing	This includes the private tow dispatch systems that clear incidents in the Eureka area. This includes numerous individual operators that serve in the region.
Eureka-Area Traveler Information Resources	Existing	This includes Bureau of Land Management, California Parks & Recreation, Department of Fish and Game, Harbor Recreation and Conservation, National Forest Service, National Park Service, North Coast Redwoods, Redwood National and State Parks, Six Rivers (includes Smith River), various State Parks (including Anderson Marsh, Clear Lake, Jackson, Jughandle, Richardson Grove, Russian Gulch, Standish-Hickey). This also includes City (Clearlake, Ukiah) and County (Humboldt, Lake and Mendocino) Recreation Departments. This also includes area hotels, restaurants, gas stations, shopping, etc.
Eureka-Area Traveler Information Systems	Planned	These systems collect traveler information from operational sources (e.g., local traffic and public safety agencies/systems), visitor information systems (e.g. chambers of commerce), and local travel destinations (e.g., Parks). This information is then made available to travelers through both broadcast and interactive digital information services through the Internet and other media.

Table 4-4: Northern California Coast Inventory (cont.).

Element Name	Status	Description
Eureka-Area TV and Radio Stations	Existing	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the analog TV, radio and print media intended for human, rather than system, processing and interpretation.
Eureka-Area Visitor Information Services	Existing	This includes chambers of commerce for Clearlake, Eureka, Hopland, Lakeport, Mendocino Coast/Fort Bragg, Ukiah, and Willits. Eureka Convention and Visitors Bureau, Mendocino County Convention and Visitors Bureau, Northern California Tourism, and Redwood Empire Association.
HELP	Existing	HELP (Heavy Vehicle Electronic License Plate, Inc.), is a non-profit partnership between motor carriers and government agencies (including Caltrans) whose mission is to develop and deploy advanced technology systems to create a cooperative operating and regulatory environment which improves the efficient and safe movement of commercial vehicles and the performance of highway systems.
Inter-City Transit	Existing	This includes dispatch systems for Amtrak ThruWay Bus, Coastline Enterprises, Greyhound, North Coast Railroad and Porter Stage Lines.
Inter-City Transit Vehicles	Existing	This includes transit vehicles for Amtrak ThruWay Bus, Coastline Enterprises, Greyhound, and Porter Stage Lines.
IRP Clearinghouse	Existing	This is a registration reciprocity agreement among jurisdictions in the United States and Canada which provides for payment of license fees on the basis of fleet miles operated in various jurisdictions
Mayday Service Provider	Existing	Service centers that provide Mayday and other special concierge services for their clients. These centers will typically be outside the COATS region, but will interact with local agencies when their client's have an emergency in the region. Current examples of this system include the service centers operated by GM (OnStar), ATX Technologies (Ford and others), and AAA.
MCMIS	Existing	MCMIS contains information on the safety fitness of commercial motor carriers and hazardous material shippers subject to the Federal Motor Carrier Safety Regulations and the Hazardous Materials Regulations. This information is available to the general public through the MCMIS Data Dissemination Program.
Motor Carrier Dispatch and Back Office Systems	Existing	These provide the capability for commercial drivers and dispatchers to receive real-time routing information and access databases containing vehicle and cargo locations as well as carrier, vehicle, cargo, and driver information.
Other Weather Data	Existing	This terminator refers to weather information received from the National Weather Service or state agencies which also have weather-related information. This could include fully equipped weather stations, isolated stream gauges, or other similar technologies.

Table 4-4: Northern California Coast Inventory (cont.).

Element Name	Status	Description
SAFER	Existing	SAFER provides carrier, vehicle, and driver safety and credential information to fixed and mobile roadside inspection stations. This information will allow the roadside inspector to select vehicles and/or drivers for inspection based on the number of prior carrier inspections, as well as carrier, vehicle, and driver safety and credential historical information.
Transit Users	Existing	This terminator represents the human entities using Public Transit vehicles. They may be in the act of embarking or debarking the vehicles and are thus sensed for the purpose of determining passenger loading and fares, or on the vehicles and able to request and receive information.
Traveler Information Devices	Planned	These are personal devices which may be used to access real-time transportation information.
Travelers	Existing	This terminator represents any individual (human) who uses transportation services. At the time that data is passed to or from the terminator the individual is neither a driver, pedestrian, or transit user. This means that the data provided is that for pre-trip planning or multi-modal personal guidance and includes their requests for assistance in an emergency. Subsequent to receipt of pre-trip information, a Traveler may become a vehicle driver, passenger, transit user, or pedestrian.
Vehicle Information Systems	Existing	These are devices installed in passenger vehicles that support access to digital traveler information. A wide range of evolving technologies are available.

4.5 Subregional Architecture Flow Definitions

Table 4-5 lists every architecture flow that is included in the subregional architectures presented in the previous sections. Some flows were customized for the COATS study area as described in Chapter 3 (as indicated by asterisks), but all of the remaining architecture flow definitions were extracted from the definitions used in version 3.0 of the National ITS Architecture. The National ITS Architecture also identifies relevant standards information for each of these architecture flows. Consult the National ITS Architecture web site at http://www.iteris.com/itsarch for the latest standards information that is relevant to the COATS architecture.

Table 4-5: Architecture Flows Included in COATS Regional Architecture.

Flow Name	Customized?	Flow Description
activity reports		Activity reports containing records of citations, accidents, inspections, etc.
archive coordination		Catalog data, meta data, published data, and other information exchanged between archives to support data synchronization and satisfy user data requests.
archive requests		A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.
archive status		Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.
basic vehicle measures		Information provided to on-board ITS equipment from the vehicle platform indicating current vehicle status.
border clearance event record		Results of border clearance check.
broadcast advisories		General broadcast advisories that are provided over wide-area wireless communications direct to the vehicle radio. These analog advisory messages may provide similar content to ITS broadcast information flows, but include no digital data component. Existing Highway-Advisory Radio (HAR) advisory messages are a prime example of this flow.
broadcast information		General broadcast information that contains link travel times, incidents, advisories, transit services and a myriad of other traveler information.
citation data		Safety problems related to the carrier, driver and vehicle that may lead to a citation.
clearance event record		Results of vehicle clearance activity.
closure coordination		Coordination between subsystems regarding construction and maintenance closure times and durations.
compliance review report		Report containing data from facility activity logs from various roadside facilities.
construction activity status	Yes	Information about impending construction projects coordinated at a statewide level and distributed to districts.
construction and maintenance archive data		Information describing road construction and maintenance activities identifying the type of activity, the location of the activity, and the activity status. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
credential application		Application for commercial vehicle credentials for a particular route/trip.
credentials and safety information request		Request for additional credentials and safety information.

Table 4-5: Architecture Flows Included in COATS Regional Architecture (cont.).

Flow Name	Customized?	Flow Description
credentials and safety information response		Instructions to commercial vehicle managing and/or information systems indicating which vehicles are to be allowed to pass and which are out of service or have not been credentialed.
credentials information		Response containing credentials information.
credentials information request		Request for credential information.
current network conditions		Current traffic information, road conditions, and camera images that can be used to locate and verify reported incidents, and plan and implement an appropriate response.
CVAS information exchange		Tax and credential fee information exchanged between cooperating commercial vehicle administration offices (e.g. regional or inter-state preclearance data).
CVC override mode		Manual override by the commercial vehicle roadside facility inspector of automated pass/pull-in signage information.
CVO database update		Credential information and safety problem list updates.
CVO driver initialization		Commercial vehicle driver and vehicle information and requests to the commercial vehicle managing system.
CVO Pull in Message		Message sent to commercial vehicle driver requesting pull in to inspection/verification stop along with inspection results.
CVO weight and presence		Weigh-In-Motion message to indicate presence of commercial vehicle and its weight.
demand responsive transit plan		Plan regarding overall demand responsive transit schedules and deployment.
demand responsive transit request		Request for paratransit support.
driver and vehicle information		Requests from the driver and vehicle for routing, payment, and enrollment information.
driver information		General advisory and traffic control information provided to the driver while en-route.
driver inputs		Driver commands to the vehicle.
electronic clearance data		Information required for electronic clearance (toll, safety, customs, etc.).
electronic clearance request		Request for electronic clearance data (Toll, safety, customs, etc.).
electronic credentials		Authenticated credentials including route enrollment and payment confirmation.
emergency acknowledge		Acknowledge request for emergency assistance and provide additional details regarding actions and verification requirements.
emergency archive data		Logged incident information that characterizes the identified incidents and provides a record of the corresponding incident response. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

Table 4-5: Architecture Flows Included in COATS Regional Architecture (cont.).

Flow Name	Customized?	Flow Description
emergency data request		A request for additional information or a control command issued by the emergency response agency in response to an emergency request for assistance from a traveler.
emergency dispatch requests		Emergency vehicle dispatch instructions including incident location and available information concerning the incident.
emergency notification		An emergency request for assistance originated by a traveler using an in-vehicle, public access, or personal device. Sufficient information is provided so that the recipient can determine the location of the emergency as a minimum. Additional information identifying the requestor and requesting device and the nature and severity of the emergency may also be provided (and required) by some systems.
emergency traffic control request		Special request to preempt the current traffic control strategy in effect at one or more signalized intersections or highway segments. For example, this flow can request all signals to red-flash, request a progression of traffic control preemptions along an emergency vehicle route, or request another special traffic control plan.
emergency vehicle tracking data		The current location and operating status of the emergency vehicle.
emissions archive data		Air quality and vehicle emissions information that is collected by sensors or derived from models. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
emissions data		Emissions data and associated imagery collected by roadside equipment.
environmental conditions		Current environment conditions (e.g., air temperature, wind speed, surface temperature) as measured by environmental sensors and communicated by supporting field equipment.
equipment maintenance status		Current status of field equipment maintenance actions.
external reports		Traffic and incident information that is collected by the media through a variety of mechanisms (e.g., radio station call-in programs, air surveillance).
fault reports		Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.
fleet to driver update		Updated instructions to the driver including dispatch, routing, and special instructions
incident command information		Information that supports local management of an incident. It includes resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency personnel in the field to implement an effective, safe incident response.
incident command request		Request for resources, commands for relay to other allied response agencies, and other requests that reflect local command of an evolving incident response.

Table 4-5: Architecture Flows Included in COATS Regional Architecture (cont.).

Flow Name	Customized?	Flow Description
incident data		Data and imagery from the roadside supporting incident detection and verification.
incident data*	Yes	Data and imagery from the roadside supporting incident detection and verification.
incident information		Notification of existence of incident and expected severity, location, time and nature of incident.
incident information for media		Report of current desensitized incident information prepared for public dissemination through the media.
incident information request		Request for incident information, clearing time, severity. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.
incident information*	Yes	Notification of existence of incident and expected severity, location, time and nature of incident.
incident report		Report of an identified incident including incident location, type, severity and other information necessary to initiate an appropriate incident response.
incident response coordination		Incident response procedures, resource coordination, and current incident response status that are shared between allied response agencies to support a coordinated response to incidents. This flow also coordinates a positive hand off of responsibility for all or part of an incident response between agencies.
incident response status		Status of the current incident response including traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides).
incident response vehicle coordination	Yes	Communication between vehicles involved in emergency or incident response activities. This communication is essential to reducing the impact of incidents, especially road closures, on travelers. It may require several different communication media, as this will typically span over many jurisdictional lines.
incident status		Information gathered at the incident site that more completely characterizes the incident and provides current incident response status.
information request		General purpose information request for data stored within the commercial vehicle operations information exchange network.
international border crossing data		Cleared commercial vehicle data to allow pass-thru international border crossings.
international border crossing data update		Update from commercial vehicle check stations of international border crossing events.
ISP coordination		Coordination and exchange of transportation information between centers. This flow allows a broad range of transportation information collected by one ISP to be redistributed to many other ISPs and their clients.
local signal preemption request		Direct control signal or message to a signalized intersection that results in preemption of the current control plan and grants right-of-way to the requesting vehicle.

Table 4-5: Architecture Flows Included in COATS Regional Architecture (cont.).

Flow Name	Customized?	Flow Description
local signal priority request		Request from a vehicle to a signalized intersection for priority at that intersection.
localized weather information	Yes	Select weather information (e.g. wind, precipitation, humidity, temperature, etc.) that may be used to active a local weather warning system. The information is transmitted between a field-based weather data station and a collocated traveler advisory system.
lock tag data		Tag information on cargo lock.
lock tag data request		Request to supply lock information on cargo lock for retransmission to international border crossing station.
maintenance activity coordination	Yes	Information communicated from the maintenance dispatch center to maintenance vehicles to coordinate maintenance activities. This could include information about locations of activities, resource deployment status, and any actions which should be taken.
maintenance activity information	Yes	Information about non-planned and planned road conditions that may affect travel conditions, including construction-related lane closures and detours, and weather-related events.
maintenance activity status	Yes	Any communication sent from maintenance vehicles back to the maintenance dispatch office. This would include information about the current status of the action, expected duration of an action, and the need for additional resources.
maintenance dispatch office coordination	Yes	Information communicated between different maintenance dispatch centers regarding locations of critical maintenance actions, like road closures, detours, winter road maintenance, etc.
maintenance resource request		Request for road maintenance resources that can be used in the diversion of traffic (cones, portable signs), clearance of an incident, and repair of ancillary damage.
maintenance resource response		Current status of maintenance resources included availability and deployment status.
maintenance vehicle coordination	Yes	Any type of vehicle to vehicle communication between maintenance vehicles.
maintenance vehicle location	Yes	Information transmitted from maintenance vehicles to the maintenance dispatch office, characterizing the vehicle's location.
media information request		Request from the media for current transportation information.
media information request*	Yes	Request from the media for current transportation information.
multimodal information		Schedule information for alternate mode transportation providers such as train, ferry, air and bus.
multimodal information request		Information request for alternate mode transportation providers such as train, ferry, air and bus.
on board safety data		Vehicle safety data measured by vehicle sensors and sent to inspection stations
on board vehicle data		Condition of the commercial vehicle sent to commercial vehicle manager primarily for maintenance purposes.

Table 4-5: Architecture Flows Included in COATS Regional Architecture (cont.).

Flow Name	Customized?	Flow Description
on-board safety request		Request for onboard vehicle safety data.
parking archive data		Data used to analyze and monitor trends in parking demand, pricing, and operational actions. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
parking availability		Current parking lot occupancy, parking availability, and cost information.
parking demand management request		Request to change the demand for parking facility use through pricing or other mechanisms.
parking demand management response		Response to parking demand management change requests indicating level of compliance with request.
parking instructions		Information that allows local parking facilities to be managed to support regional traffic management objectives.
pass/pull-in		Command to commercial vehicle to pull into inspection station.
permit request	Yes	Information about the date, time and nature of activities permitted on the right-of-way.
permit support request	Yes	Information provided to maintenance staff to assist in permits for right-of-way access granted by the permitting agency. This would include date, time and location of requests for infringement of highway right-of-way, along with details about any precautions that maintenance staff should undertake to protect the traveling public, maintenance staff, and those authorized onto the right-of-way, including traffic cones, VMS messages, flaggers, etc.
permit support request confirmation	Yes	Maintenance dispatch offices confirm that information regarding a specific permit request has been understood, and that any maintenance tasks required to protect the traveling public and permittees will be undertaken.
pollution data		Measured emissions data comprised of various atmospheric pollutants.
provider profile confirm		Confirmation of profile information received by a service provider (e.g. for a hotel or restaurant).
provider profile data		Information supplied by a service provider (e.g., a hotel or restaurant) that identifies the service provider and provides details of the service offering. This flow covers initial registration of a service provider and subsequent submittal of new information and status updates so that data currency is maintained.
request for right-of-way		Forwarded request from signal prioritization, signal preemption, pedestrian call, multi-modal crossing activation, or other source for right-of-way.
request for service		A traveler service request initiated by a driver or traveler. The request may result in a financial transaction, summon an emergency response, or initiate another service at the behest of the driver.

Table 4-5: Architecture Flows Included in COATS Regional Architecture (cont.).

Flow Name	Customized?	Flow Description
request for traffic information		Request for traffic information that specifies the region/route of interest, the desired effective time period, and other parameters that allow preparation of a tailored response. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.
resource deployment status		Status of traffic management center resource deployment identifying the resources available and their current deployment status.
resource request		A request for traffic management resources to implement special traffic control measures, assist in clean up, verify an incident, etc.
road construction information for transit	Yes	Information regarding construction activities which may affect transit service, requiring long-term realignment of routes and/or delay to transit users.
road network use		Aggregated route usage and associated travel data from clients for planning and analysis.
roadside archive data		A broad set of data derived from roadside sensors that includes current traffic conditions, environmental conditions, and any other data that can be directly collected by roadside sensors. This data also indicates the status of the sensors and reports of any identified sensor faults.
roadside log update		Update of activities at commercial vehicle check stations including clearance events and inspection reports.
roadway information system data		Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these systems.
roadway information system status		Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.
safety information		Response containing commercial vehicle safety information.
safety information request		Request for commercial vehicle safety information.
safety inspection record		Record containing results of commercial vehicle safety inspection.
screening data		Data stored in vehicle's tag allowing electronic clearance at border crossings, debits at toll plazas, and clearance at safety inspections.
screening request		Request for screening data based on vehicle and possibly cargo's tags.
seismic conditions	Yes	Current seismic conditions as measured by remote sensors and communicated by supporting field equipment.
selected routes		Routes selected based on route request criteria.
sensor and surveillance control		Information used to configure and control sensor and surveillance systems at the roadside.

Table 4-5: Architecture Flows Included in COATS Regional Architecture (cont.).

Flow Name	Customized?	Flow Description
signal control data		Information used to configure and control traffic signal systems.
suggested route		Suggested route for a dispatched emergency vehicle that may reflect current network conditions and the additional routing options available to en-route emergency vehicles that are not available to the general public.
tax filing, audit data		Commercial vehicle tax filing and audit data.
traffic archive data		Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
traffic control coordination		Information transfers that enable remote monitoring and control of traffic management devices. This flow is intended to allow cooperative access to, and control of, field equipment during incidents and special events and during day-to-day operations. This flow also allows 24-hour centers to monitor and control assets of other centers during off-hours, allows system redundancies and fail-over capabilities to be established, and otherwise enables integrated traffic control strategies in a region.
traffic equipment status		Identification of field equipment requiring repair and known information about the associated faults.
traffic flow		Raw and/or processed traffic detector information which allows derivation of traffic flow variables (e.g., speed, volume and density measures).
traffic images		High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.
traffic images*	Yes	High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.
traffic information		Current and forecasted traffic information, road and weather conditions, incident information, and pricing data. Either raw data, processed data, or some combination of both may be provided by this architecture flow.
traffic information coordination		Traffic information exchanged between TMC's. Normally would include incidents, congestion data, traffic data, signal timing plans, and real-time signal control information.
traffic information for media		Report of current traffic conditions, incidents, maintenance activities and other traffic-related information prepared for public dissemination through the media.
traffic information for media*	Yes	Report of current traffic conditions, incidents, maintenance activities and other traffic-related information prepared for public dissemination through the media.
traffic information for transit		Current and forecasted traffic information and incident information.

Table 4-5: Architecture Flows Included in COATS Regional Architecture (cont.).

Flow Name	Customized?	Flow Description
transit and fare schedules		Specific transit and fare schedule information including schedule adherence.
transit archive data		Data used to describe and monitor transit demand, fares, operations, and system performance. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
transit emergency coordination data		Data exchanged between centers dealing with a transit-related incident.
transit emergency data		Initial notification of transit emergency at a transit stop or on transit vehicles and further coordination as additional details become available and the response is coordinated.
transit information for media		Report of transit schedule deviations for public dissemination through the media.
transit information request		Request for transit operations information including schedule and fare information. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.
transit request confirmation		Confirmation of a request for transit information or service.
transit schedule information		Current and projected transit schedule adherence.
transit system data		Current transit system operations information indicating current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.
transit traveler information		Transit information prepared to support transit users and other travelers. It contains transit schedules, real-time arrival information, fare schedules, and general transit service information.
transit traveler request		Request by a Transit traveler to summon assistance, request transit information, or request any other transit services.
transit vehicle location data		Current transit vehicle location and related operational conditions data provided by a transit vehicle.
transit vehicle schedule performance		Estimated times of arrival and anticipated schedule deviations reported by a transit vehicle.
travel service info		Reservation information or yellow pages data.
travel service request		Request for reservation or other service (e.g., yellow pages).
traveler information		Traveler information comprised of traffic status, advisories, incidents, payment information and many other travel-related data updates and confirmations.
traveler information for media		General traveler information regarding incidents, unusual traffic conditions, transit issues, or other advisory information that has been desensitized and provided to the media.

Table 4-5: Architecture Flows Included in COATS Regional Architecture (cont.).

Flow Name	Customized?	Flow Description
traveler inputs		Request by a traveler to summon assistance, request travel information, make a reservation, or request any other traveler service.
traveler interface updates		Visual or audio information (e.g., routes, messages, guidance) to the traveler.
traveler profile		Information about a traveler including equipment capabilities, personal preferences and recurring trip characteristics.
traveler request		Request by a traveler to summon assistance, request information, make a reservation, or initiate any other traveler service.
TRMS coord		Coordination information between local/regional transit organizations including schedule, on-time information and ridership.
vehicle control		Vehicular control commands
vehicle pollution criteria		Vehicular pollution acceptance criteria.
weather information		Accumulated forecasted and current weather data (e.g., temperature, pressure, wind speed, wind direction, humidity, precipitation, visibility, light conditions, etc.).
weather information coordination	Yes	Information exchange between agencies who are collecting weather-related information, including generalized atmospheric and precipitation conditions, as well as local stream gauge readings.
web traveler information data	Yes	A variety of information that may be provided to a Web-browser traveler information interface, including congestion maps, camera images, construction and road closure reports, weather-related traveler advisories, transit access, etc.
widearea statistical pollution information		Aggregated region-wide measured emissions data and possible pollution incident information.
work zone status		Status of maintenance work zone.
yellow pages information		Travel service information covering tourist attractions, lodging, restaurants, service stations, emergency services, and other services and businesses of interest to the traveler.
yellow pages request		Request for information through a yellow pages type service.

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5 EARLY WINNER PROJECT

One important benefit of developing a regional architecture is that it can assist in the project development process. Therefore, as shown in Figure 5-1, the next step in developing the COATS Regional Architecture was to define early project architectures. Of the six candidate projects identified in the COATS early winner report (8), the Bi-State Traveler Safety and Incident Management System centered around Siskiyou Pass was selected for early demonstration and evaluation. Consequently, this project was selected for further architecture development.

This chapter identifies the portions of the COATS Regional Architecture that will be implemented by the Siskiyou Pass early winner project. The basic architecture definition for this project is extended to identify specific architecture flows that will be implemented and ITS standards that may be relevant to the project.

5.1 Project Background

Interstate 5 from Yreka, California to Medford, Oregon is a major connecting route between California and Oregon, and is part of a significant north-south corridor between Canada

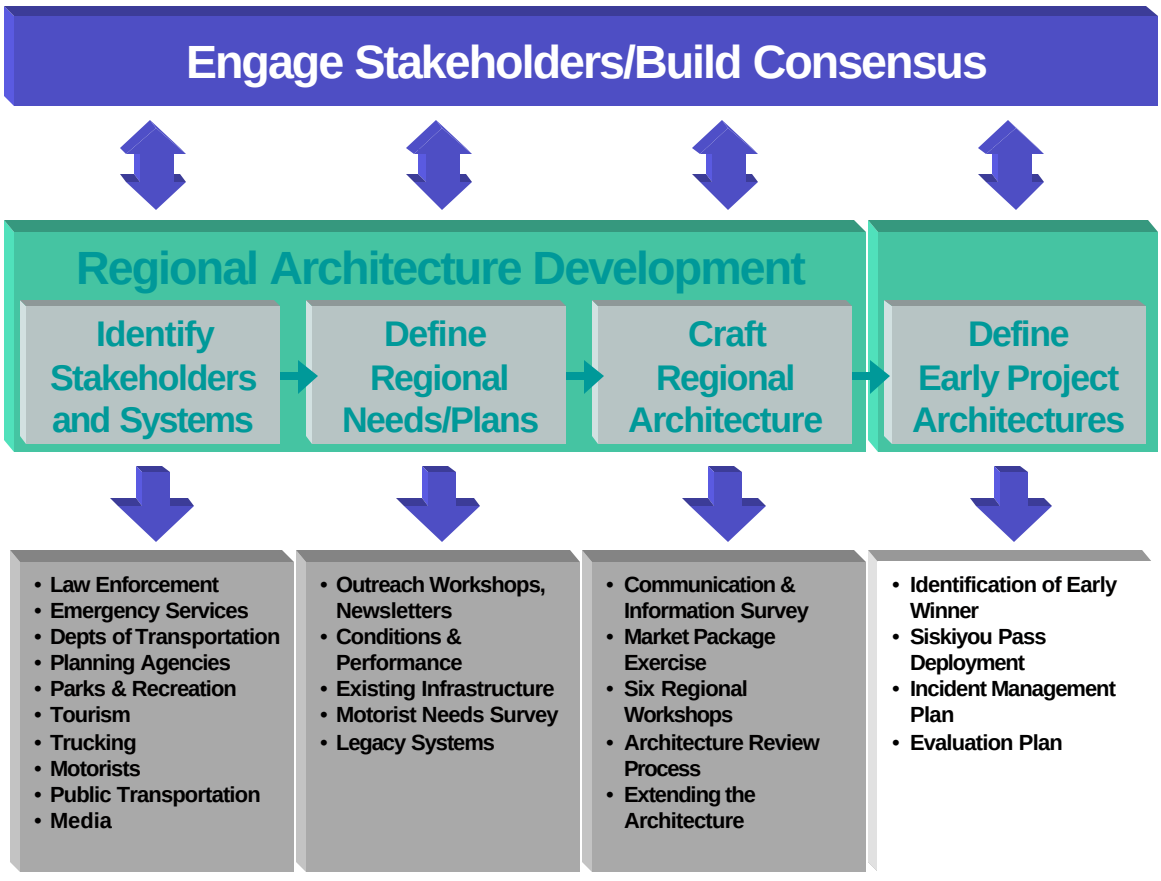

Figure 5-1: Define Early Project Architectures.

and Mexico. Siskiyou Pass, located approximately two miles north of the state border on Interstate 5, is at an elevation of 1,314 meters (4,310 feet), and consequently is subject to significant weather-related transportation challenges, including rapidly changing atmospheric conditions, reduced visibility due to fog, rain and/or snow, and slippery pavement. Daily traffic volumes at Siskiyou Pass are approximately 12,000 vehicles per day (9), representing the highest volume traffic crossing between the two states (10). Of that traffic, approximately 36 percent is commercial vehicle traffic (10).

5.2 Project Architecture

The early winner project includes a variety of technologies to facilitate traveler information, roadway maintenance and incident management activities in the Siskiyou Pass vicinity. Figures 5-2 and 5-3 show simplified architecture flow diagrams representing existing and short-term deployment in Oregon and California, respectively. These figures were developed based off of the Turbo Architecture database, with customized flows and subsystems created as necessary to reflect deployed technologies. These diagrams are simplified in that they represent the subset of equipment deployed on either side of the border without showing how the two states will relate to each other. The diagrams also do not include the current and future coordination of ODOT and Caltrans with law enforcement agencies on both sides of the border to manage incidents on the pass.

In Figure 5-2, it is clear that the Medford TOC is pivotal in the management of ITS infrastructure on the pass. Projects included with the early winner include closed-circuit television (CCTV) cameras, road weather information systems (RWIS), and variable message signs. These elements will allow dispatchers to more readily determine conditions on Siskiyou Pass, and communicate that information to motorists. Several other elements on the Oregon side of the border are being considered as well.

- Cable Television Station. From project participants and stakeholder input it was determined that infrastructure that supports pre-trip traveler information through a cable advisory television channel would be beneficial. This channel would also display closed circuit television (CCTV) images of road conditions.

- Advanced Vehicle Detection. These systems could provide additional information about traffic volumes and speeds throughout the pass area.

- Automatic Vehicle Location. Installed on maintenance fleets, this technology could help to optimize the efficiency of vehicles in clearing the roadway and responding to incidents.

- Motorist-Aide Call Boxes. When conditions at the pass break down, installation of these call boxes can help motorists to summon help, such as a tow truck or emergency services.

- Information Kiosks. Kiosks currently installed in the Ashland and Medford areas, which are maintained by the Southern Oregon Visitors Association (SOVA), are being upgraded to take advantage of the real-time information available through the

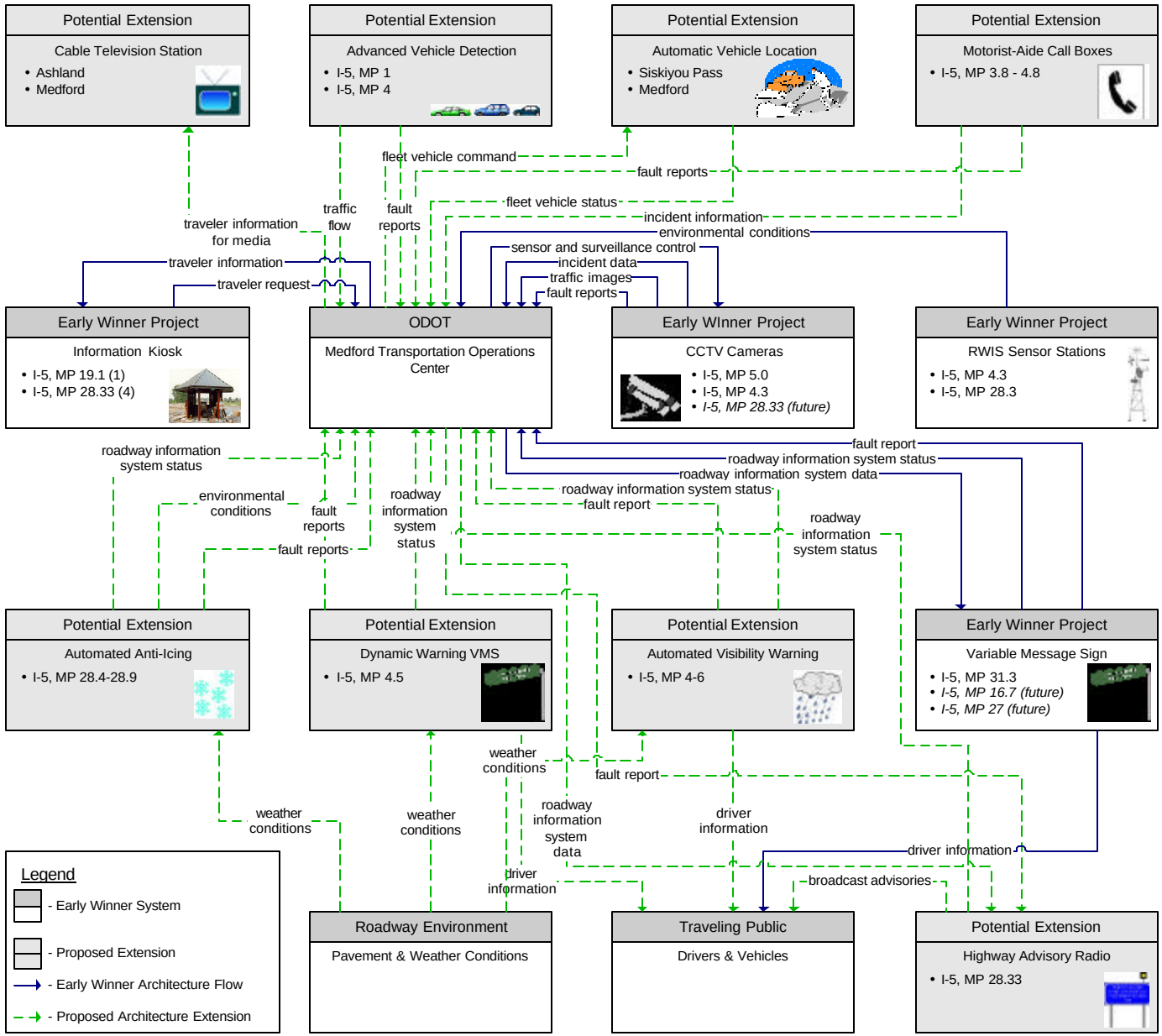

Figure 5-2: Early Winner Project Architecture (Oregon).

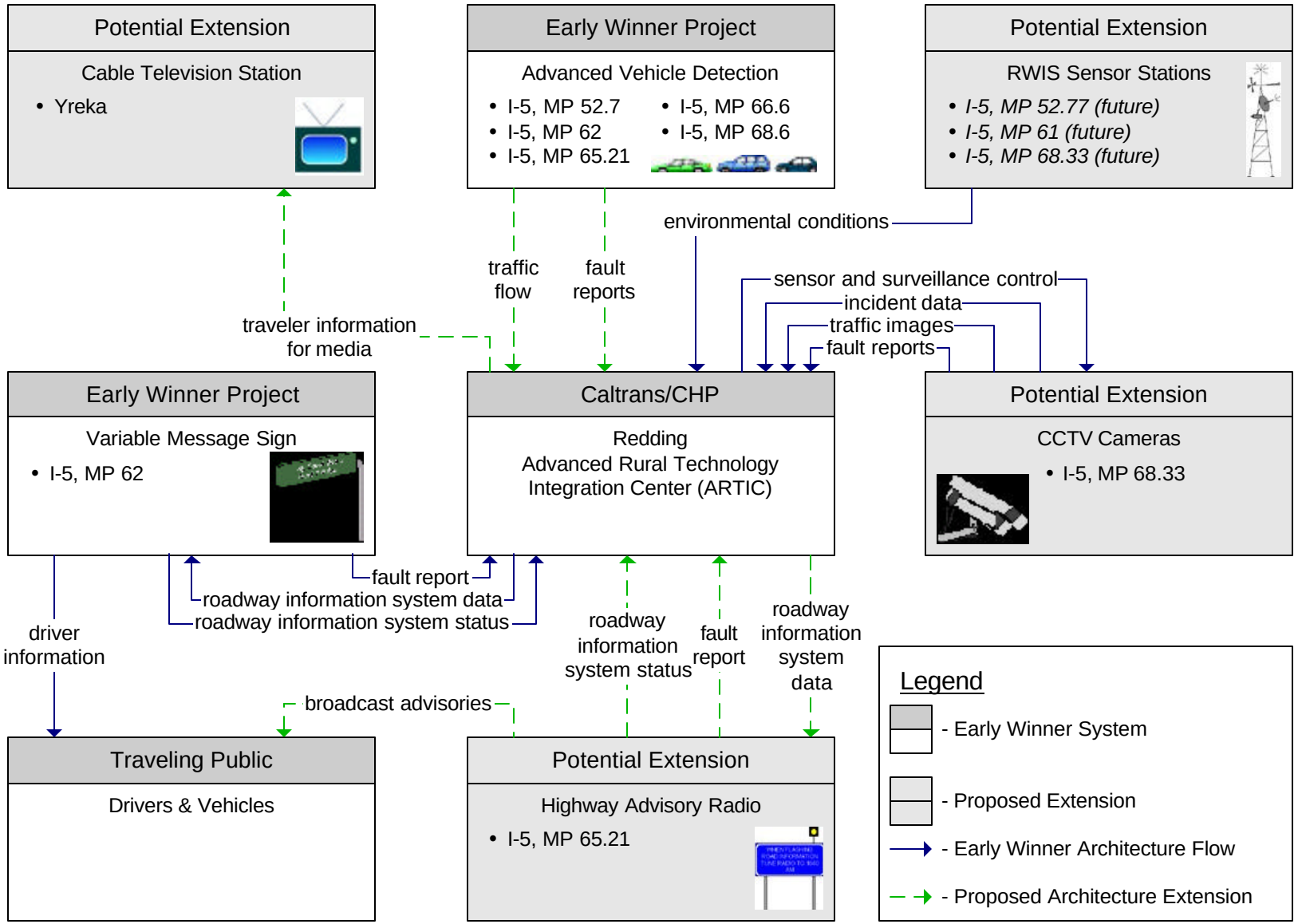

Figure 5-3: Early Winner Project Architecture (California).

Internet. Once this has been accomplished, these kiosks may provide information similar to the cable television station, a link to ODOT's TripCheck interface, or other helpful pre-trip information.

- Automated Anti-Icing. This technology involves spot application of anti-icing chemicals at areas which tend to freeze earlier and more frequently, such as bridges. The Medford viaduct was identified as a short-term location for this technology. This can reduce the number of trips maintenance workers need to devote to the viaduct and potentially direct more of their efforts to keeping the pass open.

- Dynamic Warning Variable Message Signs. This technology combines dynamic messaging with vehicle detection technology to provide customized messages to vehicles regarding appropriate driving speeds. Short-term deployment is recommended for the immediate vicinity around the Pass, with one sign in each travel direction.

- Automated Visibility Warning. To deal with sudden poor visibility in the pass area, automated visibility warning systems may provide advanced notification to drivers in order to reduce rear-end collisions. This system may notify the TOC when it is activated.

- Highway Advisory Radio. Located in Medford, this proposed deployment would help to provide en-route traveler information in addition to variable message signs. This technology permits more detailed information about expected delays, detours or chain requirements to be provided.

The architecture flow diagram shows each of these technologies having real-time communications with the TOC. The specific media employed will depend upon the availability of nearby landline coverage and/or the coverage area for wireless communications. The amount of data required to be transmitted will vary considerably between RWIS, which send a short stream of textual data on an intermittent basis, and CCTV, which are capable of transmitting real-time video. In addition to the data exchange indicated on the flow diagram, technologies are shown sending "fault reports" to the TOC, which may help to provide early notification of malfunctioning equipment.

Figure 5-2 presents a simplified picture in that it does not include the communications involved with the Siskiyou Pass Incident Management Plan, which coordinates emergency response and dispatch activities among several agencies on both sides of the state border, and SOVA, which would continue to be responsible for kiosks.

Figure 5-3 depicts data flows on the California side of the border. The Redding ARTIC has responsibility over this section of Interstate 5, and will have oversight over Caltrans' ITS devices. Caltrans will be employing similar technologies as ODOT. However, as different vendors may be used to supply technologies, it is critical that a conscious effort be made to coordinate information flow between the Medford TOC and Redding ARTIC, as shown in Figure 5-4. As ITS infrastructure in the vicinity of the border increases, it is critical that information exchange across the state boundary be as seamless as possible.

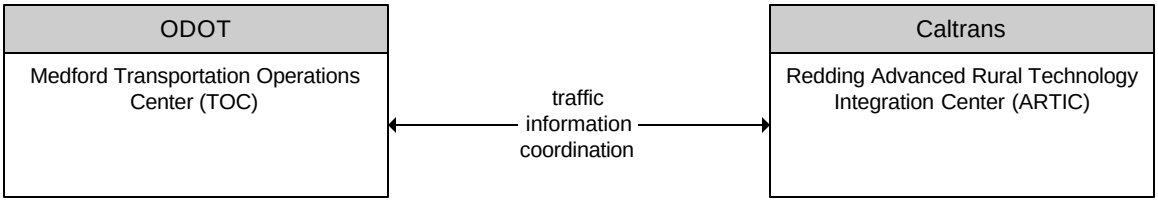

Figure 5-4: Potential Coordination Flow Between Medford TOC and Redding ARTIC.

Table 5-1 provides a brief definition of each architecture flow in the figure and an indication of how the flow will be used in the COATS region.

The core project includes controllers, a variable message sign, a kiosk, RWIS sensor stations, CCTV cameras and the communications system that connects these field elements with the Medford TOC or the Redding ARTIC. Several major avenues for project enhancement are available. These include: 1) the integration of deployed RWIS, traffic monitoring, and variable message sign technologies to implement dynamic warning systems that warn drivers that are driving too fast for current conditions; and 2) broader distribution of current pass conditions, including CCTV camera images, via a local cable channel or the internet. These more advanced features are taken into consideration in the project architecture so that these expansion options can be addressed in future upgrades.

5.3 Related ITS Standards

The standards that are related to the early winner project are identified in Table 5-2. Standards are documented agreements that contain technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics for the interchange of data. Each row in the table identifies a standard and the architecture flow that it supports. Standards that are applicable to multiple flows are repeated more than once in the table. The last three columns in the table indicate whether the standard establishes communications protocol, data dictionary, or message set standards for ITS. Communications protocol standards define sets of rules for moving data and associated messages. A data dictionary standard defines the organization of the database so that the data is given meaning. The message set standards identify associated data elements for typical applications. All three types of standards may be required to fully define an interoperable interface. This comprehensive standards list was generated based on the relationships between the project architecture, the National ITS Architecture, and the standards activities. These lists should be reviewed and refined to identify the subset of these standards that should actually be considered for use in project implementation.

Table 5-1: Regional Architecture Flows Related to Early Winner Project.

Source	Destination	Flow	Definition	COATS Application
Advanced Vehicle Detection	Medford TOC and Redding ARTIC	traffic flow	Raw and/or processed traffic detector information which allows derivation of traffic flow variables (e.g., speed, volume and density measures).	"Advanced" refers to non-intrusive vehicle detection technologies that could perform acceptably under the varied climatic conditions at Siskiyou Pass. Traffic data provided by these detection stations could supplement information provided by CCTV cameras about current traffic conditions.
Automated Anti-Icing, Automated Visibility Warning, Dynamic Warning VMS, Highway Advisory Radio, Variable Message Sign	Medford TOC and Redding ARTIC	roadway information system status	Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.	Each of these technologies can return their current operational status. In addition to this, the Dynamic Warning VMS can return current traffic measurements that can be used to determine the affect the sign is having on average vehicle speeds.
Automated Anti-Icing, Dynamic Warning VMS	Medford TOC	environmental conditions	Current environment conditions (e.g., air temperature, wind speed, surface temperature) as measured by environmental sensors and communicated by supporting field equipment.	Sensors that measure current conditions in order to provide more accurate dynamic warnings to drivers can also be used for remote sensing and data collection at the TOC/ARTIC.
Automated Visibility Warning, Dynamic Warning VMS, and Variable Message Sign	Drivers & Vehicles	driver information	General advisory and traffic control information provided to the driver while en-route.	The Variable Message Sign will receive messages directly from the TOC, while the other two technologies are designed to provide information to motorists independently of human input. Due to space limitations, communications using these technologies are required to be brief but clear.
Automatic Vehicle Location	Medford TOC	fleet vehicle status*	For a maintenance vehicle, this could include not only the vehicle's location, but also its current maintenance activity (i.e. plow raised, door open, etc.).	Maintenance vehicles equipped with AVL could be dispatched more effectively in order to expedite response to incidents and adverse road surface conditions.
CCTV Cameras	Medford TOC and Redding ARTIC	incident data	Data and imagery from the roadside supporting incident detection and verification.	Included in the initial project architecture. CCTV may be used to verify the location and severity of incidents in the Siskiyou Pass area. Their area of coverage will be limited by surrounding topography and visibility conditions, and consequently will not be able to verify all incidents occurring in the pass area.
CCTV Cameras	Medford TOC and Redding ARTIC	traffic images	High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.	Included in the initial project architecture. Although the National ITS Architecture definition specifies "real-time" and "high fidelity," this is not a true requirement for many applications, including this COATS application.

* - Customized Architecture Flow

Table 5-1: Regional Architecture Flows Related to Early Winner Project (cont.).

Source	Destination	Flow	Definition	COATS Application
Highway Advisory Radio	Drivers & Vehicles	broadcast advisories	General broadcast advisories that are provided over wide-area wireless communications direct to the vehicle radio. These analog advisory messages may provide similar content to ITS broadcast information flows, but include no digital data component.	These systems could provide more detailed en-route traveler information based on current conditions, such as descriptions of detours or road closures, information about chains requirements, and estimates of expected travel delay.
Information Kiosk	Medford TOC	traveler request	Request by a traveler to summon assistance, request information, make a reservation, or initiate any other traveler service.	This flow would not be required for an initial implementation since the kiosk does not necessarily need to forward traveler requests back to the TOC/ARTIC. More advanced interactive services could be supported by this flow in future implementations.
Medford TOC	Automatic Vehicle Location	fleet vehicle command*	Requests provided by dispatchers to vehicle operators to place vehicle activities in locations where they would be most beneficial.	The chain of command as shown in the flow diagram may be simpler than actually occurs. Other agencies involved in traffic management, such as law enforcement, may also be involved in vehicle dispatching and command decisions.
Medford TOC and Redding ARTIC	Cable Television Station	traveler information for media	General traveler information regarding incidents, unusual traffic conditions, transit issues, or other advisory information that has been desensitized and provided to the media.	Would also include camera images in this implementation, although this is not specifically identified in the National ITS Architecture description.
Medford TOC and Redding ARTIC	CCTV Cameras	sensor and surveillance control	Information used to configure and control sensor and surveillance systems at the roadside.	Included in the initial project architecture. This is the interface between the sign display and the driver's eyes which is subject to uniformity standards (e.g., MUTCD) but as a human interface, is not the focus of the regional architecture.
Medford TOC and Redding ARTIC	Highway Advisory Radio, Variable Message Sign	roadway information system data	Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these systems.	Included in the initial project architecture. The highway advisory radio and variable message sign are additions to an existing system, which will influence standards decisions for this interface.

* - Customized Architecture Flow

Table 5-1: Regional Architecture Flows Related to Early Winner Project (cont.).

Source	Destination	Flow	Definition	COATS Application
Medford TOC and Redding ARTIC	Dynamic Warning VMS	roadway information system data	Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these systems.	Preliminary project descriptions indicate the first DWS installations will be autonomous. Two-way communications would allow system operation (and vehicle behavior) to be remotely monitored and collected.
Medford TOC and Redding ARTIC	Dynamic Warning VMS	sensor and surveillance control	Information used to configure and control sensor and surveillance systems at the roadside.	Real-time measures of road surface conditions can be measured and factored into the safe speed warnings that are displayed. These sensors will be deployed as part of the project.
Medford TOC and Redding ARTIC	Information Kiosk	traveler information	Traveler information comprised of traffic status, advisories, incidents, payment information and many other travel-related data updates and confirmations.	Included in the initial project architecture. Camera images may be provided to the kiosks based on the project description. This information stream could include a variety of visitor and traveler information relevant to I-5 travelers.
Medford TOC and Redding ARTIC	RWIS Sensor Stations	sensor and surveillance control	Information used to configure and control sensor and surveillance systems at the roadside.	Included in the initial project architecture. Two-way communications would allow the sensor stations to be remotely controlled.
Motorist-Aide Call Boxes	Medford TOC	incident information*	Manual reports from travelers using roadside telephones, describing vehicle breakdowns, incidents, or other factors that may severely disrupt traffic flow.	Call boxes can provide important early notification of situations which may cause severe traffic disruptions. They provide an important supplement for motorists who do not have access to wireless communications.
Pavement & Weather Conditions	Automated Anti-Icing, Dynamic Warning VMS, Automated Visibility Warning	weather conditions	Collected weather condition data from sensors.	This data flow differs from that transmitted by RWIS sensors because it would consist only a couple of measurements, specific to the needs of that site. It also would need to be measured continuously, and not in ten-minute polling intervals as is typical of RWIS sensors.
RWIS Sensor Stations	Medford TOC and Redding ARTIC	environmental conditions	Current environment conditions (e.g., air temperature, wind speed, surface temperature) as measured by environmental sensors and communicated by supporting field equipment.	Included in the initial project architecture.

* - Customized Architecture Flow

Table 5-1: Regional Architecture Flows Related to Early Winner Project (cont.).

Source	Destination	Flow	Definition	COATS Application
Variable Message Sign	Medford TOC and Redding ARTIC	roadway information system status	Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.	Included in the initial project architecture. This variable message sign is an addition to an existing system, which will influence standards decisions for this interface.
Various devices	Medford TOC and Redding ARTIC	fault reports	Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.	This capability ensures that maintenance staff are made aware of malfunctioning equipment in a timely fashion.
Redding ARTIC and Medford TOC	Medford TOC and Redding ARTIC	traffic information coordination	Traffic information exchanged between ARTIC/TOCs. Normally would include incidents, congestion data, traffic data, signal timing plans, and real-time signal control information.	This flow would allow coordination of data that is collected from RWIS sensors and traffic detectors and traveler information that is being displayed on the variable message signs that are installed on both sides of the state boundary at Siskiyou pass. This flow supports coordination of this information between the two state DOT management centers that operate this equipment. In the future, this interface could be expanded to also support control coordination so that either TOC/ARTIC could control the Siskiyou Pass field equipment within some mutually agreed operating conventions.

* - Customized Architecture Flow

Table 5-2: ITS Standards Relevant to Early Winner Project.

Flow	SDO	Standard Title	Doc ID	Protocol		
				C	D	M
environmental conditions	AASHTO	NTCIP - Base Standard: Octet Encoding Rules (OER)	1102	C		
environmental conditions	AASHTO	NTCIP - Class B Profile	2001	C		
environmental conditions	AASHTO	NTCIP - Point to Multi-Point Protocol Using RS-232 Subnetwork Profile	2101	C		
environmental conditions	AASHTO	NTCIP - Internet (TCP/IP and UDP/IP) Transport Profile	2202	C		
environmental conditions	AASHTO	NTCIP - Application Profile for Simple Transportation Management Framework (STMF)	2301	C		
environmental conditions	AASHTO	NTCIP - Application Profile for Trivial File Transfer Protocol	2302	C		
environmental conditions	AASHTO	NTCIP - Application Profile for File Transfer Protocol (FTP)	2303	C		
environmental conditions	AASHTO	NTCIP - Simple Transportation Management Framework (STMF)	1101		D	M
environmental conditions	AASHTO	NTCIP - Simple Transportation Management Protocol (STMP)	1103		D	M
environmental conditions	AASHTO	NTCIP - Global Object Definitions	1201		D	M
environmental conditions	AASHTO	NTCIP - Object Definitions for Environmental Sensor Stations & Roadside Weather Information System	1204		D	M
environmental conditions	AASHTO	NTCIP - Subnetwork Profile for Point-to-Point Protocol using RS 232	2103		D	M
environmental conditions	AASHTO	NTCIP - Subnetwork Profile for Ethernet	2104		D	M
environmental conditions	AASHTO	NTCIP - TP-Null Transport Profile	2201		D	M
roadway information system data	AASHTO	NTCIP - Base Standard: Octet Encoding Rules (OER)	1102	C		
roadway information system data	AASHTO	NTCIP - Class B Profile	2001	C		
roadway information system data	AASHTO	NTCIP - Point to Multi-Point Protocol Using RS-232 Subnetwork Profile	2101	C		
roadway information system data	AASHTO	NTCIP - Internet (TCP/IP and UDP/IP) Transport Profile	2202	C		
roadway information system data	AASHTO	NTCIP - Application Profile for Simple Transportation Management Framework (STMF)	2301	C		
roadway information system data	AASHTO	NTCIP - Application Profile for Trivial File Transfer Protocol	2302	C		
roadway information system data	AASHTO	NTCIP - Application Profile for File Transfer Protocol (FTP)	2303	C		

Legend: SDO = Standards Development Organization; Doc ID = Document Identification Number; C = Communications Protocol; D = Data Dictionary Protocol; M = Message Set Protocol.

Table 5-2: ITS Standards Relevant to Early Winner Project (cont.).

Flow	SDO	Standard Title	Doc ID	Protocol		
				C	D	M
roadway information system data	AASHTO	NTCIP - Simple Transportation Management Framework (STMF)	1101		D	M
roadway information system data	AASHTO	NTCIP - Simple Transportation Management Protocol (STMP)	1103		D	M
roadway information system data	AASHTO	NTCIP - Global Object Definitions	1201		D	M
roadway information system data	AASHTO	NTCIP - Object Definitions for Dynamic Message Signs	1203		D	M
roadway information system data	AASHTO	NTCIP - Data Dictionary for Closed Circuit Television (CCTV)	1205		D	M
roadway information system data	AASHTO	NTCIP - Object Definitions for Video Switches	1208		D	M
roadway information system data	AASHTO	NTCIP - Subnetwork Profile for Point-to-Point Protocol using RS 232	2103		D	M
roadway information system data	AASHTO	NTCIP - Subnetwork Profile for Ethernet	2104		D	M
roadway information system data	AASHTO	NTCIP - TP-Null Transport Profile	2201		D	M
roadway information system status	AASHTO	NTCIP - Base Standard: Octet Encoding Rules (OER)	1102	C		
roadway information system status	AASHTO	NTCIP – Class B Profile	2001	C		
roadway information system status	AASHTO	NTCIP – Point to Multi-Point Protocol Using RS-232 Subnetwork Profile	2101	C		
roadway information system status	AASHTO	NTCIP – Internet (TCP/IP and UDP/IP) Transport Profile	2202	C		
roadway information system status	AASHTO	NTCIP – Application Profile for Simple Transportation Management Framework (STMF)	2301	C		
roadway information system status	AASHTO	NTCIP – Application Profile for Trivial File Transfer Protocol	2302	C		
roadway information system status	AASHTO	NTCIP – Application Profile for File Transfer Protocol (FTP)	2303	C		
roadway information system status	AASHTO	NTCIP – Simple Transportation Management Framework (STMF)	1101		D	M
roadway information system status	AASHTO	NTCIP – Simple Transportation Management Protocol (STMP)	1103		D	M
roadway information system status	AASHTO	NTCIP – Global Object Definitions	1201		D	M
roadway information system status	AASHTO	NTCIP – Object Definitions for Dynamic Message Signs	1203		D	M

Legend: SDO = Standards Development Organization; Doc ID = Document Identification Number; C = Communications Protocol; D = Data Dictionary Protocol; M = Message Set Protocol.

Table 5-2: ITS Standards Relevant to Early Winner Project (cont.).

Flow	SDO	Standard Title	Doc ID	Protocol		
				C	D	M
roadway information system status	AASHTO	NTCIP – Subnetwork Profile for Point-to-Point Protocol using RS 232	2103		D	M
roadway information system status	AASHTO	NTCIP – Subnetwork Profile for Ethernet	2104		D	M
roadway information system status	AASHTO	NTCIP – TP-Null Transport Profile	2201		D	M
sensor and surveillance control	AASHTO	NTCIP – Base Standard: Octet Encoding Rules (OER)	1102	C		
sensor and surveillance control	AASHTO	NTCIP – Class B Profile	2001	C		
sensor and surveillance control	AASHTO	NTCIP – Point to Multi-Point Protocol Using RS-232 Subnetwork Profile	2101	C		
sensor and surveillance control	AASHTO	NTCIP – Internet (TCP/IP and UDP/IP) Transport Profile	2202	C		
sensor and surveillance control	AASHTO	NTCIP – Application Profile for Simple Transportation Management Framework (STMF)	2301	C		
sensor and surveillance control	AASHTO	NTCIP – Application Profile for Trivial File Transfer Protocol	2302	C		
sensor and surveillance control	AASHTO	NTCIP – Application Profile for File Transfer Protocol (FTP)	2303	C		
sensor and surveillance control	AASHTO	NTCIP – Simple Transportation Management Framework (STMF)	1101		D	M
sensor and surveillance control	AASHTO	NTCIP – Simple Transportation Management Protocol (STMP)	1103		D	M
sensor and surveillance control	AASHTO	NTCIP – Global Object Definitions	1201		D	M
sensor and surveillance control	AASHTO	NTCIP – Data Collection & Monitoring Devices	1206		D	M
sensor and surveillance control	AASHTO	NTCIP – Transportation System Sensor Objects	1209		D	M
sensor and surveillance control	AASHTO	NTCIP – Subnetwork Profile for Point-to-Point Protocol using RS 232	2103		D	M
sensor and surveillance control	AASHTO	NTCIP – Subnetwork Profile for Ethernet	2104		D	M
sensor and surveillance control	AASHTO	NTCIP – TP-Null Transport Profile	2201		D	M
traffic images	AASHTO	NTCIP – Base Standard: Octet Encoding Rules (OER)	1102	C		
traffic images	AASHTO	NTCIP – Internet (TCP/IP and UDP/IP) Transport Profile	2202	C		

Legend: SDO = Standards Development Organization; Doc ID = Document Identification Number; C = Communications Protocol; D = Data Dictionary Protocol; M = Message Set Protocol.

Table 5-2: ITS Standards Relevant to Early Winner Project (cont.).

Flow	SDO	Standard Title	Doc ID	Protocol		
				C	D	M
traffic images	AASHTO	NTCIP – Application Profile for Simple Transportation Management Framework (STMF)	2301	C		
traffic images	AASHTO	NTCIP – Application Profile for Trivial File Transfer Protocol	2302	C		
traffic images	AASHTO	NTCIP – Application Profile for File Transfer Protocol (FTP)	2303	C		
traffic images	AASHTO	NTCIP – Simple Transportation Management Framework (STMF)	1101		D	M
traffic images	AASHTO	NTCIP – Simple Transportation Management Protocol (STMP)	1103		D	M
traffic images	AASHTO	NTCIP – Global Object Definitions	1201		D	M
traffic images	AASHTO	NTCIP – Data Dictionary for Closed Circuit Television (CCTV)	1205		D	M
traffic images	AASHTO	NTCIP – Object Definitions for Video Switches	1208		D	M
traffic images	AASHTO	NTCIP – Subnetwork Profile for Ethernet	2104		D	M
traffic images	AASHTO	NTCIP – TP-Null Transport Profile	2201		D	M
traveler information	SAE	Standard for ATIS Message Sets Delivered Over Bandwidth Restricted Media	J2369	C	D	M
traveler information	SAE	ISP-Vehicle Location Referencing Message Profiles	J1746		D	
traveler information	SAE	Advanced Traveler Information System (ATIS) Data Dictionary	J2353		D	
traveler information	SAE	Advanced Traveler Information System (ATIS) Message Set	J2354			M
traveler information for media	AASHTO	NTCIP – Base Standard: Octet Encoding Rules (OER)	1102	C		
traveler information for media	AASHTO	NTCIP – Internet (TCP/IP and UDP/IP) Transport Profile	2202	C		
traveler information for media	AASHTO	NTCIP – Application Profile for Trivial File Transfer Protocol	2302	C		
traveler information for media	AASHTO	NTCIP – Application Profile for File Transfer Protocol (FTP)	2303	C		
traveler information for media	AASHTO	NTCIP – Applications Profile for Data Exchange ASN.1 (DATEX)	2304	C		
traveler information for media	AASHTO	NTCIP – Applications Profile for Common Object Request Broker Architecture (CORBA)	2305	C		
traveler information for media	AASHTO	NTCIP – Subnetwork Profile for Ethernet	2104		D	M

Legend: SDO = Standards Development Organization; Doc ID = Document Identification Number; C = Communications Protocol; D = Data Dictionary Protocol; M = Message Set Protocol.

Table 5-2: ITS Standards Relevant to Early Winner Project (cont.).

Flow	SDO	Standard Title	Doc ID	Protocol		
				C	D	M
traveler information for media	SAE	Advanced Traveler Information System (ATIS) Data Dictionary	J2353		D	
traveler information for media	SAE	Advanced Traveler Information System (ATIS) Message Set	J2354			M
traveler request	SAE	Advanced Traveler Information System (ATIS) Data Dictionary	J2353		D	
traveler request	SAE	Advanced Traveler Information System (ATIS) Message Set	J2354			M
traffic information coordination	AASHTO	NTCIP – Base Standard: Octet Encoding Rules (OER)	1102	C		
traffic information coordination	AASHTO	NTCIP – Internet (TCP/IP and UDP/IP) Transport Profile	2202	C		
traffic information coordination	AASHTO	NTCIP – Application Profile for Trivial File Transfer Protocol	2302	C		
traffic information coordination	AASHTO	NTCIP – Application Profile for File Transfer Protocol (FTP)	2303	C		
traffic information coordination	AASHTO	NTCIP – Applications Profile for Data Exchange ASN.1 (DATEX)	2304	C		
traffic information coordination	AASHTO	NTCIP – Applications Profile for Common Object Request Broker Architecture (CORBA)	2305	C		
traffic information coordination	AASHTO	NTCIP – Subnetwork Profile for Ethernet	2104		D	M
traffic information coordination	ITE	Standard for Functional Level Traffic Management Data Dictionary (TMDD)	TM 1.03		D	
traffic information coordination	ITE	Message Set for External TMC Communication (MS/ETMCC)	TM 2.01			M

Legend: SDO = Standards Development Organization; Doc ID = Document Identification Number; C = Communications Protocol; D = Data Dictionary Protocol; M = Message Set Protocol.

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6 NEXT STEPS

This report has provided an overview of the process of developing the COATS Regional Architecture, and has given some general information about the content of its associated Turbo Architecture database. The regional architecture has been defined at a very high level for the COATS region as a whole, and includes three subregional architectures and an early winner project architecture. As this effort satisfies TEA-21 requirements of conformity to the National ITS Architecture, it provides an important input into the development of the COATS ITS Strategic Deployment Plan.

It should be understood, however, that this initial ITS architecture development is only the first step in the sustained planning and integration effort. The first steps in the process involved identification and definition of the regional stakeholders and systems as well as the regional needs and challenges. The architecture development phase has involved the identification and definition of the system interconnects and information flows.

The development of an ITS architecture is, by its very nature, very dynamic, as shown in Figure 6-1. The architecture is a blueprint for project development and, consequently, will need regular review and updating to insure its validity. Therefore, the next step in the process is the validation process. The validation process occurs at three levels.

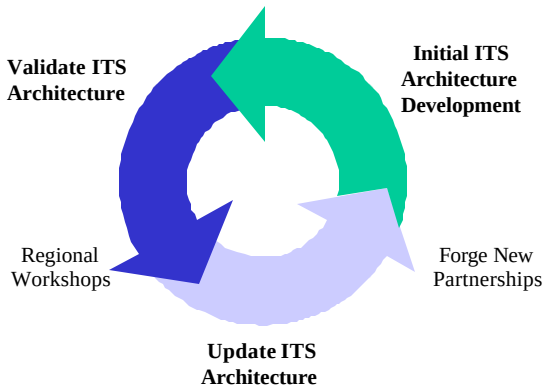

Figure 6-1: Development and Refinement of a Regional ITS Architecture.

- Stakeholder and system level. Each stakeholder and associated organization needs to identify and validate their systems, the interfaces and information flows. This step is best done by the stakeholders themselves, since they are most familiar with their own systems as well as the needs and challenges of their individual organization and related systems.

- Subregional level. The validation of the subregional ITS architecture includes the identification of the subregional systems, interfaces and information flows. It is suggested that workshops be held with subregional stakeholders as part of the validation effort for subregional architectures.

- COATS regional level. It is also recommended that a regional workshop be held for validation of the COATS Regional Architecture.

Each of these validation activities is beyond the scope of the strategic deployment plan of which this ITS architecture is a component; however, they would be quite valuable in making the architecture more useful to stakeholders. To facilitate this validation, the COATS Regional Architecture is maintained as a "living" database, available on the Internet from

http://www.coe.montana.edu/wti. The database can be adapted in the future as regional requirements evolve.

The initial ITS architecture for the Early Winner Project on the Siskiyou Pass shows that there is a need to improve communication and information exchange across the Oregon – California State line. For motorists on Interstate 5, the state line is almost invisible, with the exception of the respective states' welcome signs. The early winner ITS architecture indicates that the ODOT equipment communicates with the Medford TOC and the Caltrans equipment communicates with the Redding ARTIC. However, the Redding and Medford centers do not have any advanced communication systems between each other at this time. The development of a seamless communication and information exchange between the Medford and Redding centers will be necessary in order to develop a truly regional transportation system, which can more adequately address the region's transportation needs and challenges.

The regional architecture presented in this report may provide significant benefits to stakeholders throughout the region. It may help to leverage resources for ITS projects in the COATS study area. It highlights new opportunities for partnership in order to utilize scarce resources more efficiently, promotes interoperability and integration, and provides guidance for defining new projects. However, just as the ongoing success of the COATS project hinges on the development and pursuit of working relationships with new stakeholders, so the success of this regional architecture depends upon the ongoing input from stakeholders to maximize its potential. Consequently, validation efforts should be undertaken by COATS stakeholders in order to help address the transportation challenges of the COATS region in a truly regional way.

REFERENCES

1. *California / Oregon Advanced Transportation Systems Project Regional Stakeholder Partnership Business Plan Working Paper*. Western Transportation Institute, Bozeman [MT]: June 1998.
2. *California / Oregon Advanced Transportation Systems (COATS) Stakeholder Outreach Workshop Summary*. Western Transportation Institute, Bozeman [MT]: March 1999.
3. Cuelho, Eli and Amy Gill, *COATS Technical Memorandum One: Volume One, Review of Legacy Systems.* Western Transportation Institute, Bozeman [MT]: November 1998.
4. McGowen, Pat and Alyssa Reynolds, *COATS Technical Memorandum One: Volume Two, Conditions and Performance*. Western Transportation Institute, Bozeman [MT]: November 1998.
5. Harry, Scott R., Randy W. Carroll and John M. Mounce, *Northern California / Southern Oregon Rural Intelligent Transportation Systems (ITS) Areawide Travel and Safety Improvement Project: Traveler Needs Survey (Volume I)*. Western Transportation Institute, Bozeman [MT]: September 1998.
6. Harry, Scott R., Randy W. Carroll and John M. Mounce, *Northern California / Southern Oregon Rural Intelligent Transportation Systems (ITS) Areawide Travel and Safety Improvement Project: Traveler Needs Survey Significance Testing (Volume II)*. Western Transportation Institute, Bozeman [MT]: August 1998.
7. *California / Oregon Advanced Transportation Systems: Project Infrastructure*. Western Transportation Institute, Bozeman [MT]: March 1999.
8. *California / Oregon Advanced Transportation Systems: Candidate Early-Winner Projects.* Western Transportation Institute, Bozeman [MT]: April 1999.
9. California Department of Transportation Web site, http://svhqsgi4.dot.ca.gov/hq/traffops/saferesr/trafdata/1998all/r005-6i.htm. Accessed June 22, 2000.
10. "Siskiyou Pass Traveler Safety and Incident Management: Evaluation Plan." Western Transportation Institute, Bozeman [MT]: January 2000.

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APPENDIX A COMMUNICATIONS AND INFORMATION SURVEY

See following pages.

CALIFORNIA – OREGON ADVANCED TRANSPORTATION SYSTEMS PROJECT

QUESTIONNAIRE

Name_____

Title_____

Agency/Affiliation_____

Purpose: *To identify your agency's priority transportation-related information needs that may be improved through transportation system improvements being developed under the COATS program. The survey will help determine how those improvements will be most compatible with the ways your agency receives and transmits information, both currently and in the near future.*

Survey Content:

1A: Transportation-related information **CURRENTLY RECEIVED** by your organization *(either from other organizations or from remote technologies)***.**

1B: Transportation-related information that your organization would **LIKE TO RECEIVE** in the future *(either from other organizations or from remote technologies)***.**

2A: Transportation-related information **CURRENTLY PROVIDED** by your organization.

2B: Transportation-related information that your organization would **LIKE TO PROVIDE** in the future.

Instructions:

1. Review the purpose of the survey.
2. Provide organizations name AND/OR technology types in t1he areas provided in the table. *If more than three lines are needed for any category, use the space labeled "**Other**"; specifying the type of information in the blank provided.*
3. Match the organization **OR** technology to a communication method using the symbols provided in the legend at the bottom of each page (*see example provided on page 2 of the survey*).
4. To ensure your transportation-related needs are incorporated in the results, send the completed survey to the Western Transportation Institute, MSU-Bozeman, using the contact information provided at the end of the survey by **Monday, November 1, 1999**.

Section 1A: Information CURRENTLY RECEIVED by Your Agency/Organization

Information Types	From what ORGANIZATIONS AND/OR TECHNOLOGIES are you CURRENTLY RECEIVING these types of information?	Associated Communication Methods (A-H) *See table below*
EXAMPLE	1. *XYZ Organization*	1. B, D
	2. *Remote Weather Station*	2. A
	3. *On-site personnel*	3. C
Weather Conditions	1. 2. 3.	1. 2. 3.
Road Conditions	1. 2. 3.	1. 2. 3.
Unusual Conditions (e.g., extreme weather, emergency travel only, etc.)	1. 2. 3.	1. 2. 3.
Crashes and Breakdowns	1. 2. 3.	1. 2. 3.
Maintenance Needs (e.g., sand, carcass removal, etc.)	1. 2. 3.	1. 2. 3.
Construction Activities	1. 2. 3.	1. 2. 3.
Other: (*please specify*) _____	1. 2. 3.	1. 2. 3.
Other: (*please specify*) _____	1. 2. 3.	1. 2. 3.

Symbol	Method of Communication
A	Telephone
B	Fax
C	Field radio
D	Email
E	Internet
F	Standard mail (USPS)
G	Television, Radio
H	Other (*please specify*)

Section 1B: Information Your Agency would LIKE TO RECEIVE

Information Types	From what ORGANIZATIONS AND/OR TECHNOLOGIES would you LIKE TO RECEIVE these types of information?	Associated Communication Methods (*A*-*H*) *See table below*
Weather Conditions	1. 2. 3.	1. 2. 3.
Road Conditions	1. 2. 3.	1. 2. 3.
Unusual Conditions (e.g., extreme weather, emergency travel only, etc.)	1. 2. 3.	1. 2. 3.
Crashes and Breakdowns	1. 2. 3.	1. 2. 3.
Maintenance Needs (e.g., sand, carcass removal, etc.)	1. 2. 3.	1. 2. 3.
Construction Activities	1. 2. 3.	1. 2. 3.
Other: (*please specify*) _____	1. 2. 3.	1. 2. 3.
Other: (*please specify*) _____	1. 2. 3.	1. 2. 3.

Symbol	Method of Communication
A	**Telephone**
B	**Fax**
C	**Field radio**
D	**Email**
E	**Internet**
F	**Standard mail (USPS)**
G	**Television, Radio**
H	**Other (*please specify*)**

Section 2A: Information CURRENTLY PROVIDED by Your Agency/Organization

Information Types	**To what ORGANIZATIONS do you PROVIDE these types of information?**	**Associated Communication Methods (*A-H*)** *See table below*
Weather Conditions	1. 2. 3.	1. 2. 3.
Road Conditions	1. 2. 3.	1. 2. 3.
Unusual Conditions (e.g., extreme weather, emergency travel only, etc.)	1. 2. 3.	1. 2. 3.
Crashes and Breakdowns	1. 2. 3.	1. 2. 3.
Maintenance Needs (e.g., sand, carcass removal, etc.)	1. 2. 3.	1. 2. 3.
Construction Activities	1. 2. 3.	1. 2. 3.
Other: (*please specify*) _____	1. 2. 3.	1. 2. 3.
Other: (*please specify*) _____	1. 2. 3.	1. 2. 3.

Symbol	Method of Communication
A	**Telephone**
B	**Fax**
C	**Field radio**
D	**Email**
E	**Internet**
F	**Standard mail (USPS)**
G	**Television, Radio**
H	**Other (*please specify*)**

Section 2B: Information Your Organization would LIKE TO PROVIDE

Information Types	**To what ORGANIZATIONS would you LIKE TO PROVIDE these types of information?**	**Associated Communication Methods (*A-H*)** *See table below*
Weather Conditions	1. 2. 3.	1. 2. 3.
Road Conditions	1. 2. 3.	1. 2. 3.
Unusual Conditions (e.g., extreme weather, emergency travel only, etc.)	1. 2. 3.	1. 2. 3.
Crashes and Breakdowns	1. 2. 3.	1. 2. 3.
Maintenance Needs (e.g., sand, carcass removal, etc.)	1. 2. 3.	1. 2. 3.
Construction Activities	1. 2. 3.	1. 2. 3.
Other: (*please specify*) _____	1. 2. 3.	1. 2. 3.
Other: (*please specify*) _____	1. 2. 3.	1. 2. 3.

Symbol	Method of Communication
A	**Telephone**
B	**Fax**
C	**Field radio**
D	**Email**
E	**Internet**
F	**Standard mail (USPS)**
G	**Television, Radio**
H	**Other (*please specify*)**

Other Information

1. What specific pieces of transportation related information would help you do your job more effectively?____

_____

1.a. Which agencies could possibly provide this information? _____

1.b. What plans do you have to receive this information? _____

1.c. What would be the communication mode? _____

_____

2. What major projects do you have coming up that could benefit from some amount of collaboration with any of these agencies listed above? _____

_____

3. Are you satisfied with the timeliness and regularity with which you currently receive information related to:

- ➔ unplanned conditions such as severe weather, crashes, breakdowns, closures? ___ Yes___ No
- ➔ planned conditions such as roadway construction, events, closures and detours? ___ Yes___ No

3.a. If no, what would you like to see changed?_____

_____

4. Please provide any additional comments: _____

_____

_____

_____

Please send completed survey no later than **Monday, November 1, 1999**.

