MARICOPA ASSOCIATION of GOVERNMENTS

MAG Regional ITS Architecture

Regional ITS Architecture

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1. INTRODUCTION

The purpose of this project is to update the Intelligent Transportation Systems (ITS) Architecture for the Maricopa Association of Governments (MAG) Region. A Regional ITS Architecture (RIA) is a useful tool for planning and implementing ITS within the MAG Region. From a planning perspective, the regional ITS architecture defines the ITS that the stakeholders wish to realize over a given timeframe. The ITS architecture properly and efficiently defines projects so that they build upon one another to be able to achieve the goals and objectives of the Region. The MAG Regional ITS Architecture can identify opportunities for making ITS investments in a more cost-effective fashion, by utilizing inter-agency cooperation during planning, implementation, and operation of these ITS projects.

MAG developed a RIA as part of an ITS Strategic Plan in 2001 which summarized the existing and planned ITS infrastructure as well as the ITS "roadmap" that intended to guide ITS projects and programs in the MAG region for the next 20 years. Since the completion of that project, the amount of ITS infrastructure and level of communications in the MAG Region has increased significantly, as has the integration among agency systems. Furthermore, the National ITS Architecture has been updated to include new services (including expanded emergency management, traffic management and maintenance and construction operations focused services) which need to be reviewed for applicability to the MAG Region. The Federal Highway Administration (FHWA) Final Rule 23 CFR 940 (Rule 940) was adopted which requires that ITS projects, for highways/streets as well as transit, conform to the Rule 940 to be able to receive federal funding.

Along with the ITS infrastructure and communications developing in the Region, the transportation system as a whole has seen significant growth, including an expanded freeway network, additional arterials, and transit services expanding to meet the demands of the Region's growing population and geographic expansion of the metropolitan area. Section 2 of this technical memorandum describes the multimodal transportation network in the MAG Region. MAG is taking this opportunity to capture the expanded deployment and integration of ITS in the Region, and provide a valuable tool for continued project deployment and integration among the MAG member agencies.

The ITS Architecture is intended to serve as a planning tool that is technology-neutral, explains the use of the system from the perspective of various stakeholders, and helps to set goals and expectations for ITS projects. MAG's vision for this RIA update is to go beyond identifying functionality within the ITS architecture, but to also link the RIA to existing and planned systems and ITS infrastructure in the Region. In doing so, the architecture will become a much more tangible and valuable tool for stakeholders as they develop projects, and establish their project requirements through Systems Engineering processes. By linking the RIA more closely to ITS infrastructure (and status of ITS infrastructure), it will provide for a more complete picture of deployment and integration within the MAG Region.

1.1 Overview of Tasks

Key tasks of this project for developing the MAG Regional ITS Architecture include:

Task 1 – Project Management/Communications

- Provide project updates to the MAG Project Manager and MAG ITS Committee
- *Deliverables: Project status updates to MAG ITS Committee*

Task 2 – Region Definition and Inventory

- Identify stakeholders, existing systems and infrastructure, and planned projects

- Establish operational framework in the region
- Develop a glossary to define terms within the Regional ITS Architecture

- *Deliverable: Technical Memorandum #1 – Region Definition and Inventory*

Task 3 – Develop Logical Architecture

- Establish user needs and user requirements
- Develop logical architecture for the MAG Region

- *Deliverable: Technical Memorandum #2 – Logical Architecture*

Task 4 – Develop Physical Architecture

- Develop physical architecture for the MAG Region and provide traceability between the logical and physical architecture
- Customize functional elements within the architecture, including market packages and equipment packages, to reflect local functionality desired by stakeholders
- Provide a link between local agency ITS infrastructure and the ITS architectures
- Conduct an ITS Architecture Review Workshop with stakeholders in the Region

- *Deliverable: Technical Memorandum #3 – Physical Architecture*

Task 5 – Organization of the Regional ITS Architecture

- Develop functional requirements and ITS standards for ITS services provided in the Region
- Provide MAG and its members with a Regional ITS Architecture that complies with the Rule 940 requirements
  - *Deliverable: Final MAG Regional ITS Architecture Report*

1.2 Input to the Architecture Development

For the MAG RIA, stakeholders from state, regional, county, city and transit operations agencies were involved in the architecture development and review. In order to accurately capture the breadth of deployment and integration in the Region since the last ITS Architecture was developed, the consultant team obtained input directly from MAG member agencies through an inventory survey as well as follow-up discussions with some stakeholders for more specific information. The consultant team provided periodic updates to the MAG ITS Committee and made all project deliverables available via a project web site and e-mail. A stakeholder workshop in November 2008 served as a comment discussion/resolution forum with the ITS architecture development team and key stakeholders so that physical architecture elements and connectivity could be discussed among participating agencies.

In order to capture key functional priorities and needs to support the RIA development, the team used the ITS plans that have been developed by various agencies in the Region over the last several years. Many of these plans identify priority functions and services, connectivity needs, strategic priorities that ITS can help to address, as well as map out deployment and integration scenarios. Goals and priorities were extracted from these plans and incorporated into the RIA development process. These plans and projects reviewed by the team are included in Section 3 of this document.

Another important input to the RIA development is the MAG Regional Transportation Plan (RTP), which is a comprehensive multi-modal plan to prioritize transportation system enhancements and guide investment in the Region's transportation network through FY 2028 (the July 2007 Update expanded the RTP to FY2028 to maintain a 20-year planning horizon for the

Regional Transportation Plan). The RTP covers freeway, arterial and public transportation systems, and lays out a detailed sequence of projects that will expand the current transportation networks as well as provide for the needed enhancements to existing transportation facilities throughout the Region. Also included in the RTP is a chapter on Systems Operations and Management, which identifies ITS as a critical component in member agencies being able to effectively monitor, manage and operate transportation networks (freeway, arterial and transit) to promote safe and efficient travel throughout the Region.

In addition to those ITS projects that are included in the TIP, important regional initiatives, including the Regional Community Network (RCN) and Center-to-Center (C2C) System, are also reflected in the architecture concepts.

1.3 Methodology to Develop the MAG ITS Architecture

Figure 1 shows the process of developing the architecture and the many inputs and review sessions that are required to establish a consensus-based regional ITS architecture. The process of developing the RIA for the MAG Region has a foundation in stakeholder involvement and information gathering. Stakeholder needs and regional focus areas were combined with local knowledge of existing systems to develop a comprehensive inventory of existing, programmed and future ITS infrastructure. The regional inventory is captured in the architecture databases.

Using this information, a logical ITS architecture was developed which defines what ITS systems and devices should do from the user's (public) perspective rather than the operations perspective. The logical architecture is represented in terms of user requirements and processes that would be required to implement those requirements.

The next step in the RIA development process was to develop the physical view of the ITS architecture. This is where stakeholders, subsystems, information and data flows, connectivity among subsystems and infrastructure were documented and diagrammed. The physical architecture defines how ITS systems and devices are currently being operated and which agencies are currently coordinating operations to provide those user services defined in the logical architecture. The physical architecture gives a detailed and comprehensive picture of what agencies are doing in the MAG Region with ITS, and uses Market Packages and Equipment Packages to illustrate functionality and connectivity. The National ITS Architecture version 6.0 is being used as the basis to develop the physical architecture for the MAG RIA. Elements within the MAG Region are being customized to reflect actual agency and system names, as well as to clearly identify the status of various elements and connectivity. This customization may also extend to expanding what is currently available within the National ITS Architecture to more accurately depict system operations and connectivity within the MAG Region.

Turbo Architecture is a software application used to develop a Regional ITS Architecture based on the National ITS Architecture, and it was used to build the MAG RIA Update. Turbo Architecture focuses on the physical view of the RIA and will store the information about stakeholders, the regional ITS inventory, services (market packages), requirements and allow the team to assign information/data flows among the entities and infrastructure within the architecture. This was the first time that the MAG RIA was developed using Turbo Architecture, and it provides for a solid foundation for future reviews and updates.

A stakeholder workshop held during the project was used to review developed material and provide feedback to more accurately depict each agency and the communications they have within the RIA.

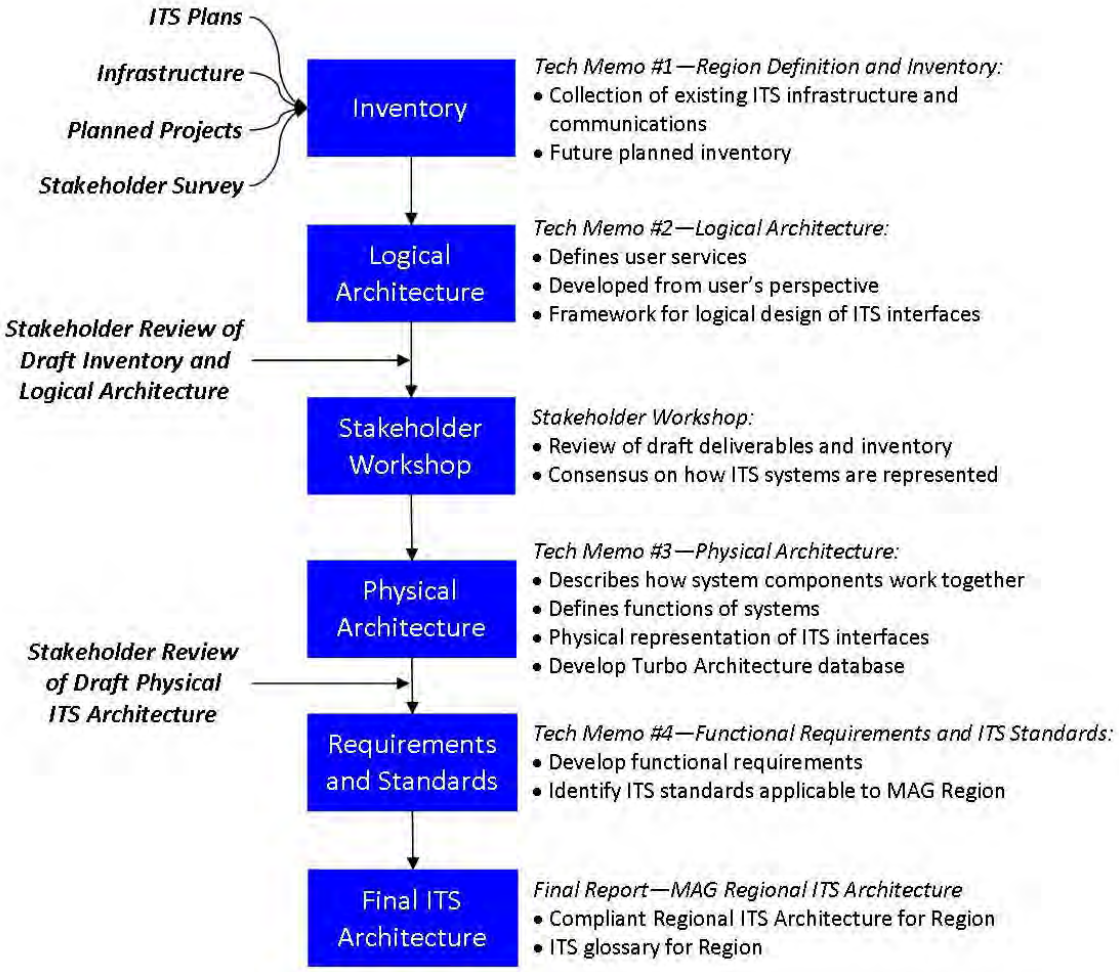


Figure 1 – ITS Architecture Development Process

The existing and planned ITS systems for each member agency in the MAG Region are comprised of devices, centers, and systems that help to manage the area's transportation network more efficiently. Each of these components of the agencies' ITS systems have been input into an ITS architecture database called Turbo Architecture Version 4.0. Turbo Architecture builds and documents information flows, usable standards for development, customized market packages, and definitions of devices, systems, stakeholders, and services. Turbo Architecture draws from the updated National ITS Architecture Version 6.0 by providing standards and guidance to developing user-defined information flows and communications for the specific region for which the architecture is being developed. This tool provides consistency with the National ITS Architecture in accordance with FHWA Rule 940.

An architecture website has been developed to show the inventory, interconnects, and customized market packages by stakeholder agency. The website is accessible at the address: www.consystec.com/mag/web/, and also through a link from the MAG ITS Committee web page. Stakeholders are able to view the customized market packages specific to their agency and comment directly to the architecture developers. Agencies can also see what other market packages have been identified for other agencies as well to illustrate regional ITS integration. This provides a beneficial tool in reviewing the complete ITS architecture that has been developed for this region.

An ITS glossary has also been defined for the MAG Region which includes key terms and descriptions applicable to this architecture. This glossary is provided in **Appendix G**.

1.4 Mapping to Rule 940 Requirements

A list of requirements for an ITS architecture to be compliant with the FHWA Final Rule/FTA Policy compared to the MAG RIA are provided in **Table 1**. This table shows that through the scope of work for this project, the end result is a compliant Regional ITS Architecture for the MAG Region. The table also identifies where specific components are located.

Table 1 – ITS Architecture Requirements

Rule 940 Requirement	Analysis to Address Requirement	Section within MAG RIA
Description of region, participating agencies, and other stakeholders.	Textual description in Final Report and Turbo Architecture database.	MAG RIA Website Technical Memorandum 1 RIA Final Report Section 2
Identification of participating agencies' roles and responsibilities.	Agency roles and responsibilities are defined within the tabular list on the web site as well as detailed in two sections of the RIA.	MAG RIA Website RIA Final Report Sections 2 and 5
An operational concept that identifies the roles and responsibilities of stakeholders in the implementation and operation the systems.	This discussion of the roles and responsibilities for transportation and ITS operations in the MAG Region.	Technical Memorandum 1 RIA Final Report Section 2 and 5
Agreements, procedures, and resources necessary for operations and maintenance of the system.	The listing of existing and planned agreements is included within the Final Report. Recommended agreements were developed based on interfaces identified in the RIA.	RIA Final Report Section 5
Functional requirements definitions for ITS system.	Functional requirements are based upon the equipment packages selected for each element in the inventory.	MAG RIA Website (Inventory-Equipment Packages) RIA Final Report Section 5 and RIA Appendix E
Interface requirements and information exchanges with planned and existing systems and subsystems.	The detailed description of stakeholder physical elements, at the level of subsystems and terminators, and information flows between these elements is held in Turbo Architecture. Customized market packages with specific agency and system names within the data flow diagrams are included in the Final Report.	MAG RIA Website RIA Final Report Section 5 and RIA Appendix D
Identification of applicable ITS standards supporting regional and national interoperability.	This identification is contained in the Turbo Architecture database and is included as an Appendix to the Final Report.	RIA Final Report Section 5 and RIA Appendix F
The sequence of projects required for implementation.	ITS projects currently in the MAG TIP (2009-2013) are included in the Final Report. Projects are mapped to market packages on the MAG RIA Website.	MAG RIA Website RIA Final Report Section 3
Develop and implement procedures and responsibilities for maintaining the architecture as needs evolve within the region.	Defines what elements of the architecture are maintained, who maintains it, and identifies a timeframe and process for updating and maintaining the architecture.	RIA Final Report Section 7

In addition to addressing the Rule 940 requirements, the MAG RIA also includes guidance for stakeholders in the region for how to use the RIA to support project identification and development, as well as systems engineering documentation for ITS projects. Section 6 describes how to use portions of the RIA to develop specific project concepts, identify required interfaces, identify where there needs to be coordination with other agencies, and how to use the high-level functional requirements to develop more detailed design requirements.

1.5 Updates Since the Previous Strategic Plan

The 2001 ITS Strategic Plan Update included an ITS Architecture that reflected the priorities of stakeholders at the time it was developed. Since the 2001 Strategic Plan Update, the ITS infrastructure deployed by agencies in the MAG Region has increased substantially. The previous Plan Update provided a "roadmap" that intended to guide ITS projects and programs in the MAG Region for the next 20 years, with a strong emphasis on infrastructure deployment for arterials, freeways and transit. Supporting activities, including recommended resources, training needs, and operational strategies, were also developed with a strong link back to the identified projects and priorities outlined in the ITS architecture by stakeholders.

In addition to the ITS architecture, a significant emphasis was put on developing an ITS Implementation Plan to outline ITS project recommendations through 2021, with a focus on the timeframe from 2002 – 2006, and 2007 – 2011. In many cases, functionality within the projects identified in the 2002-2011 scenarios have been implemented or are programmed as part of the current MAG TIP; in some cases, specific projects may have been modified from what was identified in the Strategic Plan, but key functionality desired by stakeholders was ultimately implemented or incorporated into other projects. Advances in the region with traveler information, freeway management system (FMS) expansion, transit/public transportation systems and technologies, arterial ITS instrumentation, special event management and public safety computer aided dispatch (CAD) and traffic management center (TMC) integration have addressed several of the 'near term' project types identified in the 2001 Strategic Plan Update.

There were, however, priorities that were identified that ultimately were not addressed. Some of these included:

- Personalized traveler information and route guidance;
- Electronic tolling and payment services;
- Maintenance vehicle tracking; and
- Fleet management.

Some of these concepts and priorities were dependent on private sector involvement and leadership to develop, implement and operate. The Region has had varying levels of private sector involvement, particularly with traveler information applications. As the business models have shifted for the private sector, their roles have evolved and changed. Others, such as tolling or parking management, posed additional constraints for implementation. Tolling would require legislative approval before any pricing projects could be implemented. In the case of parking or fleet management, necessary institutional agreements or cooperative deployments would be needed.

At the time the 2001 ITS Strategic Plan Update and ITS Architecture were developed, existing control and operations centers included the Arizona Department of Transportation Traffic Operations Center (ADOT TOC), the Maricopa County Department of Transportation (MCDOT) TMC, and TMCs in the Cities of Phoenix, Scottsdale, and Chandler. Today, there are traffic management centers in Glendale, Goodyear, Mesa, Gilbert, Surprise, Peoria and more are planned in additional cities. Transit operations and management has also undergone some significant system enhancements, and with the addition of light rail in the metropolitan area, there is an even stronger focus on coordinating multimodal systems.

Although implementing and enhancing traffic management and operations centers remains a priority, there is a strong focus today on how to utilize these centers and their systems to more effectively manage and operate the regional networks. Establishing systems to share data among

centers in real time, as well as utilizing systems and infrastructure for more effective real-time operations are priorities that continue to evolve in the Region.

The ITS Architecture developed with the 2001 plan was based on an earlier version of the National ITS Architecture. Since the Plan Update, FHWA has issued guidance on regional ITS architecture development as well as established the FHWA Rule 940/FTA Policy on architecture conformity and standards. In the 2001 Plan Update ITS architecture development process, there was a strong emphasis on market package prioritization and recommended timeframes for market package priorities. These priorities may have corresponded to maturity of technology, dependency on other ITS systems or programs, overall likelihood of implementation and ability of the market package to address a specific need.

The National ITS Architecture has also evolved to include new and expanded functionalityto respond to needs driven by trends and events at the national scale. In 2001 there were 63 market packages in the National ITS Architecture. With version 6.0 of the National ITS Architecture (current version), there are 91 market packages. Over the last several years, the National ITS Architecture has been expanded to include additional incident and emergency management functions, expanded transit functionality, expanded traveler information functionality, maintenance and construction operations, and vehicle infrastructure integration. Similarly, standards have also been updated to correspond to the current status of key standards development activities.

2. REGION DEFINITION

2.1 Overview of the MAG Region and Stakeholders

In 2004, Maricopa County contained approximately 60 percent of the population in Arizona, as well as eight of the nine cities in Arizona with populations greater than 100,000 people. A 2005 Special Census Survey indicated that in September of 2005, the population for Maricopa County exceeded 3,700,000 people. This represents an increase of 20.5% since 2000. For the past several decades, the MAG Region has been one of the fastest growing regions in the country. By 2030, the region is projected to nearly double in population.

MAG member agencies proactively plan for the growing population and its effects on the transportation network. In 1985, Proposition 300 implemented a half-cent sales tax in Maricopa County over 20 years specifically for transportation. That funding enabled the build-out of the freeway network within the Region, including the Loop System, State Route 51, and provided for expansion of the existing freeway corridors to better meet the needs of regional growth. A major funding source to be able to expand the current transportation network to respond to the growing population was the passing of Proposition 400 in 2004, which authorized the continuation of the half-cent sales tax for transportation in the region (Maricopa County Transportation Excise Tax). This action provided a 20-year extension of the half-cent sales tax through 2025 to implement projects and programs identified in the MAG RTP. Proposition 300 in 1985 was focused on expanding the Regional Freeway System, and revenues collected from the Proposition 400 half-cent sales tax extension are now allocated among freeway/highway, arterial street projects, and public transit programs and projects. These monies must be applied to projects and programs consistent with the MAG RTP.

There are plans to expand the current transportation network to be able to accommodate more travelers. The following summarizes the planned growth of the network:

- **MAG RTP –** The MAG Regional Transportation Plan is the comprehensive, performance based, multi-modal, and coordinated regional plan that addresses all major modes of transportation and key transportation related activities through fiscal year 2028. The RTP is funded through various federal, state, and local revenue streams, including the half-cent sales tax extension provided by Proposition 400. Regional funding is allocated in the RTP as follows: 57% identified for freeway/highway programs; 32% for transit; 9% for arterial street improvements; and 2% for other programs (including safety planning, non-motorized transportation projects, and other regional programs)
- **Freeway/Highway System –** The freeway/highway system is a focus of transportation planning and implementation in the MAG Region. The RTP calls for new freeway/highway corridors, added travel lanes on existing facilities (including HOV and general purpose lanes), new interchanges with arterial streets on existing freeways, and direct connections between HOV lanes at freeway-to-freeway interchanges. A total of 615 centerline miles are in the freeway/highway network in the MAG Region and an additional 98 miles are planned for future development as identified in the current RTP.
- **Arterial Street System –** The current arterial street system consists primarily of roadways on a one-mile grid system which provides a high level of accessibility and mobility to the regional freeway system serving multi-modal transportation facilities. Expansion of the arterial network in the Region includes widening existing arterials, construction of new arterials following the one-mile grid pattern, arterial capacity improvements through intersection redesign, and closing gaps in the arterial network in

both developed and developing areas. The current RTP identifies $9.8 billion in arterial projects and enhancements.

- **Public Transportation System –** Fixed route bus service in the MAG Region represents an increasingly important component of the regional transportation network. New routes will be added to the existing transit system, METRO Light Rail opened in December 2008 and expansion plans will be the next phase of the project, and bus services including vanpool, ride share, and dial-a-ride services also will be expanded.
- **Intelligent Transportation Systems –** Over the last decade, ADOT, MAG, MCDOT, cities, and transit have been actively investing and deploying systems and infrastructure which have significantly enhanced the capability of agencies in the Region to operate and manage the transportation network. The RTP allocates funding to assist in the implementation of projects identified in the regional ITS Plan. The MAG Region is a relatively robust area in terms of ITS deployment and integration. There has been a concerted effort to direct funding and resources toward instrumenting urban freeway corridors as well as major arterials with detection, closed-circuit television (CCTV) camera monitoring, traveler information capabilities, as well as transit technology enhancements. Furthermore, centralized hubs for traffic management and operations coordination (such as traffic operations and management centers) greatly enhance transportation agencies' ability to control and manage traffic. MAG has helped to guide these efforts through collaborative development of the ITS Strategic Plan, Regional Concept of Transportation Operations, and now with the Regional ITS Architecture update and the future ITS Strategic Plan update.

Considering the planned expansion of the transportation network, it is the responsibility of MAG member agencies to be able to monitor and manage the network that is expanding in their jurisdiction to provide the public with safe and efficient travel. The two primary components of planning for this expansion are 1) document existing conditions and 2) plan for future deployment and interactions necessary to respond to changing conditions. Developing this ITS Architecture for the MAG Region will address the first component of planning for this growth in the MAG Region in regards to ITS development. The ITS Architecture identifies what is currently available on the transportation network to monitor and manage traffic as well as the coordination between agencies that facilitates faster incident management and real-time traffic management. The ITS Strategic Plan developed as a separate project will address the second component which will guide the future planning of ITS in the Region to be able to respond to the changing conditions of the roadways.

This section will discuss the stakeholder agencies in the MAG Region that have either directly or indirectly provided input to this project, the coordination teams established to facilitate communication between agencies on a regional level, and the operational roles and responsibilities of the MAG member agencies. **Figure 2** shows the various stakeholder agencies and their jurisdictions in the MAG Region.

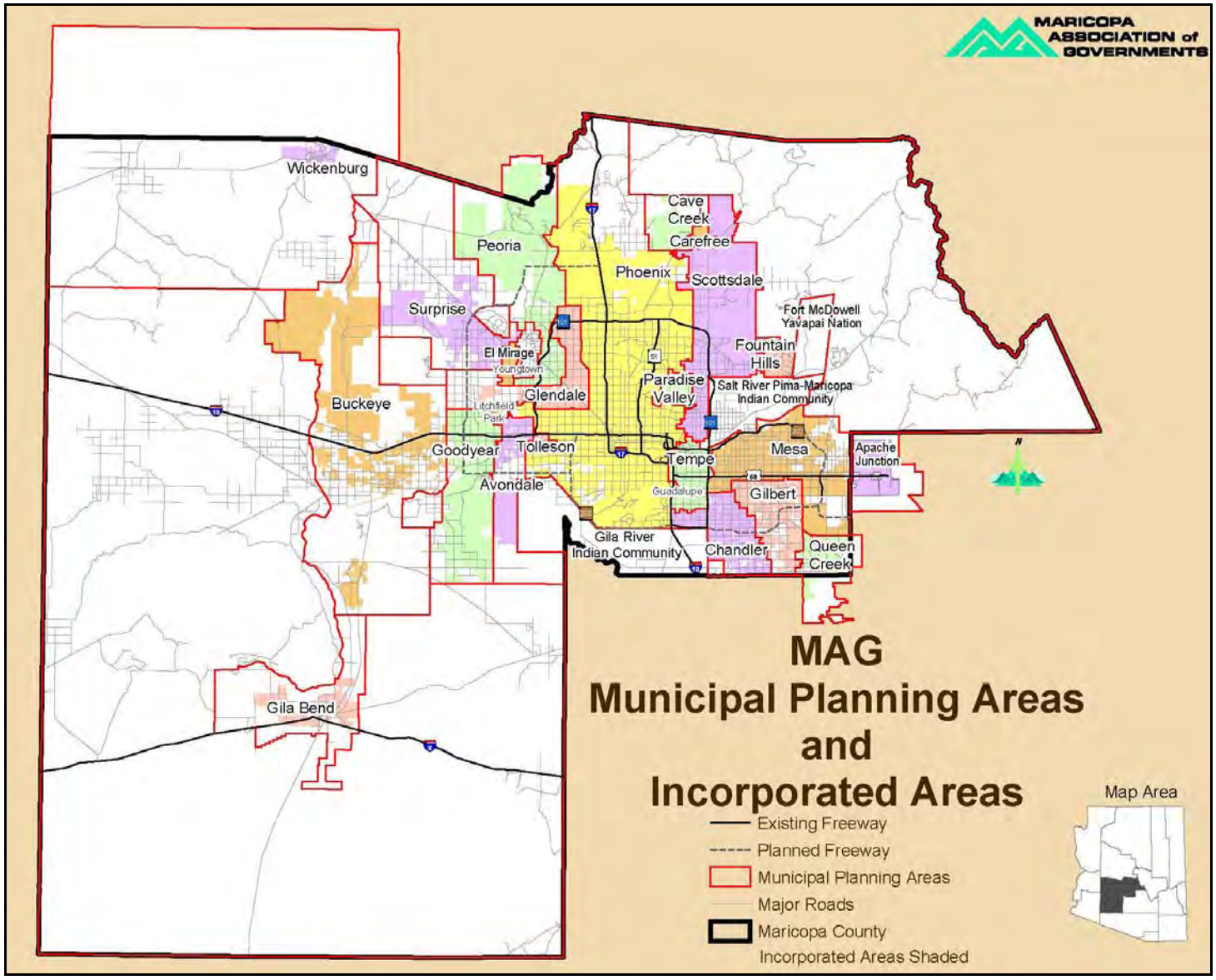


Figure 2 – MAG Member Agency Jurisdictions Map

2.1.1 Current Regional Operations

This section provides an overview of the various transportation networks and modes within the Region, as well as summarizes some of the agency stakeholders that have an active role in managing and operating transportation systems within those networks.

Regional Freeway Network

ADOT operates and maintains the regional freeway network. Freeway construction and enhancements throughout the Region have been accelerated in order to meet the demands of the Region's growing population, and was funded through revenues generated from the Proposition 300 sales tax. Widening of existing freeways, including I-10 in the West Valley, Loop 101 from Chandler to Scottsdale, and I-17 in north Phoenix are helping to increase capacity on these vital corridors. High-occupancy vehicle lanes are being extended on SR-51 and I-17, and HOV lanes are being built with the I-10 widening in the West Valley and Loop 202 in the East Valley. The RTP identifies HOV lane construction on additional segments of Loop 101, 202 and US 60 as part of future projects.

ADOT operates an FMS on approximately 130 miles of the Phoenix metropolitan area freeway system that travels through many local jurisdictions. Primary components of the FMS include vehicle detectors, CCTV surveillance, dynamic message signs (DMS) for traveler information, and ramp meters. Fiber telecommunications provides the communications and control infrastructure for ADOT staff to monitor and implement management and control strategies from the ADOT TOC, which is staffed 24/7/365. Another 37 miles of FMS is in design and will be constructed in the near-term, and the RTP identifies funding needs for FMS through FY2025. For many local jurisdictions, the ADOT FMS ITS devices and fiber communications are important for their local operations whether it be viewing ADOT's cameras or utilizing ADOT fiber/conduit space to communicate with another department or agency. Ramp metering capability is provided at many on-ramps to the freeway network and is a time-based operated system. ADOT utilizes data from system detectors to monitor freeway speeds, and this data is also used to calculate travel times for DMS posting and to support other traveler information programs. ADOT has recently begun providing travel times on DMS on a limited number of signs during the weekday AM and PM commute periods.

The Arizona Department of Public Safety (DPS) is responsible for incident management on freeways and highways throughout the state. In the metro area, two key services provide for enhanced incident management, response and clearance: ADOT's Arizona Local Emergency Response Teams (ALERT) are dispatched from ADOT's TOC to respond to freeway incidents to support traffic control and detours; and the Freeway Service Patrol (operated by DPS) provides assistance to motorists on freeways who require support or help with stalled vehicles, minor collisions or other impact.

Arterial Street Network and Operations

The metropolitan area is characterized by a network of four-lane (or more) arterials on a one-mile grid system, supplemented with local and collector streets. Travelers in the Region are very dependent on the Region's arterial roadway system, and it is estimated that the Region's arterial network carries over half of the total vehicle-miles traveled in the Region (MAG Regional Transportation Plan 2007 Update, page 9-1). The Region has several key east-west and north-south arterial corridors that traverse multiple jurisdictions, and these cross-jurisdictional arterial corridors can include two, three or even four different traffic

signal systems operated by different cities in the Region, and in some cases include two or more interchanges with freeways.

Local agencies recognize that improved traffic signal operations are a significant factor in overall regional mobility. Each jurisdiction in the Region operates independent traffic signal systems, which pose several challenges to the vision of a 'seamless' arterial network. MAG's Traffic Signal Optimization Program (TSOP) provides funding for coordinating signals on arterials, and encourages partnerships among agencies to address these multi-jurisdictional corridors. The AZTech™ Operations Committee has developed regional center-to-center traffic management system guidelines and formats for interjurisdictional traffic signal timing data exchange. The Committee meets monthly to discuss and address interjurisdictional signal operations coordination. Traffic Signal Groups in the East Valley and West Valley (meets as needed), and the Valley Area Traffic Engineers Committee (meets one to two times a year) provide ad-hoc forums for local traffic operations personnel and managers to discuss traffic signal operations and management issues in a multijurisdictional context. However, none of these groups are firmly linked to any formal decision making or planning process.

The Bell Road ITS project is an example of interjurisdictional cooperation between City of Peoria, City of Surprise, and MCDOT. These three agencies meet every two months to discuss issues specific to this corridor and work together to provide collaborative traffic management of the state's busiest arterial corridor.

To meet the growing demands of arterial management and mobility, agencies in the MAG Region have been actively implementing ITS technologies to support their arterial traffic and incident management, travel information, day-to-day operations and maintenance of their systems. TMCs are becoming an integral part of Street or Transportation Departments in cities in the MAG Region. At present, TMCs are operational in several jurisdictions, including the Cities of Glendale, Goodyear, Phoenix, Scottsdale, Peoria, Mesa, Chandler and Maricopa County DOT. The City of Peoria is nearing completion of a new city TMC that will also serve as a back-up ADOT TOC, and the City of Surprise will have its TMC in place in early 2009. Avondale also plans to implement a TMC in the next few years. These TMCs provide a central location for the cities and county to manage their regional traffic signal systems, monitor arterial devices (including detection, CCTV and arterial DMS) and coordinate with other agencies for traffic and incident management, as well as for managing traffic during planned special events.

Arterial ITS infrastructure will continue to expand in the near term (through 2013), and the RTP identified $83M in arterial ITS programs through 2028 (including local funding share and contributions). Arterial ITS projects within the MAG TIP including expanding fiber and wireless telecommunications, upgrading and expanding detection and monitoring equipment (including CCTV), expanding traveler information on arterials with additional dynamic message signs, and constructing or enhancing local TMCs.

Incident management on arterials is provided largely through local agency police and fire/EMS, Maricopa County Sheriff's office. The Regional Emergency Action Coordination Team (REACT) Incident Management Program at MCDOT has formally partnered with a few local cities. REACT teams are dispatched as requested by City police and County sheriff to provide incident traffic management support. State, City and County TMCs are able to support incident management on those corridors where traffic signals are connected to the TMC as well as on corridors that are instrumented with CCTV monitoring.