Via fax: ATTN: Eli Cuelho
(406) 994-1697

Via mail: ATTN: Eli Cuelho
Western Transportation Institute
PO Box 173910
Montana State University – Bozeman
Bozeman, MT 59717-3910

Thank you for your input!

If you have questions, please contact Eli Cuelho at:
ph: (406) 994-7886 OR elic@coe.montana.edu

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APPENDIX B ARCHITECTURE WORKSHOP ATTENDANCE

March 1, 2000 – Coos Bay, Oregon

Greg Aldrich, Coquille Economic Development Corporation
John Bennett, Region 3, Oregon Department of Transportation
Jim Burrfield, Curry County Transit
Jay Cable, Reedsport Emergency Management System Coordinator
Larry Close, Mill Casino
Steve Doty, Coos Bay Streets Division
Phil George, Oregon State Police
Sue Holmes, Coos County Transit
Chuck Larsen, Oregon Department of Transportation
Leo Lightle, City of Brookings
Dave McDaniel, Coos County Sheriff, Emergency Management
Galen McGill, ITS Manager, Oregon Department of Transportation
Robin Phillips, Transit, Oregon Department of Transportation
Nathaniel Price, Federal Highway Administration

March 22, 2000 – Klamath Falls, Oregon

Cindy Deas, Klamath/Lake/Modoc/ Siskiyou Outdoor Recreation Working Group
Bob Doran, Oregon Department of Transportation
Starla Fenner, Basin Transit Service
John R. Hawkins, Amtrak
Chuck Larsen, ITS Unit, Oregon Department of Transportation
Mark Macfarlane, USDA Forest Service
Galen McGill, ITS Manager, Oregon Department of Transportation
Jim Mediger, Oregon State Police
Ernest Palmer, Basin Transit Service
Stan Strickland, Klamath County Public Works
Bill Thompson, Klamath County Emergency Services

April 10, 2000 – Redding, California

Nancy Braga, Communications Supervisor, CHP Communications Center – Yreka
Charles Byrd, Sheriff, Shasta County Sheriff's Department
Frank Cechini, Federal Highway Administration
Todd Chadd, Lieutenant, California Highway Patrol – Northern Division
Craig Dorman, Superintendent, Lava Beds National Monument
Jay Gunsauls, Deputy Fire Chief, Redding Fire Department
Scott Holmquist, Field Battalion Chief, California Department of Forestry
Tim Huckabay, Traffic Engineering and Operations, Caltrans District 2
David King, Assistant Chief, California Highway Patrol – Northern Division
Dan Kovacich, Executive Office, Shasta County RTPA
Martin Nicholas, Chief of Police, City of Weed
Craig Sharp, Director, City of Weed Department of Public Works
John Stokes, Transportation Planner, Shasta County RTPA
Steve Thede, Chief of Interpretation, Whiskeytown National Recreation Area
Myrlane Wederbrook, Transportation Engineering Technician, Caltrans District 2
Russ Wenham, Division Chief, Caltrans District 2
Scott White, Associate Planner II, Trinity County RTPA

April 11, 2000 – Eureka, California

Spencer Clifton, Executive Director, Humboldt County Association of Governments
Mia Edington, Caltrans District 1
Janet Jackson, Assistant Roads Director, Hoopa Valley Tribal Roads Department
Michael Lucas, Caltrans District 1
Carol McCall, Public Affairs & Community Relations, Redwood National & State Parks and Smith River National Recreation Area
Randy Mendosa, Lieutenant, Arcata Police Department
Dale Neiman, City Manager, City of Fortuna
Rod Sanderson, Superintendent of Distribution, Pacific Lumber Company
Monty Soulis, Communications Operator II, California Highway Patrol
Martin Van Zandt, Deputy District Director, Maintenance and Operations, Caltrans District 1
Cheryl Willis, Chief, Division Planning, Caltrans District 1

April 13, 2000 – Ukiah, California

Chris Brown, Air Quality Planner, Mendocino County Air Quality Management District
Lisa Davey, Assistant Planner, Mendocino Council of Governments
Phil Dow, Executive Director, Mendocino Council of Governments
Loretta Ellard, Deputy (Planning), Mendocino Council of Governments
Cathy McKeon, Senior Civil Engineer, City of Ukiah
Jim Mulheren, Representative Member, Ukiah Chamber of Commerce
Stanley Townsend, Director, Mendocino County Department of Transportation
Steve Turner, Assistant General Manager, Mendocino Transit Authority

April 24, 2000 – Medford, Oregon

Craig Ackerman, Superintendent, Oregon Caves National Monument
Michael Baker, Oregon Department of Transportation
Mathew Barnes, Rogue Valley Transit District
Ron Butros, Region 3 Traffic Manager, Oregon Department of Transportation
Jared Castle, Public Information Office, Oregon Department of Transportation
Sherrin Coleman, Rogue Valley Transportation District
Sandy Eccker, Jackson County Emergency Management
Robert Fynn, ITS Unit, Oregon Department of Transportation
Joe Hunkins, Southern Oregon Visitors Association
Cindy Johnson, Mobility Works
Dave Marshall, Douglas County Sheriff's Office
Jim McClellan, Mayor, City of Winston
Galen McGill, ITS Manager, Oregon Department of Transportation
Norm Nelson, Douglas County Sheriff's Office
Nathaniel Price, Federal Highway Administration
Gordon Renskers, Lieutenant, Oregon State Police
Mike Spaeth, Medford TOC Dispatch, Oregon Department of Transportation
Wayne Stinson, Douglas County Emergency Services
Chandra Swaminathan, Mobility Works

APPENDIX C INVENTORY OF STAKEHOLDERS AND SUBSYSTEMS

Table C-1 lists all stakeholdrs and subsystems included in the COATS region. For descriptions on individual

Table C-1: Inventory of Stakeholders and Systems.

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
1-800-427-ROAD	Existing		✓	✓	▪ Personal Information Access	This is a toll-free number run by Caltrans which provides current road conditions information. This may be superceded by 511 at a later date.
1-800-977-ODOT	Existing	✓			▪ Personal Information Access	This toll-free number provides current road conditions from all areas within Oregon by touchtone phone (outside of Oregon, this is available at 503-588-2941). The service is provided by ODOT. This may be superceded by 511 at a later date.
Airline Schedule Operations	Existing	✓	✓	✓	▪ Multimodal Transportation Service Provider	Includes Ascot, Horizon, Skywest, United and other airlines offering regular scheduled passenger service.
Amtrak Schedule Operations	Existing	✓	✓	✓	▪ Multimodal Transportation Service Provider	This is the operational entity that provides static and real-time Amtrak schedule information for the COATS architecture.
California Highway Information Web Page	Existing		✓	✓	▪ Information Service Provider ▪ Other ISP ▪ Personal Information Access	This interactive Web-based service (http://www.dot.ca.gov/hq/roadinfo) provides key road construction, detour and closure information based on user-specified route numbers.
California Weigh Stations	Existing		✓	✓	▪ Commercial Vehicle Check	These are locations where commercial vehicles may be weighed and inspected.
Caltrans District 1 Public Affairs	Existing			✓	▪ Media ▪ Public Information Office*	This office is responsible for communicating with local media all news regarding key Caltrans activities in District 1. It may be used to disseminate information about road closures, ongoing construction projects, and other activities that may affect highway travel.
Caltrans District 2 Public Affairs	Existing		✓		▪ Media ▪ Public Information Office*	This office is responsible for communicating with local media all news regarding key Caltrans activities in District 2. It may be used to disseminate information about road closures, ongoing construction projects, and other activities that may affect highway travel.
Caltrans Field Equip District 1 (Eureka)	Existing			✓	▪ Roadway Subsystem	This includes the environmental sensors, variable message signs, HAR, signals, traffic detectors, and any other field equipment and instrumentation operated by Caltrans District 1.
Caltrans Field Equip District 2 (Redding)	Existing		✓		▪ Roadway Subsystem	This includes the environmental sensors, variable message signs, HAR, signals, traffic detectors, and any other field equipment and instrumentation operated by Caltrans District 2.
Caltrans HQ Construction Program	Existing		✓	✓	▪ Construction and Maintenance	This program is responsible for implementing the state's highway construction program. It will provide information to local districts about future construction projects as they are introduced.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Caltrans HQ Permits	Existing		✓	✓	▪ Permitting Office*	The Encroachment Permits department is a part of the office of development services within Caltrans' Traffic Operations program. As the responsible department for protecting the public's investment in the State highway system, the permits office reviews all requests from utility companies, developers, volunteers, nonprofit organizations, etc., desiring to conduct various activities within the right of way. Such activities could include for example: construction of highway improvements, driveway installation and maintenance, highway landscaping and graffiti removal, commercial filming, special events such as parades commemorating an event, e.g. Independence Day.
Caltrans HQ Traffic	Existing		✓	✓	▪ Archived Data Management Subsystem ▪ Other Archives	This office is responsible for coordinating the state's transportation management centers, facilitating data exchange and interoperability. It will also serve as a repository for field data collected at districts across the state.
Caltrans Maintenance District 1 (Eureka)	Existing			✓	▪ Construction and Maintenance ▪ Maintenance Dispatch Office* ▪ Other Maintenance Dispatch Office*	Covers the resource management and dispatch systems operated by Caltrans District 1.
Caltrans Maintenance District 1 (Eureka) Vehicles	Existing			✓	▪ Maintenance Vehicles* ▪ Other Maintenance Vehicles*	These Caltrans vehicles are responsible for maintenance activities, including setting up road closures, assisting in incident removal, and performing winter maintenance. It is assumed that there is seamless communication between the vehicle and its driver, who will actually be directing and performing the maintenance activity.
Caltrans Maintenance District 2 (Redding)	Existing		✓		▪ Construction and Maintenance ▪ Maintenance Dispatch Office* ▪ Other Maintenance Dispatch Office*	Covers the resource management and dispatch systems operated by Caltrans District 2.
Caltrans Maintenance District 2 (Redding) Vehicles	Existing		✓		▪ Maintenance Vehicles* ▪ Other Maintenance Vehicles*	These Caltrans vehicles are responsible for maintenance activities, including setting up road closures, assisting in incident removal, and performing winter maintenance. It is assumed that there is seamless communication between the vehicle and its driver, who will actually be directing and performing the maintenance activity.
Caltrans RWIS	Existing		✓	✓	▪ Weather Service	These are RWIS stations maintained by Caltrans for providing information on atmospheric and pavement temperature conditions at remote sites. Information from these sites is helpful for maintenance officials in making maintenance decisions.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Caltrans Weather Warning Systems	Existing		✓	✓	▪ Roadway Subsystem	These are driver advisory systems which are activated based on certain meteorological conditions or thresholds (e.g. high wind, icy bridge, etc.). They process information provided by a localized weather station and provide a warning to motorists when specified conditions arise.
Caltrans/CHP Eureka ARTIC	Existing			✓	▪ Other TM ▪ Traffic Management	This ARTIC (Advanced Rural Technology Integration Center) plays a central role in the COATS architecture for managing and monitoring the transportation system in Del Norte, Humboldt, Mendocino and Lake Counties. It is a Tier 3 Satellite Operation Center connected to the Oakland Regional TMC.
Caltrans/CHP Oakland Regional TMC	Existing			✓	▪ Other TM	This Tier 1 TMC is tied to Tier 3 Satellite Operation Centers in Eureka and San Luis Obispo.
Caltrans/CHP Redding ARTIC	Existing		✓		▪ Other TM ▪ Traffic Management	This ARTIC (Advanced Rural Technology Integration Center) coordinates transportation operations for north central California, serving Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties. It is a Tier 3 Satellite Operation Center which is connected to the Sacramento TMC.
Caltrans/CHP Sacramento Regional TMC	Existing		✓		▪ Other TM	This Tier 1 TMC is tied to Tier 2 (Urban) TMCs in Stockton and Fresno and Tier 3 Satellite Operation Centers in Redding and Kingvale
CHIN	Existing		✓	✓	▪ Information Service Provider ▪ Other ISP	The California Highway Information Network provides daily adverse travel conditions information. Information is made available to telephone and Internet.
CHP Eureka and Humboldt Division Dispatch and 911 Centers	Existing			✓	▪ Emergency Management ▪ Other EM	This includes offices in Crescent City, Humboldt, Garberville, Ukiah and Clearlake.
CHP Northern District Dispatch and 911 Centers	Existing		✓		▪ Emergency Management ▪ Other EM	This placeholder includes the Redding, Susanville and Yreka dispatch centers. These centers are responsible for CHP offices in Alturas, Cottonwood, Mt. Shasta, Quincy, Redding, Red Bluff, Susanville, Trinity River, and Yreka, as well as Dunsmuir Grade Inspection Facility.
CHP Vehicles	Existing		✓	✓	▪ Emergency Vehicle Subsystem	California Highway Patrol vehicles.
COATS Kiosks	Planned	✓	✓	✓	▪ Remote Traveler Support	This is a planned system which would provide real-time traveler and tourism information to travelers throughout the COATS region.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Commercial Vehicle (Onboard) Systems	Existing	✓	✓	✓	▪ Commercial Vehicle Subsystem	This subsystem resides in a commercial vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations. The Commercial Vehicle Subsystem provides two-way communications between the commercial vehicle drivers, their fleet managers, and roadside officials, and provides HAZMAT response teams with timely and accurate cargo contents information after a vehicle incident.
Commercial Vehicle Driver	Existing	✓	✓	✓	▪ Commercial Vehicle Driver	This terminator represents the human entity that operates vehicles transporting goods including both long haul trucks and local pick up and delivery vans.
Commercial Vehicles	Existing	✓	✓	✓	▪ Commercial Vehicle	The actual commercial vehicle along with the special aspects of large commercial vehicles and vehicles designed to carry cargo that extend beyond the characteristics defined for the Basic Vehicle. This terminator thus represents a special type of Basic Vehicle that is used to transport goods or services which are operated by professional drivers, typically administered as part of a larger fleet, and regulated by a Commercial Vehicle Manager.
Coos Bay-Area City Traffic Control Equip	Existing	✓			▪ Roadway Subsystem	This includes traffic equipment maintained by the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, and Roseburg.
Coos Bay-Area City Traffic Control Systems	Existing	✓			▪ Other TM ▪ Traffic Management	This includes traffic management activities for the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, Brookings, Port Orford, Gold Beach, Bandon, Myrtle Point, Elkton, Sutherland, Myrtle Creek, and Wells Creek.
Coos Bay-Area County Maintenance Systems	Existing	✓			▪ Construction and Maintenance	This includes Coos County, Curry County, Douglas County and Lane County Maintenance Department systems.
Coos Bay-Area E-911 Comm Centers	Existing	✓			▪ Emergency Management ▪ Other EM	This includes the two communications centers each in Coos and Curry Counties.
Coos Bay-Area EMS Provider Dispatch	Existing	✓		✓	▪ Emergency Management ▪ Other EM	This includes the broad range of private EMS, ambulance and air evacuation providers that serve the Coos Bay area, including Bay Cities Ambulance, Coquille Valley Ambulance, Lower Umpqua EMS, Medic 4 Ambulance, Myrtle Point, Curry County EMS, and Del Norte.
Coos Bay-Area EMS Vehicles	Existing	✓		✓	▪ Emergency Vehicle Subsystem	This includes the broad range of private EMS, ambulance and air evacuation vehicles that serve the Coos Bay area, including Bay Cities Ambulance, Coquille Valley Ambulance, Lower Umpqua EMS, Medic 4 Ambulance, Myrtle Point, Curry County EMS, and Del Norte.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Coos Bay-Area Fire and Rescue Dispatch	Existing	✓			▪ Emergency Management ▪ Other EM	This includes fire and rescue dispatch centers for Coos Bay, North Bend, Florence, Reedsport, Coquille, Hauser, East Bay, Millington, and Charleston. (The last four cities are volunteer.)
Coos Bay-Area Fire and Rescue Vehicles	Existing	✓			▪ Emergency Vehicle Subsystem	This includes fire and rescue vehicles serving Coos Bay, North Bend, Florence, Reedsport, Coquille, Hauser, East Bay, Millington, and Charleston. (The last four cities are volunteer.)
Coos Bay-Area Paratransit Dispatch	Existing	✓			▪ Other TRM ▪ Transit Management	Includes Curry-Coos County Transit System, Senior Transportation.
Coos Bay-Area Paratransit Vehicles	Existing	✓			▪ Transit Vehicle Subsystem	Includes Curry-Coos County Transit System, Senior Transportation.
Coos Bay-Area Planning Agencies	Existing	✓			▪ Archived Data Management Subsystem ▪ Other Archives	This includes various city and county planning agencies that may have use for archived data, including but not limited to the Umpqua Regional Council of Governments.
Coos Bay-Area Police and Sheriff Dispatch	Existing	✓			▪ Emergency Management ▪ Other EM	This includes the police departments for the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, Brookings, Port Orford, Gold Beach, Bandon, Myrtle Point, Elkton, Sutherland, Myrtle Creek, and Wells Creek. This also includes county sheriffs from Coos, Curry and Douglas Counties, as well as tribal police.
Coos Bay-Area Police and Sheriff Vehicles	Existing	✓			▪ Emergency Vehicle Subsystem	This includes law enforcement vehicles for the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, Brookings, Port Orford, Gold Beach, Bandon, Myrtle Point, Elkton, Sutherland, Myrtle Creek, and Wells Creek. This also includes county sheriffs from Coos, Curry and Douglas Counties, as well as tribal police.
Coos Bay-Area Radio Stations and Newspapers	Existing	✓			▪ Media	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the radio and print media intended for human, rather than system, processing and interpretation.
Coos Bay-Area Towing/Recovery	Existing	✓			▪ Other EM	This includes the private tow dispatch systems that clear incidents in the Coos Bay area. This includes numerous individual operators that serve in the region.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Coos Bay-Area Traveler Information Resources	Existing	✓			▪ Yellow Pages Service Providers	This includes Parks and Recreation Departments for the cities of Coos Bay, North Bend, Florence, Reedsport, Coquille, and Roseburg; the Bureau of Land Management; U.S. Forest Service; Oregon Parks & Recreation; Coos County Bikeway Committee; Coos County and Curry County Parks; Bandon Dunes Recreational Area; as well as area hotels, restaurants, gas stations, shopping, etc.
Coos Bay-Area Visitor Information Services	Existing	✓			▪ Information Service Provider ▪ Other ISP	This includes City Chambers of Commerce, Central Oregon Coast Association, Southern Oregon Visitors Association, Oregon Tourism Commission, Oregon Lodging Association, and Coos Bay-North Bend Tourism Promotion Bureau.
CVO Inspector	Existing	✓	✓	✓	▪ CVO Inspector	This terminator represents the human entities who perform regulatory inspection of Commercial Vehicles in the field. CVO Inspectors support the roadside inspection, weighing, and checking of credentials either through automated preclearance or manual methods.
DEQ Medford Regional Office	Existing	✓			▪ Emissions Management	DEQ is responsible for protecting and enhancing Oregon's water and air quality, for cleaning up spills and releases of hazardous materials, and for managing the proper disposal of solid and hazardous wastes. DEQ operates a vehicle inspection program in the Rogue Valley to make sure cars are maintained properly to reduce emissions.
Downtown Parking District	Existing	✓			▪ Parking Management	This district covers the downtown Klamath Falls area.
Drivers	Existing	✓	✓	✓	▪ Driver	This terminator represents the human entity that operates a licensed vehicle on the roadway. Included are operators of private, Transit, Commercial, and Emergency vehicles where the data being sent or received is not particular to the type of vehicle. Thus this external originates driver requests and receives driver information that reflects the interactions which might be useful to all drivers, regardless of vehicle classification.
Eureka-Area Air Districts	Existing			✓	▪ Emissions Management	This includes various districts responsible for air quality management, including the North Coast Unified AQMD (responsible for Del Norte, Humboldt and Trinity Counties), the Lake County AQMD and the Mendocino County AQMD.
Eureka-Area City Traffic Control Equip	Existing			✓	▪ Roadway Subsystem	This includes the field equipment owned and operated by the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Lakeport, Point Arena, Rio Dell, Trinidad. Ukiah and Willits.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Eureka-Area City Traffic Control Systems	Existing			✓	▪ Other TM ▪ Traffic Management	This includes the traffic management functions performed by the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Lakeport, Point Arena, Rio Dell, Trinidad. Ukiah and Willits.
Eureka-Area County Maintenance Systems	Existing			✓	▪ Construction and Maintenance	This includes public works or transportation departments for Del Norte, Humboldt, Lake and Mendocino Counties.
Eureka-Area E-911 Comm Centers	Existing			✓	▪ Emergency Management ▪ Other EM	This includes the wireline public safety answering points on the northern California coast, including but not limited to a center in Curry County, Oregon which provides service to northern Del Norte County.
Eureka-Area EMS Provider Dispatch	Existing			✓	▪ Emergency Management ▪ Other EM	This includes the broad range of private EMS, ambulance and air evacuation providers, including Arcata Mad River Ambulance Inc, City Ambulance of Eureka, City of Lakeport, Coast Guard, Del Norte Air Ambulance, Hoopa Ambulance, Medivac (CalSTAR), Mendocino Coast Hospital Ambulance, North Coast EMS, North Pacific Emergency Services, Redwood Empire Life Support, and Ukiah Ambulance.
Eureka-Area EMS Vehicles	Existing			✓	▪ Emergency Vehicle Subsystem	This includes the broad range of private EMS, ambulance and air evacuation vehicles, including those operated by Arcata Mad River Ambulance Inc, City Ambulance of Eureka, City of Lakeport, Coast Guard, Del Norte Air Ambulance, Hoopa Ambulance, Medivac (CalSTAR), Mendocino Coast Hospital Ambulance, North Coast EMS, North Pacific Emergency Services, Redwood Empire Life Support, and Ukiah Ambulance.
Eureka-Area Fire and Rescue Dispatch	Existing			✓	▪ Emergency Management ▪ Other EM	This includes dispatch functions provided for Arcata Fire District, Blue Lake Fire District, Brooktrails Fire Dept , California Department of Forestry, Clearlake Fire District, Coast Guard (Clear Lake), Coast Guard (Fort Bragg), Crescent City Volunteer Fire Department, Eureka Fire District, Ferndale Fire District, Fort Bragg Fire Department, Fortuna Fire District, Garberville Rescue, Lakeport Fire Dept, Redwood Valley Fire District, Samoa Peninsula Fire District, South Trinity Area Rescue, Ukiah Fire Dept, Ukiah Valley Fire District, Upper Lake Fire District, and Willits Fire Department. This also includes California Fish & Game, National Park Service, U.S. Fish & Wildlife and U.S. Forest Service.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Eureka-Area Fire and Rescue Vehicles	Existing			✓	▪ Emergency Vehicle Subsystem	This includes vehicles owned by Arcata Fire District, Blue Lake Fire District, Brooktrails Fire Dept , California Department of Forestry, Clearlake Fire District, Coast Guard (Clear Lake), Coast Guard (Fort Bragg), Crescent City Volunteer Fire Department, Eureka Fire District, Ferndale Fire District, Fort Bragg Fire Department, Fortuna Fire District, Garberville Rescue, Lakeport Fire Dept, Redwood Valley Fire District, Samoa Peninsula Fire District, South Trinity Area Rescue, Ukiah Fire Dept, Ukiah Valley Fire District, Upper Lake Fire District, and Willits Fire Department. This also includes California Fish & Game, National Park Service, U.S. Fish & Wildlife and U.S. Forest Service.
Eureka-Area Fixed Route Dispatch	Existing			✓	▪ Other TRM ▪ Transit Management	This includes dispatch and management operations for the following transit systems: Arcata-Mad River Transit System, which serves Arcata and Eureka; Eureka Transit Service (run by Humboldt Transit Authority), which provides service to Eureka; Mendocino Transit Authority, which connects cities in Mendocino County; Redwood Coast Transit, which serves Crescent City; and Redwood Transit System (Humboldt Transit Authority), which goes throughout Humboldt County.
Eureka-Area Fixed Route Vehicles	Existing			✓	▪ Transit Vehicle Subsystem	This includes transit vehicles for the following transit systems: Arcata-Mad River Transit System, which serves Arcata and Eureka; Eureka Transit Service (run by Humboldt Transit Authority), which provides service to Eureka; Mendocino Transit Authority, which connects cities in Mendocino County; Redwood Coast Transit, which serves Crescent City; and Redwood Transit System (Humboldt Transit Authority), which goes throughout Humboldt County.
Eureka-Area Municipal Planning Agencies	Existing			✓	▪ Archived Data Management Subsystem ▪ Other Archives	This includes planning divisions for the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Hoopa, Lakeport, Point Arena, Rio Dell, Trinidad, Ukiah, and Willits.
Eureka-Area Paratransit Dispatch	Existing			✓	▪ Other TRM ▪ Transit Management	This includes various paratransit dispatch operations, including Coastal Cab, Crescent City Paratransit Services, Door to Door Airporter, Fortuna Senior Bus, Lake Transit Authority, Mendocino Limousine, Mendocino Transit Authority, Redwood Dial A Ride, Yellow Cab. This also includes various senior centers (such as in Mendocino County) that each have paratransit services.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Eureka-Area Paratransit Vehicles	Existing			✓	▪ Transit Vehicle Subsystem	This includes transit vehicles to support paratransit operations, including Coastal Cab, Crescent City Paratransit Services, Door to Door Airporter, Fortuna Senior Bus, Lake Transit Authority, Mendocino Limousine, Mendocino Transit Authority, Redwood Dial A Ride, Yellow Cab. This also includes various senior centers (such as in Mendocino County) that each have paratransit services.
Eureka-Area Police and Sheriff Dispatch	Existing			✓	▪ Emergency Management ▪ Other EM	This includes law enforcement agencies for the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Lakeport, Point Arena, Rio Dell, Trinidad, Ukiah and Willits, and for the Hoopa Tribe. It also includes county sheriff's offices for Del Norte, Humboldt, Lake and Mendocino Counties. This also includes various other law enforcement agencies with specialized jurisdictions, such as California Department of Forestry, California Fish & Game, National Park Service, and the U.S. Forest Service.
Eureka-Area Police and Sheriff Vehicles	Existing			✓	▪ Emergency Vehicle Subsystem	This includes vehicles used for law enforcement by the cities of Arcata, Blue Lake, Clearlake, Crescent City, Eureka, Ferndale, Fort Bragg, Fortuna, Lakeport, Point Arena, Rio Dell, Trinidad, Ukiah and Willits, and for the Hoopa Tribe. It also includes county sheriff's vehicles for Del Norte, Humboldt, Lake and Mendocino Counties. This also includes vehicles associated with various other law enforcement agencies with specialized jurisdictions, such as California Department of Forestry, California Fish & Game, National Park Service, and the U.S. Forest Service.
Eureka-Area Regional Transportation Planning Agencies	Existing			✓	▪ Archived Data Management Subsystem ▪ Other Archives	This includes organizations responsible for transportation planning along the northern California coast, including the Del Norte Local Transportation Commission (LTC); the Humboldt County Association of Governments; the Lake Council of Governments; and the Mendocino Council of Governments.
Eureka-Area Towing/Recovery	Existing			✓	▪ Other EM	This includes the private tow dispatch systems that clear incidents in the Eureka area. This includes numerous individual operators that serve in the region.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Eureka-Area Traveler Information Resources	Existing			✓	▪ Yellow Pages Service Providers	This includes Bureau of Land Management, California Parks & Recreation, Department of Fish and Game, Harbor Recreation and Conservation, National Forest Service, National Park Service, North Coast Redwoods, Redwood National and State Parks, Six Rivers (includes Smith River), various State Parks (including Anderson Marsh, Clear Lake, Jackson, Jughandle, Richardson Grove, Russian Gulch, Standish-Hickey). This also includes City (Clearlake, Ukiah) and County (Humboldt, Lake and Mendocino) Recreation Departments. This also includes area hotels, restaurants, gas stations, shopping, etc.
Eureka-Area Traveler Information Systems	Planned			✓	▪ Information Service Provider ▪ Other ISP	These systems collect traveler information from operational sources (e.g., local traffic and public safety agencies/systems), visitor information systems (e.g. chambers of commerce), and local travel destinations (e.g., Parks). This information is then made available to travelers through both broadcast and interactive digital information services through the Internet and other media.
Eureka-Area TV and Radio Stations	Existing			✓	▪ Media	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the analog TV, radio and print media intended for human, rather than system, processing and interpretation.
Eureka-Area Visitor Information Services	Existing			✓	▪ Information Service Provider ▪ Other ISP	This includes chambers of commerce for Clearlake, Eureka, Hopland, Lakeport, Mendocino Coast/Fort Bragg, Ukiah, and Willits. Eureka Convention and Visitors Bureau, Mendocino County Convention and Visitors Bureau, Northern California Tourism, and Redwood Empire Association.
Green Light Admin System	Existing	✓			▪ Commercial Vehicle Administration ▪ Other CVAS	The Green Light program equips trucks with small pager-like devices called transponders. Transponders allow trucks to identify themselves while they're weighed at high speed by sensors and scales in the highway. A truck equipped with a Green Light transponder can go past an Oregon weigh station at normal cruising speed, instead of pulling off the highway and lining up to weigh at static scales.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
HELP	Existing		✓	✓	▪ Commercial Vehicle Administration ▪ Other CVAS	HELP (Heavy Vehicle Electronic License Plate, Inc.), is a non-profit partnership between motor carriers and government agencies (including Caltrans) whose mission is to develop and deploy advanced technology systems to create a cooperative operating and regulatory environment which improves the efficient and safe movement of commercial vehicles and the performance of highway systems.
Highway Travel Conditions Reporting System	Existing	✓			▪ Information Service Provider ▪ Other ISP	This is an ODOT-run interface in which information about road closures, construction activities and traffic incidents can be entered. The database is accessible in a variety of formats, including a Web-based format (TripCheck) and an 800-number.
IFTA Clearinghouse	Existing	✓			▪ Commercial Vehicle Administration ▪ Other CVAS	This is a national clearinghouse designed to allocate fuel taxes between multiple states for motor carrier activities across jurisdictional lines, in accordance with the International Fuel Tax Agreement.
Inter-City Transit	Existing	✓	✓	✓	▪ Other TRM ▪ Transit Management	This includes dispatch systems for Amtrak ThruWay Bus, Coastline Enterprises, Greyhound, North Coast Railroad and Porter Stage Lines.
Inter-City Transit Vehicles	Existing	✓	✓	✓	▪ Transit Vehicle Subsystem	This includes transit vehicles for Amtrak ThruWay Bus, Coastline Enterprises, Greyhound, and Porter Stage Lines.
IRP Clearinghouse	Existing		✓	✓	▪ Commercial Vehicle Administration ▪ Other CVAS	This is a registration reciprocity agreement among jurisdictions in the United States and Canada which provides for payment of license fees on the basis of fleet miles operated in various jurisdictions
Klamath Falls-Area City Traffic Control Equip	Existing	✓			▪ Roadway Subsystem	This includes traffic control equipment owned and operated by the cities of Klamath Falls and Lakeview.
Klamath Falls-Area City Traffic Control Systems	Existing	✓			▪ Other TM ▪ Traffic Management	This includes the traffic control systems operated by the cities of Klamath Falls and Lakeview.
Klamath Falls-Area County Maintenance	Existing	✓			▪ Construction and Maintenance	This includes the maintenance systems (road maintenance, snow removal, etc.) operated in Klamath and Lake Counties.
Klamath Falls-Area E-911 Comm Centers	Existing	✓			▪ Emergency Management ▪ Other EM	This represents the public safety answering point for Klamath County that receives 911 calls.
Klamath Falls-Area EMS Provider Dispatch	Existing	✓			▪ Emergency Management ▪ Other EM	This includes the broad range of private EMS, ambulance and air evacuation providers that serve the Klamath Falls area, including Klamath County Emergency Services.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Klamath Falls-Area EMS Vehicles	Existing	✓			▪ Emergency Vehicle Subsystem	This includes the broad range of private EMS, ambulance and air evacuation vehicles that serve the Klamath Falls area, including Klamath County Emergency Services.
Klamath Falls-Area Fire Dispatch	Existing	✓			▪ Emergency Management ▪ Other EM	This includes Klamath County, Lake County and Keno Rural Fire Districts.
Klamath Falls-Area Fire Vehicles	Existing	✓			▪ Emergency Vehicle Subsystem	This includes Klamath County, Lake County and Keno Rural Fire Districts.
Klamath Falls-Area Fixed Route Dispatch	Existing	✓			▪ Other TRM ▪ Transit Management	This includes all fixed-route transit systems serving the greater Klamath Falls area, including Basin Transit Service Transportation District.
Klamath Falls-Area Fixed Route Vehicles	Existing	✓			▪ Transit Vehicle Subsystem	This includes transit vehicles operating on fixed-route transit systems in the greater Klamath Falls area, including Basin Transit Service Transportation District.
Klamath Falls-Area Paratransit Dispatch	Existing	✓			▪ Other TRM ▪ Transit Management	This includes Red Ball Stage Lines Transit Dispatch Operations.
Klamath Falls-Area Paratransit Vehicles	Existing	✓			▪ Transit Vehicle Subsystem	This includes Red Ball Stage Lines Transit.
Klamath Falls-Area Planning Agencies	Existing	✓			▪ Archived Data Management Subsystem ▪ Other Archives	This includes city and county planning agencies that may use data archived from ITS.
Klamath Falls-Area Police and Sheriff Dispatch	Existing	✓			▪ Emergency Management ▪ Other EM	This includes the cities of Klamath Falls and Lakeview. This also includes county sheriffs' dispatch operations in Klamath County and Lake County.
Klamath Falls-Area Police and Sheriff Vehicles	Existing	✓			▪ Emergency Vehicle Subsystem	This includes law enforcement vehicles for the cities of Klamath Falls and Lakeview, and for county sheriffs in Klamath and Lake Counties.
Klamath Falls-Area Towing/Recovery	Existing	✓			▪ Other EM	This includes the private tow dispatch systems that clear incidents in the Klamath Falls area. This includes numerous individual operators that serve in the region.
Klamath Falls-Area Traveler Information Resources	Existing	✓			▪ Yellow Pages Service Providers	This includes Collier State Park, Crater Lake National Park, Klamath Falls Parks & Recreation, Kla-Mo-Ya Casino, Lava Beds National Monument, Running Y Ranch, and Winema National Forest. It also includes area hotels, restaurants, gas stations, shopping, etc.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Klamath Falls-Area TV, Radio Stations and Newspapers	Existing	✓			▪ Media	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the analog TV, radio and print media intended for human, rather than system, processing and interpretation.
Klamath Falls-Area Visitor Information Services	Existing	✓			▪ Information Service Provider ▪ Other ISP	This includes Klamath County Department of Tourism, Klamath Falls Chamber of Commerce, and Lakeview Chamber of Commerce.
Mayday Service Provider	Existing	✓	✓	✓	▪ Emergency Management ▪ Other EM	Service centers that provide Mayday and other special concierge services for their clients. These centers will typically be outside the COATS region, but will interact with local agencies when their client's have an emergency in the region. Current examples of this system include the service centers operated by GM (OnStar), ATX Technologies (Ford and others), and AAA.
MCMIS	Existing	✓	✓	✓	▪ Commercial Vehicle Administration ▪ Other CVAS	MCMIS contains information on the safety fitness of commercial motor carriers and hazardous material shippers subject to the Federal Motor Carrier Safety Regulations and the Hazardous Materials Regulations. This information is available to the general public through the MCMIS Data Dissemination Program.
Medford-Area City Traffic Control Equip	Existing	✓			▪ Roadway Subsystem	This includes field equipment for the cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston.
Medford-Area City Traffic Control Systems	Existing	✓			▪ Other TM ▪ Traffic Management	This includes traffic control systems for the cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston that are owned and operated by the respective Public Works Departments for each city.
Medford-Area County Maintenance Systems	Existing	✓			▪ Construction and Maintenance	This includes the highway maintenance systems for Douglas County, Jackson County, and Josephine County.
Medford-Area E-911 Comm Centers	Existing	✓			▪ Emergency Management ▪ Other EM	This includes public safety answering points for the greater Medford area, including Douglas Co. 911 Comm Center, Jackson Co. 911 Comm Center, Josephine Co. 911 Comm Center, Myrtle Creek Comm Center, Medford Comm Center, Ashland Comm Center, and Southern Oregon Regional Communications Center.
Medford-Area EMS Provider Dispatch	Existing	✓			▪ Emergency Management ▪ Other EM	This includes Douglas County Emergency Services, Jackson County Emergency Management, Josephine County Emergency Services, Mercy Flights and Pacific Flights.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Medford-Area EMS Vehicles	Existing	✓			▪ Emergency Vehicle Subsystem	This includes vehicles operated by Douglas County Emergency Services, Jackson County Emergency Management, Josephine County Emergency Services, Mercy Flights and Pacific Flights.
Medford-Area Fire/Rescue Dispatch	Existing	✓			▪ Emergency Management ▪ Other EM	This includes the Fire/Rescue Dispatch Operations in the Medford region including county fire districts (Douglas, Jackson, and Josephine County) and municipal fire departments (Cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, Winston, and Wolf Creek).
Medford-Area Fire/Rescue Vehicles	Existing	✓			▪ Emergency Vehicle Subsystem	This includes the Fire/Rescue vehicles in the Medford region including those owned by county fire districts (Douglas, Jackson, and Josephine County) and municipal fire departments (Cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, Winston, and Wolf Creek).
Medford-Area Fixed Route Dispatch	Existing	✓			▪ Other TRM ▪ Transit Management	This includes all fixed-route transit systems serving the greater Medford area, including Rogue Valley Transportation District and Roseburg Transit.
Medford-Area Fixed Route Vehicles	Existing	✓			▪ Transit Vehicle Subsystem	This includes transit vehicles operating on fixed-route transit systems in the greater Medford area, including Rogue Valley Transportation District and Roseburg Transit.
Medford-Area Paratransit Dispatch	Existing	✓			▪ Other TRM ▪ Transit Management	This includes private shuttle services (e.g., Airport Transit) and public services (Southern Oregon Transportation) that provide door-to-door transit services in the Medford area.
Medford-Area Paratransit Vehicles	Existing	✓			▪ Transit Vehicle Subsystem	This includes private shuttle services (e.g., Airport Transit) and public services (Southern Oregon Transportation) that provide door-to-door transit services in the Medford area.
Medford-Area Planning Agencies	Existing	✓			▪ Archived Data Management Subsystem ▪ Other Archives	This includes various city and county planning agencies that may have use for archived data, including but not limited to the Rogue Valley Council of Governments.
Medford-Area Police and Sheriff Dispatch	Existing	✓			▪ Emergency Management ▪ Other EM	This includes the local police department dispatch systems operating in the cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston. This also includes county sheriffs for Jackson and Josephine Counties.
Medford-Area Police and Sheriff Vehicles	Existing	✓			▪ Emergency Vehicle Subsystem	This includes law enforcement vehicles serving the cities of Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston. This also includes county sheriff vehicles for Jackson and Josephine Counties.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Medford-Area Towing/Recovery	Existing	✓			▪ Other EM	This includes the private tow dispatch systems that clear incidents in the Medford area. This includes numerous individual operators that serve in the region.
Medford-Area Traveler Information Resources	Existing	✓			▪ Yellow Pages Service Providers	This includes the State Parks and Recreation Department, parks and recreation departments for Douglas County, Jackson County, and Josephine County, the City Parks and Recreation areas for the cities in the region (Ashland, Central Point, Grants Pass, Medford, Roseburg, and Winston), Oregon Caves National Monument, Shakespeare Festival, Britt Festival, and Seven Feathers Casino. It also includes area hotels, restaurants, gas stations, shopping, etc.
Medford-Area TV and Radio Stations	Existing	✓			▪ Media	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the analog TV, radio and print media intended for human, rather than system, processing and interpretation.
Medford-Area Visitor Centers	Existing	✓			▪ Information Service Provider ▪ Other ISP	This includes visitor centers in Medford and Ashland.
Medford-Area Visitor Information Services	Existing	✓			▪ Information Service Provider ▪ Other ISP	This includes the systems operated by Oregon Tourism Commission, Chambers of Commerce and other organizations that provide tourist information for the local region.
Motor Carrier Dispatch and Back Office Systems	Existing	✓	✓	✓	▪ Fleet and Freight Management	These provide the capability for commercial drivers and dispatchers to receive real-time routing information and access databases containing vehicle and cargo locations as well as carrier, vehicle, cargo, and driver information.
ODOT Bend TOC	Existing	✓			▪ Other TM	This center is at the periphery of the COATS region. It provides traffic control capabilities for the ODOT-operated facilities in eastern Oregon.
ODOT Communications Division	Existing	✓			▪ Media ▪ Public Information Office*	The Communications Division produces and/or oversees ODOT's internal and external communications, including the agency's Internet site. It has offices located in each of ODOT's five regions to provide information to local news media outlets.
ODOT Field Equip (Medford TOC)	Existing	✓			▪ Roadway Subsystem	This includes the environmental sensors, variable message signs, HAR, signals, traffic detectors, and any other field equipment and instrumentation operated by ODOT Region 3.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
ODOT Maintenance Districts (Medford TOC)	Existing	✓			▪ Construction and Maintenance ▪ Maintenance Dispatch Office* ▪ Other Maintenance Dispatch Office*	Covers the resource management and dispatch systems operated by ODOT maintenance districts in Coos Bay, Roseburg, Medford and Klamath Falls.
ODOT Maintenance Vehicles (Medford TOC)	Existing	✓			▪ Maintenance Vehicles* ▪ Other Maintenance Vehicles*	These ODOT vehicles are responsible for maintenance activities, including setting up road closures, assisting in incident removal, and performing winter maintenance. It is assumed that there is seamless communication between the vehicle and its driver, who will actually be directing and performing the maintenance activity.
ODOT Medford TOC	Existing	✓			▪ Other TM ▪ Traffic Management	The ODOT Transportation Operations Center in Medford plays a central role in the COATS architecture. It connects to centers in Bend and Salem and Caltrans centers in Eureka and Redding.
ODOT RWIS Server	Existing	✓			▪ Weather Service	This is a central, statewide server which collects data from each of the state's regional RWIS servers.
ODOT Salem TOC	Existing	✓			▪ Other TM	This center is at the periphery of the COATS region. It provides traffic control capabilities for the ODOT-operated facilities in the Lane, Linn and Marion Counties portion of the COATS region.
ODOT Statewide Planning	Existing	✓			▪ Archived Data Management Subsystem ▪ Other Archives	This includes all divisions within ODOT that will use archived data.
ODOT Weather Warning System	Existing	✓			▪ Roadway Subsystem	These are driver advisory systems which are activated based on certain meteorological conditions or thresholds (e.g. high wind, icy bridge, etc.). They process information provided by a localized weather station and provide a warning to motorists when specified conditions arise.
Oregon Weigh Stations	Existing	✓			▪ Commercial Vehicle Check	These are locations where commercial vehicles may be weighed and inspected.
OSP Dispatch	Existing	✓			▪ Emergency Management ▪ Other EM	The Oregon State Police operates several dispatch/communications centers in southern Oregon, all of which operate on a common computer-aided dispatch system for tracking call and response activities. These are often collocated with ODOT facilities for improved incident management, although ODOT and OSP staff will have differing roles in incident management.
OSP Vehicles	Existing	✓			▪ Emergency Vehicle Subsystem	Oregon State Police vehicles.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Other Weather Data	Existing	✓	✓	✓	▪ Weather Service	This terminator refers to weather information received from the National Weather Service or state agencies which also have weather-related information. This could include fully equipped weather stations, isolated stream gauges, or other similar technologies.
Redding-Area Air Districts	Existing		✓		▪ Emissions Management	This placeholder includes Colusa County APCD, Glenn County APCD, Lassen County APCD, Modoc County APCD, Northern Sierra APCD, Shasta County AQMD, Siskiyou County APCD, and Tehama County APCD
Redding-Area City Traffic Control Equip	Existing		✓		▪ Roadway Subsystem	This includes traffic equipment for the cities of Alturas, Anderson , Corning, Mount Shasta, Orland, Red Bluff, Redding, Shasta Lake, Susanville, Weed, Willows, and Yreka.
Redding-Area City Traffic Control Systems	Existing		✓		▪ Other TM ▪ Traffic Management	This includes traffic management functions for the cities of Alturas, Anderson, Corning, Mount Shasta, Orland, Red Bluff, Redding, Shasta Lake, Susanville, Weed, Willows, and Yreka.
Redding-Area County Maintenance Systems	Existing		✓		▪ Construction and Maintenance	This includes public works departments for the following counties: Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity.
Redding-Area E-911 Comm Centers	Existing		✓		▪ Emergency Management ▪ Other EM	This includes public safety answering points receiving wireline 911 calls in the Redding area.
Redding-Area EMS Provider Dispatch	Existing		✓		▪ Emergency Management ▪ Other EM	This includes the broad range of private EMS, ambulance, and air evacuation providers that serve the Redding area, including American Med. Response (includes North Valley Ambulance), City of Dorris, Emergency Medical Center, Mount Shasta Ambulance Service, NorCal EMS, Northern Siskiyou Ambulance Service, Shascom, and Trinity County Life Support.
Redding-Area EMS Vehicles	Existing		✓		▪ Emergency Vehicle Subsystem	This includes the broad range of private EMS, ambulance, and air evacuation vehicles that serve the Redding area, including American Med. Response (includes North Valley Ambulance), City of Dorris, Emergency Medical Center, Mount Shasta Ambulance Service, NorCal EMS, Northern Siskiyou Ambulance Service, Shascom and Trinity County Life Support.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Redding-Area Fire Dispatch	Existing		✓		▪ Emergency Management ▪ Other EM	This includes fire departments for the communities of Alturas, Anderson, Corning, Cottonwood, Happy Valley, Jones Valley, Mountain Gate, Mount Shasta, Orland, Red Bluff, Redding, Shasta County, Shasta, Shasta Lake City, Susanville, Weed, Willows, and Yreka. This also includes other agencies that have fire/rescue jurisdiction in certain areas, including California Department of Forestry; County Health Departments (Hazmat), National Park Service, Office of Emergency Services (Hazmat), and US Forest Service.
Redding-Area Fire Vehicles	Existing		✓		▪ Emergency Vehicle Subsystem	This includes vehicles for community fire departments in Alturas, Anderson, Corning, Cottonwood, Happy Valley, Jones Valley, Mountain Gate, Mount Shasta, Orland, Red Bluff, Redding, Shasta County, Shasta, Shasta Lake City, Susanville, Weed, Willows, and Yreka. This also includes vehicles from other agencies that have fire/rescue jurisdiction in certain areas, including California Department of Forestry; County Health Departments (Hazmat), National Park Service, Office of Emergency Services (Hazmat), and US Forest Service.
Redding-Area Fixed Route Dispatch	Existing		✓		▪ Other TRM ▪ Transit Management	This includes the following transit systems: Lassen Rural Bus, serving Lassen County; Modoc Sage Stage; Redding Area Bus Authority (RABA) serving Redding and the surrounding communities; Siskiyou County Transit (the Stage) serving the Yreka area; Tehama Area Rural Express (TRAX) serving the Red Bluff area; and Trinity County Transit.
Redding-Area Fixed Route Vehicles	Existing		✓		▪ Transit Vehicle Subsystem	This includes vehicles operating on the following transit systems: Lassen Rural Bus, serving Lassen County; Modoc Sage Stage; Redding Area Bus Authority (RABA) serving Redding and the surrounding communities; Siskiyou County Transit (the Stage) serving the Yreka area; Tehama Area Rural Express (TRAX) serving the Red Bluff area; and Trinity County Transit.
Redding-Area Municipal Planning Agencies	Existing		✓		▪ Archived Data Management Subsystem ▪ Other Archives	These data collection and analysis system(s) provide planning data for cities and towns in Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama and Trinity Counties.
Redding-Area Paratransit Dispatch	Existing		✓		▪ Other TRM ▪ Transit Management	This includes California Association for Coordinated Transit, DART, Lassen Rural Bus, Modoc Senior Citizens/Meals on Wheels
Redding-Area Paratransit Vehicles	Existing		✓		▪ Transit Vehicle Subsystem	This includes California Association for Coordinated Transit, DART, Lassen Rural Bus, Modoc Senior Citizens/Meals on Wheels

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Redding-Area Police and Sheriff Dispatch	Existing		✓		▪ Emergency Management ▪ Other EM	This includes the cities of Alturas, Anderson, Corning, Lake Shastina, Mount Shasta, Orland, Red Bluff, Redding, Susanville, Weed, Willows, and Yreka. This also includes county sheriffs for Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties.
Redding-Area Police and Sheriff Vehicles	Existing		✓		▪ Emergency Vehicle Subsystem	This includes the vehicles for the cities of Alturas, Anderson, Corning, Lake Shastina, Mount Shasta, Orland, Red Bluff, Redding, Susanville, Weed, Willows, and Yreka; and for the county sheriffs for Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties.
Redding-Area Regional Transportation Planning Agencies	Existing		✓		▪ Archived Data Management Subsystem ▪ Other Archives	This includes county agencies responsible for transportation planning in the Redding vicinity. This includes the Lassen County Transportation Commission (TC), Modoc County Local Transportation Commission (LTC), Plumas County TC, Shasta County RTPA (also a MPO), Siskiyou County TC, Tehama County TC, and Trinity County TC.
Redding-Area Towing/Recovery	Existing		✓		▪ Other EM	This includes the private tow dispatch systems that clear incidents in the Redding area. This includes numerous individual operators that serve in the region.
Redding-Area Traveler Information Resources	Existing		✓		▪ Yellow Pages Service Providers	This includes Ashland (OR) Shakespeare Festival, BLM -Alturas Resource Area, Castle Crags State Park, Klamath National Forest, Lassen National Forest, Lassen Volcanic National Park, Lavabeds National Monument, Modoc National Forest, Mt. Shasta Ranger Station, Mt. Shasta Ski Park, Redding Recreation Department, Shasta-Trinity National Forest, Turtle Bay Park / Museum, U.S. Forest Service, Whiskeytown National Recreational Area. It also includes area hotels, restaurants, gas stations, shopping, etc.
Redding-Area Traveler Information Systems	Planned		✓		▪ Information Service Provider ▪ Other ISP	These systems collect traveler information from operational sources (e.g., local traffic and public safety agencies/systems), visitor information systems (e.g. chambers of commerce), and local travel destinations (e.g., Parks). This information is then made available to travelers through both broadcast and interactive digital information services through the Internet and other media.
Redding-Area TV and Radio Stations	Existing		✓		▪ Media	Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the analog TV, radio and print media intended for human, rather than system, processing and interpretation.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Redding-Area Visitor Information Services	Existing		✓		▪ Information Service Provider ▪ Other ISP	This includes chambers of commerce in Alturas, Dunsmuir, Redding, Trinity County, Weaverville and Yreka. It also includes Northern California Tourism , Redding Convention and Visitors Bureau, Shasta Cascade Wonderland Association, and Siskiyou County Tourism.
SAFER	Existing	✓	✓	✓	▪ Commercial Vehicle Administration ▪ Other CVAS	SAFER provides carrier, vehicle, and driver safety and credential information to fixed and mobile roadside inspection stations. This information will allow the roadside inspector to select vehicles and/or drivers for inspection based on the number of prior carrier inspections, as well as carrier, vehicle, and driver safety and credential historical information.
SOVA Kiosks	Existing	✓			▪ Remote Traveler Support	These kiosks will be upgraded to be Web-based with potential access to TripCheck and other traveler information services in the Southern Oregon region.
Transit Users	Existing	✓	✓	✓	▪ Transit User	This terminator represents the human entities using Public Transit vehicles. They may be in the act of embarking or debarking the vehicles and are thus sensed for the purpose of determining passenger loading and fares, or on the vehicles and able to request and receive information.
Traveler Information Devices	Planned	✓	✓	✓	▪ Personal Information Access	These are personal devices which may be used to access real-time transportation information.
Travelers	Existing	✓	✓	✓	▪ Traveler	This terminator represents any individual (human) who uses transportation services. At the time that data is passed to or from the terminator the individual is neither a driver, pedestrian, or transit user. This means that the data provided is that for pre-trip planning or multi-modal personal guidance and includes their requests for assistance in an emergency. Subsequent to receipt of pre-trip information, a Traveler may become a vehicle driver, passenger, transit user, or pedestrian.
TripCheck	Existing	✓			▪ Information Service Provider ▪ Other ISP ▪ Personal Information Access	TripCheck is the latest version of ODOT's travel information Internet Web site. Its goal is to provide the best travel information possible in a way that is easy to access. Tripcheck uses maps extensively, providing users with a convenient interface and a fast way to navigate the site. It includes roadway incident maps, camera images, RWIS information, and other features.
Vehicle Information Systems	Existing	✓	✓	✓	▪ Other Vehicle ▪ Vehicle	These are devices installed in passenger vehicles that support access to digital traveler information. A wide range of evolving technologies are available.

Table C-1: Inventory of Stakeholders and Systems (cont.).

Element Name	Status	South. Oregon	NCent. Calif.	N Cal. Coast	National Architecture Mapping	Description
Vehicle Mayday Systems	Existing	✓	✓	✓	▪ Other Vehicle ▪ Vehicle	These are devices installed in passenger vehicles that provide Mayday services to the vehicle occupants. In many cases, these systems are integrated with Vehicle Information Systems (see related Inventory entry).
Vehicles	Existing	✓	✓	✓	▪ Basic Vehicle	This terminator represents the basic vehicle platform that interfaces with and hosts ITS electronics. The Basic Vehicle terminator provides an interface to drive train, driver convenience and entertainment systems, and other non-ITS electronics on-board the vehicle. This interface allows general vehicle systems (e.g., the stereo speaker system) to be shared by ITS and non-ITS systems. It also allows monitoring and control of the vehicle platform for advanced vehicle control system applications.
Virtual Transit Mall	Planned	✓			▪ Information Service Provider ▪ Other ISP	This is a Web-based service that will coordinate Oregon's 200-plus transit providers in order to offer: greater access to transit information, statewide trip planning, improved connections between providers, and enhanced transit planning data.

* – Extension to National Architecture

APPENDIX D ARCHITECTURE FLOW DIAGRAMS

The following is a list of all stakeholders and subsystems included in the COATS Regional Architecture, along with the page numbers on which architecture flow context diagrams are located. Page numbers listed in boldface refer to a diagram for which the indicated entity is the center. Turbo Architecture did not display architecture flows to and from certain terminators, although these are still included in the architecture. These are indicated by alphabetic codes.

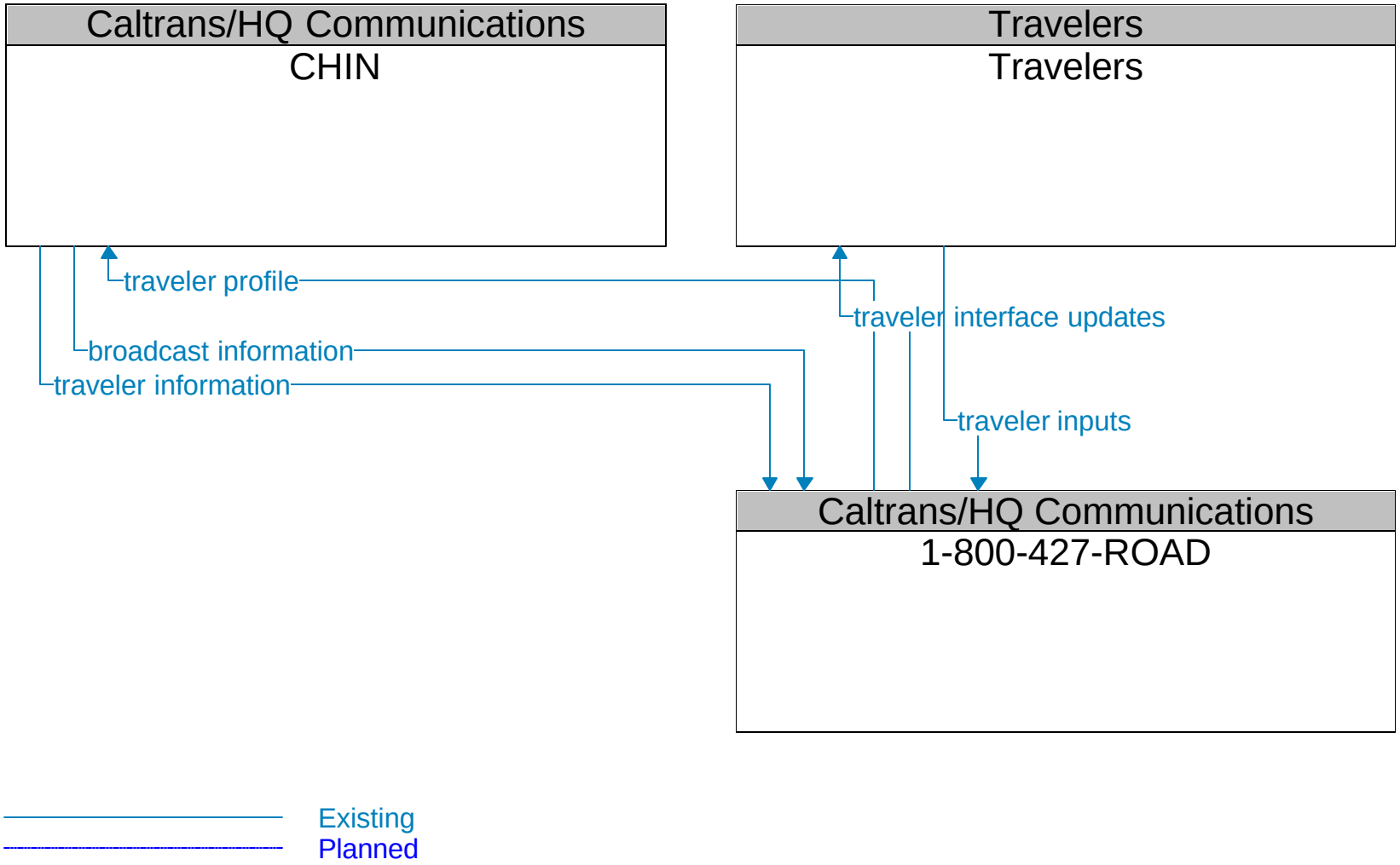

Figure D-1: Regional Diagram for 1-800-427-ROAD.

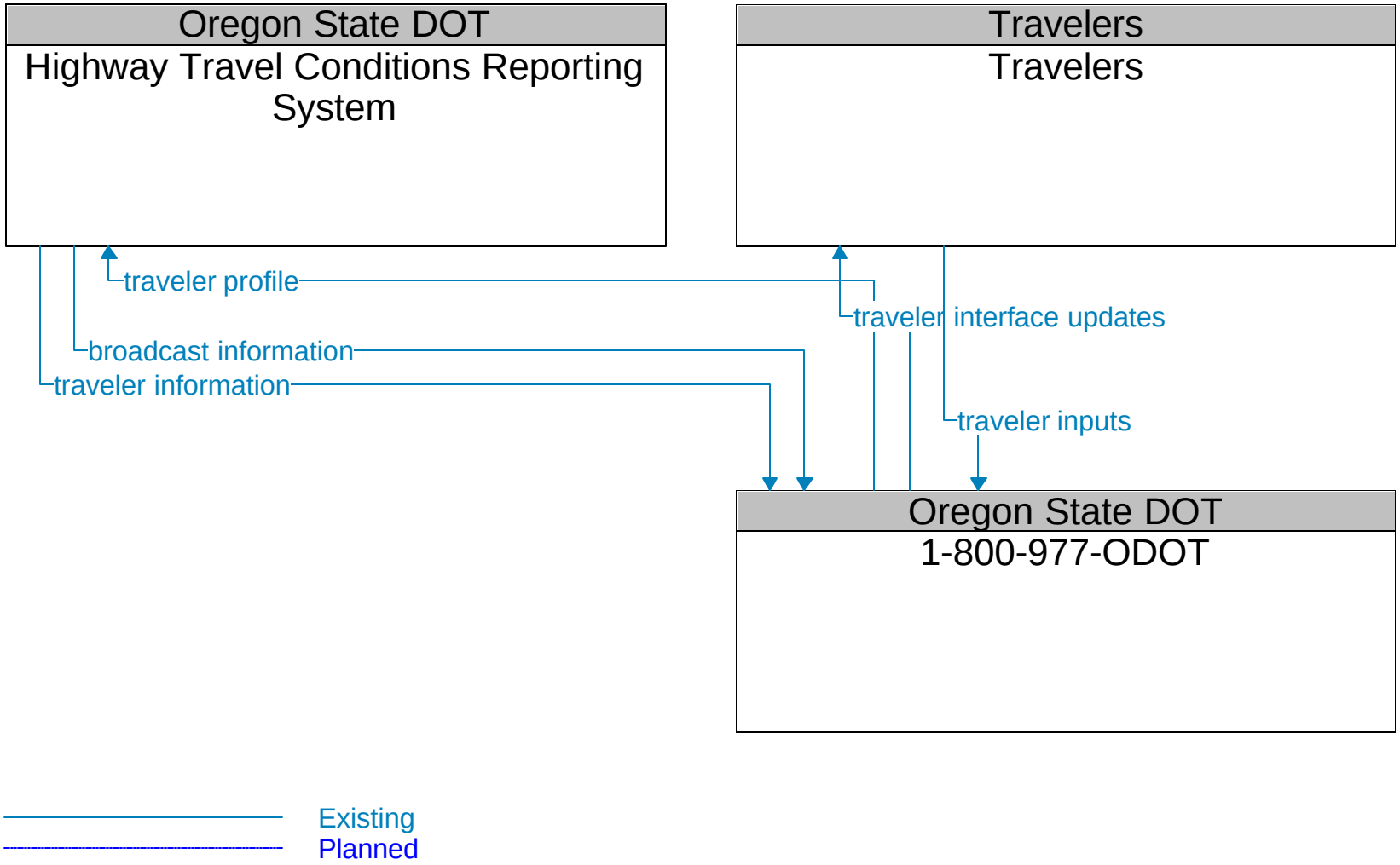

Figure D-2: Regional Diagram for 1-800-977-ODOT.

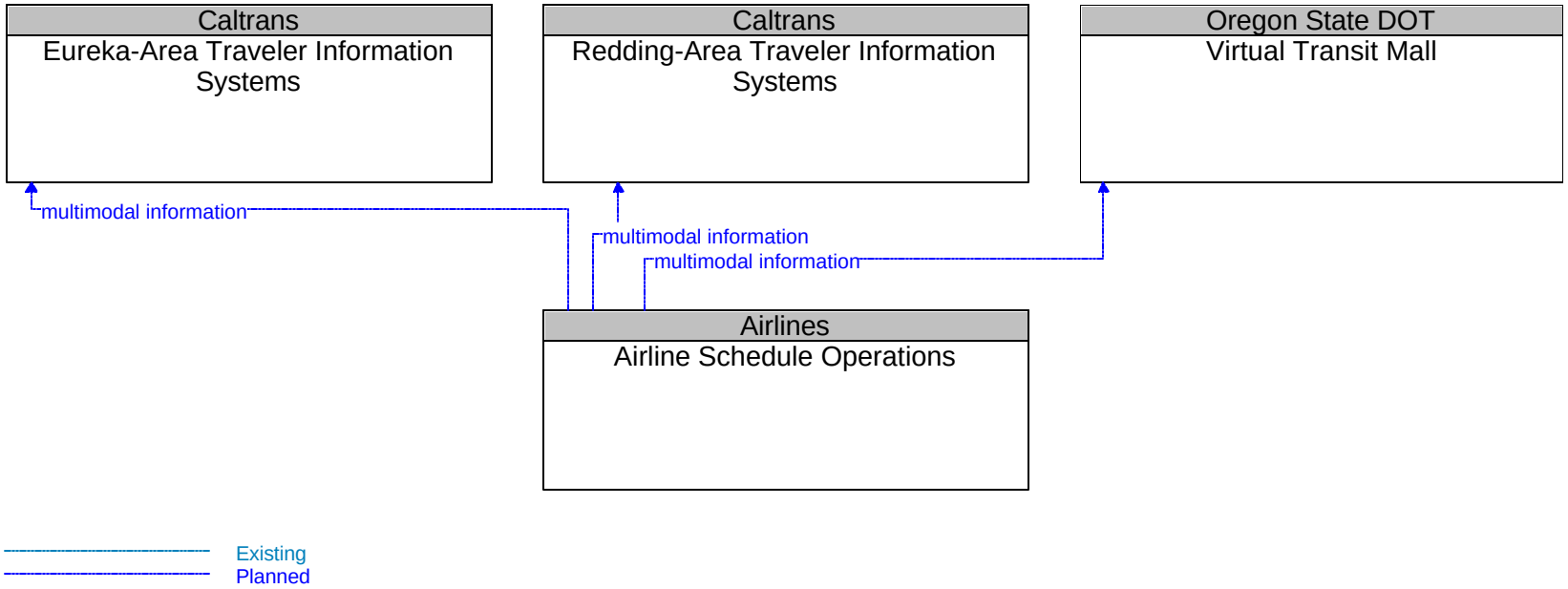

Figure D-3: Regional Diagram for Airline Schedule Operations.

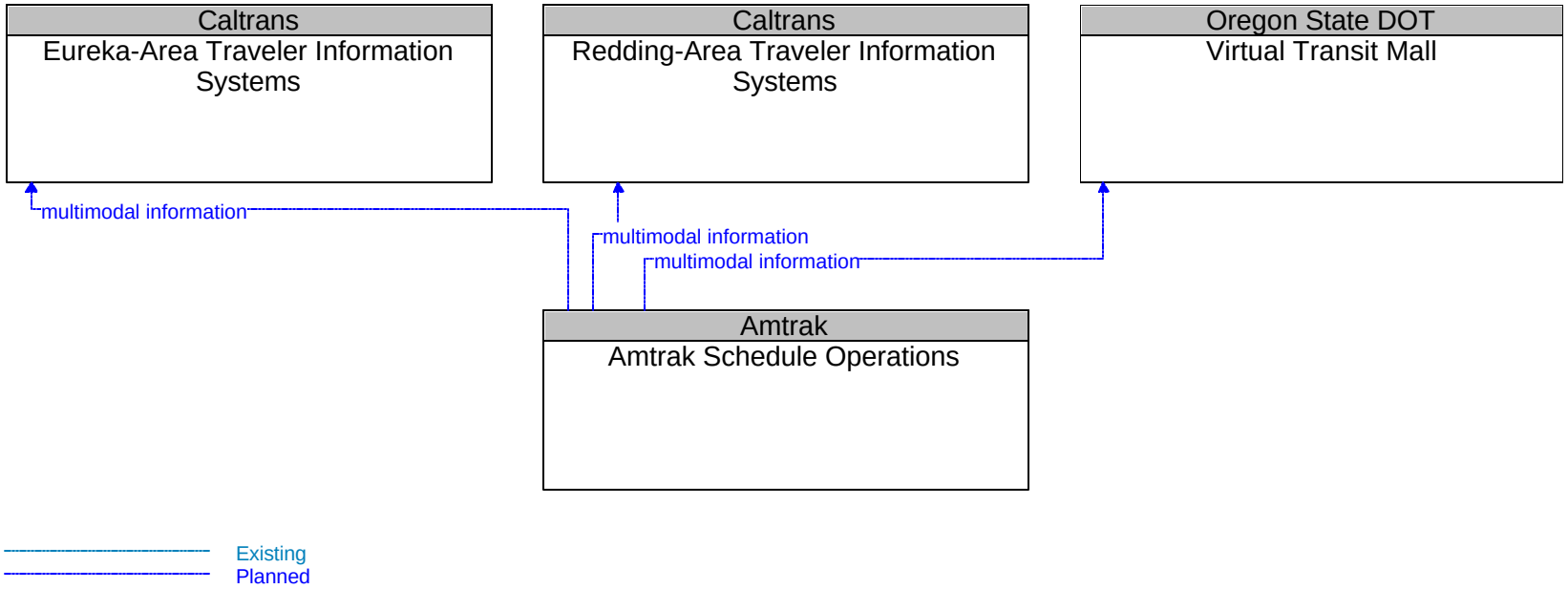

Figure D-4: Regional Diagram for Amtrak Schedule Operations.

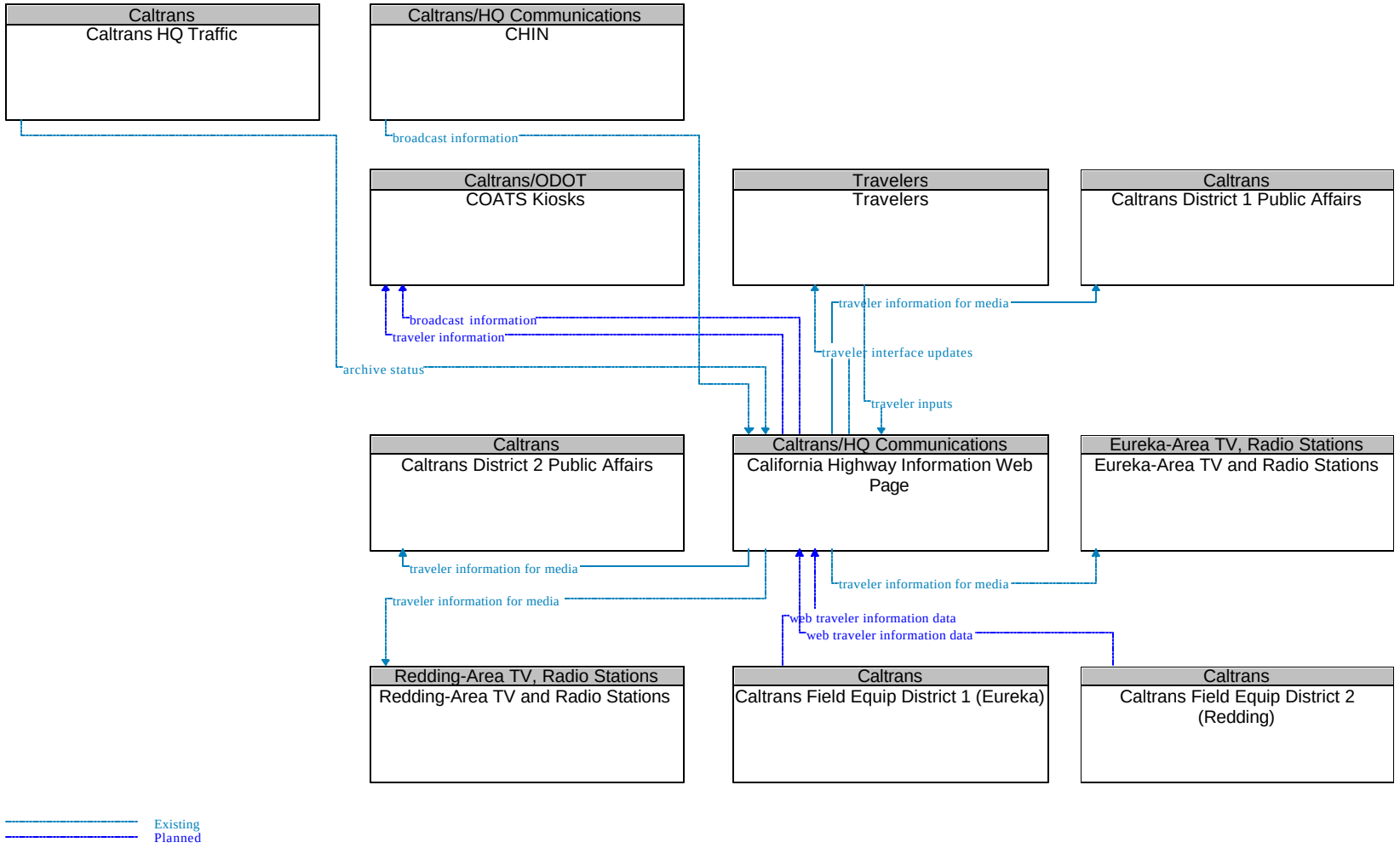

Figure D-5: Regional Diagram for California Highway Information Web Page.