Public Transportation Systems

Transit services have grown and expanded significantly in the last decade, and approximately one-third of the Proposition 400 revenues from the half-cent sales tax for transportation are being focused on mass transit.

Transit service is a cooperative effort through contracted arrangements among the Regional Public Transportation Authority (RPTA), local cities and transit operators, and it is provided under the 'brand' of Valley Metro. The RTP identifies transit funding for expanded local service, as well as for expanded Bus RAPID Transit service on both freeways and arterials. There is envisioned to be substantial growth in geographic area covered by fixed-route public transportation over the next two decades. It is important to note that several local tax initiatives also fund transit service within their respective jurisdictions.

As a summary of fixed-route services, there are two major public transportation services in the Phoenix metropolitan area: RTPA (Valley Metro) and Phoenix Public Transit. Both function as separate services but are under the Valley Metro name to display uniformity to travelers in the Valley. Both provide traveler information to the public via the Valley Metro website and are on the same vehicle management software to be able to manage their vehicle location, status, etc. There is an existing service in the City of Tempe that is using that same vehicle management software, and more cities are planned to implement citywide transit services on the same vehicle management software in the future. Fixed-route transit services in the Region include local bus service, express bus service, and circulator/shuttle services. The majority of existing routes (local and express) primarily serve arterials; RAPID Commuter service is currently provided on freeway routes within the City of Phoenix, and there are plans to implement a Bus RAPID Transit on key arterial corridors. The Transit Operations and Control Center (OCC) manages the regional transit system, including vehicle management system, and voice communications with each transit vehicle. Regional fixed-route vehicles are equipped with GPS AVL systems. The region also includes several park-and-ride facilities and transit centers.

In December 2008, the first METRO Light Rail commenced operations of the first 20-mile segment of LRT service in the Valley, which will include a line through Phoenix, Tempe and Mesa. The initial LRT fleet includes 50 trains. Each LRT train is equipped with automated vehicle location, passenger counting systems, and on-board vehicle diagnostics/monitoring as well as security systems. METRO Light Rail is also looking at future extensions of service routes to include potential expansion into Glendale and west on I-10, as well as expanding the initial line in Phoenix, Tempe and Mesa.

Table 2 describes the ITS operations and communications between the various stakeholder agencies in the MAG Region at a very high level. Later tasks in the RIA will further define the operational roles of stakeholders in the Region.

Table 2 – Operational Roles and Responsibilities of Agencies in the MAG Region

Agency / Organization Type		Planning and Operations Roles and Responsibilities
Regional	Maricopa Association of Governments	MAG serves as the MPO for the Phoenix metropolitan area. The MAG Committee structure includes an ITS Committee that is comprised of traffic and transportation professionals from MAG member agencies. MAG is responsible for all planning decisions for regional transportation and provide a Regional Transportation Plan, which includes ITS as one of many components.
Freeway Management	Arizona Department of Transportation	Operates and maintains the freeway network. Responsible for freeway management system devices/communications, including the 24/7 Traffic Operations Center. Supports the Arizona Local Emergency Response Team (ALERT) to assist with traffic incidents on the freeway network. There are freeways in the east and northeast portions of the Valley that are located on Tribal lands, which requires consultation with the respective Tribal governments for operations.
	Arizona Department of Public Safety	Public safety and law enforcement on state highways and freeways. Operates the Freeway Service Patrol (FSP) which assists stranded motorists and disabled vehicles. An interface was established between DPS and ADOT and MCDOT to share information about incidents on freeways.
Arterial Management Arterial Management	City TMC/Transportation Department	Operates and maintains the arterial network within their city/town jurisdiction including the traffic signal system and network of arterial DMS, CCTV. Many signals at freeway interchanges are operated/maintained by the local jurisdiction. Incident management on arterials is coordinated with the local public safety agencies. Cities have been actively establishing traffic operations and management centers to better operate their own infrastructure, as well as support incident management and special event traffic operations, and coordinate with neighboring agencies on incidents and events that impact multi-jurisdictional corridors.
	Maricopa County Department of Transportation	Maricopa County DOT operates and manages arterials in unincorporated areas of the Maricopa County region including CCTV, DMS, and traffic signals as well as having shared control of ITS devices in two cities for multi-jurisdictional corridor management. Maricopa County DOT operates and manages a REACT team which is an arterial incident responder service provided primarily within a few cities in the West Valley. Facilitates development of regional systems including Regional Archived Data Server (RADS) and Arterial Advanced Traveler Information System (ATIS). Provides leadership in the traffic operations for regional corridors such as Bell Road.
	City Fire Department	The City of Phoenix Fire Department dispatches for 18 local city fire department jurisdictions. They are first responders to arterial and freeway incidents. Phoenix Fire department has established a link to the Maricopa County TMC. Local Fire Departments typically do have established links to the local police department, but does not necessarily have established links to their local traffic operations center for traffic management support during incident operations.
	City Police Department	Local Police Departments are typically responsible for public safety on arterial streets within their jurisdiction. Local police and emergency services respond to traffic incidents on roadways within their jurisdiction, although there is a high degree of cooperation among emergency responders as part of current mutual aid agreements.
	Maricopa County Sheriff's Office	Public safety and law enforcement on arterials within unincorporated Maricopa County and agencies for which it is contracted including City of Litchfield Park.
Transit	Valley Metro	Responsible for regional transit planning, transit public information, the management and operation of regional bus (local, Express and RAPID) and dial-a-ride services, the Regional Ridesharing program, and a regional vanpool program.
	Phoenix Public Transit	The regional transit system is managed through the Transit Operations and Control Center, including a vehicle management system for automated vehicle location.
	METRO Light Rail	METRO is the brand name for Valley Metro Rail Inc., a non-profit, public corporation charged with the design, construction and operation of the Valley's light rail system. The first phase of light rail launched in December, 2008.

2.1.2 Stakeholder Agencies

MAG member agencies include 25 incorporated cities and towns, three Native American Indian communities, and Maricopa County. ADOT serves as an ex-officio member for transportation-related issues. Many of these MAG member agencies provide traffic management operations and serve in key roles for helping to plan for traffic and transportation programs at the local and regional levels. Emergency management agencies and transit agencies utilize the transportation network to perform their operations. Each one of these agencies have key needs in the operation and use of ITS equipment and communications between agencies that will support the development of the Regional ITS Architecture.

A survey was distributed to all MAG member agencies to gather ITS and agency coordination data as well as document the ITS deployment and integration in the MAG Region. This survey included questions for each agency regarding the number of devices, types of information sharing, and locations of devices where it is feasible to gather that information. There are many regional initiatives and plans that have been developed within the last few years which provide a substantial foundation for existing coordination and ITS infrastructure. **Table 3** summarizes the types of stakeholders whose communications and device-ownership is represented in various plans and/or have participated in the survey for inventory to help build this Regional ITS Architecture. Relevant local public safety/law enforcement elements will be identified from existing documents and planned projects and included in this ITS architecture to show interaction with other elements and other agencies.

Table 3 – Summary of Stakeholder Agencies

Category	Agency	Surveyed	TMC / Central Dispatch?	Owns ITS Devices?
MAG Member Agencies	Arizona Department of Transportation	Yes	Yes	Yes
	City of Avondale	Yes	Yes	Yes
	City of Chandler	Yes	Yes	Yes
	Town of Gilbert	Yes	Yes	Yes
	City of Glendale	Yes	Yes	Yes
	City of Goodyear	Yes	Yes	Yes
	Maricopa County	Yes	Yes	Yes
	City of Mesa	Yes	Yes	Yes
	City of Peoria	Yes	Yes	Yes
	City of Phoenix	Yes	Yes	Yes
	City of Scottsdale	Yes	Yes	Yes
	City of Surprise	Yes	Yes	Yes
	City of Tempe	Yes	Yes	Yes
	City of Apache Junction	Yes	No	Yes
	Town of Buckeye	Yes	No	No
	Town of Carefree	Yes	No	No
	City of El Mirage	Yes	No	No
	Town of Fountain Hills	Yes	No	Yes
	Town of Gila Bend	Yes	No	No
	Gila River Indian Community	Yes	No	No
	Town of Guadalupe	Yes	No	No
	City of Litchfield Park	Yes	No	Yes
	Town of Paradise Valley	Yes	No	Yes
	Town of Queen Creek	Yes	Yes	Yes
	Salt River Pima-Maricopa Indian Community	Yes	No	No
	City of Tolleson	Yes	No	Yes
	Town of Wickenburg	Yes	No	No
	Town of Youngtown	Yes	No	No
*State/Regional Emergency Management/ Public Safety	Arizona Department of Public Safety	No	Yes	Yes
	Maricopa County Sheriff	No	Yes	No
	Phoenix Fire	No	Yes	No
Transit Management	RPTA/Valley Metro	Yes	Yes	Yes
	METRO Light Rail	Yes	Yes	Yes
	Phoenix Public Transit	Yes	Yes	Yes

* The emergency management technologies/systems inventory information have been coordinated through the respective traffic management/operations contacts at State, County and City agencies surveyed.

2.1.3 Regional Stakeholder Coordination

State, regional and local agencies in the Phoenix metropolitan area have been moving toward more coordinated and integrated transportation operations for several years. There is strong support for continued physical integration and connectivity among transportation management, transit, public safety, and other key agencies to better share information, in real time, to support key traffic, transit, and incident management strategies. This move encompasses both localized projects as well as regional integration projects. Cities and towns are focusing on integrating their localized transportation and ITS networks, and in parallel the Region is working toward combining those efforts into a regional cooperative strategy. The cooperative partnerships and systems described in this section facilitate multi-agency coordination for traffic, transit, and incident management.

MAG Regional Council

The MAG Regional Council is the final decision-making body of MAG and is composed of elected officials appointed by each MAG member agency. For the majority of members, the city or town Mayor serves as the Regional Council member. Regional Council meetings are open to the public and discuss regional initiatives that move beyond just transportation into public policy related topics such as land use, census, schools, and homeless assistance programs. The Executive Committee consists of at least three Regional Council members who are elected at the annual meeting to serve for one year (until the next annual meeting). The Executive Committee is required to include the Chair, Vice Chair and Treasurer of the Regional Council as ex-officio members. In June 2002, the Executive Committee was expanded to seven members to allow for additional participation by the member agencies. The MAG By-Laws indicate that the business that arises between meetings of the Regional Council can be conducted by the Executive Committee. The Executive Committee also serves as the Finance Committee.

The Regional Council approves the Regional Transportation Plan, MAG TIP, and makes decisions on the recommendations from the TRC and TPC each year. Recommendations for the RTP and TIP come from other groups and committees within MAG; however, the final approval on funding priorities is with the MAG Regional Council.

Transportation Policy Committee (TPC)

Members of this committee include elected officials and private sector representatives from the Region, appointed by the MAG Regional Council, to help develop policy recommendations for Regional Council consideration on transportation issues, including the Regional Transportation Plan and MAG TIP. This Committee hears consent items on any proposed updates or modifications to the MAG TIP and RTP, and has responsibility for overseeing the implementation of Proposition 400.

Transportation Review Committee (TRC)

This group was formed by the Regional Council to encourage the development of the telecommunication infrastructure and applications in the MAG Region. The members of the TRC include one representative from each MAG member agency that could be from various departments within each agency. This committee also discusses transportation initiatives, major regional projects, funding allocation for MAG Federally Funded Program, federal propositions for taxes and projects, and transit initiatives, among other high profile topic areas.

MAG ITS Committee

The MAG ITS Committee is one of several Technical Advisory Committees at MAG. The ITS Committee is made up of federal, state, and local transportation agencies in the Phoenix metropolitan region, and includes representation from DPS, the Federal Highway Administration (FHWA), and Arizona State University (ASU) in addition to local, county, transit and state transportation operations representatives from MAG member agencies. The primary role of the MAG ITS Committee is to plan all regional ITS infrastructure and recommend regional investments in ITS for consideration by the Transportation Review Committee, Transportation Policy Committee and Regional Council. The meetings of the ITS Committee, which occur every month, also provide a formal avenue for interagency cooperation and coordination on matters pertaining to ITS and regional traffic management.

Under the leadership of MAG, a Regional Concept of Transportation Operations was developed in 2003. MAG will continue to have a long-term role in planning for operations. The MAG ITS Committee includes a strong multimodal focus, and is responsible for making recommendations on regional ITS infrastructure investments for the Phoenix metropolitan region.

MAG also leads working groups that support various projects and regional coordination activities. The MAG Telecommunications Advisory Group (TAG) was formed to encourage the development of telecommunication infrastructure and applications which increase multiagency cooperation and improves access to public information by travelers. The Regional Communications Network (RCN) Working Group was formed as a venue for stakeholders of the RCN program to discuss the status and the evolution of the program in the Phoenix metropolitan area. The RCN Working Group is comprised of members from the MAG Technical Advisory Group (MAG TAG) and MAG ITS Committee.

AZTech™

The AZTech™ was initially established in 1996 for the express purpose of implementing the Federal Model Deployment Initiative (MDI). AZTech™ brings together decision makers and practitioners with a consensus-based approach to planning, implementing, integrating and operating multimodal transportation systems in the region. The goals of AZTech™ are to integrate the existing ITS infrastructure into a regional system, establish a regional integrated traveler information system, and expand the transportation management system for the Phoenix metropolitan area. Members include ADOT, MAG, Valley Metro, Maricopa County, Cities and Towns, and private partners. Members represent state and county traffic management and operations, regional transit operations, regional planning, municipal traffic and transportation agencies, state and regional law enforcement and public safety, emergency services, and private partners.

AZTech™ is the name of the consortium, although systems are owned and operated by individual partner agencies. For example, the traffic management system in the City of Scottsdale and ADOT's Freeway Management System are both referred to as part of the regional AZTech™ system, yet they are owned and operated by separate agencies.

The AZTech™ partnership has grown since the last ITS strategic plan update and has been successful in obtaining additional federal grants to improve collaboration between transportation and public safety, including the design of the Regional Community Network. AZTech™ is primarily a voluntary regional forum for discussing issues related to transportation operations. There are specific AZTech™–led initiatives that benefit the

region including center-to-center standards development and center-to-center guidelines for device management.

This forum is led by the AZTech™ Executive Committee that has been co-chaired by ADOT and Maricopa County since inception. Working groups address specific focus areas, including Traffic Operations, Traveler Information, and Incident Management. These groups meet on a regular basis to address regional integration and promote interjurisdictional collaboration to enhance operations (signals, traveler information, and incident management) to deliver seamless real-time traffic management services to the public. The committee also facilitates development of regional contracts, and developed C2C data exchange standards. Recommendations generated at the AZTech™ forum can feed into the regional ITS planning process at MAG, provided they are sponsored by a MAG member agency, and meet regional planning criteria. While AZTech™ has an indirect link to the regional planning process, there is no direct role in the formal decision making process for regional ITS planning. The MAG Regional Concept of Transportation Operations identified AZTech™ as leading many of the operations-focused initiatives.

2.2 Summary of Current Regional Transportation Goals and Objectives

Substantial planning has occurred in the MAG Region for goals and objectives of the roadway and ITS investment. MAG's 2001 ITS Strategic Plan Update and the 2003 Regional Concept of Transportation Operations provide an important foundation for establishing a regional benchmark for goals and strategic priorities developed by partner agencies as part of these processes. Also important are the more localized ITS plans that have been developed by MAG member agencies over the last five or more years, as these provide a basis for specific agency objectives that must be captured within the regional ITS Architecture.

As a means of establishing the operational framework for the Region, the study team has reviewed and summarized these plans in terms of key ITS goals or services that would need to be incorporated into the updated Regional ITS Architecture. This section contains a summary of those findings from both regional ITS planning and more localized planning documents.

2.2.1 MAG Regional ITS Plans

Goals and objectives are summarized in **Table 4** that were developed for the *MAG ITS Strategic Plan Update* and the *MAG Regional Transportation Concept of Operations*. Both of these efforts brought together stakeholders from throughout the Region to establish priorities for ITS deployment, integration and operations, and to define key needs that ITS could support or address.

As a starting point for the RIA update, the study team reviewed the goals established for these prior plans for applicability to the current state of ITS in the Region, as well as to factor in how priorities may have changed or accelerated since those efforts. The goals and objectives that were included in this table apply to today's current operations and strategic planning for ITS, and represent a summary of the applicable goals and objectives that were developed as part of the previous efforts. For example, in the ITS Strategic Plan, call boxes along freeways were identified as a priority; however, the Region is not pursuing this as a strategy for implementation. To help consolidate goals into functional categories that could be translated into the RIA, **Table 4** includes categories for freeway and arterial operations, incident and emergency management, transit operations, and traveler information. In some instances, associated objectives were also identified to support the goal or strategy identified in the previous plans, and these have been identified where applicable. Specific

performance measures were identified in the *Regional Transportation Concept of Operations* that define how the agencies in the Phoenix metropolitan area will achieve their goals. The goals and objectives from this planning effort document the purpose of the focused performance measures, rather than the performance measure itself. These are categorized in the same manner as those from the MAG ITS Strategic Plan Update for a comprehensive view of regional goals in each service area. Stakeholders were asked to review this table for consistency in current operational planning and objectives of regional initiatives.

Table 4 – Consolidated Goals and Objectives for MAG Region

Operational Categories	Goals and Objectives	MAG ITS Strategic Plan Update	MAG RCTO
Traffic Management	Increase automated traffic data collection and archiving ability	X	X
	Establish integrated freeway-arterial corridor operations for major arterial corridors		X
	Enhance traffic management capabilities for normal conditions and special events	X	X
	Provide advanced warning at railroad/street crossings	X	
	Coordinate signal systems within single jurisdictions and across jurisdictional boundaries		X
	Increase ITS device shared operation partnerships along key arterial corridors		X
	Establish center-to-center communications between traffic management agencies in the region		X
Incident / Emergency Management	Improve incident detection capabilities and reduce incident clearance times	X	
	Increase real-time incident information sharing between traffic management and public safety agencies for cooperative freeway and arterial incident management	X	X
Transit Operations	Improve bus progression using traffic signal priority	X	X
	Enhanced transit service (routes, frequency, hours, security, payment, and real-time transit information)	X	X
	Coordinate roadway closure/construction information with transit agencies		X
Traveler Information	Improve accuracy, timeliness, and availability of real-time, multi-modal traveler information to the public	X	X
	Increase the use of DMS for more types of traffic, work zone and incident information, including travel times		X
	Integrate transit information with traveler information services		X

2.2.2 Local Agency ITS Plans

Several of MAG's member agencies have developed or are in the process of developing plans to guide ITS deployment and integration within their jurisdiction. **Table 5** provides a brief overview of existing plans developed by agencies in the Region, as well as pivotal goals or outcomes from these efforts that may be factored in to the Regional ITS Architecture development.

These plans are important for several reasons. First, they represent localized ITS planning processes that have identified specific issues, and corridor-specific deployment priorities within jurisdictions in the Region. Second, many of these localized plans also identify where connectivity to external or regional programs will provide benefits to the agency as well as travelers on a broader scale. They help to map out funding priorities within these agencies for ITS deployment, and can provide valuable input to priorities that should be captured and identified within the RIA.

Table 5 – Summary of Local ITS Plans

Agency Plan/Date	Key Goals and Objectives
Avondale ATMS Plan	• Identifies strategies that allow the City to maximize traffic operation, use and safety through design and implementation of ITS • Establish a Traffic Operations Center to centrally control Avondale's ITS devices, and maps out a preliminary concept for telecommunications communications and devices. Avondale's telecommunications strategy includes both fiber and wireless communications systems • Recognizes need for more detailed ITS Strategic Plan to plan ITS funding and implementation
Chandler TMC Plans	• The Chandler TMC Future Vision plan reviews the communications configuration and technologies connecting to and within the current TMC and identifies potential changes and upgrades to the TMC • The Chandler TMC Maintenance Concepts and Recommendations plan reviews the City's current maintenance practices as they impact the TMC focusing on traffic signal systems and the deployment of additional ITS elements and communications network
Glendale ITS Master Plan	• Strategies for using permanent and portable ITS devices (CCTV cameras, DMS, communications) during special event management in the University of Phoenix stadium area
Goodyear ITS Strategic Plan	• Focus on citywide ITS priorities and functional areas to deploy ITS devices, communications to devices, communications with other departments within the City, and communications with other agencies • Identified priority ITS deployment projects to utilize existing MAG programmed funding for Goodyear and plan for future MAG TIP project requests • Established feasible timeline for projects based on comprehensive funding and implementation plan
MCDOT ITS Strategic Plan	• Advance regional traveler information systems by enhancing arterial connection and information to 511 • Continue ITS infrastructure deployment of CCTV, DMS, detection as well as TMC operation of those devices • Expand TMC operations to operate devices from other jurisdictions, facilitate regional traveler information and reporting systems, coordinate with public safety and emergency management agencies • Expand REACT program to increase presence in cities and reduce response time • Integrate signals on MCDOT and multi-jurisdictional corridors
Mesa ITS Strategic Plan	• Efficient and reliable traffic management tools that support real-time management through central control of all field devices and regional and interdepartmental connectivity • Fast, informed, coordinated incident management and emergency response through shared CAD information, traffic data sharing with public agencies, and sharing CCTV camera images • Highway quality and quantity of information available to travelers via arterial DMS, incident reporting, and regional traveler information communications • Effective, multi-modal transit management through sharing information with transit
Mesa ITS Deployment Plan	• Plan for key ITS infrastructure projects to add to existing and implement new ITS deployments in Mesa to address goals defined in Mesa ITS Strategic Plan • Streamline ITS planning with planned capital improvement projects • Prioritization and implementation strategy for ITS projects
Scottsdale ITS Strategic Plan	• Create reliable travel times and reduce traffic incident delay on arterials through signal coordination and incident detection capabilities • Communicate traveler information rapidly to vehicle drivers via arterial DMS and other traveler information services such as 511 • Communicate with other departments within Scottsdale and other partner agencies such as Police, Emergency Services, ADOT, and Fire

2.2.3 Multi-Agency ITS Plans and Current Planning Efforts

In addition to local plans, there have been several key initiatives whereby multiple agencies in the Region have collaborated on specific ITS planning efforts to address very specific corridors or sub-regions. These typically involve two or more arterial traffic management agencies, and potentially County DOT and ADOT partners. These represent efforts by partners to address specific deployment, integration and operations requirements, and the major impact of these efforts on the RIA are envisioned to be agency and system connectivity strategies. **Table 6** provides an overview of multi-agency ITS plans and planning efforts, as well as collaborative efforts to address agency information sharing and provision of information to travelers. These projects/systems in this section will be captured in the RIA either as a comprehensive stand-alone service area or identified within other service areas for which it is being used.

Table 6 – Multi-Agency Collaborative Planning Efforts

Planning Effort	Description
I-10 Integrated Corridor Management System	• Integrated plan to manage and reduce congestion in the I-10 corridor in the West Valley, with a focus on the near-term construction improvements • Comprehensive system of urban interstate freeway facilities, local urban arterial streets, and express and local transit routes • Project consisted of recommended strategies for integrating ITS projects and system operations to help transportation coordination along the I-10 corridor through the I-10 widening project and other key growth considerations • Coordination with MAG, City of Goodyear, ADOT, City of Avondale, Town of Buckeye, City of Phoenix, MCDOT, and Valley Metro
Bell Road ITS Concept of Operations and ITS Operations Plan	• Bell Road ITS Phase I design project installed fiber, arterial DMS, and CCTV cameras along Bell Road between Loop 101 and Grand Avenue and the project area fell within the jurisdiction of three different agencies: City of Surprise, Maricopa County, and City of Peoria • Concept of Operations was developed by MCDOT to provide roles and responsibilities in the operation of the system for each of the services that the ITS equipment will provide • Describes roles or agencies coordinating during specific scenarios • Bell Road ITS Operations Plan was developed by MCDOT to document the agreed-upon procedure and prioritization for ITS device operations and management during these scenarios from the perspective from the three jurisdictions involved
Phoenix International Raceway (PIR) Major Event Traffic Management Plan	• Agencies have collaborated on a comprehensive traffic management plan for pre-event coordination, event day traffic and incident management, ingress/egress monitoring and management, and public information for major events at PIR • Information is distributed to local media and to the public, through the az511.gov website and 511 phone service, and the Sky Harbor Airport traveler information screens • Effort requires months of pre-planning every year and actively involves Public Information Officers (PIOs) from traffic, law enforcement, ADOT, MCDOT, cities in the area, DPS, Maricopa County Sheriff's Office (MCSO),PIR, and the media
Regional Community Network (RCN)	• In 2004, ADOT proceeded with the design of the MAG Regional Community Network (RCN) concept which would establish a fiber communications network through a topology of three sub-rings (West of I-17 Region, Northeast Region, and Southeast Region). The first phase of the project has been funded by MAG and is under implementation. The initial design of the RCN was funded through an AZTech™ grant • The RCN links multiple agencies throughout the MAG Region to facilitate the sharing of traffic management information and video conferencing capabilities between all linked agencies • The RCN network will consist of the conduit, fiber optic cable, routers, switches, and other communications hardware necessary to provide a path between network nodes • The first phase of fiber deployment and physical connection of 15 agencies utilizing mostly existing agency-owned fiber is planned to be completed by December of 2008 and the hardware/software to share information will be installed shortly thereafter • This program will expand to include fiber connectivity to other agencies in the future based on funding availability
ADOT Highway Conditions Reporting System (HCRS)	• HCRS is ADOT's closure and restriction information central server which consolidates planned event, construction, and incident information for the statewide highway system on scheduled and unscheduled state roadway closures • HCRS is essentially an internal multi-agency information sharing system, but the information input to HCRS is used to populate the public website (www.az511.com) and the 511 system • ADOT primarily populates the HCRS with roadway condition/closure information; however, there are numerous other agencies that are authorized users to the HCRS to post local arterial information • HCRS was recently expanded to include arterials in the Phoenix Metropolitan area.

Table 6 – Multi-Agency Collaborative Planning Efforts (continued)

Planning Effort	Description
AZTech™ Center-to-Center (C2C) Information System	• The AZTech™ Transportation and Public Safety C2C Needs Assessment and Concept of Operations project developed the system configuration, concept of operations, and functional requirements for the system that will make use of the RCN infrastructure, as well as other communications means such as leased lines or the Internet • C2C System does not provide any physical links between centers or agencies, but instead establishes the protocols that the various software platforms within each of the centers will use to exchange information over the RCN or other networks. • C2C system will facilitate the sharing of traffic signal timing (initially) and in the future is planned to support DMS, CCTV and potentially other information sharing in the MAG Region • Currently the software protocol has been developed to view the i2TMS and TranSuite traffic signal software, and may be expanded to other types of traffic signal software in the future • Through the C2C system, cities are also able to share CCTV camera images • Once the RCN is put into place, the C2C system will function on direct fiber paths between agencies rather than the web-based program. Through the AZTech™ grant, last-mile links were provided for agencies to connect to the communications network that the RCN is planned to utilize
AZTech™ Regional Archived Data Server (RADS)	• AZTech™ RADS provides and maintains valid, classified ITS-derived regional data for use in transportation system planning, modeling, and real-time operation applications • RADS collects and stores data from the various systems in Maricopa County, Arizona, including the ADOT freeway management system, ADOT HCRS, AZTech™ SMART Corridors, Signal Systems, Phoenix Fire, C2C, and transit operations (future) • The main system design goal for the system is to take ITS data from systems throughout the Phoenix metropolitan area, store the data in a centralized archive data server, and then make the data available for a variety of data users through a common Web interface • Data stored includes traffic volumes, speeds, closures, incidents, public transit operations, and other data collected by AZTech™ partner agencies
MCDOT Public Agency Video Distribution System	• This program will facilitate the sharing of CCTV camera images managed by transportation management agencies throughout the Phoenix metro area with public safety agencies (Department of Public Safety, Maricopa County Sheriff, Phoenix Fire Dispatch, and local public safety agencies) • Program is currently in the planning stages
Traveler Information Programs	• Local television channels and radio provide local traffic alerts and construction/work zone information, as well as special event traffic information • Information about incidents, closures, delays, or other real-time traffic condition information are shared with the traveling public via the 511 telephone service or az511.gov website as well as public-agency owned DMS (freeway and arterial) • MAG and ADOT collaborated on a mobile traffic information portal that makes freeway speed and travel time information accessible via internet-enabled cellular phones and PDAs • ADOT's HCRS is populated with road condition and traveler information from state and local agencies that are disseminated via the 511 telephone and az511.gov web site services • Travel times are displayed on select ADOT DMS as part of a pilot program that provides travelers with an estimation of freeway travel times during AM and PM peak commute hours • Information about public transportation services is available from www.valleymetro.org as well as Valley Metro's customer service center • AZTech™ establishes partnerships with the private sector such as Traffic.com ITIP sensors to collect vehicle detection information on selected roadways • AZTech™ Sky Harbor Rental Car Center (RCC) Traveler Information System • MCDOT ATIS which provides arterial data collection and real-time reporting under Maricopa County jurisdiction, arterial information made available through 511 phone and web, and automated data exchanges between MCDOT/ADOT

3. ITS INVENTORY

ITS infrastructure is not only the physical devices and telecommunications networks that are deployed throughout the transportation network – it is the communications and coordination that occurs as a result of that infrastructure. This initial task of the ITS Architecture focuses on the physical ITS infrastructure that is deployed and used by each agency to operate their respective freeway or arterial transportation networks. The later tasks of this project will define the communications and coordination that occurs in the MAG Region currently and moving forward into the future.

3.1 Inventory Data Collection

The process of creating an inventory of ITS devices, communications, and future developments starts with collecting existing inventory information from existing plans, studies, and project documentation as well as stakeholder input. An inventory of existing and planned 'ITS elements' supports development of interface requirements and information exchanges with these ITS elements. A variety of resources were used to support the data collection efforts, as described in Section 3, including local agency ITS planning documents, regional multi-agency coordinated projects, and regional concept of operations plans.

A survey was prepared and distributed to MAG member agencies to be able to gather ITS and agency coordination data to develop the MAG RIA, as well as document the ITS deployment and integration in the MAG region. The survey included questions for each agency regarding the number of devices, types of information sharing, and locations of devices where it is feasible to gather that information. Status of various devices and systems throughout the MAG region was also requested from agencies in the following categories:

- **Existing** - infrastructure/devices that are already installed, or will be in place by February 2009.
- **Planned** - infrastructure, devices or systems that agencies will be installing or deployed and have funding identified or already allocated or are envisioning implementing in the future, but funding is not yet identified or secured.

The ITS inventory is a valuable list for several reasons. First, it provides a baseline of existing and planned ITS projects and systems in the MAG Region. Second, it outlines which agencies are currently deploying and operating ITS as well as those planning to implement ITS programs. Third, it provides a foundation for identifying potential connectivity to develop the ITS architecture. Status of ITS deployments and communications in the survey is important to differentiate because the MAG ITS Strategic Plan that will be developed in a later project will evaluate the existing capabilities and the plans for the future for each agency against capabilities that support that regional growth in the future. Multi-agency projects such as the RCN and C2C support agency cooperation across jurisdictional lines, but it will be important for the ITS Strategic Plan to assess other cooperative efforts on the arterial network and from an interdepartmental standpoint as well.

3.2 Existing ITS Infrastructure

This section includes a summary description of the types of ITS infrastructure that currently exists in the MAG Region. **Table 7** provides an overview of the agency-owned infrastructure and communications that was captured as part of the survey that was given to each agency. **Appendix A** provides surveys that were distributed to each of the MAG member agencies and completed for this project.

Table 7 – Summary ITS Inventory by Agency (Freeway/Arterial)

	Centers	Devices						Communications		
Agency	TMC/TOC	CCTV	DMS	Traffic Signals	Traffic Signal System	VID	Other Detection	Fiber	Wireless	Leased Lines
ADOT										
Avondale										
Chandler										
Fountain Hills										
Gilbert										
Glendale										
Goodyear										
MCDOT										
Mesa										
Peoria										
Phoenix										
Queen Creek										
Scottsdale										
Surprise										
Tempe										

Existing capability – could be expanded in future

Planned capability – currently programmed or planned for future

3.3 Planned ITS Infrastructure

Existing infrastructure is a key focus area for this ITS Architecture because it is the foundation for ITS development and communications for the MAG Region moving forward. There are improvements to ITS infrastructure development and regional communications planned for the various agencies in the Region. These future improvements are collected as part of this project to assess the progress of implementation toward those goals as well as to identify any potential streamlining of agency planning efforts to minimize funding impacts and capital improvement requirements.

This section will review both programmed projects from the MAG TIP as well as planned projects that agencies have identified as future in the survey.

3.3.1 MAG TIP Programmed Projects

Planned infrastructure and deployment projects from the MAG TIP (2008-2014) are provided in **Table 8** by their respective timeframes. The purpose of summarizing these projects is to highlight key areas of the application of ITS that are focus areas for many jurisdictions.

One of the key themes as shown by **Table 8** is the corridor planning being developed on a citywide and countywide basis. These corridors typically span multiple jurisdictions such as Bell Road, McDowell Road, Greenway Road, Olive Avenue, Rural Road/Scottsdale Road and Arizona Avenue, among others. Infrastructure that is existing along those corridors and the ITS plans shown in the table are tremendous additions to the traffic monitoring, incident management, traffic operations, and traveler information capabilities for each jurisdiction. However, it is important to understand the benefits of not only sharing that monitoring information with other agencies, but also coordinating operations across jurisdictional boundaries. Understanding what types of infrastructure each agency currently operates combined with the future plans for neighboring jurisdictions along that same corridor will help facilitate coordination of projects to establish connections between the two or more agencies.

Another key theme is that many agencies are expanding their traffic management centers (either capabilities or physical space expansion) to support additional services and personnel in the facility. As each centralized point of ITS operations in each jurisdiction grows to become capable of collecting important information along corridors that may affect other areas, it becomes important for those agencies to share that information with other agencies. This process will largely become a reality through the RCN and C2C projects, but are also a priority for corridors that span two or three agencies that requires closer coordination on that particular asset.

Table 8 – MAG TIP (2008-2014) Programmed ITS Projects

Agency	Year	Project
ADOT	**2008**	202: Loop 101 to Gilbert Road – Design FMS
	2008	101: I-17 to SR-51 – Design and construct FMS
	2009	101: SR-51 Princess Drive – Design and construct FMS
	2011	I-17: Loop 101 to SR-74 – Design FMS, SR-51: Bell Road to Loop 101 – Design FMS, 101: I-17 to SR-51 – Design FMS, I-17: Arizona Canal to Loop 101 – Design FMS, 101: SR-51 to Princess Drive – Design FMS, 202: Dobson Rd to I-10 – Design FMS
	2012	MAG regionwide – FMS projects (2012)
Avondale	**2013**	McDowell Rd from 99th Ave to Avondale Blvd plus 99th Ave from McDowell Rd north to the first signalized shopping center location – Furnish and install 2 1/8 miles of fiber optic cable, conduit, and innerduct, and associated equipment at 9 traffic signals and one CCTV camera
Buckeye	**2010**	Miller Rd: Hazen Rd to I-10 and Monroe Rd (MC-85): Miller Rd to Apache Rd – Interconnect traffic signals
Chandler	**2007**	Various locations – Upgrade outdated TS1 signal equipment with TS2 signal equipment
	2008	Citywide – Install Chandler Fire/Police Department signal system integration and variable message signs
	2009	Chandler Blvd: Delaware St to Gilbert Rd – Install fiber optic cable traffic signal interconnection
	2010	Buffalo St at Colorado St – Upgrade, retrofit, and integrate TMC equipment
	2011	Arizona Ave: Pecos Rd to Riggs Rd – Install fiber optic cable for interconnecting traffic signals (4 out of 5 miles)
	2014	Ray, Elliot, Dobson, Connecting at Arizona back to TMC – Provide fiber optic communications from traffic signals in the project area back to the TMC
El Mirage	**2014**	Various Arterial Traffic Signals within City Limits – Phase I
Fountain Hills	**2014**	Shea Blvd and Downtown Area – Provide an initial deployment of ITS for traffic signals and monitoring/control sites at Town Hall and the Street Yard
Gilbert	**2007**	Gilbert Town Center – Design traffic management center (phase B) and purchase further equipment
	2008	Gilbert Rd: US-60 to Guadalupe Rd and US-60: Dobson Rd to Gilbert Rd – Install fiber and conduit along Gilbert Road, fiber only along US-60 (joint with Mesa to link ATMS)
	2013	Pecos Rd. – Greenfield to Power Rd, Power Rd – Pecos to Queen Creek Rd, Germann Rd – Power Rd to Sossaman Rd – Install five miles of fiber optic cable and associated communications hardware to complete a high-bandwidth, non-leased interconnection between the TOCs in Gilbert and Queen Creek
	2014	Seven intersections near Baseline & Val Vista – Installs three-mile fiber optic communication lines in existing conduits and add new CCTV cameras, traffic signal video detection, and controllers

Table 8 – MAG TIP (2008-2013) Programmed ITS Projects (continued)

Agency	Year	Project
Glendale	**2008**	Acquire computer system hardware (upgrade dispatch/routing) for transit
	2008	Various locations – Install CCTV cameras
	2012	Various locations – Deployment of ITS
	2013	59th Ave between Northern and Bethany Home, Glendale Ave between 51st Ave and 67th Ave, Peoria Ave between 47th Ave and 67th Ave – Variable message signs; ITS conduit and fiber
	2014	67th Avenue between Glendale and Cholla, near the intersection of 83rd/Maryland – Connect seven intersections to the city's central signal system and install four CCTV cameras along 67th Avenue and add equipment to a public safety building for redundant pathways between node buildings for city and RCN
Goodyear	**2011**	Citywide – Implement traffic signal system, including installation of ITS backbone and communications equipment
	2012	McDowell Rd: Sarival Rd to Litchfield Rd – Design and construct fiber-optic interconnection for traffic signals and video
	2013	Citywide – Design and construct fiber optic interconnect in existing conduit for traffic management through video surveillance and data collection
	2014	Van Buren Street – Estrella Parkway to Cotton Lane – Traffic signal connectivity to three existing and one future traffic signal and installation of CCTV cameras at key intersections
Maricopa County	**2007**	Regionwide – Construct AZTech™ smart corridors, Phase 3 (design-build)
	2008	Regionwide – System enhancements to expand arterial traveler information systems, including 511 and az511.gov
	2009	Bell Rd: Loop 303 to Loop 101 – Construct ITS improvements
	2009	Glendale, Peoria and Scottsdale City Limits – Establish REACT arterial incident response teams in Glendale, Peoria, and Scottsdale
	2010	MCDOT Traffic Management Center – Design and construct TMC upgrade
	2010	99th Ave: Olive Ave to Bell Rd – Install conduit and fiber optic cable to connect existing and planned ITS field devices
	2011	5 different locations – Upgrade traffic signals, including CCTV facilities
	2011	Bell Rd: Loop 303 to 75th Ave – Construct DMS and fiber optic cable and conduit
	2012	Olive Ave: Litchfield Rd to Loop 101 – Construct and install new conduit and fiber-optic cable to connect existing and planned ITS field devices
	2012	Regionwide – Upgrade regional archived data server (RADS) equipment
	2013	Regionwide – Develop and implement arterial ATIS enhancements, building on the previous Phase I efforts, 511 enhancements, and other key projects
	2013	McDowell Rd/Avondale Blvd, McDowell Rd/Estrella Pkwy, MC85/Avondale Blvd, MC85/Estrella Pkwy – Install arterial DMS (EB and WB) and associated conduit, pull boxes, fiber optic cable, communication equipment, and electrical service equipment – joint project with Avondale and Goodyear
	2013	Sun Valley Parkway: I-10 to Bell Rd Connection – Implement a wireless communications system and CCTV on Sun Valley Parkway.
	2014	Upgrade the Regional Archive Data Center Equipment and Systems
	2014	Various locations along MC85 from Aqua Fria Bridge West Terminal to 75th Ave – Implement ITS corridor improvements recommended in the MCDOT ITS Communications Plan

Table 8 – MAG TIP (2008-2013) Programmed ITS Projects (continued)

Agency	Year	Project
Mesa	**2008**	Mesa St: Mesa Dr to Mill Ave – Construct non-intrusive detection systems, cameras, dynamic message signs and one mile of fiber optic cable
	2008	Loop 202 – Design and install fiber optic cable and end devices and complete connections at network hubs
	2008	ITS Signal Conversions – Phase 3 – Expand fiber optic network and link 11 traffic signals to the Mesa TMC
	2009	Country Club Dr: 8th Ave to Baseline Rd (including US-60 TI) – Install real-time adaptive signal system
	2009	Various locations – Upgrade TMC equipment and purchase central components, field cameras and VMS
	2009	Along sections of Broadway, Dobson, Alma School and Baseline Rds – Establish fiber optic link on Broadway Rd and connect to west ITS loop
	2010	Baseline Rd, Southern Ave, Dobson and Alma School Rds – Establish fiber optic link with arterial streets near US-60
	2011	Various locations – Install fiber optic communications and upgrade traffic signal controllers
	2012	ITS Signal Conversions – Phase 5 – Improve existing fiber optic communications systems and install communications network and ITS devices
	2013	Ten intersections with highest crash rates within Mesa – Implement video and acoustic sensors with communications facilitated using existing traffic controller cabinets
	2013	West side mid-city, West city limits to Country Club, University to Broadway – Upgrade central traffic control system software to accommodate a lite version of adaptive control
METRO Light Rail	**2008**	I-17 Corridor – Bethany Home Rd to Dunlap Rd – Fixed guideway corridor – Northwest LRT Extension – Preliminary Engineering
Paradise Valley	**2009**	Various locations (12 intersections) – Install video detection systems
Peoria	**2008**	Traffic Management Center – Construct Traffic Management Center
	2011	Citywide – Design and construct extension to fiber optic backbone and install CCTV cameras
	2013	83rd Ave beginning at Lone Cactus Dr and continuing north to Jomax Rd – Installation of conduit, pull boxes, fiber, and CCTV cameras to connect signals to Central
	2014	Four corridors: Peoria Ave, Northern Ave, Olive Ave and 7th Ave – Upgrade the existing cabinets, traffic controllers, and loop detection to video detection and upgrading the hardware and software technology within the City's traffic signal control system
Phoenix	**2009**	Various locations – Construct regional ITS fiber optic backbone, Phase B-1
	2010	Various locations – Construct regional ITS fiber optic backbone, Phase B-2
	2011	Various locations – Construct regional ITS telecommunications expansion
	2014	ITS Strategic Plan
	2014	Fiber Optic Backbone Expansion Phase B
Queen Creek	**2008**	Queen Creek Town Center – Construct ITS infrastructure and traffic management system
	2011	Townwide – Design and construct/implement ITS hardware and software
	2012	Ellsworth Rd: Sierra Park Blvd to Empire Blvd – Construct traffic signal/CCTV system
	2012	Rittenhouse Rd: Sossaman Rd to 204th St alignment – Construct traffic signal/CCTV system
	2013	Various locations townwide – Establish ten wireless traffic signal connections

Table 8 – MAG TIP (2008-2013) Programmed ITS Projects (continued)

Agency	Year	Project
Scottsdale	**2008**	Scottsdale Rd: Pima Fwy to Indian School Rd – Construct smart corridor traffic control system
	2008	Area enclosed by McKellips Rd to Indian School Rd and 64th St to Pima Rd – Replace traffic signals controllers and cabinets
	2009	Scottsdale Rd: Frank Lloyd Wright Blvd to Thompson Peak Pkwy – Construct smart corridor traffic control system
	2009	South Scottsdale – Controller and cabinet replacement
	2010	McDowell Rd: Scottsdale Rd to Pima Rd – Construct smart corridor traffic control system
	2011	Scottsdale and Hayden Rds: Shea Blvd to McDowell Rd – Install detection equipment, variable message signs and software
	2012	Area enclosing Shea Blvd to Carefree Hwy and 56th St to 136th St – Install dynamic message signs
	2012	South Scottsdale – Replace traffic signal controllers and cabinets
	2013	Citywide – Establish last-mile connections from city fiber network
	2014	Adaptive traffic control at Frank Lloyd Wright Blvd and Loop 101
Surprise	**2008**	Surprise Center Parkway at Statler Blvd – Supply and install TMC equipment (phase 1)
	2008	Bell Rd at Coyote Lakes, Dysart Rd and 134th Ave – Equipment (CCTV cameras) and installation
	2010	Bell Rd: US-60 to Surprise Traffic Management Center – Construct fiber optic interconnection of traffic signals, cameras and VMS
	2010	Greenway Rd: US-60 to Cotton Ln – Construct fiber optic interconnection of traffic signals, cameras and VMS
	2011	Peoria Ave: Litchfield Rd to Jackrabbit Rd – Design and construct fiber optic cable interconnection of existing and future ITS facilities
	2012	Bell Rd: Loop 303 to Jackrabbit Trail (195th Ave) – Design and connect traffic signals, CCTV cameras and changeable message signs
	2013	Cotton Lane from Peoria Ave to Bell Rd – Optical fiber interconnect of signals, CCTV cameras, dynamic message signs, and connection to ITS fiber backbone
	2009	Citywide – Purchase and install malfunction management units in all traffic control cabinets
	2010	Citywide – Install video detection system
	2011	Various locations – Install fiber optic connection between ADOT FMS backbone and signal cabinets at 22 interchanges
	2011	Various locations – Install wireless communications and CCTV monitoring at 26 intersections
	2012	Citywide – Design and construct fiber optic cable installations
	2012	Light Rail Transit Corridor in Tempe – Install CCTV monitoring stations
	2013	Procure and install traffic control cabinets and hardware – Phase 1 of 3
	2014	Corridors of Elliot/Guadalupe/Warner – use existing conduit along Elliot for fiber optic communication to signals and wireless radios for signals along Guadalupe and Warner with CCTVs installed at the major intersections

3.3.2 Other Planned Infrastructure

This section includes a brief description of the types of planned infrastructure that has been captured as part of the survey that was distributed to stakeholders. These projects are not specifically identified in the MAG TIP table above because they are either funded through local agency funds or are in the conceptual stages of planning at this time.

- Many agencies in the MAG Region are expanding their current ITS program by adding CCTV cameras, DMS, portable ITS devices, fiber optic cable, and traffic detection capabilities to their jurisdiction's transportation network. Some of this planned infrastructure is shown in the MAG TIP projects table. There are additional infrastructure projects funded by the county and local agency sources to support adding ITS and communications to their transportation networks;
- Agency coordination between Gilbert, Mesa, Chandler, and Queen Creek for operations of ITS devices such as CCTV and DMS are in the planning stages primarily to coordinate management along corridors that cross into multiple jurisdictions;
- Goodyear and Avondale are planning in the future to share monitoring and detection information regarding arterial corridors that span both jurisdictions;
- Initial agency connections to the RCN are planned to be deployed in the near-term timeframe and additional agencies will connect to the network in subsequent phases of the RCN program;
- The AZTech™ C2C project currently communicates to the traffic signal system of i2TMS. Additional traffic signal systems will be added to the protocol development for sharing of traffic signal timing plan information between agencies;
- MCDOT's ATIS will provide a centralized arterial traveler information system that will integrate with ADOT's 511 system;
- Surprise has plans to implement video detection and preemption devices along key corridors in their jurisdiction which will support incident management and emergency operations; and
- Phoenix Public Transit is evaluating many technologies and services that will enhance their ability to share transit information with the public as well as coordinate with their operators on real-time conditions. Of particular note is planning to upgrade their web trip planning software to provide real time data and to display a map when customers use the web trip planner.

4. LOGICAL ARCHITECTURE

The MAG RIA update includes both a logical architecture component and a physical architecture component. A logical architecture focuses on the processes and activities to deliver specific ITS services. It describes what various systems and agencies need to do to meet the needs of users (for travelers as well as system operators and managers). The physical architecture links to specific centers, infrastructure and system components, and focuses on how systems and agencies are linked and connected to share specific information or control various elements of the ITS systems and networks.

The logical ITS architecture was the second major step in developing the RIA update for the MAG Region. Although not required as part of the FHWA Final Rule/FTA Policy on Architecture Conformity and Standards, the logical architecture provides a tangible link to specific ITS User Services (processes) that can then be traced to the infrastructure and systems in the physical architecture. This logical architecture maps the user needs and inventory with applicable User Services from the National ITS Architecture, as well as defines User Service Requirements for those user services. The MAG RIA provides a link to the physical architecture through the use of equipment packages.

MAG's goal for focusing on the logical architecture component is to provide a level of traceability between User Services and the physical elements and infrastructure that comprise the functionality identified in the physical architecture. The logical architecture also helps to describe what ITS does from a user's perspective. The goal of this logical architecture is to:

- Identify applicable User Services and User Service Requirements from the National ITS Architecture for the MAG Region, and link these to the goals and objectives from Technical Memorandum #1;
- Identify appropriate subsystems from the National ITS Architecture that can guide the development of the physical architecture in the next task;
- Identify a preliminary set of equipment packages that can be further refined during the physical architecture development; and
- Provide a means for establishing traceability from the physical architecture back to goals, objectives and User Services/User Service Requirements.

4.1 Traceability Between the Logical and Physical Architectures

There are two parallel efforts that work together to provide the foundation for building the RIA and customizing the components and market packages within the physical architecture. One aspect, the "traveler perspective", identifies what ITS needs to do to provide the required services to users of the transportation system. This concept is rooted in User Services and User Service Requirements, and is captured within the logical architecture. The second aspect is the "agency perspective", and identifies what physical components need to be deployed, integrated and operated (and by which agency) in order to deliver the desired services and functionality outlined in the user services and user services requirements. Both are important to achieve the overall goals and purpose of implementing ITS and communications in the MAG Region, but they each have a different focus.

The "Traveler Perspective" describes the traveler's experience in using the systems that agencies have planned and implemented. The goals and objectives of the MAG Region as defined in Section 2.2 describe the services that the agencies would like the traveler to experience and be able to use during their travel. There services are described in the National ITS Architecture as "User Services" that define broad functionality that the systems in the MAG Region perform for the traveler. User Service Requirements describe in more detail what will

need to be provided to the traveler and to the agencies to address a particular User Service. Both of these elements provide the foundation for the logical ITS architecture.

The "Agency Perspective" describes the interaction between agencies and devices that occurs to be able to manage the systems in the MAG Region. The ability to perform traffic management, incident management, and emergency response is rooted in the types of devices and communications that agencies utilize manage the roadways. The "Agency Perspective" begins with the implementation of devices and communications called Inventory. Equipment Packages are ultimately those services that the agency is performing that are using the inventory in each jurisdiction for the benefit of the traveling public. For example, real-time traffic condition information is shared between the center subsystem (traffic management center [TMC]) and the field subsystems (traffic signals) to be able to perform TMC Traffic Control which is an equipment package defined by the National ITS Architecture.

One important link between the logical architecture and the physical architecture is the relationship between the User Service Requirements (logical architecture) and the Equipment Packages (functional elements within the physical architecture). The User Service Requirements identified in this technical memorandum will provide traceability from the logical to the physical components.

The two perspectives are shown in **Figure 3** below.

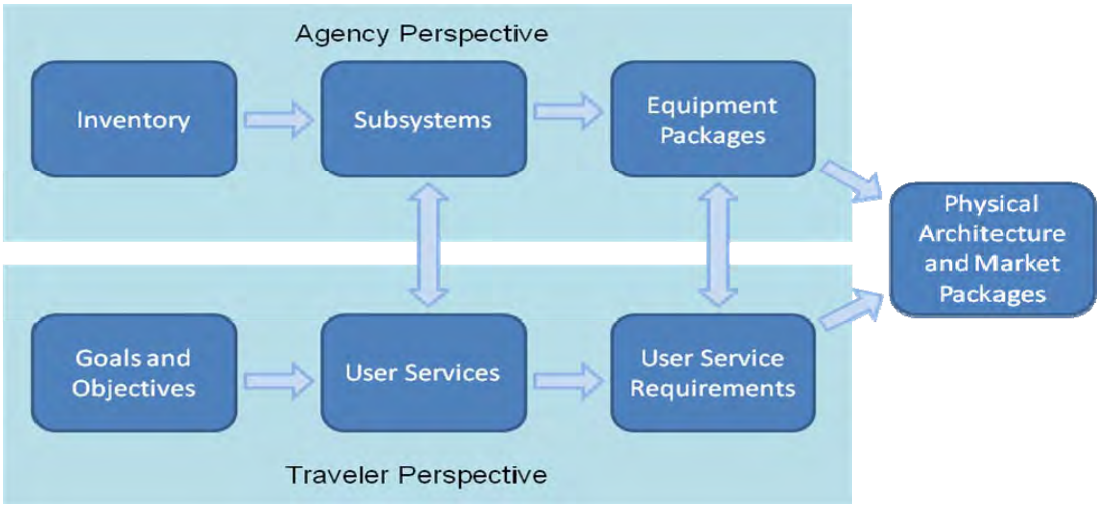


Figure 3 – Logical Architecture Development Process

As the process is developed, the perspectives in each step relate to one another by the type of input that it is providing to the logical architecture as well as the level of detail. Subsystems describe the physical entities that need to be currently operating or planned for the future in order for the User Service to be selected as appropriate for the MAG Region. For example, there is currently no commercial vehicle function that agencies in the MAG Region perform, which means that the commercial vehicle subsystem as well as any User Service that requires a commercial vehicle subsystem to interact with a center or other subsystem has been removed. The Equipment Packages are used as a check against the User Service Requirements to ensure that each are describing **how** the Subsystems and User Services, respectively, will be used in the MAG Region.

4.2 User Services and User Service Requirements

User Services in the National ITS Architecture describe broad functionality that the systems in the MAG Region perform for the traveler – what ITS should do from the user's perspective. The "Traveler Perspective" describes the traveler's experience in using the systems that agencies have planned and implemented. User Service Requirements describe in more detail what will need to be provided to the traveler and to the agencies to address a particular User Service.

4.2.1 User Services

User Services describe the transportation services that ITS can provide in the MAG Region to satisfy the user's needs. There are 33 User Services in the National ITS Architecture. User Services describe what types of actions are current and planned and how those actions relate by the types of information they share. User Services that apply to the MAG Region:

- Travel and Traffic Management
- Public Transportation Management
- Electronic Payment
- Emergency Management
- Information Management
- Maintenance and Construction Management

Two User Services were not identified as being applicable to the MAG Region:

- **Commercial Vehicle Operations** – these User Services apply primarily to private sector fleet/freight management, on-board freight applications, as well as border crossing technologies. This is not to say that Commercial Vehicle Operations would not be included as part of a different ITS architecture in Arizona (such as a statewide ITS architecture), but they do not represent services that are needed or envisioned in the MAG Region.
- **Advanced Vehicle Safety Systems** – this User Service bundle includes systems on-board vehicles (typically personal traveler vehicles) for crash avoidance, intersection warning systems, and other safety enhancements. The reason they were not included in the User Services for the MAG Region is because these types of safety systems would not be implemented by MAG member agencies; they would be led by private industry. One item to note is that with the emerging Vehicle Infrastructure Integration efforts being led by partners in this Region, there may be some applicability of some elements of this User Service bundle.

Each of the User Service bundles has many processes under them called User Service Requirements. These requirements describe in more detail the actions that take place to monitor, control, manage, and report on the ITS systems in the MAG Region. These are discussed in more detail in Section 4.2.2.

Table 9 maps the regional transportation goals and objectives as outlined in Section 2.2 to the User Services in the National ITS Architecture in order to identify candidate User Services for this region. The goals and objectives describe the services that the agencies would like the traveler to experience and be able to use during their travel, as well as capabilities that agencies need to provide the operational services identified. User Services that do not have identified functionality in the MAG Region based on the goals and objectives were not carried forward in this architecture. The Public Transportation Management User Service (2.1) has been separated into two categories because of the broad

topics that provide that service as a whole. These have been separated out in the table for clarification, and are an extension of the User Services in the National ITS Architecture. It is important to note that the Electronic Payment User Service (3.1) applies to transit operations in the MAG Region and does not include any tolling or parking payment services.

Table 10 defines the User Services that were selected for the MAG Region based on existing and planned inventory as well as the programs and services that are offered in the Region to support multiple agency operations. Many of the identified User Services are already established in the MAG Region through existing agency programs and systems.

Table 9 – Goals and Objectives Mapped to National ITS Architecture User Services

Operational Category	Goals and Objectives	Applicable User Services																					
		Travel and Traffic Management										Public Transportation Management						Electronic Payment	Emergency Management			Info. Mgmt	Maint. and Const. Mgmt
		1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	2.1	2.1a	2.1b	2.2	2.3	2.4	3.1	5.1	5.2	5.3	7.1	8.1
		Pre-Trip Travel Information	En-Route Driver Information	Route Guidance	Ride Matching and Reservation	Traveler Services Information	Traffic Control	Incident Management	Travel Demand Management	Emissions Testing and Mitigation	Highway Rail Intersection	Public Transportation Management	Transit Operations	Communications Management	En-Route Transit Information	Personalized Public Transit	Public Travel Security	Electronic Payment Services	Emergency Notification and Personal Security	Emergency Vehicle Management	Disaster Response and Evacuation	Archived Data	Maintenance and Construction Operations
Traffic Management	Increase automated traffic data collection and archiving ability	X	X				X															X	
	Establish integrated freeway-arterial corridor operations for major arterial corridors						X	X														X	
	Enhance traffic management capabilities for normal conditions and special events	X	X				X															X	
	Provide advanced warning at railroad/street crossings										X												
	Coordinate signal systems within single jurisdictions and across jurisdictional boundaries						X																
	Increase ITS device shared operation partnerships along key arterial corridors						X																
	Establish center-to-center communications between traffic management agencies in the region		X				X	X														X	
Incident/Emergency Management	Improve incident detection capabilities and reduce incident clearance times						X	X											X			X	
	Increase incident information sharing between traffic management and public safety agencies for cooperative freeway and arterial incident management						X	X											X	X	X	X	
Transit Operations	Improve bus progression using traffic signal priority						X					X	X										
	Enhanced transit service (routes, frequency, hours, security, payment, and real-time transit information)	X			X				X			X	X	X	X		X	X					

		Applicable User Services																					
		Travel and Traffic Management										Public Transportation Management						Electronic Payment	Emergency Management			Info. Mgmt	Maint. and Const. Mgmt
		1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	2.1	2.1a	2.1b	2.2	2.3	2.4	3.1	5.1	5.2	5.3	7.1	8.1
Operational Category	**Goals and Objectives**	Pre-Trip Travel Information	En-Route Driver Information	Route Guidance	Ride Matching and Reservation	Traveler Services Information	Traffic Control	Incident Management	Travel Demand Management	Emissions Testing and Mitigation	Highway Rail Intersection	Public Transportation Management	Transit Operations	Communications Management	En-Route Transit Information	Personalized Public Transit	Public Travel Security	Electronic Payment Services	Emergency Notification and Personal Security	Emergency Vehicle Management	Disaster Response and Evacuation	Archived Data	Maintenance and Construction Operations
	Coordinate roadway closure/construction information with transit agencies							X				X	X	X	X								X
Traveler Information	Improve accuracy, timeliness, and availability of real-time, multi-modal traveler information to the public	X	X				X	X							X				X				X
	Increase the use of DMS for more types of traffic, work zone and incident information, including travel times	X	X				X	X															X
	Integrate transit information with traveler information services	X	X												X								

Table 10 – User Services Selected for the MAG Region

#	User Service	Description	MAG Region Application
		Travel and Traffic Management	
1.1	Pre-Trip Travel Information	• Allows travelers to access a complete range of real-time multimodal transportation information at home, work, and other major sites where trips originate • Information on road network conditions, incidents, weather, and transit services, are conveyed through these systems to provide travelers with the latest conditions and opportunities in order to plan their travel	511, HCRS information on roadway conditions az511.gov website Valley Metro transit and METRO Rail web sites Local media providers (TV, radio and web)
1.2	En-Route Driver Information	• Provides driver advisories to convey information about traffic conditions, incidents, construction, transit schedules, and other mode choice options to drivers of personal, commercial, and public transit vehicles	Permanent and portable DMS (freeways and arterials) 511 Media broadcasts (radio)
1.4	Ride Matching and Reservations	• Provides real-time ride matching information and reservations to travelers in their homes, offices or other locations, and assists transportation providers with vehicle assignments and scheduling	Rideshares Dial-a-Rides
1.6	Traffic Control	• Provides for the integration of the freeway and surface street systems and gives preference to transit and public safety vehicles • Real-time traffic information collected by this service is also disseminated for use by many other user services	Operational control and management of devices (signals, ramp meters, cameras, etc.) Agency TMC/TOC TMC information sharing
1.7	Incident Management	• Utilizes sensors, data processing, and communications to improve the incident management and response capabilities of transportation and public safety officials, the towing and recovery industry, and others involved in incident response • This service will help these groups to quickly and accurately identify incidents and implement a response	Coordination among public safety and transportation management for incident response operations Specialized incident response programs (ALERT, FSP, REACT) Integration of public safety systems with traffic management
1.8	Travel Demand Management	• Generates and communicates management and control strategies that support the implementation of programs to reduce the number of individuals who choose to drive alone; increase the use of high occupancy vehicles and transit; and provide a variety of mobility options for those who wish to travel in a more efficient manner, for example in non-peak periods	Collection of data to support multi-modal strategy implementation Ridematching and ridesharing services
1.10	Highway Rail Intersection	• Uses ITS technologies to provide improved control of highway and train traffic to avoid or decrease the severity of collisions that occur between trains and vehicles at highway/rail intersections	Highway/rail with ADOT facilities, highway/rail with municipal facilities
		Public Transportation Management	
2.1 2.1a 2.1b	Public Transportation Management Transit Operations Communications Management	• Automates the operations, planning and management functions of public transit systems • Monitors the location of transit vehicles, identifies deviations from the schedule, and offers potential solutions to dispatchers and operators • This service will help maintain transportation schedules and assure transfer connections between modes and can be coupled with traffic control services to facilitate quick response to service delays	Transit systems and technologies for real-time location, schedule and operations information Integration of transit with traffic/transportation management to share information

Table 10 – User Services Selected for the MAG Region (continued)

#	User Service	Description	MAG Region Application
		Public Transportation Management	
2.2	En-Route Transit Information	• Provides information to travelers using public transportation after they begin their trips • Real-time, accurate transit service information will be available on-board the vehicle, at transit stations and bus stops to assist travelers in making informed decisions	Transit traveler information through station displays, and on-board systems. Future systems may include next-bus arrival information at stops
2.4	Public Travel Security	• Creates a secure environment for public transportation patrons, operators, and support staff • Provides systems that monitor the environment in transit facilities, transit stations, parking lots, bus stops and on-board transit vehicles and generates alarms when necessary	Security surveillance on-board vehicles and at transit stops
		Electronic Payment	
3.1	Electronic Payment Services	• Allows travelers to pay for transit services with a common electronic payment medium for all transportation modes and functions	Passenger fare counting for transit ridership, universal form of payment for Light Rail and bus system
		Emergency Management	
5.1	Emergency Notification and Personal Security	• Provides the ability for travelers to notify appropriate emergency response personnel regarding the need for assistance due to emergency or non-emergency situations • Provides for monitoring, threat alerts, and automated security system support in secure areas including transportation infrastructure • Provides wide area alert to notify the traveling public in emergency situations such as child abductions, severe weather watches and warnings, natural and human-caused disasters, military operations, and civil emergencies where lives and/or property are at stake	AMBER Alerts MAG CENS (Reverse 911 System)
5.2	Emergency Vehicle Management	• Oriented towards reducing the time from receipt of notification of an incident by a operator to arrival of the emergency vehicles on the scene • Includes improved communications between response vehicles and the Public Safety Answering Point dispatch center to provide improved display of emergency vehicle location and automation support to dispatchers to help them dispatch the vehicle that can most quickly reach the incident site • Provides route guidance and preemption of traffic signals on an emergency vehicle's route	Public safety AVL systems Traffic signal preemption for emergency responders Access to real-time road and traffic conditions information by public safety dispatch centers
5.3	Disaster Response and Evacuation	• Uses ITS to enhance the ability of the surface transportation system to respond to disasters • Provides enhanced access to the scene for response personnel and resources, provides better information about the transportation system in the vicinity of the disaster, and provides more efficient, safer evacuation for the general public if needed	AMBER Alert, disaster/evacuation traveler information dissemination, MAG CENS
		Information Management	
7.1	Archived Data	• Provides an ITS historical data archive for all relevant ITS data and will incorporate the planning, safety, operations, and research communities into ITS • Provides the data collection, manipulation, and dissemination functions of these groups, as they relate to data generated by ITS	Local agency archive system, HCRS, RADS

Table 10 – User Services Selected for the MAG Region (continued)

#	User Service	Description	MAG Region Application
		Maintenance and Construction Management	
8.1	Maintenance and Construction (MC) Operations	• Integrates key activities to ensure that roadways, associated infrastructure, and available resources are coordinated in the best possible manner • Areas covered by this user service are maintenance vehicle fleet management, roadway management, work zone management and safety, and roadway maintenance conditions and work plan dissemination	Maintenance vehicle, maintenance dispatch, coordination with traffic management

4.2.2 User Service Requirements

The User Services applicable to the MAG Region were determined based on identified goals and objectives from the previous task of this project. From the chosen User Services, more specific Requirements have been identified. These User Service Requirements define the processes (the activities or functions) that are required to satisfy the user services identified as part of this task. They are typically phrased in "shall" statements.

In the Archived Data User Services, for example, the requirements describe how the Archived Data function controls the archiving and distribution of ITS data through five key areas: managing the operations data integrity, acquire historical data, permanently archiving the data, integrating and processing the data products for the public agencies that can use them, and links to the data server that allows users to retrieve the data. In this example, the Archived Data User Service is describing what the data servers in the MAG Region as a whole are expected to do – not each individual archive.

To continue the example of the Archived Data User Service, one type of archived data service that is provided in this Region is ADOT's Highway Condition Reporting System (HCRS). The HCRS is an event-driven database that archives the construction and incident information directly entered into the database. HCRS receives traffic data and images information from the freeway management system as well as receives information from local agencies regarding the road closure and restriction status of main corridors in the arterial network. Each agency in the MAG Region is linked to HCRS to provide information to it or pull information from it. HCRS is generally an event-driven and actively updated database that is used for disseminating traveler information, sharing information with other agencies, archiving historical data for planning purposes, and a multitude of other uses. The archived data system that feeds the HCRS with freeway management system data is the RADS which also collects arterial traffic signal information.

An additional example is shown below:

User Service Bundle: Travel and Traffic Management

User Service: En-Route Driver Information

The En-Route Driver Information user service provides driver advisories to convey information about traffic conditions, incidents, construction, transit schedules, and other mode choice options to drivers of personal, commercial, and public transit vehicles.

Sample User Service Requirement:

ITS shall include an En-Route Driver Information (DI) function. Driver Information provides vehicle drivers with information, while en-route, which will allow alternative routes to be chosen for their destination. Driver Information consists of two major functions, which are, (1) Driver Advisory and (2) In-vehicle Signing. The potential decrease in traffic may also provide benefits in highway safety, reduced air pollution, and decreased congestion.