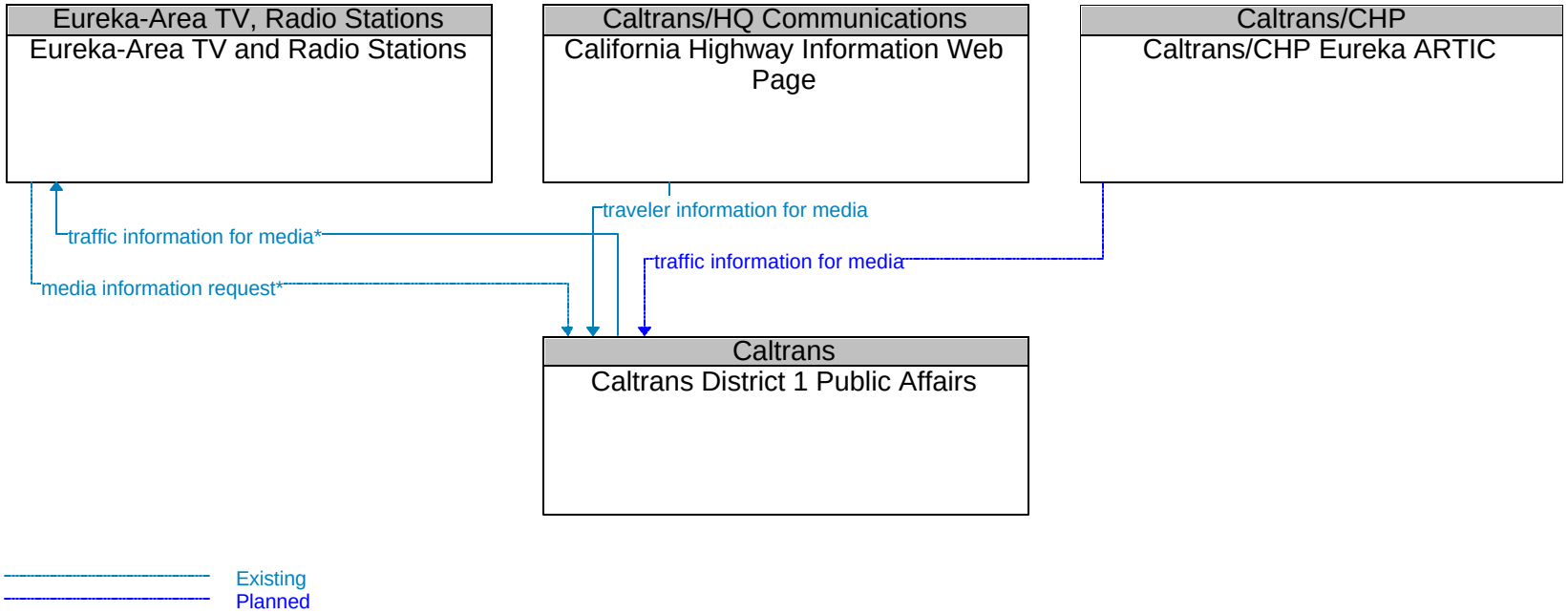

Figure D-6: Regional Diagram for Caltrans District 1 Public Affairs.

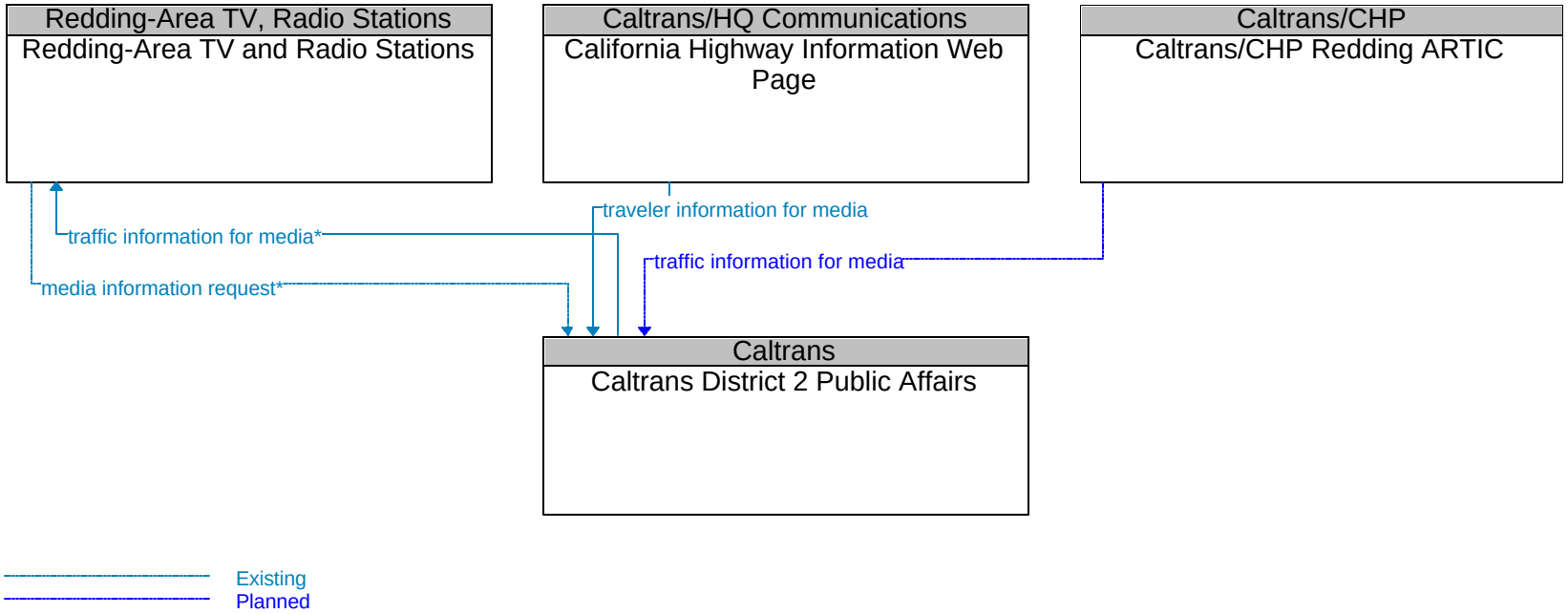

Figure D-7: Regional Diagram for Caltrans District 2 Public Affairs.

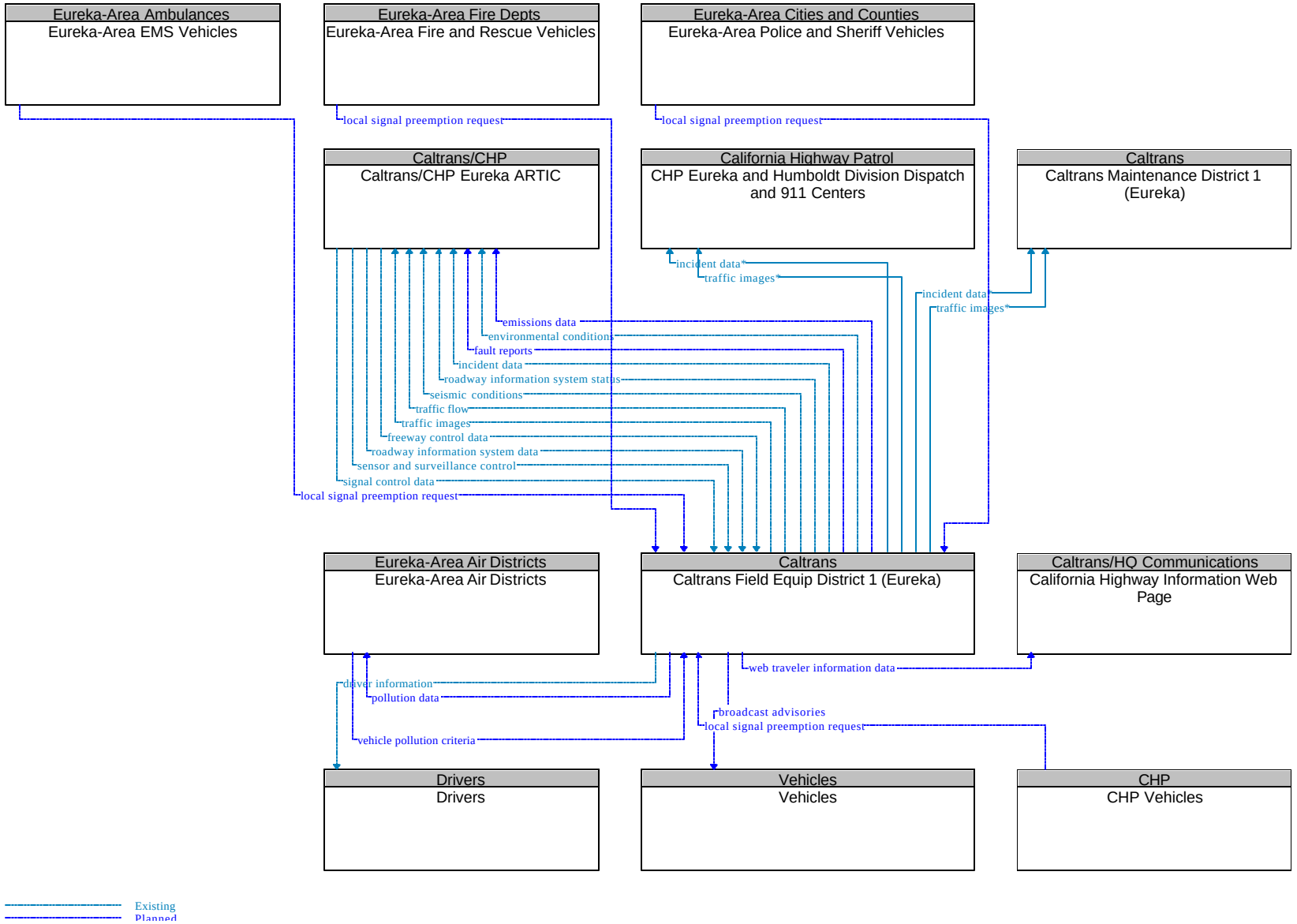

Figure D-8: Regional Diagram for Caltrans Field Equip District 1 (Eureka).

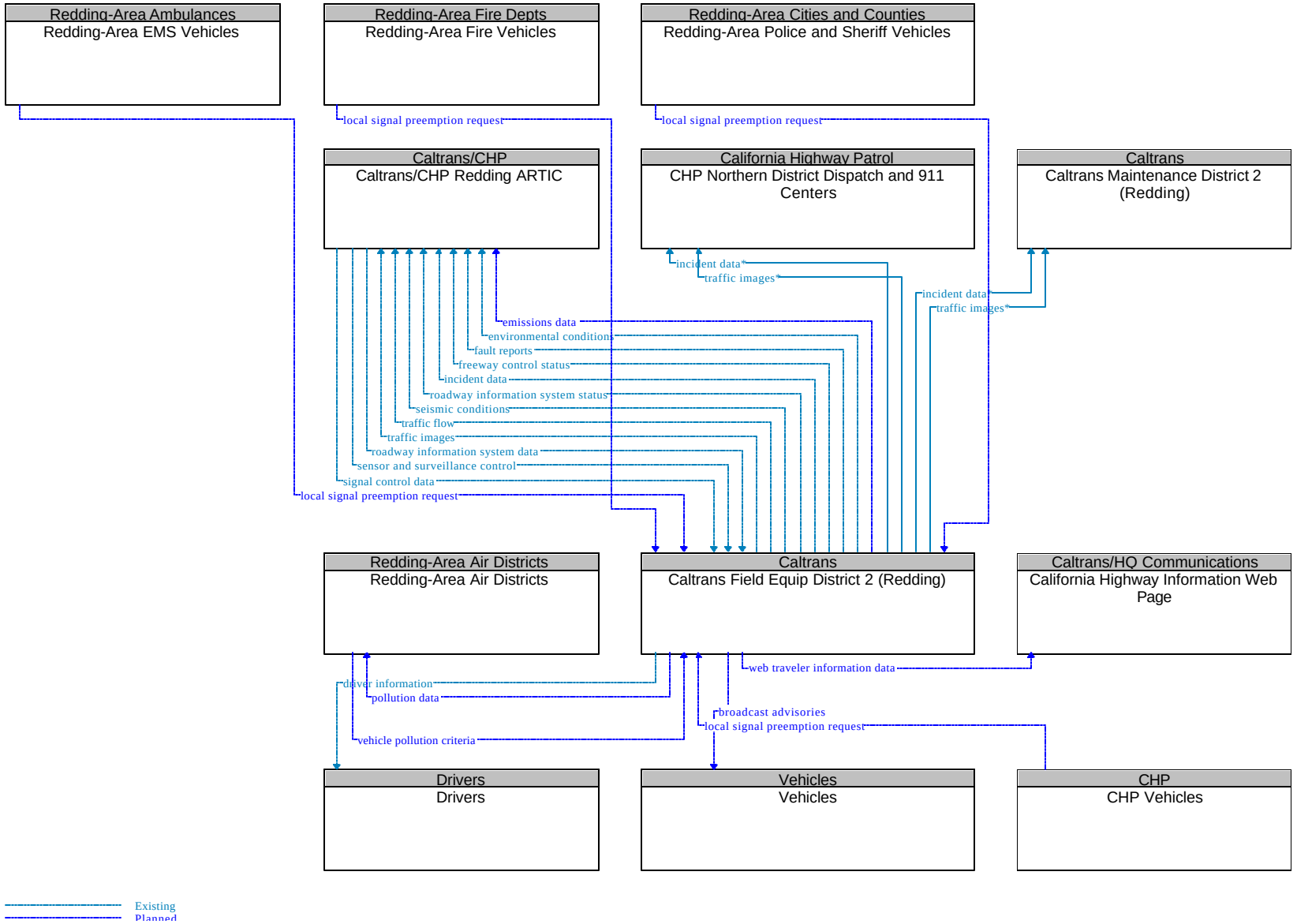

Figure D-9: Regional Diagram for Caltrans Field Equip District 2 (Redding).

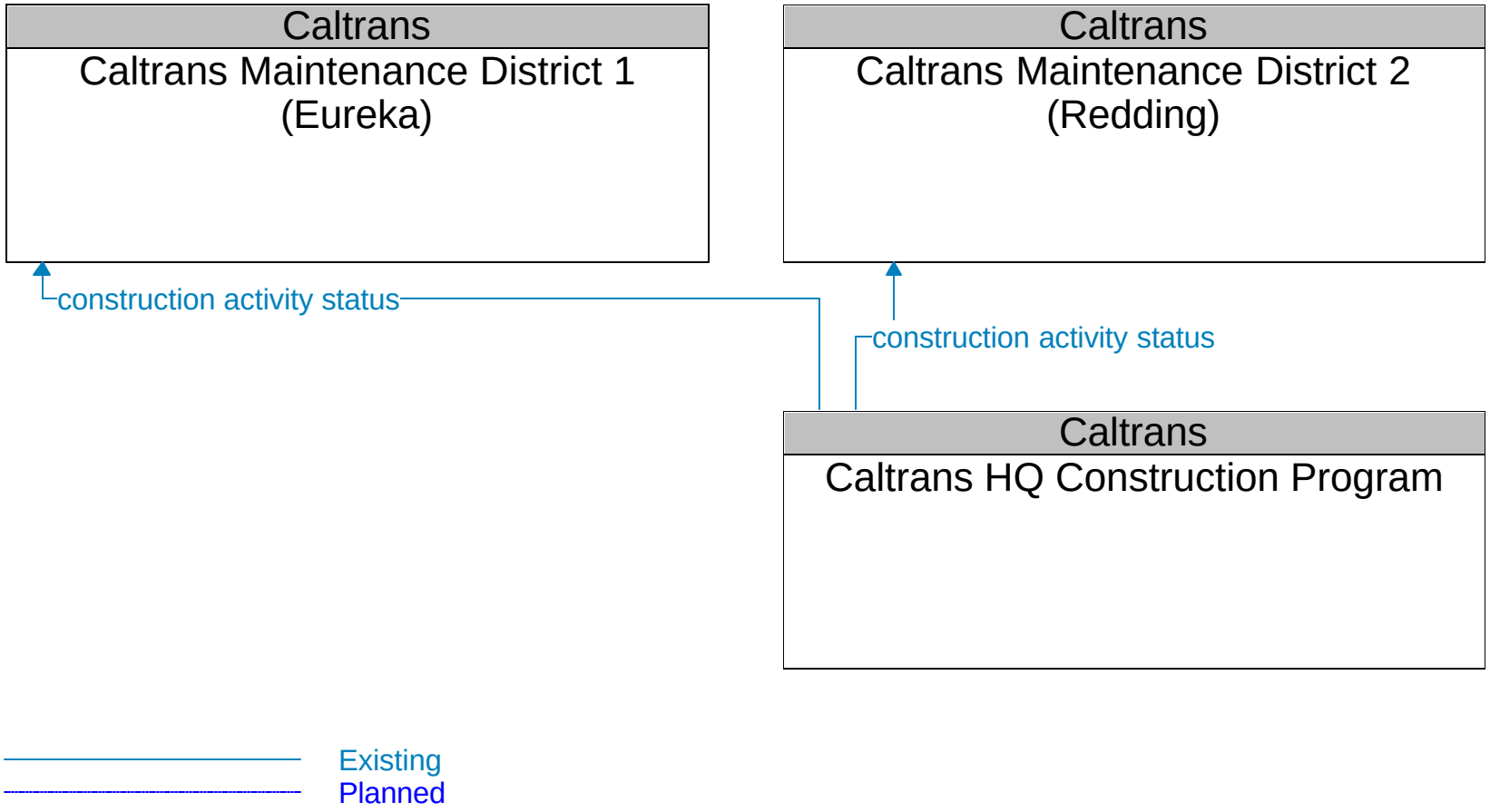

Figure D-10: Regional Diagram for Caltrans HQ Construction Program.

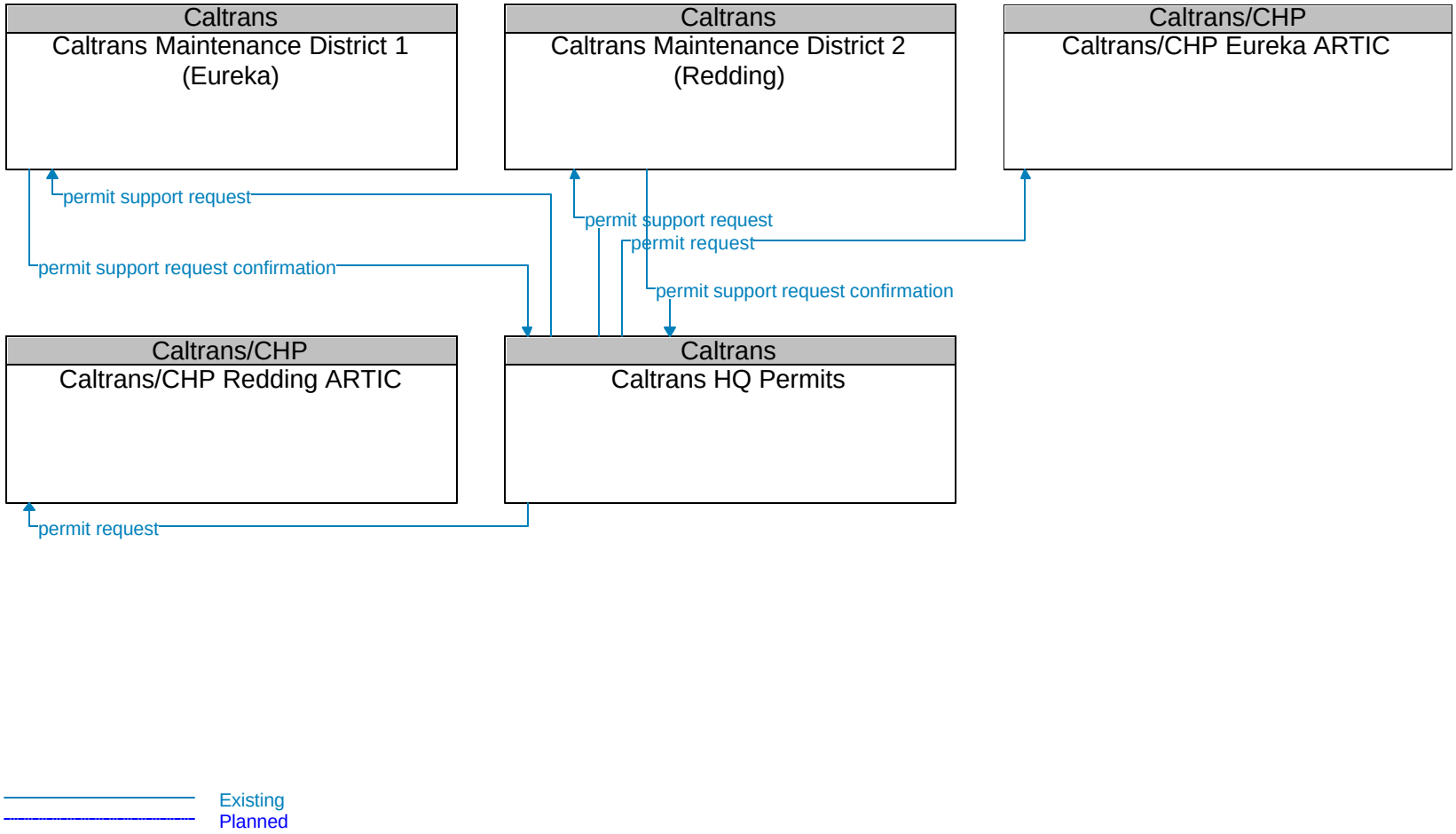

Figure D-11: Regional Diagram for Caltrans HQ Permits.

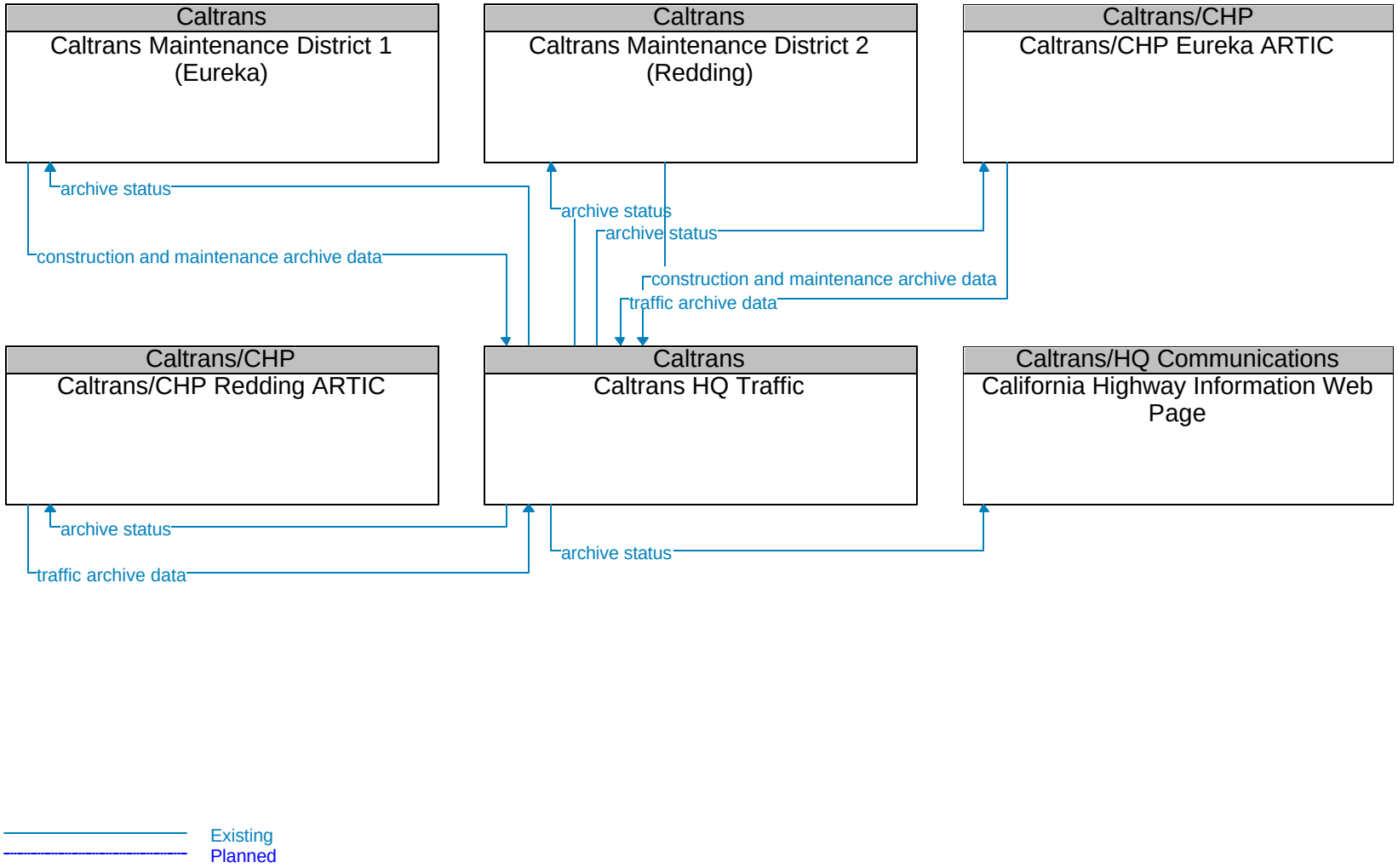

Figure D-12: Regional Diagram for Caltrans HQ Traffic.

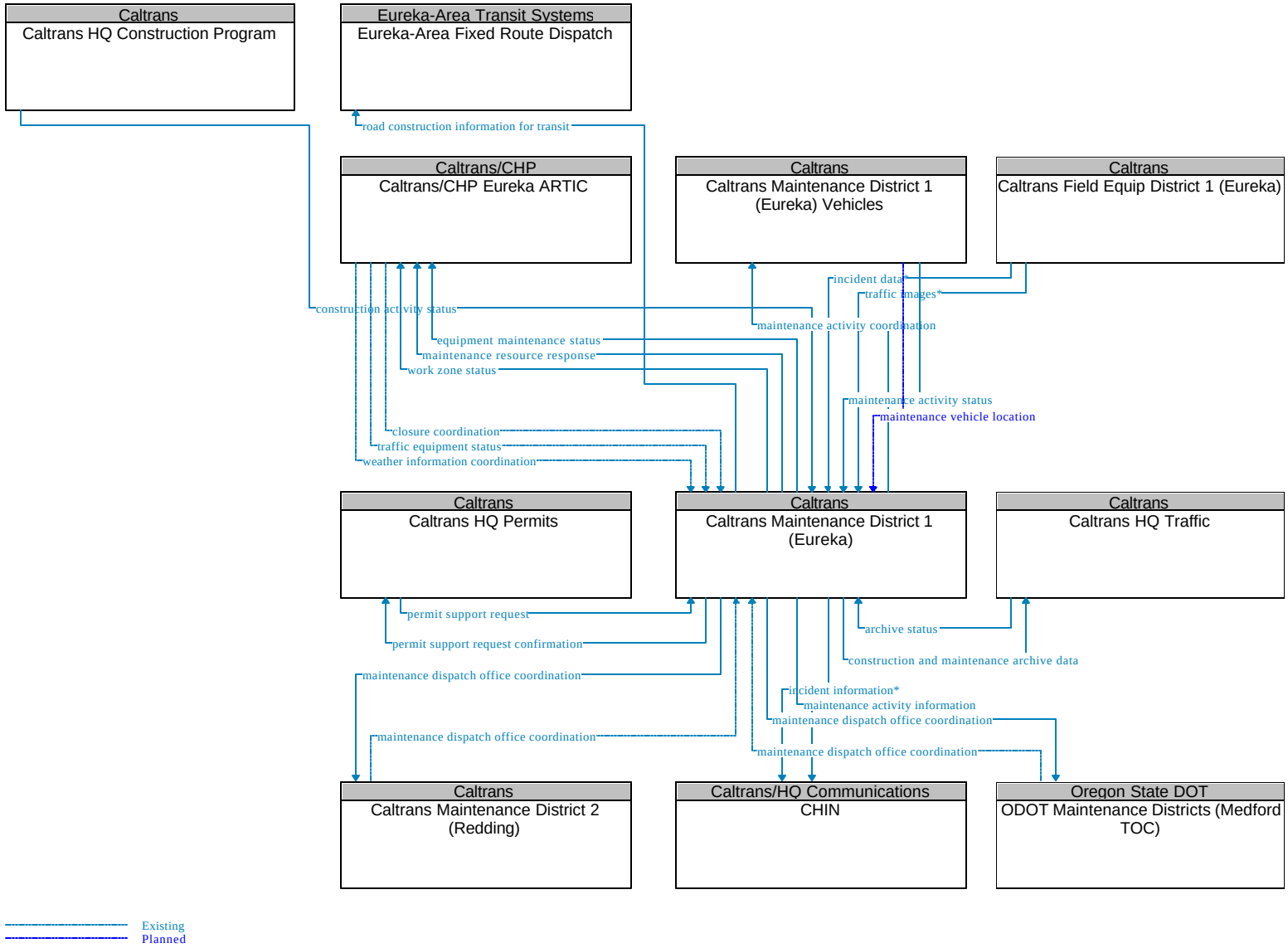

Figure D-13: Regional Diagram for Caltrans Maintenance District 1 (Eureka).

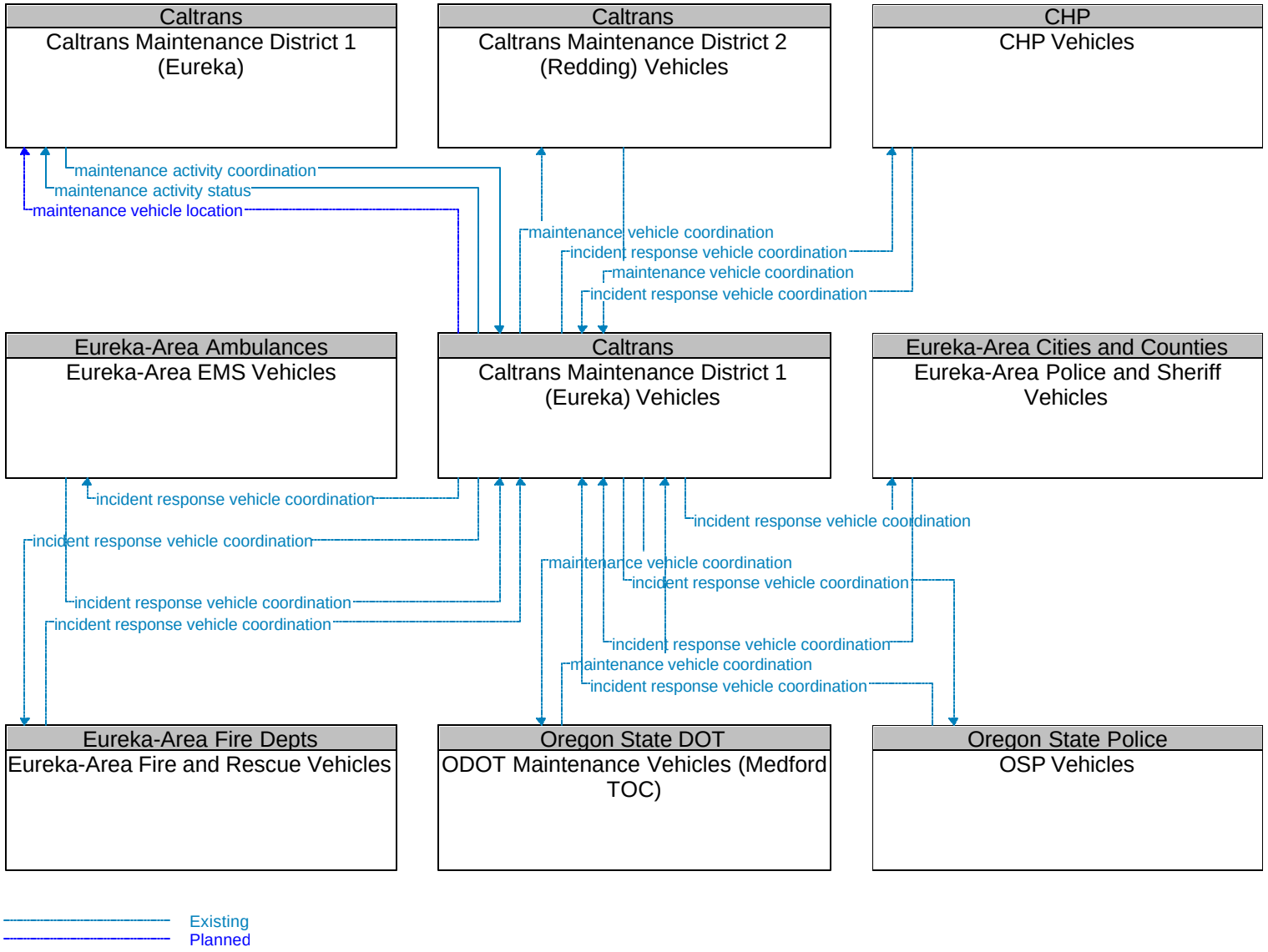

Figure D-14: Regional Diagram for Caltrans Maintenance District 1 (Eureka) Vehicles.

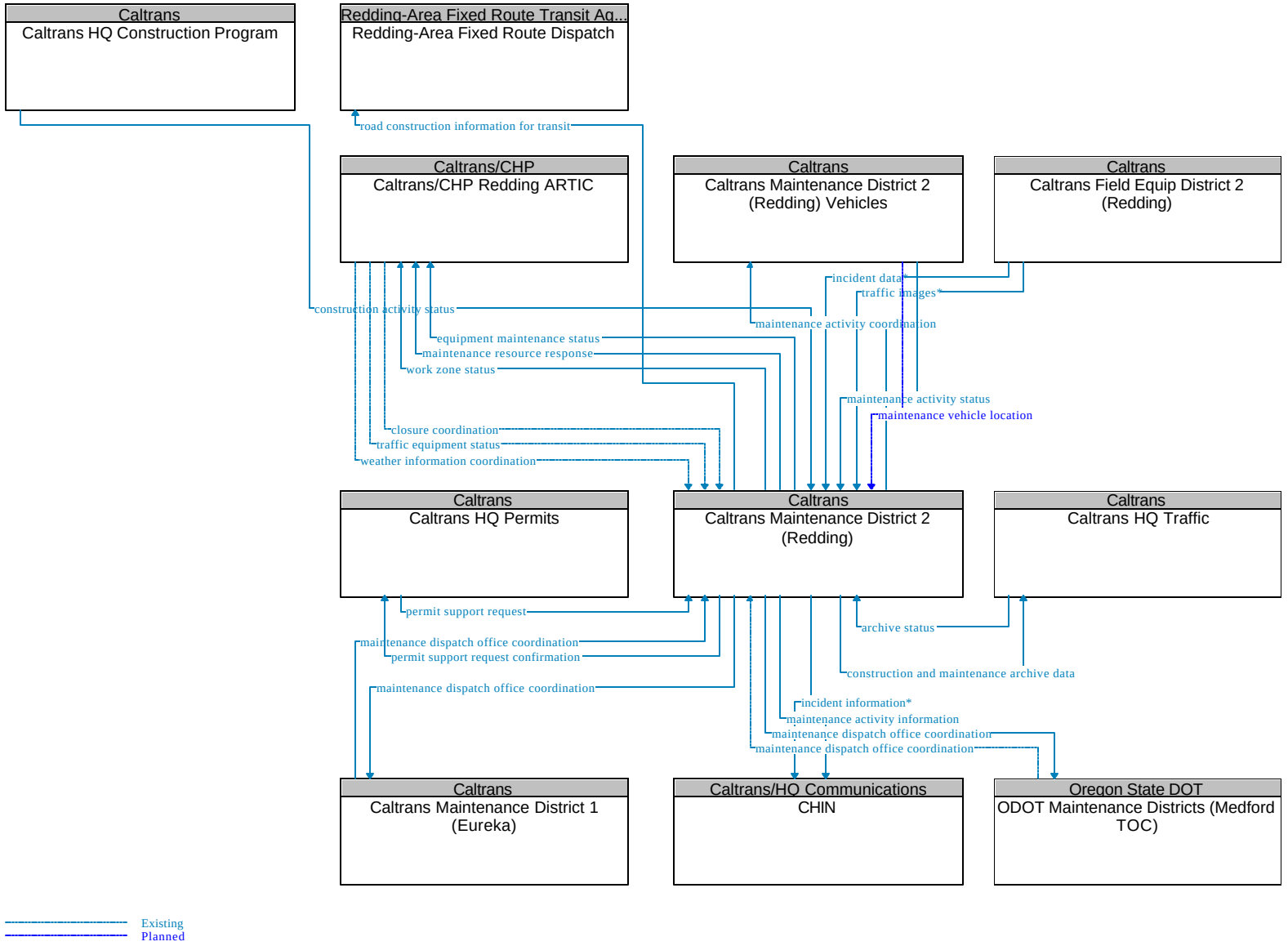

Figure D-15: Regional Diagram for Caltrans Maintenance District 2 (Redding).

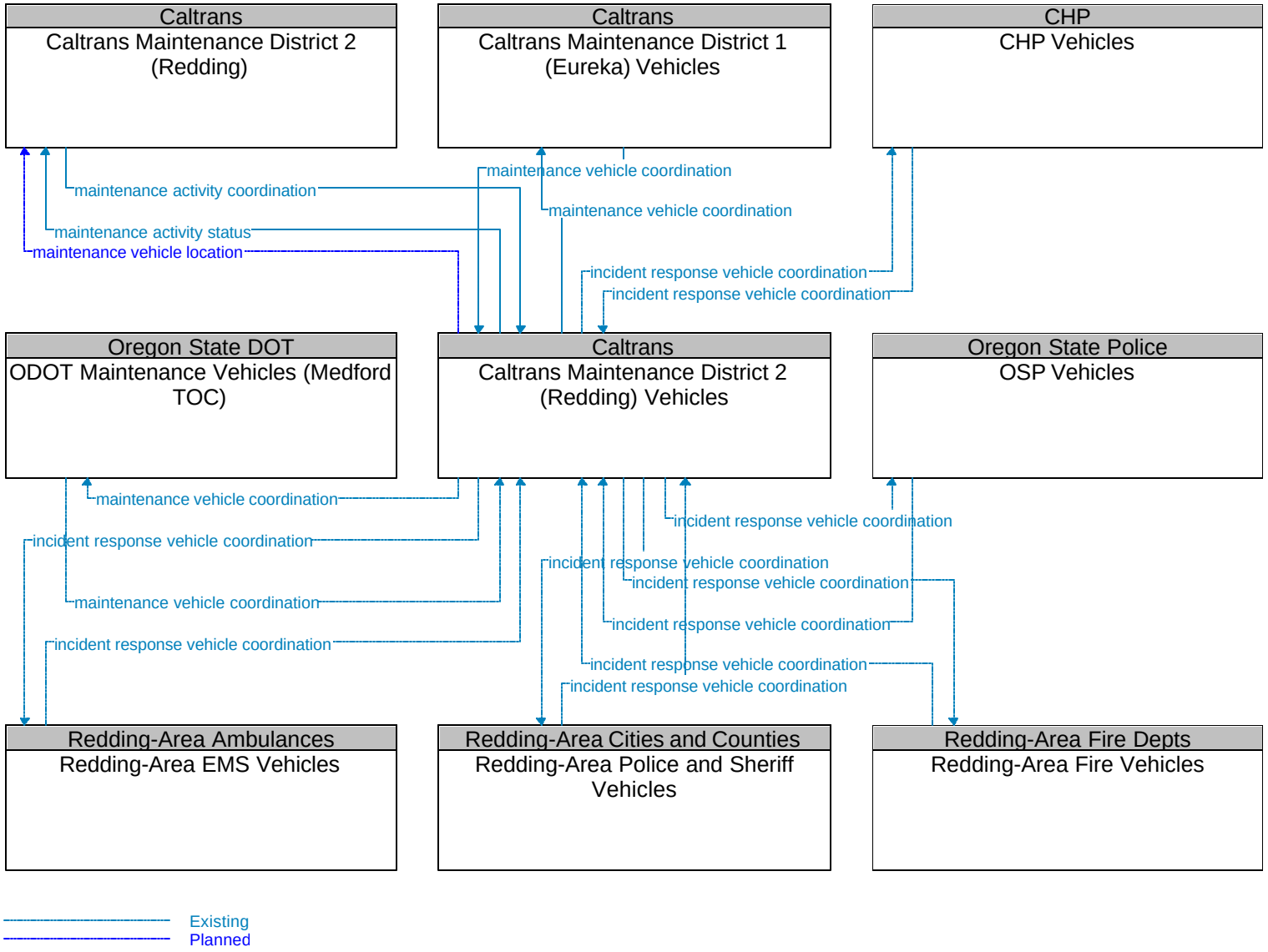

Figure D-16: Regional Diagram for Caltrans Maintenance District 2 (Redding) Vehicles.

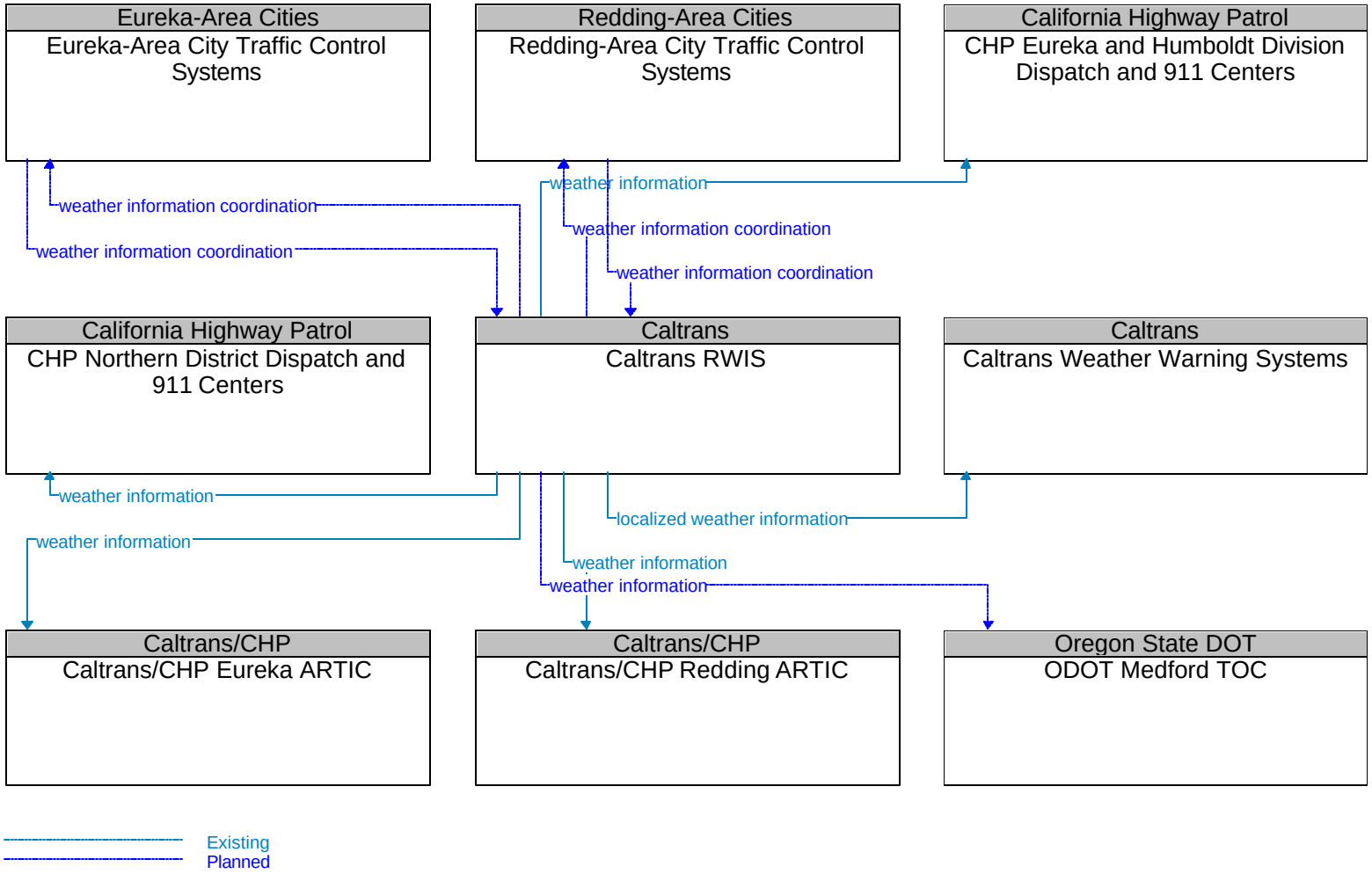

Figure D-17: Regional Diagram for Caltrans RWIS.

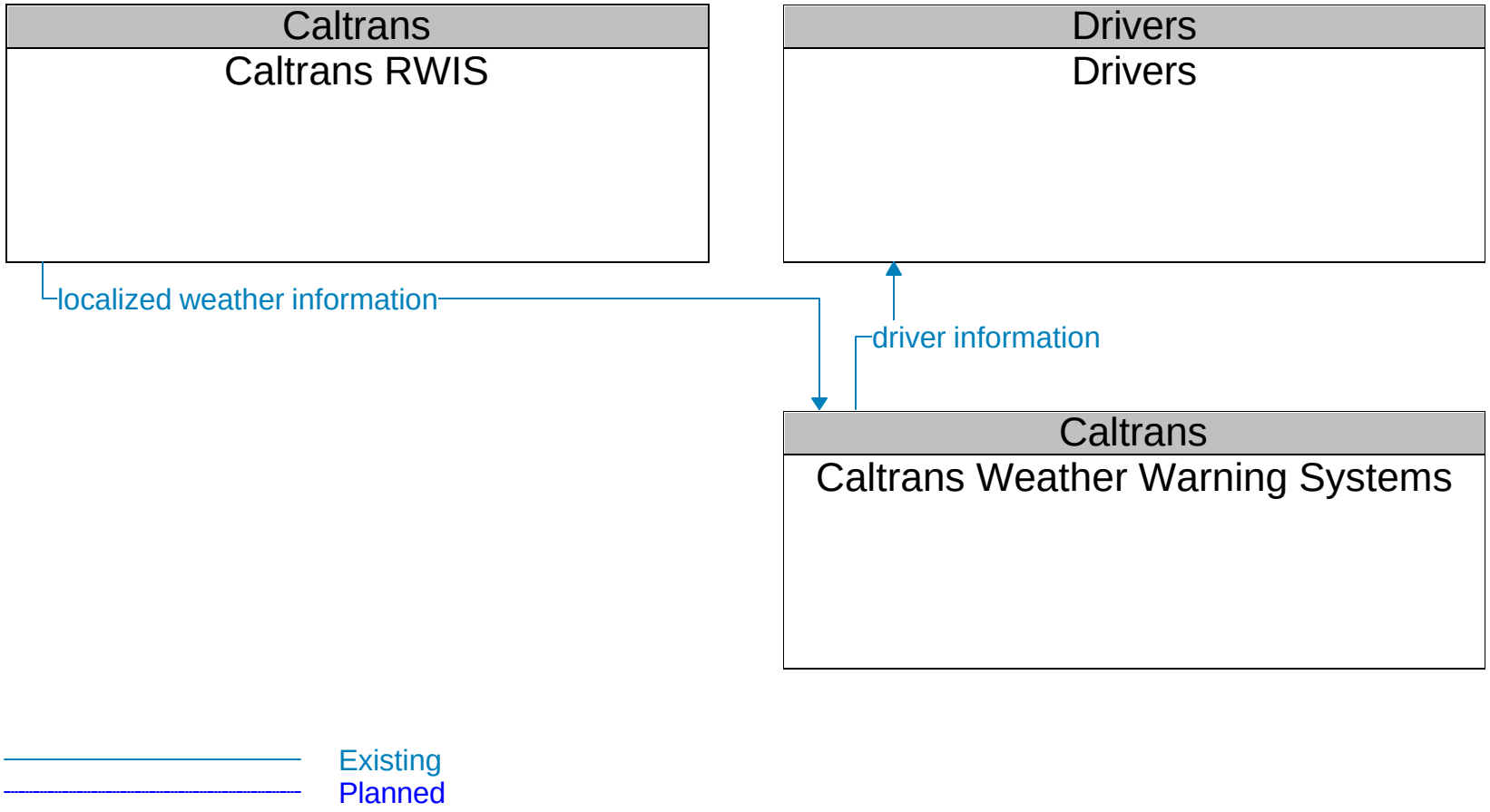

Figure D-18: Regional Diagram for Caltrans Weather Warning Systems.

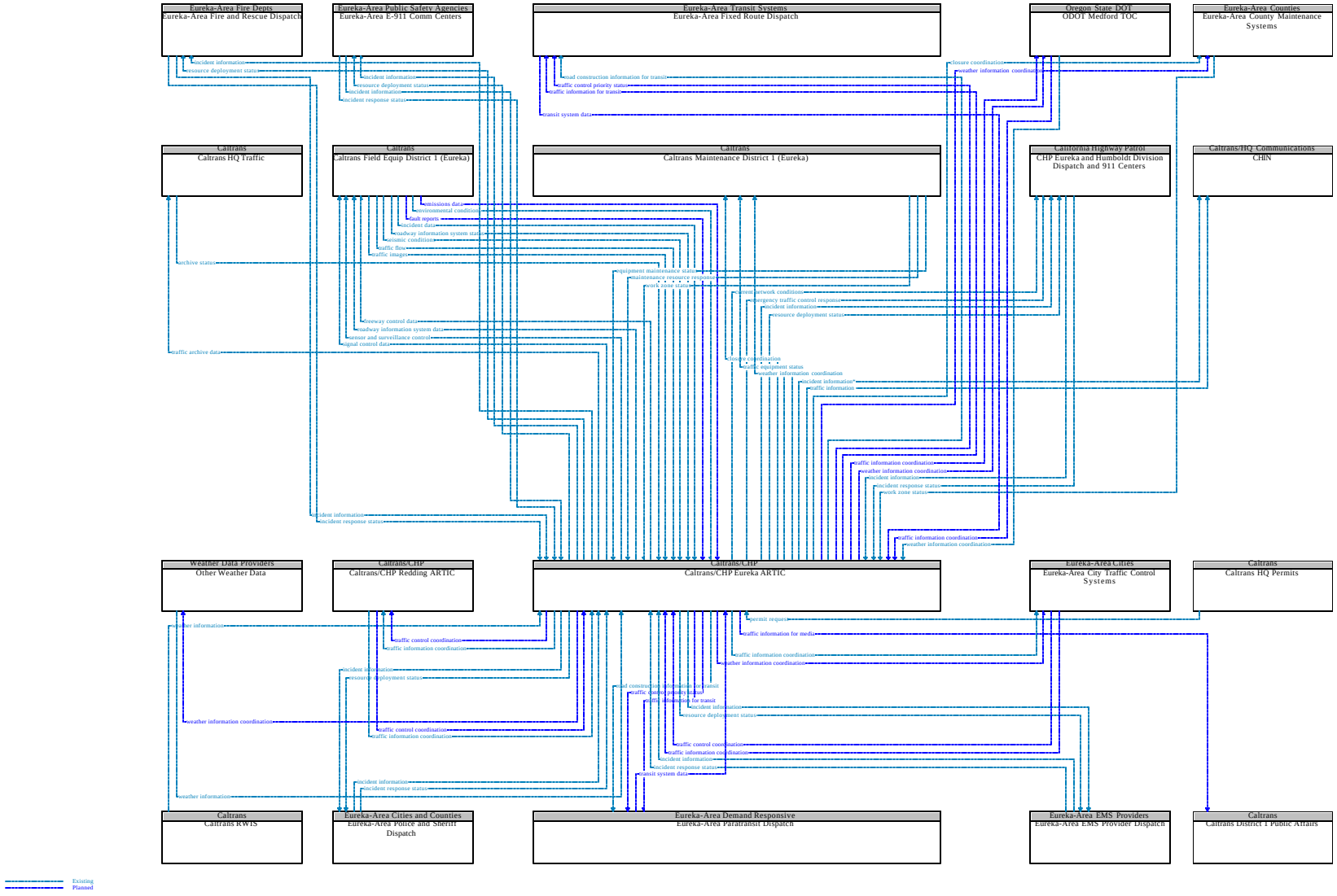

Figure D-19: Regional Diagram for Caltrans/CHP Eureka ARTIC.

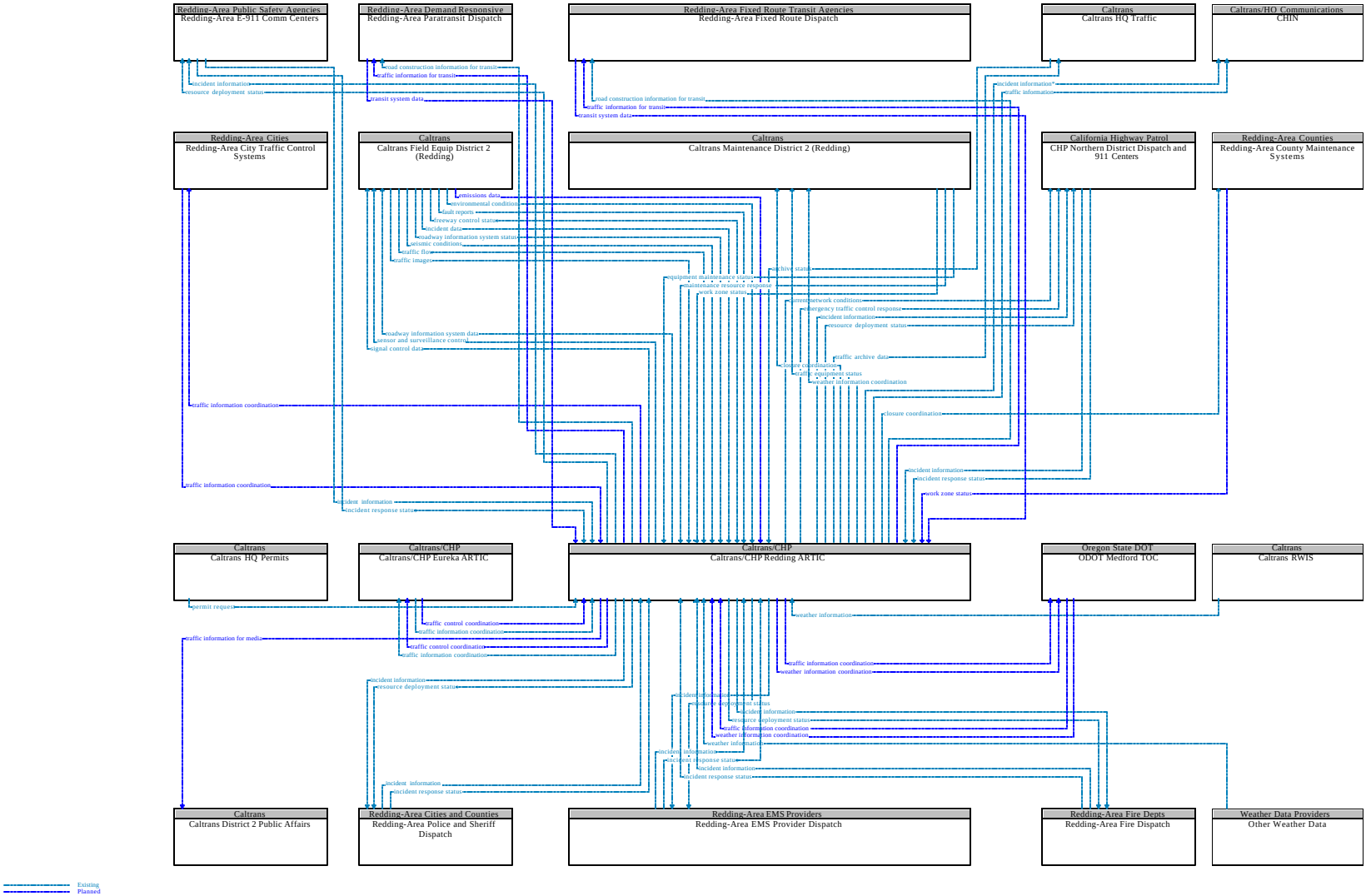

Figure D-20: Regional Diagram for Caltrans/CHP Redding ARTIC.

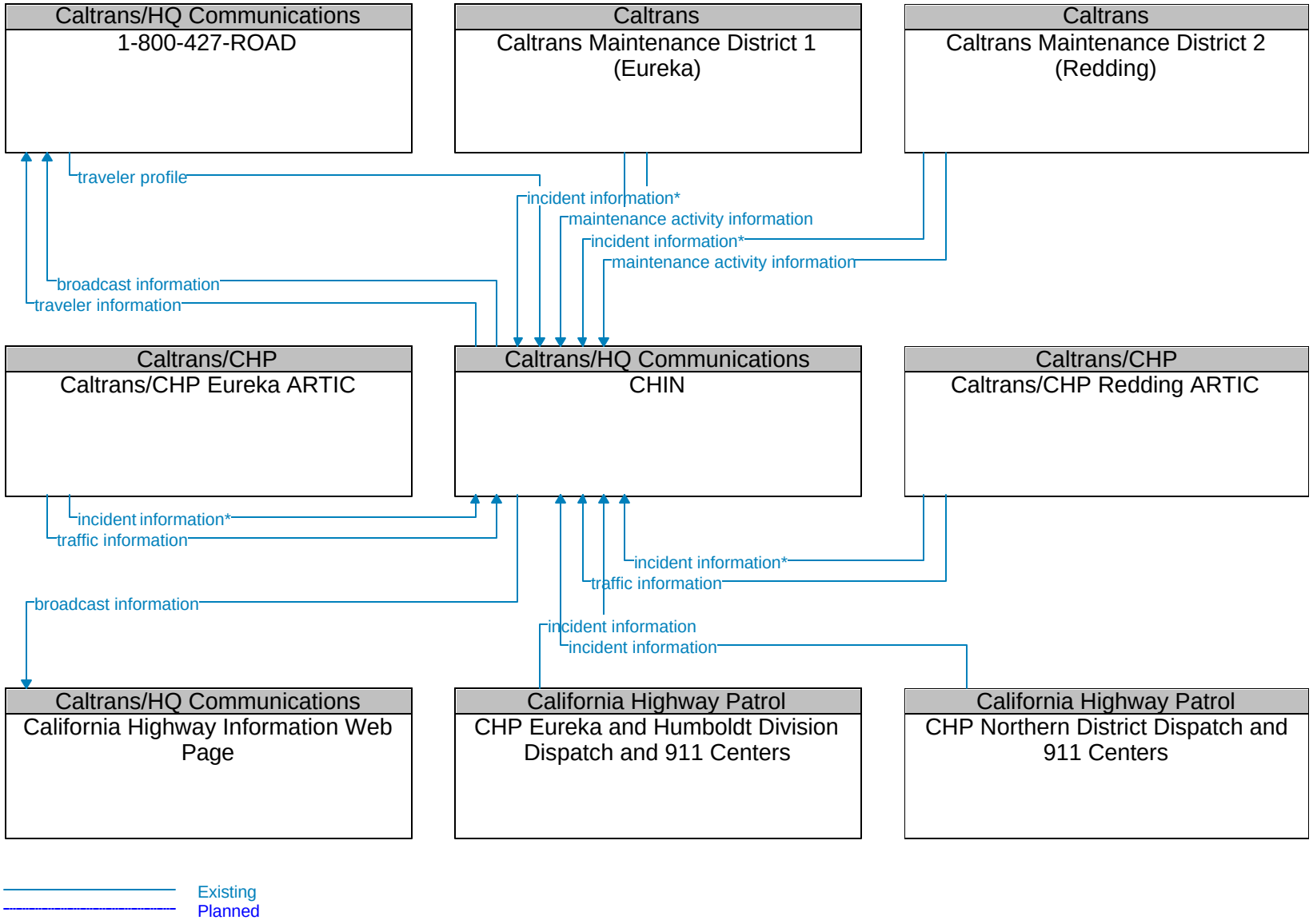

Figure D-21: Regional Diagram for CHIN.

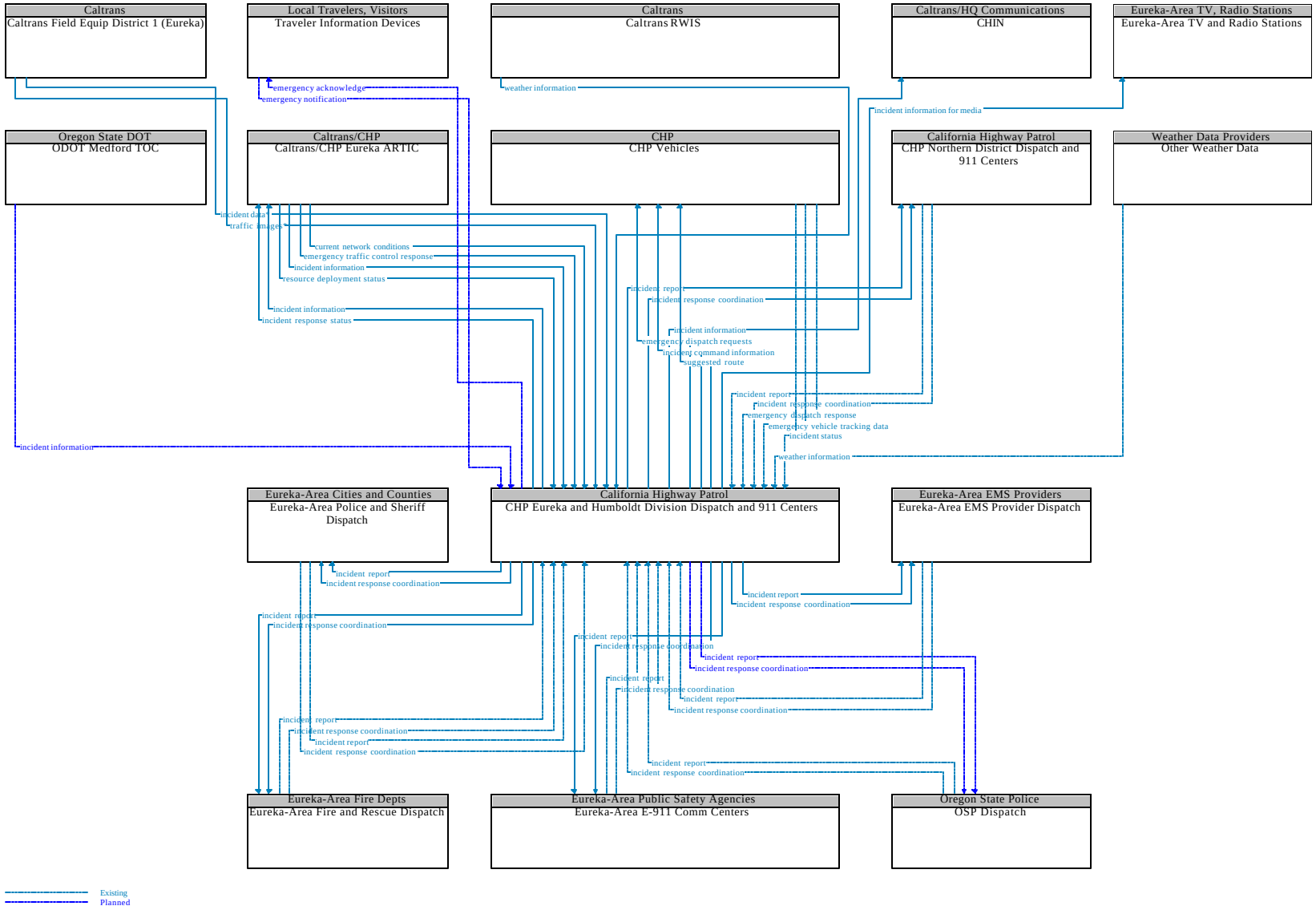

Figure D-22: Regional Diagram for CHP Eureka and Humboldt Division Dispatch and 911 Centers.

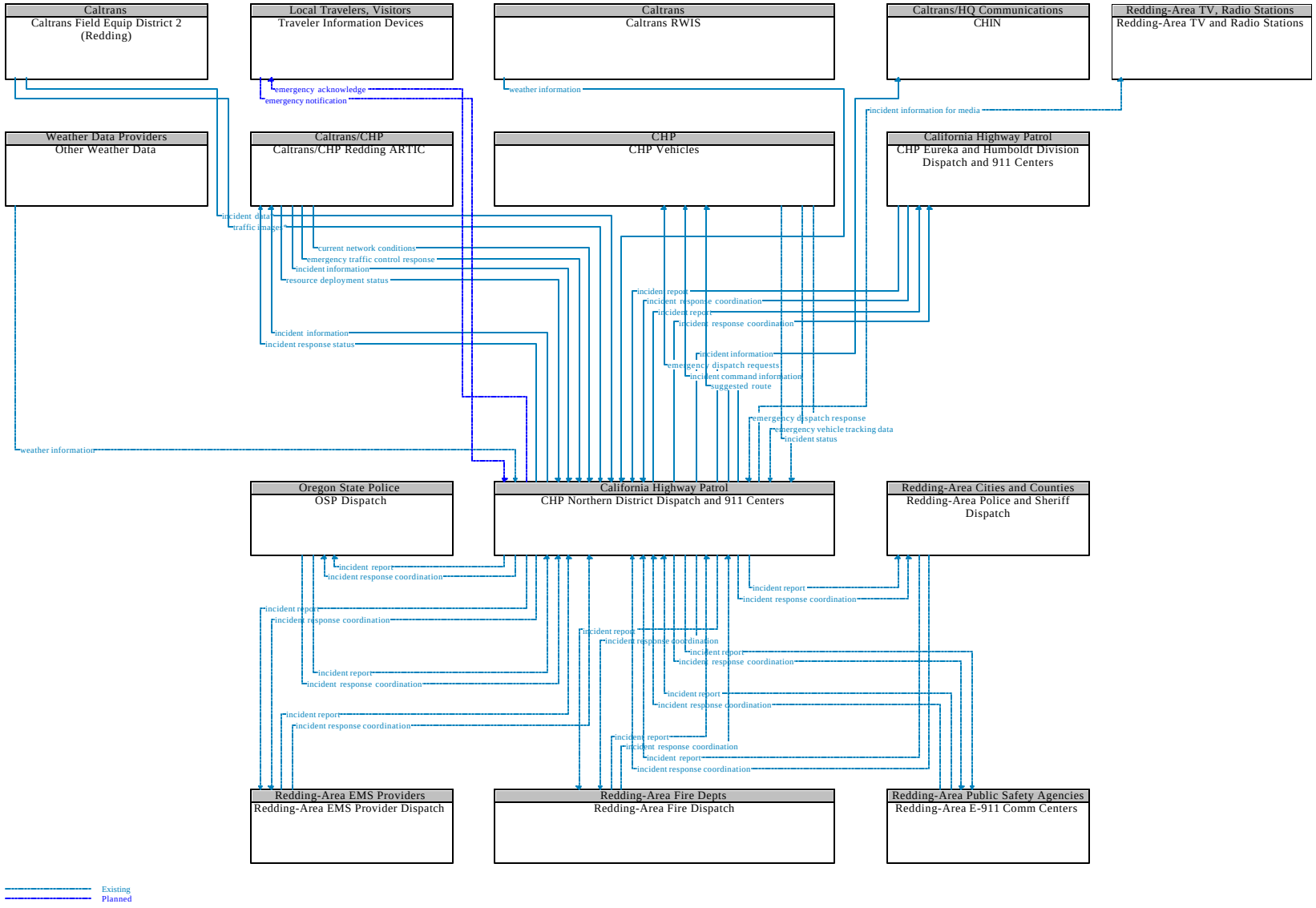

Figure D-23: Regional Diagram for CHP Northern District Dispatch and 911 Centers.

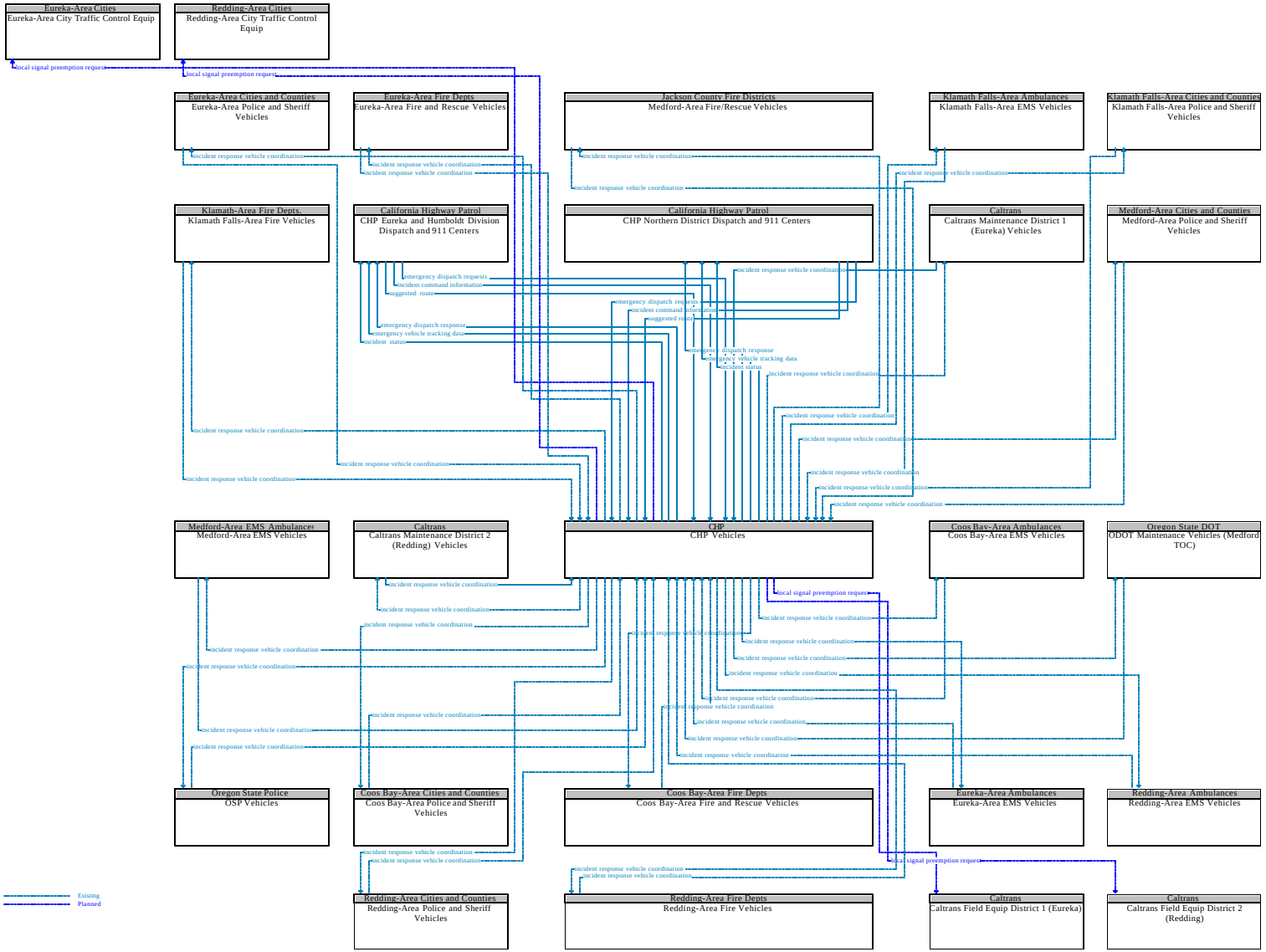

Figure D-24: Regional Diagram for CHP Vehicles.

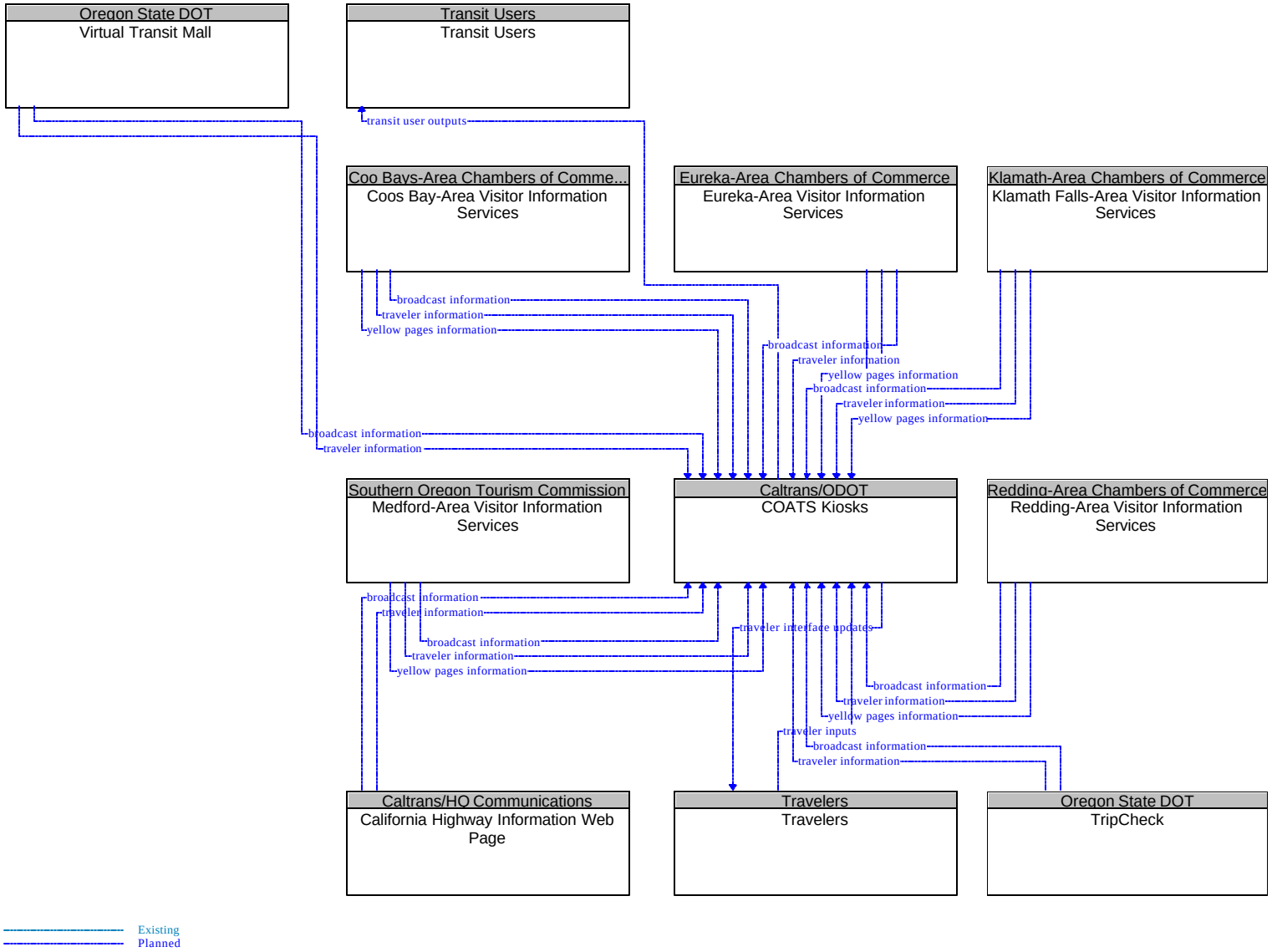

Figure D-25: Regional Diagram for COATS Kiosks.