Applicable User Service Requirements from the National ITS Architecture for the MAG Region are listed in **Appendix B**. Not all User Service Requirements have been carried forward for consideration. The User Services and User Service Requirements described in this section and in the appendix have been filtered from their original state in the National ITS Architecture to align with functionality and objectives in the MAG Region. **The details of the actual and physical interactions and relationships between agencies to make this functionality occur are part of the physical ITS architecture development.**

4.3 Subsystems and Equipment Packages

The "Agency Perspective" begins with the implementation of devices and communications systems that are part of the regional inventory. Equipment Packages are ultimately those services that the agency is performing that are using the inventory elements for the benefit of the traveling public. For example, real-time traffic condition information is shared between the center subsystem (TMC) and the field subsystems (traffic signals) to be able to perform TMC Traffic Control which is an equipment package defined by the National ITS Architecture.

4.3.1 System Interconnect

The National ITS Architecture provides a comprehensive list of subsystems that are used in general architectures. **Figure 4** shows a system interconnect diagram, or "sausage diagram" which identifies the subsystems and primary interconnects among subsystems in the MAG Region. The National ITS Architecture interconnect diagram has been customized for the MAG Region based on the inventory gathered from stakeholders. This figure summarizes the existing, planned, and future ITS elements for the MAG Region in the context of a high-level physical interconnect. Those boxes that are shaded in gray are not being used currently in the MAG Region and are not planned for the future.

The primary purpose of the architecture is to identify specific connectivity between transportation systems and elements in the MAG Region. **Figure 4** also shows the high-level relationships of the subsystems in the MAG Region. How the systems actually interface with each other on a physical communication level is an integral part of the physical ITS architecture developed in a later task.

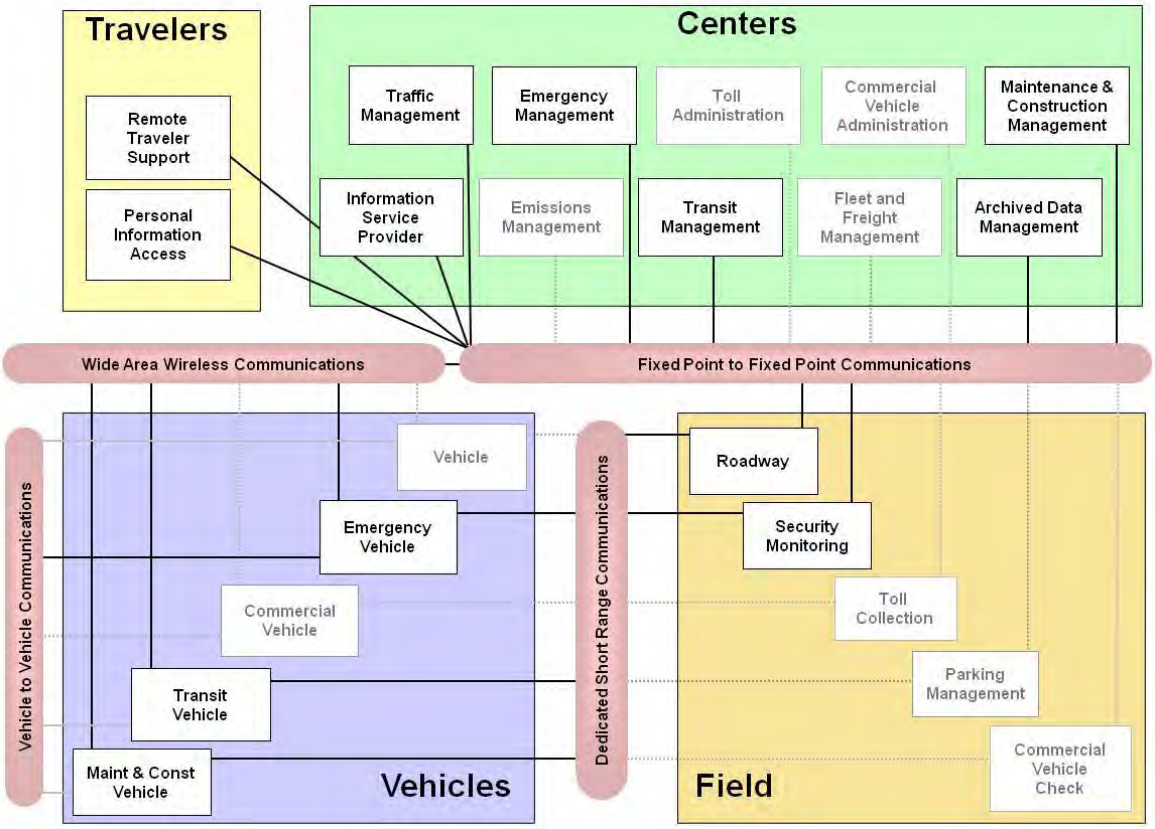


Figure 4 – MAG Region System Interconnect Diagram

4.3.2 Subsystems and Equipment Packages

Subsystems have been mapped to the Inventory which are then mapped to corresponding Equipment Packages. Equipment Packages are those services that the agency is performing that are using the subsystems in each jurisdiction for the benefit of the traveling public. Equipment Packages are essentially a small concept of operations describing a function being performed from the agency perspective. They are a key link between the logical architecture and the physical architecture because the concepts that are discussed at a high level in this logical architecture can be broken down into their physical ability to be performed by the agencies involved. User Service Requirements are another key link to the physical architecture and those were described previously in Section 4.2.2.

There are specific subsystems, such as the Toll Collection Field Subsystem, that would not be included in this architecture because toll collection is not being used on roadways currently in the MAG Region. If tolling or congestion pricing is identified as part of a future strategy, this would need to be updated within the RIA to show that future functionality. Subsystems that are identified in this table will be brought forward into the physical ITS architecture to be able to categorize the inventory in the MAG Region.

Equipment packages describe specific pieces of functionality that need to occur in the region in order for the user services to be provided to the traveling public. Equipment packages take the subsystems and designate deployment-sized pieces that can be applied to that subsystem to demonstrate the desired functionality of services in the region. Equipment

packages provide a detailed view of the architecture and are tied to specific market packages and specific inventory items as shown on the MAG ITS Architecture website.

Equipment packages group similar processes of a particular subsystem together into an "implementable" package. In the architecture website, equipment packages have been provided for each of the specific inventory items as shown in the "Inventory by Stakeholder" sublink. Multiple equipment packages are linked to that subsystem based on the different kinds of functionality that the one inventory item provides. For example, the ADOT DMS inventory item is involved in the functionality of "Roadway Freeway Control", "Roadway Traffic Information Dissemination", "Roadway Equipment Coordination", and others. Each one of those equipment packages is technology-neutral but describes the functionality of the ADOT DMS. Similarly, the DMS in other agencies, such as City of Chandler DMS and City of Scottsdale DMS provide the same or similar functionality as the ADOT DMS; therefore, the equipment packages will be the same or similar to those represented for the ADOT DMS.

While market packages describes function or service that is provided when multiple subsystems work together to share information and operate devices/systems, equipment packages describe the specific functionality that one element in the market package must have in order to be part of that market package to provide that service. In the example described above, ADOT DMS provides traveler information to travelers. That functionality is described in the equipment package "Roadway Traffic Information Dissemination" and is represented in the market package "ATMS06 – Traffic Information Dissemination." Multiple subsystems are shown in each market package and thus multiple equipment packages are represented by each market package.

As market packages were updated throughout the course of this project, equipment packages were added/removed/updated to be consistent with the market packages. It is important to note that only three of the many equipment packages that apply to this individual market package are shown in **Figure 5** on the next page. This figure is provided to show the relationship of the equipment package to market packages. Equipment packages are linked to the inventory rather than the market packages on the architecture website due to the complex overlaps that occur within the market packages. Therefore, when agencies are reviewing the website for their project applicability in the architecture, the agency should select the appropriate inventory item to identify the market packages and equipment packages that would apply to that project.

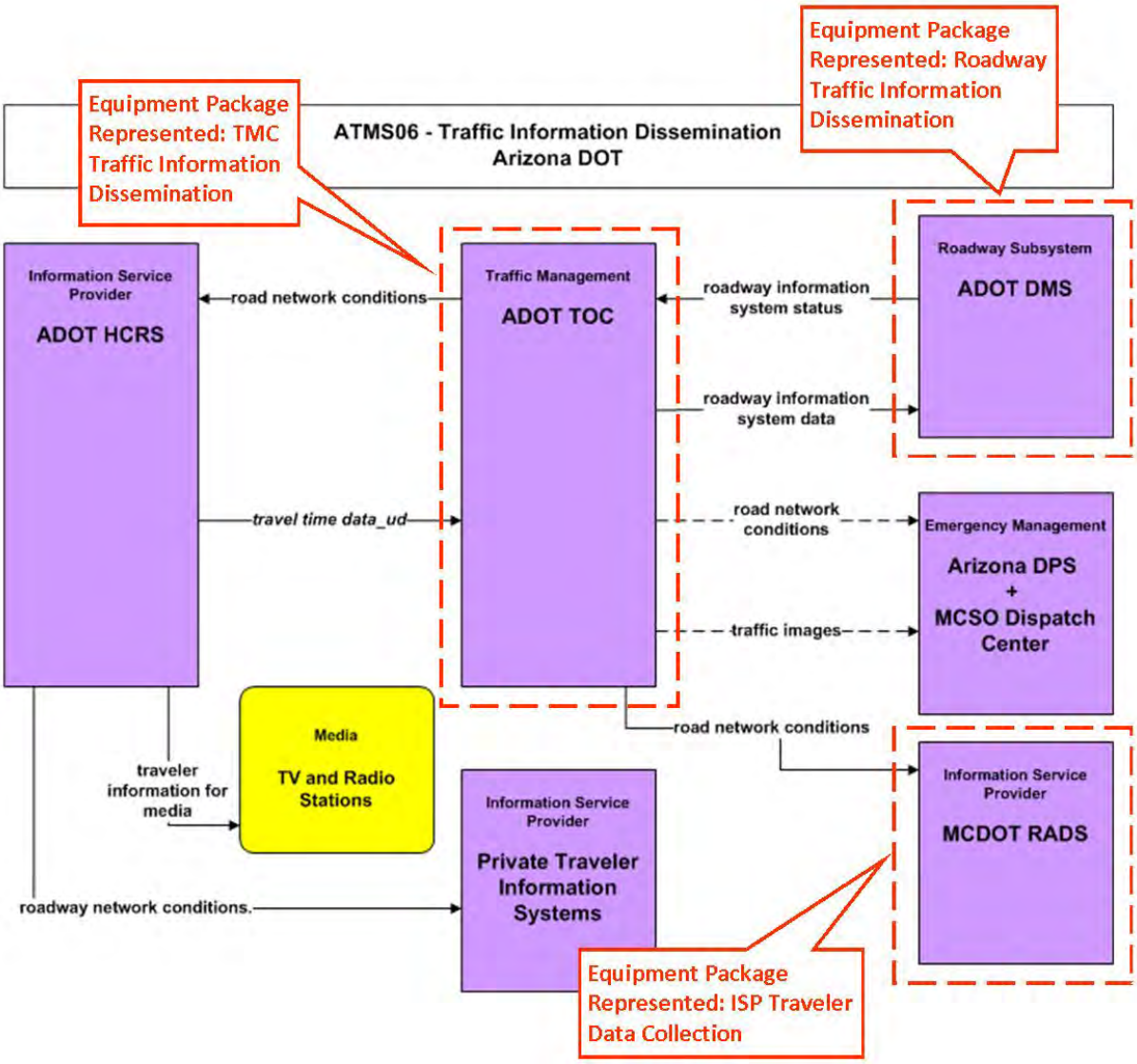


Figure 5 – Link Between Equipment Packages and Market Packages

Equipment packages describe the functionality of each subsystem ultimately through detailed functional requirements. ITS standards documented in this architecture provide interoperability capabilities for the architecture elements to be able to communicate. These standards are produced by the Turbo Architecture database which uses the inventory and market packages in this architecture to develop the list of standards to apply in this region. Subsystems and equipment packages that are applicable to the MAG Region are provided in **Table 11**; these are currently being used in the MAG Region in some capacity.

Table 11 – Subsystems and Equipment Packages for the MAG Region

Type	Subsystem	Inventory	Equipment Packages
Centers	Archived Data Management Subsystem	HCRS Local agency archives RADS server	ITS Data Repository Traffic and Roadside Data Archival Virtual Data Warehouse Services
	Emergency Management	Local Emergency Management Dispatch (City Police/Fire) County Emergency Management Dispatch (MCSO) State Emergency Management Dispatch (DPS) City Emergency Operations Centers (EOCs) County EOC Arizona Department of Emergency Management	Emergency Call-Taking Emergency Data Collection Emergency Dispatch Emergency Early Warning System Emergency Environmental Monitoring Emergency Evacuation Support Emergency Response Management Emergency Routing Incident Command Service Patrol Management
	Information Service Provider	HCRS RADS AZ511 City Websites Transit Websites Private Sector Providers (Media, Traffic.com, Others) MAG CENS (Reverse 911 System)	Basic Information Broadcast ISP Data Collection ISP Emergency Traveler Information ISP Operational Data Repository ISP Traveler Data Collection ISP VII Traveler Information Distribution Traveler Telephone Information
	Maintenance and Construction Management (MCM)	City Public Works County Maintenance ADOT Phoenix District Maintenance	MCM Data Collection MCM Environmental Information Collection MCM Incident Management MCM Roadway Maintenance and Construction MCM Vehicle Tracking MCM Work Activity Coordination MCM Work Zone Management
	Traffic Management	ADOT TOC County DOT City TMCs	Collect Traffic Surveillance HRI Traffic Management Rail Operations Coordination TMC Freeway Management TMC Incident Detection TMC Incident Dispatch Coordination/Communication TMC Multimodal Coordination TMC Regional Traffic Management TMC Signal Control TMC Speed Monitoring TMC Traffic Information Dissemination TMC Work Zone Traffic Management Traffic Data Collection Traffic Maintenance
	Transit Management	Transit Dispatch/Operations Center	Transit Center Fare Management Transit Center Fixed-Route Operations Transit Center Information Services Transit Center Multi-Modal Coordination Transit Center Paratransit Operations Transit Center Passenger Counting Transit Center Security Transit Center Vehicle Tracking Transit Data Collection

Table 11 – Subsystems and Equipment Packages for the MAG Region (continued)

Type	Subsystem	Inventory	Equipment Packages
Field	Roadway Subsystem	Freeway permanent CCTV Arterial permanent CCTV Freeway permanent DMS Freeway portable DMS Arterial permanent DMS Arterial portable DMS Freeway ramp meters Freeway ramp meter w/preemption Freeway ramp meter w/priority (transit) Signalized intersections (not tied to TMC) Signalized intersections (tied to TMC) Signalized intersection w/preemption Signalized intersection w/priority (transit) Video Image Detection Loop detection Other detection (private sector, ITIP, other) Red light running enforcement Photo radar enforcement Weigh in Motion Railroad crossings Flood sensors	Advanced Rail Crossing Roadway Basic Surveillance Roadway Data Collection Roadway Environmental Monitoring Roadway Equipment Coordination Roadway Freeway Control Roadway Incident Detection Roadway Signal Controls Roadway Signal Priority Roadway Speed Monitoring Roadway Traffic Information Dissemination Roadway Work Zone Safety Roadway Work Zone Traffic Control Standard Rail Crossing
Travelers	Personal Information Access	Personal Information Access Devices (Cell Phones, Email, PDAs)	Personal Autonomous Route Guidance Personal Basic Information Reception Personal Interactive Information Reception
	Remote Traveler Support	Traveler Information Displays (Transit and LRT Stations, Rental Car Center Traveler Information Displays)	Remote Basic Information Reception Remote Interactive Information Reception
Vehicles	Emergency Vehicle Subsystem	Law Enforcement Emergency Services Freeway Service Patrol ALERT REACT	On-board Emergency Vehicle En-Route Support On-board Emergency Vehicle Incident Management Communication
	Maintenance and Construction Vehicle	City Maintenance/Construction with Automated Vehicle Location County Maintenance/Construction with Automated Vehicle Location	MCV Roadway Maintenance and Construction MCV Vehicle Location Tracking MCV Work Zone Support
	Transit Vehicle Subsystem	Transit Vehicles with Automated Vehicle Location	On-board Maintenance On-board Passenger Counting On-board Transit Fare Management On-board Transit Information Services On-board Transit Security On-board Transit Signal Priority

4.4 Using the Logical Architecture to Develop the Physical Architecture

The inventory, goals and objectives in the MAG Region have been used to identify the applicable User Service Requirements and Equipment Packages. These tools will be used moving into the physical architecture as a representation of what is currently happening in the MAG Region. The physical architecture will describe how the services happen through sending information to and from specific subsystems. Each one of these services, and the actual information transfer that occurs to perform that service, is described as a Market Package in the National ITS Architecture. **Figure 6** below depicts the interrelationships that the "Traveler Perspective" and the "Agency Perspective" have to build the foundation for the physical architecture. It is important to consider that the "Agency Perspective" which includes the physical elements in the logical architecture is what the physical architecture uses as a basis for information. The subsystems and equipment packages are highlighted in this figure as the direct lead to the physical architecture with the user services and user service requirements describing from the users' perspective what the service should do.

Figure 6 depicts a specific example of the relationship between the subsystem, equipment package and the physical architecture. The "Center Subsystem" (identified as a TMC in the MAG Region) provides a service to the traveler called "Traffic Control" (User Service 1.6) which has many user service requirements that need to be performed in order to provide that service to the traveling public. In order to provide the "Traffic Control" service, the TMC physically operates the equipment package called "TMC Signal Controls" which describes at a high level how the roadway signals are physically controlled by the TMC. In order to actually physically control the roadway signals, specific information flows need to be identified between the TMC and the roadways signals which bridges the gap between the logical architecture and the physical architecture. The physical architecture will be used to identify the specific information flows as well as the functions of the MAG Region. Signal control is only one component of the "Surface Street Control" market package.

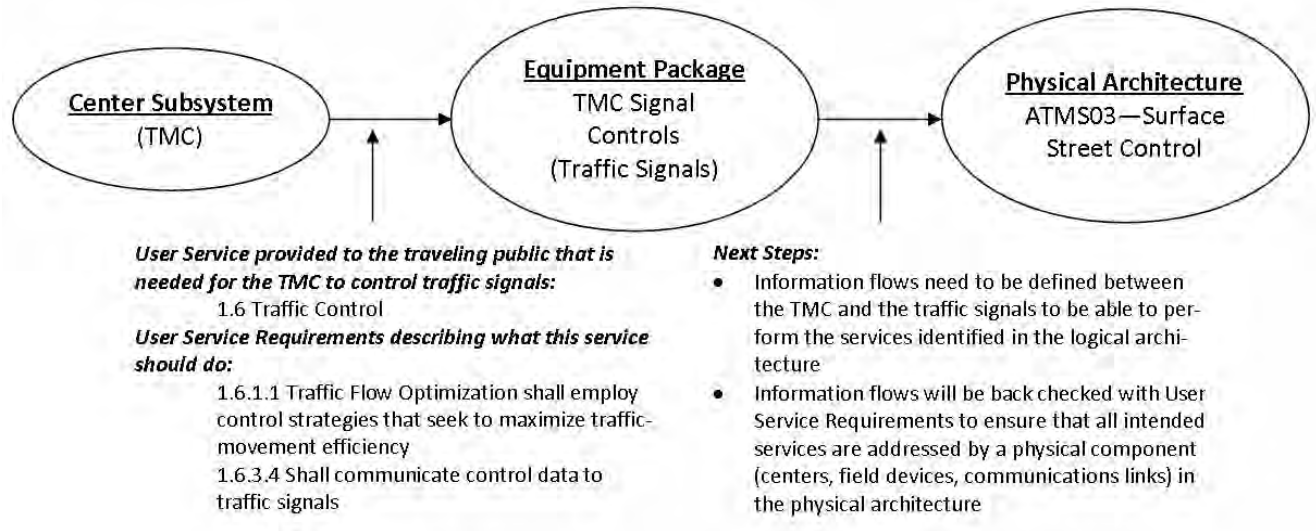


Figure 6 – Link to the Physical ITS Architecture

5. PHYSICAL ARCHITECTURE

5.1 Overview

The MAG RIA update includes both a logical architecture component and a physical architecture component. A logical architecture describes what various systems and agencies need to do to meet the needs of users (for travelers as well as system operators and managers). The physical architecture links to specific centers, infrastructure and system components, and focuses on how systems and agencies are linked and connected to share specific information or control various elements of the ITS systems and networks.

The physical ITS architecture is the third major step in developing the MAG RIA. An architecture maps the existing and planned functionality in the MAG Region and is required as part of the FHWA Final Rule/FTA Policy on Architecture Conformity and Standards. This architecture can be used as a tool by stakeholder agencies to document their ITS functionality, identify integration opportunities (within agencies and among multiple agencies), as well as show consistency with the regional architecture when developing ITS projects and applying for funding for new ITS projects.

The two primary components of the physical ITS architecture are market packages and equipment packages. This architecture includes customized market packages to reflect MAG member agency systems, projects and status. Market packages provide an overview of the actual information sharing and actual physical coordination of services that occurs in a region. The physical architecture and market packages define the actual representation of controlling devices, sharing information with other agencies, and day-to-day operations of the equipment and systems in each jurisdiction and the regional systems. Stakeholder consensus on the physical architecture and the market packages that are customized for the local relationships is very important to accurately reflect the existing and planned functionality. This supports the future growth of existing systems and the implementation of new systems or technology.

Equipment packages describe specific pieces of functionality that need to occur in order for the User Services to be provided to the traveling public.

MAG's goal for focusing on the physical architecture component is to provide a level of traceability between User Services and the physical elements and infrastructure that comprise the functionality identified in the physical architecture. The goals of this physical architecture are to:

- Identify appropriate subsystems from the National ITS Architecture that can guide the development of the physical architecture;
- Focus on the components of this region that involve transportation-related functions and systems – internal processes for emergency management coordination have been represented at a high-level or are not discussed in this architecture;
- Identify and customize market packages selected from the National ITS Architecture specific to the devices, systems, and communications operated by agencies in this region;
- Identify equipment packages that apply to the functionality in this region; and
- Establish traceability from the physical architecture back to goals, objectives and User Services/User Service Requirements.

5.1.1 Stakeholder Involvement

A stakeholder workshop was used to review developed material and provide feedback to more accurately depict each agency and the communications they have within the ITS architecture. A project workshop held in November 2008 included members of the MAG ITS Committee. This workshop allowed stakeholders to review and discuss the proposed market packages. Customized market packages were made available for stakeholders to review via the architecture website prior to the meeting. Due to the volume of customized market packages created for this architecture, only a limited amount of customized market packages were able to be reviewed during the workshop. These included regionally significant functions such as the ADOT HCRS, AZTech™ RADS, and some example market packages from the advanced traffic management system and emergency management groupings to show stakeholders how to review their customized market packages.

A review of the architecture website was also provided at the meeting to educate stakeholders on the most effective and efficient method of reviewing the architecture that applies to their jurisdictions and operations.

Involving stakeholders in the development of this architecture and its customized market packages allows for a consensus-based process prior to proceeding with full development of the ITS Architecture. The market packages were modified based on input received from stakeholders at this meeting.

5.1.2 Link from Logical to Physical Architecture

The physical architecture will describe how the services happen through sending information to and from specific subsystems. Each one of these services, and the actual information transfer that occurs to perform that service, is described as a Market Package in the National ITS Architecture. The interrelationship between the “Traveler Perspective” and the “Agency Perspective” in the logical architecture has built the foundation for the physical architecture. The subsystems and equipment packages are the direct lead to the physical architecture while the user services and user service requirements are describing from the users’ perspective what the service should do.

5.2 Customized Market Packages

Market packages provide the most high-impact visualization of ITS functionality and element interfaces. These represent the core functions, relationships of agencies, information sharing and connections to entities outside the architecture (terminators). Market packages also provide the most direct correlation to infrastructure and projects, which is a high priority for MAG as part of this ITS Architecture. Market packages include stakeholders and elements that work together to provide a service to satisfy identified stakeholder needs. They illustrate the information exchanges between subsystems, such as center-to-center communications between agencies or center-to-field connections between an operations center and the field infrastructure that it operates. Examples of market packages from the National ITS Architecture include Traffic Information Dissemination, Traffic Incident Management System, and Work Zone Management.

With customized market packages, stakeholders are able to get a ‘big picture’ view of the functionality and see how their systems and projects fit within the context of an ITS architecture. The different components (equipment packages) work together to deliver the desired functionality in the region. There may be additional capabilities desired within these functions but are not

represented in existing market packages as identified in the National ITS Architecture which were added and/or modified with stakeholder input.

Market packages have been diagrammed to show data flows and connections. The status of elements within market packages have also been identified (existing and planned). This section includes a description of market packages, selected market packages appropriate to the MAG Region, a description of the Turbo Architecture database and website tool for viewing the architecture, and the customized market packages that have been developed for this region.

5.2.1 Market Package Definition

The National ITS Architecture is a general framework for planning, defining, and integrating ITS and is a resource for any region in the U.S. independent of specific system design. The standard market package diagrams provided in the National ITS Architecture are relevant to functional services that ITS could provide, not what specific ITS technologies could provide for the region.

Market packages are tailored to fit, separately or in combination, real world transportation problems and needs. Market packages show the centers and devices that must work together to deliver a desired transportation service. Market packages depict current and future information transfer between ITS devices, management centers, and people. Those elements that represent the source of multiple levels of information transfer are called "subsystems". Subsystems are grouped into four classes: Centers, Field, Vehicles, and Travelers as described in greater detail as applicable in the MAG Region in **Table 12**.

Table 12 – Subsystem Definitions

Subsystem	Definition	Examples in MAG Region
Center	Provide management, administrative, and support functions for the transportation system. The center subsystems each communicate with other centers to enable coordination between modes and across jurisdictions.	Traffic Operations Centers Emergency Operations Centers Police/Fire Dispatch Centers
Field	Intelligent infrastructure distributed along the transportation network which perform surveillance, information gathering, and information dissemination whose operation is governed by the center subsystem.	Traffic Signals CCTV Cameras Dynamic Message Signs Vehicle Detection Flood Sensors
Vehicle	Covers ITS related elements on vehicle platforms such as automatic vehicle location equipment and operations capabilities for portable field equipment.	Maintenance and Construction Vehicles Public Safety Vehicles Incident Response Vehicles
Traveler	Equipment used by travelers to access ITS services pre-trip including information service providers.	Internet Web Sites AZ511

Each subsystem in a market package satisfies a particular role in that functionality. For example, as part of the ATMS01 – Network Surveillance market package, the Traffic Management Subsystem gives and receives information the Roadway Subsystem (such as cameras and vehicle detection deployed on the roads) and the Information Service Provider Subsystem (such as HCRS and RADS). The Traffic Management Subsystem provides the

foundation of information transfer for the functionality of Network Surveillance. This market package has been further defined in this architecture to represent how each agency utilizes the network surveillance function in their jurisdiction which may change from agency-to-agency depending on the infrastructure used as well as the status (existing or planned) of that infrastructure.

The types of communications connections between each subsystem are shown in the interconnect diagram from the National ITS Architecture with the subsystems that apply to the functionality, systems, and primary interconnects in the MAG Region are in **Figure 7**. The National ITS Architecture interconnect diagram has been customized using the applicable market packages and information flows in those market packages. This figure summarizes the existing, planned, and future ITS elements for stakeholders in the context of a physical interconnect. The primary purpose of the architecture is to identify the connections between transportation systems and elements in the MAG Region. In **Figure 7**, the network surveillance functionality includes information flows between cameras on the road and the centers that operate the cameras which have been highlighted in red. This has been shown as just one of the many interconnections between subsystems that can be represented by a market package (ATMS01 – Network Surveillance) that make up the complete picture of the ITS Architecture. **Figure 8** in Section 5.2.3 shows the Network Surveillance market package in more detail customized for the City of Scottsdale which represents the functionality highlighted in red in the figure below.

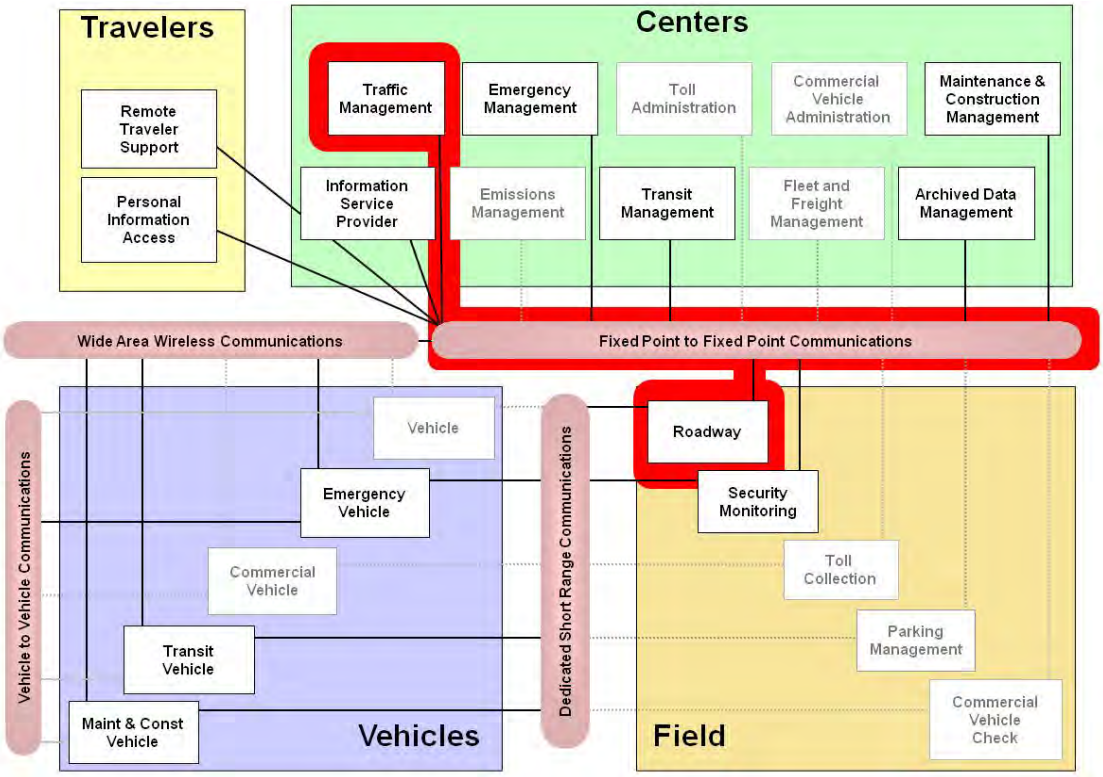


Figure 7 – Network Surveillance Functionality within Regional Interconnect Diagram

Information flows between the many different components in the market packages define the specific information (data) that is exchanged between each component. Each information flow specifies what information is exchanged and the direction of the flow. These information flows could be requests for information, alerts and messages, status

requests, broadcast advisories, construction status, and other key information that is needed to be transferred between devices and agencies, or between agencies. Market packages that apply to the functions that occur in this Region have been customized for the agencies in the MAG Region.

Market packages have been used to serve as a mechanism for linking common transportation problems, challenges, goals, and policies with potential ITS solutions. A broad range of alternative solutions may be applied to solve identified transportation problems – only some of these solutions may be labeled "ITS" and directly supported by the National ITS Architecture.

5.2.2 Selected Market Packages Applicable to the MAG Region

Specific market packages that are chosen for the MAG Region out of the 91 total market packages available in the National ITS Architecture help to illustrate the existing and planned functionality in the MAG region. A table listing and defining all of the available market packages from the National ITS Architecture that were reviewed for consideration in MAG's RIA is provided in **Appendix C**. Market packages that are not applicable to the region, such as commercial vehicle operations or winter maintenance, are not included in this architecture. The market packages selected from the National ITS Architecture were chosen based on the existing and planned inventory and documented communications and cooperation between agencies. Applying the goals and objectives as well as priorities to the National ITS Architecture, 36 market packages were selected for the MAG RIA and these are shown in **Table 13** below. Examples of what type of operations and coordination are discussed in each market package are provided in the table as well. The reference number (e.g. ATMS01) before each market package name refers to the relevant reference in the National ITS Architecture.