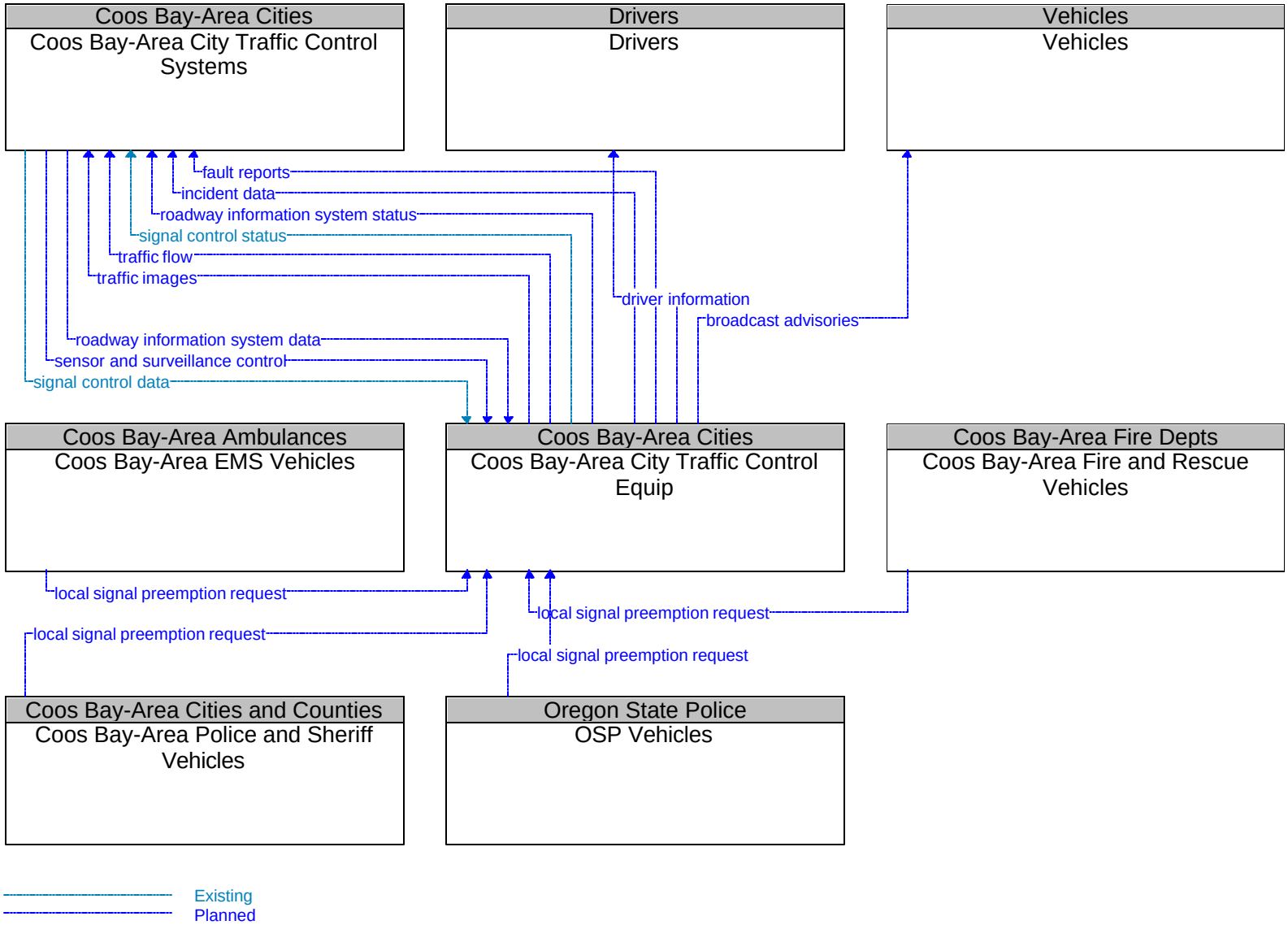

Figure D-26: Regional Diagram for Coos Bay-Area City Traffic Control Equip.

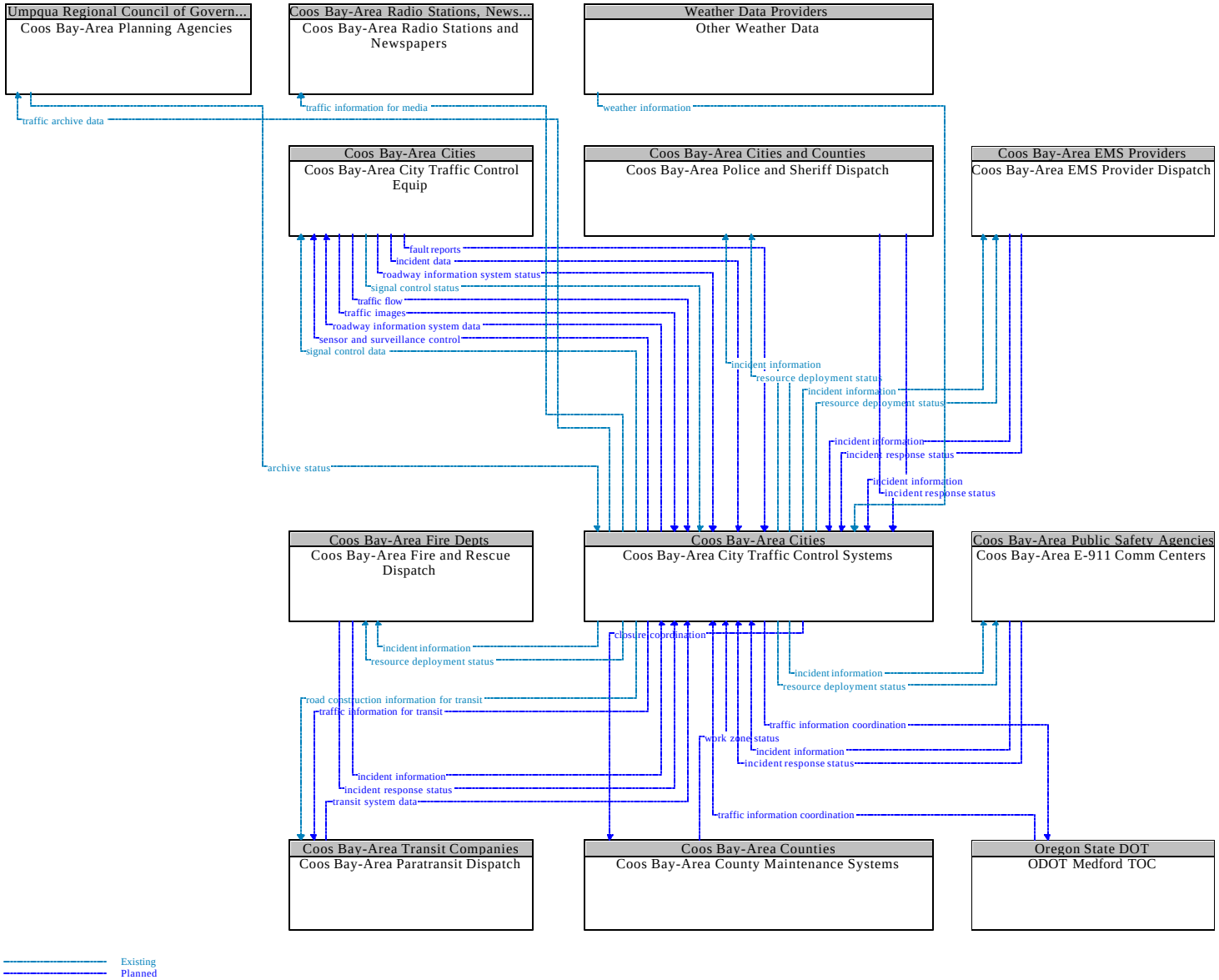

Figure D-27: Regional Diagram for Coos Bay-Area City Traffic Control Systems.

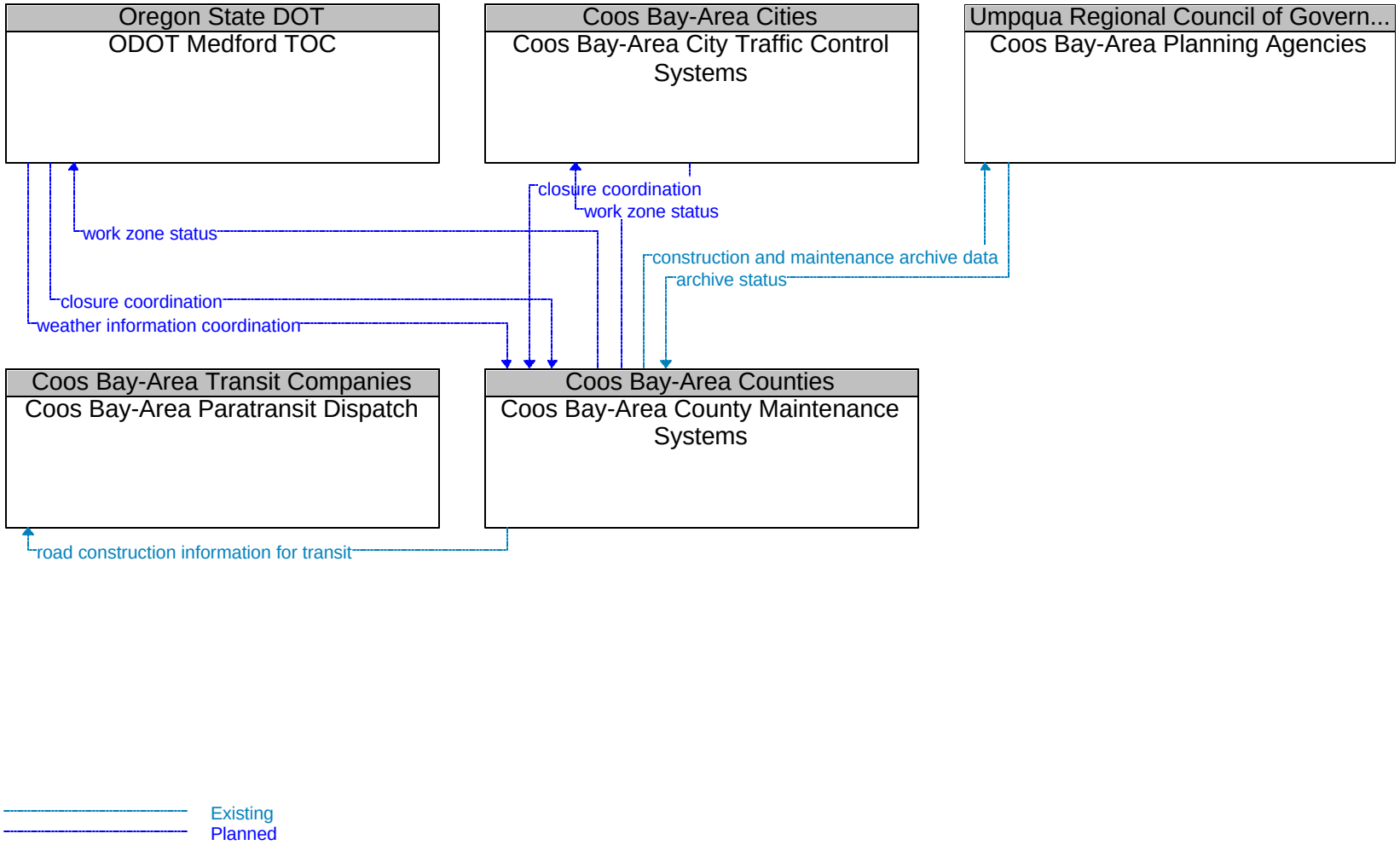

Figure D-28: Regional Diagram for Coos Bay-Area County Maintenance Systems.

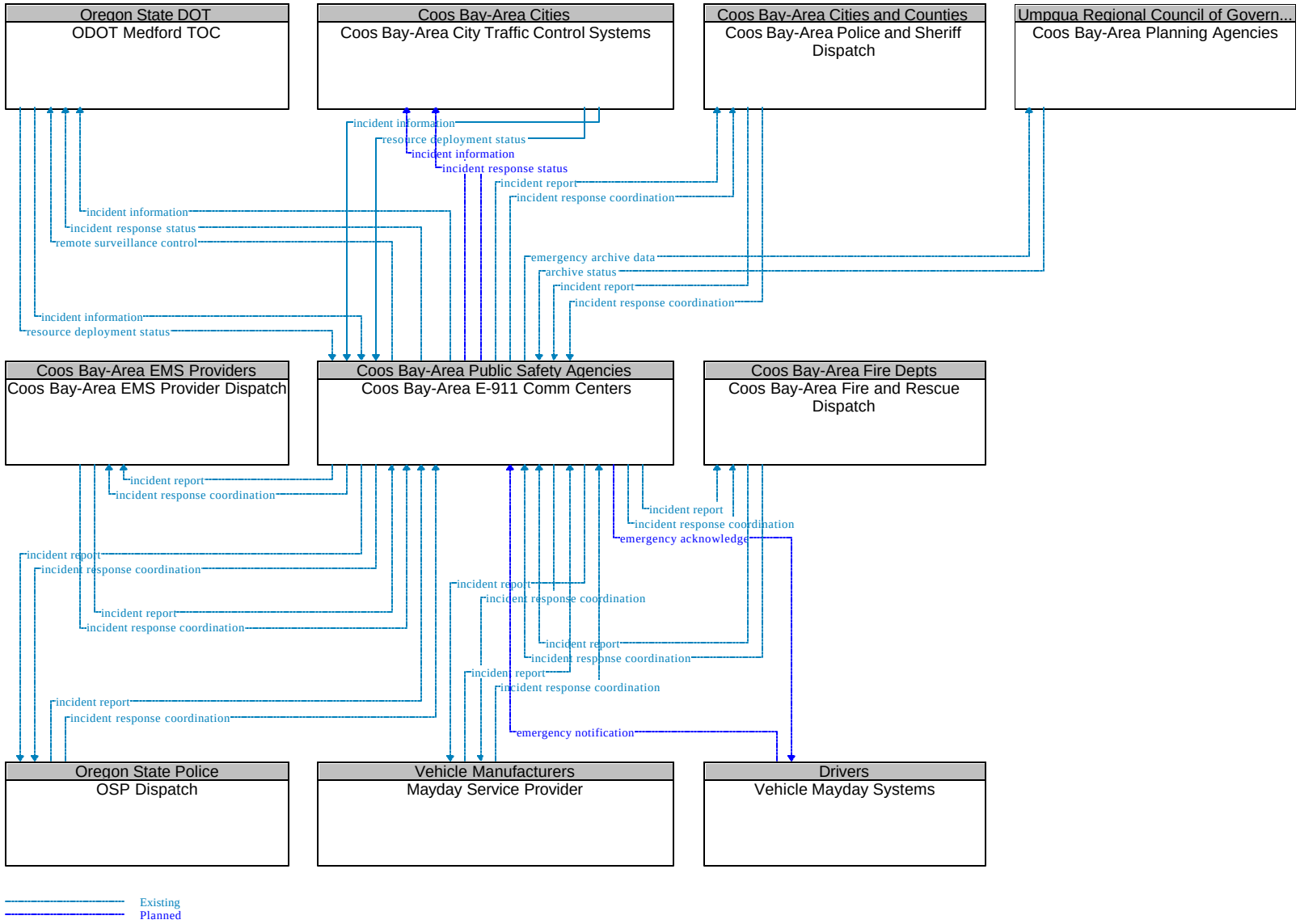

Figure D-29: Regional Diagram for Coos Bay-Area E-911 Comm Centers.

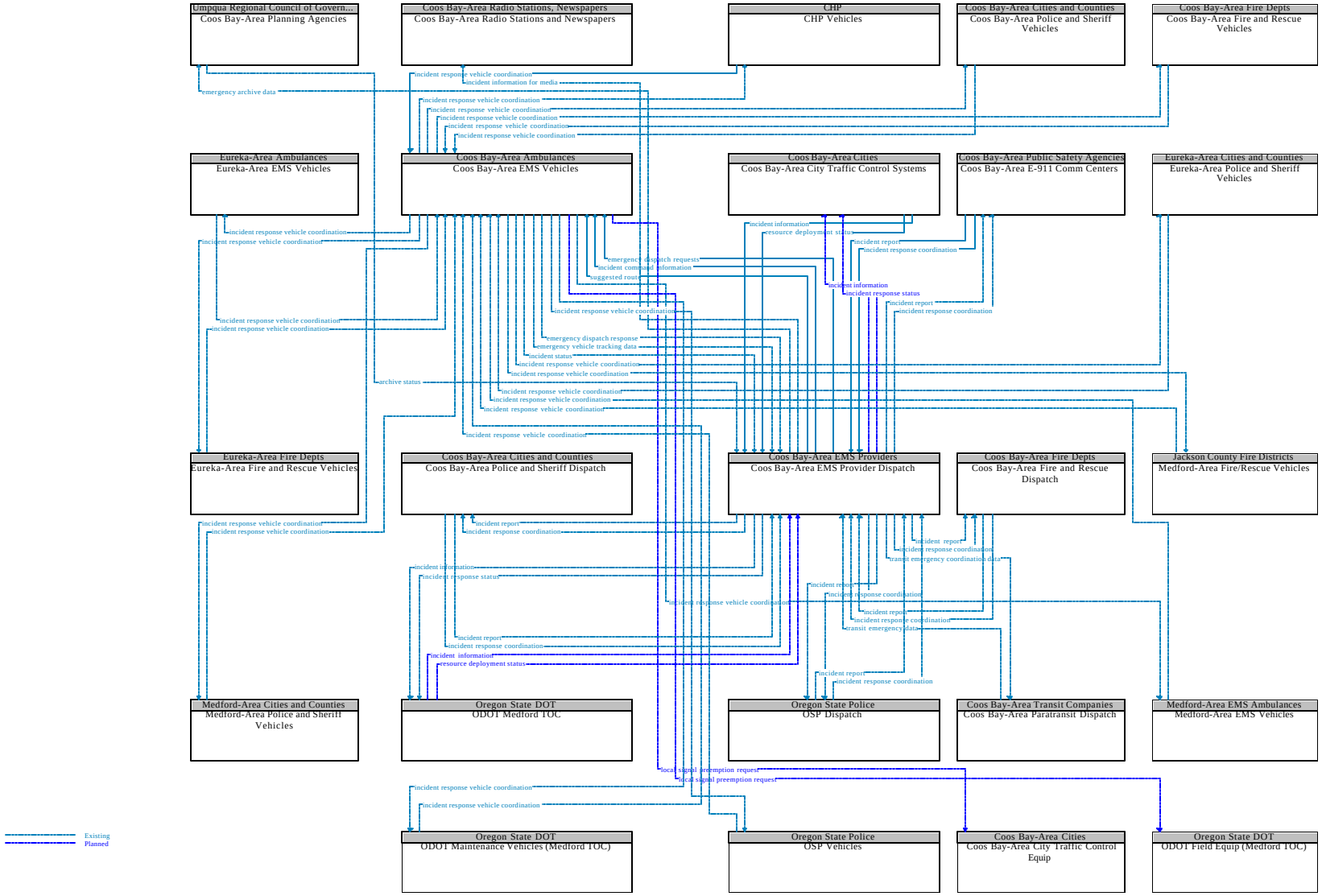

Figure D-30: Regional Diagram for Coos Bay-Area EMS Dispatch and Vehicles.

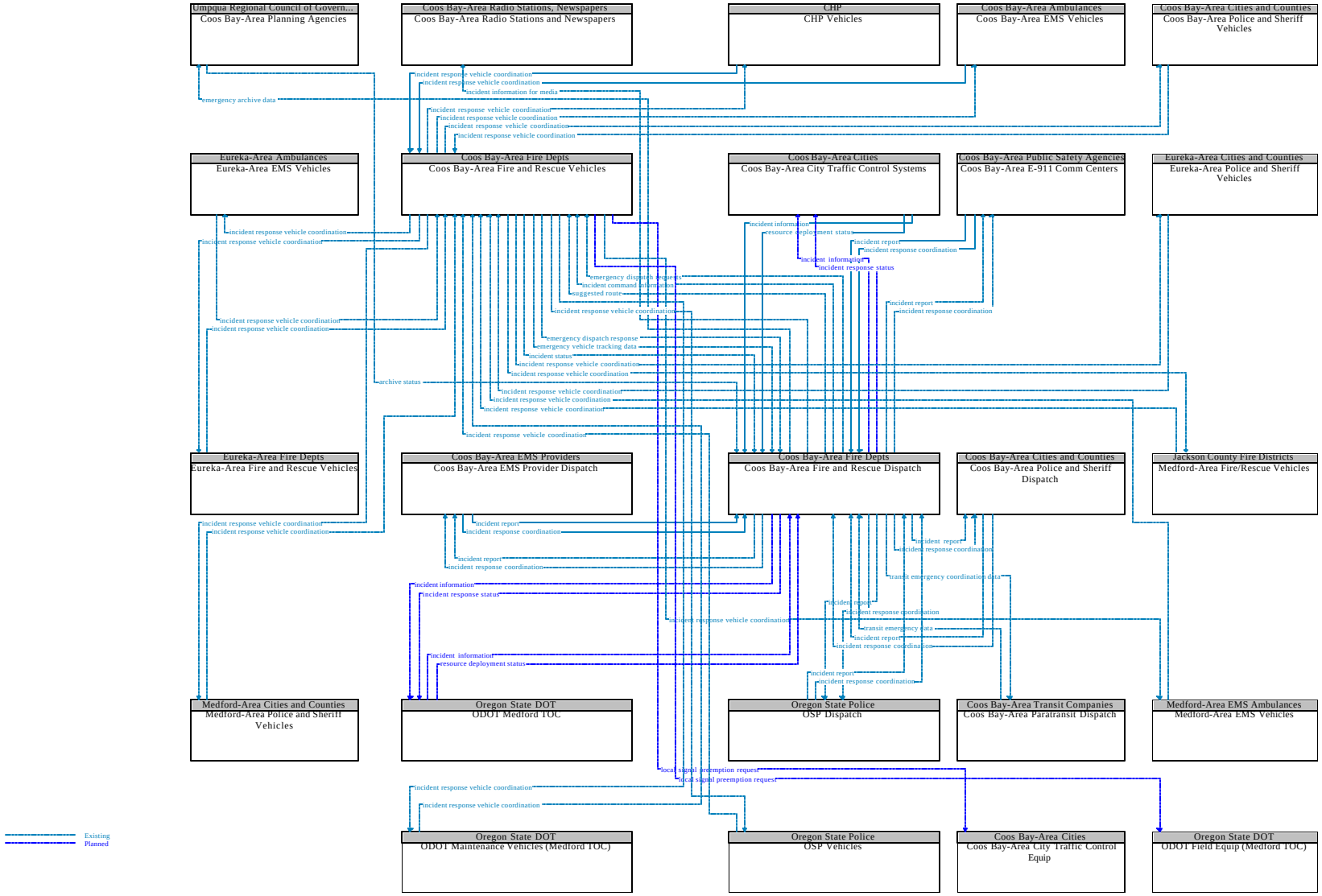

Figure D-31: Regional Diagram for Coos Bay-Area Fire and Rescue Dispatch and Vehicles.

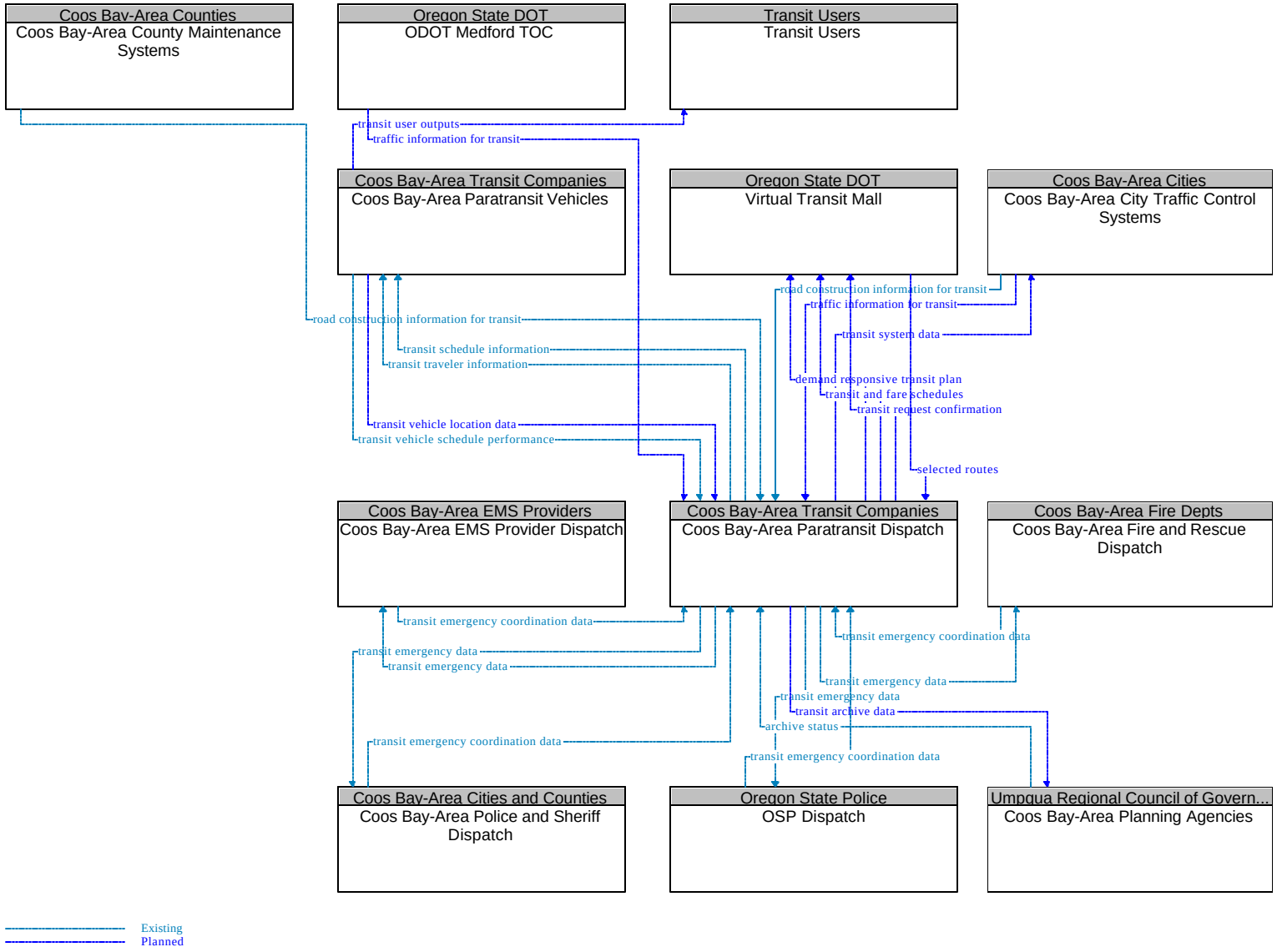

Figure D-32: Regional Diagram for Coos Bay-Area Paratransit Dispatch and Vehicles.

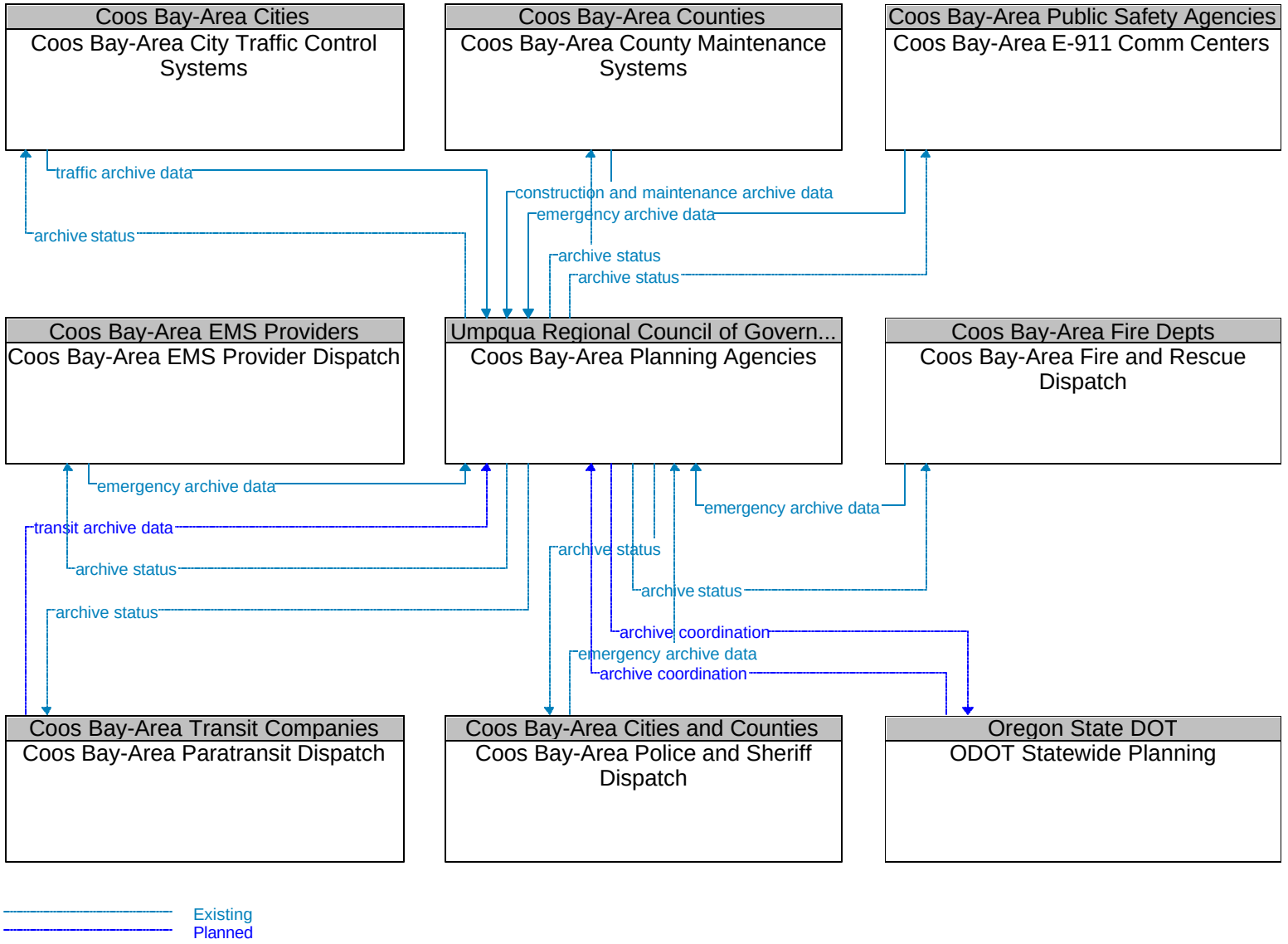

Figure D-33: Regional Diagram for Coos Bay-Area Planning Agencies.

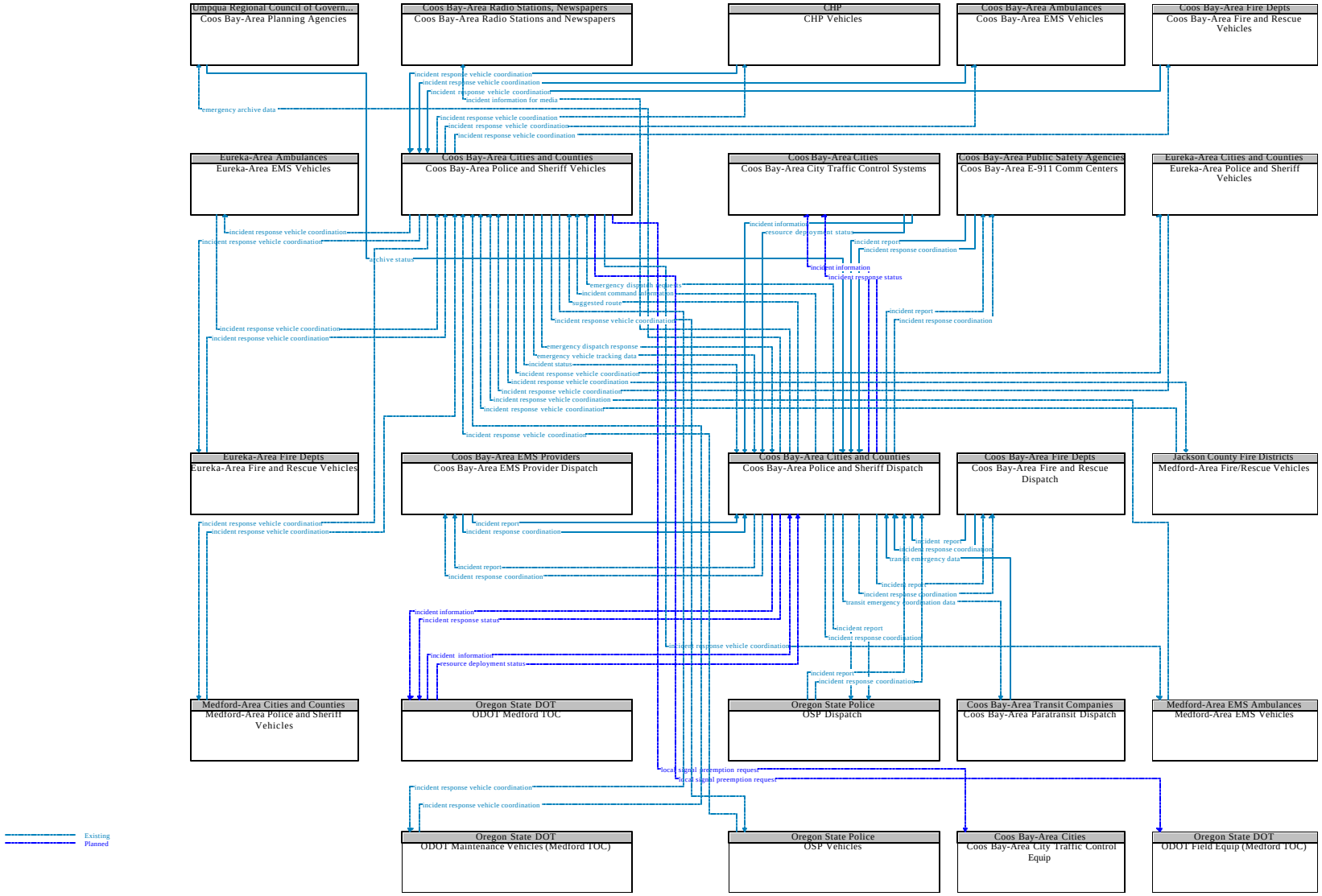

Figure D-34: Regional Diagram for Coos Bay-Area Police and Sheriff Dispatch and Vehicles.

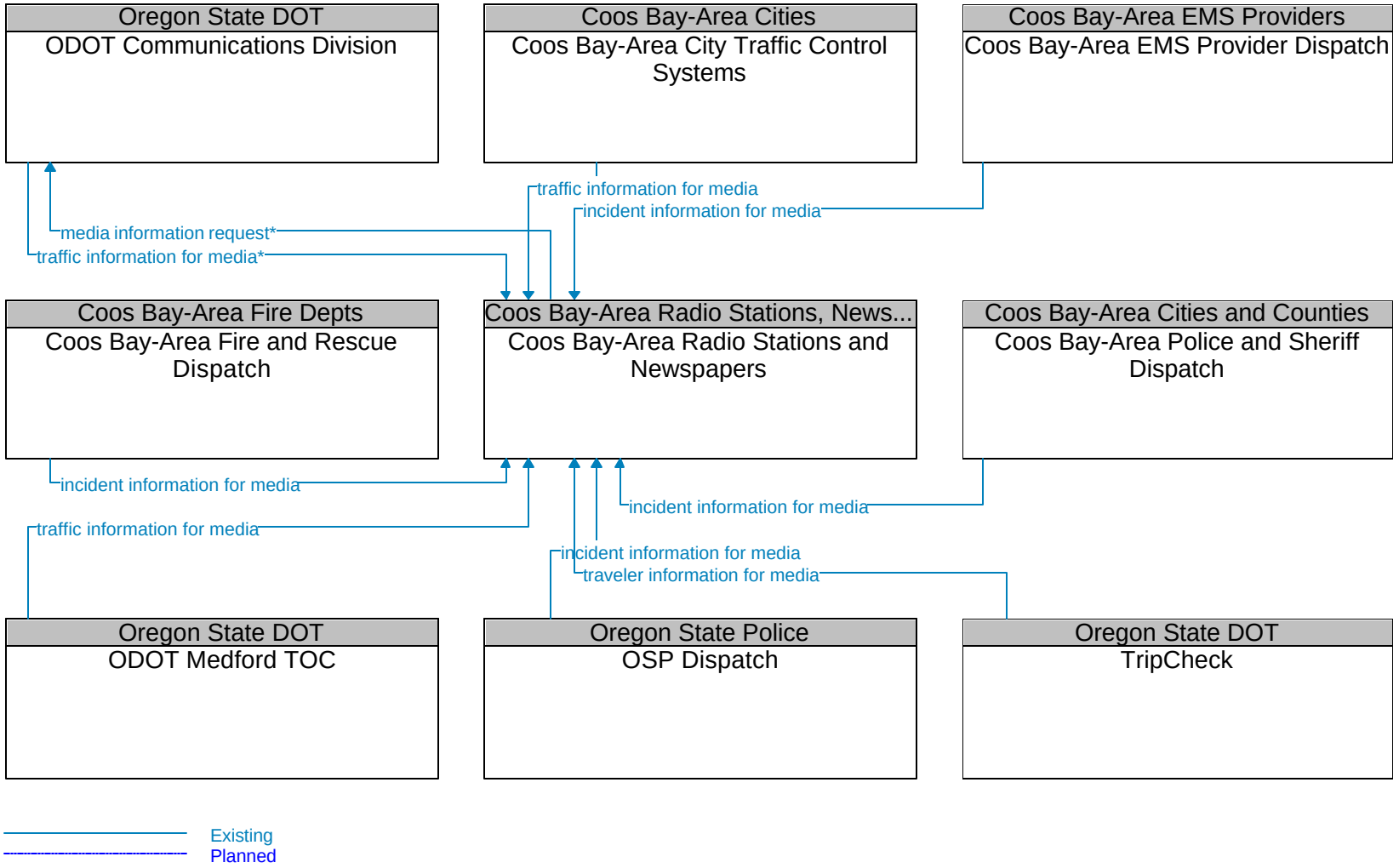

Figure D-35: Regional Diagram for Coos Bay-Area Radio Stations and Newspapers.

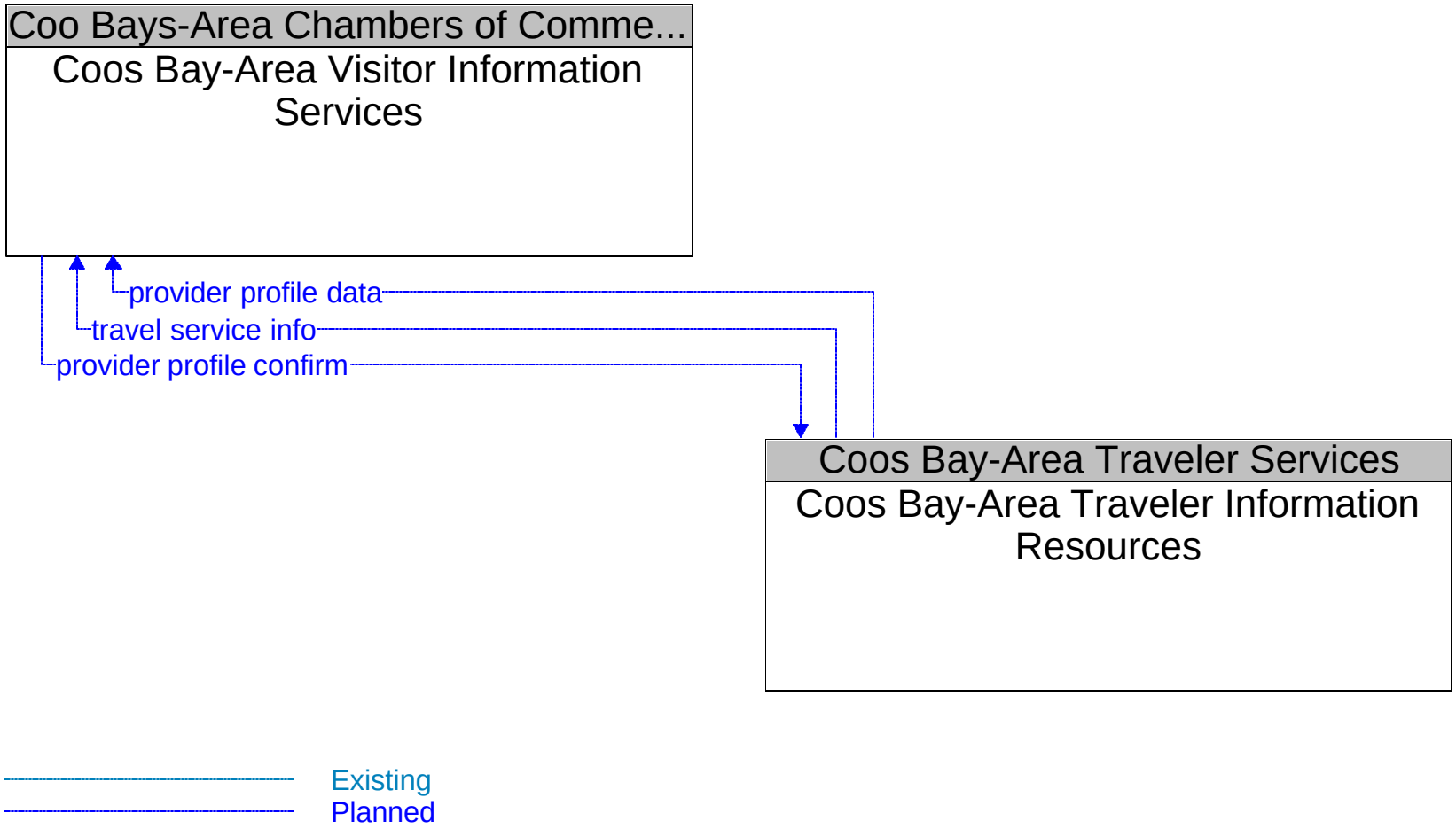

Figure D-36: Regional Diagram for Coos Bay-Area Traveler Information Resources.

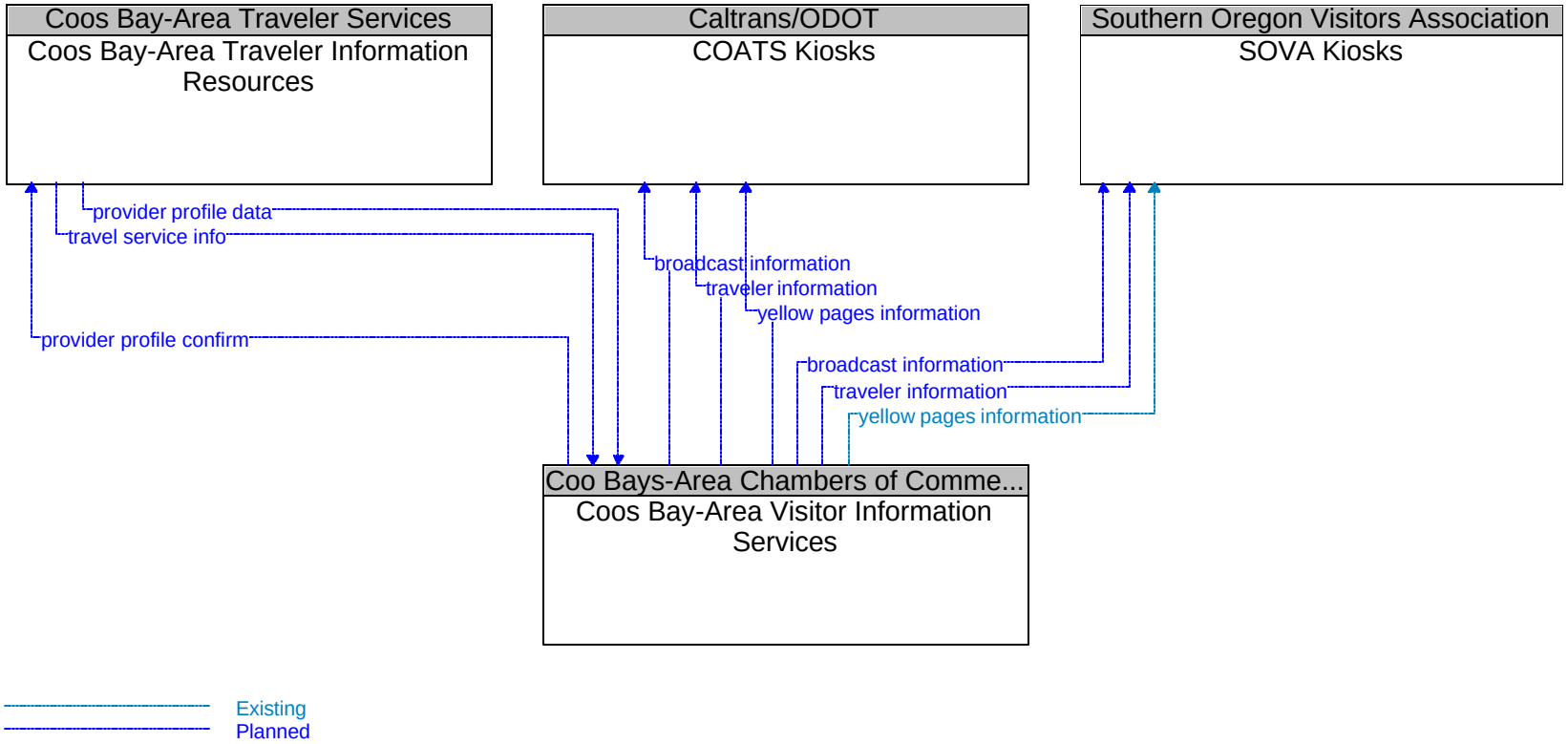

Figure D-37: Regional Diagram for Coos Bay-Area Visitor Information Services.

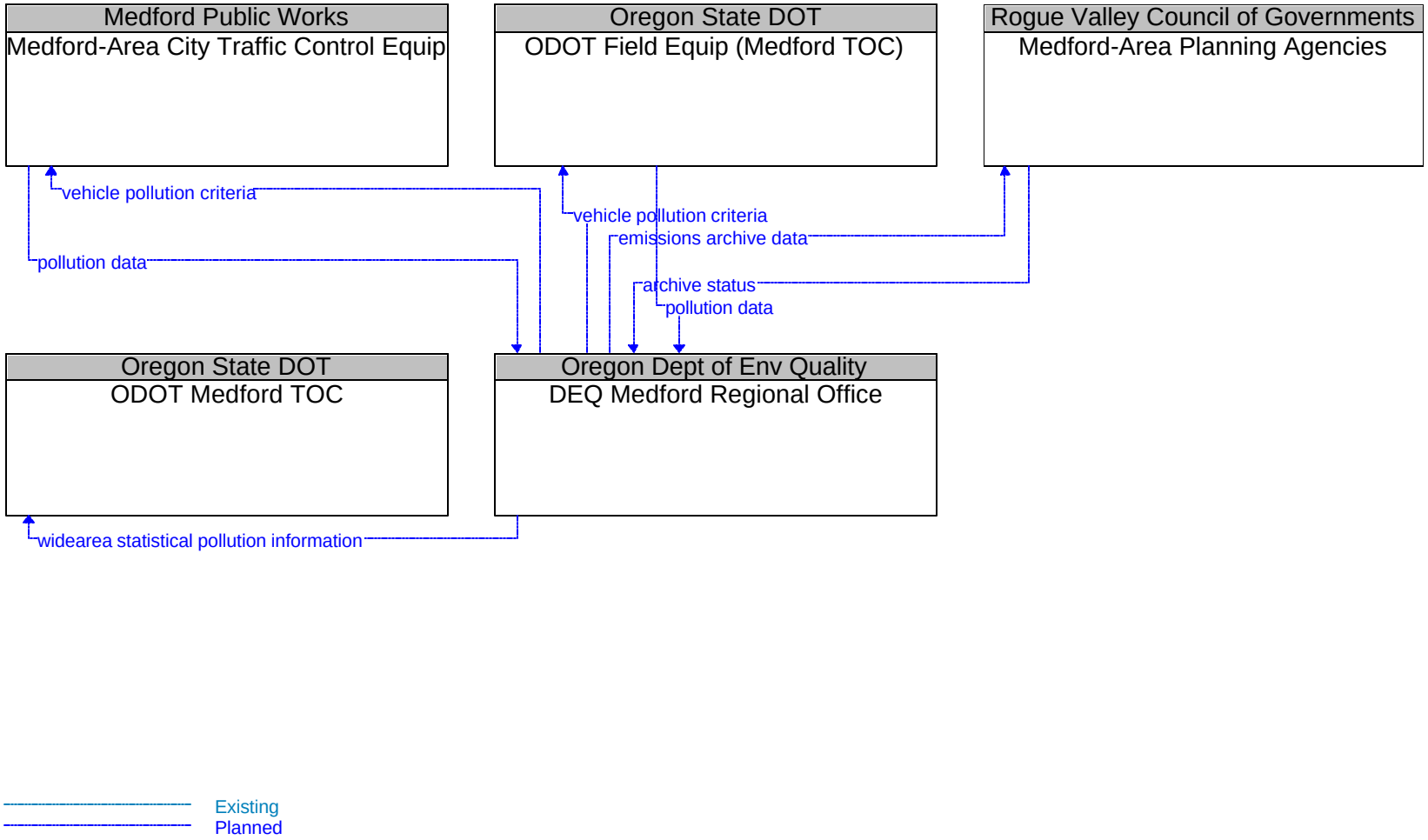

Figure D-38: Regional Diagram for DEQ Medford Regional Office.

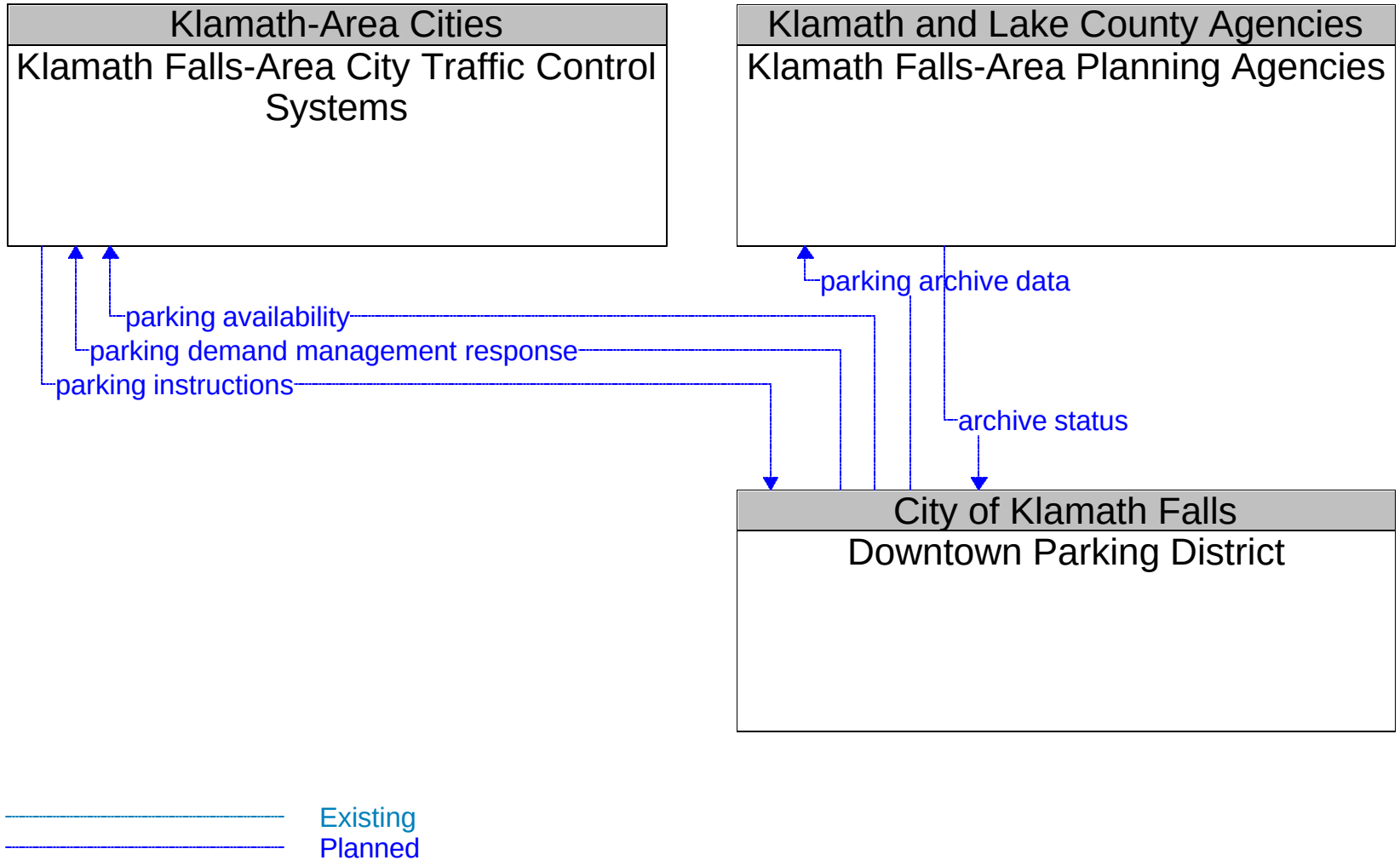

Figure D-39: Regional Diagram for Downtown Parking District.

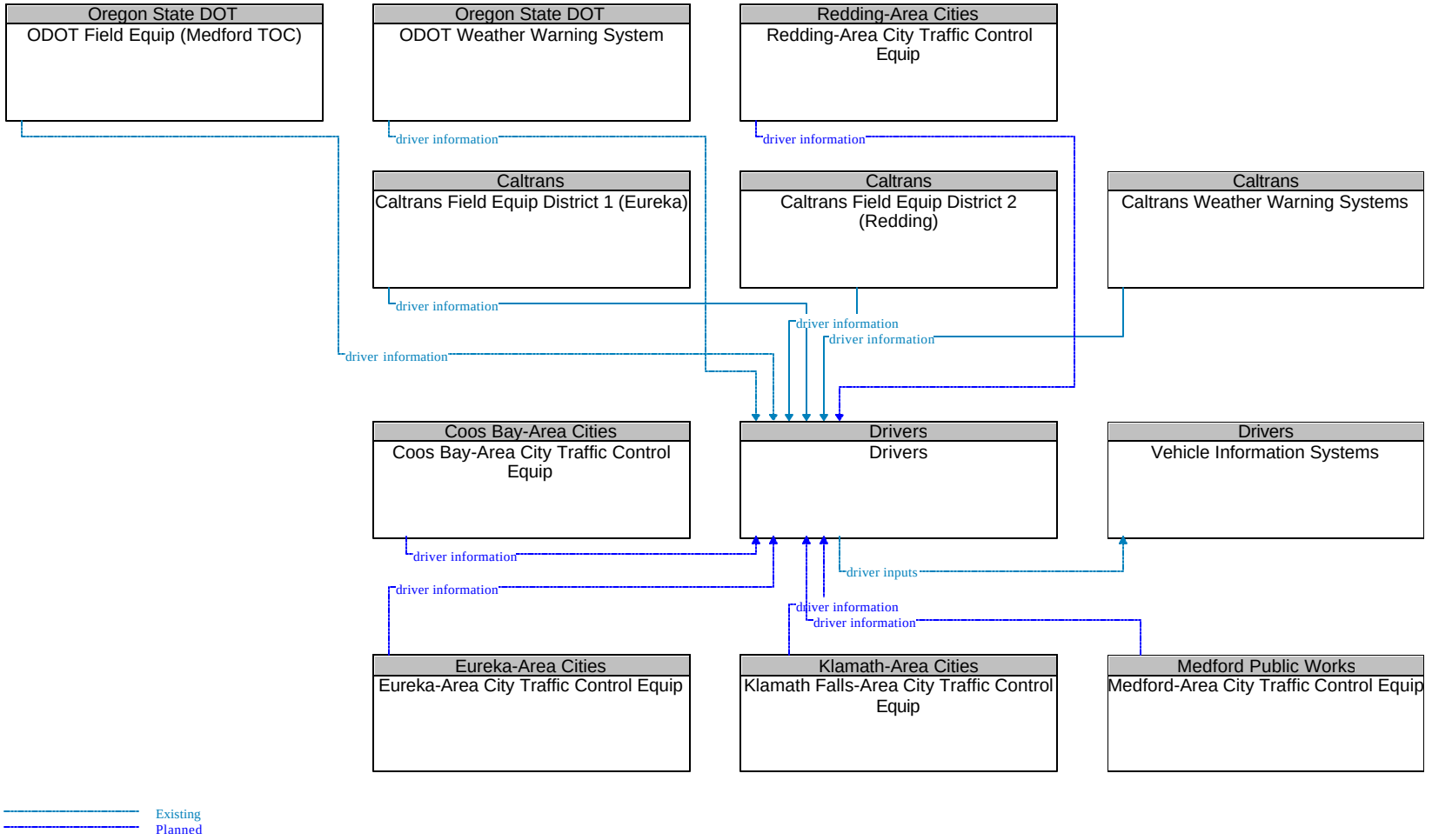

Figure D-40: Regional Diagram for Drivers.

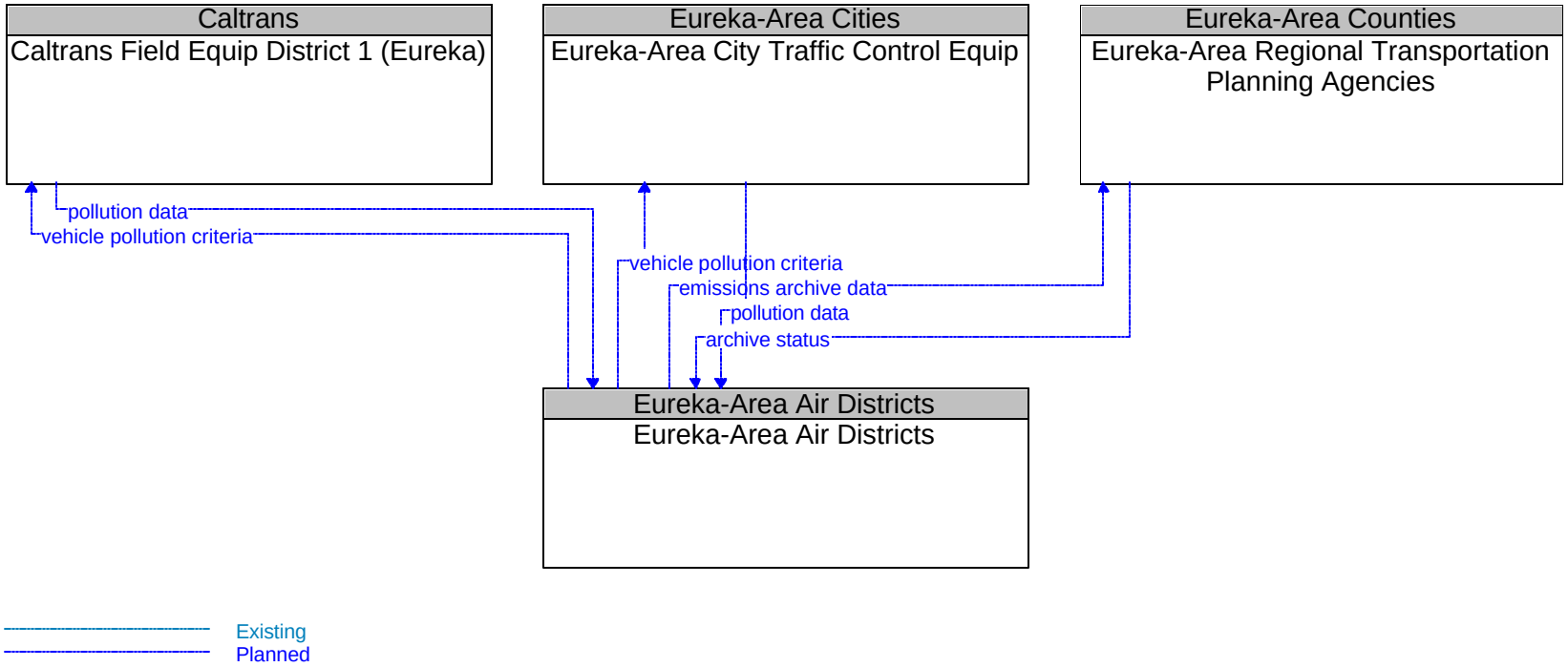

Figure D-41: Regional Diagram for Eureka-Area Air Districts.

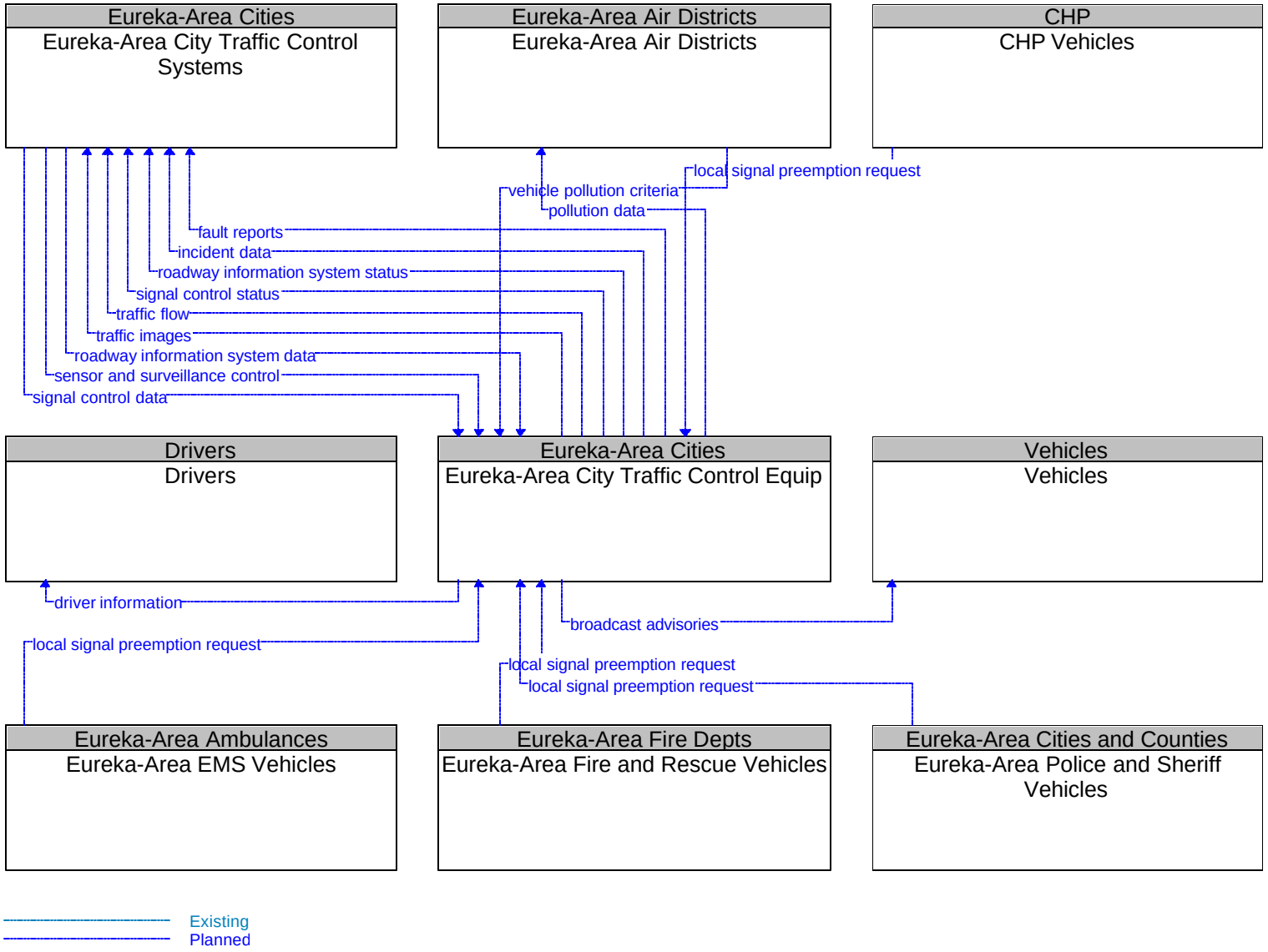

Figure D-42: Regional Diagram for Eureka-Area City Traffic Control Equip.

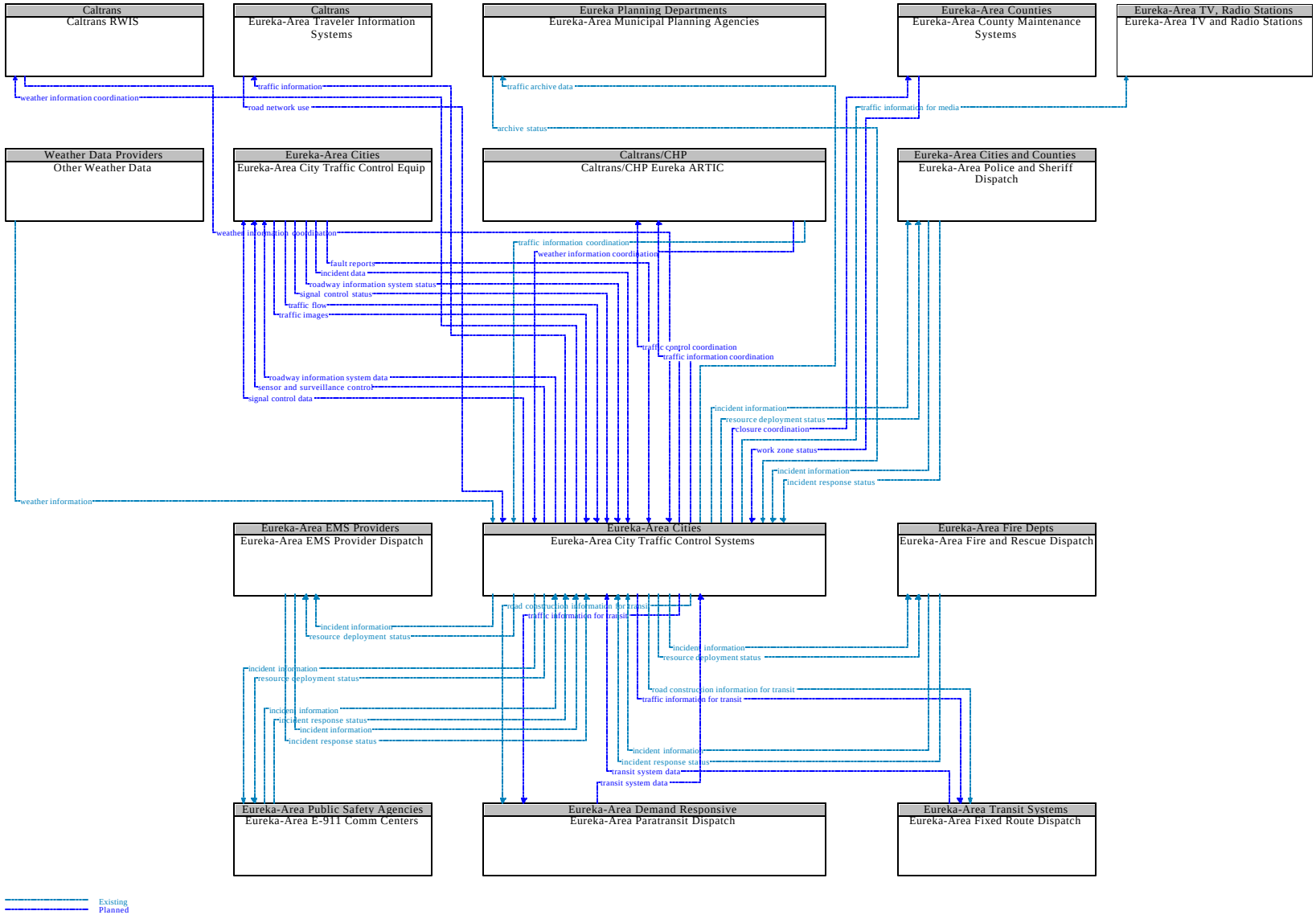

Figure D-43: Regional Diagram for Eureka-Area City Traffic Control Systems.

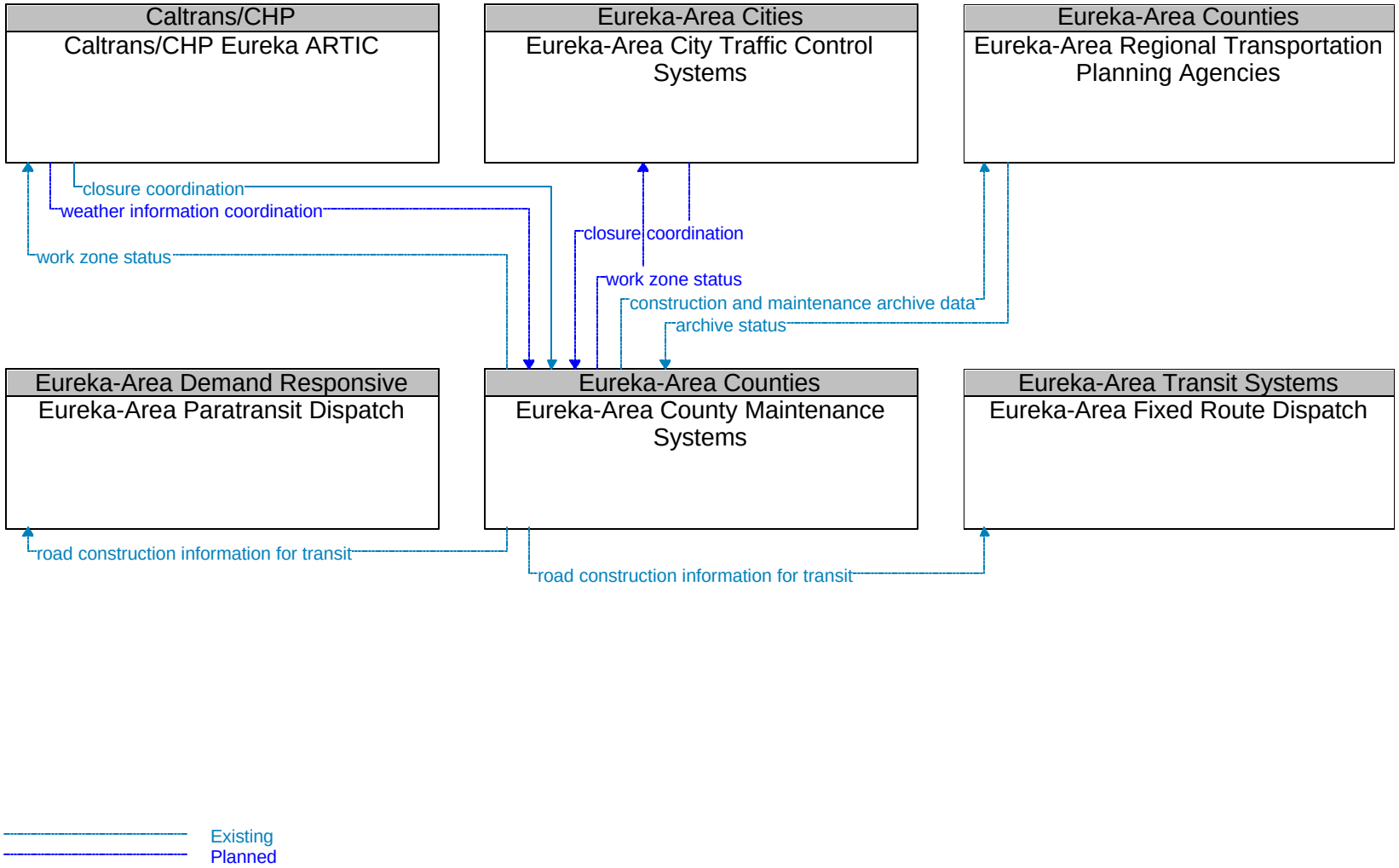

Figure D-44: Regional Diagram for Eureka-Area County Maintenance Systems.