Table 13 – Market Packages Included in MAG ITS Architecture

Market Package	Market Package Name	Example MAG Region Devices/Systems/Services
Traffic Management Service Area		
ATMS01	Network Surveillance	Managing/operating cameras and vehicle detection on roadways
ATMS02	Traffic Probe Surveillance	Using automated vehicle location for transit and private sector systems
ATMS03	Surface Street Control	Managing/operating traffic signals
ATMS04	Freeway Control	Managing/operating cameras, vehicle detection, ramp meters, DMS on freeways
ATMS06	Traffic Information Dissemination	Sending road network conditions and traffic images to other agencies and traveler information systems
ATMS07	Regional Traffic Management	TMC-to-TMC coordination through direct links or through regional systems such as the center-to-center information sharing
ATMS08	Traffic Incident Management System	Agency coordination during incidents between TMCs, public safety, emergency response, and incident response support
ATMS13	Standard Railroad Grade Crossing	Traffic signal interaction with railroad at-grade crossings
ATMS17	Regional Parking Management	Coordination between parking management systems
ATMS18	Reversible Lane Management	Special event reversible lane signals
ATMS19	Speed Monitoring	Local speed displays that are archived locally and can be downloaded by the agency for analysis of speeds
Emergency Management Service Area		
EM01	Emergency Call-Taking and Dispatch	Phoenix Fire dispatch responsibilities in the region, local police dispatching functions, TMC support for traffic images shared on public safety video distribution system
EM02	Emergency Routing	Dispatching of public safety vehicles and interaction with local traffic signals for preemption for fire vehicles
EM04	Roadway Service Patrols	DPS Freeway Service Patrol
EM06	Wide-Area Alert	Wide-area alerts to agencies to be displayed on DMS and input into traveler information systems, EOC relationship to transportation, AMBER Alerts
EM07	Early Warning System	Warnings to transportation agencies, EOC relationship to transportation
EM10	Disaster Traveler Information	Disaster traveler information to agencies to be displayed on DMS and input into traveler information systems, EOC relationship to transportation
Maintenance and Construction Management Service Area		
MC03	Road Weather Data Collection	Collection of flood sensor information
MC04	Weather Information Processing and Distribution	Sharing of flood sensor information with transportation, transit, and public safety agencies
MC09	Work Zone Safety Monitoring	Monitoring capability at ADOT work zones to be able to quickly respond to incidents, work zone warnings as needed
MC10	Maintenance and Construction Activity Coordination	Sharing of planned construction information with other agencies through HCRS or local reporting system

Table 13 – Market Packages Included in MAG ITS Architecture (continued)

Market Package	Market Package Name	Example MAG Region Devices/Systems/Services
Public Transportation Service Area		
APTS01	Transit Vehicle Tracking	Tracking transit vehicles
APTS02	Transit Fixed-Route Operations	Operation of fixed-route service for Valley Metro and METRO Light Rail
APTS03	Demand Response Transit Operations	Local dial-a-ride service operation that is requested service by a traveler
APTS04	Transit Fare Collection Management	Automatic fare collection system on-board transit and light rail vehicles
APTS05	Transit Security	On-board security measures to secure travelers and drivers, transit center security measures
APTS06	Transit Fleet Management	Transit maintenance scheduling through on-board status equipment
APTS07	Multi-Modal Coordination	Coordination among light rail and transit services
APTS08	Transit Traveler Information	Transit website schedules, routes, and fares, transit center real-time displays of transit traveler information
APTS09	Transit Signal Priority	Transit buses and light rail vehicles requesting priority from traffic signals for a green light in their direction for faster service
APTS10	Transit Passenger Counting	Automated passenger counting on-board transit vehicles
Traveler Information Service Area		
ATIS01	Broadcast Traveler Information	ADOT HCRS operations and information inputs/outputs, 511 traveler information service resource for information
ATIS02	Interactive Traveler Information	Interactive 511 telephone and web service for requesting information about specific roads or services
ATIS10	VII Traveler Information	Emergency Vehicle Infrastructure Integration (VII) integration with ramp meters, traffic signals, and incident traveler information
Archived Data Management Service Area		
AD1	ITS Data Mart	Local data archives for each agency
AD2	ITS Data Warehouse	RADS archiving and sharing of information, HCRS archiving and sharing of information

These market packages were customized with MAG Region partner agencies and field equipment, and the interfaces between agencies and infrastructure were established. Interfaces have been identified for each element in the MAG RIA and each element has been mapped to those other elements with which it must interface.

5.2.3 Customized Market Packages

Customized market packages give stakeholders a real-world perspective on the roles and responsibilities their agency will have in providing a particular service to the region. In order to provide a conceptual perspective of how the market packages work together to support the MAG Region's goals for ITS deployment, high-level conceptual diagrams have been developed for each selected market package from the National ITS Architecture. Over 150 customized market packages have been developed which show the detailed information flows that occur within each one of these market packages in a format that is user-friendly and understandable. The customized market packages will be included in the final ITS architecture and are available on the architecture website. They are categorized by "Market Packages by Stakeholder"

or “Market Packages by Functional Area” to assist the stakeholder in finding the applicable market package for their project. **Appendix D** includes all customized market packages for this architecture categorized by functional area. **Figure 8** below shows an example of a customized market package created for the City of Scottsdale network surveillance functionality.

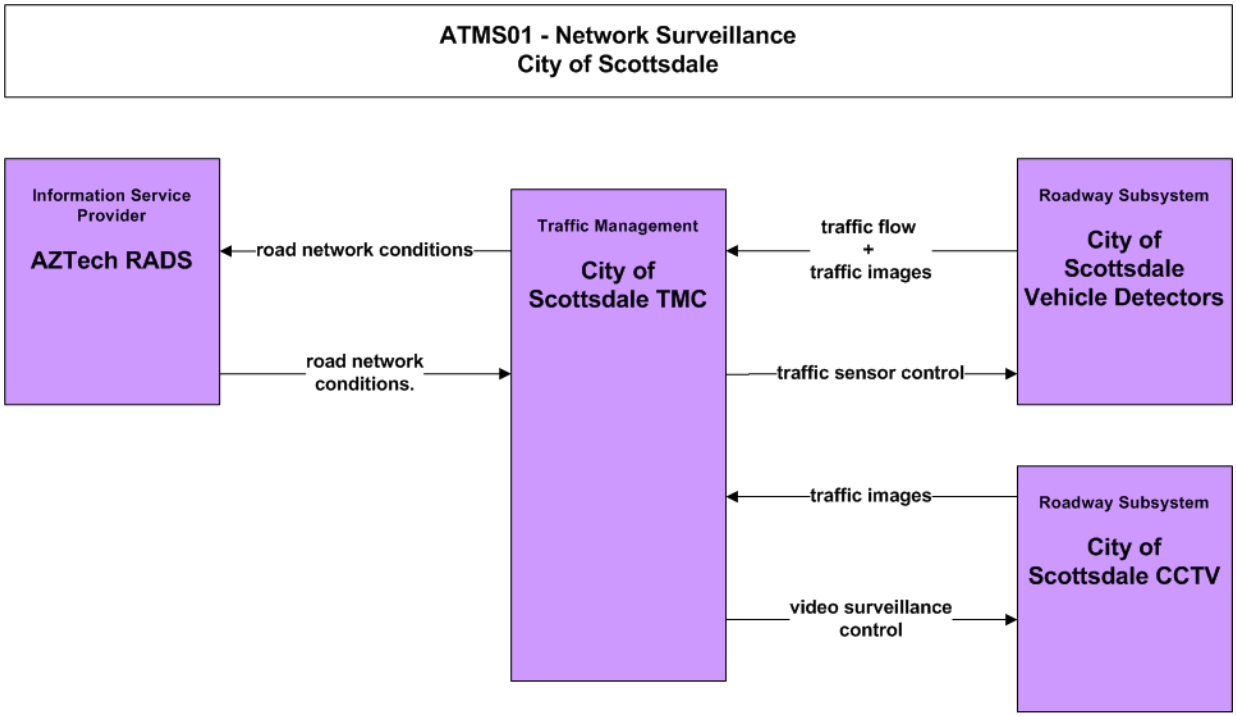


Figure 8 – Customized Market Package for City of Scottsdale

It is important to understand the use of customized market packages and the reasoning for multiple inventory items to be depicted differently based on the multiple functions they perform or for which they are used. The ADOT HCRS, for example, serves many purposes in this region: stores information about planned impacts to the freeway system, sends information to the 511 traveler information telephone service, shares information with the regional data archives for dissemination to other agencies, and its function as a data archive. These and other functions that the ADOT HCRS performs are shown in separate market packages in the architecture because the functionality differs depending on what information is being shared, and with what other systems or agencies that information is being shared.

A set of systems unique to this region is the center-to-center relationship between devices, local and regional archives, and traveler information services. The interaction of these various systems including RADS, HCRS, freeway management system components, and center-to-center systems throughout the region are shown in **Figure 9**. This showing the AZTech™ system diagram has been used extensively to depict existing and planned relationships utilizing these systems.

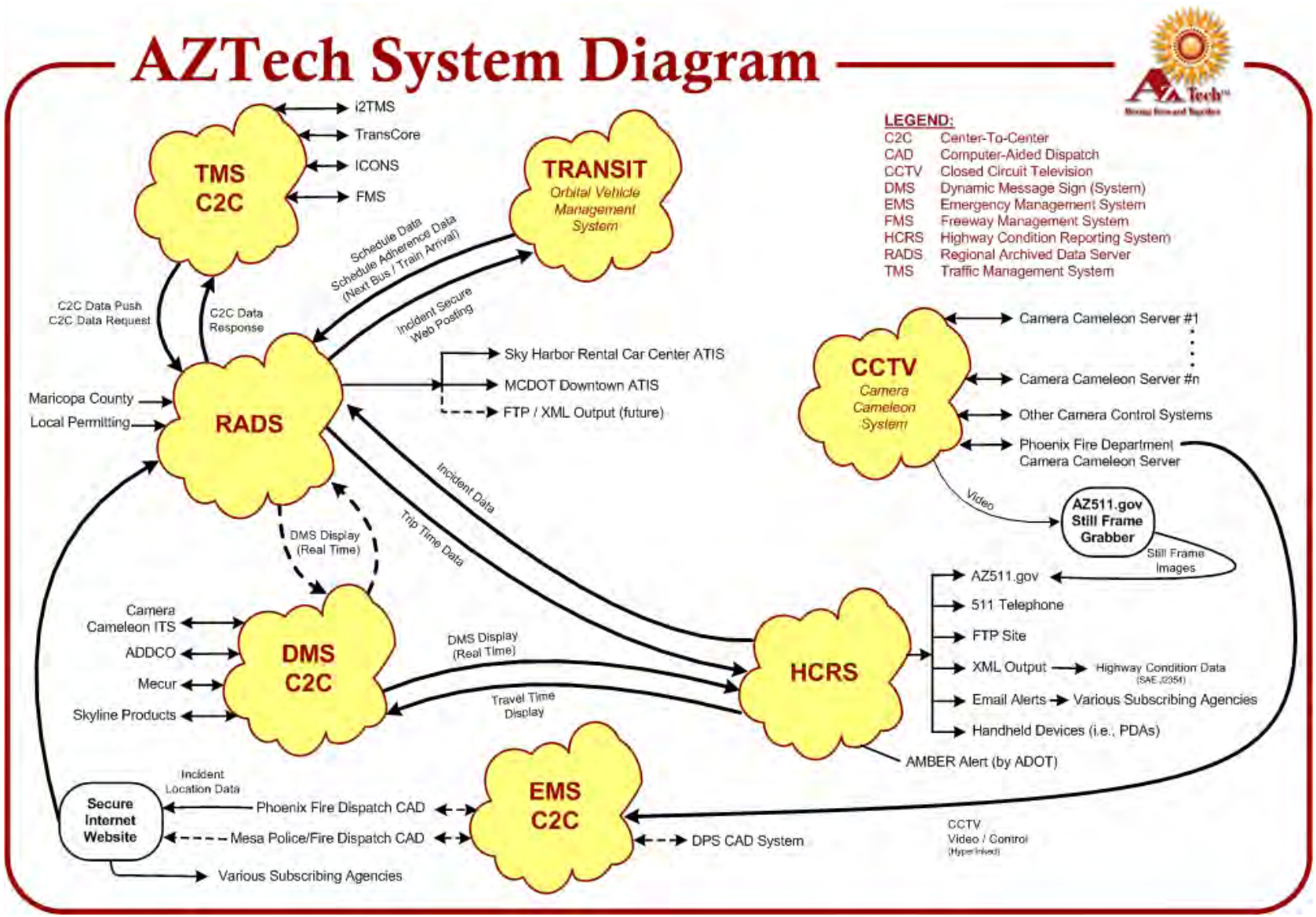


Figure 9 – AZTech™ System Diagram

Not every detailed information flow provided in the Turbo Architecture database is shown in these customized market packages – only the most influential on each agency to depict a concept of operations for the MAG Region. Some of the information flows are shown as "planned" because they do not currently exist for that particular agency or that particular function. As systems are put in place and connections are established, the architecture can be updated to reflect these information flows as "existing".

In many of the customized market packages, specific agencies have been called out to represent specific operations or local systems, such as the City of Chandler TMC managing and operating the City of Chandler Traffic Signals. Specific elements have been called out for cities such as Phoenix, Glendale, Goodyear, Scottsdale and others due to the amount of infrastructure already in place as well as the capabilities these agencies have through their TMCs. In order for the architecture to be expandable and adaptable to the changing operational responsibilities of each agency, a "City and Local Municipalities" grouping has been created to represent those agencies that are not called out specifically in a particular market package. Identifying centers, devices, and some agency systems as owned by "City and Local Municipalities" is a streamlined way of grouping agencies that behave the same way in the different functions in the architecture. This benefits the scalability of the architecture when and update is needed to include a new stakeholder or a new function. The requirements for the maintenance of the architecture are reduced through this grouping. Agencies included in the "City and Local Municipalities" category are:

- City of Apache Junction
- City of El Mirage
- City of Litchfield Park
- City of Tolleson
- Fort McDowell Yavapai Nation
- Gila River Indian Community
- Salt River-Pima Maricopa Indian Community
- Town of Buckeye
- Town of Carefree
- Town of Cave Creek
- Town of Fountain Hills
- Town of Gila Bend
- Town of Guadalupe
- Town of Paradise Valley
- Town of Wickenburg
- Town of Youngtown

As more ITS infrastructure begins to be implemented within these agencies, future updates of the RIA will warrant developing customized market packages for these specific agencies.

5.3 Functional Requirements, ITS Standards and Agreements

This section will describe how functional requirements were developed and are displayed on the project architecture website. Standards that are used in the MAG Region currently, those that are envisioned in the future, and their applicability will also be described in this section. Agreements that are in place in the MAG Region as well as those that would need to be developed are discussed in this section as well.

5.3.1 Functional Requirements

Functional requirements are the detailed purpose of an inventory item to provide the services as described by their equipment packages. The functional requirements identified for this architecture were based on the input of inventory elements and the customization of the market packages which resulted in a defined list of functional requirements for the entire architecture. In order to be able to use these functional requirements in project development, they have been provided on the project architecture website linked to the inventory elements for each agency.

The functional requirements are found by selecting the inventory that would be included in the agency project and then selecting the applicable equipment package service that the inventory would provide to the agency or the traveling public.

For example, in order to find the appropriate functional requirements for ADOT cameras to provide video images to the ADOT TOC, ADOT would follow the process of:

- Selecting "ADOT CCTV" in their Inventory list;
- Select "Roadway Basic Surveillance" in the Equipment Package list for providing video images to a center; and
- At the bottom of the screen is the list of functional requirements for that inventory element to be able to provide that function or service to ADOT.

Functional requirements are provided in this report in **Appendix E** organized by inventory item, then equipment package, then applicable functional requirements for that equipment package.

5.3.2 ITS Standards

ITS standards define how system components interconnect and work within the overall framework of the National ITS Architecture. Standards allow for the deployment of different components, vendor-specific technologies, and infrastructure to be interoperable at the local, regional, and national levels to interact together to support a seamless transportation system. Standards also allow innovation in technology development to occur without a forklift replacement in the hardware or software systems needed to operate that new technology. Other purposes for ITS standards use include:

- ITS standards used in a deployment can greatly reduce component development costs;
- ITS standards are open and non-proprietary, helping state and local transportation managers avoid costly single-source procurements and locked-in maintenance relationships with vendors;
- ITS standards support the deployment of interoperable ITS systems, helping agencies link together different types of ITS technologies and making system expansions easier to plan and implement; and
- ITS standards are being developed for many different types of ITS technologies and their use in project deployment is a key aspect of conformity with the Final Rule.

New standards that are developed go through an approval process before they can be included in the formalized standards documents. Existing standards are amended and modified as needed based on new standards development or new technology development. Several national and international standards organizations are working toward developing

ITS standards for communications, field infrastructure, messages and data dictionaries, and other areas. The organizations participating in ITS standards activities include:

- AASHTO (American Association of State Highway and Transportation Officials)
- ANSI (American National Standards Institute)
- APTA (American Public Transportation Association)
- ASTM (American Society for Testing and Materials)
- IEEE (Institute of Electrical and Electronics Engineers)
- ITE (Institute of Transportation Engineers)
- NEMA (National Electrical Manufacturers Association)
- SAE (Society of Automotive Engineers)

The AZTech™ Center-to-Center Specification was developed specifically for this region which facilitates the sharing of information between centers relating to the functionality of CCTV cameras, DMS, HCRS, incident management, RADS, arterial traffic signal systems, and transit. The C2C protocol is currently being used between agencies that operate the Siemens I2 traffic signal system and will bring other agency traffic signal systems into the C2C sharing environment in the near future.

Two examples of ITS standards that are widely used by agencies in the MAG Region include:

- **NTCIP 1203: Object Definitions for Dynamic Message Signs (DMS) –** this ITS standard defines the protocol for sending and receiving data from a freeway, arterial, or portable DMS to be able to communicate with a center or another device.
- **NTCIP 1205: Object Definitions for Closed Circuit Television (CCTV) Camera Control –** this ITS standard defines the protocol for sending and receiving data from a freeway, arterial, or portable CCTV to be able to communicate with a center or another device.

National standards developed by the list of participating organizations are formalized and are currently in use in the MAG region. **Appendix F** identifies all of the ITS standards identified by Turbo Architecture that are used in the MAG Region.

5.3.3 Agreements

The MAG RIA has identified agency communications, device/center interfaces and information exchanges which provide the ITS services and systems in the MAG Region. Agreements allow agencies to document the roles and responsibilities of the particular service or function that is being agreed to as well as any obligations each agency has for maintenance, operations, or financial support. **Table 14** below summarizes the established institutional agreements in the Phoenix metropolitan area that support interagency operations, maintenance, shared ownership, shared data, and other systems/services which show interfaces in the architecture.

Table 14 – Summary of Institutional Agreements

Agreement Name	Agencies Involved	Summary
Regional Concept of Transportation Operations Memorandum of Understanding (October 22, 2003)	MAG, ADOT, Maricopa County DOT, Phoenix Transit, and Cities	Participants agree to cooperate to develop and implement regional priority functions for arterial and freeway multi-modal transportation issues. Signed by MAG; ADOT; MCDOT; cities
MOU AZTech™ ITS Model Deployment (1996)	ADOT, MCDOT, MAG Member Agencies	Provided a framework and guidelines to promote coordinated decision making and information sharing in planning, design, development, and evaluation of AZTech™ Model Deployment.
AZTech™ MDI IGA's (1998)	ADOT, MCDOT, RPTA, City of Phoenix, Phoenix Public Transit, City of Glendale	Facilitated integration of existing multi-modal ITS infrastructure into a regional system. The agreements identified funding arrangements, acceptance of equipment, and maintenance and operations obligations of each of the partners
AZTech™ Phase 1, 2 and 3 Private Partnerships (1998 – 2001)	AZTech™, and private partners (integration, traveler information providers [web, PDA, kiosk and in vehicle] and transit AVL partners)	Formalized the agreement between MCDOT and private agencies for data sharing and dissemination to the public.
AZTech™ SMART Corridor Phase 2 (2002) and Phase 3 (2006) IGA's	MCDOT and 8 Local Jurisdictions (Cities of Phoenix and Glendale, among others)	Cooperative arrangement between MCDOT and 8 local jurisdictions to plan and implement an integrated SMART Corridor program.
Emergency Traffic Management Mutual Aid (REACT) MOU and IGAs	MCDOT, MCSO, City of Glendale, City of Avondale, City of Goodyear (in progress)	Agreements to provide emergency traffic management support for arterial closures/incidents
Radio Interoperability for Public Safety and Transportation (December 6, 2004)	ADOT, MCDOT, DPS	Agreement between ADOT, MCDOT, and Arizona DPS to install automatic vehicle location on response vehicles.
AZTech™ Connectivity IGA (June 24, 2004)	ADOT, MCDOT	Agreement between ADOT and MCDOT to connect transportation and public safety agencies to the AZTech™ transportation operations telecommunications network in the Phoenix metro area.
AZTech™ Center-to-Center Stakeholder Agreement (January 2006)	AZTech™ Partner Agencies	Agreement of the AZTech™ stakeholders to develop and implement the C2C System.
Fiber Optic Backbone (April 3, 2006)	ADOT, City of Phoenix	Agreement between the City of Phoenix and ADOT to design and construct a fiber backbone, to designate fibers for each party, and for joint use of conduit.
Automatic Aid Agreement for Fire Protection and Emergency Services	Phoenix Fire Department, 18 Local Fire Departments	Automatic aid agreement including centralized dispatch at Phoenix Fire, and dispatch of closest vehicle to incident for fire agencies.
Intergovernmental Cooperative Purchasing Agreements	ADOT, MCDOT	MCDOT and ADOT established standard procurement specs for signal system, wireless communications and ITS equipment.
Agreements with Local Media (Established 2002-2004)	ADOT, Channel 3, Channel 5, Channel 10, Channel 12, Channel 15, Telemundo, Total Traffic	Agreements provide media access to ADOT CCTV freeway images for broadcasts.

Table 14 – Summary of Institutional Agreements (continued)

Agreement Name	Agencies Involved	Summary
Phoenix Downtown Traffic Management System Intergovernmental Agreement Amendment One	ADOT, City of Phoenix	City of Phoenix pay all costs associated with the DTMS project and ADOT granted the City use of State highway right of way.
Transit Services in Avondale (2004) and Glendale (2000)	City of Phoenix Transit, Local Cities	Agreement between the City of Phoenix Transit and other cities to provide fixed-route and dial-a-ride transit services.
Sky Harbor Rental Car Center ATIS Displays Agreement	MCDOT, City of Phoenix	MCDOT and City of Phoenix established an agreement for physical ATIS displays in the Rental Car Center and connection to the central communications room
Bell Road Operations Plan for Shared Use of Devices	MCDOT, City of Surprise, City of Peoria	Documented roles, responsibilities, permission levels, and shared operations between jurisdictions for devices along Bell Road between MCDOT, Surprise, and Peoria
REACT MOU with Agencies	MCDOT, City of Peoria (future), City of Glendale (future)	This agreement is being developed to provide consistency in REACT services and define the roles and responsibilities of the MCDOT versus the local REACT teams.

Table 15 provides a list of potential agreements based on the types of interfaces identified in the MAG RIA. It is important to note that as ITS services and systems are implemented or expanded in the Region, part of the planning and review process for those projects should include a review of potential agreements that would be needed for implementation or operations. These agreements are not specified for specific projects because the coordination/sharing/joint operations that are possible should be evaluated on every project. Example agencies for which each agreement would be beneficial to be developed between are shown in the table.

Table 15 – Potential Agreements that Support Existing/Future Coordination Shown in Architecture

Agreement and Agencies	Agreement Description
Data Sharing and Usage (Internal Public Divisions)	
TMC/EOC **TMC/Police** **TMC/Fire** **TMC/Public Works**	This agreement would define the parameters, guidelines, and policies for intra-agency ITS data, road restriction, maintenance activity and work zone activity information sharing. This data sharing would support regional activities related to traffic management, incident management, work zone notifications, traveler information, and other functions. The terms of this agreement should generally address such items as: ▪ Types of data and information to be shared – camera feeds, roadway restrictions, detector information, incident and special event information, maintenance activity ▪ How the information will be used (traffic incident management, displayed on web site for travel information, distributed to private media, etc.) ▪ Parameters for data format, quality, security ▪ Frequency of sharing data
Data Sharing and Usage (Public Agency-Public Agency)	
TMC/TMC **TMC/Transit** **TMC/Police** **TMC/Fire** **TMC/EOC** **TMC/Airport**	This agreement would define the parameters, guidelines, and policies for data sharing and usage of ITS-related information from public agency to public agency. Because this agreement is with external entities, it will likely be in the form of a Memorandum of Understanding or Inter-Governmental Agreement. This type of agreement is recommended to define terms of use for distributing public-agency information regarding: ▪ Traffic conditions ▪ Traffic signal timing plans ▪ Road closures and restrictions ▪ CCTV camera images ▪ Data sent to RADS or HCRS ▪ Work zone information ▪ Public safety coordination with traffic management ▪ Transit coordination with traffic management In specific, coordination among jurisdictions for traffic signal timing to improve overall flow and progression along multi-jurisdictional corridors is a priority for this region. MAG provides funding for signal coordination activities. As part of regional initiatives such as Center-to-Center and the Regional Community Network being developed to facilitate interagency sharing of information, agencies may need to sign a formal agreement already established as part of these programs or implement a new agreement to define the use of these programs.

Table 15 – Potential Agreements that Support Existing/Future Coordination Shown in Architecture (continued)

Agreement and Agencies	Agreement Description
Shared Video Monitoring (Public)	
TMC/Police **TMC/Fire** **TMC/EOC**	This agreement would enable shared video monitoring of CCTV by public safety and neighboring jurisdictions for incident and traffic management purposes. This agreement would define the parameters and policies for public safety and other transportation agencies to access video images. It is recommended that the agreement include any established or newly developed policies relating to video images (including archiving, privacy, disclaimers, use of video and redistribution) as well as processes for agency requests for specific views. Shared video monitoring does not address shared use or shared control of video equipment functions. There might be some cost incurred for infrastructure, systems or fiber to enable communications between agencies, particularly with the high bandwidth required for transmitting live video images. Lower bandwidth video images such as screen-shots could also be considered for sharing.
Mutual Aid Agreements – REACT (Public)	
TMC/Police/REACT	Formal mutual aid agreements will become more important as agencies integrate systems/capabilities, particularly automated dispatch and notification. There may be funding required to support regional incident management activities. The agreement also would outline resource commitments that would be part of any mutual aid arrangement (personnel, equipment, facilities, etc.).
Joint Operations/Shared Control Agreements (Public)	
TMC/TMC **TMC/Police**	This agreement is a formal arrangement to allow joint operations or control of certain systems and equipment. This agreement will allow the other TMCs or public safety to control certain devices such as permanent DMS and CCTV cameras in incident or emergency situations and in after-hours operations. The agreement would need to define the terms of this arrangement, such as hours of operation and time of day/day of week where shared control would take effect, circumstances or incidents where shared control would take effect, system requirements for each agency to be able to share device control, definition of permissions with device control, etc. Traffic signals are typically not included as part of a joint operations strategy. Agencies have typically determined that sharing access to traffic signal timing plans will enable enhanced corridor management and operations among multiple partners, but that actual control of signals or changing timing plans on traffic signals by another jurisdiction is not permitted.
Emergency Coordination Agreements (Public)	
TMC/Local EOC, Fire, Police, County or State EOC	This agreement would establish the roles and responsibilities of a TMC in supporting emergency coordination for disasters or threats requiring evacuation or other mass coordination efforts. May include sharing requirements of CCTV video images by emergency management agencies.
Fiber Sharing Agreements (Public)	
TMC/TMC	This agreement would establish the requirements and security needs of each agency in sharing fiber cable to connect to their respective devices. Cost sharing should be delineated in the agreement as well as network maintenance / management on the fiber infrastructure. These agreements are developed to define the roles and responsibilities of the agencies for the actual sharing of fiber and should outline cost sharing that established the fiber sharing path.

5.4 Operational Concepts

An operational concept identifies the stakeholders' roles and responsibilities in the implementation and operation of the regional systems that are defined in the MAG RIA. It provides an "executive summary" view of the way the region's systems will work together to provide ITS services. The objective is not to formally define each system or specify detailed integration requirements – it is to paint a picture of the operations of the regional transportation system. General principles that are inherent to the regional transportation system in the MAG Region include:

- ADOT is responsible for operating and maintaining their own center, the freeway management system ITS field devices, and the statewide traveler information telephone and web services
- ADOT and DPS are primarily responsible for freeway management/incident response
- Maricopa County is responsible for operating and maintaining their own center, traffic signal system and ITS field devices
- Cities are responsible for operating and maintaining their own centers, traffic signal systems and ITS field devices
- There are examples of shared operations for specific corridors, and additional collaborative efforts are envisioned for the future
- There are examples of regional approaches to public safety and mutual aid for fire and arterial incident response
- Regional archived information is captured through HCRS and RADS which is shared with all agencies and feeds statewide and regional traveler information services

Each one of the customized market packages in this architecture represents essentially a 'mini' concept of operations for a particular function of how systems will be linked together to share information, which stakeholders are sharing information with whom, etc. These market packages represent how telephone traveler information works, how a local traffic management center operates their ITS devices, how public safety is involved in traffic operations during an incident and others. Each of the market packages ('mini' concept of operations) represents a portion of an agency or departments operations. The complete picture of how an agency operates is most effectively communicated through operational scenarios which provide an overview of what an agency does to support operations during each specific scenario.

In order to achieve the overall vision of operations in this Region (both existing and planned), separate operational concepts have been developed to represent the interagency coordination that is intended to occur during different types of scenarios. **Current agency operations are discussed previously in Section 2 Table 2.** Operational concepts presented here are depicting scenarios in which all planned connections/communications for each agency are functioning. There is no evacuation scenario included because the coordination efforts from a transportation perspective are engaged during the incident and work zone scenarios included below. Scenarios for which roles and responsibilities for agencies include:

- **Day-to-Day:** Involves operating/managing the agency-owned devices, shared operational control of devices, traveler information services, and archive data servers. This scenario is used as a baseline for operations which will be modified/enhanced depending on the scenarios described below.
- **Freeway Incident:** Involves state agencies as the primary stakeholders in charge of monitoring and managing freeway incidents, information sharing with other agencies that could be affected by freeway incidents, and operating available traveler information

services on a statewide level. County and statewide emergency operations centers are engaged by this scenario as the incident magnitude may determine the coordination efforts required by agencies.

- **Arterial Incident:** Involves local agencies as the primary stakeholders in charge of monitoring/management of arterial incidents, information sharing with other local agencies, and utilizing available arterial traveler information services and statewide services as applicable to the incident location and effects. Transit agencies and local emergency operations centers are engaged by this scenario as the incident location or magnitude may determine the coordination efforts required by agencies.
- **Work Zone/Construction:** Involves the coordination of state and local agencies, public safety agencies, maintenance divisions, and media as well as traveler information services available depending on where the work zone is located. This scenario engages the transit agencies as the location of work zone/construction could impact transit operations.

Tables 16-19 below describe the roles and responsibilities of the stakeholders in each scenario described above. These descriptions are not intended to be all inclusive of the operations during each scenario but rather an example of coordination efforts that occur in the MAG Region and the multi-agency approach to operations and response.

5.4.1 Day-to-Day Operations

The agencies in the MAG Region all have specific duties that they perform on a day-to-day basis which typically include monitoring traffic (via camera or by vehicle), sharing of information, and traveler information tasks. For TMCs, day-to-day operations include operating/managing the agency-owned devices, shared operational control of devices, traveler information services, and archive data servers. For public safety agencies, day-to-day operations include standard patrol of transportation system (arterial or freeway depending on agency) and dispatch of vehicles. This operational scenario describes the typical functionality of the agencies. The purpose of the 'typical' functionality and additional functionality is introduced when incidents or work zones call for the involvement of the agencies. Incident and work zone scenarios are described in subsequent sections. **Table 16** describes the day-to-day operations of agencies in the MAG Region.

Table 16 – Roles and Responsibilities During Day-to-Day Operations

DAY-TO-DAY OPERATIONS		
Service Category	**Agency**	**Roles and Responsibilities**
Traffic Management	ADOT TOC	• Operates and manages the ITS devices on the freeways (CCTV cameras, freeway DMS, different types of vehicle detection sensors, and ramp meters) • Supports the ALERT incident management service on the freeway network • Operates, manages and updates HCRS for traveler information dissemination via 511 and az511.gov services • Post traveler information for motorists on freeway DMS of incident, closure, event, construction, travel times • Shares CCTV video feeds with other TMCs • Receives DPS and Phoenix Fire CAD feeds • Coordinates with ADOT maintenance as needed
	Maricopa County TMC	• Operates and manages arterials in unincorporated areas of Maricopa County including CCTV, DMS, and traffic signals • Share control of CCTV and DMS along Bell Road with Surprise and Peoria • Operates and manages REACT for Maricopa County and coordinates with a few local agencies to provide service • Operates, manages and updates the regional data archive RADS which coordinates with ADOT's HCRS for traveler information dissemination • Manages the Rental Car Center ATIS travel time displays based on real-time vehicle data from freeway network captured by the FMS and RADS • Manages the MCDOT ATIS which provides arterial data collection and real-time reporting of information in Maricopa County • Receives DPS and Phoenix Fire CAD feeds
	Local TMCs	• Operates and manages the arterial network within their jurisdiction including the traffic signal system and network of arterial DMS, CCTV, and vehicle detection • Posts traveler information for motorists on arterial DMS of incident, closure, special events, and construction • Operates/maintains signals at freeway interchanges in their jurisdiction (for agencies where this is applicable) • Coordinates with local police department and local arterial incident response team where applicable • Receives ADOT CCTV video feeds in the area of their jurisdiction • Share arterial road network conditions information with RADS (via center-to-center interfaces) through which applicable information is sent then to HCRS • Coordinate with neighboring local TMC for corridor operations
Public Safety and Emergency Response	Arizona DPS	• Public safety vehicles patrol regional/statewide freeway network • Public safety/emergency response dispatch of vehicles to incident location with vehicle location tracking to increase the efficiency of the response • Dispatches FSP vehicles to incidents as needed • View ADOT CCTV via an established interface • Provide updates to ADOT TOC via DPS CAD
	MCSO	• Public safety vehicles patrol unincorporated Maricopa County roads
	Local Police	• Public safety vehicles patrol city/town jurisdiction
	Phoenix Fire	• Dispatches for 18 local city fire department jurisdictions

5.4.2 Freeway Incidents

Incidents that occur on the freeway introduce a specific subset of responsibilities for each agency in order to efficiently respond to and resolve the incident. Depending on the severity of the incident, local arterials and local public safety may be called upon to support incident response and clearance efforts. The freeway incident operational scenario involves state agencies as the primary stakeholders in charge of monitoring and managing freeway incidents, information sharing with other agencies that could be affected by freeway incidents, and operating available traveler information services on a statewide level. **Table 17** describes the roles of agencies in the MAG Region during freeway incidents. It is important to note that typical day-to-day operational roles are described in this section has having an added purpose and direction when that functionality is used during freeway incidents. New roles are also described that are not present in the day-to-day operational scenario table because of the enhanced functionality required during incidents.