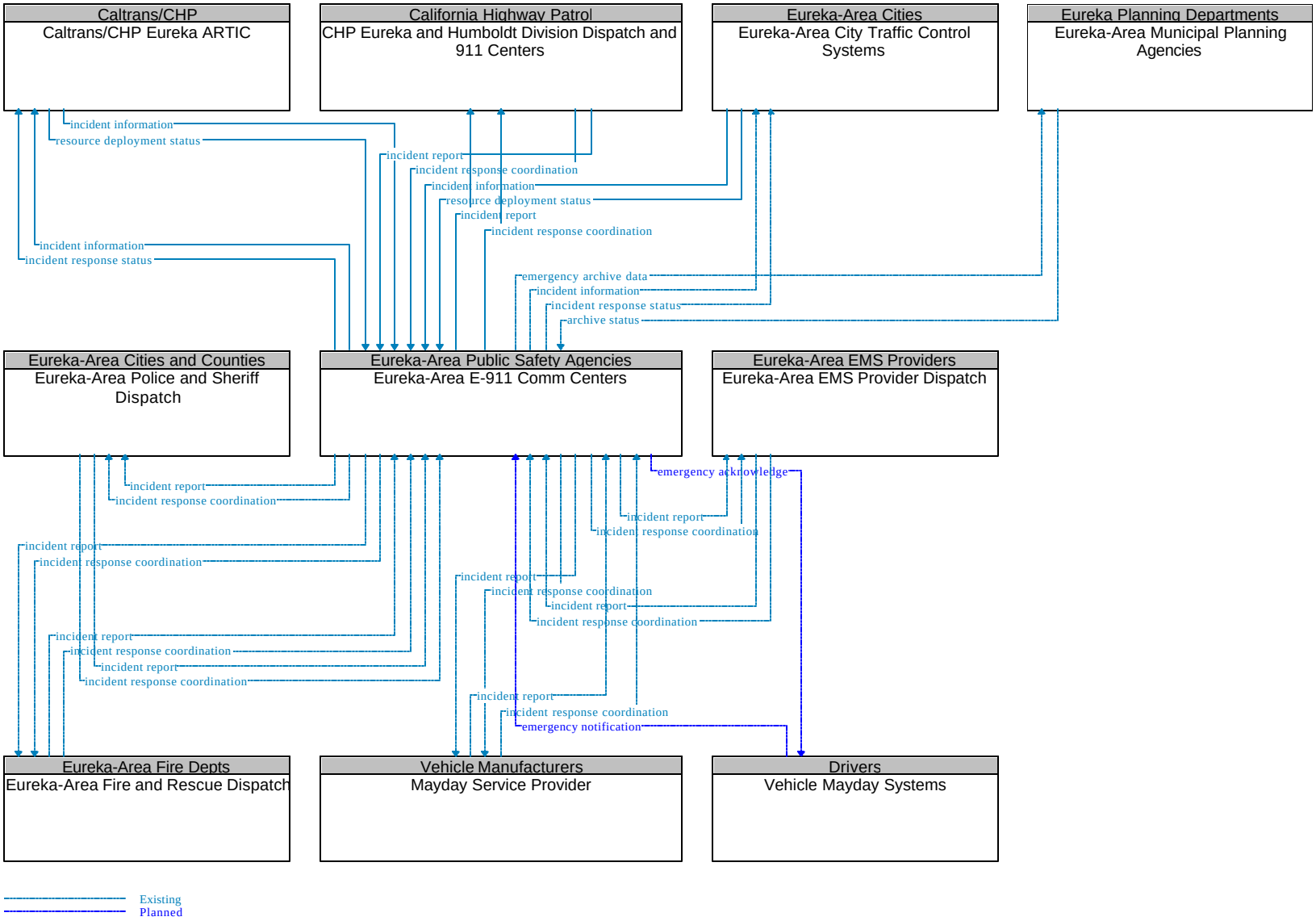

Figure D-45: Regional Diagram for Eureka-Area E-911 Comm Centers.

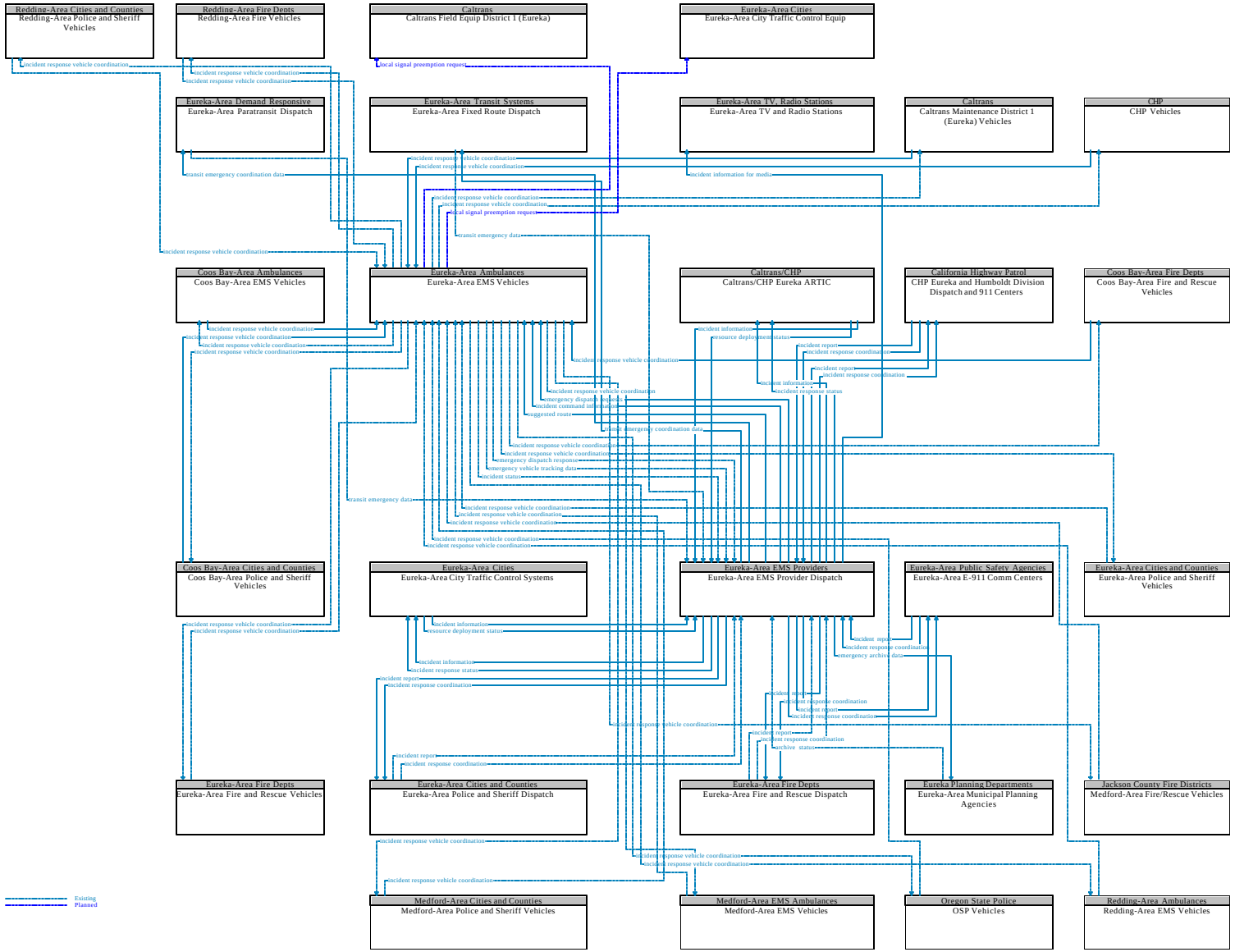

Figure D-46: Regional Diagram for Eureka-Area EMS Dispatch and Vehicles.

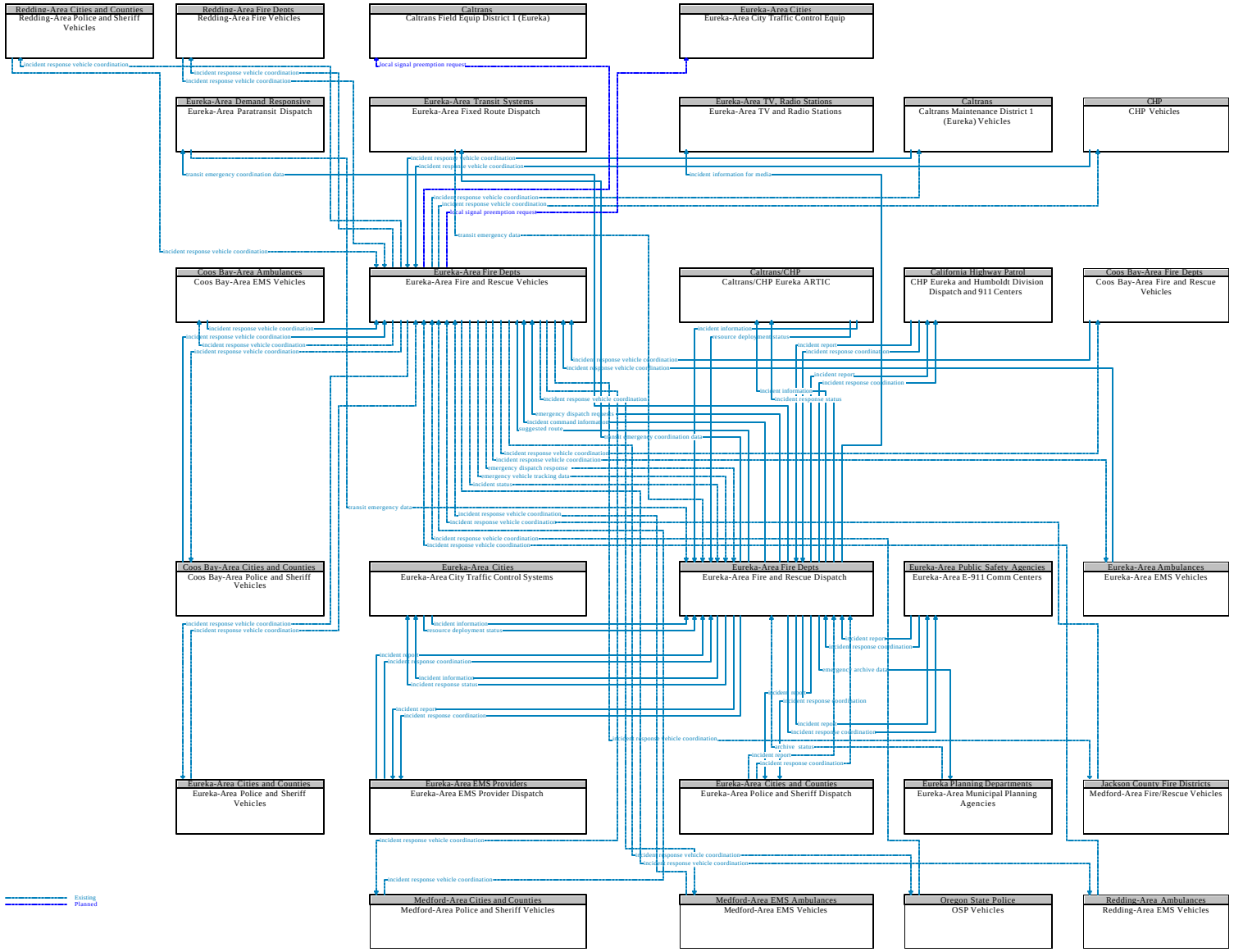

Figure D-47: Regional Diagram for Eureka-Area Fire and Rescue Dispatch and Vehicles.

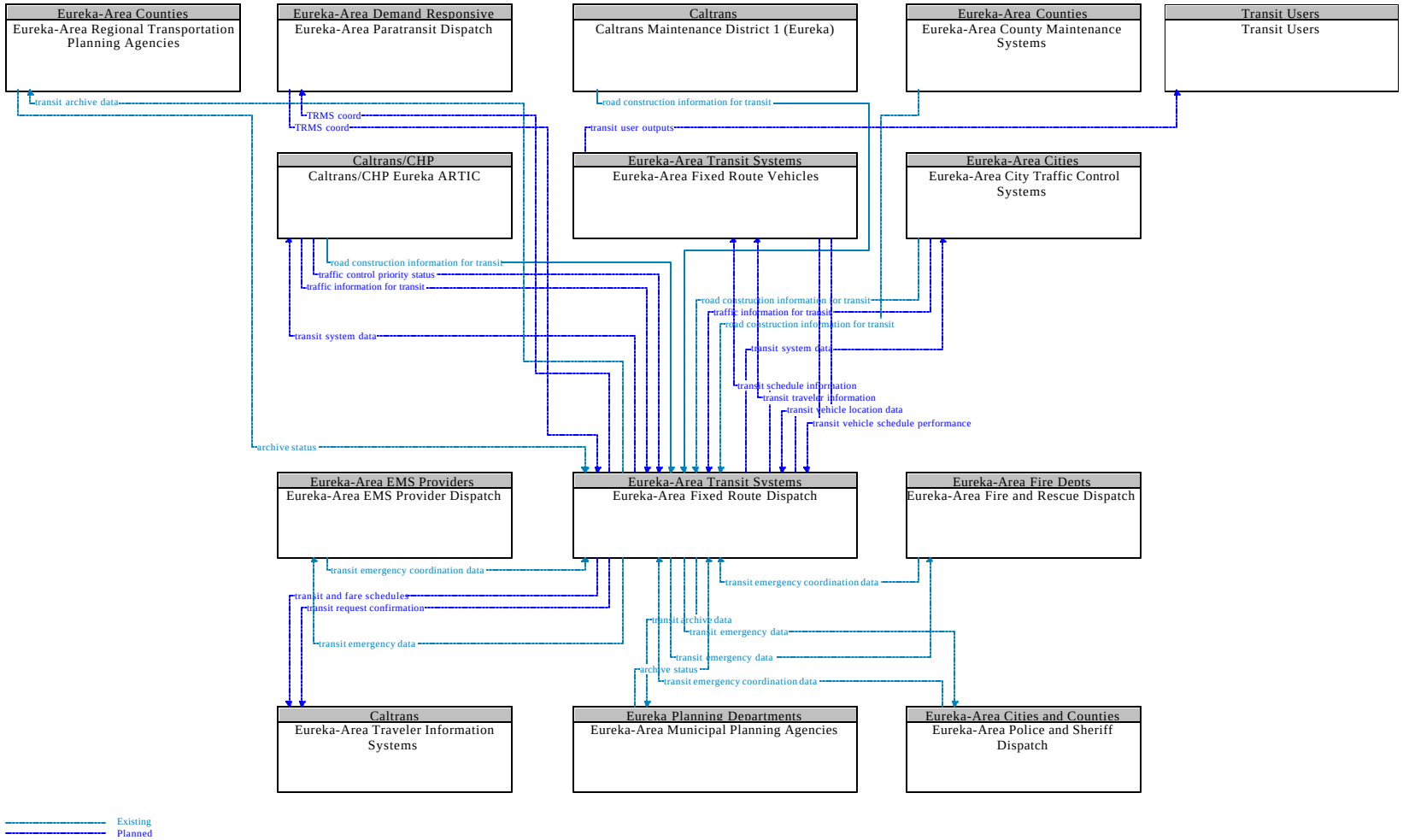

Figure D-48: Regional Diagram for Eureka-Area Fixed Route Dispatch and Vehicles.

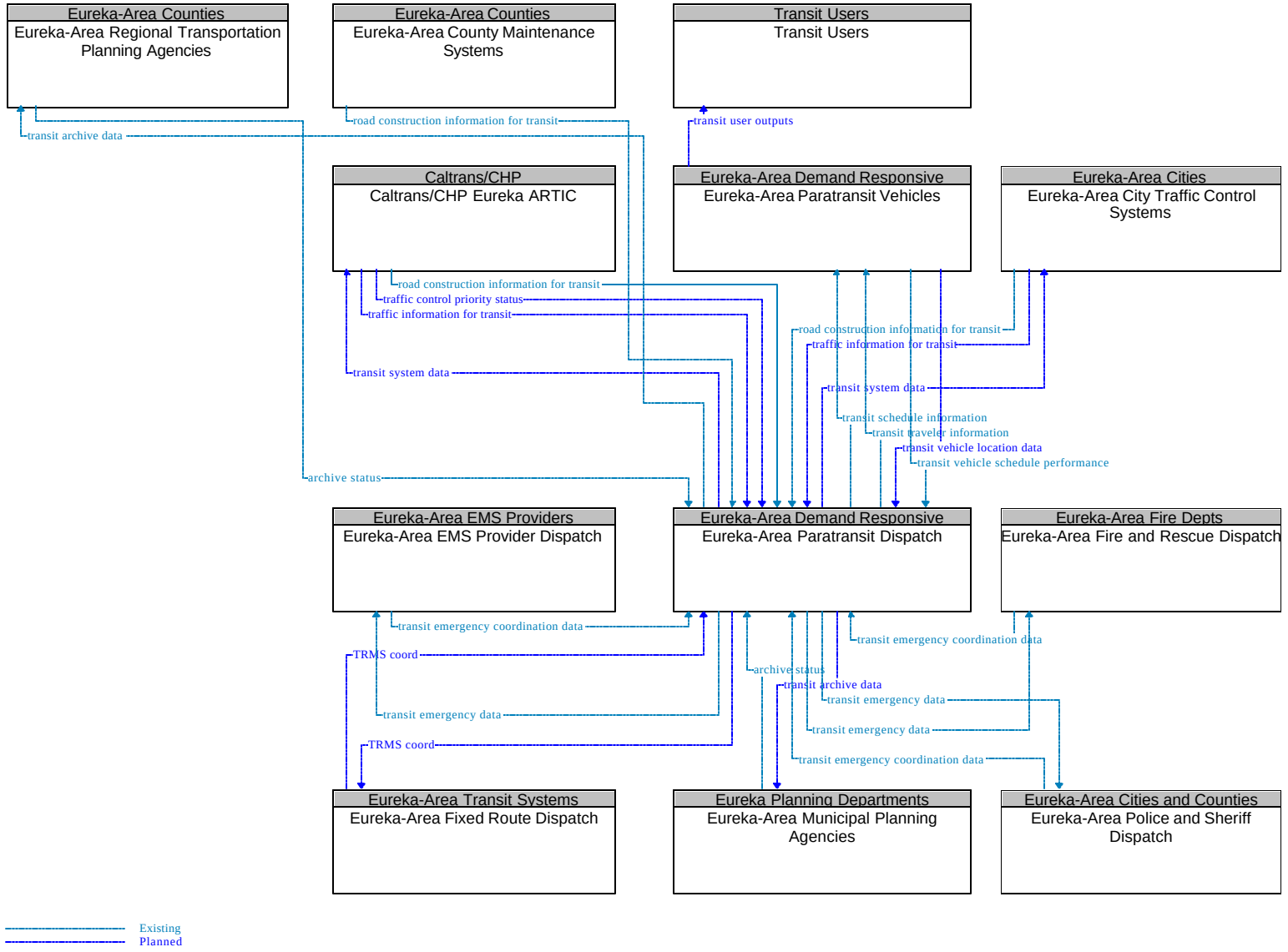

Figure D-49: Regional Diagram for Eureka-Area Paratransit Dispatch and Vehicles.

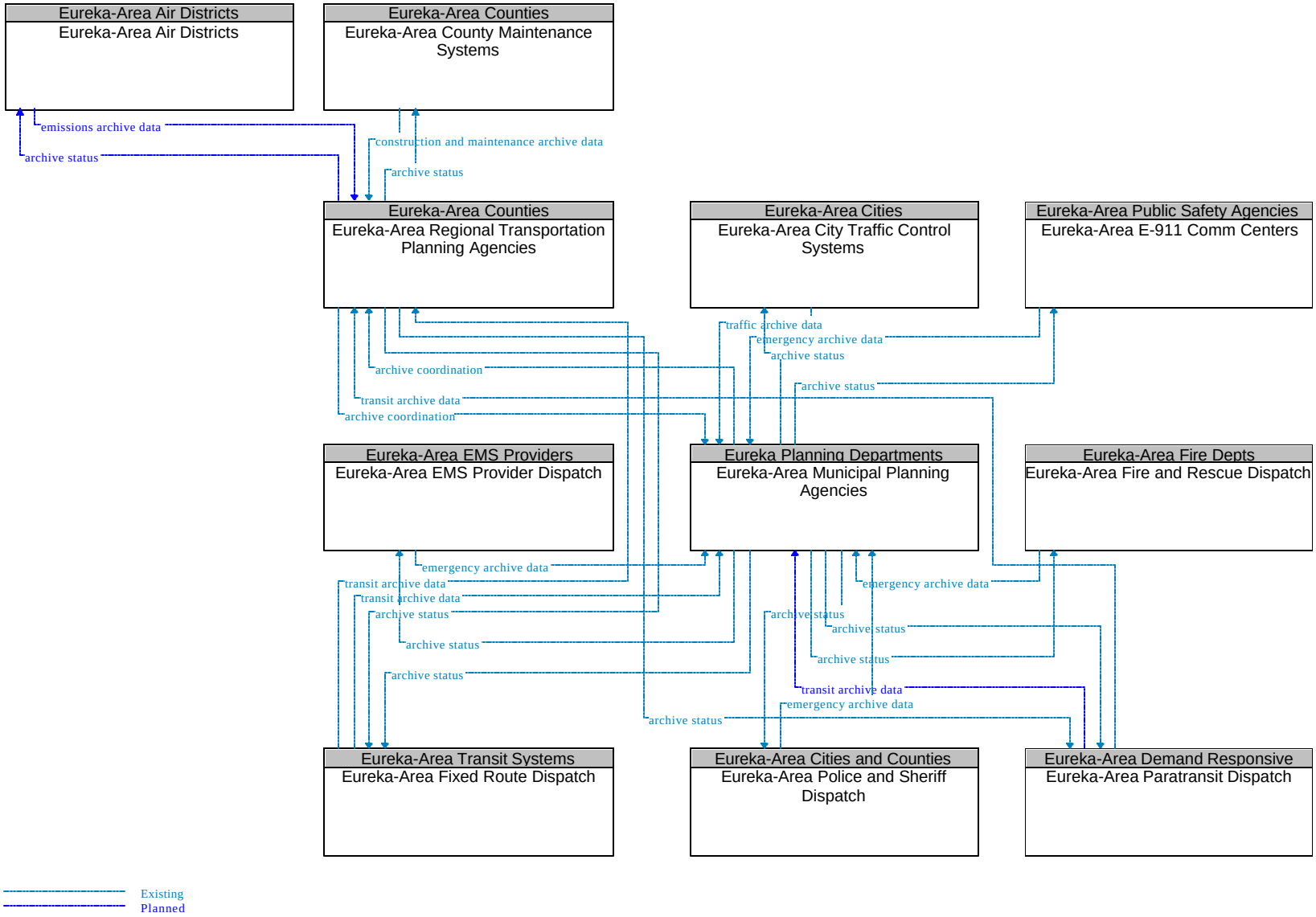

Figure D-50: Regional Diagram for Eureka-Area Planning Agencies.

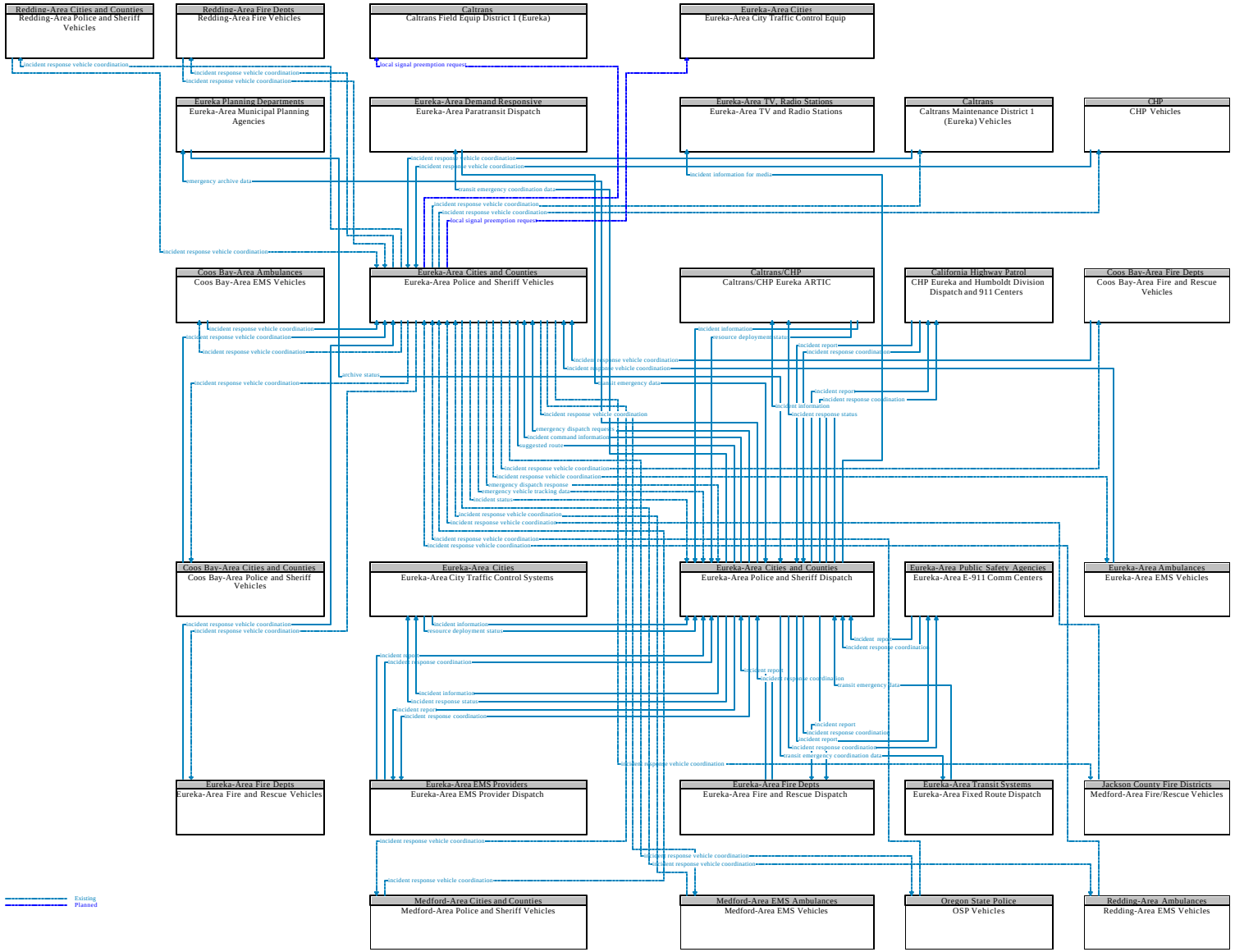

Figure D-51: Regional Diagram for Eureka-Area Police and Sheriff Dispatch and Vehicles.

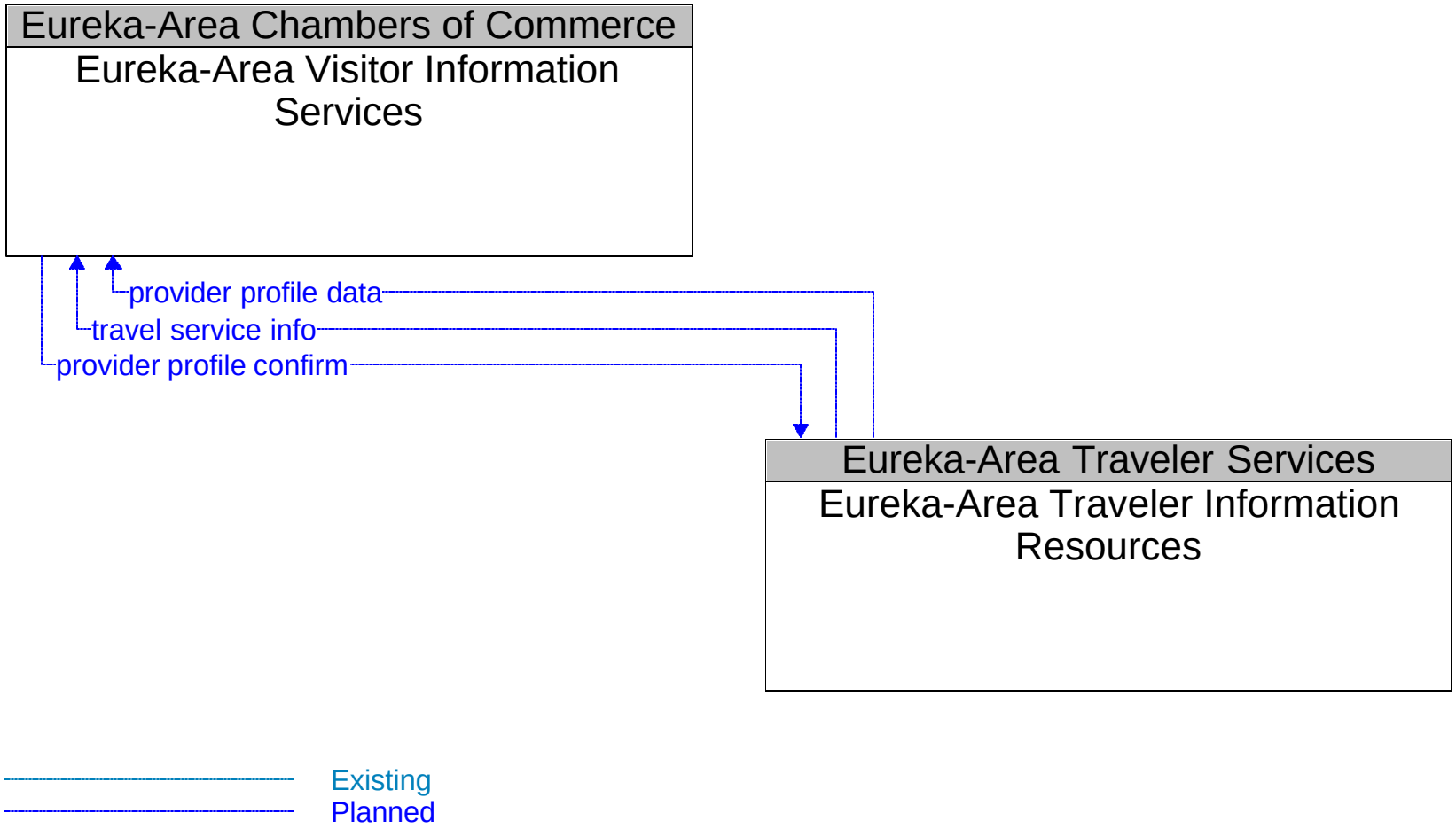

Figure D-52: Regional Diagram for Eureka-Area Traveler Information Resources.

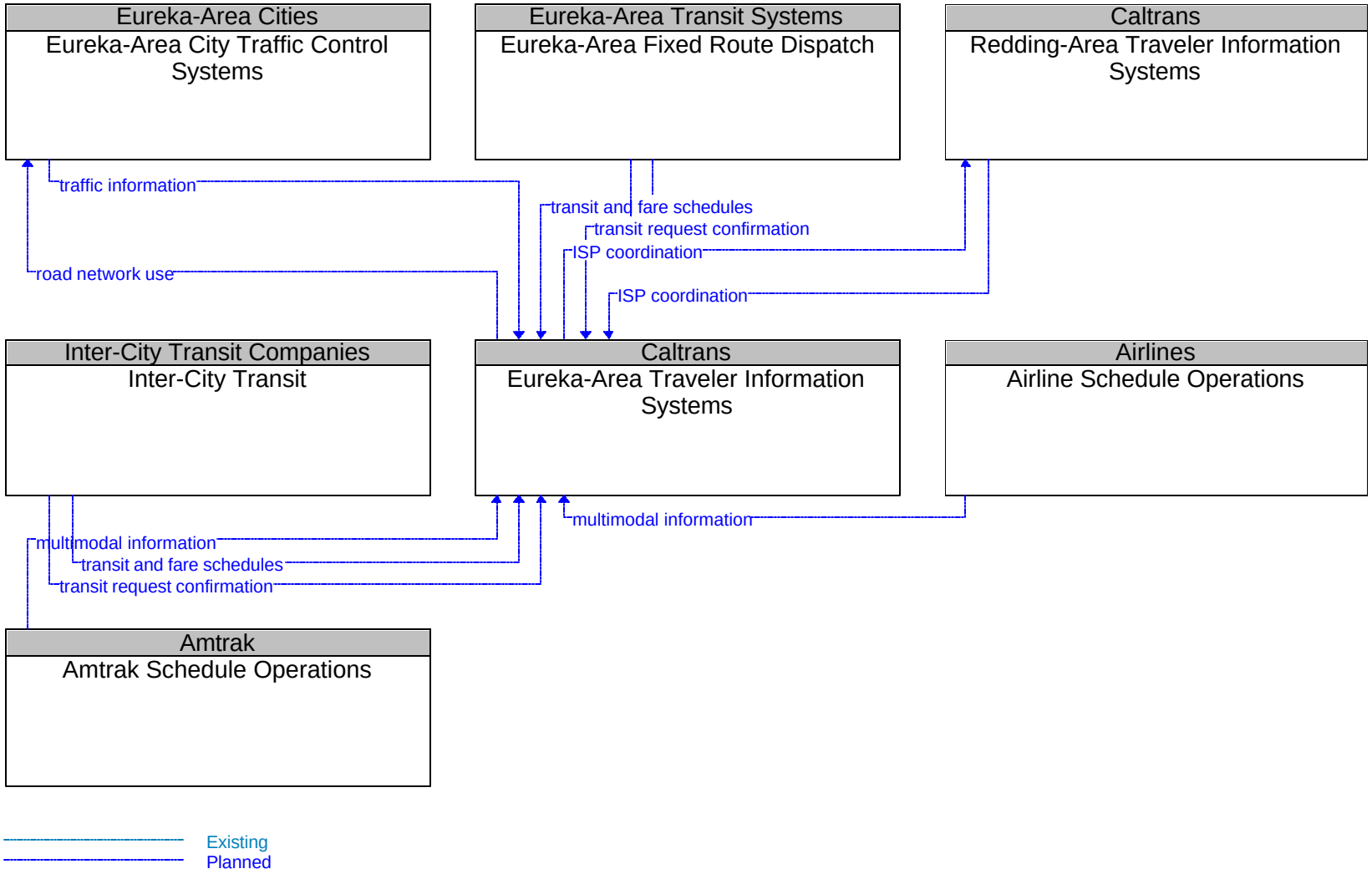

Figure D-53: Regional Diagram for Eureka-Area Traveler Information Systems.

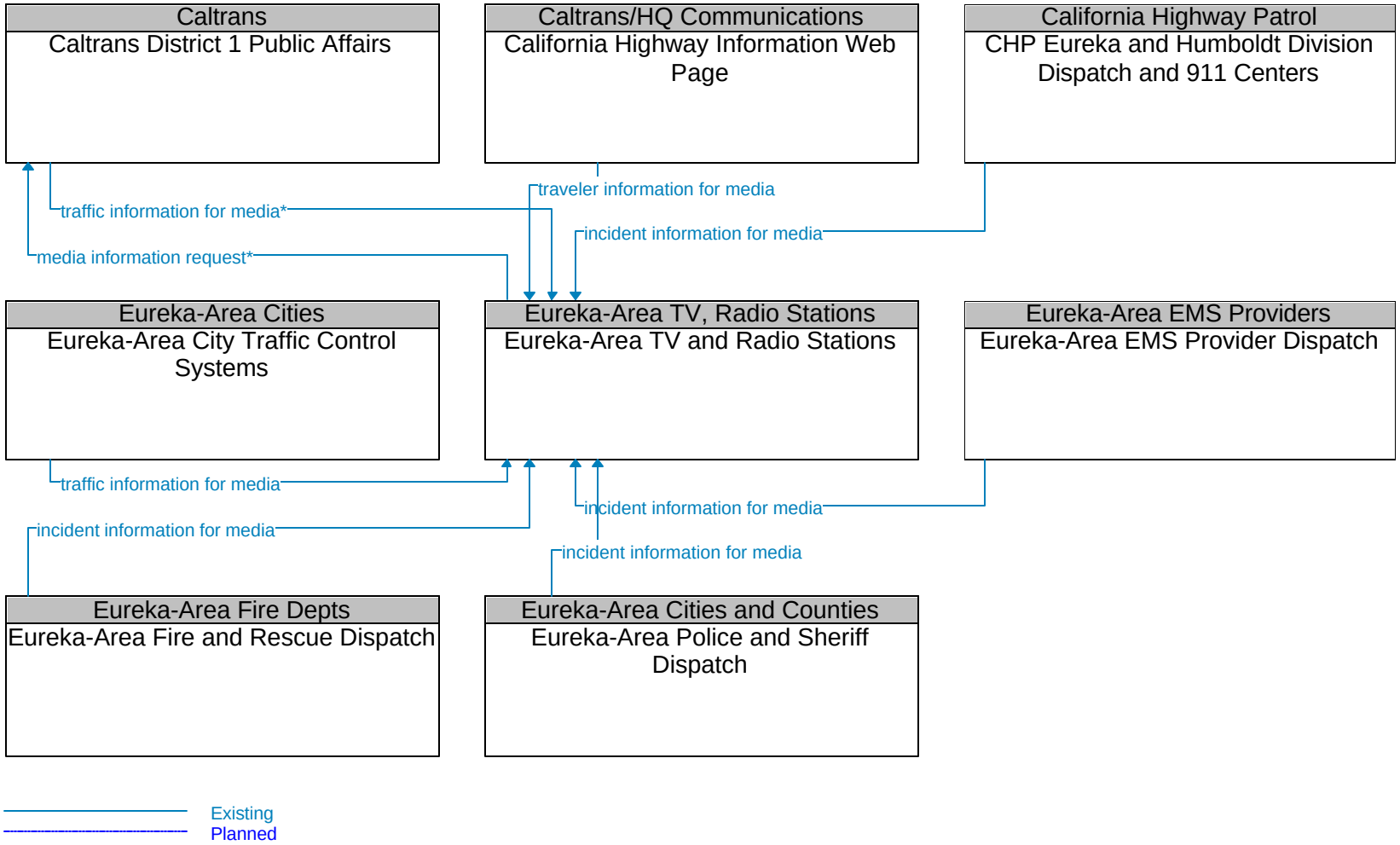

Figure D-54: Regional Diagram for Eureka-Area TV and Radio Stations.

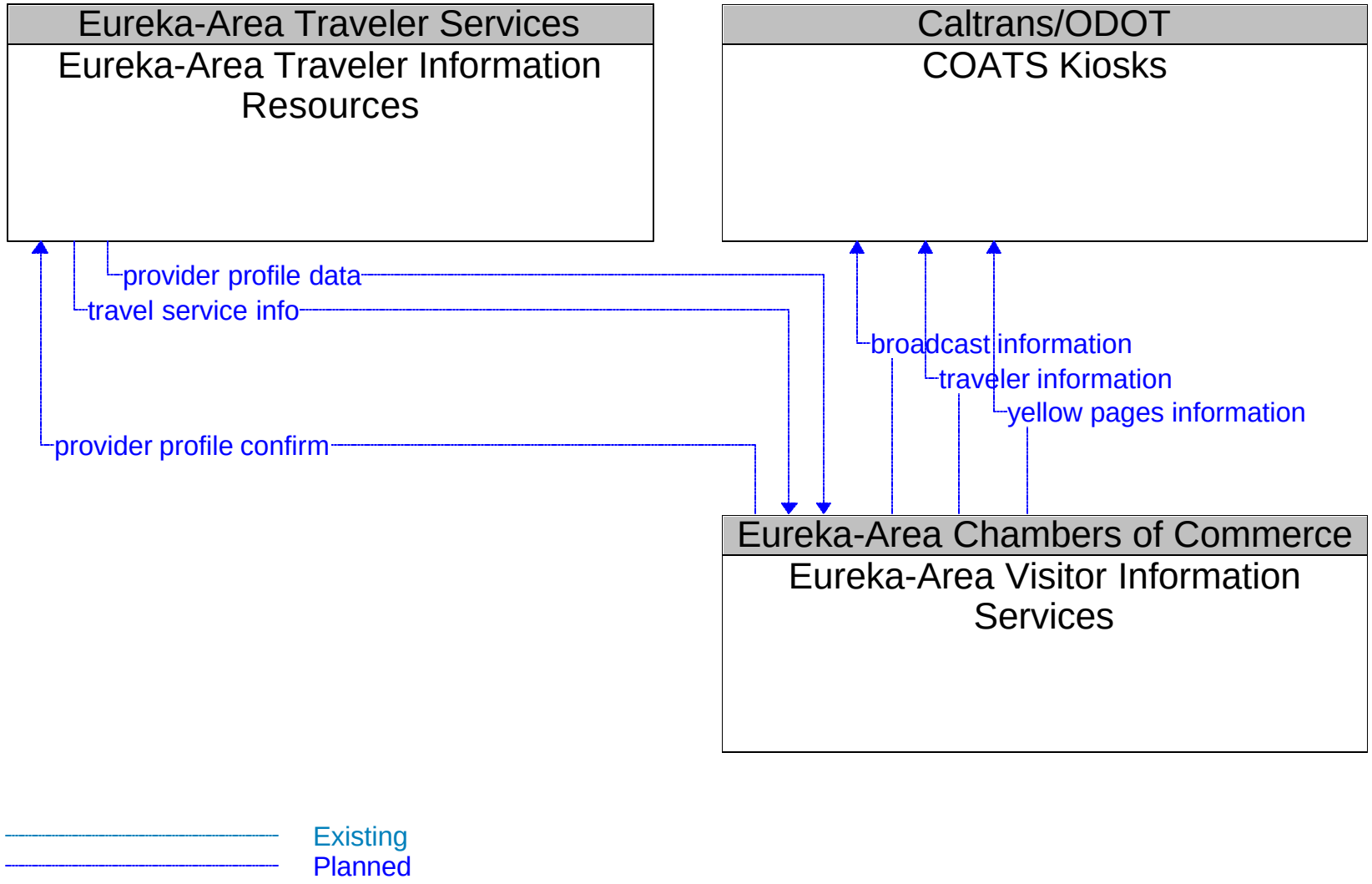

Figure D-55: Regional Diagram for Eureka-Area Visitor Information Services.

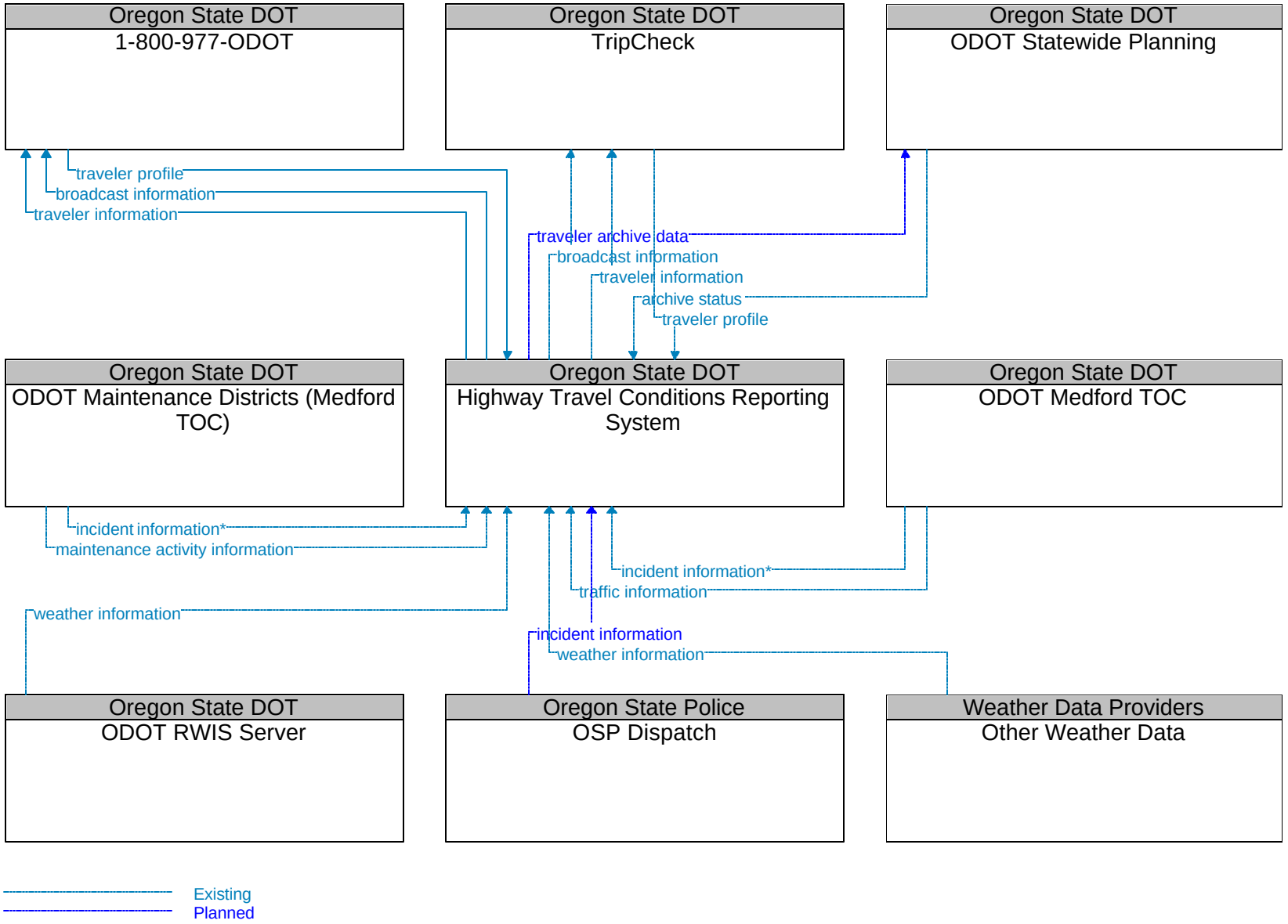

Figure D-56: Regional Diagram for Highway Travel Conditions Reporting System.

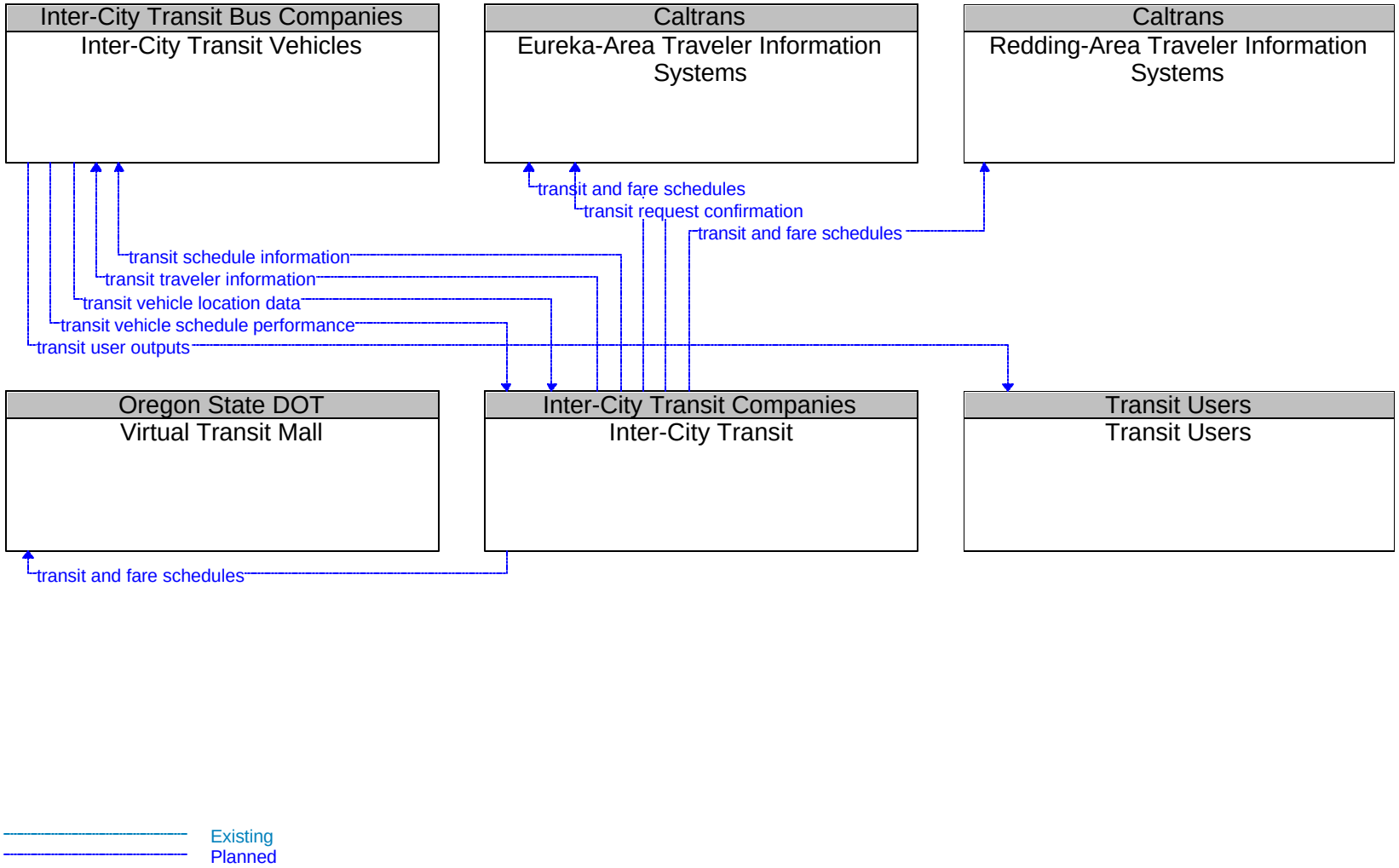

Figure D-57: Regional Diagram for Inter-City Transit Dispatch and Vehicles.

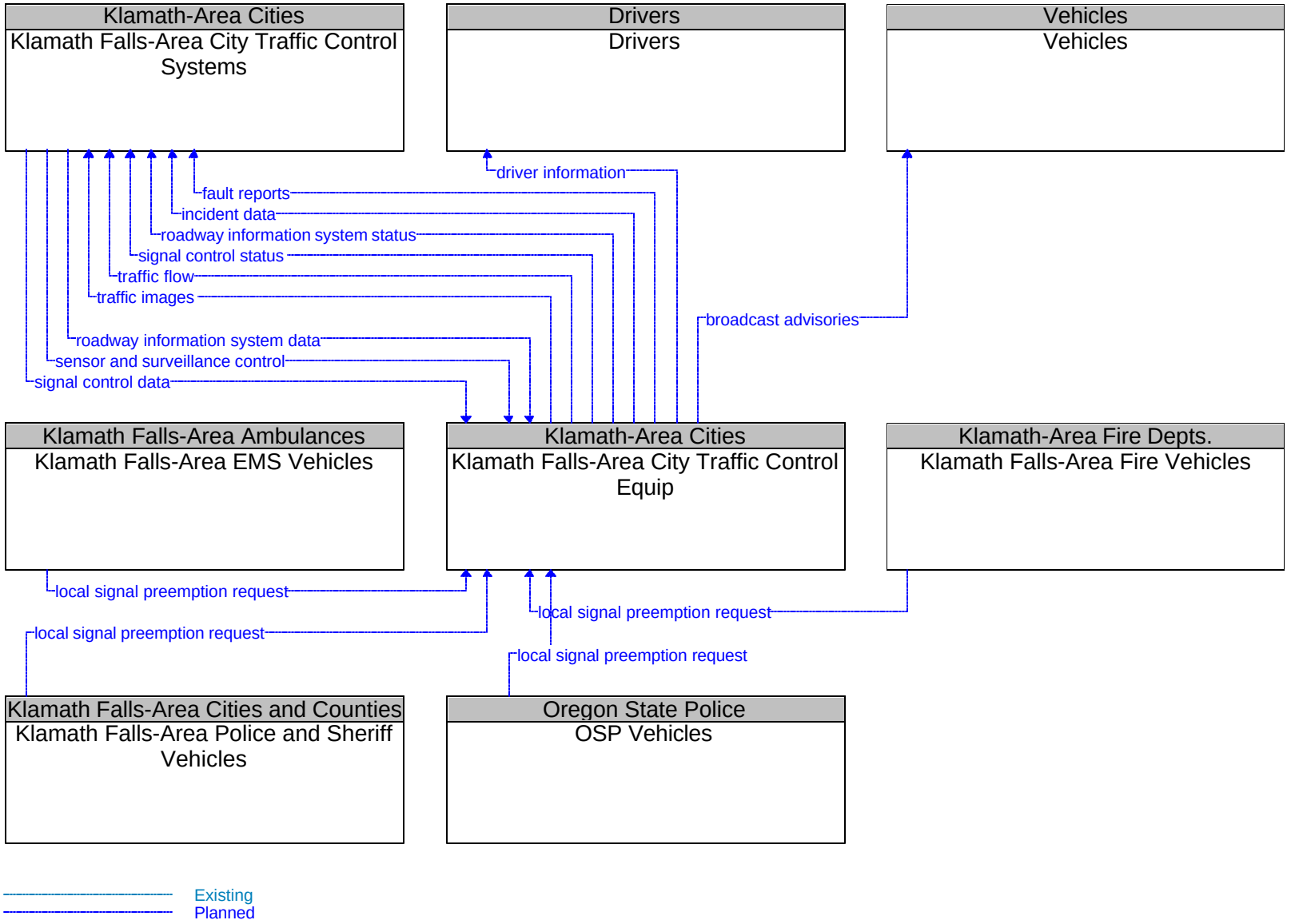

Figure D-58: Regional Diagram for Klamath Falls-Area City Traffic Control Equip.

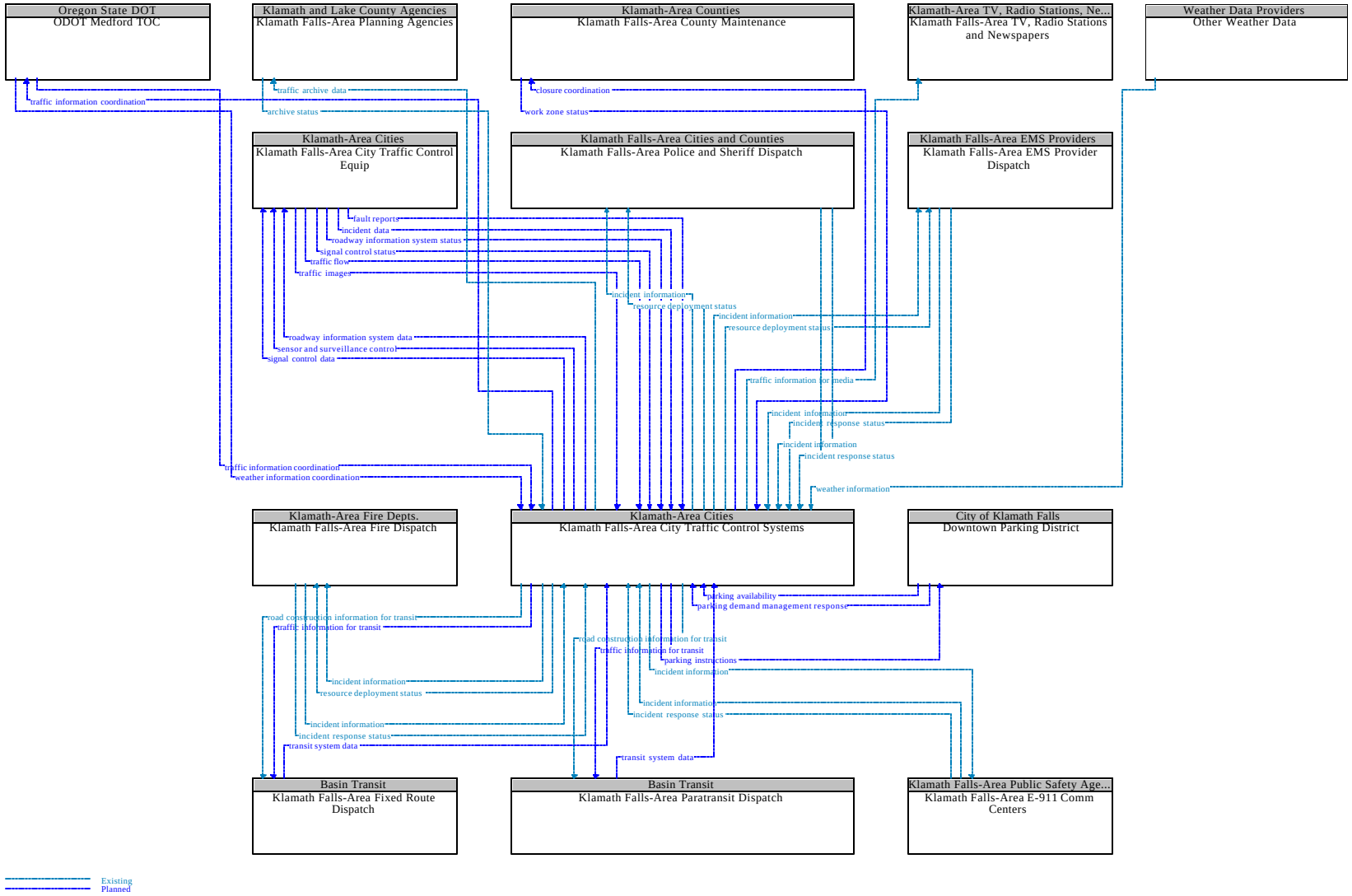

Figure D-59: Regional Diagram for Klamath Falls-Area City Traffic Control Systems.

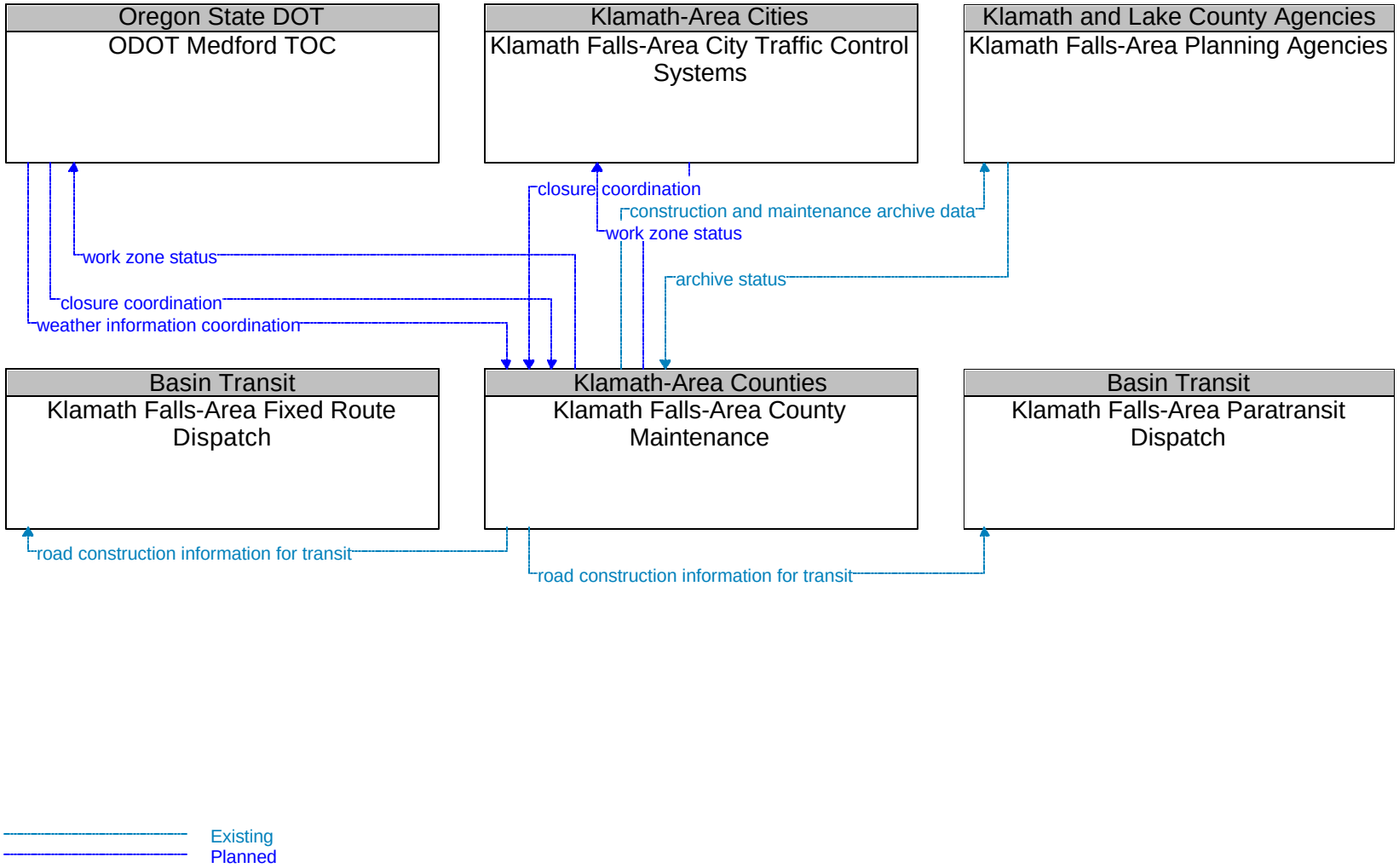

Figure D-60: Regional Diagram for Klamath Falls-Area County Maintenance Systems.

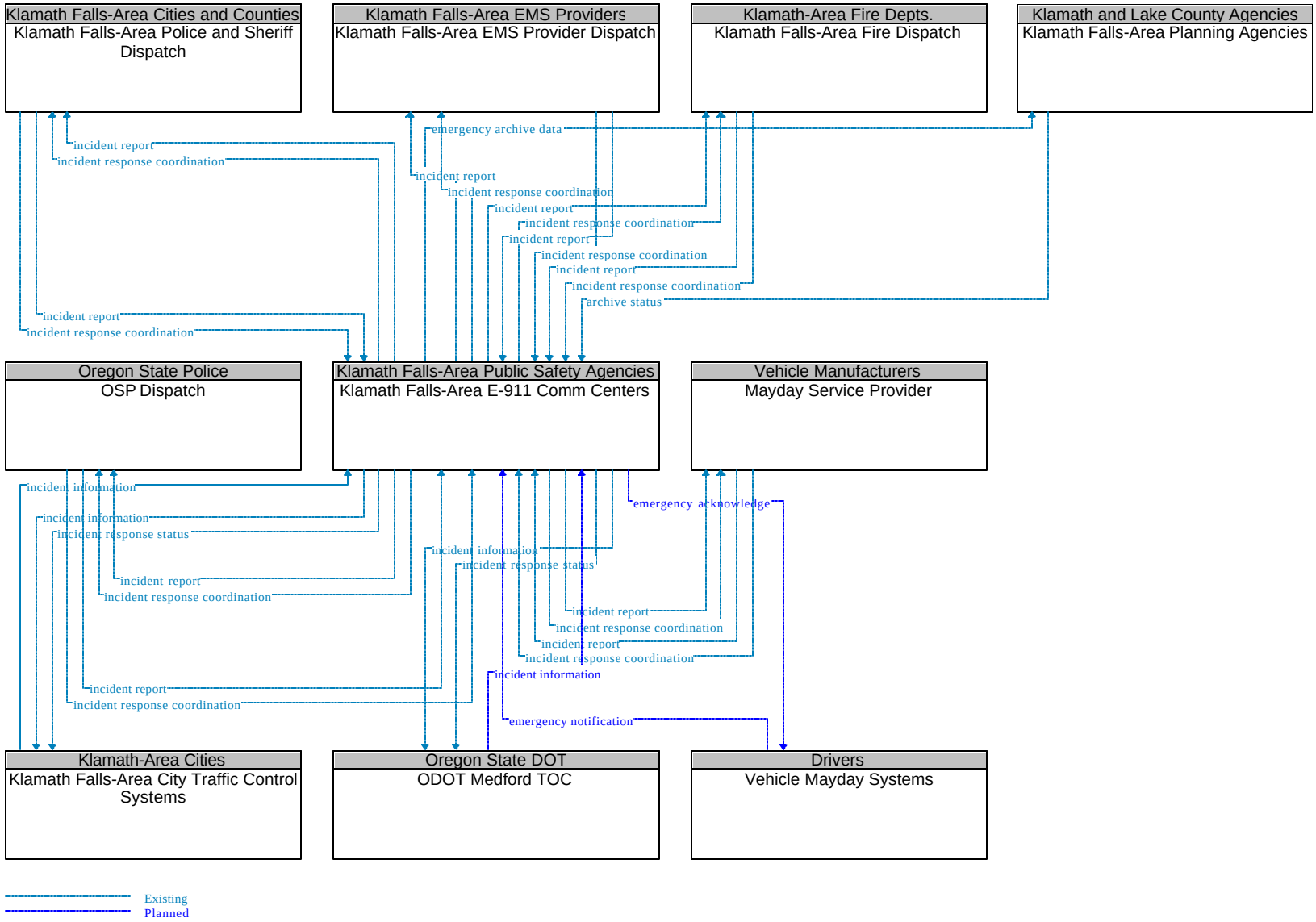

Figure D-61: Regional Diagram for Klamath Falls-Area E-911 Comm Center.

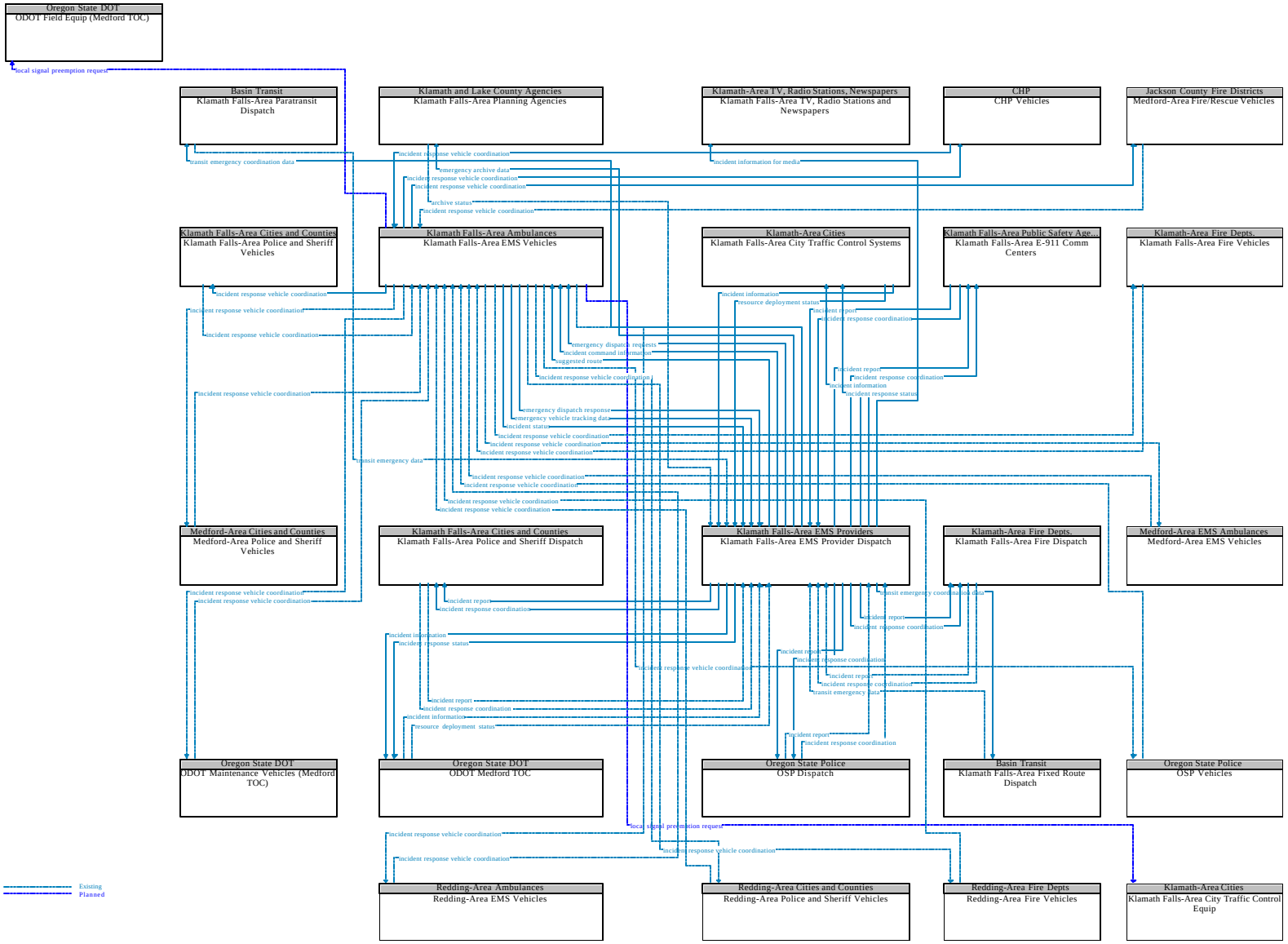

Figure D-62: Regional Diagram for Klamath Falls-Area EMS Dispatch and Vehicles.

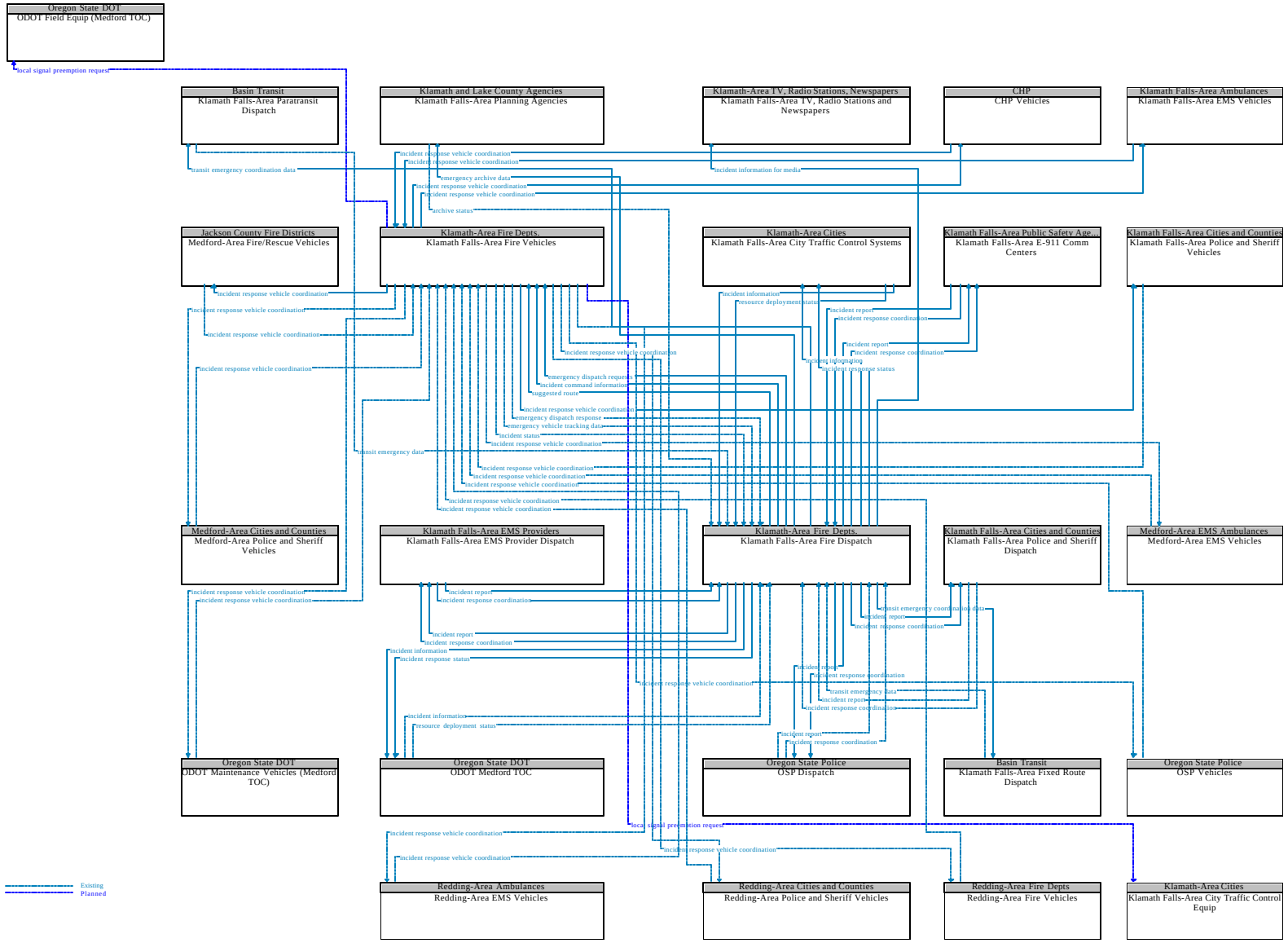

Figure D-63: Regional Diagram for Klamath Falls-Area Fire and Rescue Dispatch and Vehicles.