Table 17 – Roles and Responsibilities During Freeway Incidents

FREEWAY INCIDENTS		
Service Category	**Agency**	**Roles and Responsibilities**
Traffic Management	ADOT TOC	• Detects/verifies incidents via CCTV video images/traffic detection • Receives automated alerts and incident updates through Phoenix Fire CAD interface • Monitors DPS CAD feed at TOC • Notify motorists via freeway DMS of incident, closure, event • Shares CCTV video feeds with other TMCs • Coordinates with Local TMCs to adjust traffic signal timing to respond to potential increased traffic congestion entering onto the arterial network • Coordinate with ALERT teams to support incident • Post incident traveler information to HCRS for dissemination via 511 and az511.gov services • Share incident traveler information with ADOT PIOs for dissemination via media • Coordinate with ADOT maintenance as needed for incident clearance • If the incident is large enough to warrant an evacuation or warning to the public, the ADOT EOC is included in the coordination efforts
	Maricopa County TMC	• Receives automated alerts and incident updates through Phoenix Fire CAD interface • Notify motorists via arterial DMS of incident, closure, event as needed • Depending on the scale of the incident, the TMC may be engaged by the Local EOC, Maricopa County EOC, ADOT EOC, or Arizona Department of Emergency Management (ADEM) EOC to facilitate traffic management strategies for evacuation or other large scale emergencies
	Local TMCs	• View ADOT CCTV video feeds in the area of their jurisdiction to determine impacts to arterials based on detours/traffic congestion • Notify motorists via arterial DMS of incident, closure, event as needed • Coordinates with Local Police to manage traffic congestion entering onto the arterial network as a result of closures of detours on adjacent freeways
Public Safety and Emergency Response	Arizona DPS	• Public safety/emergency response dispatch of vehicles to incident location with vehicle location tracking to increase the efficiency of the response • Dispatches FSP vehicles to incident • ADOT CCTV via an established interface • Provide incident notification and updates to ADOT TOC via DPS CAD
	MCSO	• Support DPS through direct request as needed
	Local Police	• Coordinates with Local TMCs to manage traffic congestion entering onto the arterial network
	Phoenix Fire	• Responds to freeway incidents • Coordinates with Local TMCs to manage traffic congestion entering onto the arterial network • Updates to Phoenix Fire CAD system which are then shared with ADOT and MCDOT TMCs

5.4.3 Arterial Incidents

Similar to the freeway incidents scenario, incidents that occur on the arterial network introduce a specific subset of responsibilities for each agency in order to efficiently respond to and resolve the incident causing traffic congestion. Depending on the severity of the incident, ADOT and DPS may be called upon to support incident response and clearance efforts and particularly monitor detour traffic, although their roles for arterial incident management are minimal. The arterial incident operational scenario involves local responding to TMCs and local public safety agencies as the primary stakeholders in charge of monitoring, and managing arterial incidents, information sharing with other agencies that could be affected by arterial incidents, and operating available traveler information services and statewide services as applicable to the incident location and effects. **Table 18** describes the roles of agencies in the MAG Region during arterial incidents. Similar to freeway incidents, typical day-to-day operational roles are described in this section has having an added purpose and direction when that functionality is used during arterial incidents. New roles are also described that are not present in the day-to-day operational scenario table because of the enhanced functionality required during incidents.

Table 18 – Roles and Responsibilities During Arterial Incidents

ARTERIAL INCIDENTS		
Service Category	**Agency**	**Roles and Responsibilities**
Traffic Management	Local TMCs	• Adjust agency traffic signals and timing plans and intersection/corridor detection based on incident impact • View real-time CCTV video feeds on major corridors in city to monitor incident location and impacts to arterial traffic • Notify motorists via arterial DMS of incident, closure, event • Share CCTV video feeds with internal divisions (Local Police, Local Fire, Local Public Works) as needed to support incident response and management • Shares CCTV video feeds with other TMCs to support traffic management coordination during incidents • Coordinates with Local Police, Local Fire, and MCSO (if applicable) regarding incident information and response requests • If needed, coordinate with Local Police and MCSO to dispatch REACT/coordinate with REACT • Notify adjacent jurisdictions of incidents/closures/detour routes as well as notifying transit and media as needed • Post incident information on local jurisdiction website and send information via email alerts to local jurisdiction personnel if applicable • Coordinate with local maintenance as needed for incident response and management • If the incident is large enough to public works warrant an evacuation or warning to the public, the Local EOC is included in the coordination efforts • Distribute e-mail alerts about the incident and closures to pre-defined distribution list

Table 18 – Roles and Responsibilities During Arterial Incidents (continued)

ARTERIAL INCIDENTS		
Service Category	**Agency**	**Roles and Responsibilities**
Traffic Management (continued)	Maricopa County TMC	• View MCDOT CCTV video feeds as well as CCTV from Local TMCs to monitor incident location and impacts to traffic • Update incident and arterial road network conditions to RADS and ATIS (future) • Notify motorists via arterial DMS of incident, closure, event as needed • Adjust signal timing plans for MCDOT signals on MCDOT corridors to respond to incident traffic conditions • Coordinate with local agency TMCs if incident traffic may affect adjacent municipal corridors • Coordinate with MCDOT REACT teams and update incident status as information becomes available • Distribute e-mail alerts about the incident and closures to pre-defined distribution list, which includes media • Coordinate with Maricopa County maintenance as needed for incident clearance support • If the incident is large enough to warrant an evacuation or warning to the public, the Maricopa County EOC is included in the coordination efforts • Depending on the scale of the incident, the TMC may be engaged by the Local EOC, Maricopa County EOC, ADOT EOC, or ADEM EOC to facilitate traffic management strategies for evacuation or other large scale emergencies
	ADOT TOC	• Share ADOT CCTV video images with Local TMCs
Public Safety and Emergency Response	Local Police	• Public safety/emergency response dispatch of vehicles to incident location with vehicle location tracking to increase the efficiency of the response • On-scene management and clearance of incidents • Coordination with police dispatch to provide updates • Dispatch/coordinate with County or Local REACT team • View Local TMC CCTV and/or coordinate with Local TMC on incident monitoring
	MCSO	• Coordinates with Local TMC as needed to provide public safety resource support • Support local public safety through direct request as needed • Notifies local public safety and Local TMC of incident if MCSO is first to respond to incident
	Arizona DPS	• Support Local Police or MCSO through direct request as needed if arterial incident could impact freeway operations
	Phoenix Fire	• Respond to arterial incidents from 911 dispatch • Update Phoenix Fire CAD system with incident details and updated incident information (CAD feed is shared with traffic management agencies) • Support Local Police, Local Fire or MCSO through direct request as needed
Transit	Valley Metro, Phoenix Public Transit, METRO Light Rail	• Receives incident notification and closures direct from Local TMC and/or RADS that might affect transit routes or schedule adherence • If transit vehicle is in incident, transit agency will notify Local Police for assistance, Local TMC for assessment of traffic signal adjustments or maintenance that may be necessary

5.4.4 Work Zone/Construction

The responsibilities for each agency when a work zone or construction site is on the freeways or on the arterial network are described in this section. There are different responsibilities depending on where the location of the work zone is and what detour and monitoring requirements are required for that work zone. This scenario generally discusses the agency coordination necessary to minimize work zone related traffic congestion and maximize the monitoring capability of the traffic for safety purposes. This scenario engages the traffic and public safety agencies in the MAG Region but also engages the transit agencies as the location of work zone/construction could impact transit operations. **Table 19** describes these responsibilities during work zone/construction events.

Table 19 – Roles and Responsibilities During Work Zone/Construction

WORK ZONE/CONSTRUCTION		
Service Category	**Agency**	**Roles and Responsibilities**
Traffic Management	ADOT TOC	If work zone is in ADOT's jurisdiction: • Share real-time CCTV monitoring view with DPS and neighboring jurisdictions of work zone area • Notify motorists via freeway DMS of freeway closure and work zone information • Share traffic condition and work zone status with HCRS and RADS so local agencies will have work zone impact information • Receive work zone status information from other agencies • ADOT maintenance group will monitor portable and permanent equipment through work zone and on detours and adjacent routes If work zone does not affect jurisdiction: • Monitor/retrieve work zone status information from HCRS as needed
	Maricopa County TMC	If work zone is in MCDOT's jurisdiction: • Monitor portable and permanent equipment through work zone and on detours and adjacent routes • Share real-time CCTV monitoring view with police and neighboring jurisdictions • Notify motorists via arterial DMS of arterial closure and work zone information as needed • Adjust timing plans on work zone corridor and detours to accommodate increased traffic patterns due to work zone • Share traffic condition and work zone status with adjacent and other TMCs, update HCRS and RADS/ATIS as needed • Receive work zone status information from other agencies If work zone does not affect jurisdiction: • View CCTV camera feed as desired • Monitor/retrieve work zone status information from HCRS as desired

Table 19 – Roles and Responsibilities During Work Zone/Construction (continued)

WORK ZONE/CONSTRUCTION		
Service Category	**Agency**	**Roles and Responsibilities**
Traffic Management	Local TMCs	• Monitor portable and permanent equipment through work zone • Monitor portable and permanent equipment on detours and adjacent routes • Share real-time CCTV monitoring views with police and neighboring jurisdictions of work zone area • Notify motorists via arterial DMS of closure and work zone information as needed • Adjust timing plans on work zone corridor and detours to accommodate increased traffic patterns due to work zone • Share traffic condition and work zone status with adjacent and other TMCs, update HCRS and RADS as needed • Receive work zone status information from other agencies
Public Safety/Emergency Management	Local Police	• View real-time CCTV camera feeds from Local TMC of work zone corridor and detours/adjacent corridors • Dispatch response vehicles as requested by TMCs or based on view of CCTV camera feeds • Police personnel to monitor work zone and coordinate with Local TMC as needed
	MCSO	• Coordinates with Local TMC as needed to provide public safety resource support • Support local public safety through direct request as needed
	Arizona DPS	• Dispatch FSP vehicles for incident support in work zones as requested by TMC responsible for jurisdiction where the work zone is located
	Phoenix Fire	• Support Local Police, Local Fire or MCSO through direct request as needed • Coordinates with Local TMC or Maricopa County TMC as needed to provide support through direct request as needed
Transit	Valley Metro, Phoenix Public Transit, METRO Light Rail	• Receives work zone notification direct from Local TMC and/or RADS that might affect transit routes or schedule adherence • Coordinate with Local TMC as needed regarding traffic signal adjustments that could impact transit routes or schedule adherence

6. HOW TO USE THE MAG ITS ARCHITECTURE AND WEBSITE

An important goal of the MAG RIA was to make the regional ITS architecture a valuable resource to member agencies to support agency ITS project planning and development, ITS integration, and required systems engineering processes. An agency that intends to develop an ITS project in their jurisdiction or in partnership with other agencies and will be applying for MAG TIP funding will be required to use the MAG RIA. First, to identify where in the MAG RIA the project is represented – this shows the pre-planning done in support of that project development. Second, agencies may be required to complete a systems engineering analysis – for documentation of the project development process that is using federal funds. This section will describe how to use the MAG RIA in support of ITS project implementation from project development through the systems engineering analysis.

6.1 Project Identification/TIP Application

In order to use the RIA to support project development, the portion of the RIA that will be included in the project must be identified. This is a key step in architecture use because this is when the ITS project will be viewed in the broader context of the RIA. This is when the services, functionality, and integration opportunities envisioned in the region are reviewed and considered as the basic scope of the project is defined. This step is also required to meet the FHWA Rule/FTA Policy.

If integration opportunities are to be considered, the RIA should be used as early in the project development lifecycle as possible. The architecture should be reviewed before firm project cost estimates are established, while there is still opportunity to adjust the scope to accommodate the functionality and interfaces identified in the RIA. This opportunity may occur before or after programming/budgeting, depending on how specifically the ITS project is defined in the TIP/STIP or other programming/budget document.

In order to define the full benefits that the MAG RIA provides to project development and application for funding, **Table 20** has been developed to highlight the location of information in this document and on the website for agencies to use to develop various types of ITS projects. When agencies are reviewing the architecture document and website for their project applicability, selecting the appropriate inventory item will identify the market packages and equipment packages that would apply to that project.

Agency requirements for projects to be mapped to the architecture for compliance with the MAG TIP application process includes:

- Associated Market Packages – listing of the market packages from the MAG ITS Architecture that are supported by this project.
- User Services – listing of the user services from the MAG ITS Architecture that are supported by this project.
- Subsystems – listing of the subsystems from the MAG ITS Architecture that are supported by this project.

These three components define the system/s that will be created or impacted by the project, the functionality that will be implemented, and the interfaces that will be added or updated. The current ITS projects in the MAG TIP have been included on the website, as shown in the links list from the website to the right, which also link to applicable agency-specific market packages.

Table 20 – Example Project Type Mapping to MAG Regional ITS Architecture Components

Project Type	ITS Inventory ("ITS Inventory" Link from Website or Table 11)	Example Subsystems ("Mapping" Category)	Example Associated Market Packages*	Example Equipment Packages*	Example Functional Requirements* (Select the appropriate equipment package/s)	Example User Services* (Table 10 – choose based on descriptions provided)
Installation of new CCTV cameras / expansion of existing camera system and integrating the cameras to be operational from a control center.	CCTV, TMC	Roadway Subsystem, Traffic Management	ATMS01 - Network Surveillance	Roadway Basic Surveillance	1 - The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	1.6 Traffic Control 1.7 Incident Management
Installation of new DMS and integrating DMS to be operational from a control center.	DMS, TMC	Roadway Subsystem, Traffic Management	ATMS06 - Traffic Information Dissemination	Roadway Traffic Information Dissemination	1 - The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	1.2 En-Route Driver Information
Synchronization of traffic signals along key corridor and integrating system to be operational from a control center.	Traffic Signals, TMC	Roadway Subsystem, Traffic Management	ATMS03 - Surface Street Control	Roadway Signal Controls	1 - The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.	1.6 Traffic Control
Deployment of traffic detection for use at mid-block locations and intersections.	Vehicle Detectors, TMC	Roadway Subsystem, Traffic Management	ATMS01 - Network Surveillance	Roadway Basic Surveillance	1 - The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.	1.6 Traffic Control
TMC to TMC communications installation to facilitate interagency coordination	TMC	Traffic Management	ATMS07 - Regional Traffic Management	TMC Regional Traffic Management	1 - The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	1.6 Traffic Control 1.7 Incident Management
Implement a project to archive data and send applicable information to a regional server for dissemination via 511 or another traveler information service.	Local City and Municipal Archived Data	Archived Data Management Subsystem	AD1 - ITS Data Mart AD2 - ITS Data Warehouse	ITS Data Repository	2 - The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data.	7.1 Archived Data

* Projects will likely map back to more than one market package, equipment package, and requirement.

The MAG Transportation Improvement Program (TIP) is a five year schedule of specific projects to be constructed across the MAG Region. The *"Guide to Transportation Programming"* for MAG (developed in October 2007 for fiscal year 2008) provides MAG member agencies background information, instructions, and deadlines on the different transportation programs and requirements for the MAG TIP for each fiscal year. The MAG TIP process is outlined in **Table 21**. The important dates for agencies to be aware of are bolded in the table: initial project recommendations from agencies are due in August and the final MAG TIP is not typically approved until the next year. The TIP application process could vary and agencies should periodically check with MAG to determine the application deadlines for the next TIP update cycle.

Table 21 – MAG TIP Process

Transportation Improvement Program - Fiscal Year	
Year 1	
August	• **Member agencies develop project requests for MAG Federal funds** • **Stakeholders meeting/workshop on applying for MAG Federal funds**
September	• 1st Week - Member agencies submit project requests for MAG Federal funds • 3rd Week - Transportation Review Committee (TRC) review/recommend/approve draft list of MAG Federal Fund project requests
October	• Modal Transportation Advisory Committees (TACs) first review of requests for MAG Federal funds
November	• Modal TACs second review and rank modal projects
November/December	• TIP Data Entry System available to member agencies for project updates
December	• First Week - TRC review/recommend/approve second draft of MAG federally funded program
Year 2	
January	• 1st Week - Member agencies submit privately and locally funded projects for inclusion in TIP for an Air Quality Conformity Analysis (AQCA) • Managers, TPC, and RC review/recommend/approve second draft of MAG federally funded program • Draft MAG TIP (Listing of Projects) produced
February	• TRC recommends Draft TIP Project Listings for AQCA
February/March	• Draft TIP Project Listings for TAC and public review
April	• Managers, TPC and RC review/recommend/approve Draft TIP for an AQCA
April/May	• TIP undergoes AQCA
June	• AQTAC recommends approval of the AQCA • TRC review/recommend/approve TIP
July	• Managers, TPC and RC review/recommend/approve TIP
August	• Governor's designee approves TIP
August/September	• **First Four Years of the TIP included in the Arizona STIP**

For ITS projects, MAG allocates a specific amount per year, and agencies in the region apply for funding for specific ITS projects. Applications are reviewed and consolidated by MAG, and then presented to the MAG ITS Committee for review and discussion. In many cases, funding requests exceed available funding, and it is up to the MAG ITS Committee to agree on an appropriate

strategy, which could include reducing federal funding for some or all projects to be able to fund the majority of projects, or even eliminating some projects from consideration.

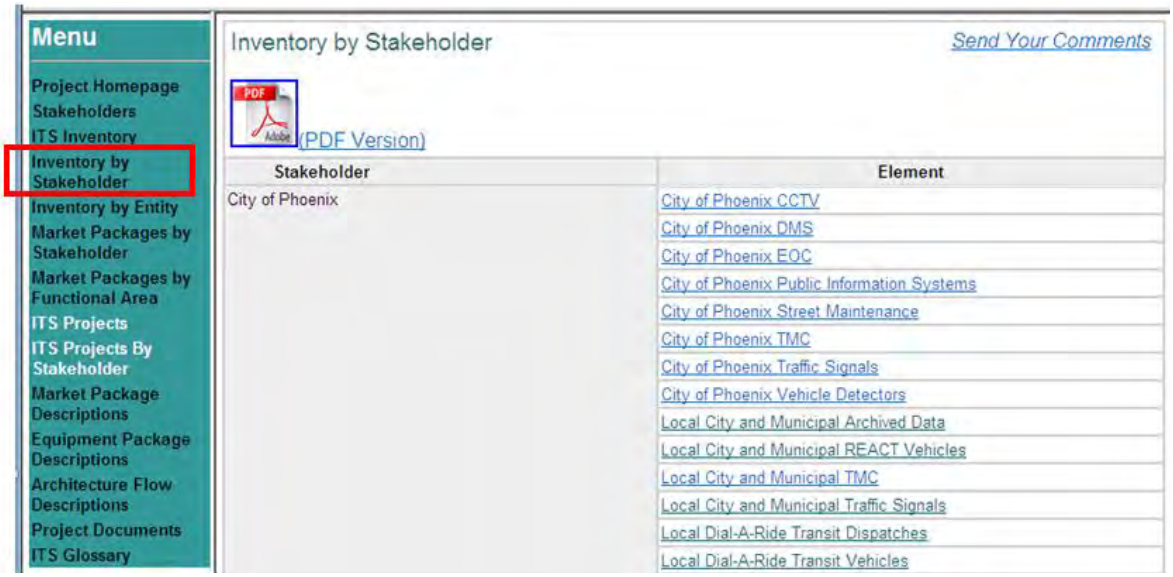
There have been opportunities for close-out funding through MAG, whereby there is a small surplus of funds available after all projects have been funded. This is not the case for every year, and should not be viewed as a consistent funding source. Often, with such short turn-around for the close-out process, projects that are funded are typically smaller in nature, do not require any design, or have designs complete and just need funding for implementation.

6.2 Project Development

Once funding has been identified for the ITS project and the development is underway, the MAG RIA is beneficial for providing a context in which the project will fit within the regional ITS implementations (either existing or planned). Agencies can use the RIA website to determine the functionality for the project, and also detailed communications and operating requirements of the project based on the functionality desired. Potential inventory items will also be identified (centers, roadside, other stakeholders, etc.). This section will describe how to navigate the project architecture website from the agency perspective as well as how to integrate architecture components into the agency project.

The ITS architecture and website were developed to be able to provide stakeholders with a tool that makes navigating the architecture a more streamlined process and points the stakeholder in the right direction quickly. This section is developed to guide the agencies in how to use the website through various screen captures of the actual website. Under each link there are PDF boxes that can be clicked to bring up a PDF of the full list of inventory, customized market packages by stakeholder or by functional area, and other options. This PDF tool is helpful in the review of market packages that need to be updated as part of a future architecture.

ITS inventory provides the foundation of information for which the entire architecture was built and information flows were created. Agencies can find their specific inventory items by using the "Inventory by Stakeholder" link if inventory has been defined specifically for their agency, or by using the "ITS Inventory" link and finding the agency-specific inventory item. If there is not an inventory item created specifically for your agency (for example, City of Phoenix DMS), the agency should find the "Local Cities and Municipalities" list which provides generic market packages and information flows for inventory that has not been specified. Below is a screen capture of the "Inventory by Stakeholder" link showing the list City of Phoenix inventory items.



When an inventory item is selected, as shown in the example below of ADOT CCTV, four very important types of information are displayed. The status of the inventory item, the subsystem that the inventory item maps to in the architecture (the way it is represented in market packages), what market packages that inventory item is depicted in, and finally the equipment packages that are applicable to that inventory item. All of this information is applicable to the MAG TIP application process and to find functional requirements for a project to help with the design of the project.

Functional requirements can be found by selecting the equipment package that best represents the purpose of the project that the agency is developing. By selecting the equipment package, a list of functional requirements is displayed at the bottom of the screen which can be helpful for functional design considerations on the project.

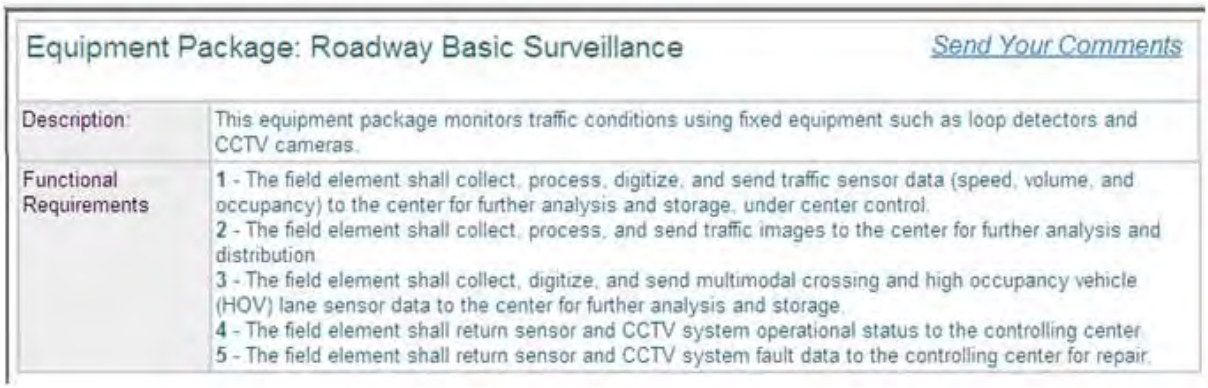
For example, in order to find the appropriate functional requirements for ADOT cameras to provide video images to the ADOT TOC, ADOT would follow the process of:

- Selecting “ADOT CCTV” in their Inventory list;
- Select “Roadway Basic Surveillance” in the Equipment Package list for providing video images to a center; and
- At the bottom of the screen is the list of functional requirements for that inventory element to be able to provide that function or service to ADOT. ADOT can then tailor these requirements to suit the needs of the project, but the RIA provides a starting point.

As another example, for the installation of arterial DMS in Avondale, Avondale would follow the process of:

- Selecting “City of Avondale DMS” in their Inventory list;
- Selecting “Roadway Traffic Information Dissemination” in the Equipment Package list for providing messages to travelers; and
- At the bottom of the screen is the list of functional requirements.

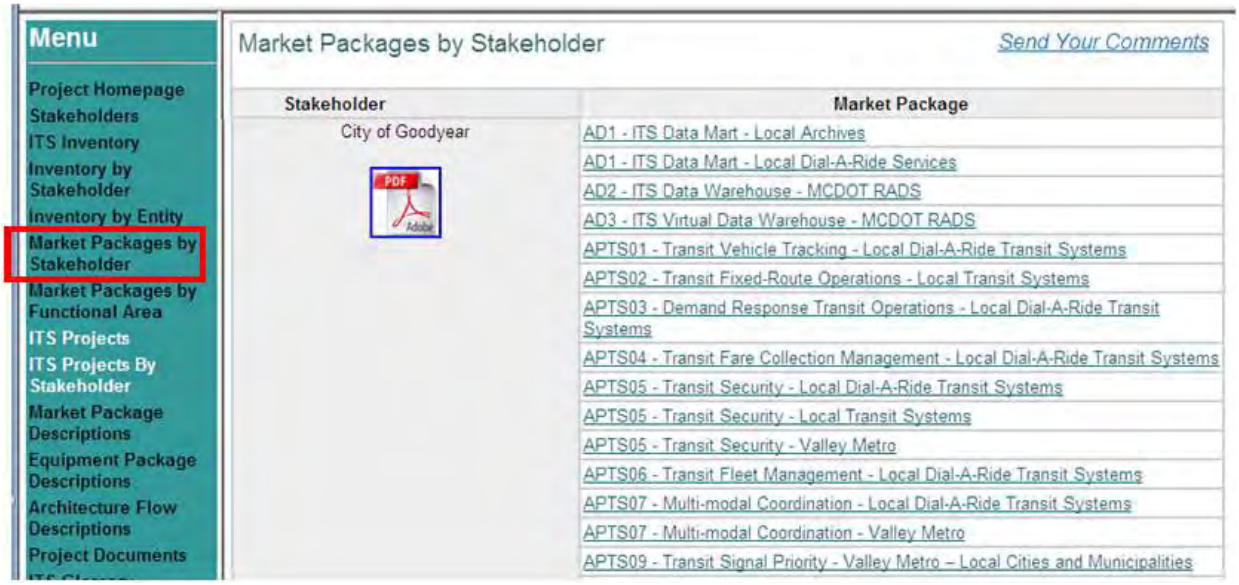
On the next page is a screen capture of the functional requirements that support the example equipment package “Roadway Basic Surveillance”.



Equipment Package: Roadway Basic Surveillance — Send Your Comments

Description:	This equipment package monitors traffic conditions using fixed equipment such as loop detectors and CCTV cameras.
Functional Requirements	1 - The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control. 2 - The field element shall collect, process, and send traffic images to the center for further analysis and distribution. 3 - The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage. 4 - The field element shall return sensor and CCTV system operational status to the controlling center. 5 - The field element shall return sensor and CCTV system fault data to the controlling center for repair.

The customized market packages are included in the final ITS architecture and are available on the architecture website. They are categorized by "Market Packages by Stakeholder" or "Market Packages by Functional Area" to assist the stakeholder in finding the applicable market package for their project. **Appendix D** includes all customized market packages for this architecture categorized by functional area. Below is a screen capture of the "Market Packages by Stakeholder" link showing the City of Goodyear in the list of stakeholders. The "Market Package by Functional Area" selection could be helpful for agencies that do not have a specific market package for the project/program they plan to implement.



Menu

- Project Homepage
- Stakeholders
- ITS Inventory
- Inventory by Stakeholder
- Inventory by Entity
- Market Packages by Stakeholder
- Market Packages by Functional Area
- ITS Projects
- ITS Projects By Stakeholder
- Market Package Descriptions
- Equipment Package Descriptions
- Architecture Flow Descriptions
- Project Documents

Market Packages by Stakeholder — Send Your Comments

Stakeholder	Market Package
City of Goodyear	AD1 - ITS Data Mart - Local Archives
	AD1 - ITS Data Mart - Local Dial-A-Ride Services
	AD2 - ITS Data Warehouse - MCDOT RADS
	AD3 - ITS Virtual Data Warehouse - MCDOT RADS
	APTS01 - Transit Vehicle Tracking - Local Dial-A-Ride Transit Systems
	APTS02 - Transit Fixed-Route Operations - Local Transit Systems
	APTS03 - Demand Response Transit Operations - Local Dial-A-Ride Transit Systems
	APTS04 - Transit Fare Collection Management - Local Dial-A-Ride Transit Systems
	APTS05 - Transit Security - Local Dial-A-Ride Transit Systems
	APTS05 - Transit Security - Local Transit Systems
	APTS05 - Transit Security - Valley Metro
	APTS06 - Transit Fleet Management - Local Dial-A-Ride Transit Systems
	APTS07 - Multi-modal Coordination - Local Dial-A-Ride Transit Systems
	APTS07 - Multi-modal Coordination - Valley Metro
	APTS09 - Transit Signal Priority - Valley Metro – Local Cities and Municipalities

The architecture has been developed for agencies to use as a tool to support project development and provide a consensus-based vision of ITS services in the Region. There are many agencies that have unique functionality or communications This architecture can be used for agencies to not only see what other agencies are doing to expand their own services, but also can be used to bridge the gap between similar projects that adjacent or similar agencies are doing in order to support more regionally-focused ITS programs moving forward.

6.3 Systems Engineering

During the development of an ITS project, an agency may be required to perform a systems engineering analysis to document the planning and purpose of the project for MAG federal funding requirements. This section has been developed provide an overview of the systems engineering process and purpose as well as guide agencies with the development of their project-specific analysis.

6.3.1 Systems Engineering Process

Systems Engineering is a process for project development that considers the entire lifecycle of a project and emphasizes up-front planning and system definition. Systems Engineering is a requirement for the FHWA's Final Rule 23 CFR 940. As part of federal funding compliance, MAG requires that local and regional ITS projects using federal ITS funding apply the systems engineering process and principles.

Systems Engineering is a multi-step and iterative process for developing an ITS project that supports standards use and implementation. **Figure 10** shows the "Vee" diagram, which shows how each step of the process builds on the previous one. It stresses conceptual development and how the concept guides each of the key steps toward implementing and maintaining the system. This process typically applies to complex system design/integration/development efforts. This RIA maps to the beginning of the Systems Engineering process shown in the "Vee" diagram. Projects such as fiber design or a signal synchronization (which are represented as specific project types as part of the RIA) map to the high-level design and detailed design parts of the "Vee" diagram.

The structure provides for a process that asks critical questions along the way to make sure that important steps or issues that could impact a project and the Region are not overlooked. Systems Engineering is an effective risk management tool because by taking critical measures to identify project issues, benefits, risks and impacts, as well as going through a series of validation and approval points, there is less uncertainty about project objectives or expectations.

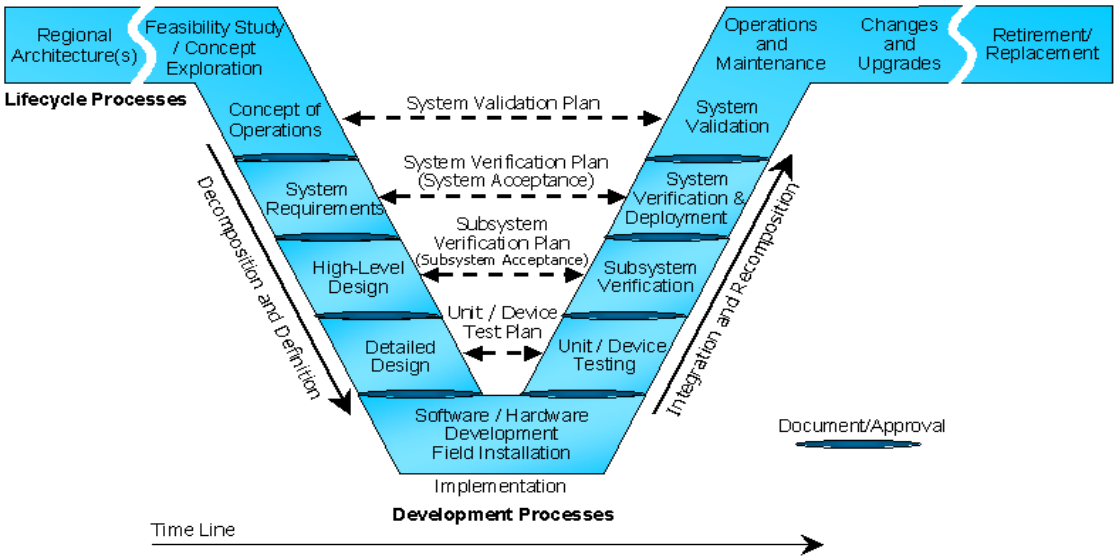


Figure 10 – "Vee" Systems Engineering Process Diagram

The purpose of using a systems engineering approach in developing a RIA and developing ITS projects are:

Regional ITS Architecture –

- Numerous project types are defined that together as a whole represent the MAG Region functionality;
- Allows stakeholders an opportunity to bring to the table the existing and planned functionality for their jurisdiction; and
- Allows stakeholders to understand the functionality of neighboring jurisdictions to ensure interoperability between the two or more jurisdictions.

ITS Projects –

- Improves stakeholder coordination;
- Develops more adaptable systems to the changing technologies of today's world;
- Verifies functionality of the project prior to making purchasing decisions;
- Supports the implementation of a system that meets the goals of the stakeholder and functions as planned; and
- Using a systems engineering approach reduces the risk of schedule and cost overruns.

6.3.2 MAG System Engineering Analysis Guidance

MAG has developed Interim Guidance on Systems Engineering Analysis Required for ITS Projects (August 2006). This guidance document was developed to outline the steps that need to be included in a Systems Engineering Analysis for all federally funded ITS projects in the MAG Region. The steps include:

- ***Interfacing with the Regional ITS Architecture –*** identify the relevant subsystems, user needs, user services, market package and architecture flows in the RIA that are covered by the project.
- ***Feasibility Study –*** technical, financial and institutional feasibility is explored in this step.
- ***Project Planning and Concept of Operations –*** defines the operation of the system developed/enhanced by the project and roles and responsibilities of each stakeholder as part of the project.
- ***System Requirements Definition –*** user service and functional requirements need to be defined in order to verify that the system performs as expected.
- ***System Design –*** a high-level and low-level design are developed to meet the system requirements.
- ***System Implementation –*** this step reviews the processes that are required to implement a project including procurement, hardware fabrication, software coding, configuration, etc.
- ***System Test and Verification –*** development of plans for testing, verifying and validating the functions of the new ITS project.
- ***System Operation and Maintenance –*** defines requirements for operations and maintenance and for ensuring that the system performs as planned.
- ***System Update, Retirement and Replacement*** – alternative studies for system upgrade and strategy plan for updating, retiring and replacing the system.