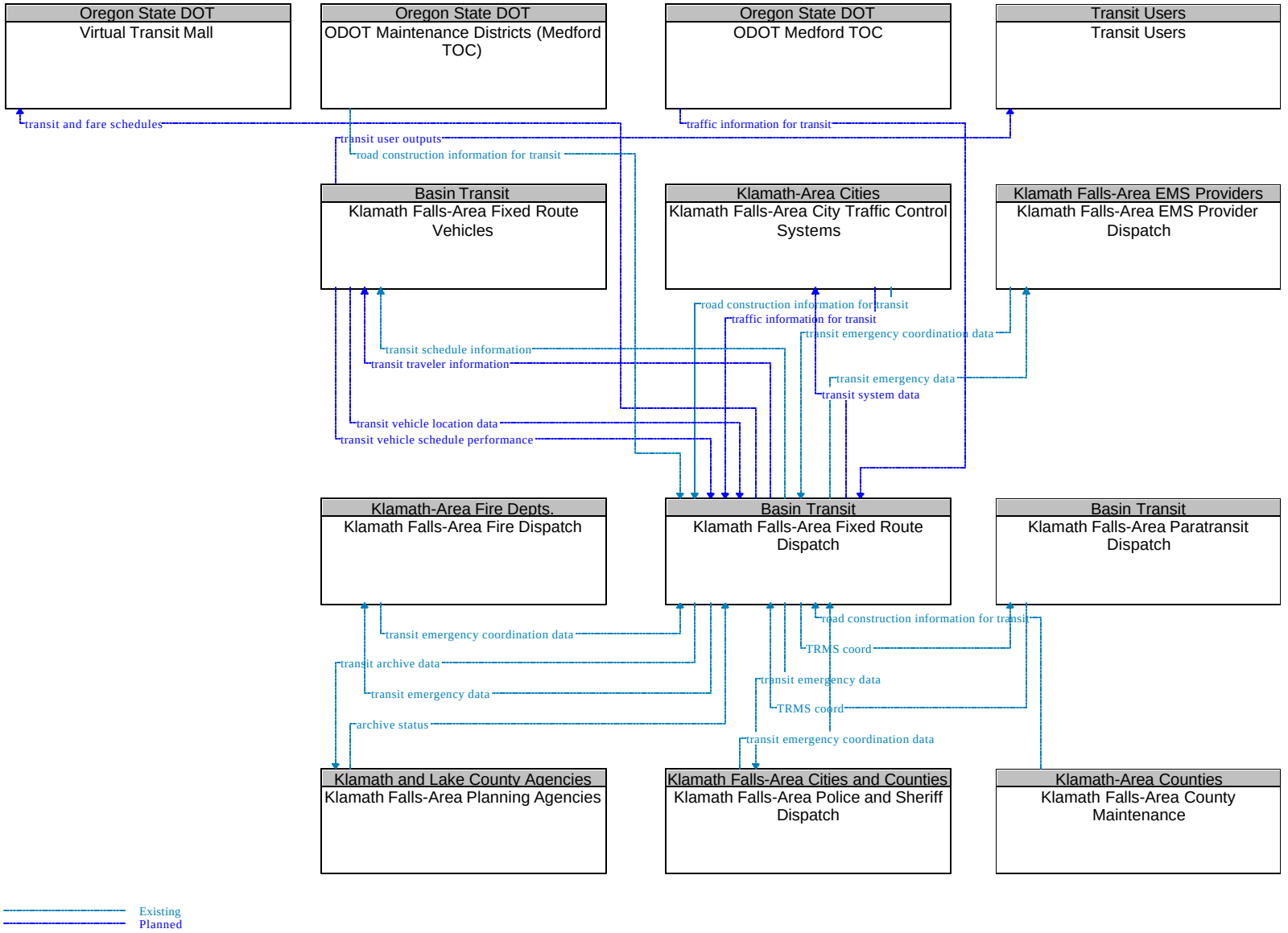

Figure D-64: Regional Diagram for Klamath Falls-Area Fixed Route Dispatch and Vehicles.

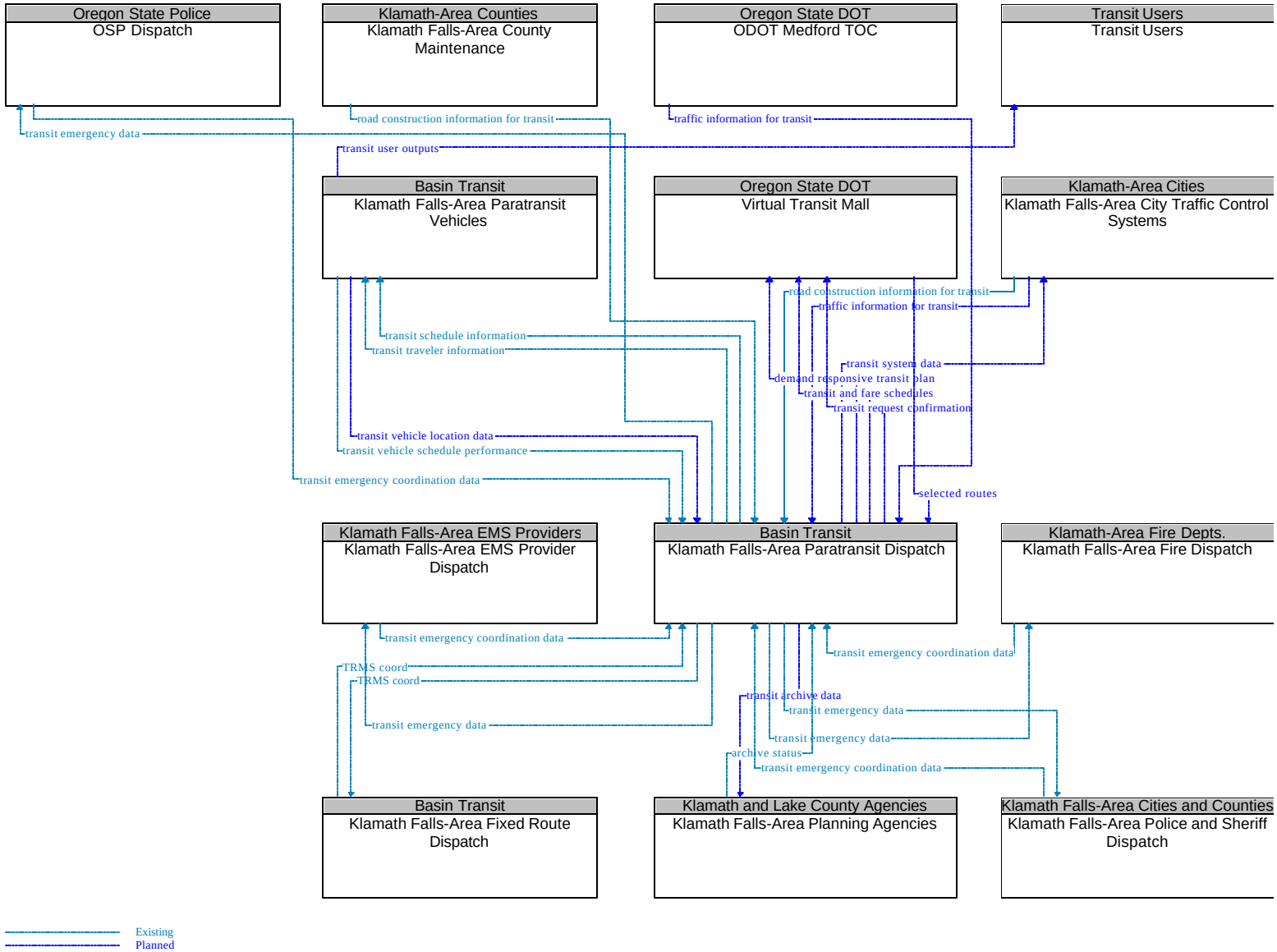

Figure D-65: Regional Diagram for Klamath Falls-Area Paratransit Dispatch and Vehicles.

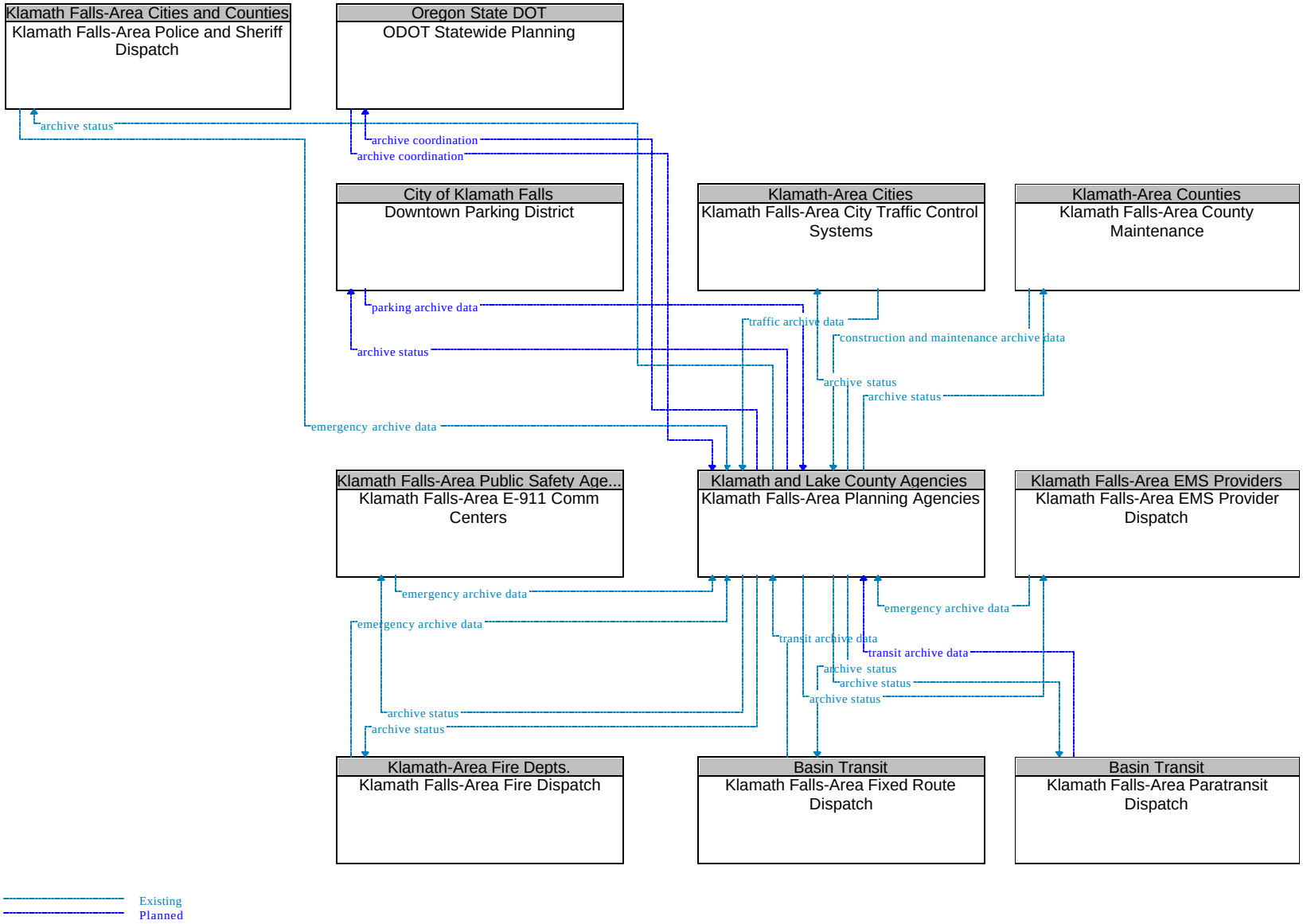

Figure D-66: Regional Diagram for Klamath Falls-Area Planning Agencies.

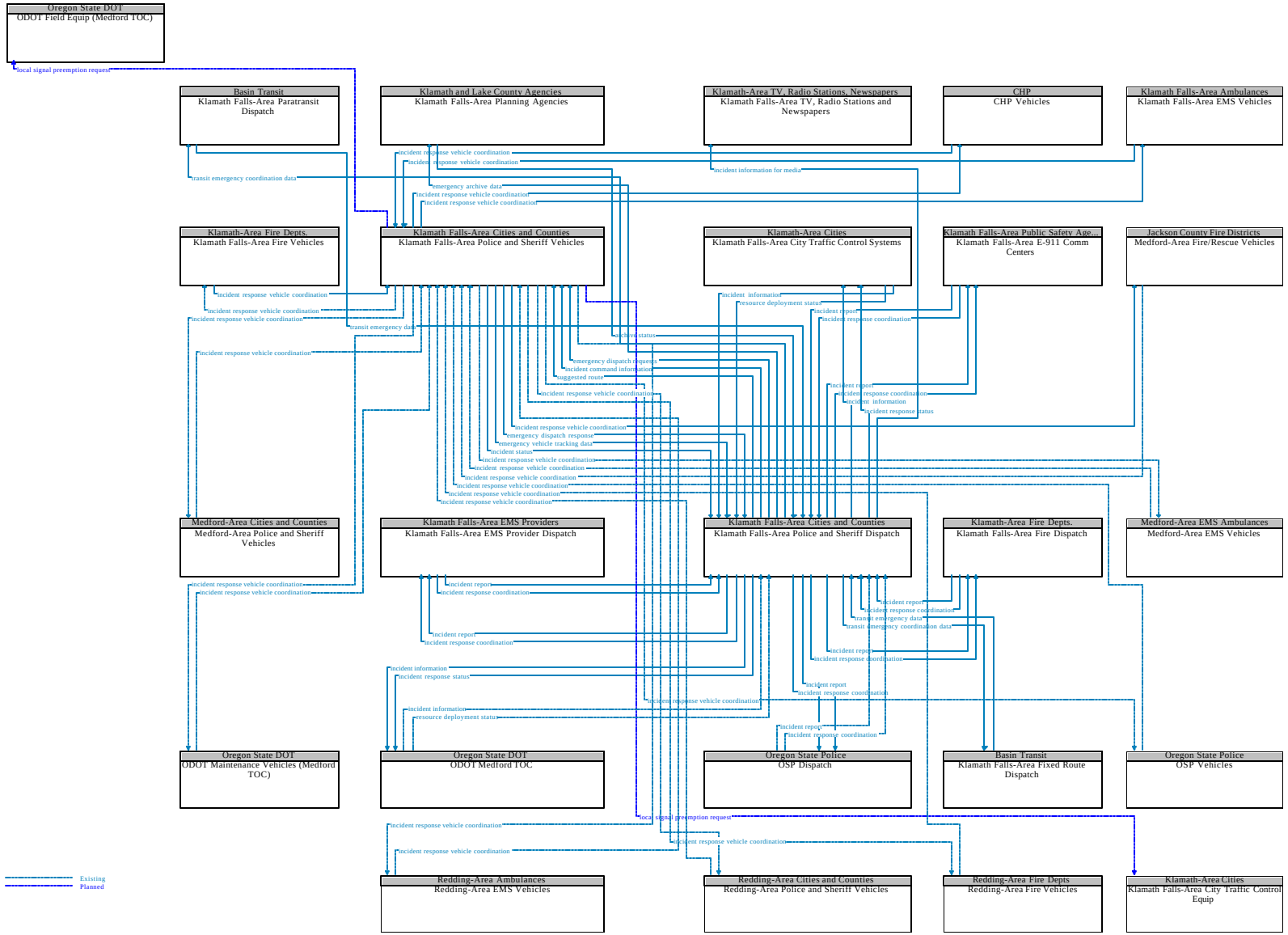

Figure D-67: Regional Diagram for Klamath Falls-Area Police and Sheriff Dispatch and Vehicles.

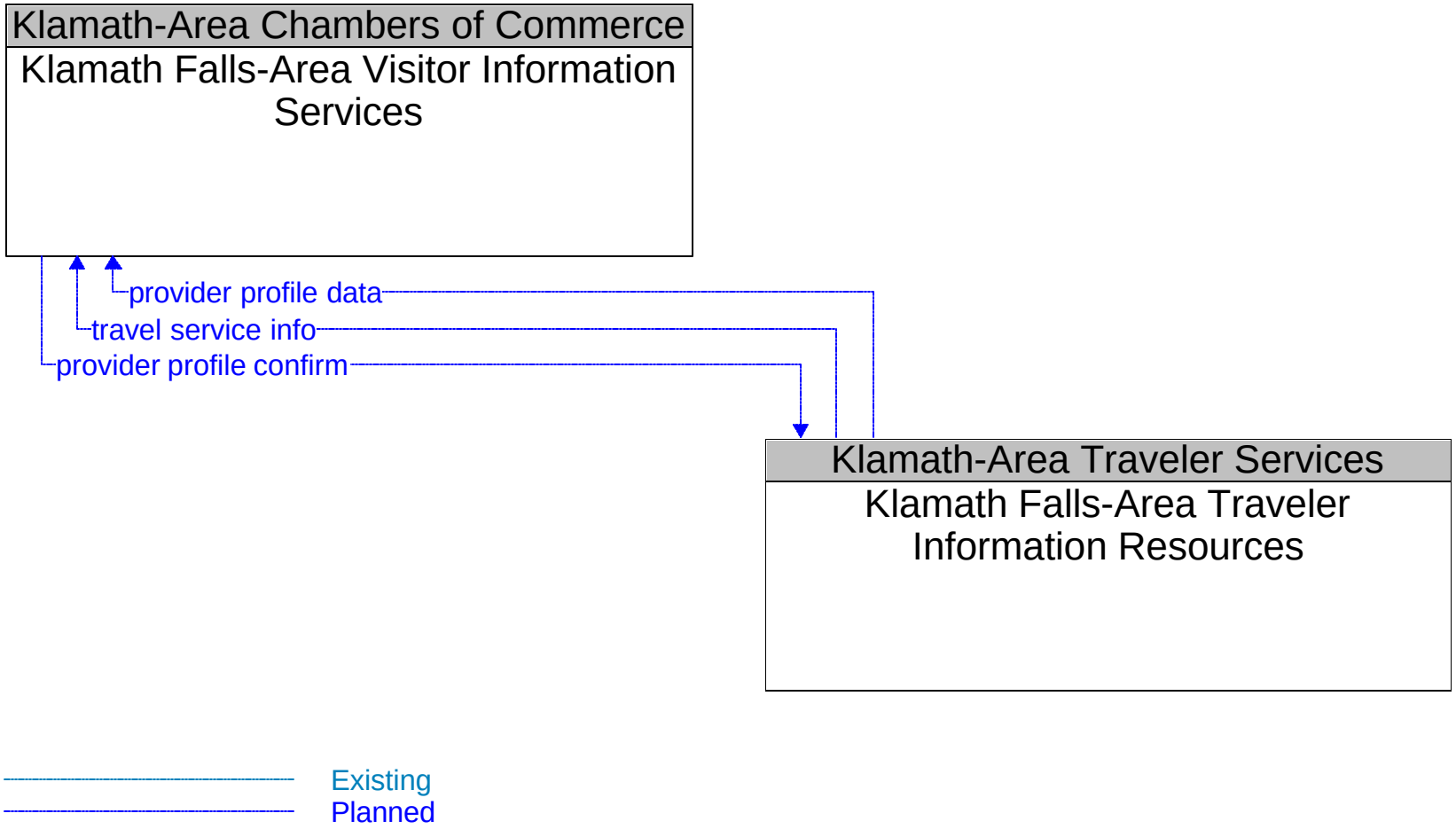

Figure D-68: Regional Diagram for Klamath Falls-Area Traveler Information Resources.

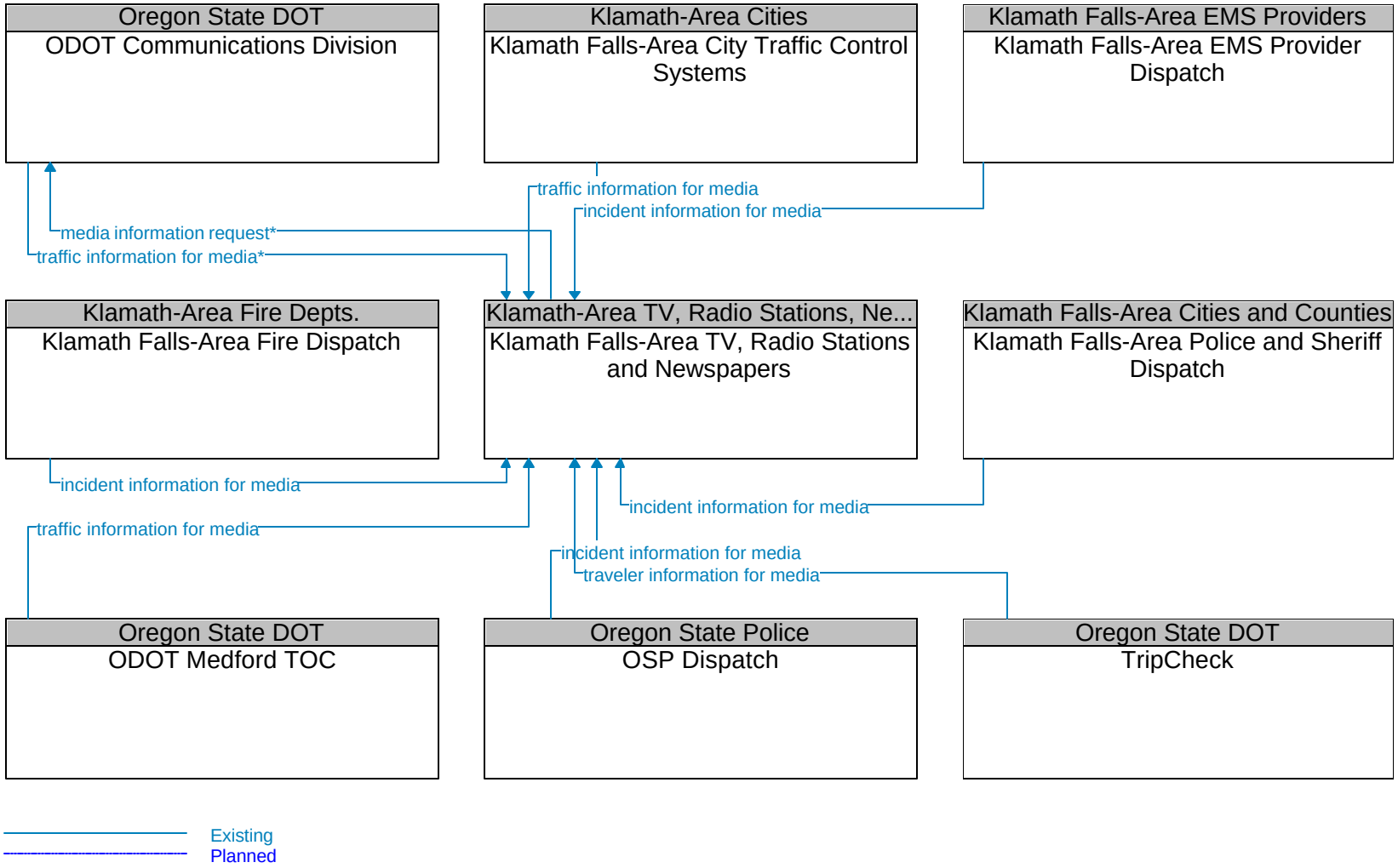

Figure D-69: Regional Diagram for Klamath Falls-Area TV, Radio Stations and Newspapers.

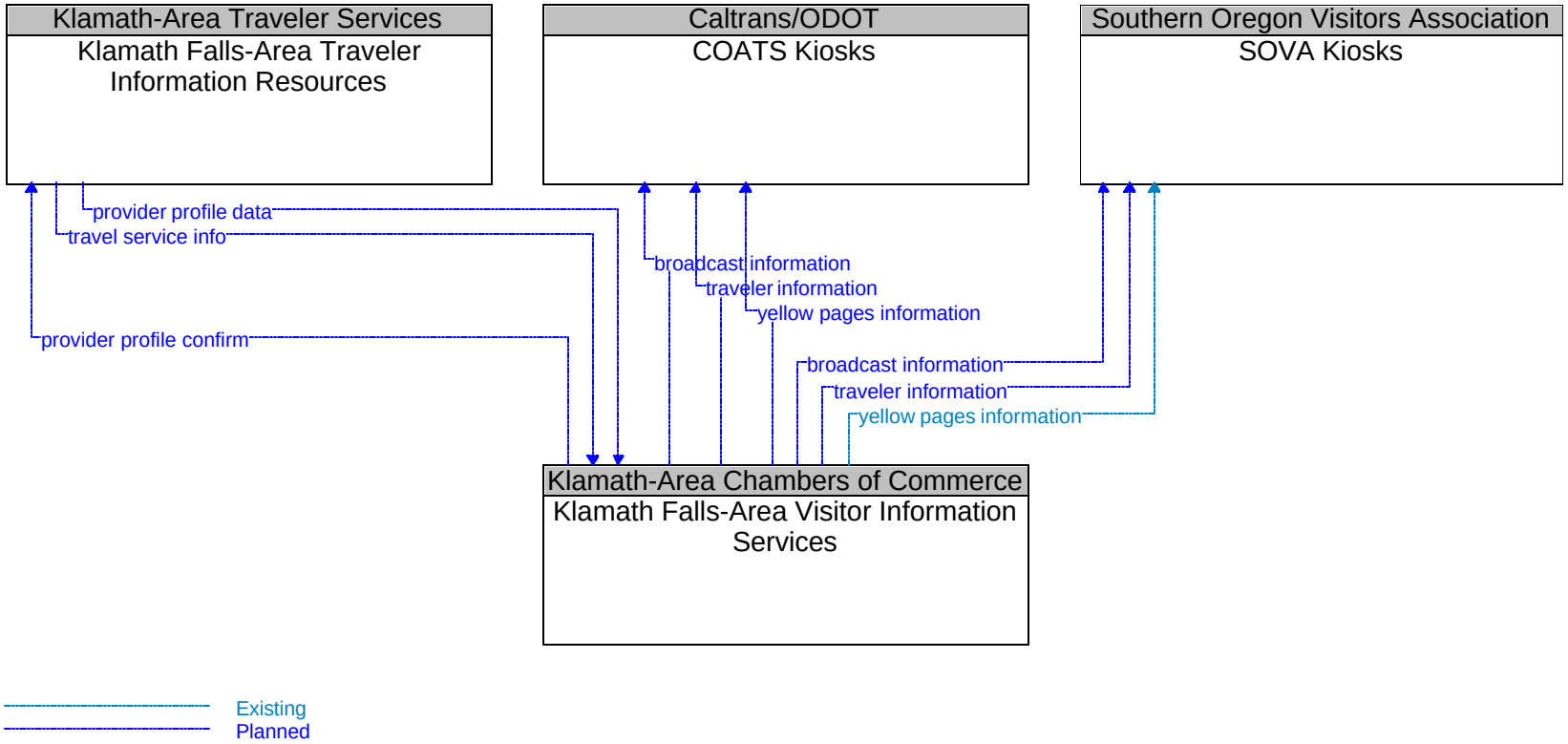

Figure D-70: Regional Diagram for Klamath Falls-Area Visitor Information Services.

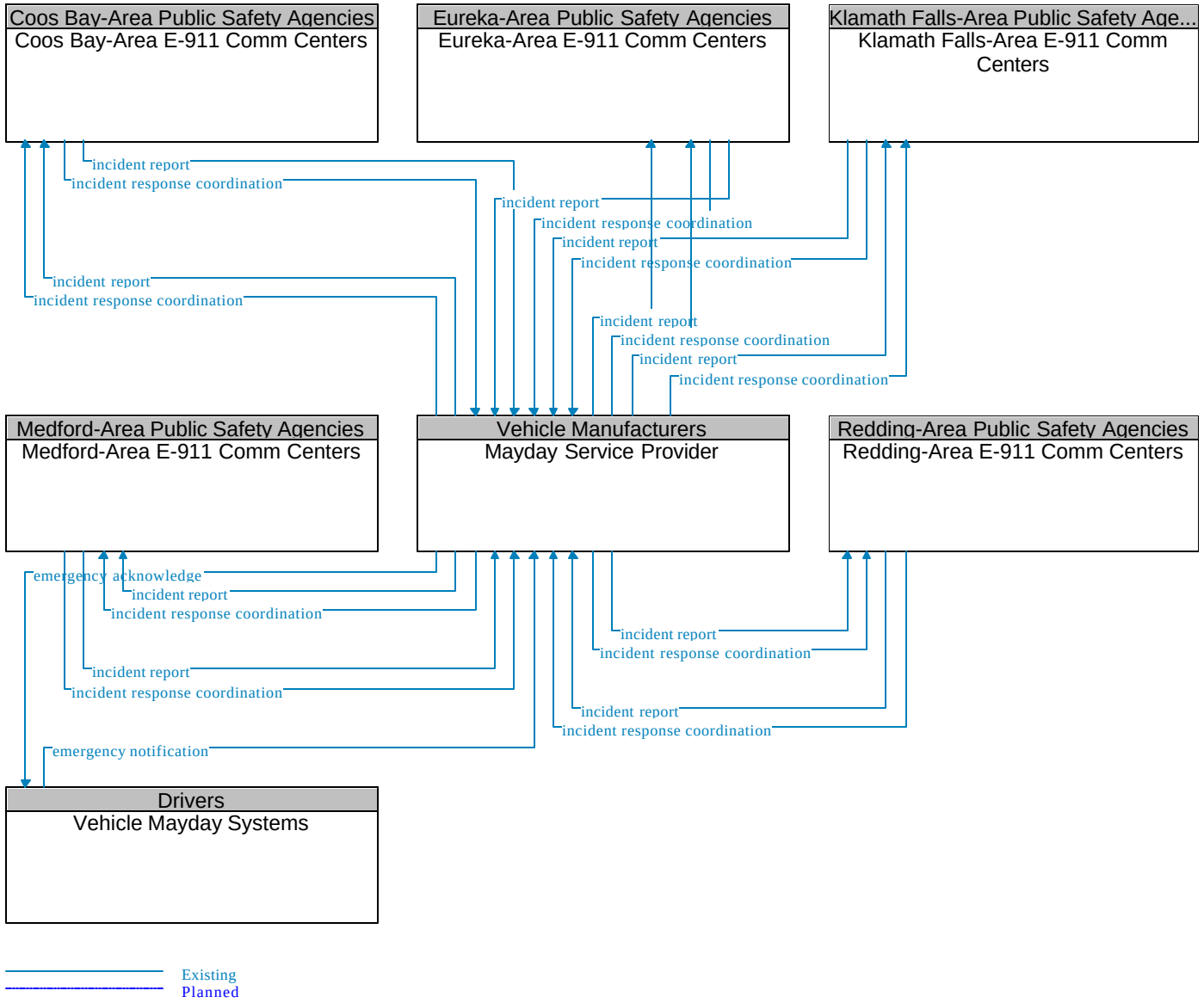

Figure D-71: Regional Diagram for Mayday Service Provider.

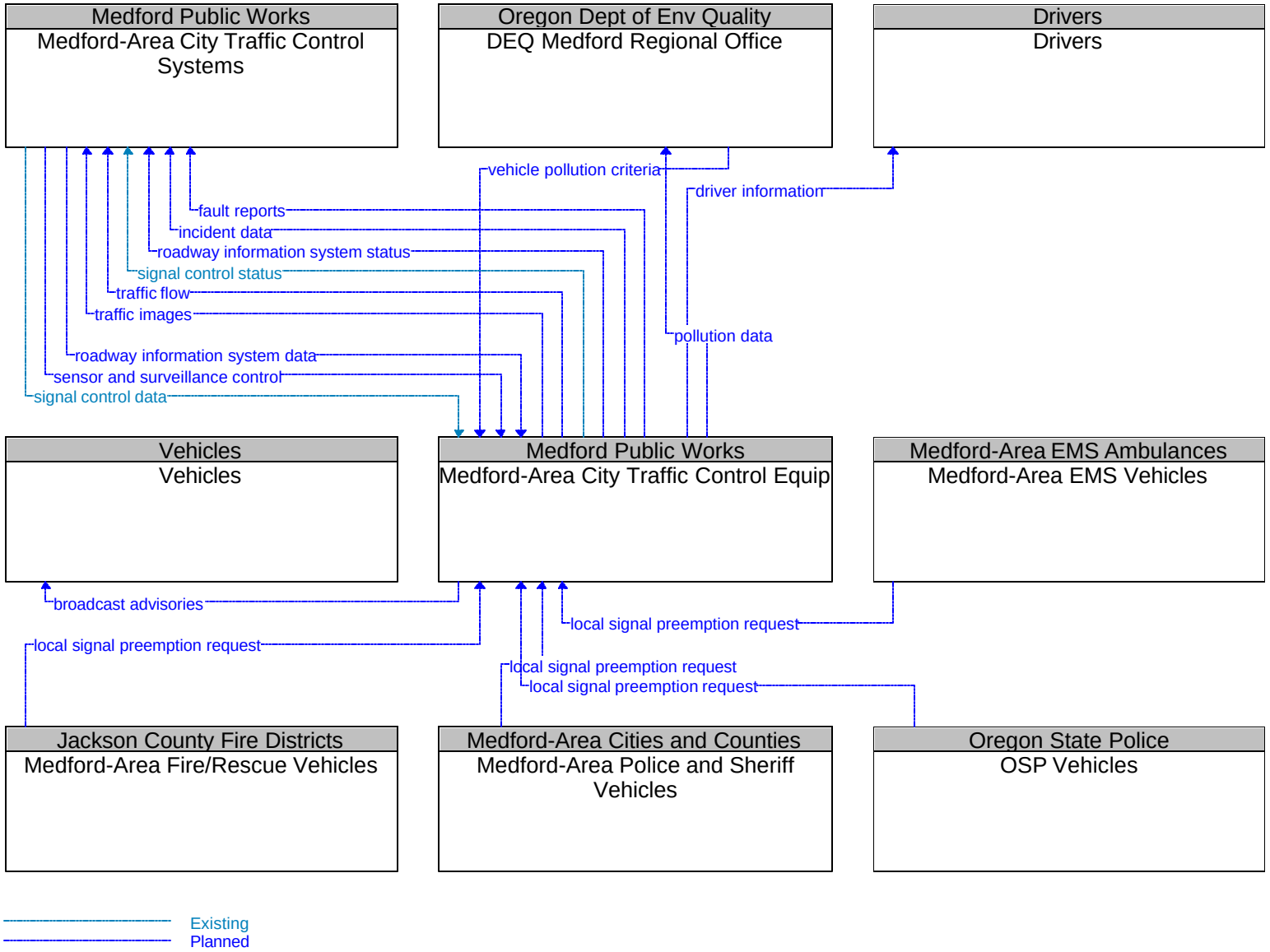

Figure D-72: Regional Diagram for Medford-Area City Traffic Control Equip.

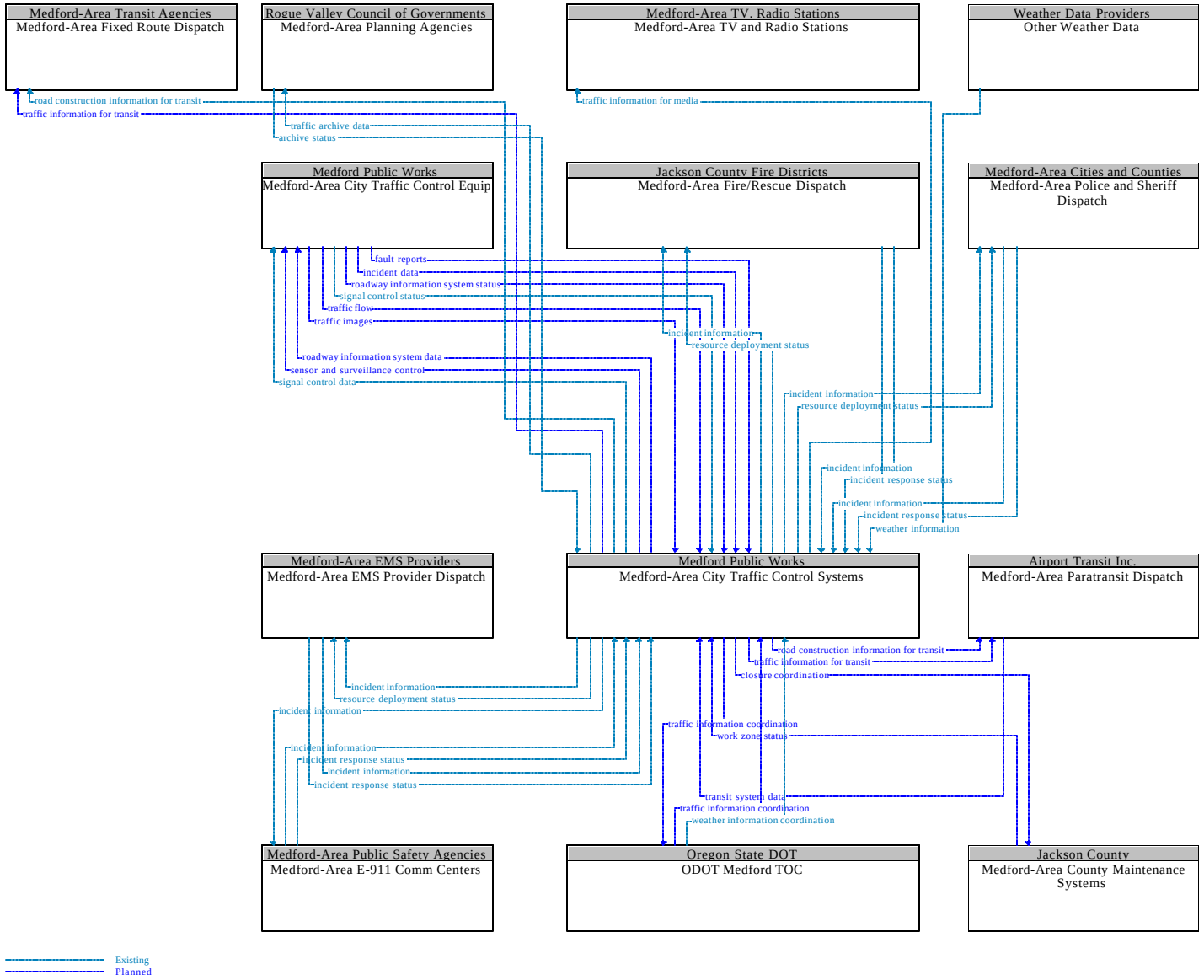

Figure D-73: Regional Diagram for Medford-Area City Traffic Control Systems.

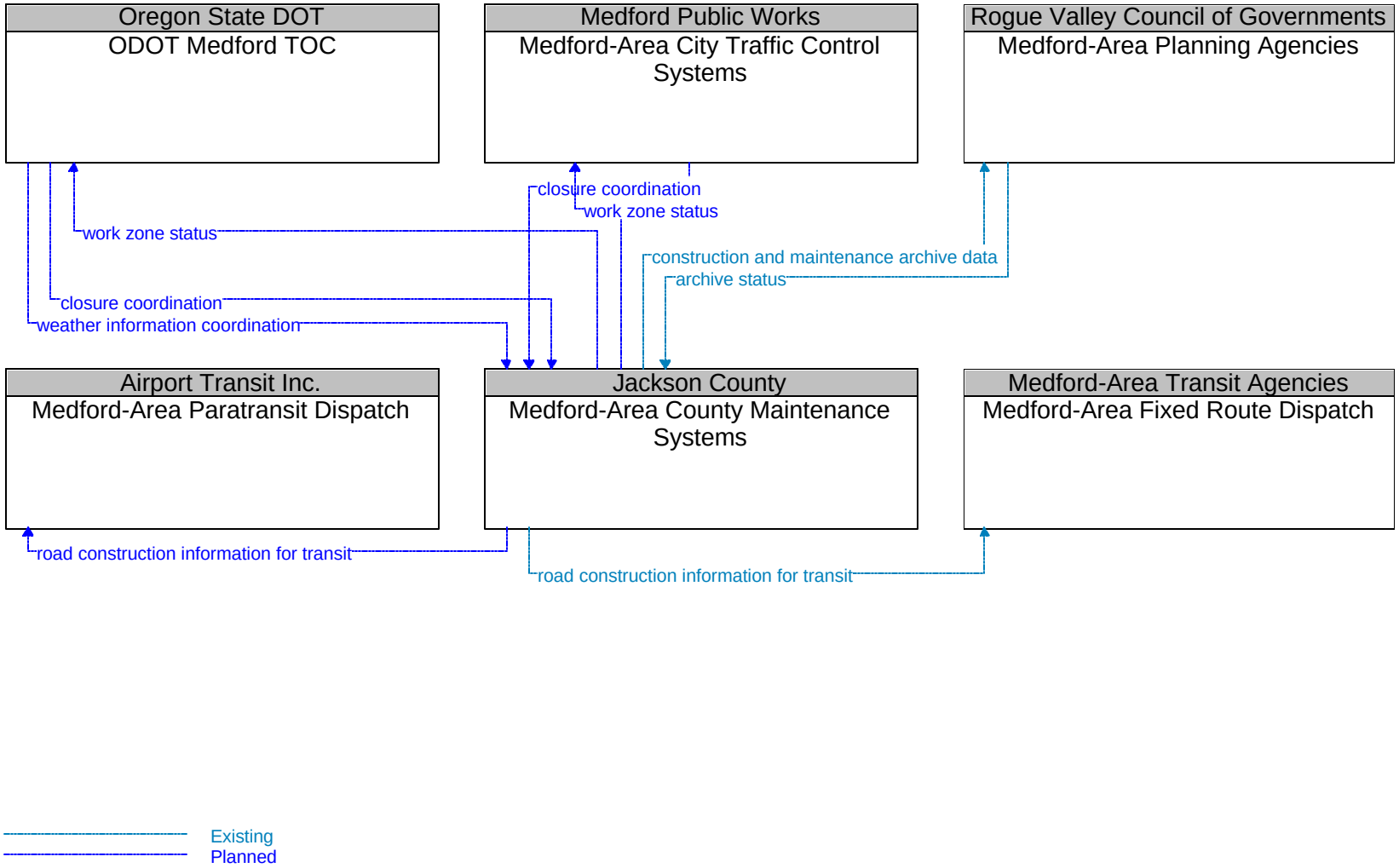

Figure D-74: Regional Diagram for Medford-Area County Maintenance Systems.

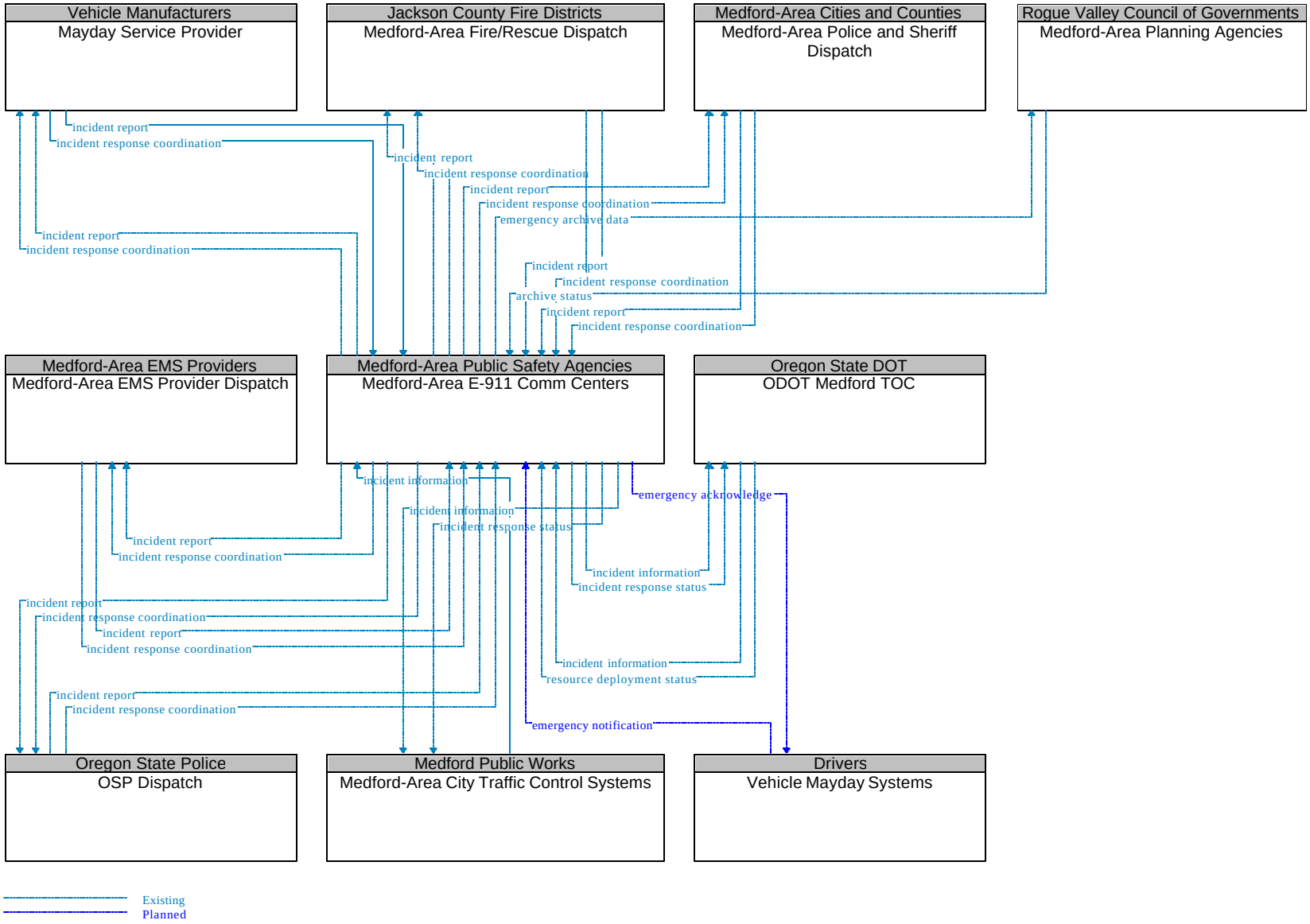

Figure D-75: Regional Diagram for Medford-Area E-911 Comm Centers.

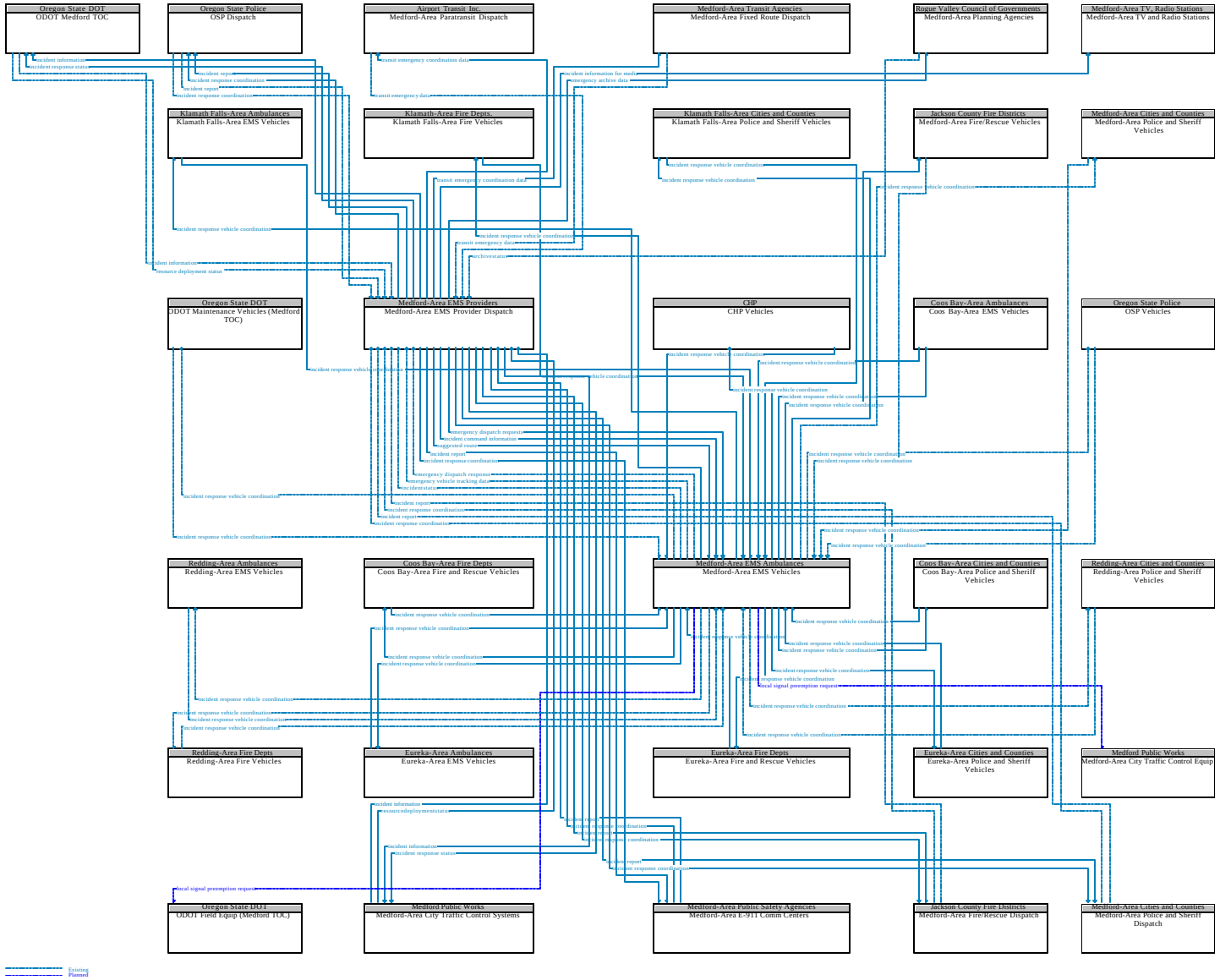

Figure D-76: Regional Diagram for Medford-Area EMS Dispatch and Vehicles.

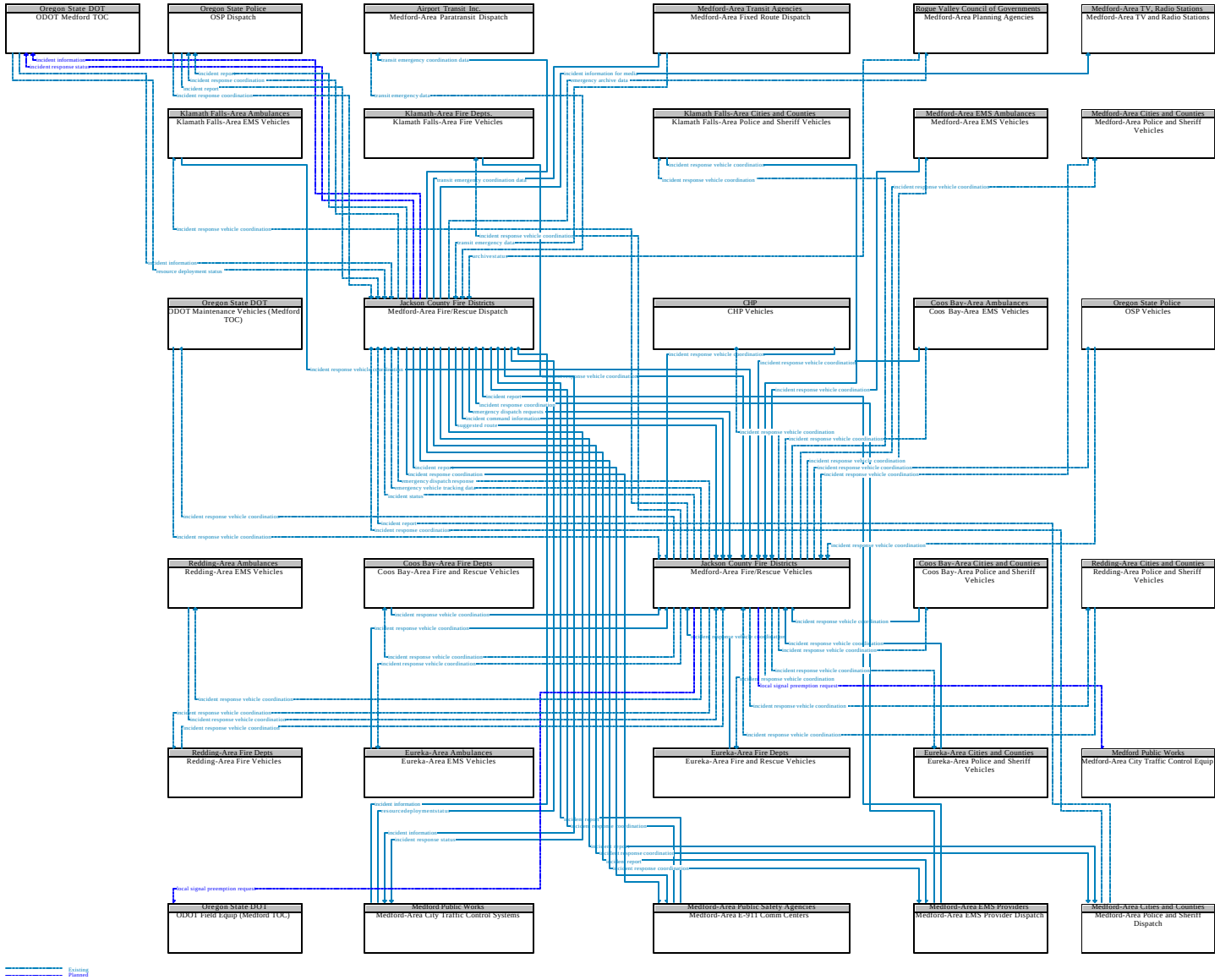

Figure D-77: Regional Diagram for Medford-Area Fire and Rescue Dispatch and Vehicles.

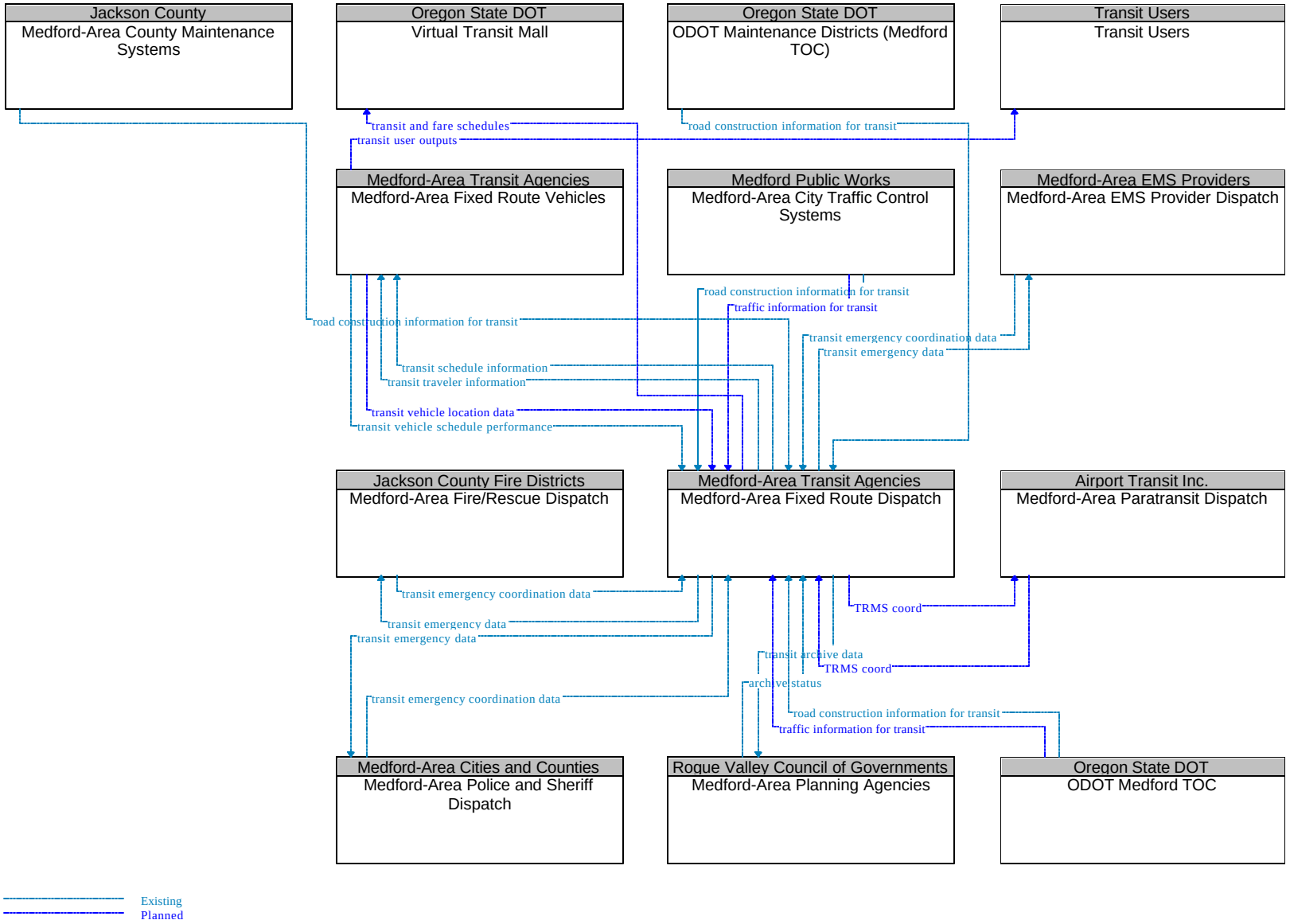

Figure D-78: Regional Diagram for Medford-Area Fixed Route Dispatch and Vehicles.

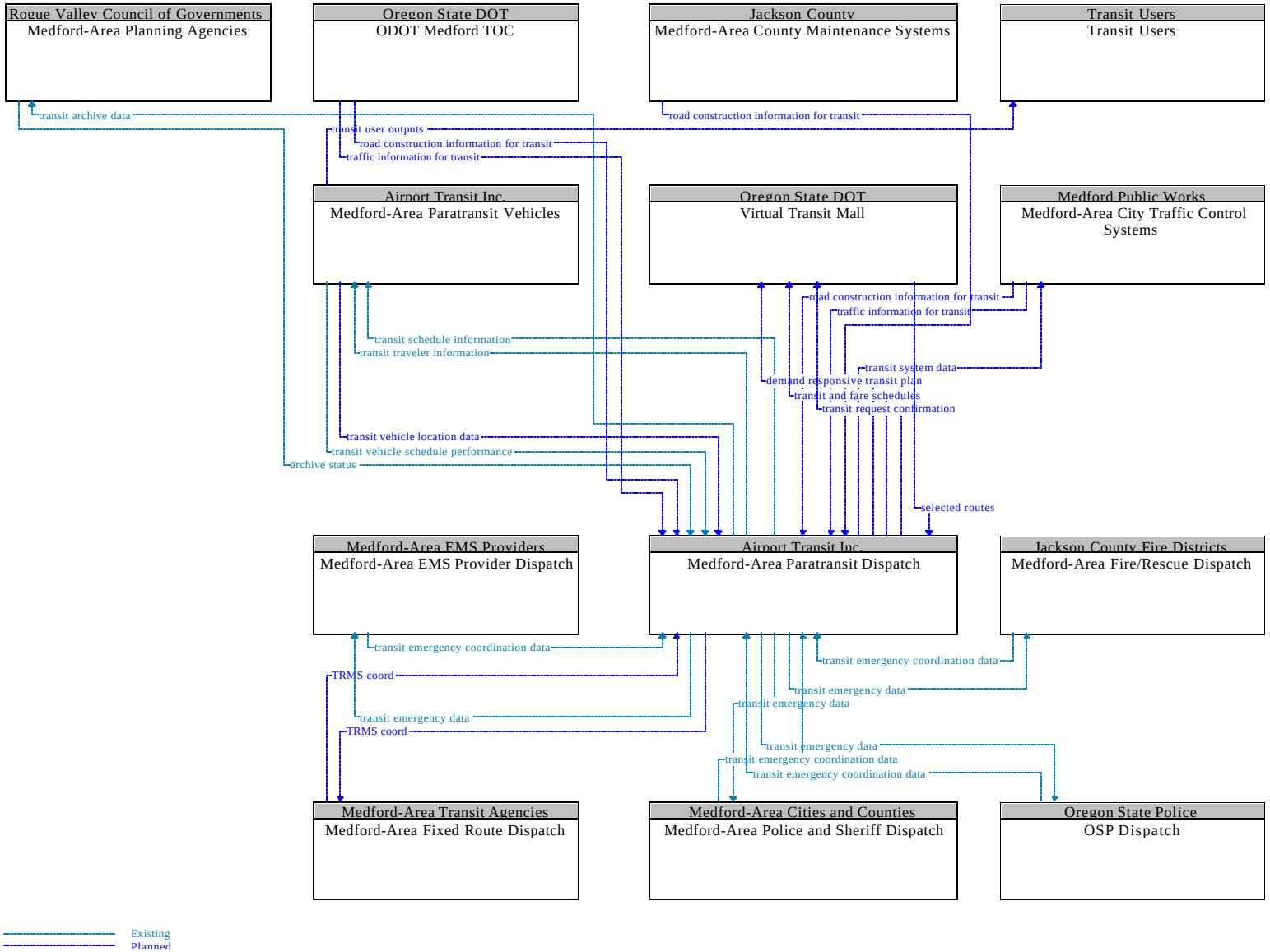

Figure D-79: Regional Diagram for Medford-Area Paratransit Dispatch and Vehicles.

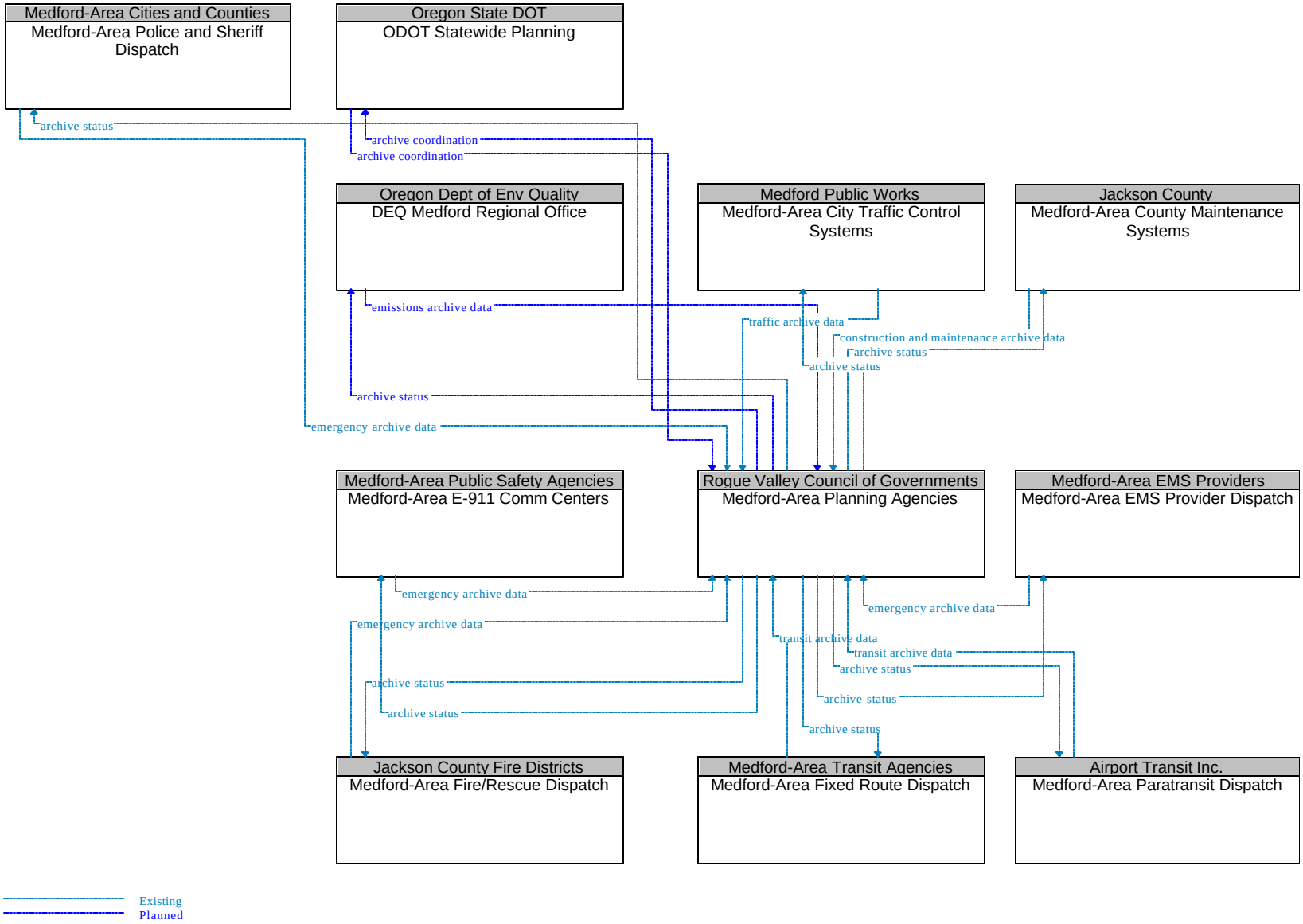

Figure D-80: Regional Diagram for Medford-Area Planning Agencies.

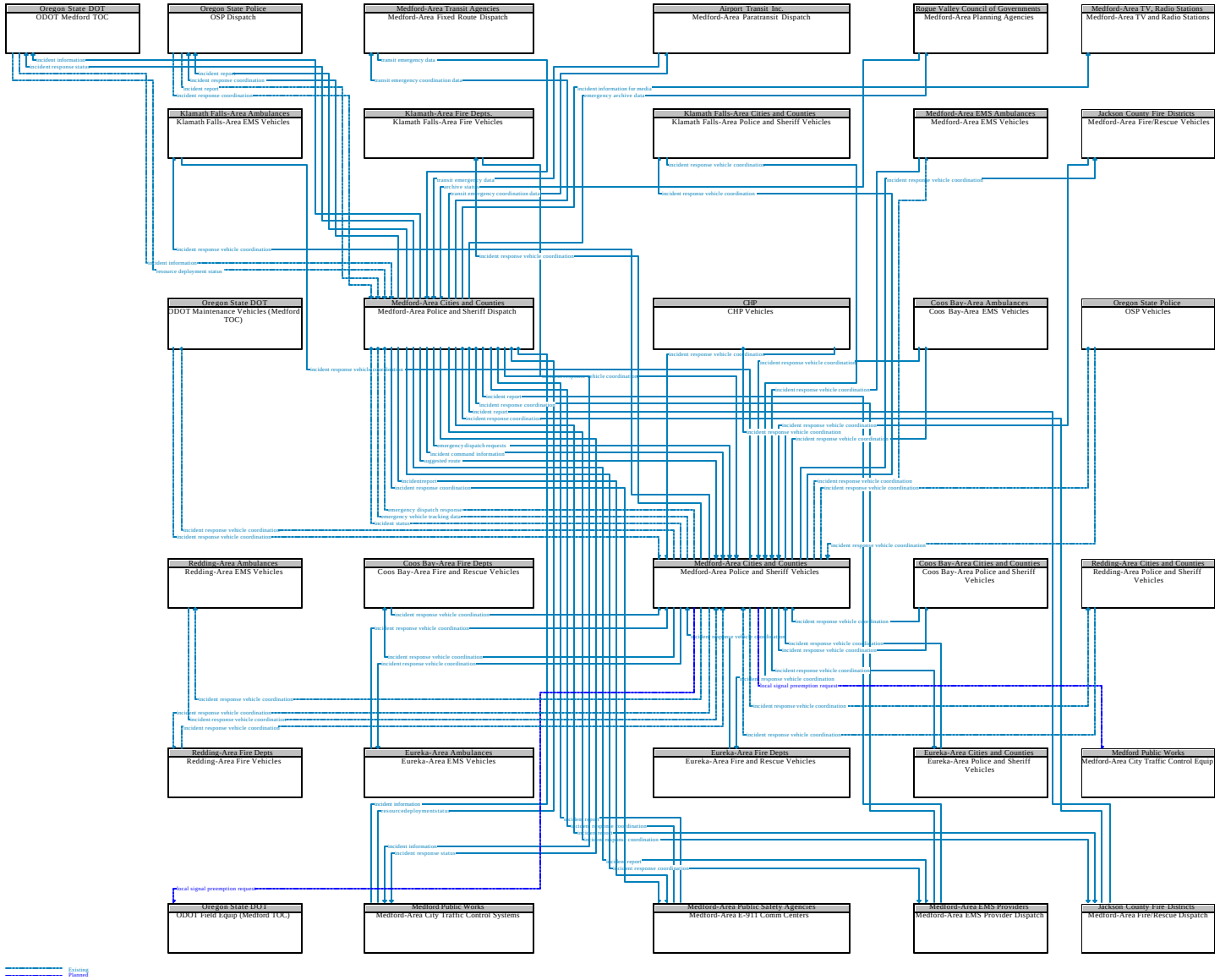

Figure D-81: Regional Diagram for Medford-Area Police and Sheriff Dispatch and Vehicles.

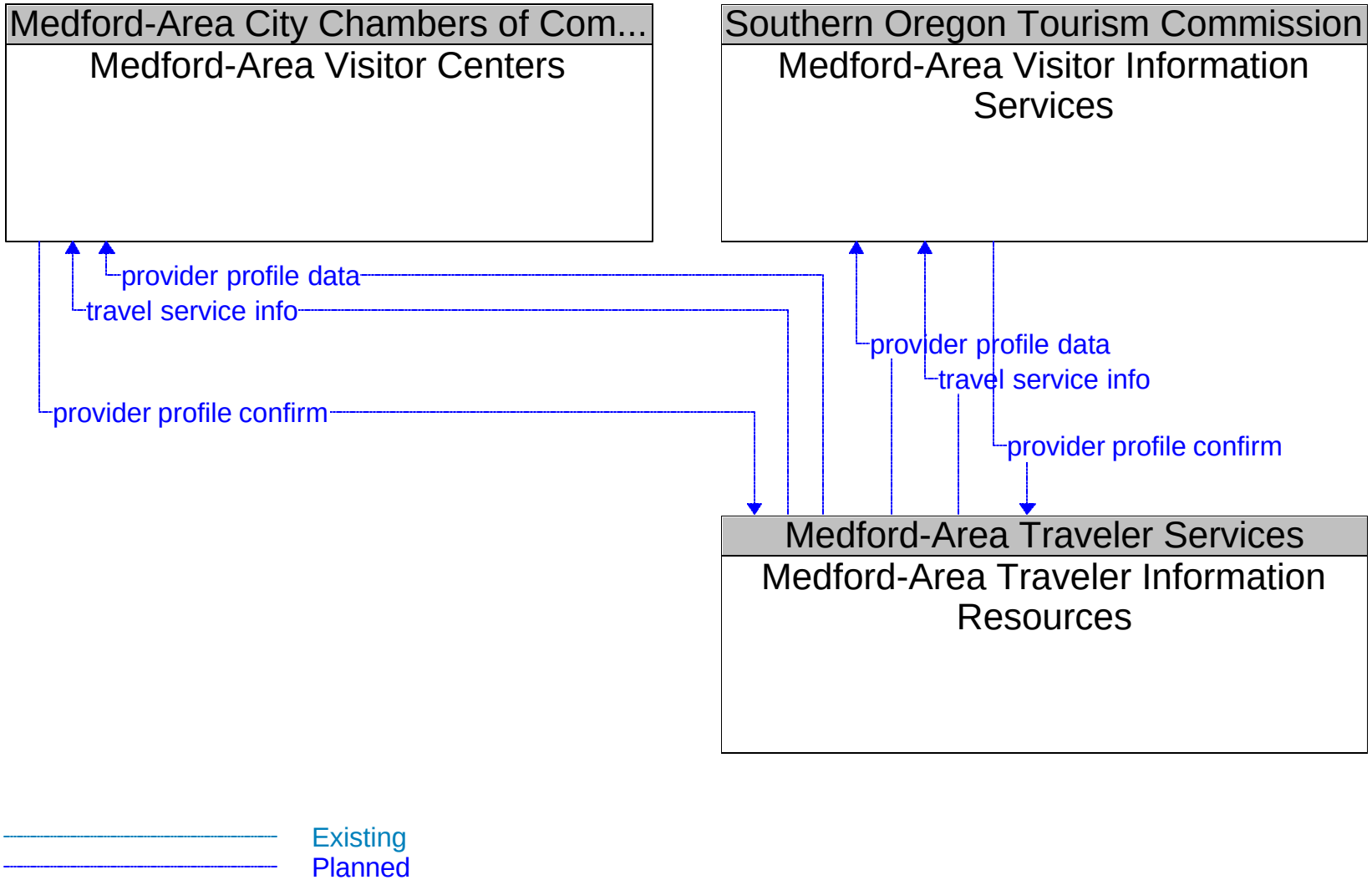

Figure D-82: Regional Diagram for Medford-Area Traveler Information Resources.