Some ITS projects that do not use the Highway Trust Fund need to apply for MAG funding and are therefore not subject to the Rule/Policy requirements. Projects developed exclusively with local funds and projects developed by non-transportation agencies (e.g., public safety agencies) fall into this category. For these projects, use of the architecture is voluntary and can be motivated by the potential interjurisdictional and regionally significant benefits of use and the need to reduce risks.

6.3.3 Using The MAG RIA to Support Systems Engineering Analysis For Projects

The MAG RIA supports the initial project planning, concept development, and requirements building for ITS projects. These steps are shown in the first leg of the "Vee" diagram as the foundation components of developing a project. The initial planning steps are used to be able to develop more detailed requirements and provide a back check for functionality throughout the project cycle to make sure that the project continues to address goals and needs defined in the initial planning stages of the project. This process has been required for ITS projects in the MAG Region because it is not efficient to redevelop or reinvest in an ITS project that been implemented in a fashion that changed in scope and purpose dramatically over the course of the project which could have been mitigated through proper project planning.

If an agency is required to develop a systems engineering analysis for an ITS project, this section defines the pieces of the architecture that will be useful in the analysis process. TThe MAG RIA supports the systems engineering analysis steps as defined in the MAG guidance document as follows:

- ***Interfacing with the Regional ITS Architecture***
  - Identify the subsystems, user services, customized market package and information flows that apply to the project following the example projects shown in Table 20 in Section 6.1.
  - The components applicable to the project are identified on the architecture website as described in Section 6.1 and 6.2.
- ***Feasibility Study***
  - This step will not require the use of the MAG RIA.
- ***Project Planning and Concept of Operations***
  - This step is supported by the customized market packages and information flows defined in the MAG RIA. Each market packages provides a 'mini' concept of operations for how various systems and stakeholders are envisioned to interact and share information.
  - ITS project types can be found in the customized market packages based on the functionality the project will provide, the types of communications that the project will use, and which inventory items will be needed for the project to support interfaces for data sharing and control.
  - The Concept of Operations will require agencies to describe the operations of the system provided by the project and this can be supported by identifying which market package/s and what functionality will be provided by the project in the architecture.
  - The roles and responsibilities of each stakeholder as part of the project can be supported by reviewing the inventory interfaces defined in the architecture.

  - Regional systems/servers that the project will link to can also be defined in the architecture to document the potential regional use of the project.
  - The RIA identifies types of agreements that may be required to support the functionality of different levels of information sharing and integration. Agencies can use these descriptions to identify where specific agreements might be needed. These are included in Section 5.3.3.
- ***System Requirements Definition***
  - Equipment packages, user services and functional requirements can be identified in the architecture to support project development as described in Section 6.1. Functional requirements are derived from equipment packages; these equipment packages outline specific functionality delivered by elements of the regional ITS. User services are contained in Section 4.2 and subsystems and equipment packages are shown in Section 4.3. Functional requirements are also detailed in Section 5.3.
  - These system requirements describe the intended project functionality and are used later in the project development process to verify that the project is performing according to the requirements set forth at the beginning.
- ***System Design***
  - Functional requirements are detailed requirements for the interfaces between field/center/server and can support the development of the high-level design for the project by qualifying a particular strategy for design.
  - Specific user services can be documented in this step to back check that the design will meet the intended project functionality.
- ***System Implementation***
  - This step will not require the use of the MAG RIA.
- ***System Test and Verification***
  - The agency is required to document how the functions provided by the ITS project will be verified and tested. This step can refer to back checking functionality with the system requirements defined in a previous step.
- ***System Operation and Maintenance***
  - Specific agency agreements as well as general agreement types that could support operations and maintenance of ITS projects are defined in Section 5.3.3.
  - It is important for the agency to evaluate the applicability of agreements that are defined in this architecture to provide more detail in this step of the systems engineering analysis as to the roles and responsibilities for operations and maintenance.
- ***System Update, Retirement and Replacement***
  - This step will not require the use of the MAG RIA.

The systems engineering analysis developed for an ITS process documents the project planning from initial concept development through design, implementation, system acceptance, and ultimately system retirement/replacement. The MAG RIA is a useful tool in the development of the systems engineering analysis for an ITS project through a majority of the steps required.

7. ITS ARCHITECTURE MAINTENANCE PLAN

The MAG ITS Architecture and associated Turbo Architecture database are dynamic plans that focus on documenting current and future ITS infrastructure and plans throughout the MAG Region as well as relationships with other agencies. To be consistent with changing needs and evolving technologies, the architecture and database require periodic updating and review as the ITS program evolves in the Region. As projects are implemented or expanded, as agency priorities change, or as other changes occur that impact ITS in the various jurisdictions in the Region, changes will be documented through updates and regular maintenance procedures for the upkeep of the architecture. This architecture maintenance plan acts as a control mechanism for maintaining order in the updating of the architecture and outlines a process for keeping the architecture up-to-date over time.

This maintenance plan is laid out in two parts, both of which act as instructions for changes to the architecture. The first portion is presented for the user or regional stakeholder. It provides some background information along with recommended procedures for how a change should be initiated by the user. The second portion of this document is presented for the maintainer of the architecture and database. It identifies how the change is handled after it is submitted by the user. This format allows each party to focus on the information that primarily pertains to them. MAG will have primary maintenance responsibility for the ITS architecture documents, website and database.

7.1 Purpose for Maintenance

The MAG RIA and database are dynamic planning tools that are subject to change as ITS needs and infrastructure evolves in the Region. New projects constructed or planned every year may change the status or existence of inventory elements and information flows. As changes occur, portions of the architecture document, website and database will need to be updated accordingly. These changes should be initiated by the stakeholders as the need arises and should be submitted to MAG via the MAG ITS Committee monthly meetings for inclusion in the next update. The following list includes events identified by the *Regional ITS Architecture Maintenance White Paper*[1] as events that may require change to an ITS architecture and deployment plan:

- **Changes in Regional Needs** – The ITS Architecture and website were created to support transportation planning in addressing individual agency, local interagency, and regional needs. Over time these needs can change and the corresponding aspects of the architecture may need to be updated.
- **New Stakeholders –** New stakeholders become active in ITS and the architecture and website should be updated to reflect their place in the local network of ITS elements, interfaces, information flows, and participation in regional activities. New transportation modes and new transportation services for example could be considered that touch the systems of additional stakeholders.
- **Changes in Scope of Services Considered –** The range of services considered by the architecture expands.
- **Changes in Other Architectures –** The MAG RIA covers not only elements and interfaces within the Region, but also identifies interfaces for specific agencies and local ITS architectures in the Region. Changes in the local city ITS architectures that are developed in the region may necessitate changes in the architecture for MAG to maintain consistency between them.

1 This white paper was developed by the FHWA in 2004 and is a guide for transportation professionals who are involved in the development, use and maintenance of regional ITS architectures. It provides guidance on what should be contained in an architecture maintenance plan and on the process of maintaining the architecture.

- **Changes due to Project Definition or Implementation –** When actually defined or implemented, a project may add, subtract, or modify elements, interfaces, or information flows within the architecture. The architecture is meant to describe the current (as well as future) implementation of ITS, it must be updated to correctly reflect how the newly deployed projects integrate into their system.
- **Changes due to Project Addition/Deletion –** Projects will be added or deleted through the MAG TIP planning process or through project delivery. This could change the status or existence of inventory items, information flows, and market packages in the architecture and database.

In order to MAG member agencies to be able to use the architecture for project development and application purposes, the architecture needs to reflect the most current state of ITS in the Region.

7.2 Frequency and Process of Review/Updates

There is no fixed time period or exact event on when the ITS Architecture **should** be updated. When such a change occurs, it does not necessarily require that the ITS Architecture be updated immediately. For example, it is not necessary to update the RIA just because a new version of the U.S. National ITS Architecture is released, particularly if it has no direct effect on the existing MAG RIA. On the other hand, If there are no significant changes in policies or status on the deployment of ITS Systems in the region, it may not be necessary to update the ITS Architecture for several years. However, the update is necessary to ensure that the ITS Architecture continues to accurately represent the regional view of ITS Systems and that the architecture continues to stay compliant with federal requirements.

It will be important to periodically review the MAG RIA, even though a major update might not be warranted. A recommended review and update cycle is presented below:

- **Annual Review** – It is recommended that the ITS Architecture be reviewed on an annual basis for minor corrections and modifications to reflect other changes that may affect the RIA. These modifications may be a result of changes in project status, new stakeholders, or updates to agency agreements. Modifications may also result from projects being implemented (changing status of data flows from “planned” to “existing”). This review will be led by the MAG ITS Committee. It is recommended that this review be coordinated with the MAG TIP Call for Projects process.
- **Comprehensive Update** – A more thorough update of the MAG RIA is recommended every three years. With minor updates and modifications occurring in the interim, this Comprehensive Update would address new or adjusted projects outlined in the MAG TIP being included in the RIA, as well as identify significant changes or additions that could affect multiple stakeholders. It is recommended that this Comprehensive Update include input from the full MAG ITS Committee, either through a workshop format, individual phone calls or smaller workshops. Proposed updates and revisions to the RIA should be reviewed by the MAG ITS Committee for consensus.

When a possible change to the architecture has been identified, a **Change Request Form** should be completed by the initiator of the change and the form should be submitted to MAG. MAG will initiate a formal request for architecture changes as part of a regularly scheduled MAG ITS Committee meeting.

The Change Request Form should include the following information:

- Contact information of individual proposing change: name, title, agency, email, fax number and phone number;
- Date;
- Short description of proposed change;
- Detailed description of proposed change (what is to be added, deleted, or modified);
- Type of change proposed (e.g. new project, new stakeholder, etc.);
- Name of system(s) or project(s) being implemented or modified (if applicable);
- Status:
  - Proposed (want to implement but has not yet secured funding for the project);
  - Planned (secured funding for the project);
  - Under Construction (currently deploying the system); or
  - Existing (deployed the system and it is currently operational).

A sample Change Request Form is included in **Table 22** below.

Table 22 – Example Change Request Form

Stakeholder Proposing Change	**Name**		**Title**	
	Agency			
	Email			
	Phone No.		**Fax No.**	
Date				
Description of Change	**Title**	*Short Description*		
	Detailed Description	*(What is to be added, deleted, or modified? Attach additional documentation if necessary)*		
	Type of Change	☐ New Market Package ☐ Deleted Market Package ☐ Modified Market Package or Data Flow (attach mark up or sketch)	☐ New/Changed Stakeholder ☐ Change in Project Status (planned now existing) ☐ Other	
	Systems or Projects	*Name of System(s) or Project(s) being implemented or modified (if applicable)*		
Project Status	☐ PROPOSED (funding not yet secured) ☐ PLANNED (funding secured) ☐ UNDER CONSTRUCTION (stakeholder is currently deploying system/project) ☐ EXISTING			

MAG will be responsible for gathering information updates and the using the procedure listed below to complete the update process. As Change Request Forms for the MAG RIA are submitted for consideration, a master document or Change Log with all the proposed changes, dispositions, and maintenance history should be maintained by MAG.

This Change Log will contain the following information:

- Change Number (MAG will assign a unique identifying change number for each requested change that needs to be tracked);
- Change Disposition (accepted, accepted with modifications, rejected, deferred);
- Disposition Comment;
- ITS Architecture Plan Components Affected (estimated)
- The location and version number of the revised document, spreadsheet, database or graphic
- The date of the change so that stakeholders can easily identify recent changes; and
- Notes of any additional actions or decisions related to the change.

7.3 Roles and Responsibilities

As the gatekeeper of the RIA, MAG will carry out the change (addition, addition with modifications, deletion, or modification) as specified in the approved Change Request Form, including performing the following tasks:

- Evaluate how the changes affect the architecture documents, Turbo database, and website.
- Evaluate whether or not the change impacts multiple stakeholders, or could potentially impact other elements within the RIA. This will also include coordination with those stakeholders to obtain consensus on the proposed change.
- Ensure that changes are carried out on the most recent versions of the affected documents, databases, and graphics.
- Verify that all dependencies, updated and related documents are synchronized with each other.
- Ensure that after changes are made, revised documents are posted, stored online, or otherwise disseminated in “read-only” format to prevent any unauthorized changes from being made and databases are updated and saved in “read-only format” to reflect the most recent date when changes were made.
- Update the Change Log with the status of the change.
- Notify the MAG ITS Committee of changes and updates made to the RIA.

Roles and responsibilities of the various stakeholders in the maintenance of the MAG RIA are described below:

Responsible Agency - MAG

- Currently, MAG is the Responsible Agency, and is responsible for the baseline and revised MAG RIA. In this role, MAG is responsible for maintaining the ITS architecture as well as keeping the official architecture documentation, in hardcopy, softcopy, and website formats. MAG may elect to do minor updates in-house, or may decide to contract with a consultant for major RIA updates. MAG is responsible for overseeing and guiding the maintenance efforts as well as being responsible for the baseline document for this MAG RIA. The MAG RIA Manager will receive the Change Request forms and requests for documentation from

stakeholders, coordinates changes among affected stakeholders, notifies stakeholders of updates, maintains the "official" records, including Change Request Database, updates the status of Change Request Forms, and manages the consultant (if applicable). In addition, MAG is responsible for maintaining any subsequent changes to the baseline architecture as approved by the MAG ITS Committee.

MAG ITS Committee (RIA Maintenance Subgroup)

- MAG may elect to establish a subgroup of the MAG ITS Committee to support review and/or update of the RIA. It is important to note that all substantial changes would need to be reviewed and agreed upon by the full MAG ITS Committee. As ITS in the region continues to expand and as there becomes a stronger focus on integrated systems, there will be significant emphasis on input and consensus from the MAG ITS Committee to approve changes to the architecture that may impact multiple stakeholders.

Stakeholders

- Any government agency or private organization that has a role in providing transportation services in the region. In the context of the MAG RIA, a Stakeholder, owns, operates, and/or maintains at least one ITS element in the ITS Architecture. Thus, that Stakeholder is called out in the corresponding Turbo Architecture database to the ITS Architecture. Each stakeholder responsible for updating its projects and ITS elements in the architecture as their ITS projects come online or get approved funding. It is envisioned that members of the MAG ITS Committee will provide input, review, recommended changes and consensus on behalf of their agency.

MARICOPA ASSOCIATION of GOVERNMENTS

MAG Regional ITS Architecture

Appendix A – Inventory By Agency

Prepared by:

Kimley-Horn and Associates, Inc.

June, 2010
091980011-15

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MAG REGIONAL ITS ARCHITECTURE – APPENDIX A

ARIZONA DEPARTMENT OF TRANSPORTATION

TRAFFIC MONITORING AND DETECTION	Existing (as of July 30 2008)	Programmed (Through 2013)	Planned (Not Programmed)
Number of freeway CCTV cameras ***(*provide locations)***	133 (Phx metro area) - locations on az511.gov		
Number of vehicle detection locations on freeways ***(*provide instrumented corridors)***			
Loops (connected to ADOT TOC)			
Loops (not connected to ADOT TOC)			
Passive acoustic detectors		0	0
Other types of detectors (please list the numbers of each type)			
How many speed cameras are deployed on the freeway system? ***(*provide instrumented corridors)***	6		30
Number of centerline freeway miles covered by FMS ***(*FMS coverage map)***			
Weigh-in-Motion stations ***(*provide locations in metro area/MAG region)***		0	0
RAMP METERING	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many ramps have ramp meters? ***(*provide locations)***			
How many ramps have ramp meter detection? ***(*indicate which locations)***			
How many ramp meters utilize mainline traffic flow data to adjust metering rates?			
How many metered ramps have priority access capability for transit vehicles?	None	None	None
How many metered ramps have preemption access capability for emergency vehicles?	None	None	1 for VII Research
TRAVELER INFORMATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Traveler information dissemination to the public:	-		
Television - dedicated channel	private partner		
Television - broadcast media news (ADOT provides data feed via FTP, links to news media)	Yes		
511 telephone service	Yes		
Personalized access (PDA, other wireless) - partnership project with MAG	Yes		
www.az511.gov; www.valleyfreeways.com	Yes		
Email alerts			yes
Other - please list			
Permanent freeway DMS (*verify future numbers)	67	19	
How many portable DMS are owned by your agency for freeway traveler information purposes?	13		
Freeway DMS used for the following info:			
Travel times	Yes		

TRAVELER INFORMATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Incident information	Yes		
Construction/work zone information	Yes		
AMBER Alerts	Yes		
Special event traffic information	Yes		
Emergency/threat alerts	Yes		
Public service announcements (high pollution advisory, drinking and driving warnings)	Yes		
Other types of information (please list)			
TRAFFIC MANAGEMENT COORDINATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Traffic management agency connections for traffic/emergency/incident information sharing between agencies:			
DPS	Yes		
Arizona Department of Emergency Management	Yes		
Arizona Emergency Operations Center	Yes		
Valley Metro	Yes		
Maricopa County Flood Control District	Yes		
City of Avondale			yes
City of Glendale	Yes		
Maricopa County	Yes		
City of Phoenix	Yes		
City of Phoenix - Fire Dept	Yes		
City of Scottsdale	Yes		
City of Tempe	Yes		
City of Mesa			
What agencies does ADOT share control of ADOT ITS devices with through established permissions?			
MCDOT			
Please list all MCDOT, Glendale, Phx, Scottsdale, DPS, Tempe			
Other Systems ADOT is Connected To:			
Center-to-Center	Yes		
Regional Communications Network ADOT/MAG	No	Yes	
Public Safety Video Distribution System	No	Yes	
COMMUNICATIONS INFRASTRUCTURE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many miles of fiber optic cable infrastructure have been deployed by your agency?			
Please verify other types of communications media utilized by your agency:			
Wireless			
Leased lines			

SPECIAL EVENT MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
What other agencies does ADOT coordinate with for special event management purposes:			
DPS	Yes		
City of Avondale	Yes		
City of Glendale	Yes		
Maricopa County	Yes		
City of Phoenix	Yes		
City of Scottsdale	Yes		
City of Tempe	Yes		
Other (please list) - need info about agencies in the MAG region only. Goodyear, Peoria, Chandler			
OTHER ACTIVITIES AND SERVICES	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many ALERT vehicles does your agency have in operation? (ALERT also has AVL)	8		2
How many Freeway Service Patrol vehicles are in operation on ADOT freeways?	8		
Number of signalized intersections/interchanges operated by ADOT (within the MAG region)			
How many railroad grade crossing signals are operated by ADOT?	0		
What types of information does your data archive collect and store?			
Detector information/freeway volumes and speeds	Yes		
DMS activity (messages	Yes		
CCTV images	No		
HCRS Entries	Yes		
ALERT responses	Yes		
CAD Incident Entrees yes for Phx Fire only	yes/no		
511 call volumes	Yes		
www.az511.gov web usage	Yes		
Other (please list)			
Name of reporting system - Highway Condition Reporting System - HCRS	yes		
Other reporting systems you are connected to - MCDOT Regional Archived Data Server - RADS, DPS Computer Aided Dispatch	yes		

CITY OF AVONDALE

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	ATMS.now		
Is there a Traffic management/operations center ***(*Provide address/location)***	Yes		
How many signalized intersections are operated by your agency:	-		
Connected to the City TMC	28		
Not connected to the City TMC	10		
Number of synchronized signalized intersections ***(*indicate locations)***	17		
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***	38		
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	0		
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	0		
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	0		
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	0		
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	2		
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	0		
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	3		11
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	0		
What type of arterial vehicle detection does your agency use for traffic management purposes:	-		
Stop bar intersection detection	Yes		
Advanced intersection detection	Yes		
Mid-block detection	No		
Vehicle Image Detection	Yes		
Other types of detectors - please indicate (i.e., ITIP sensors)	No		
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***	Avondale Blvd, Dysart Rd		
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***			60

TRAFFIC MONITORING AND DETECTION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How is arterial detection data being used by your agency?			
Real-time operations	Yes		
Planning purposes	No		
Use is limited to localized signal operations (presence)	Yes		
Other comments on your agency's traffic monitoring/detection capabilities not already addressed in the above questions:	The City is currently conducting an inventory so not all the information is available at this time.		
TRAVELER INFORMATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How does your agency disseminate traveler information to the public:	-		
Television - dedicated channel/local cable channel	Yes		
Link to local media	Yes		
Link to HCRS for dissemination on 511	No		
Email alerts	Yes		
Agency website	Yes		
Private sector providers (i.e., Traffic.com)	No		
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	0		11
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	No		
How many portable DMS are owned by your agency for arterial traveler information purposes?	4		
Please verify the types of information displayed on your arterial DMS:	-		
Travel times	-		
Incident information	-		
Construction/work zone information	Yes		
Emergency/threat alerts	-		
Special event information	Yes		
Other (please describe)			
Other comments or activities about traveler information by your agency that are not addressed above:			
AGENCY COORDINATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Which devices/systems do you share control of with other agencies?			
CCTV (identify agency)	0		
DMS (identify agency)	0		
Signal timing plans (view only access) (identify agency)	0		
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	0		
ADOT	0		
MCDOT	0		

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Cities (please list)	0		
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*			
Police			
Fire			
City Emergency Operations Center			
Transit			
Arizona Department of Emergency Management			
Maricopa County Emergency Operations Center			
Other (please list)	IT		
What regional systems are you connected to?	-		
Center-to-Center	No	No	Yes
Regional Communications Network	No	No	Yes
Public Safety Video Distribution System	No	Yes	
Please describe any additional information/activities about your agency coordination or connectivity status:			

COMMUNICATIONS INFRASTRUCTURE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	0		30
Please verify other types of communications media that are utilized by your agency for traffic operations and management:	-		
Wireless ***(identify locations)***	Yes		
Leased lines	No		
Other (please list)			

EVENT MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
What other agencies do you coordination with for event management purposes:	-		
ADOT	Yes		
Adjacent City (please list)	Goodyear		
Other (please list)	MCDOT, Glendale		

ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have an arterial incident response team?	No		
How many vehicles does your agency have as part of the arterial incident response team?	-		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?	No		
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?	No		
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?	unknown		
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			
OPERATIONAL DATA ARCHIVING/STORAGE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have a data archive for operations data?	No		
What types of information does your data archive collect and store?	0		
Detector information	0		
Signal operations	*		
DMS activity	0		
CCTV images	0		
Service patrol calls	0		
Other (please list)	* = capable but not tracked		
How does your agency track closures, incidents or planned construction/restrictions?			

CITY OF CHANDLER

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	i2TMS		
Is there a Traffic management/operations center ***(*Provide address/location)***	Yes	215 E. Buffalo; Chandler, Az 85225	
How many signalized intersections are operated by your agency:	200		
Connected to the City TMC	120		
Not connected to the City TMC	80		
Number of synchronized signalized intersections ***(*indicate locations)***	200		
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***	150		
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	TBD		
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	4		
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	0		
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	All Track Crossings NS by RR		
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	12		
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	6		
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	5 and 120 Intersections have video that feed to TMC from detection cameras		
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	0		
What type of arterial vehicle detection does your agency use for traffic management purposes:	Photo Enforcement		
Stop bar intersection detection	Yes		
Advanced intersection detection			
Mid-block detection			

TRAFFIC MONITORING AND DETECTION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Vehicle Image Detection	Yes		
Other types of detectors - please indicate (i.e., ITIP sensors)			
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***	Chandler Blvd, Arizona Ave		
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***	120 Intersections, various #, see map		
How is arterial detection data being used by your agency?	-		
Real-time operations	Yes		
Planning purposes	Yes		
Use is limited to localized signal operations (presence)	No		
Other comments on your agency's traffic monitoring/detection capabilities not already addressed in the above questions:			

TRAVELER INFORMATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How does your agency disseminate traveler information to the public:	-		
Television - dedicated channel/local cable channel	Yes		
Link to local media	Yes		
Link to HCRS for dissemination on 511			
Email alerts			
Agency website	Yes		
Private sector providers (i.e., Traffic.com)			
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	2		
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	0		
How many portable DMS are owned by your agency for arterial traveler information purposes?	4		
Please verify the types of information displayed on your arterial DMS:	-		
Travel times	No		
Incident information	Yes		
Construction/work zone information	Yes		
Emergency/threat alerts	Yes		
Special event information	Yes		
Other (please describe)			
Other comments or activities about traveler information by your agency that are not addressed above:			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Which devices/systems do you share control of with other agencies?			
CCTV (identify agency)	None		
DMS (identify agency)	None		
Signal timing plans (view only access) (identify agency)	None		
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	-		
ADOT	No	Yes	
MCDOT	No		
Cities (please list)	Gilbert		
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*			
Police	yes		
Fire	Yes		
City Emergency Operations Center	yes		
Transit	no		
Arizona Department of Emergency Management	no		
Maricopa County Emergency Operations Center	no		
Other (please list)			
What regional systems are you connected to?	-		
Center-to-Center	No	Yes	
Regional Communications Network	No	Yes	
Public Safety Video Distribution System	No	Yes	
Please describe any additional information/activities about your agency coordination or connectivity status:			

COMMUNICATIONS INFRASTRUCTURE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	See Map		
Please verify other types of communications media that are utilized by your agency for traffic operations and management:			
Wireless ***(identify locations)***	yes		
Leased lines	no		
Other (please list)			

EVENT MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
What other agencies do you coordination with for event management purposes:			
ADOT	Yes		
EVENT MANAGEMENT	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Adjacent City (please list)	Yes		
Other (please list)			
ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have an arterial incident response team?	No		
How many vehicles does your agency have as part of the arterial incident response team?	-		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?			
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?			
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?			
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			
OPERATIONAL DATA ARCHIVING/STORAGE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have a data archive for operations data?	Possible but not done		
What types of information does your data archive collect and store?	None		
Detector information			
Signal operations			
DMS activity			
CCTV images			
Service patrol calls			
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?	Yes, Barricade team		

CITY OF GLENDALE

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	i2TMS		
Is there a Traffic management/operations center ***(*Provide address/location)***	Yes		
How many signalized intersections are operated by your agency:	-		
Connected to the City TMC	190		
Not connected to the City TMC			
Number of synchronized signalized intersections ***(*indicate locations)***			
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***			
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***			
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***			
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***			
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***			
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***			
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***			
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	30	43	18
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***			
What type of arterial vehicle detection does your agency use for traffic management purposes:	-		
Stop bar intersection detection	Yes		
Advanced intersection detection	Yes		
Mid-block detection	Yes		
Vehicle Image Detection	Yes		
Other types of detectors - please indicate (i.e., ITIP sensors)			
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***			
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***			
How is arterial detection data being used by your agency?	-		
Real-time operations	Yes		
Planning purposes	Yes		
Use is limited to localized signal operations (presence)	No		

TRAVELER INFORMATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How does your agency disseminate traveler information to the public:	-		
Television - dedicated channel/local cable channel	Yes		
Link to local media	Yes		
Link to HCRS for dissemination on 511			
Email alerts			
Agency website	Yes		
Private sector providers (i.e., Traffic.com)			
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	1		20
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***			
How many portable DMS are owned by your agency for arterial traveler information purposes?			
Please verify the types of information displayed on your arterial DMS:	-		
Travel times	No		
Incident information	Yes		
Construction/work zone information	Yes		
Emergency/threat alerts	Yes		
Special event information	Yes		
Other (please describe)			
Other comments or activities about traveler information by your agency that are not addressed above:			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Which devices/systems do you share control of with other agencies?			
CCTV (identify agency)			
DMS (identify agency)			
Signal timing plans (view only access) (identify agency)			
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?			
ADOT			
MCDOT			
Cities (please list)			
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*	-		
Police	Yes		
Fire			
City Emergency Operations Center			
Transit			
Arizona Department of Emergency Management			
Maricopa County Emergency Operations Center			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Other (please list)			
What regional systems are you connected to?	-		
Center-to-Center	No	Yes	
Regional Communications Network	No	Yes	
Public Safety Video Distribution System	No	Yes	
Please describe any additional information/activities about your agency coordination or connectivity status:			
COMMUNICATIONS INFRASTRUCTURE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**			
Please verify other types of communications media that are utilized by your agency for traffic operations and management:			
Wireless ***(identify locations)***			
Leased lines			
Other (please list)			
EVENT MANAGEMENT	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
What other agencies do you coordination with for event management purposes:			
ADOT			
Adjacent City (please list)			
Other (please list)			
ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have an arterial incident response team?	No	Yes	
How many vehicles does your agency have as part of the arterial incident response team?	-		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?			
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?			
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?			
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			

OPERATIONAL DATA ARCHIVING/STORAGE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have a data archive for operations data?			
What types of information does your data archive collect and store?			
Detector information			
Signal operations			
DMS activity			
CCTV images			
Service patrol calls			
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?			

CITY OF GOODYEAR

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	i2TMS		
Is there a Traffic management/operations center ***(*Provide address/location)***	Yes		
How many signalized intersections are operated by your agency:	-		
Connected to the City TMC	0	30	47
Not connected to the City TMC	77		
Number of synchronized signalized intersections ***(*indicate locations)***	0		
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***			
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***			
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	0		
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	0		
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	0		
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	0		
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	0		
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	16	18	4
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	0		
What type of arterial vehicle detection does your agency use for traffic management purposes:	-		
Stop bar intersection detection	Yes		
Advanced intersection detection	No		
Mid-block detection	No		
Vehicle Image Detection	Yes		
Other types of detectors - please indicate (i.e., ITIP sensors)	No		
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***	Litchfield Road	Estrella Parkway	
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***	308 (4 at each intersection)		
How is arterial detection data being used by your agency?	-		
Real-time operations	No		
Planning purposes	Yes		
Use is limited to localized signal operations (presence)	Yes		

TRAVELER INFORMATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How does your agency disseminate traveler information to the public:	-		
Television - dedicated channel/local cable channel	Yes		
Link to local media	Yes		
Link to HCRS for dissemination on 511	No		
Email alerts	No		
Agency website	Yes		
Private sector providers (i.e., Traffic.com)	No		
Other (please describe)	-		
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	0	7	3
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	No		
How many portable DMS are owned by your agency for arterial traveler information purposes?	3		3
Please verify the types of information displayed on your arterial DMS:	-		
Travel times	-		
Incident information	-		
Construction/work zone information	-		
Emergency/threat alerts	-		
Special event information	-		
Other (please describe)	-		
Other comments or activities about traveler information by your agency that are not addressed above:			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Which devices/systems do you share control of with other agencies?	-		
CCTV (identify agency)	No		
DMS (identify agency)	-		
Signal timing plans (view only access) (identify agency)	No	C2C	
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	-		
ADOT	No		
MCDOT	Yes		
Cities (please list)	No	Avondale	
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*	-		
Police	No		
Fire	No		
City Emergency Operations Center	No		
Transit	No		
Arizona Department of Emergency Management	No		
Maricopa County Emergency Operations Center	No		

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Other (please list)	-		
What regional systems are you connected to?	-		
Center-to-Center	No	Yes	
Regional Communications Network	No	No	Yes
Public Safety Video Distribution System	No	Yes	
Please describe any additional information/activities about your agency coordination or connectivity status:			
COMMUNICATIONS INFRASTRUCTURE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	12	25	11.5
Please verify other types of communications media that are utilized by your agency for traffic operations and management:	-		
Wireless ***(identify locations)***	No		
Leased lines	Yes		
Other (please list)			
EVENT MANAGEMENT	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
What other agencies do you coordination with for event management purposes:	-		
ADOT	Yes		
Adjacent City (please list)	Avondale		
Other (please list)	MCDOT		
ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have an arterial incident response team?	No	No	Yes
How many vehicles does your agency have as part of the arterial incident response team?	-		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?	Yes		
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?			
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?	Yes		
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			

OPERATIONAL DATA ARCHIVING/STORAGE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have a data archive for operations data?	No		
What types of information does your data archive collect and store?	-		
Detector information	-		
Signal operations	-		
DMS activity	-		
CCTV images	-		
Service patrol calls	-		
Other (please list)	-		
How does your agency track closures, incidents or planned construction/restrictions?			