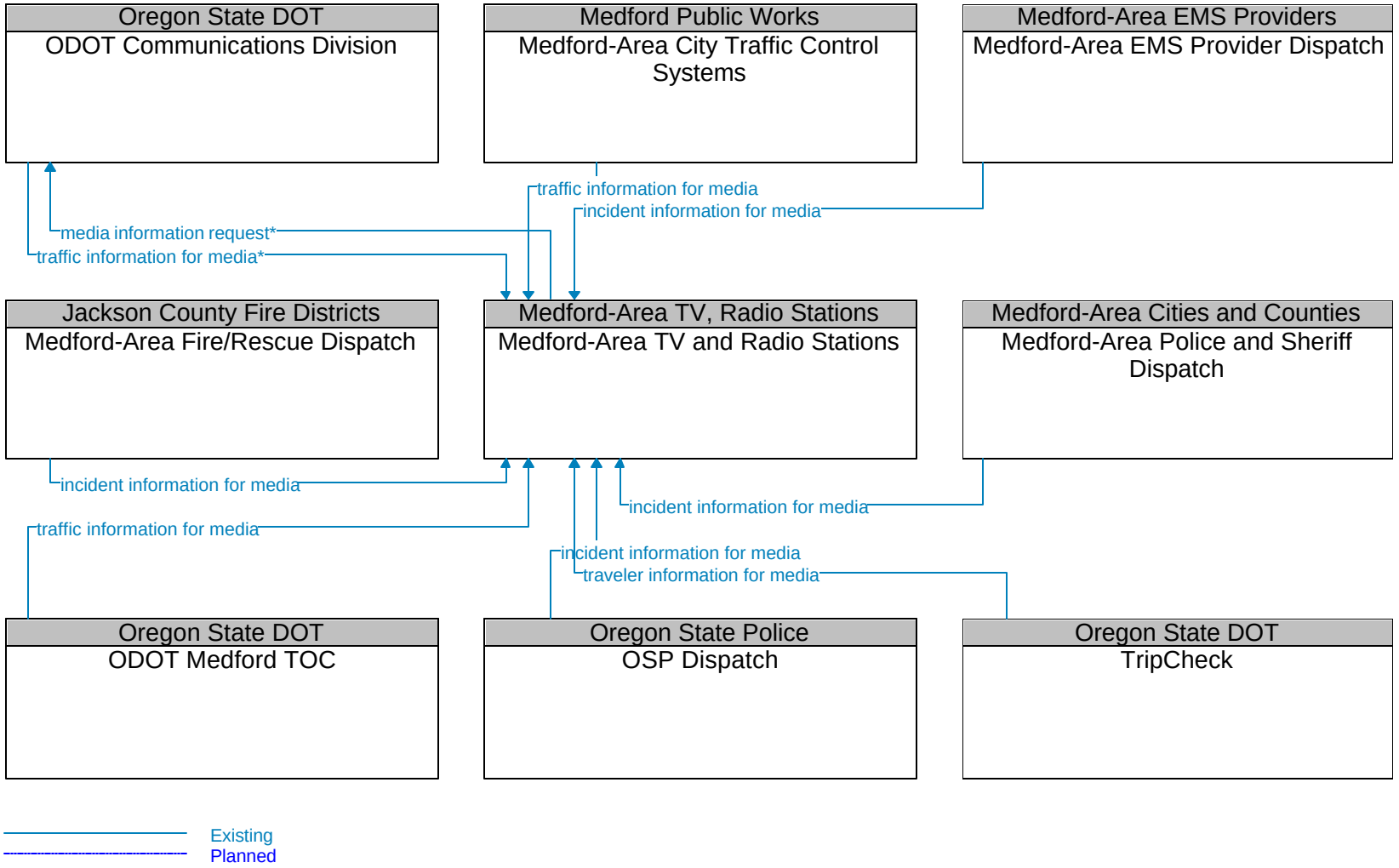

Figure D-83: Regional Diagram for Medford-Area TV and Radio Stations.

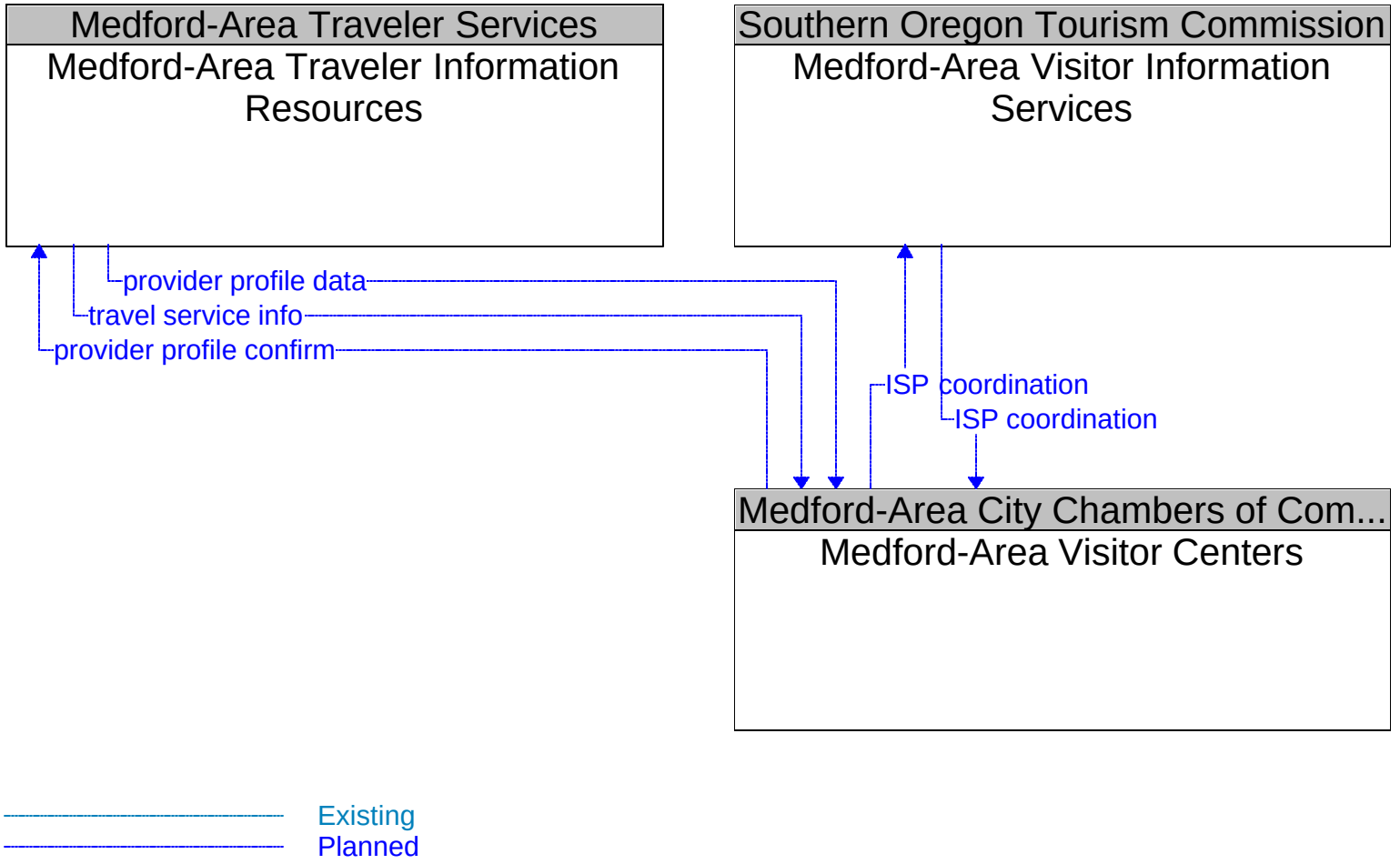

Figure D-84: Regional Diagram for Medford-Area Visitor Centers.

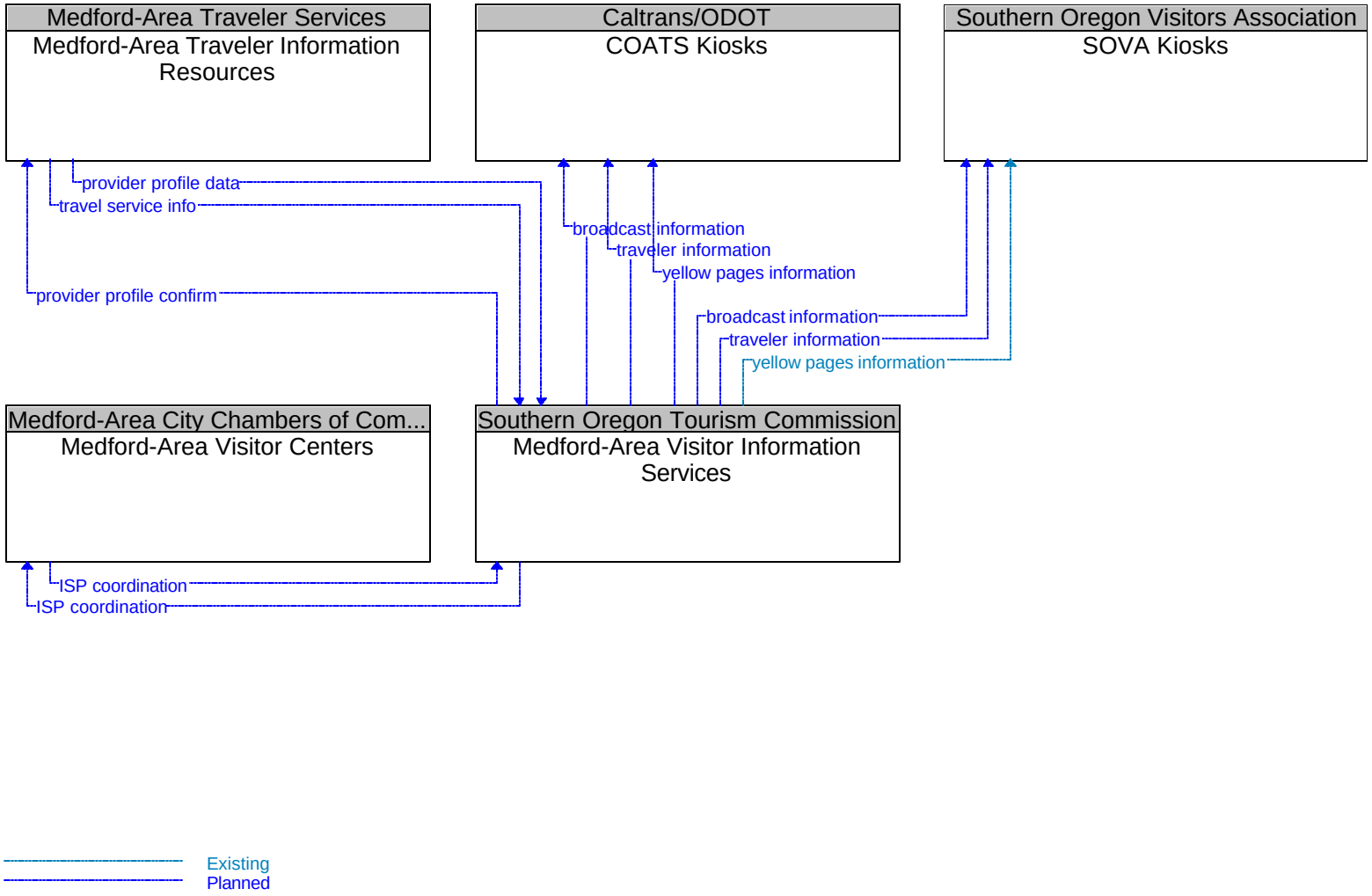

Figure D-85: Regional Diagram for Medford-Area Visitor Information Services.

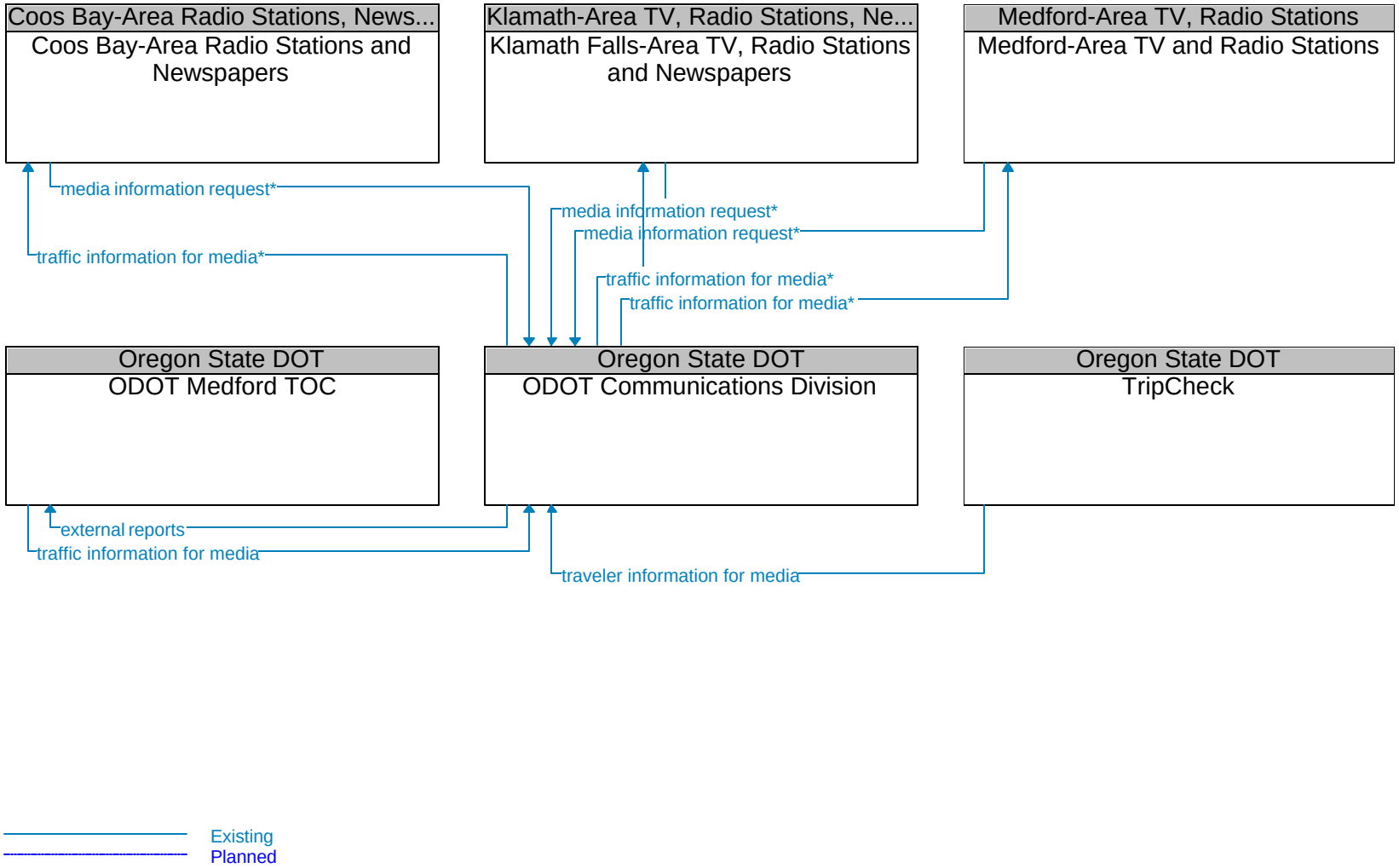

Figure D-86: Regional Diagram for ODOT Communications Division.

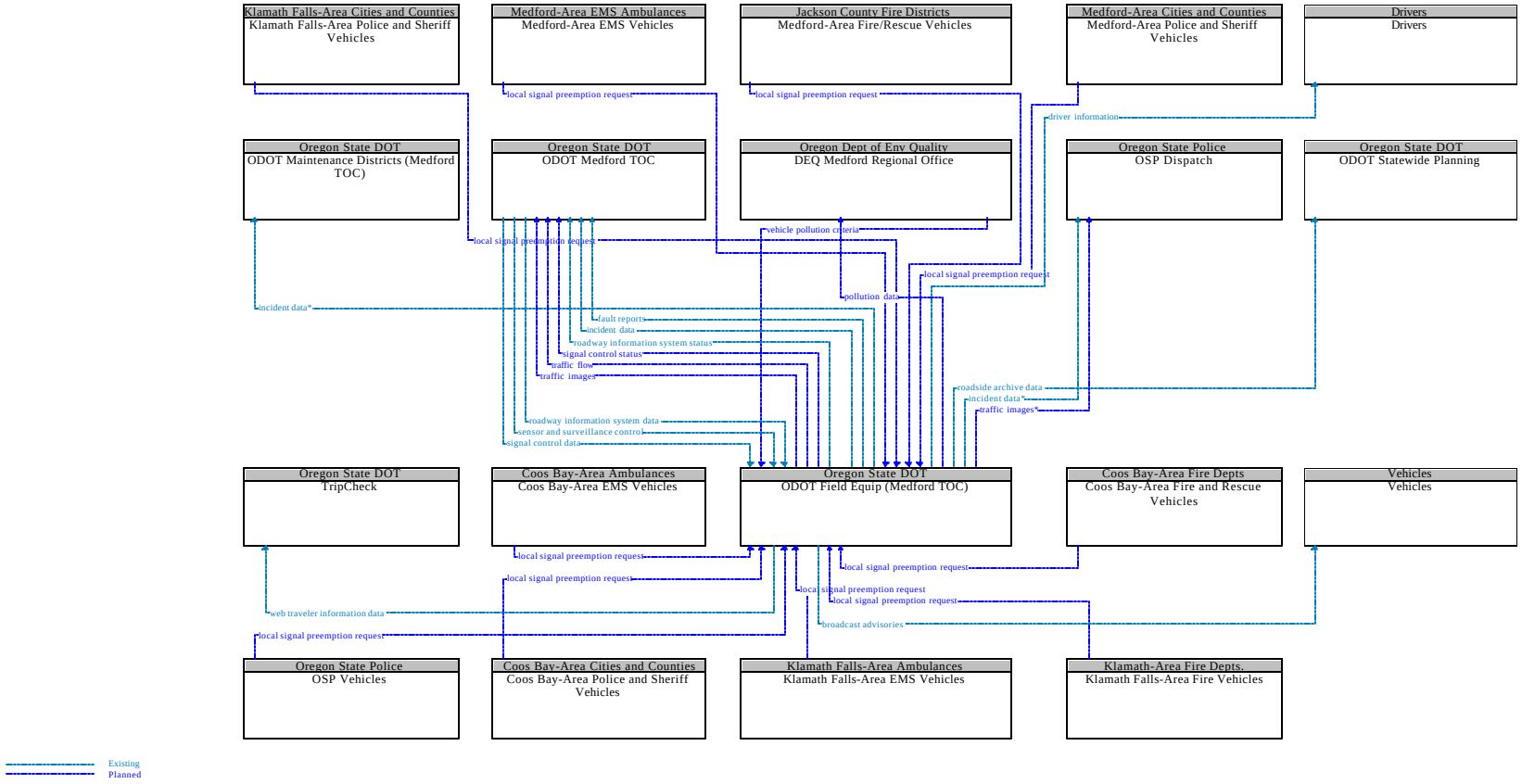

Figure D-87: Regional Diagram for ODOT Field Equip (Medford TOC).

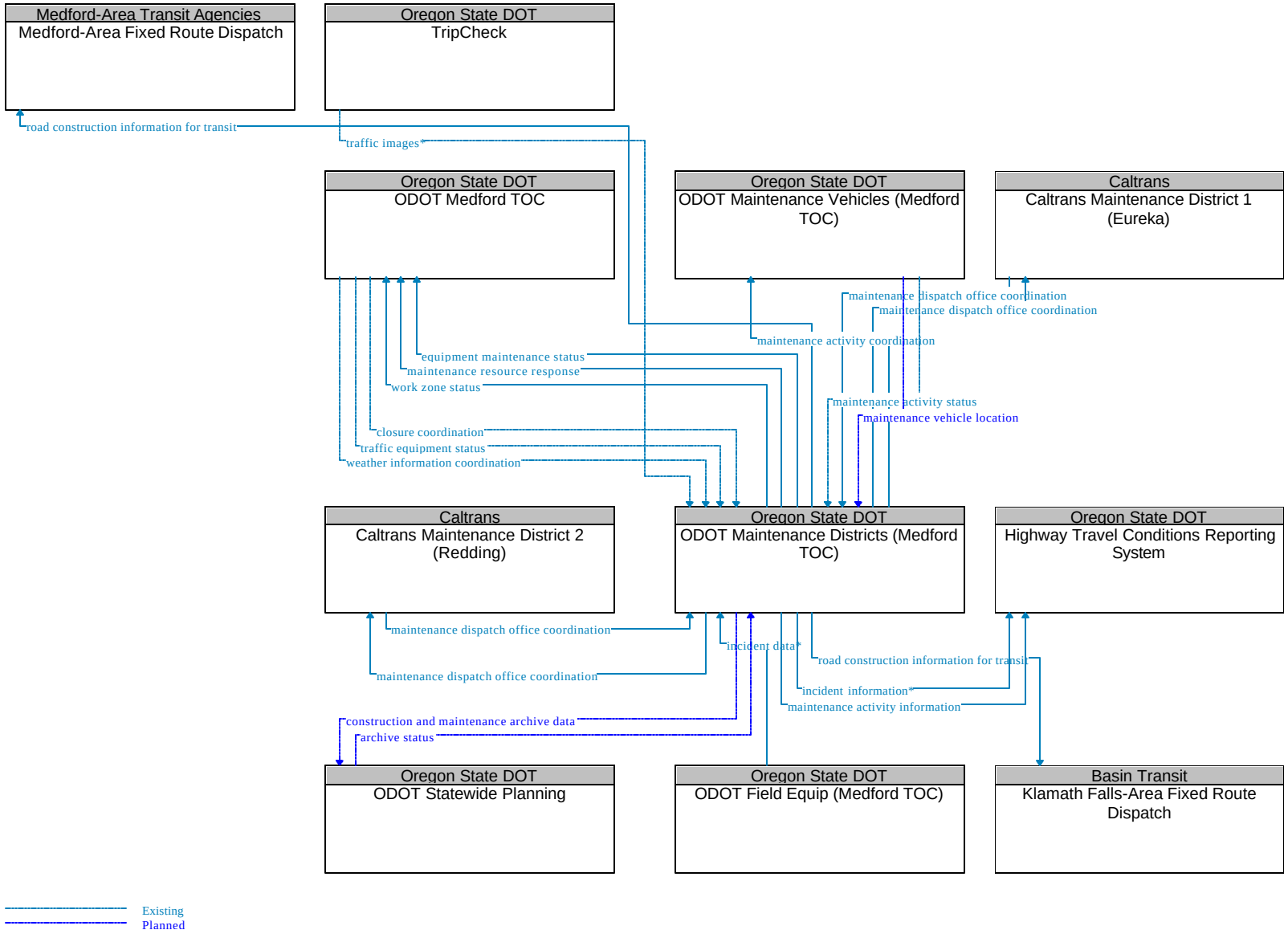

Figure D-88: Regional Diagram for ODOT Maintenance Districts (Medford TOC).

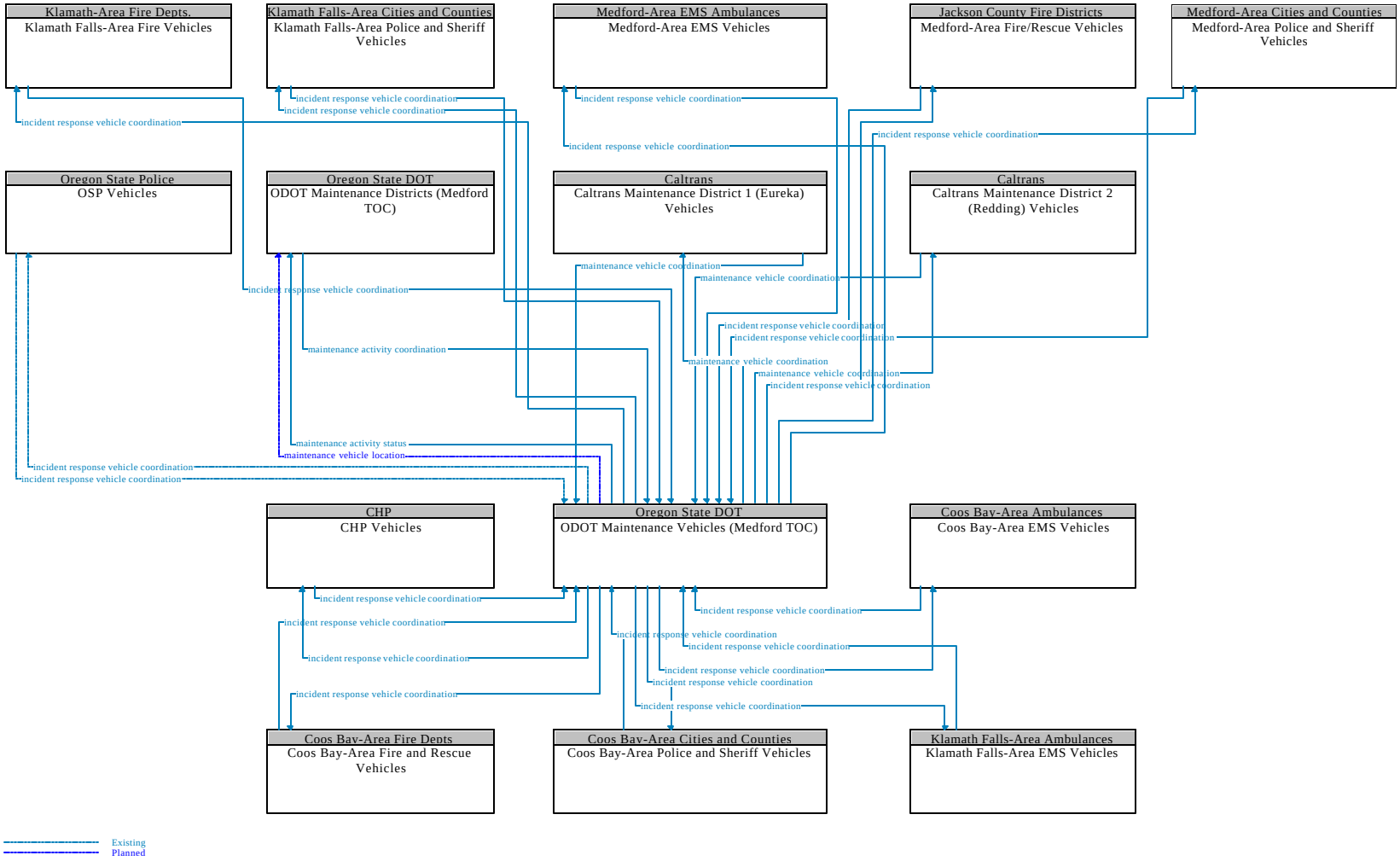

Figure D-89: Regional Diagram for ODOT Maintenance Vehicles (Medford TOC).

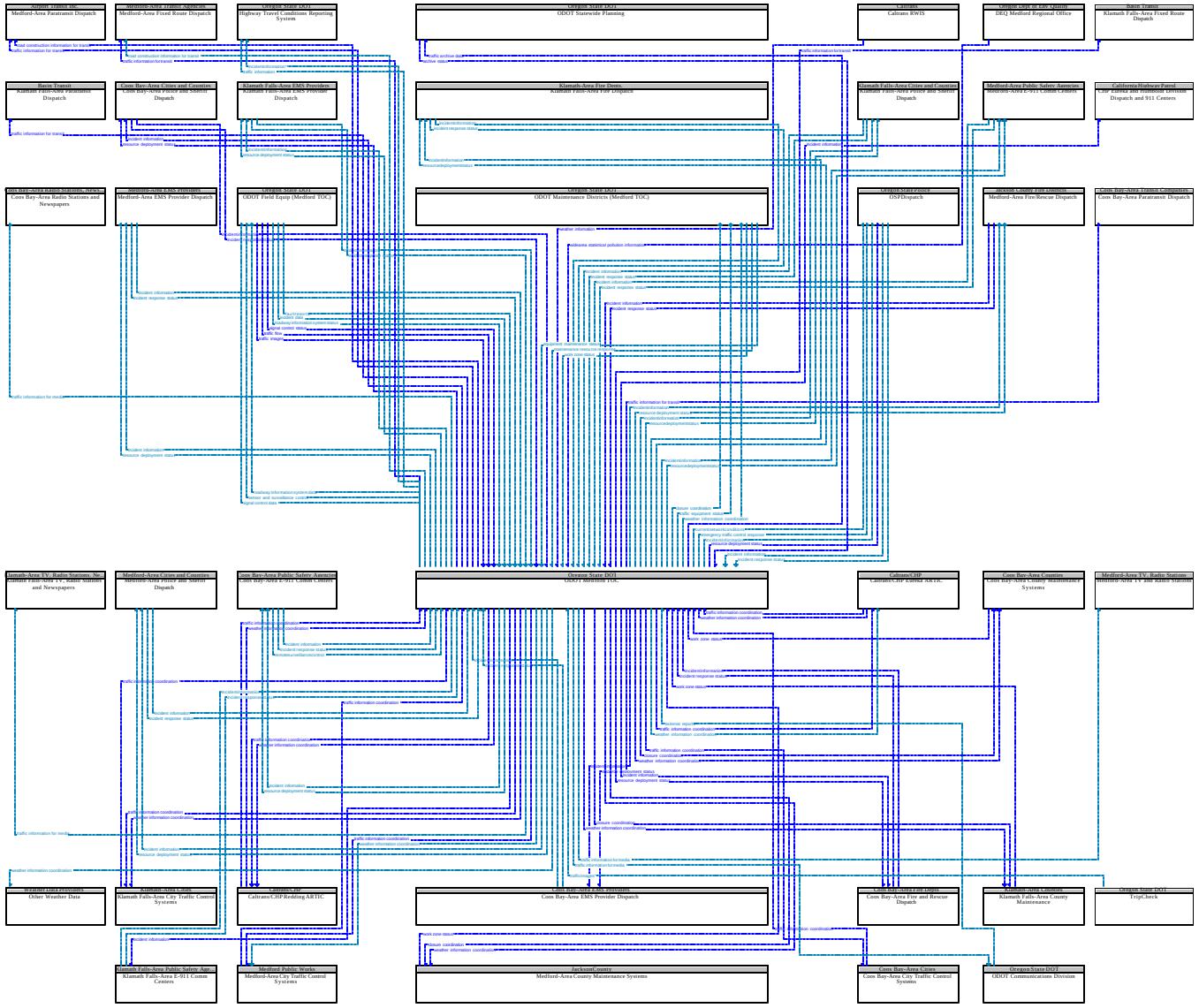

Figure D-90: Regional Diagram for ODOT Medford TOC.

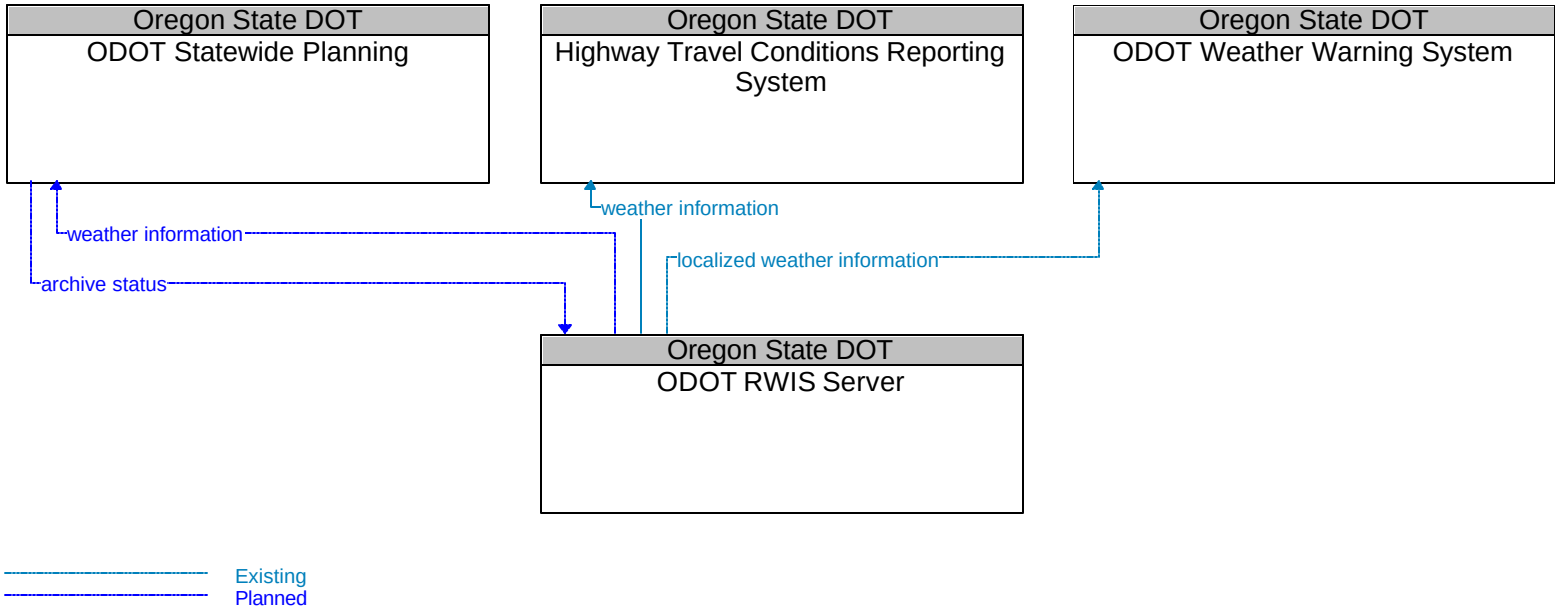

Figure D-91: Regional Diagram for ODOT RWIS Server.

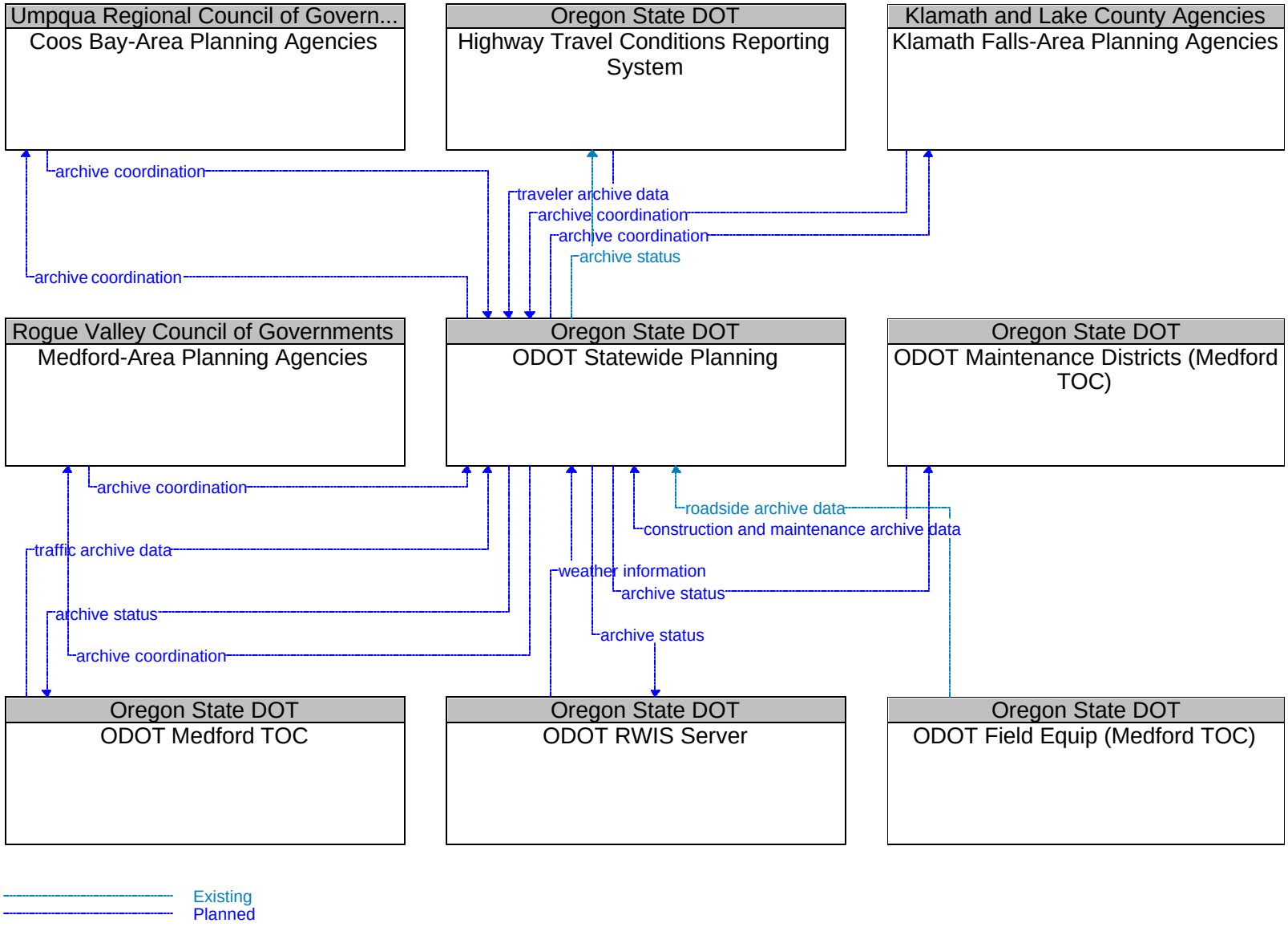

Figure D-92: Regional Diagram for ODOT Statewide Planning.

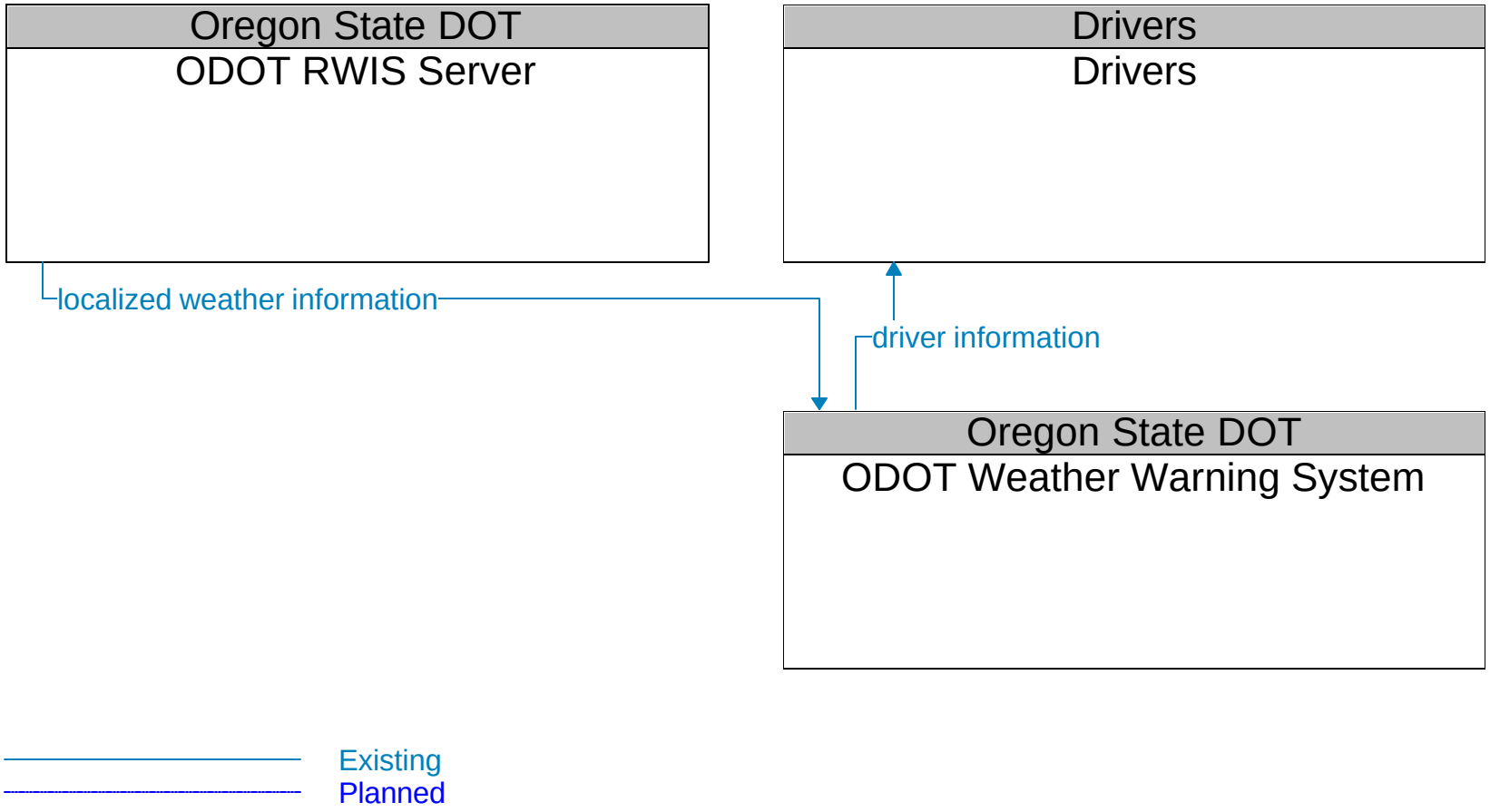

Figure D-93: Regional Diagram for ODOT Weather Warning System.

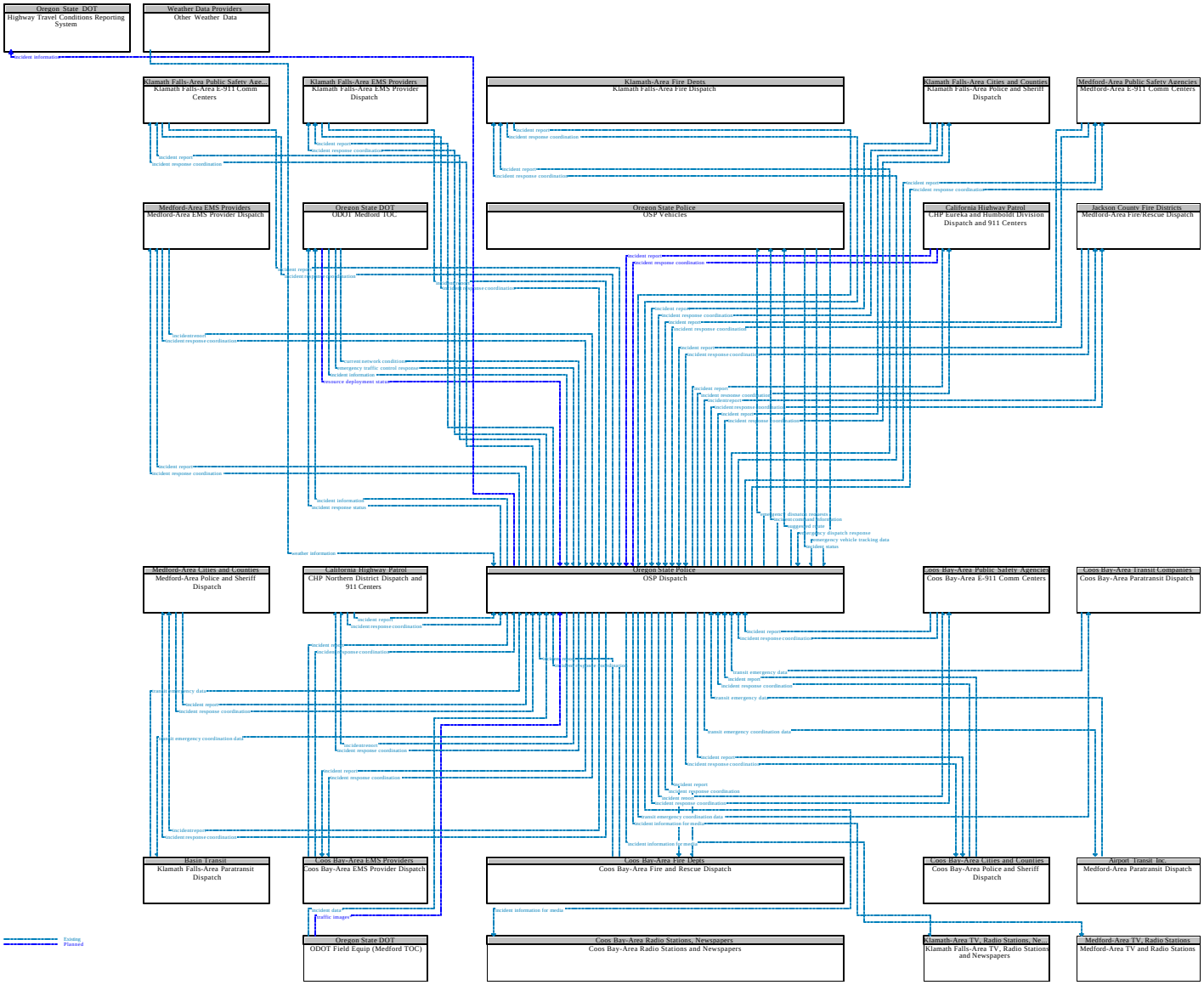

Figure D-94: Regional Diagram for OSP Dispatch.

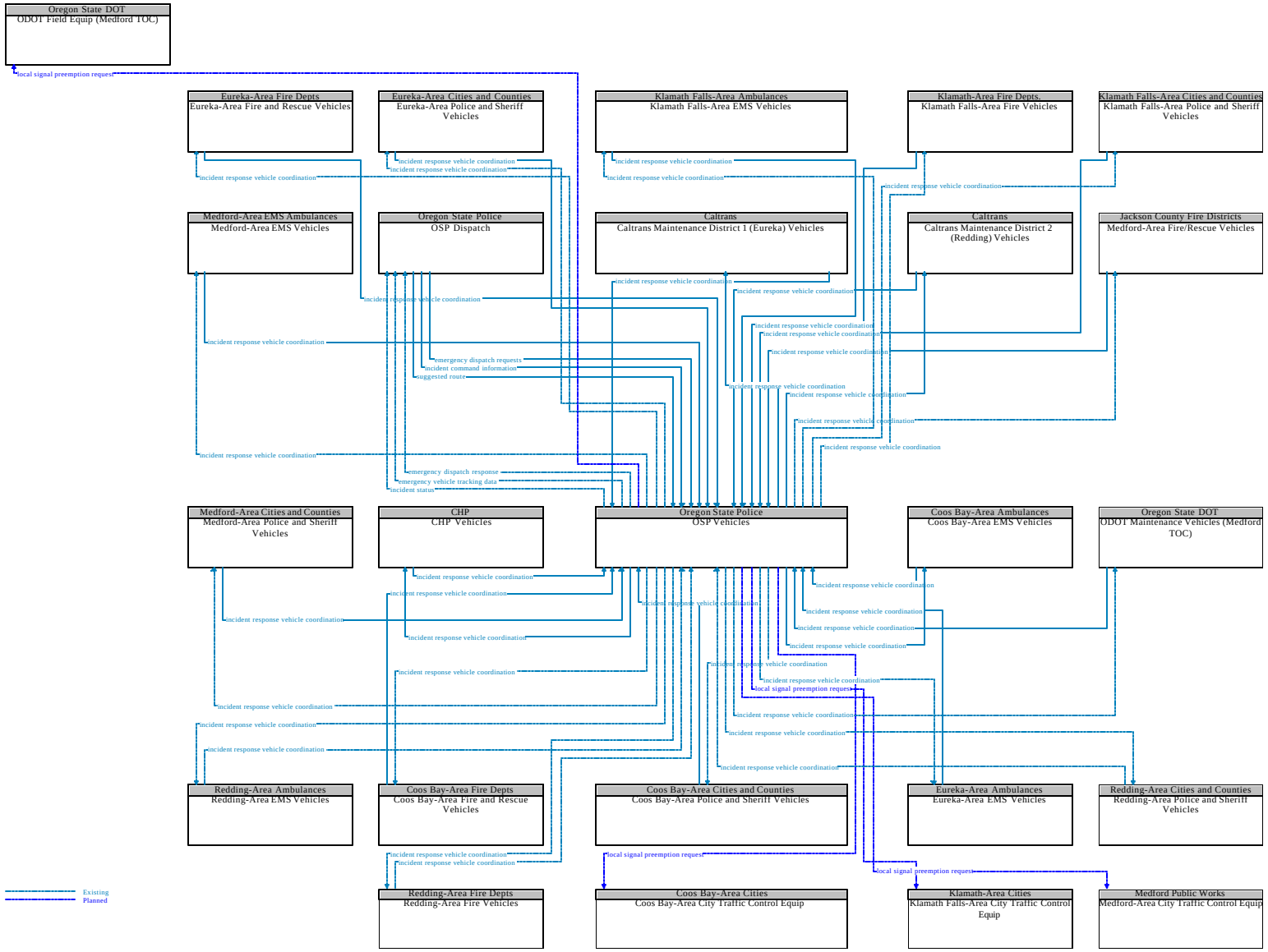

Figure D-95: Regional Diagram for OSP Vehicles.

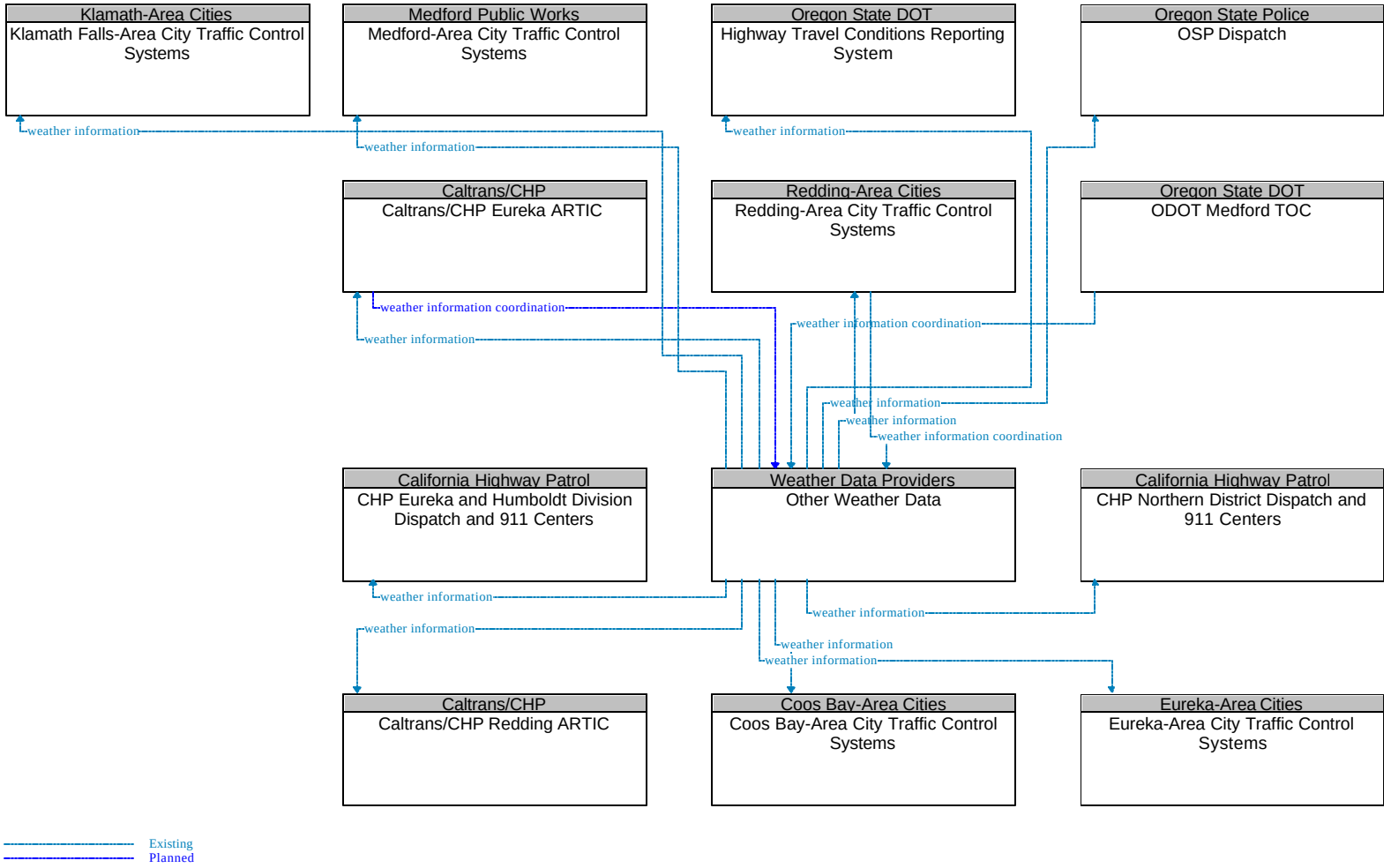

Figure D-96: Regional Diagram for Other Weather Data.

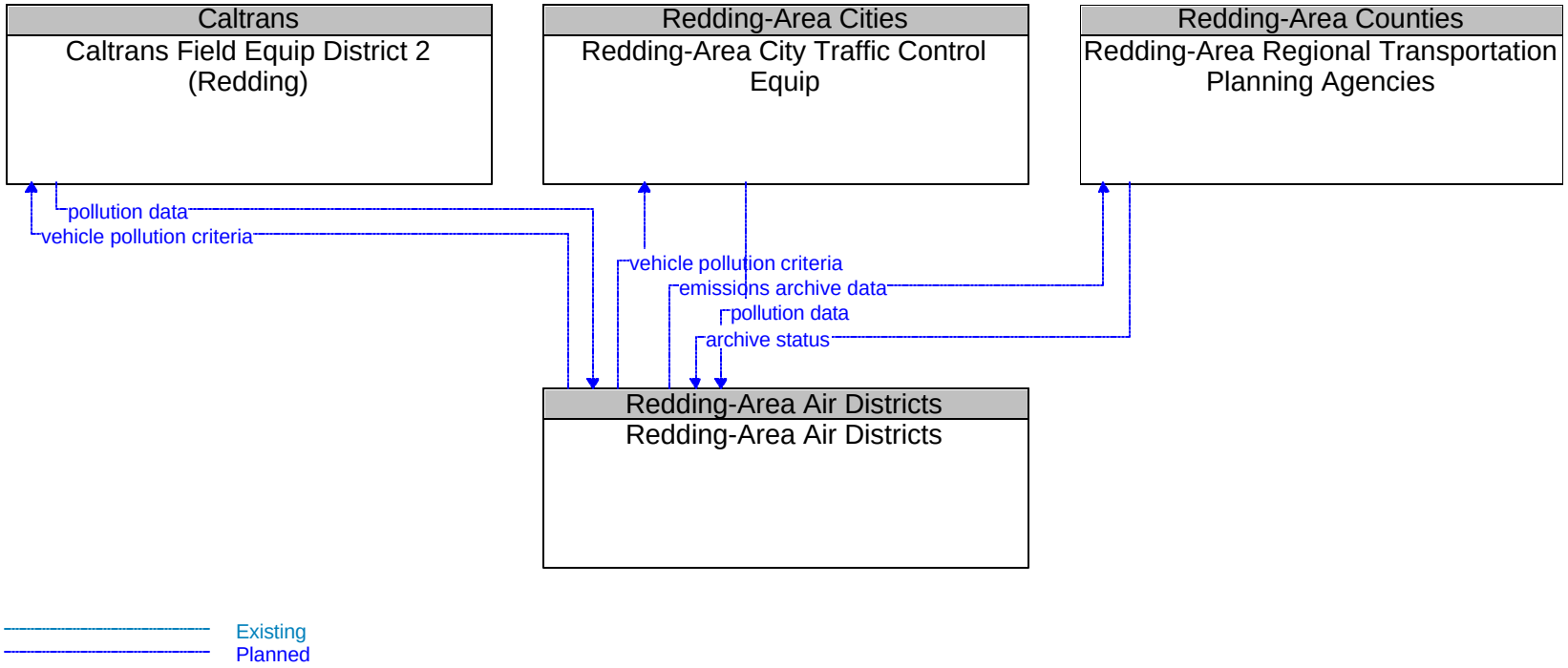

Figure D-97: Regional Diagram for Redding-Area Air Districts.

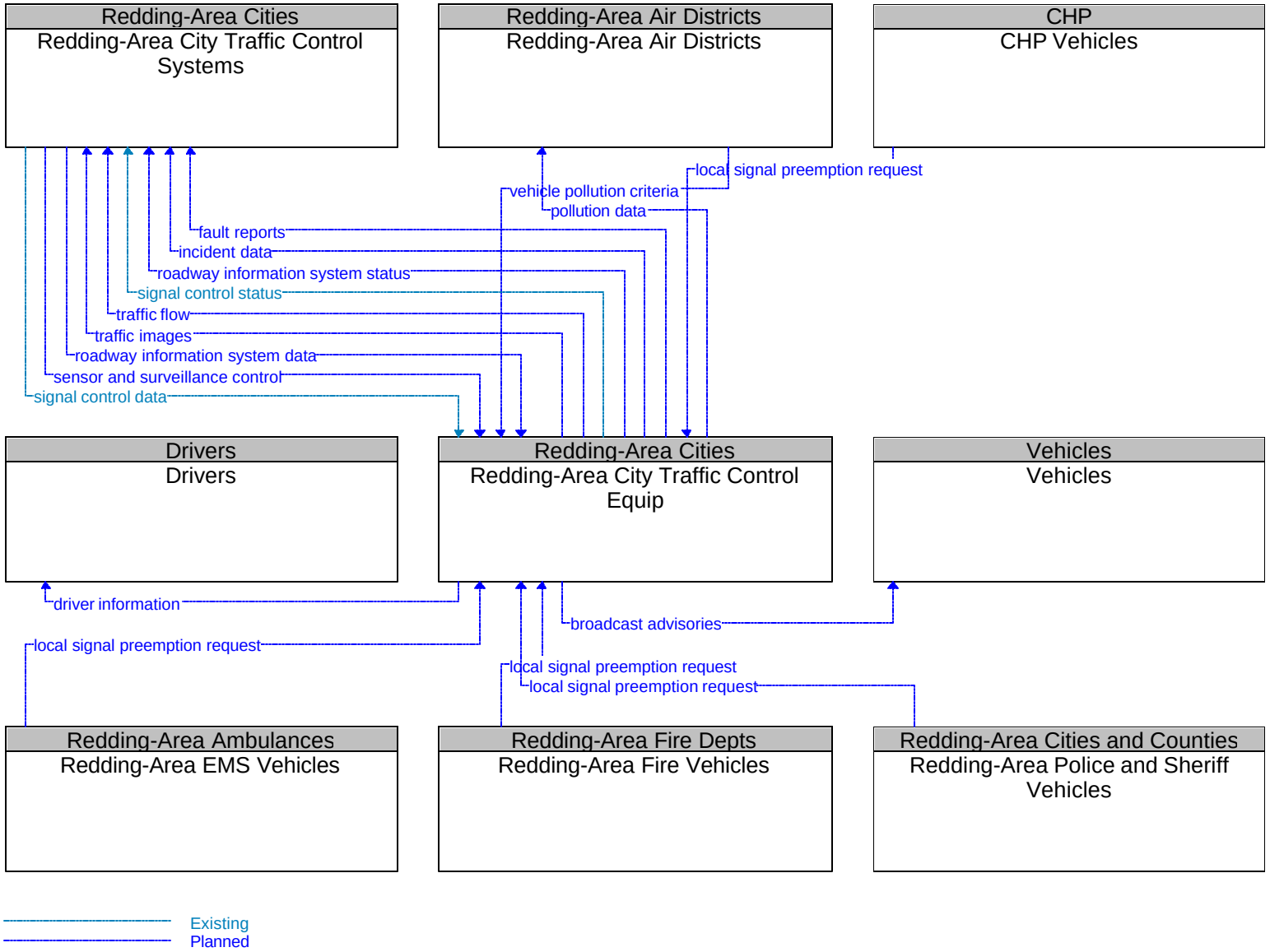

Figure D-98: Regional Diagram for Redding-Area City Traffic Control Equip.

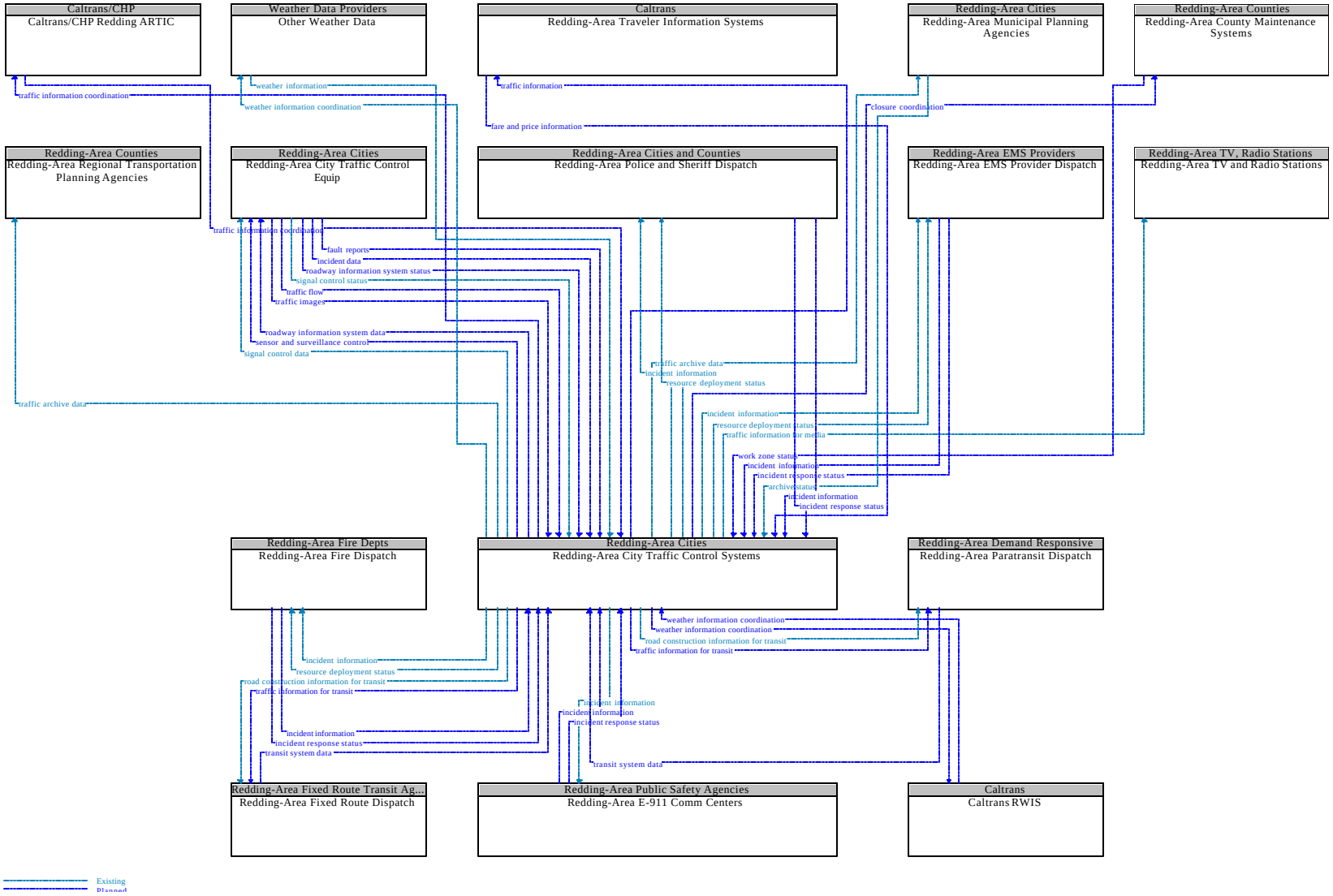

Figure D-99: Regional Diagram for Redding-Area City Traffic Control Systems.

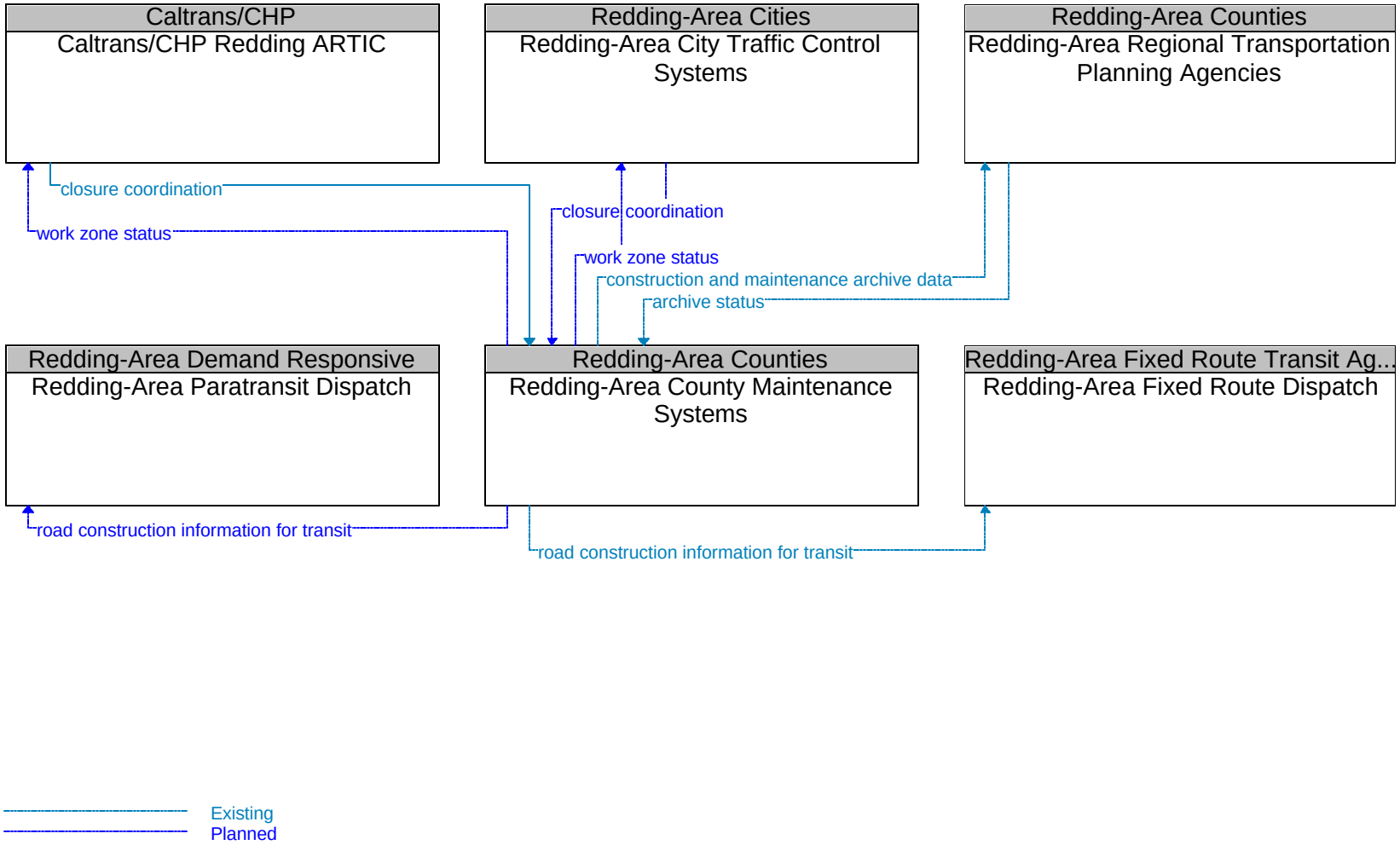

Figure D-100: Regional Diagram for Redding-Area County Maintenance Systems.

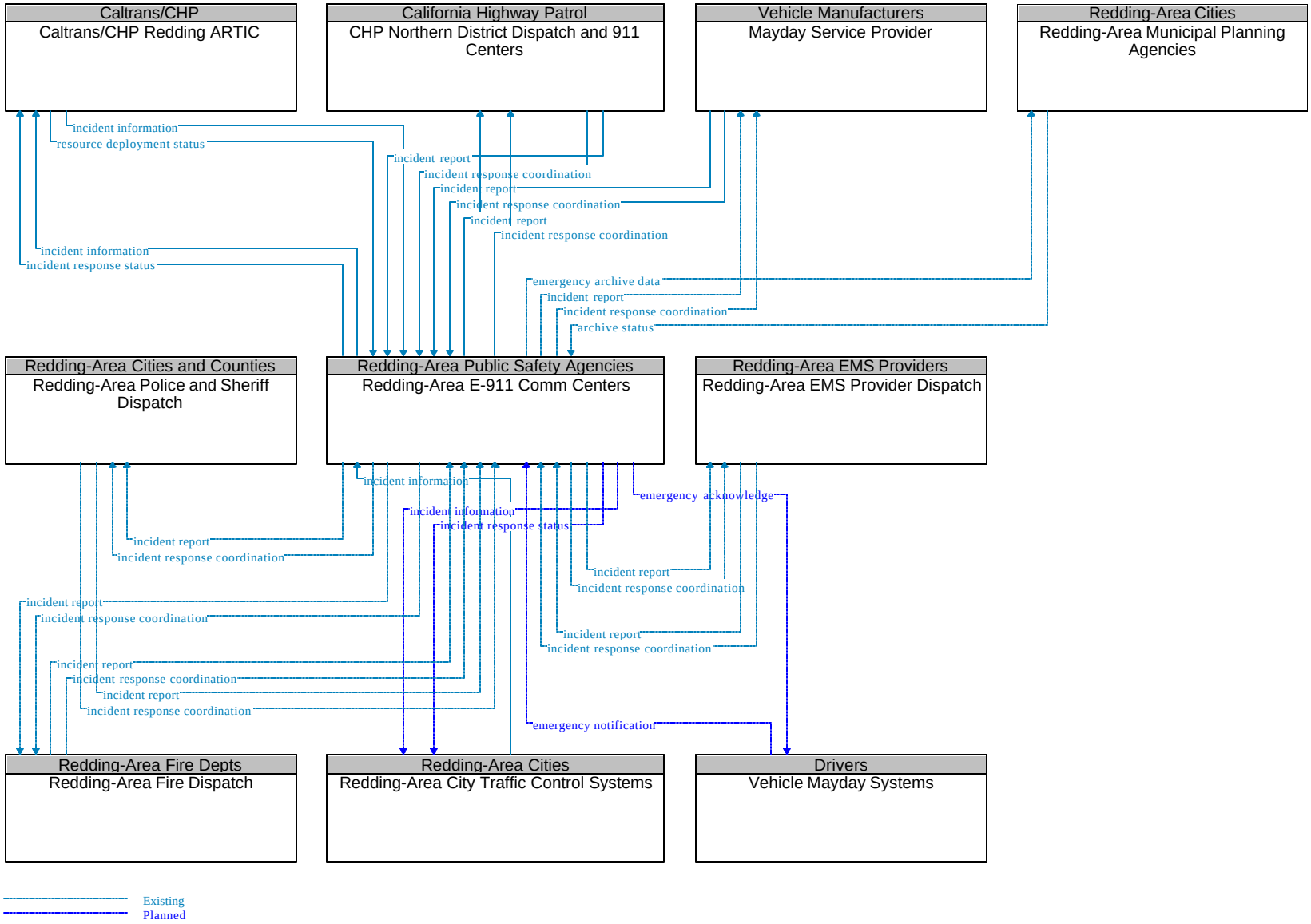

Figure D-101: Regional Diagram for Redding-Area E-911 Comm Centers.

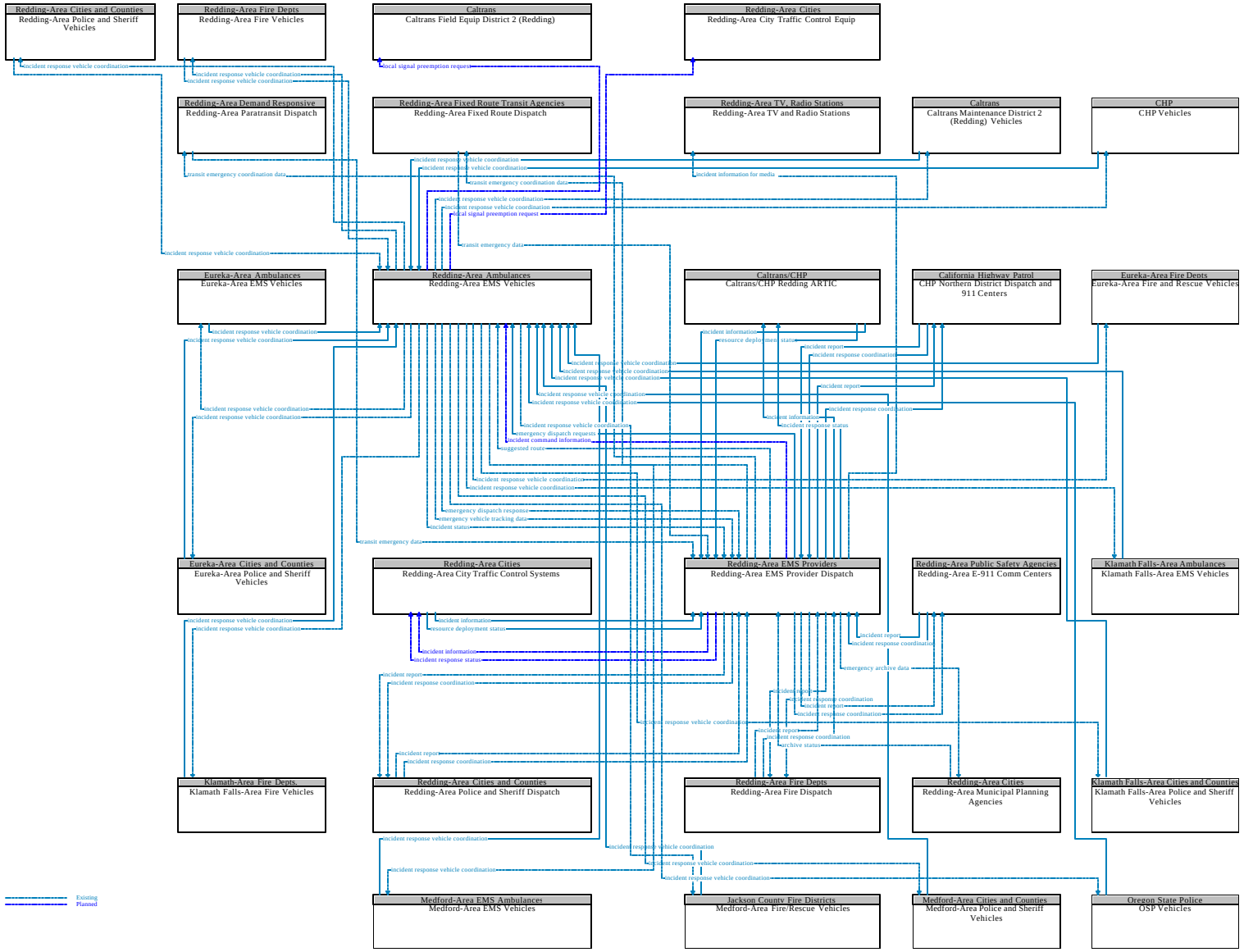

Figure D-102: Regional Diagram for Redding-Area EMS Dispatch and Vehicles.

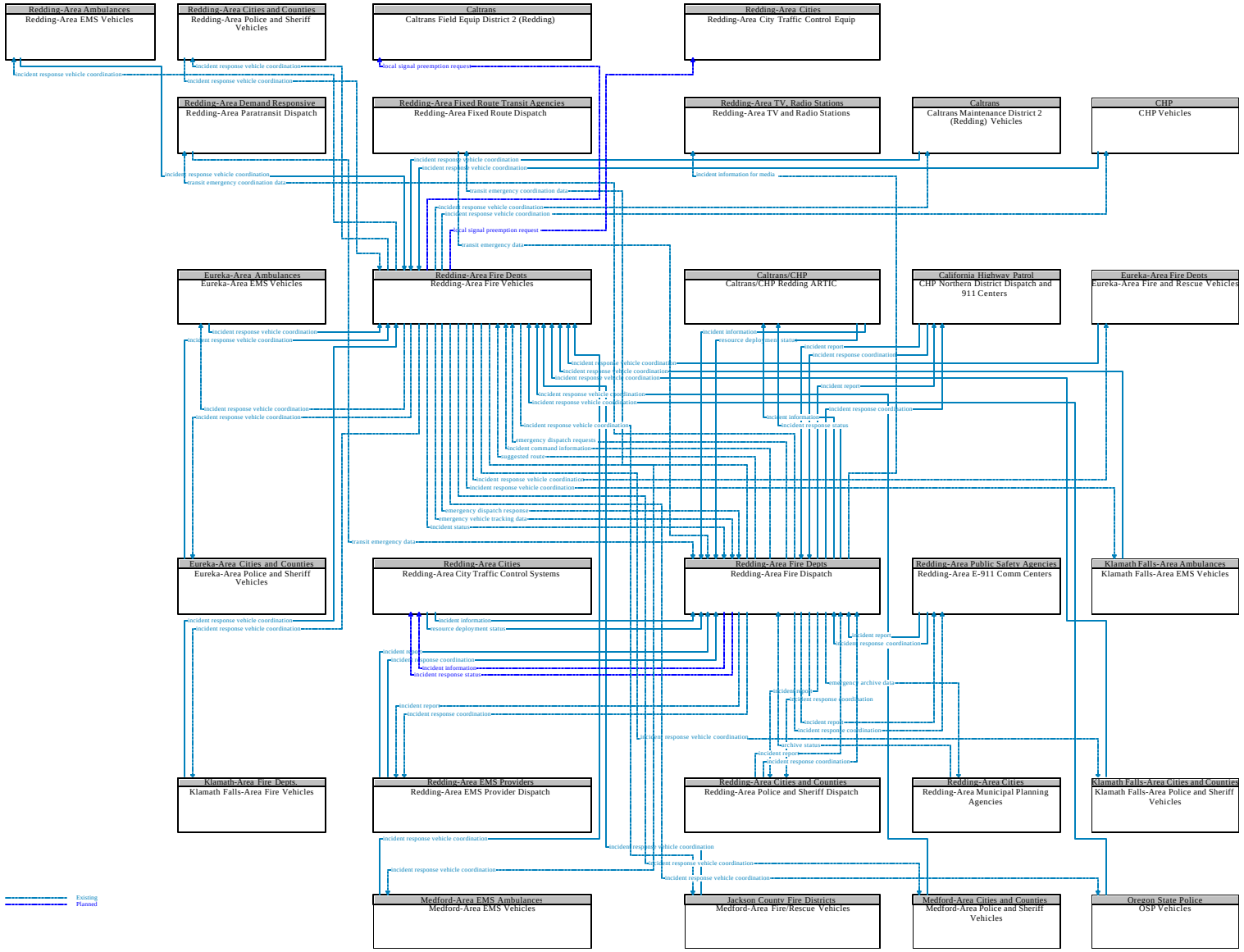

Figure D-103: Regional Diagram for Redding-Area Fire Dispatch and Vehicles.

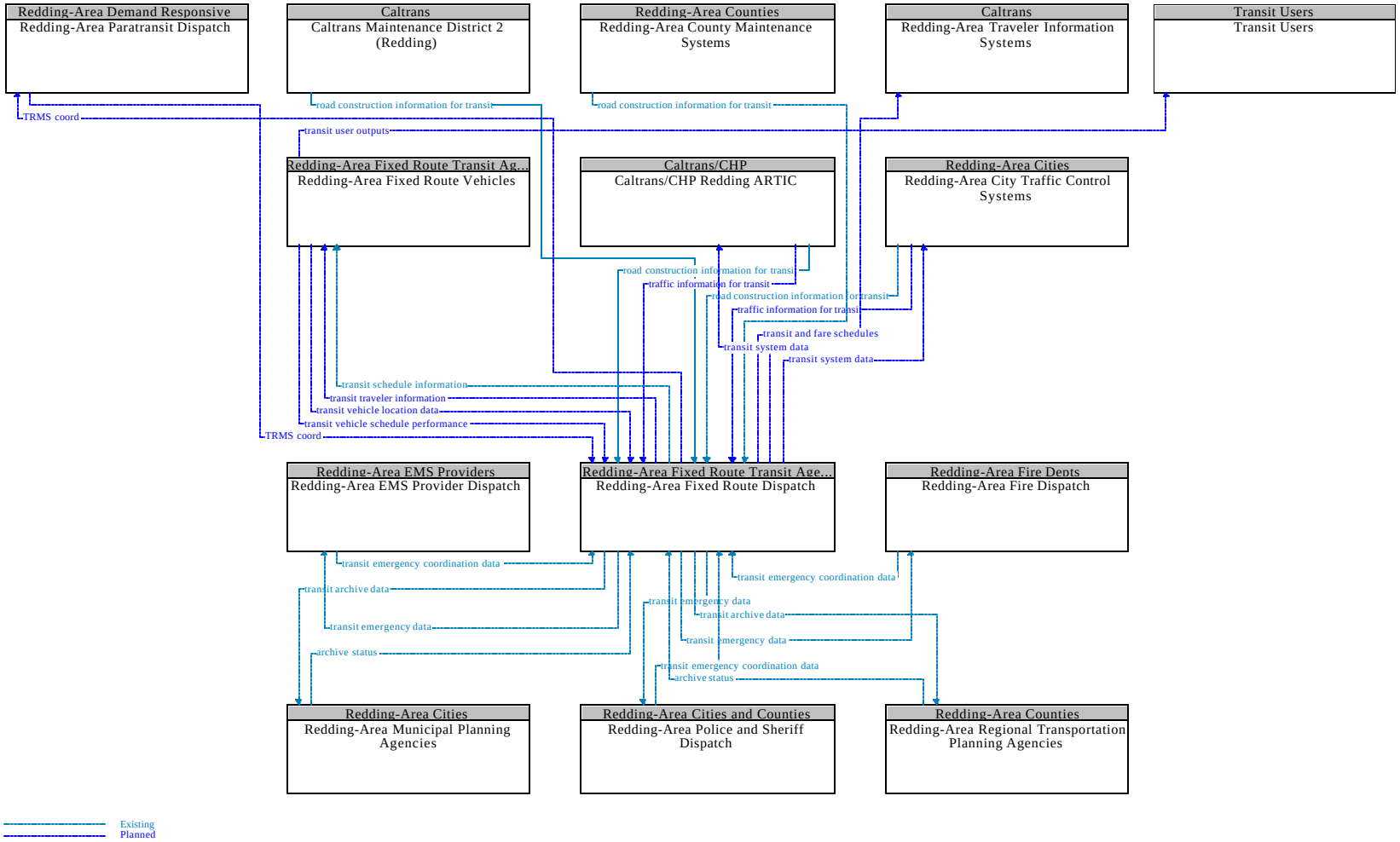

Figure D-104: Regional Diagram for Redding-Area Fixed Route Dispatch and Vehicles.

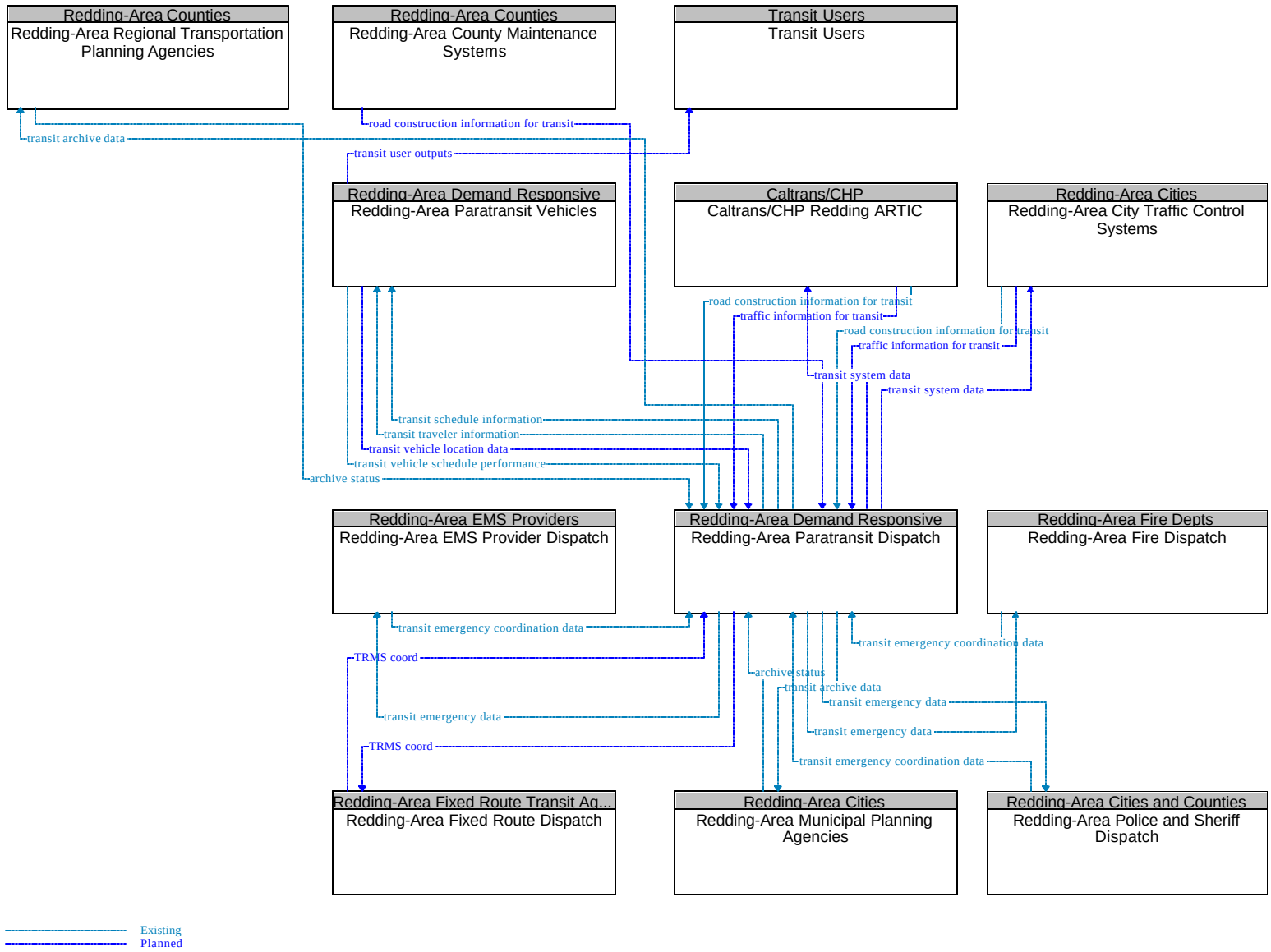

Figure D-105: Regional Diagram for Redding-Area Paratransit Dispatch and Vehicles.

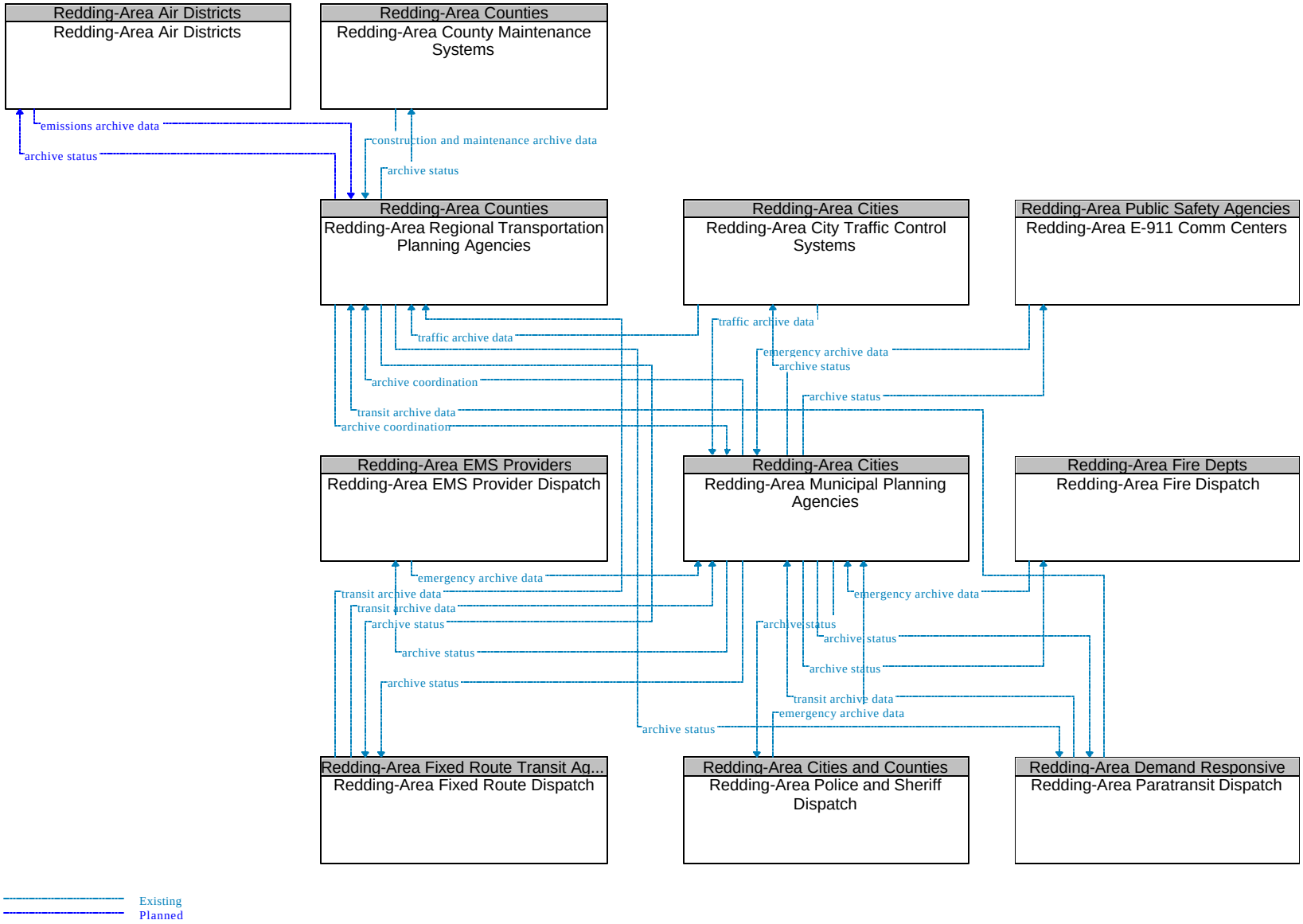

Figure D-106: Regional Diagram for Redding-Area Planning Agencies.

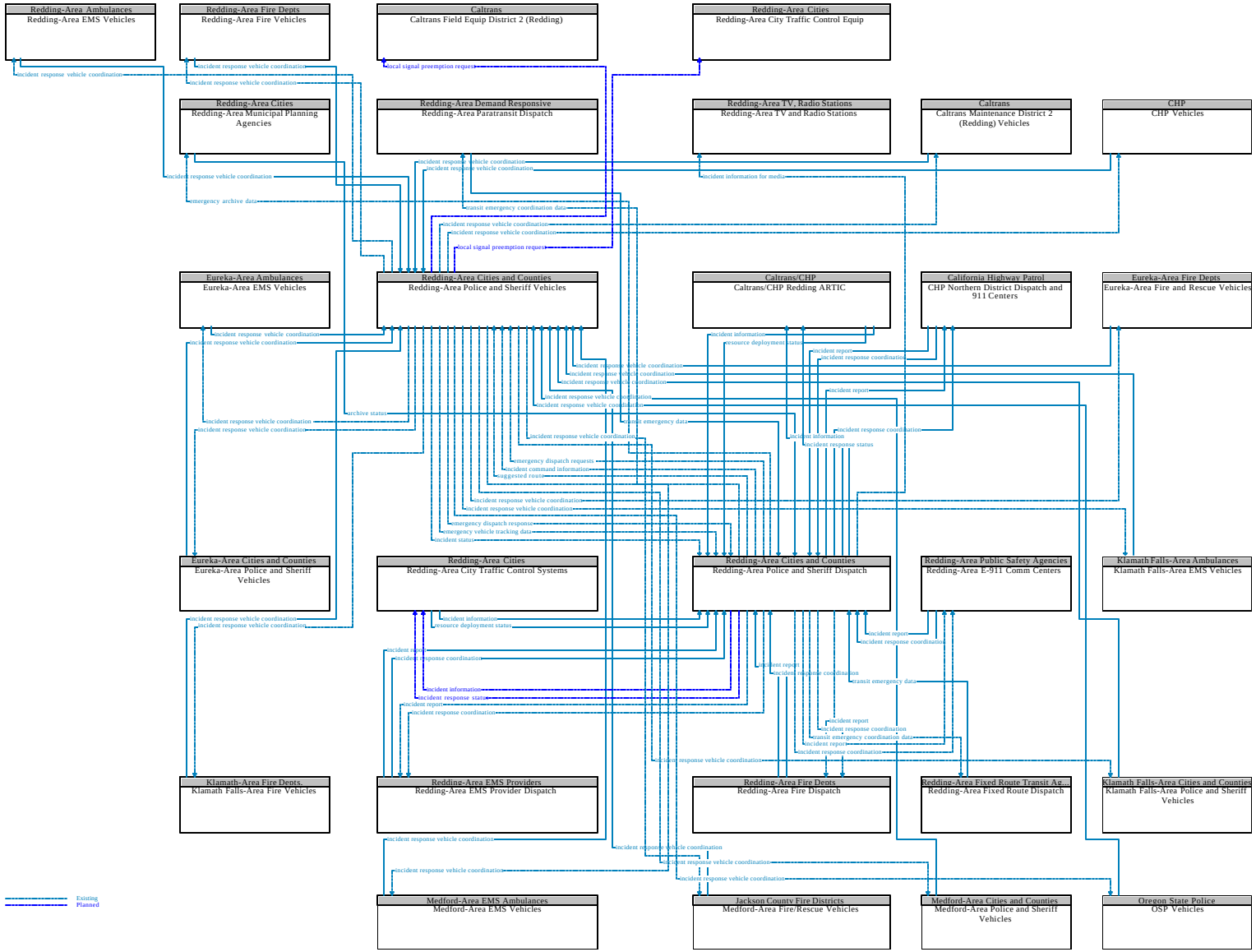

Figure D-107: Regional Diagram for Redding-Area Police and Sheriff Dispatch and Vehicles.

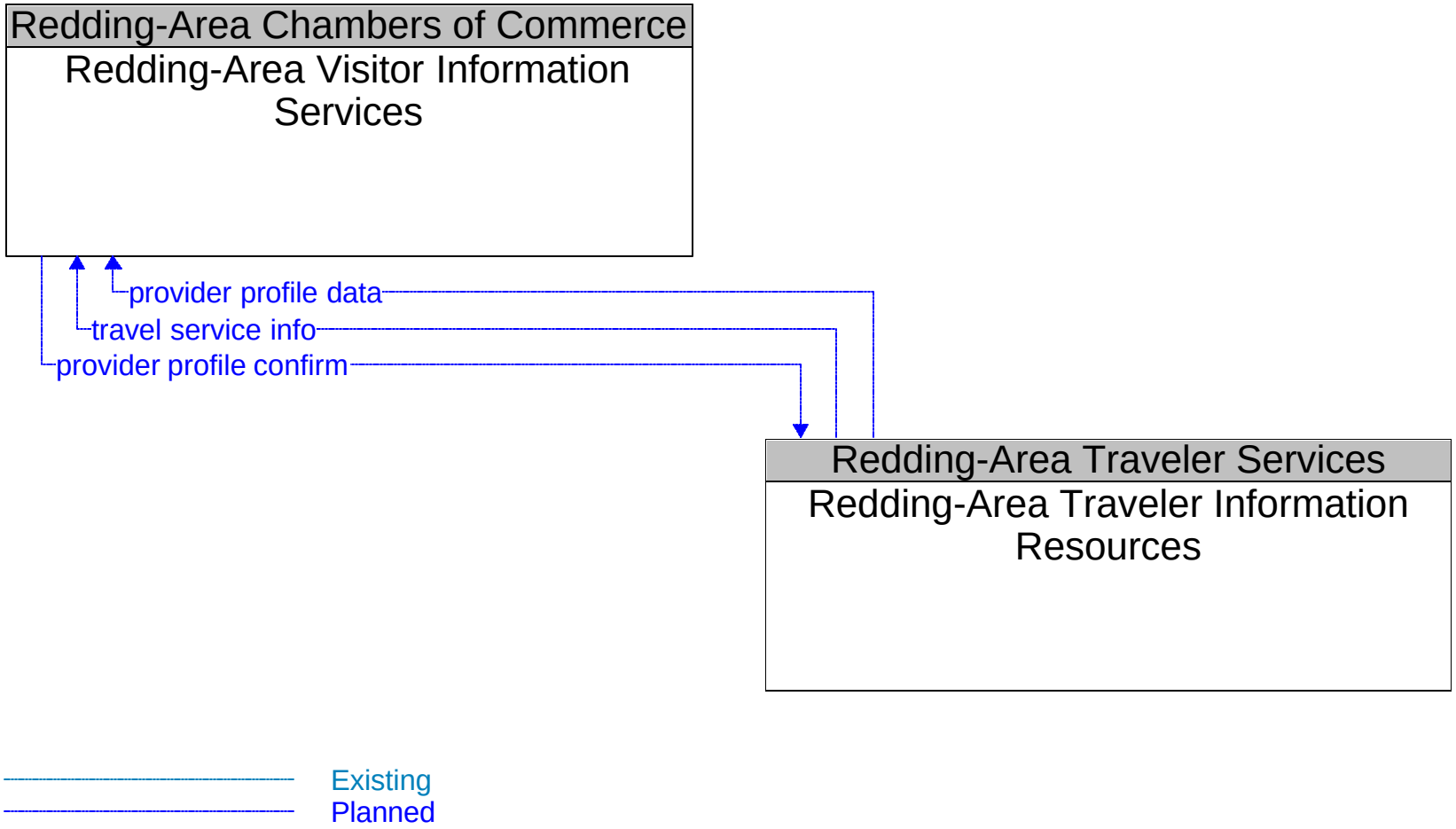

Figure D-108: Regional Diagram for Redding-Area Traveler Information Resources.

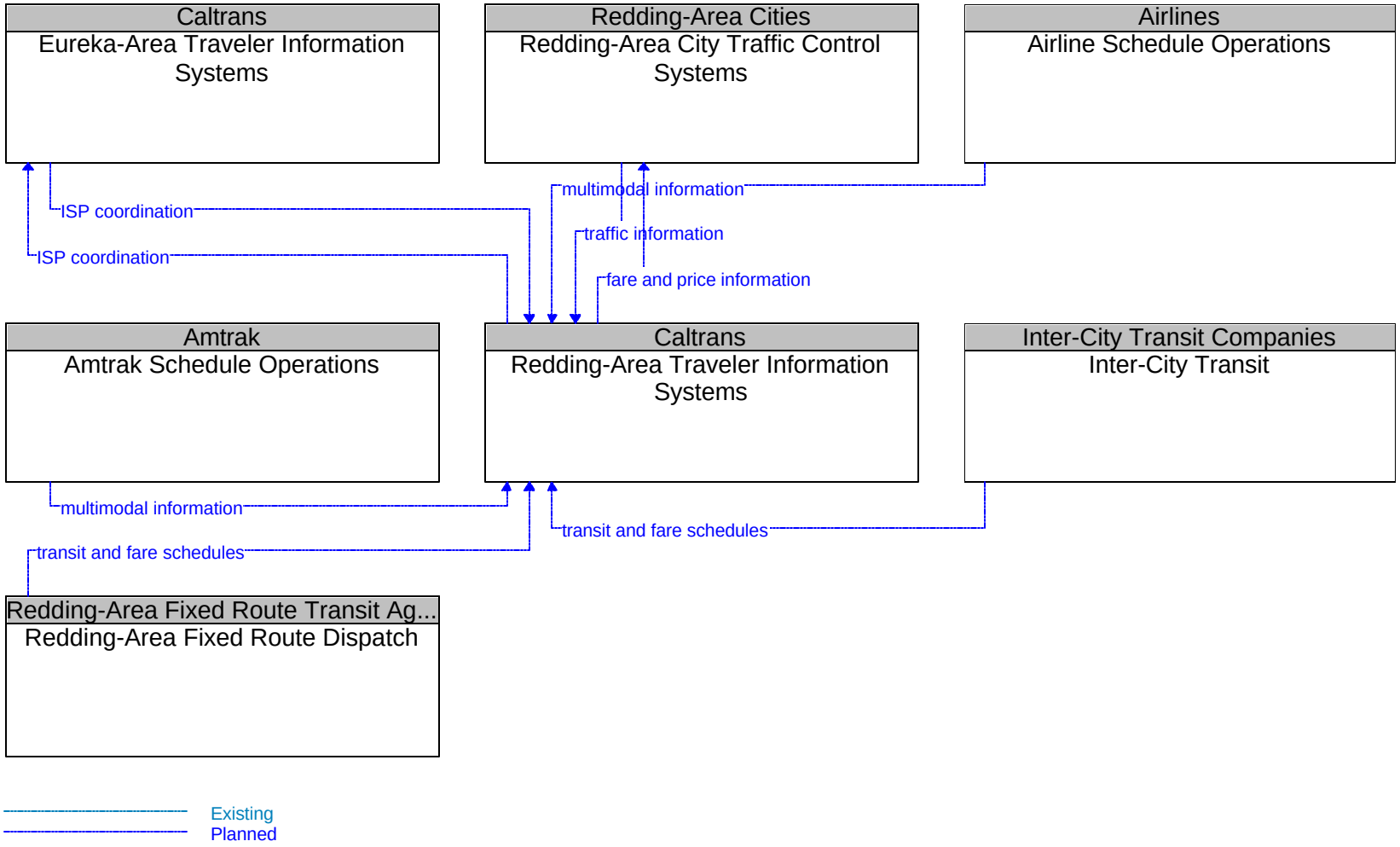

Figure D-109: Regional Diagram for Redding-Area Traveler Information Systems.

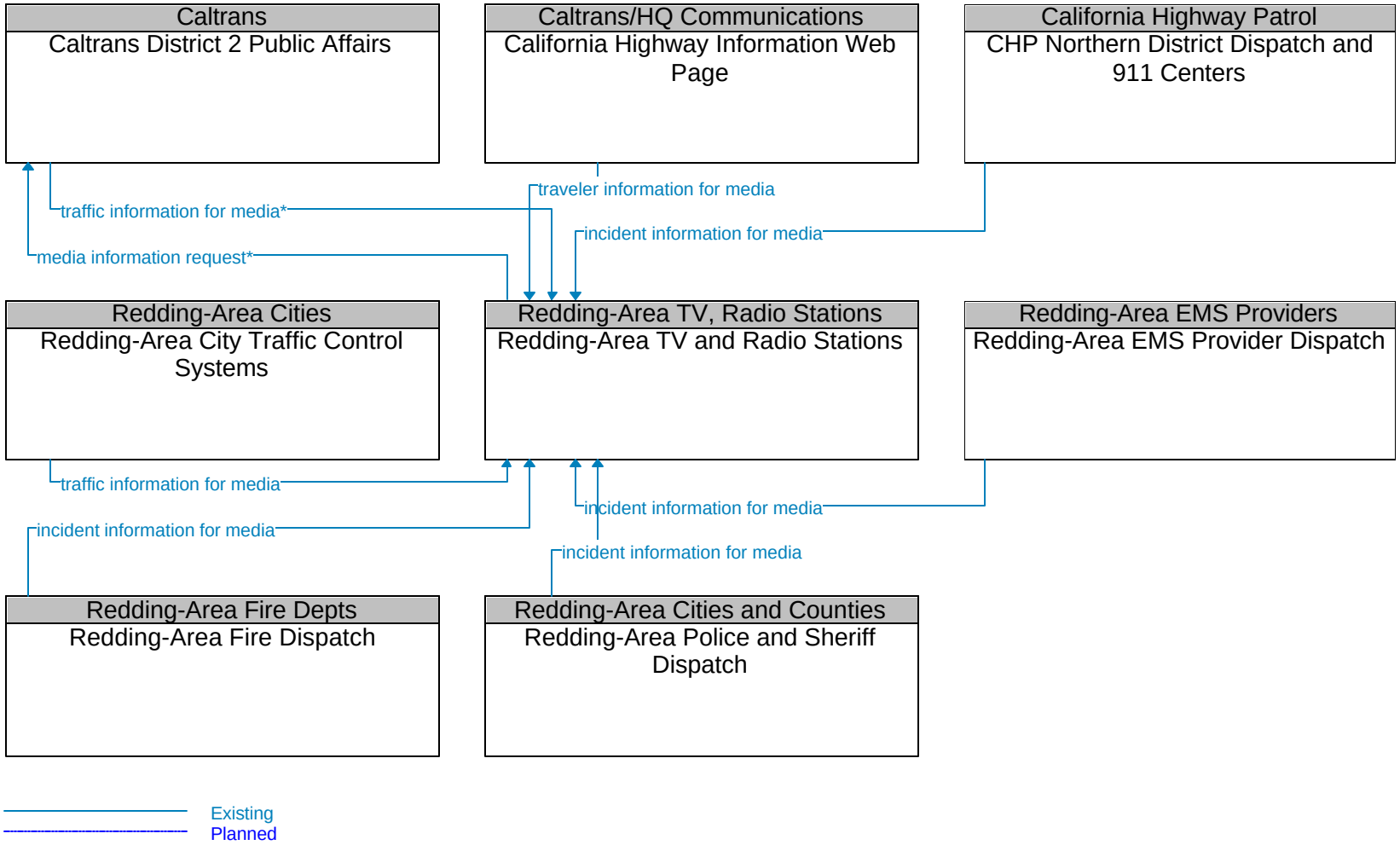

Figure D-110: Regional Diagram for Redding-Area TV and Radio Stations.

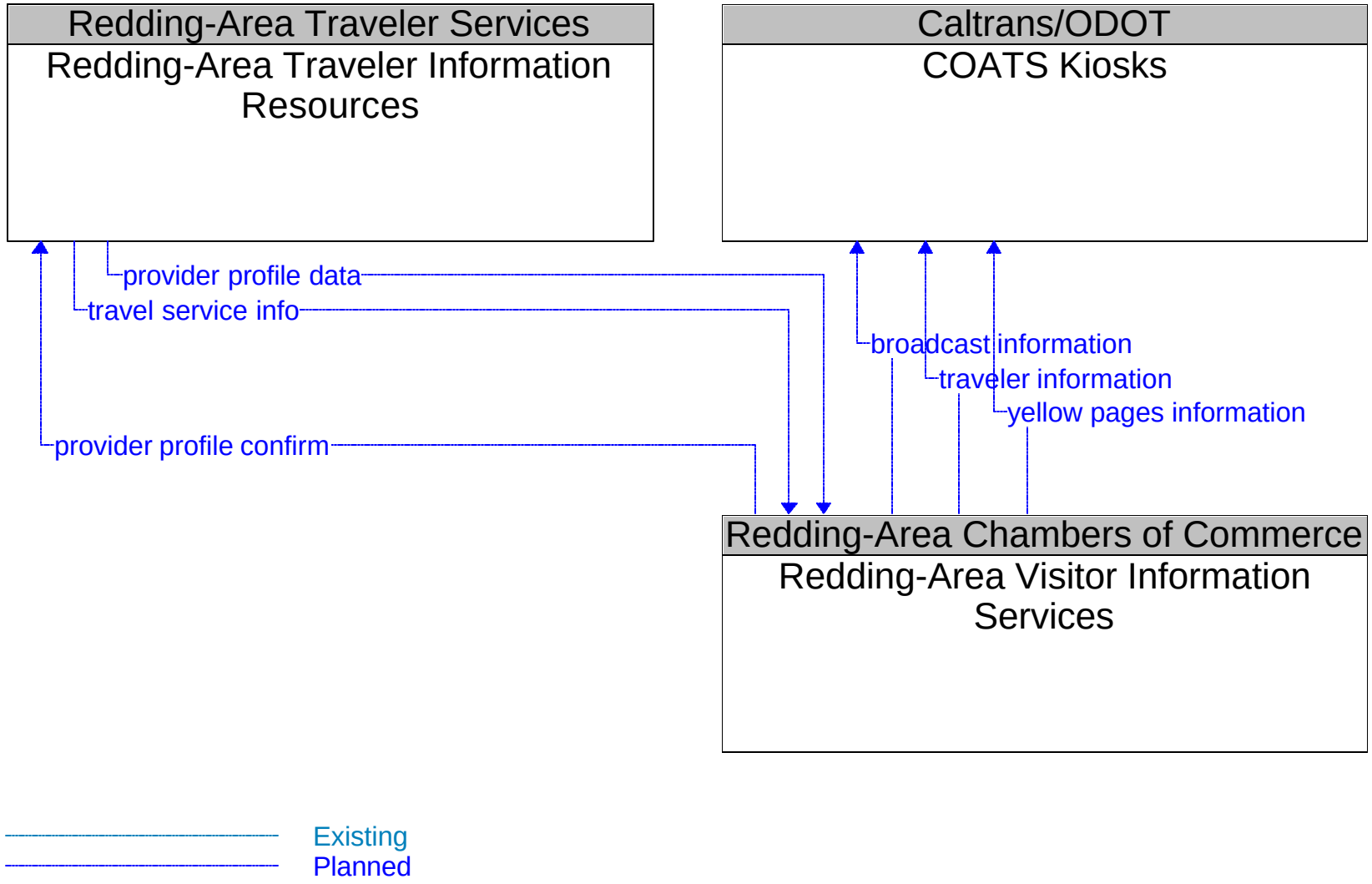

Figure D-111: Regional Diagram for Redding-Area Visitor Information Services.

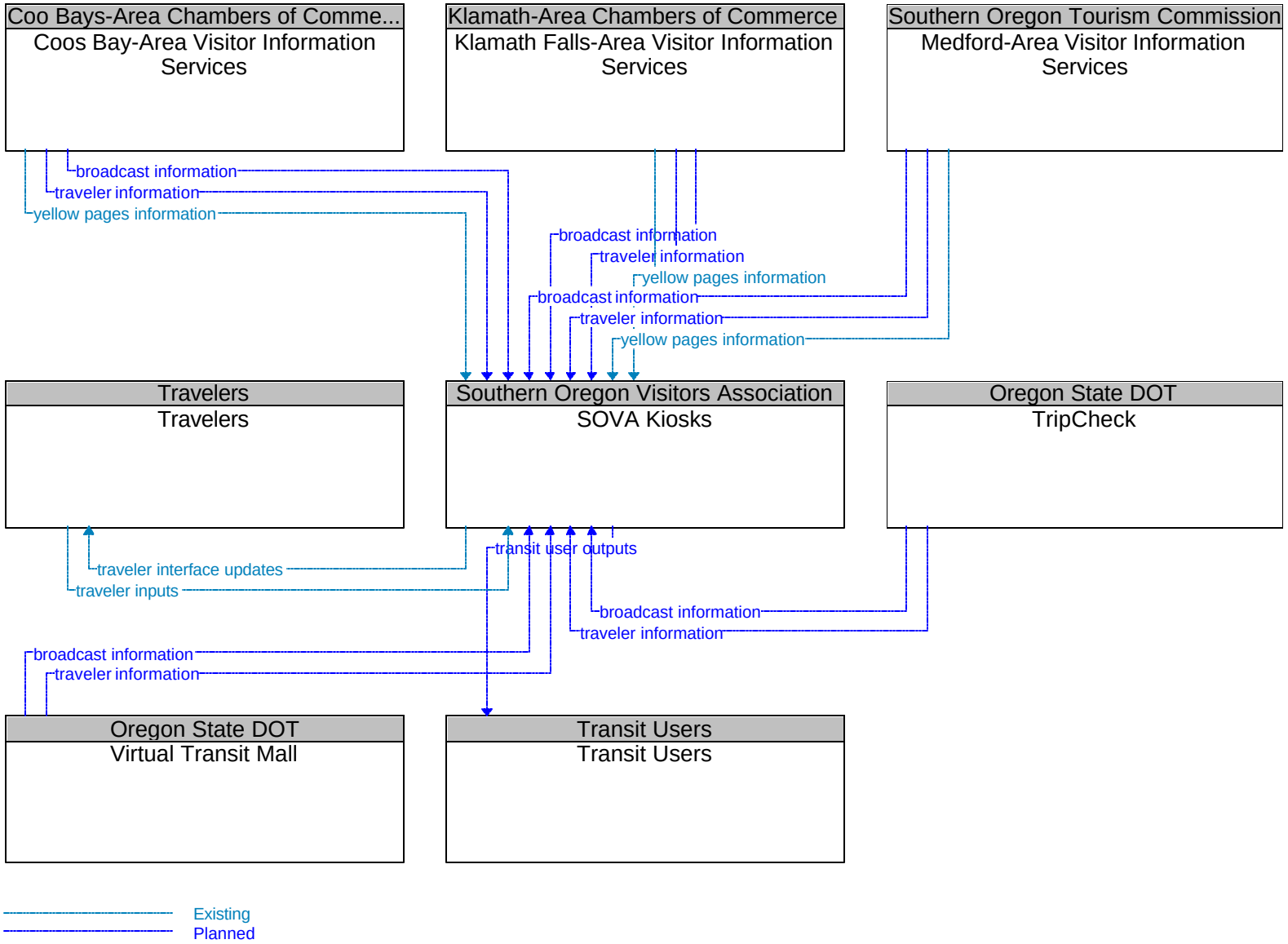

Figure D-112: Regional Diagram for SOVA Kiosks.

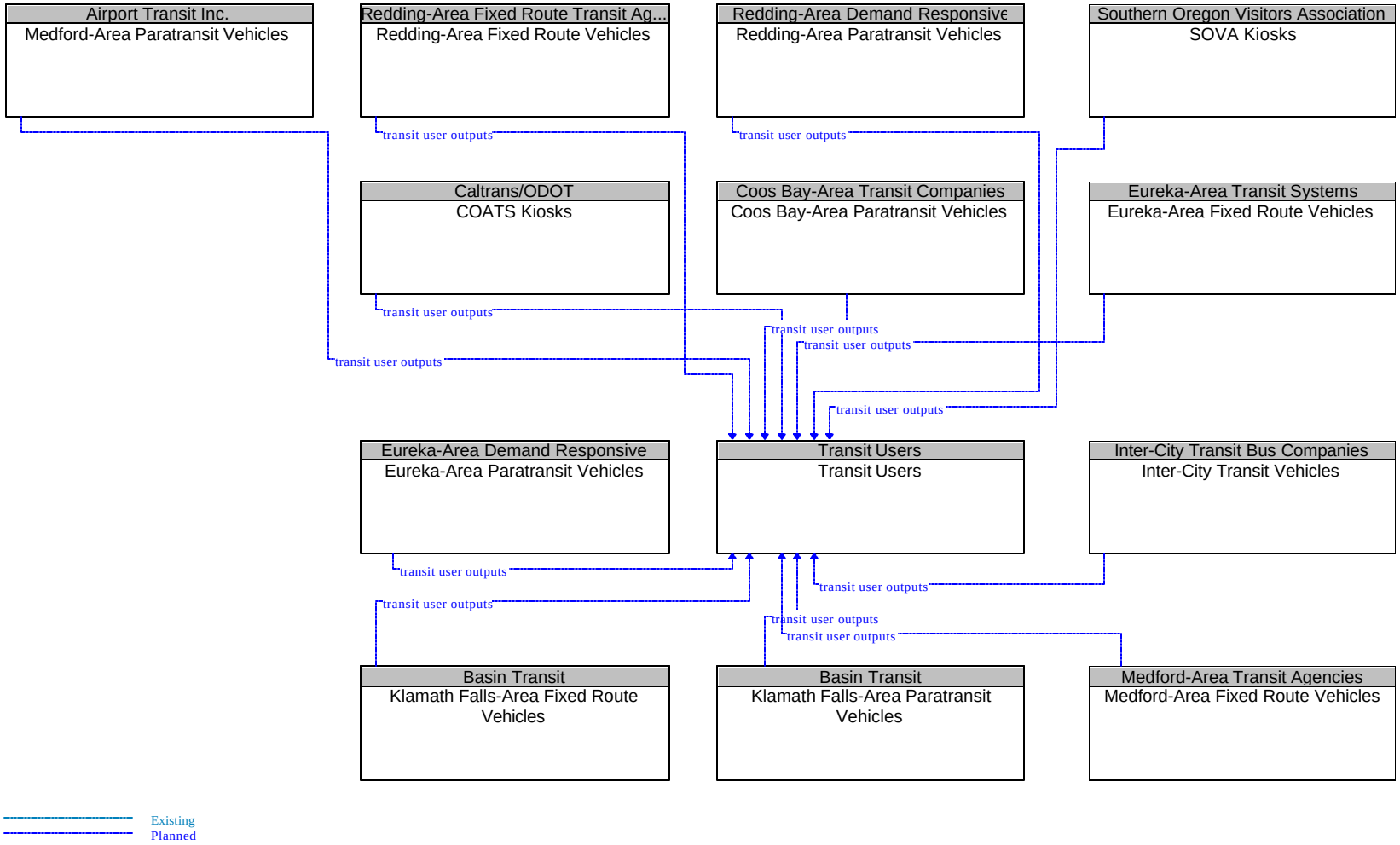

Figure D-113: Regional Diagram for Transit Users.

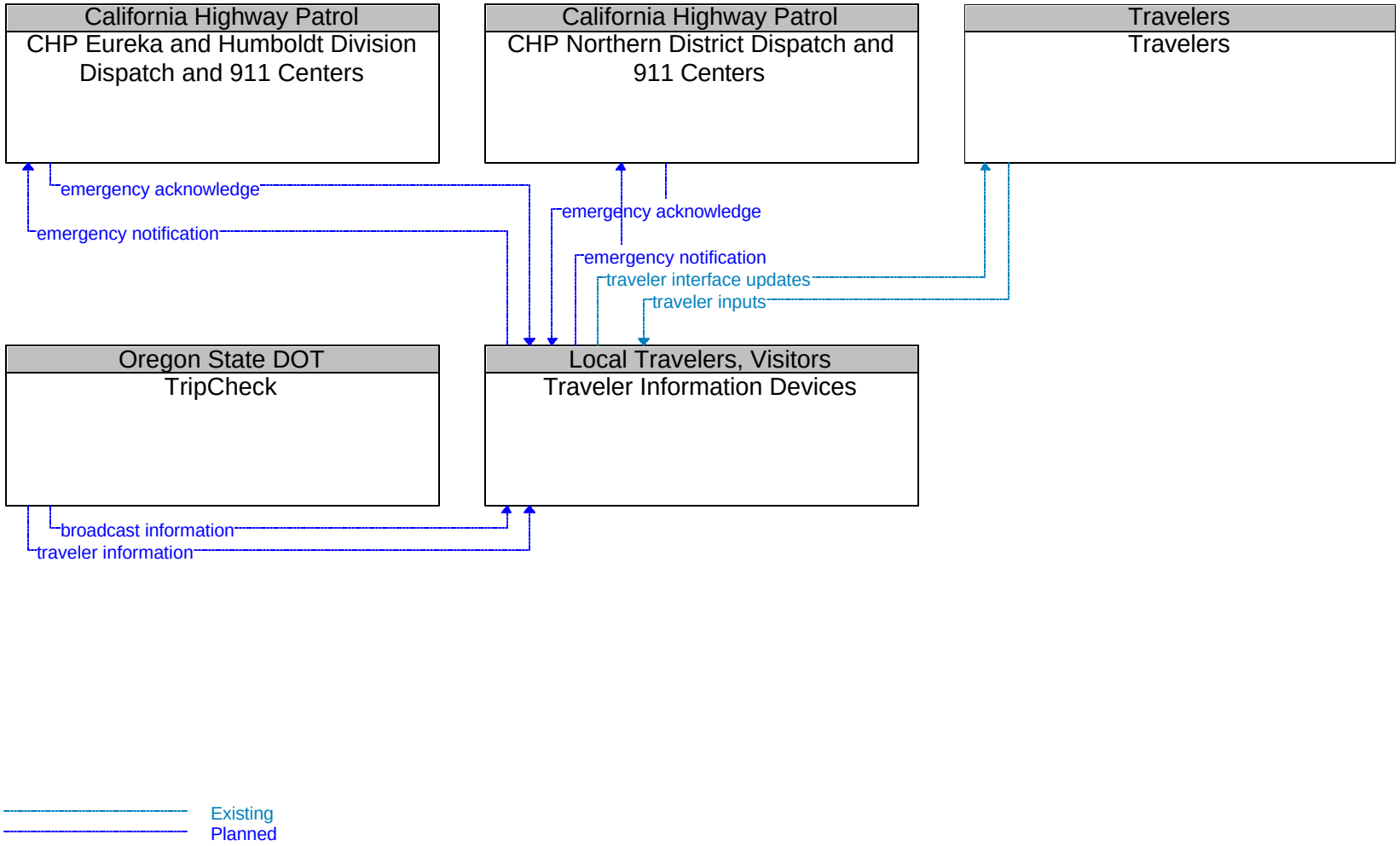

Figure D-114: Regional Diagram for Traveler Information Devices.

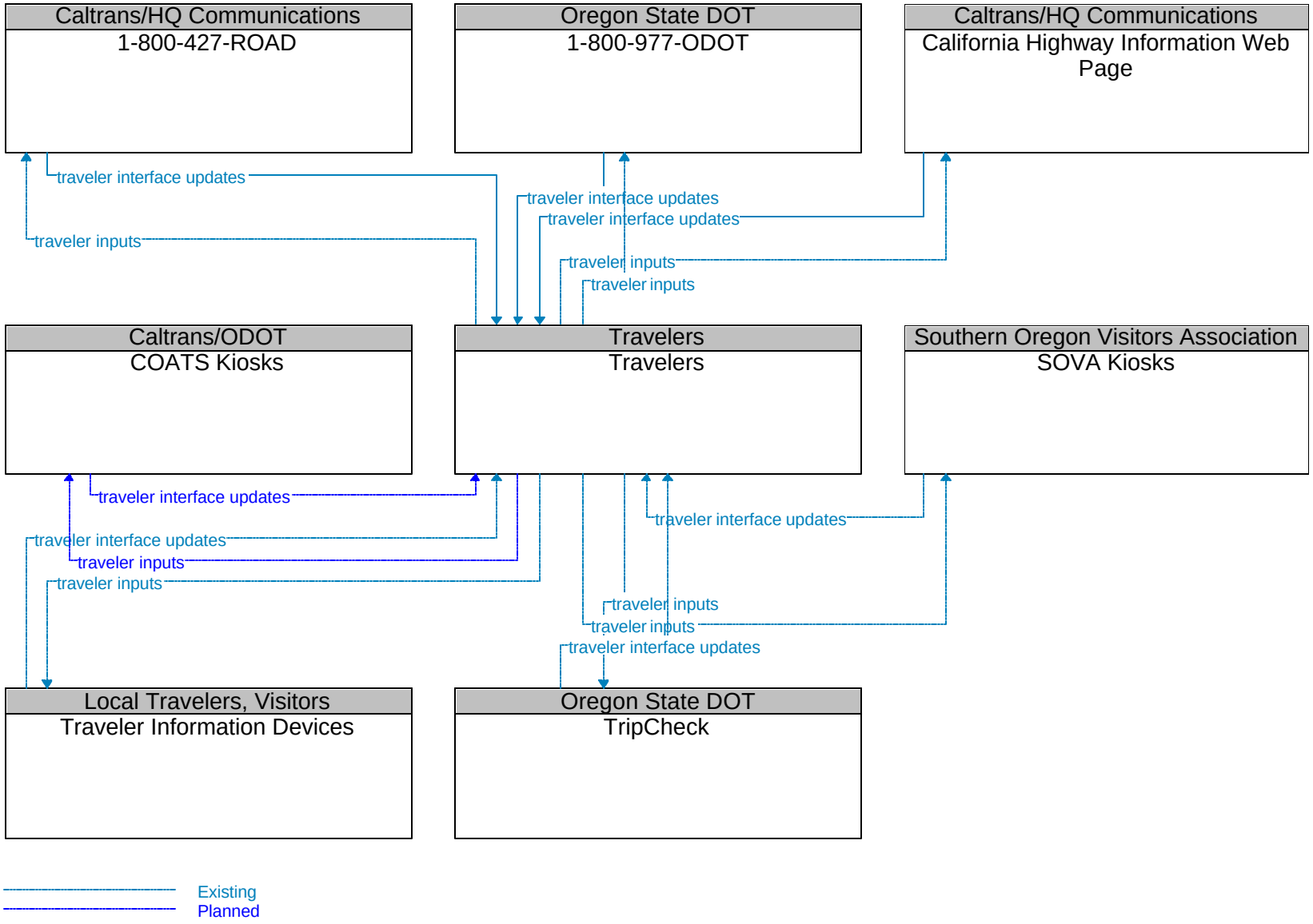

Figure D-115: Regional Diagram for Travelers.

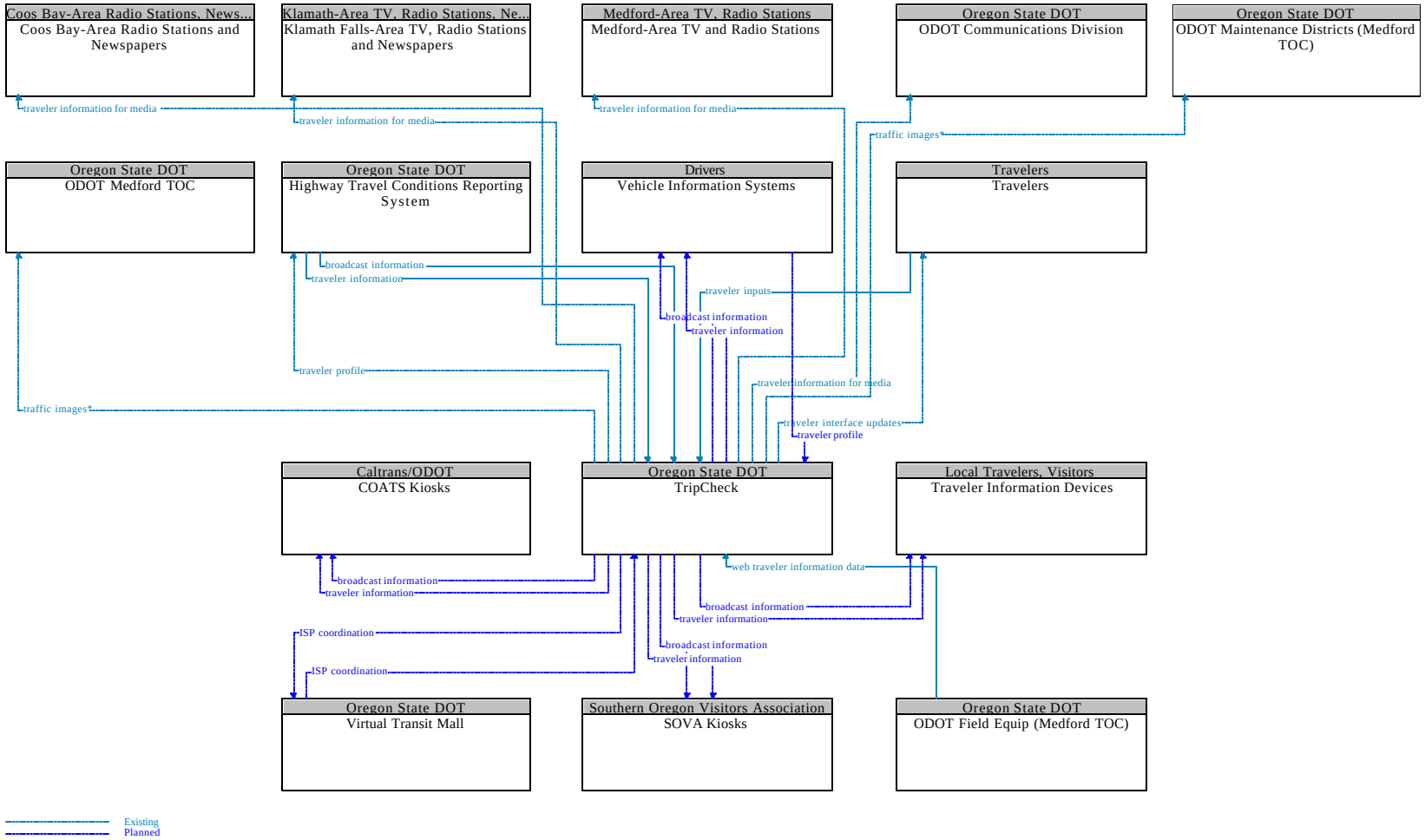

Figure D-116: Regional Diagram for TripCheck.

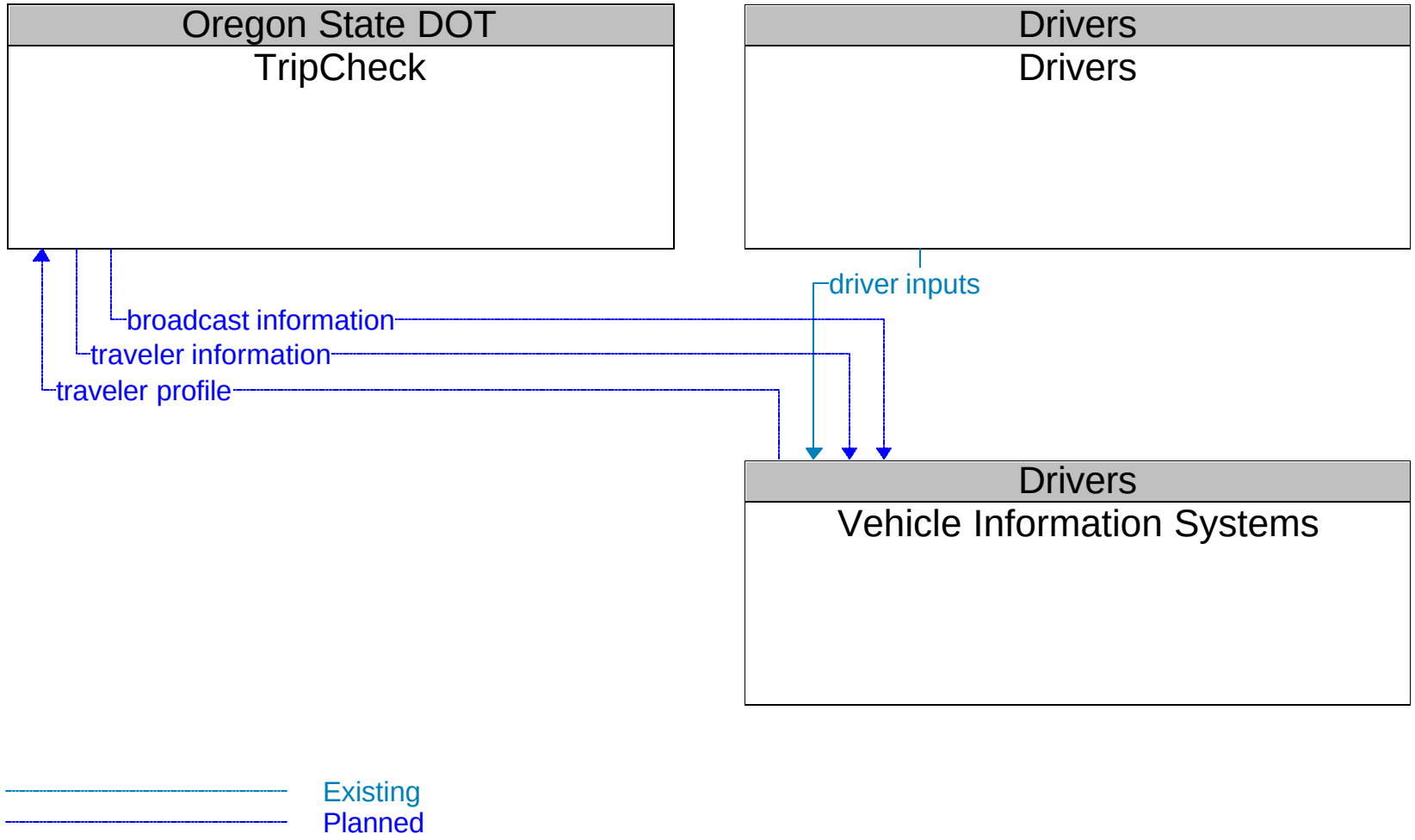

Figure D-117: Regional Diagram for Vehicle Information Systems.

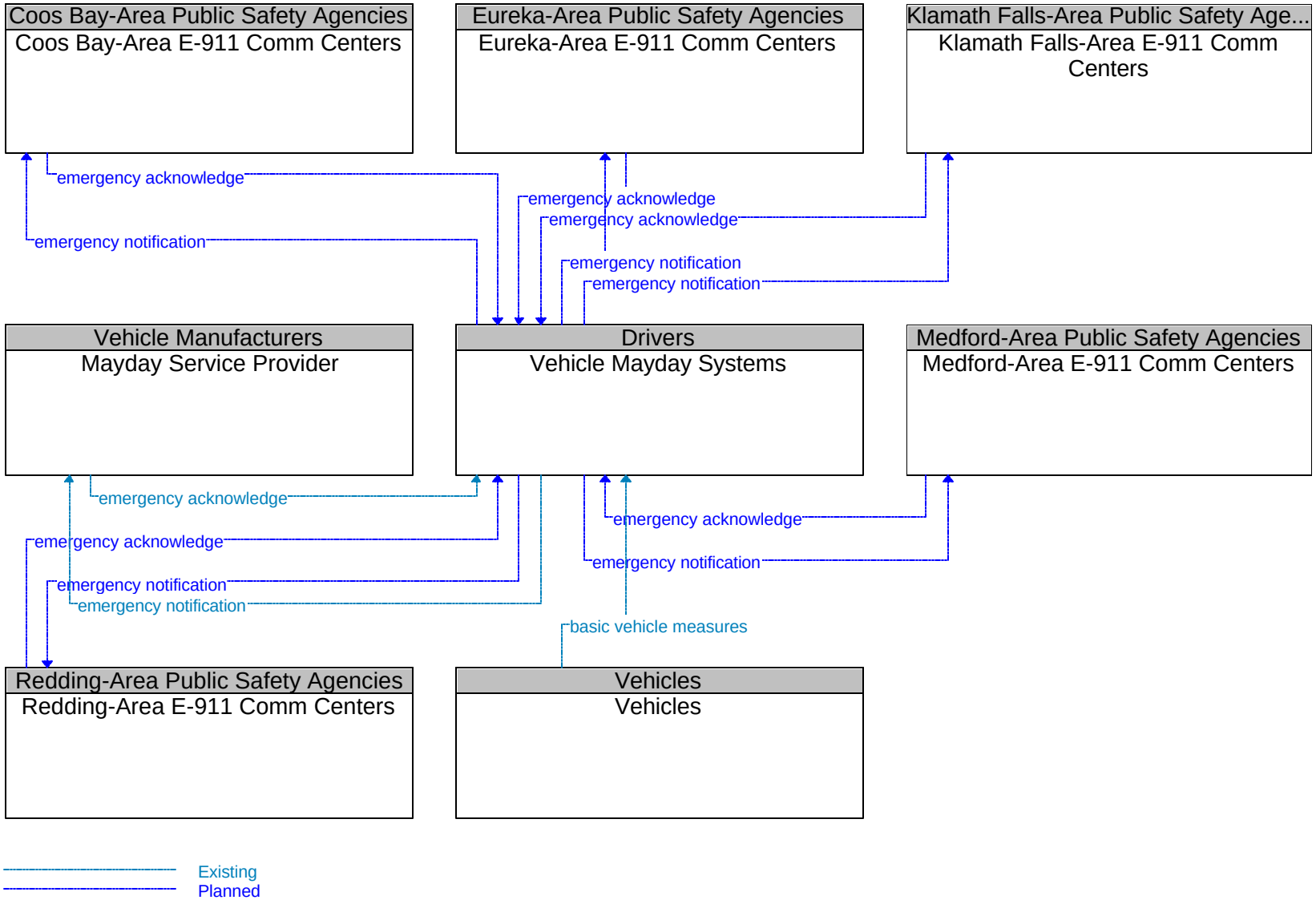

Figure D-118: Regional Diagram for Vehicle Mayday Systems.

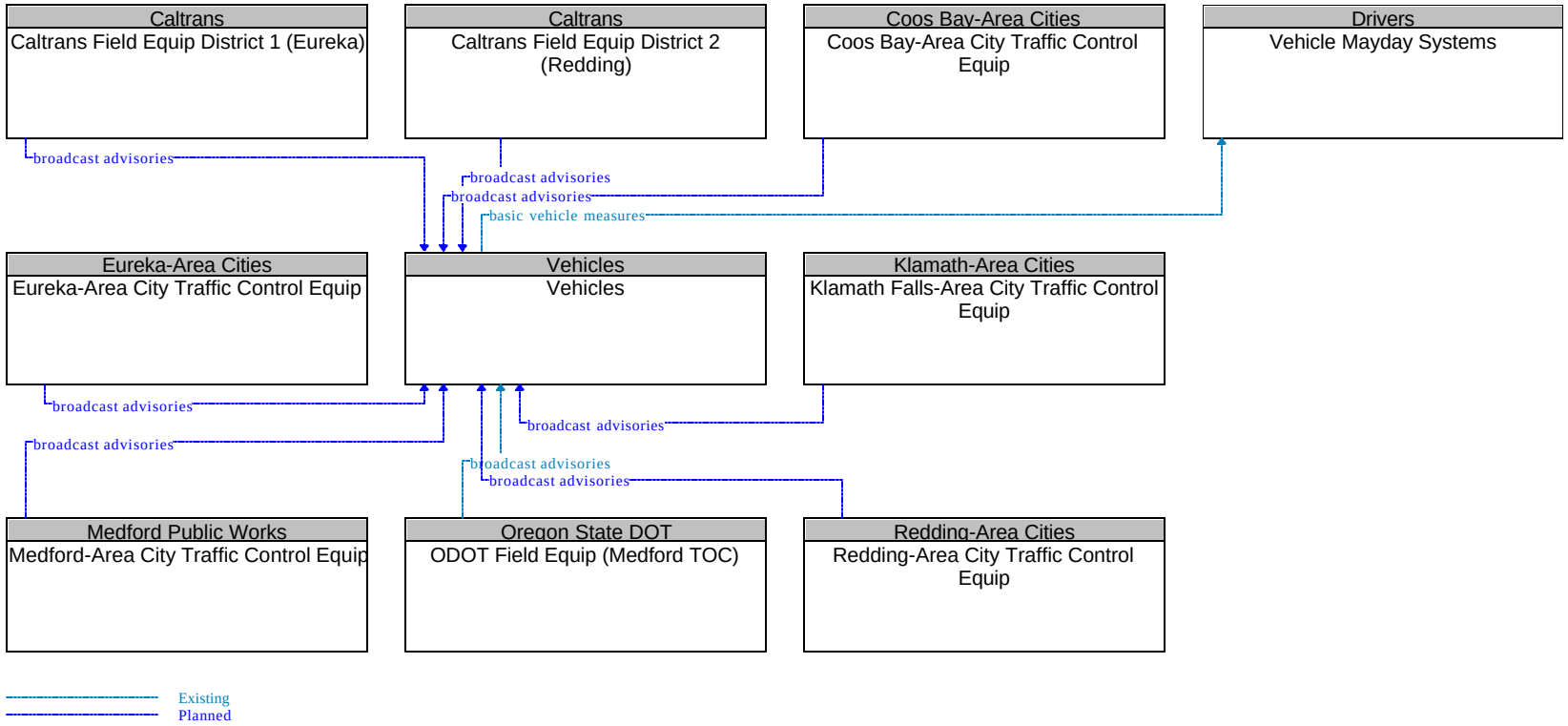

Figure D-119: Regional Diagram for Vehicles.

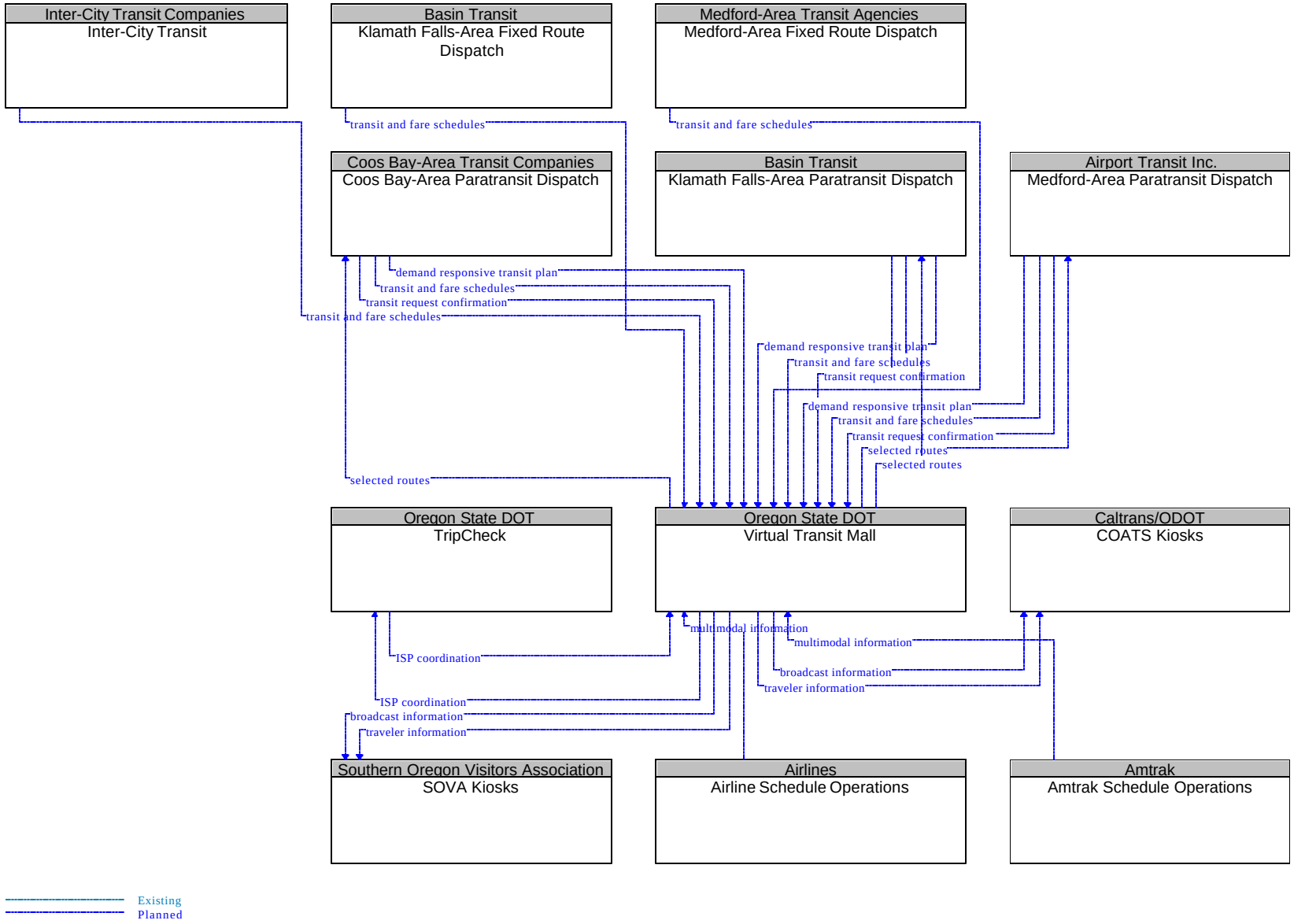

Figure D-120: Regional Diagram for Virtual Transit Mall.