CITY OF MESA

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	ICONS		
Is there a Traffic management/operations center ***(*Provide address/location)- 300 E. 6th Street, Mesa***	Yes		
How many signalized intersections are operated by your agency:	389	449	
Connected to the City TMC	384	449	
Not connected to the City TMC	5	0	
Number of synchronized signalized intersections ***(*indicate locations)***	388	449	
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***	305	350	
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	305	350	
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	0	47	
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	4	15	
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	2	2	
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	30	40	
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	0		
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	58	90	157
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	3		
What type of arterial vehicle detection does your agency use for traffic management purposes:	-		
Stop bar intersection detection	Yes		
Advanced intersection detection	No		
Mid-block detection	Yes		
Vehicle Image Detection	Yes		
Other types of detectors - please indicate (i.e., ITIP sensors)			
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***	Broadway, Main/Apache, Ellsworth, Country Club, Power		
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***	228 (35 int x >4) & (30 int x <4)	300	
How is arterial detection data being used by your agency?	-		
Real-time operations	No	Yes	

TRAFFIC MONITORING AND DETECTION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Planning purposes	Yes		
Use is limited to localized signal operations (presence)	Yes		
Other comments on your agency's traffic monitoring/detection capabilities not already addressed in the above questions:			
TRAVELER INFORMATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How does your agency disseminate traveler information to the public:	-		
Television - dedicated channel/local cable channel	Yes		
Link to local media	No		
Link to HCRS for dissemination on 511	No		
Email alerts	No		
Agency website	No		
Private sector providers (i.e., Traffic.com)	Yes		
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	2		
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	No		
How many portable DMS are owned by your agency for arterial traveler information purposes?	0	10	
Please verify the types of information displayed on your arterial DMS:	-		
Travel times	No		
Incident information	Yes		
Construction/work zone information	Yes		
Emergency/threat alerts	Yes		
Special event information	Yes		
Other (please describe) New transit services	New transit services		
Other comments or activities about traveler information by your agency that are not addressed above:			
AGENCY COORDINATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Which devices/systems do you share control of with other agencies?	-		
CCTV (identify agency)	No		
DMS (identify agency)	No		
Signal timing plans (view only access) (identify agency)	No	C2C	
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	-		
ADOT	No		
MCDOT	No		
Cities (please list)	No		
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*	-		

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Police	No		
Fire	No		
City Emergency Operations Center	No		
Transit	No		
Arizona Department of Emergency Management	No		
Maricopa County Emergency Operations Center	No		
Other (please list)			
What regional systems are you connected to?	-		
Center-to-Center	No	Yes	
Regional Communications Network	No	Yes	
Public Safety Video Distribution System	No	Yes	
Please describe any additional information/activities about your agency coordination or connectivity status:			
COMMUNICATIONS INFRASTRUCTURE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	96	120	
Please verify other types of communications media that are utilized by your agency for traffic operations and management:	-		
Wireless ***(identify locations)***	Yes		
Leased lines	Yes		
Other (please list)			
EVENT MANAGEMENT	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
What other agencies do you coordination with for event management purposes:	-		
ADOT	Yes		
Adjacent City (please list)	Chandler / Tempe		
Other (please list)	MCDOT		
ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have an arterial incident response team?	No		
How many vehicles does your agency have as part of the arterial incident response team?	-		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?	Yes		
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?	No		
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?	No		
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			

OPERATIONAL DATA ARCHIVING/STORAGE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have a data archive for operations data?	No		
What types of information does your data archive collect and store?			
Detector information			
Signal operations			
DMS activity			
CCTV images			
Service patrol calls			
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?	Through barricade coordinator and ADOT coordination meetings.		

CITY OF PEORIA

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	i2TMS		
Is there a Traffic management/operations center ***(*Provide address/location) 9875 N. 85th Avenue***	Yes		
How many signalized intersections are operated by your agency:	91		
Connected to the City TMC	15		
Not connected to the City TMC	76		
Number of synchronized signalized intersections ***(*indicate locations)***	80		
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***	74		
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	0		
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	0		
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	0		
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	2		
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	4		
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	0		
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	8		
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	4		
What type of arterial vehicle detection does your agency use for traffic management purposes:	-		
Stop bar intersection detection	Yes		
Advanced intersection detection	Yes		
Mid-block detection	City owned Traffic Count Stations		
Vehicle Image Detection	Yes		
Other types of detectors - please indicate (i.e., ITIP sensors)	ITIP Sensors		
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***			
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***			
How is arterial detection data being used by your agency?			
Real-time operations	Yes		

TRAFFIC MONITORING AND DETECTION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Planning purposes	Yes		
Use is limited to localized signal operations (presence)			
Other comments on your agency's traffic monitoring/detection capabilities not already addressed in the above questions:			
TRAVELER INFORMATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How does your agency disseminate traveler information to the public:	-		
Television - dedicated channel/local cable channel	Yes		
Link to local media	Yes		
Link to HCRS for dissemination on 511			
Email alerts	Yes		
Agency website	Yes		
Private sector providers (i.e., Traffic.com)	Yes (ITIP)		
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	2		
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	2		
How many portable DMS are owned by your agency for arterial traveler information purposes?	4		
Please verify the types of information displayed on your arterial DMS:	-		
Travel times	No		
Incident information	Yes		
Construction/work zone information	No		
Emergency/threat alerts	Yes		
Special event information	Yes		
Other (please describe)			
Other comments or activities about traveler information by your agency that are not addressed above:			
AGENCY COORDINATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Which devices/systems do you share control of with other agencies?	-		
CCTV (identify agency)	MCDOT, Surprise		
DMS (identify agency)	MCDOT, Surprise		
Signal timing plans (view only access) (identify agency)	No		
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	-		
ADOT	No		
MCDOT	Yes		

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Cities (please list)	Surprise		
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*	-		
Police	No		
Fire	No		
City Emergency Operations Center	No		
Transit	No		
Arizona Department of Emergency Management	No		
Maricopa County Emergency Operations Center	No		
Other (please list)	-		
What regional systems are you connected to?	-		
Center-to-Center	No	Yes	
Regional Communications Network	No	Yes	
Public Safety Video Distribution System	No	Yes	
Please describe any additional information/activities about your agency coordination or connectivity status:			

COMMUNICATIONS INFRASTRUCTURE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**			
Please verify other types of communications media that are utilized by your agency for traffic operations and management:			
Wireless ***(identify locations)***			
Leased lines			
Other (please list)			

EVENT MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
What other agencies do you coordination with for event management purposes:	-		
ADOT	Yes		
Adjacent City (please list)	Surprise, Glendale		
Other (please list)	MCDOT		

ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have an arterial incident response team?	No	Yes	
How many vehicles does your agency have as part of the arterial incident response team?	-		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?			
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?			
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?			
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			
OPERATIONAL DATA ARCHIVING/STORAGE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have a data archive for operations data?			
What types of information does your data archive collect and store?			
Detector information			
Signal operations			
DMS activity			
CCTV images			
Service patrol calls			
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?			

CITY OF PHOENIX

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	Transuite-Transcore		
Is there a Traffic management/operations center ***(*Provide address/location)***	200 W Washington		
How many signalized intersections are operated by your agency:	1010	10	
Connected to the City TMC	668	342	
Not connected to the City TMC	342		
Number of synchronized signalized intersections ***(*indicate locations)***			
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***	176	400	
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	176	400	
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	119	15	
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	13		
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	12	0	
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	0	0	
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***			
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	10		
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	0	0	0
What type of arterial vehicle detection does your agency use for traffic management purposes:			
Stop bar intersection detection			
Advanced intersection detection	yes		
Mid-block detection	yes		
Vehicle Image Detection	yes		
Other types of detectors - please indicate (i.e., ITIP sensors)	yes		
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***	0		
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***	34		
How is arterial detection data being used by your agency?			
Real-time operations	yes		
Planning purposes	yes		
Use is limited to localized signal operations (presence)			

TRAVELER INFORMATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How does your agency disseminate traveler information to the public:			
Television - dedicated channel/local cable channel			
Link to local media			
Link to HCRS for dissemination on 511			
Email alerts			
Agency website	yes		
Private sector providers (i.e., Traffic.com)			
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	6		
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***			
How many portable DMS are owned by your agency for arterial traveler information purposes?			
Please verify the types of information displayed on your arterial DMS:			
Travel times			
Incident information			
Construction/work zone information	yes		
Emergency/threat alerts			
Special event information			
Other (please describe)			
Other comments or activities about traveler information by your agency that are not addressed above:			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Which devices/systems do you share control of with other agencies?	0		
CCTV (identify agency)	0		
DMS (identify agency)	0		
Signal timing plans (view only access) (identify agency)	0		
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?			
ADOT			
MCDOT			
Cities (please list)			
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*			
Police	yes		
Fire			
City Emergency Operations Center			
Transit	yes		
Arizona Department of Emergency Management			
Maricopa County Emergency Operations Center			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Other (please list)			
What regional systems are you connected to?			
Center-to-Center			
Regional Communications Network			
Public Safety Video Distribution System			
Please describe any additional information/activities about your agency coordination or connectivity status:			
COMMUNICATIONS INFRASTRUCTURE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	80-100		
Please verify other types of communications media that are utilized by your agency for traffic operations and management:			
Wireless ***(identify locations)***	25		
Leased lines	680		
Other (please list)			
EVENT MANAGEMENT	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
What other agencies do you coordination with for event management purposes:			
ADOT			
Adjacent City (please list)	cop PD		
Other (please list)			
ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have an arterial incident response team?			
How many vehicles does your agency have as part of the arterial incident response team?			
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?			
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?			
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?			
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			

OPERATIONAL DATA ARCHIVING/STORAGE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have a data archive for operations data?	no		
What types of information does your data archive collect and store?			
Detector information			
Signal operations			
DMS activity			
CCTV images			
Service patrol calls			
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?	Closure application TRACS		

CITY OF SCOTTSDALE

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	TranSuite		
Is there a Traffic management/operations center ***(*Provide address/location)***	Yes		
How many signalized intersections are operated by your agency:	300		
Connected to the City TMC	198		
Not connected to the City TMC	2		
Number of synchronized signalized intersections ***(*indicate locations)***	90%		
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***	70%		
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	0		
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	0		
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	0		
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	0		
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	9		
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	9		
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	50	75	25
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	0		
What type of arterial vehicle detection does your agency use for traffic management purposes:	-		
Stop bar intersection detection	Yes		
Advanced intersection detection	Yes		
Mid-block detection	Yes		
Vehicle Image Detection	no		
Other types of detectors - please indicate (i.e., ITIP sensors)	no		
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***	Hayden, Scottsdale		
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***	2		
How is arterial detection data being used by your agency?	-		
Real-time operations	no		
Planning purposes	no		
Use is limited to localized signal operations (presence)	No		

TRAVELER INFORMATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How does your agency disseminate traveler information to the public:	-		
Television - dedicated channel/local cable channel	Yes		
Link to local media	Yes		
Link to HCRS for dissemination on 511	Yes		
Email alerts	Yes		
Agency website	Yes		
Private sector providers (i.e., Traffic.com)			
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	25	40	0
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	No		
How many portable DMS are owned by your agency for arterial traveler information purposes?	6		
Please verify the types of information displayed on your arterial DMS:	-		
Travel times	No		
Incident information	Yes		
Construction/work zone information	Yes		
Emergency/threat alerts	Yes		
Special event information	Yes		
Other (please describe)			
Other comments or activities about traveler information by your agency that are not addressed above:			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Which devices/systems do you share control of with other agencies?			
CCTV (identify agency)	No		
DMS (identify agency)	No		
Signal timing plans (view only access) (identify agency)	No		
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	None		
ADOT			
MCDOT			
Cities (please list)			
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*			
Police	Yes		
Fire	Yes		
City Emergency Operations Center	Yes		
Transit	No		
Arizona Department of Emergency Management	No		
Maricopa County Emergency Operations Center	No		

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Other (please list)			
What regional systems are you connected to?	-		
Center-to-Center	No	Yes	
Regional Communications Network	No	No	Yes
Public Safety Video Distribution System	No	Yes	
Please describe any additional information/activities about your agency coordination or connectivity status:			
COMMUNICATIONS INFRASTRUCTURE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	25	15	5
Please verify other types of communications media that are utilized by your agency for traffic operations and management:	-		
Wireless ***(identify locations)***	Yes		
Leased lines	Yes		
Other (please list)			
EVENT MANAGEMENT	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
What other agencies do you coordination with for event management purposes:			
ADOT	Yes		
Adjacent City (please list)			
Other (please list)			
ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have an arterial incident response team?	No	Yes	
How many vehicles does your agency have as part of the arterial incident response team?	-		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?	Yes		
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?	Yes		
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?	Yes		
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			

OPERATIONAL DATA ARCHIVING/STORAGE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have a data archive for operations data?	Yes		
What types of information does your data archive collect and store?			
Detector information	It can		
Signal operations	Yes		
DMS activity	Yes		
CCTV images	No		
Service patrol calls	No		
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?			

CITY OF SURPRISE

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	i2TMS	KITS - being designed	
Is there a Traffic management/operations center ***(*Provide address/location)***	Yes		
How many signalized intersections are operated by your agency:			
Connected to the City TMC	34	44	
Not connected to the City TMC			
Number of synchronized signalized intersections ***(*indicate locations)***	Bell Rd: Ave Arts to Bell Pointe		
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***			
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***			
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***			
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***			
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***			
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***			
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***			
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	4		25
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	3		
What type of arterial vehicle detection does your agency use for traffic management purposes:	-		
Stop bar intersection detection	No		
Advanced intersection detection	No		
Mid-block detection	No	Greenway 2010 - 2 locations	
Vehicle Image Detection	Yes		
Other types of detectors - please indicate (i.e., ITIP sensors)			
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***			
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***			

TRAFFIC MONITORING AND DETECTION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How is arterial detection data being used by your agency?			
Real-time operations			
Planning purposes			
Use is limited to localized signal operations (presence)			
Other comments on your agency's traffic monitoring/detection capabilities not already addressed in the above questions:			
TRAVELER INFORMATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How does your agency disseminate traveler information to the public:	-		
Television - dedicated channel/local cable channel	No		
Link to local media	No		
Link to HCRS for dissemination on 511	No		
Email alerts	Yes		
Agency website	Yes		
Private sector providers (i.e., Traffic.com)			
Other (please describe)	text subscribers		
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	2	4	
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	Bell Rd in Peoria		
How many portable DMS are owned by your agency for arterial traveler information purposes?			
Please verify the types of information displayed on your arterial DMS:	-		
Travel times	No		
Incident information	Yes		
Construction/work zone information	Yes		
Emergency/threat alerts	No		
Special event information	Yes		
Other (please describe)	information as it relates to traffic only		
Other comments or activities about traveler information by your agency that are not addressed above:			
AGENCY COORDINATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Which devices/systems do you share control of with other agencies?	-		
CCTV (identify agency)	Peoria, MCDOT		
DMS (identify agency)	Peoria, MCDOT		
Signal timing plans (view only access) (identify agency)	Peoria, MCDOT		

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	-		
ADOT	Yes		
MCDOT	Yes		
Cities (please list)	Peoria		
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*	-		
Police	Yes		
Fire	Yes		
City Emergency Operations Center			
Transit			
Arizona Department of Emergency Management			
Maricopa County Emergency Operations Center			
Other (please list)	REACT		
What regional systems are you connected to?	-		
Center-to-Center	No	No	Yes
Regional Communications Network	No	Yes	
Public Safety Video Distribution System	No	Yes	
Please describe any additional information/activities about your agency coordination or connectivity status:			

COMMUNICATIONS INFRASTRUCTURE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	3.5	5.5	3
Please verify other types of communications media that are utilized by your agency for traffic operations and management:			
Wireless ***(identify locations)***			
Leased lines			
Other (please list)			

EVENT MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
What other agencies do you coordination with for event management purposes:			
ADOT			
Adjacent City (please list)			
Other (please list)			

ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have an arterial incident response team?	Yes - REACT		
How many vehicles does your agency have as part of the arterial incident response team?	3		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?			
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?			
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?			
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			
OPERATIONAL DATA ARCHIVING/STORAGE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have a data archive for operations data?	coming with KITS		
What types of information does your data archive collect and store?	-		
Detector information	Yes		
Signal operations	Yes		
DMS activity	Yes		
CCTV images	No		
Service patrol calls	Yes - REACT		
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?			

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	i2TMS		
Is there a Traffic management/operations center ***(*Provide address/location)***	Yes, 2901 W Durango, Phx, AZ		
How many signalized intersections are operated by your agency:	145		230 total
Connected to the City TMC	71		
Not connected to the City TMC	74		
Number of synchronized signalized intersections ***(*indicate locations)***	Bell, Peoria, MC-85, Power, Riggs, 99th Ave, Indian School		
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***			
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	?		
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	None		
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	None		
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	?		
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	None		
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	None		
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	31	70-80	
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	Bell Rd - Peoria, Surprise, Goodyear, 9 total		
What type of arterial vehicle detection does your agency use for traffic management purposes:	-		
Stop bar intersection detection	Yes		
Advanced intersection detection	Wireless, Loops,		
Mid-block detection	No		
Vehicle Image Detection	?		
Other types of detectors - please indicate (i.e., ITIP sensors)	ITIP (RTMS)		

TRAFFIC MONITORING AND DETECTION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***	MC-85, Bell, Olive, Hayden, Baseline		
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***	?		
How is arterial detection data being used by your agency?	-		
Real-time operations	Yes		
Planning purposes	Yes		
Use is limited to localized signal operations (presence)	No		
Other comments on your agency's traffic monitoring/detection capabilities not already addressed in the above questions:			
TRAVELER INFORMATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How does your agency disseminate traveler information to the public:	-		
Television - dedicated channel/local cable channel	No		
Link to local media	Yes		
Link to HCRS for dissemination on 511	Yes		
Email alerts	Yes		
Agency website	Yes		
Private sector providers (i.e., Traffic.com)	Yes		
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***			
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	Yes - Peoria, Surprise	Yes - Goodyear, Avondale	
How many portable DMS are owned by your agency for arterial traveler information purposes?	None		
Please verify the types of information displayed on your arterial DMS:	15		
Travel times	No		
Incident information	Yes		
Construction/work zone information	Yes		
Emergency/threat alerts	Yes		
Special event information	Yes		
Other (please describe)			
Other comments or activities about traveler information by your agency that are not addressed above:			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Which devices/systems do you share control of with other agencies?	-		
CCTV (identify agency)	Peoria, Surprise	Goodyear, Avondale	
DMS (identify agency)	Peoria, Surprise	Goodyear, Avondale	
Signal timing plans (view only access) (identify agency)	Peoria, Surprise	Any agency linked to C2C	
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	-		
ADOT	Yes		
Cities (please list)	Peoria, Surprise		
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*	-		
Police	Yes - MCSO, DPS		
Fire	Yes - Phoenix Fire		
City Emergency Operations Centers	No		
Transit	Yes - Phoenix Public Transit, Valley Metro		
Arizona Department of Emergency Management	No	Yes	
Maricopa County Emergency Operations Center	No	Yes	
Other (please list)			
What regional systems are you connected to?	-		
Center-to-Center	Yes		
Regional Communications Network	No	Yes	
Public Safety Video Distribution System	No	Yes	
Please describe any additional information/activities about your agency coordination or connectivity status:			

COMMUNICATIONS INFRASTRUCTURE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	7.2		
Please verify other types of communications media that are utilized by your agency for traffic operations and management:			
Wireless ***(identify locations)***	Yes - Riggs, MC-85, Olive, Peoria, 99th, University, El Mirage, Del Webb, Broadway,		
Leased lines	Yes - Bell Rd, Majority of communications (50 DS1 / T1 leased lines)		
Other (please list)	TWP and Dial-Up - RH Johnson		
EVENT MANAGEMENT	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
What other agencies do you coordination with for event management purposes:	-		
ADOT	Yes		
City (please list)	Peoria, Surprise, Goodyear, Avondale, Mesa, Scottsdale		
Other (please list)			
ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have an arterial incident response team?	Yes		
How many vehicles does your agency have as part of the arterial incident response team?	11		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?	Yes		
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?	Yes		
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			

OPERATIONAL DATA ARCHIVING/STORAGE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have a data archive for operations data?	Yes - RADS server		
What types of information does your data archive collect and store?	-		
Detector information	Yes		
Signal operations	Yes		
DMS activity	Yes		
CCTV images	No		
Service patrol calls	Yes		
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?	RCRS		

PHOENIX PUBLIC TRANSIT

FLEET CHARACTERISTICS	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many transit vehicles are equipped with automated vehicle location capability:			
Fixed route local bus (Includes Express route buses)	792	106	
Fixed route express bus			
Fixed route RAPID bus	56	24	
Regional collectors	55	26	
Demand responsive	186	15	
Light rail			
How many transit vehicles have real-time monitoring of vehicle components (vehicle maintenance checks, door activity):			
Fixed route local bus	792		
Fixed route express bus			
Fixed route RAPID bus	56		
Regional collectors	55		
Demand responsive	186		
Light rail			
How many vehicles have an on-board transit fare collection system:			
Fixed route local bus	792		
Fixed route express bus			
Fixed route RAPID bus	56		
Regional collectors			
Demand responsive	65		
Light rail			
How many vehicles have an on-board passenger counting system:			
Fixed route local bus	126		
Fixed route express bus			
Fixed route RAPID bus	20		
Regional collectors	10		
Demand responsive			
Light rail			
How many vehicles have an on-board security surveillance system:			
Fixed route local bus	792		
Fixed route express bus			
Fixed route RAPID bus	56		
Regional collectors	55		
Demand responsive			
Light rail			

FLEET CHARACTERISTICS	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many transit stations have security surveillance capabilities:			
Bus	all		
Light rail			
TRAFFIC SIGNAL AND RAMP METER PRIORITY CAPABILITIES	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many fixed route buses have traffic signal priority capability?	0	25	
How many demand responsive vehicles have traffic signal priority capability?	0	0	
How many fixed route buses have ramp meter signal priority capability?	0	0	
Total number of demand responsive vehicles with ramp meter signal priority capability	0	0	
TRAVELER INFORMATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Please verify the methods your agency uses to disseminate transit routes, schedules, and fare information to the public:			
Television - dedicated channel			
Phone (automated and customer assistance support)	YES		
Website	YES		
Traveler information kiosks	YES		
Variable message signs (on-board)	YES		
511 telephone service	YES		
Mobile/PDA accessible site	NO		
Email alerts	NO		
Please verify the methods your agency uses to disseminate real-time transit schedule adherence or arrival/departure times to the public:			
Television - dedicated channel	NO		
Automated phone system	YES		
Website	YES		
Traveler information kiosks	NO		
Dynamic message boards (on-board, transit station)	YES		
511 telephone service	YES		
Mobile/PDA alert	NO		
Email alerts	NO		
How many transit facilities electronically display automated or dynamic traveler information to the public			
Bus or transfer stations	18		
Park and ride facilities	4		
Light rail			

INTEGRATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Provide a description of your current dispatch/communications center capabilities.			
What agencies do you share transit traveler information with?			
ADOT	511		
MAG			
MCDOT			
Cities - please list			
Other?			
What systems are you connected to?	NONE		
Center-to-Center	NO		
Regional Communications Network	NO		

TOWN OF GILBERT

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	9/08 we are converting to Siemens I2 System		
Is there a Traffic management/operations center ***(*Provide address/location)***	50 East Civic Center Drive, Gilbert		
How many signalized intersections are operated by your agency:	162	32	30
Connected to the City TMC	86	194	
Not connected to the City TMC	76		
Number of synchronized signalized intersections ***(*indicate locations)***	86	194	
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***	158	194	
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	na		
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	0		
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	0		
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	2 Higley & Vest and Power & Pecos		
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	0		
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	0		
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	21	24	30
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	0		
What type of arterial vehicle detection does your agency use for traffic management purposes:			
Stop bar intersection detection			
Advanced intersection detection			
Mid-block detection			
Vehicle Image Detection			
Other types of detectors - please indicate (i.e., ITIP sensors)			
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***			
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***	0		
How is arterial detection data being used by your agency?	na		
Real-time operations			

TRAFFIC MONITORING AND DETECTION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Planning purposes			
Use is limited to localized signal operations (presence)			
Other comments on your agency's traffic monitoring/detection capabilities not already addressed in the above questions:			
TRAVELER INFORMATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How does your agency disseminate traveler information to the public:			
Television - dedicated channel/local cable channel			
Link to local media			
Link to HCRS for dissemination on 511			
Email alerts			
Agency website	X		
Private sector providers (i.e., Traffic.com)			
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	2 - Gilbert Rd. north of Williams Field and Gilbert Rd north of Guadalupe		
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	na		
How many portable DMS are owned by your agency for arterial traveler information purposes?	2		
Please verify the types of information displayed on your arterial DMS:			
Travel times			
Incident information			
Construction/work zone information	X		
Emergency/threat alerts			
Special event information	X		
Other (please describe)			
Other comments or activities about traveler information by your agency that are not addressed above:			
AGENCY COORDINATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Which devices/systems do you share control of with other agencies?			
CCTV (identify agency)	na	Chandler and Queen Creek	Mesa
DMS (identify agency)	na	Chandler	
Signal timing plans (view only access) (identify agency)	na	Chandler and Queen Creek	Mesa

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?			
ADOT	na		
MCDOT	na		
Cities (please list)	na		
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*	na		
Police	na		
Fire	na		
City Emergency Operations Center	na		
Transit	na		
Arizona Department of Emergency Management	na		
Maricopa County Emergency Operations Center	na		
Other (please list)			
What regional systems are you connected to?			
Center-to-Center	na		
Regional Communications Network	na		
Public Safety Video Distribution System	na		
Please describe any additional information/activities about your agency coordination or connectivity status:			

COMMUNICATIONS INFRASTRUCTURE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	19		55
Please verify other types of communications media that are utilized by your agency for traffic operations and management:			
Wireless ***(identify locations)***	over 100 locations		
Leased lines			
Other (please list)			

EVENT MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
What other agencies do you coordination with for event management purposes:			
ADOT			
Adjacent City (please list)			
Other (please list)			

ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have an arterial incident response team?	no		
How many vehicles does your agency have as part of the arterial incident response team?	na		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?			
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?	na		
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?			
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			
OPERATIONAL DATA ARCHIVING/STORAGE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have a data archive for operations data?	no		
What types of information does your data archive collect and store?			
Detector information			
Signal operations			
DMS activity			
CCTV images			
Service patrol calls			
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?			

TOWN OF QUEEN CREEK

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	To be determined		
Is there a Traffic management/operations center ***(*Provide address/location)***			22350 S Ellsworth Rd, Queen Creek, AZ 85242
How many signalized intersections are operated by your agency:			
Connected to the City TMC	0	10	All
Not connected to the City TMC	30		
Number of synchronized signalized intersections ***(*indicate locations)***	10 (time-based) Ellsworth/Queen Creek Rd Ellsworth Loop/Ellsworth Rd (North Connector) Ellsworth Loop/Rittenhouse Rd Ellsworth Loop/Maya Rd Ellsworth Loop/Victoria Ln Ellsworth Loop/Ocotillo Rd Ellsworth Loop/Ellsworth Rd (South Connector) Rittenhouse Rd/QC Marketplace Rittenhouse/Ellsworth Rd Rittenhouse/Cornerstone at QC	11 (via fiber to central) Ellsworth/Queen Creek Rd Ellsworth Loop/Ellsworth Rd (North Connector) Ellsworth Loop/Rittenhouse Rd Ellsworth Loop/Maya Rd Ellsworth Loop/Victoria Ln Ellsworth Loop/Ocotillo Rd Ellsworth Loop/Ellsworth Rd (South Connector) Rittenhouse/QC Marketplace Rittenhouse/Ellsworth Rd Rittenhouse/Cornerstone at QC Ocotillo Rd/Rittenhouse Rd	Most
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***	25 - All EXCEPT these: Power Rd/Riggs Rd Chandler Hts Rd/Sossaman Rd Ellsworth Rd/Chandler Hts Rd Ellsworth Rd/Cloud Rd Ellsworth Rd/Ocotillo Rd		All
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	25 Not sure what this means. We use TOMAR and accept all codes.		
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	0		
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	0		
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	2 Ellsworth Rd/Rittenhouse Rd Combs Rd/Rittenhouse Rd		
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	0		
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	0		

TRAFFIC MONITORING AND DETECTION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	0	6 Ellsworth Loop Rd/Ellsworth Rd (North Connector) Ellsworth Loop Rd/Rittenhouse Rd Ellsworth Loop Rd/Ocotillo Rd Ellsworth Loop Rd/Ellsworth Rd (South Connector) Rittenhouse Rd/Ellsworth Rd Ocotillo Rd/Rittenhouse Rd	
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	0	0	
What type of arterial vehicle detection does your agency use for traffic management purposes:			
Stop bar intersection detection	Yes		
Advanced intersection detection	select locations		
Mid-block detection	No		
Vehicle Image Detection	Yes		
Other types of detectors - please indicate (i.e., ITIP sensors)	Loops at some temp signals Microwave on portable signals		
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***	N/A		
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***	VIDS at all intersections, all approaches EXCEPT: Power Rd/Riggs Rd - VIDS stopline, loops advance Chandler Hts Rd/Sossaman Rd - portable, microwave only Ellsworth Rd/Chandler Hts Rd - portable, no detection working, in recall Ellsworth Rd/Cloud Rd - portable microwave only Rittenhouse Rd/Combs Rd - 3 approaches have VIDS, EB has loops		
How is arterial detection data being used by your agency?			
Real-time operations			
Planning purposes			
Use is limited to localized signal operations (presence)	X		
Other comments on your agency's traffic monitoring/detection capabilities not already addressed in the above questions:			

TRAVELER INFORMATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How does your agency disseminate traveler information to the public:			
Television - dedicated channel/local cable channel			
Link to local media			
Link to HCRS for dissemination on 511			
Email alerts	No real-time. Planned restrictions for upcoming week and unplanned major road closures are posted to web and emailed to media and public lists		
Agency website	No real-time. Planned restrictions for upcoming week and unplanned major road closures are posted to web and emailed to media and public lists		
Private sector providers (i.e., Traffic.com)			
Other (please describe)			
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	0		
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	No		
How many portable DMS are owned by your agency for arterial traveler information purposes?	3 for various purposes		
Please verify the types of information displayed on your arterial DMS:			
Travel times			
Incident information	X		
Construction/work zone information	X		
Emergency/threat alerts			
Special event information	X		
Other (please describe)	occasionally used as driver feedback speed signs		
Other comments or activities about traveler information by your agency that are not addressed above:			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Which devices/systems do you share control of with other agencies?	N/A		
CCTV (identify agency)			
DMS (identify agency)			
Signal timing plans (view only access) (identify agency)			
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	N/A		
ADOT			
MCDOT			
Cities (please list)			
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*	N/A		
Police			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Fire			
City Emergency Operations Center			
Transit			
Arizona Department of Emergency Management			
Maricopa County Emergency Operations Center			
Other (please list)			
What regional systems are you connected to?	N/A		
Center-to-Center			
Regional Communications Network			
Public Safety Video Distribution System			
Please describe any additional information/activities about your agency coordination or connectivity status:			
COMMUNICATIONS INFRASTRUCTURE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**	0	~3.5	
Please verify other types of communications media that are utilized by your agency for traffic operations and management:	N/A		
Wireless ***(identify locations)***			
Leased lines			
Other (please list)			
EVENT MANAGEMENT	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
What other agencies do you coordination with for event management purposes:	N/A		
ADOT			
Adjacent City (please list)			
Other (please list)			
ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have an arterial incident response team?	Traffic Engineering staff handles this, but not as part of a dedicated program/team.		
How many vehicles does your agency have as part of the arterial incident response team?	2		
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?	No		
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?	No		
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?	Yes		

OPERATIONAL DATA ARCHIVING/STORAGE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have a data archive for operations data?	No		
What types of information does your data archive collect and store?			
Detector information			
Signal operations			
DMS activity			
CCTV images			
Service patrol calls			
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?	Yes		

TOWN OF YOUNGTOWN

TRAFFIC SIGNAL MANAGEMENT	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Model and Vendor of your agency's traffic signal/management system:	Not Applicable		
Is there a Traffic management/operations center ***(*Provide address/location)***	No	None	None
How many signalized intersections are operated by your agency:	0	0	0
Connected to the City TMC	0	0	0
Not connected to the City TMC	0	0	0
Number of synchronized signalized intersections ***(*indicate locations)***	0	0	0
Number of signalized intersections with emergency vehicle signal preemption ***(*indicate locations)***	0	0	0
Number of signalized intersections with preemption encryption for sharing with other agencies ***(*indicate locations)***	0	0	0
Number of signalized intersections with signal priority for transit vehicles ***(*indicate locations)***	0	0	0
Number of signalized intersections with signal priority for light rail ***(*indicate locations)***	0	0	0
Number of signalized intersections that are in close proximity to train tracks which have specific timing sequences for train crossings ***(*indicate locations)***	0	0	0
How many signalized intersections have automated photo red light running enforcement? ***(*indicate locations)***	0	0	0
How many signalized intersections have automated speed enforcement? ***(*indicate locations)***	0	0	0
TRAFFIC MONITORING AND DETECTION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Number of arterial CCTV cameras **deployed/owned** by your agency ***(*provide locations)***	0	0	0
Number of arterial CCTV cameras **in other jurisdictions** that your agency can operate ***(*provide locations)***	0	0	0
What type of arterial vehicle detection does your agency use for traffic management purposes:			
Stop bar intersection detection	0	0	0
Advanced intersection detection	0	0	0
Mid-block detection	0	0	0
Vehicle Image Detection	0	0	0
Other types of detectors - please indicate (i.e., ITIP sensors)	0	0	0
Arterial corridors that have consecutive intersection detection capabilities along a corridor that are provided by your agency ***(*attach map of corridor and extent of coverage if available)***	0	0	0
Number of VID (video image detection devices) deployed by your agency? ***(*provide intersections, indicate if VID covers all 4 intersection directions)***	0	0	0
How is arterial detection data being used by your agency?			
Real-time operations	0	0	0
Planning purposes	0	0	0
Use is limited to localized signal operations (presence)	0	0	0

TRAVELER INFORMATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How does your agency disseminate traveler information to the public:			
Television - dedicated channel/local cable channel	No	None	None
Link to local media	No	None	None
Link to HCRS for dissemination on 511	No	None	None
Email alerts	No	None	None
Agency website	No	No	Yes
Private sector providers (i.e., Traffic.com)	No	None	None
Other (please describe)	N/A		
How many permanent arterial DMS are deployed by your agency? ***(*provide locations)***	0	0	0
Can you operate arterial DMS in another jurisdiction? ***(*provide locations/jurisdiction)***	No	No	No
How many portable DMS are owned by your agency for arterial traveler information purposes?	None	None	None
Please verify the types of information displayed on your arterial DMS:			
Travel times	N/A	N/A	N/A
Incident information	N/A	N/A	N/A
Construction/work zone information	N/A	N/A	N/A
Emergency/threat alerts	N/A	N/A	N/A
Special event information	N/A	N/A	N/A
Other (please describe)			
Other comments or activities about traveler information by your agency that are not addressed above:			

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Which devices/systems do you share control of with other agencies?			
CCTV (identify agency)	N/A	N/A	N/A
DMS (identify agency)	N/A	N/A	N/A
Signal timing plans (view only access) (identify agency)	N/A	N/A	N/A
What **traffic management** agencies are you connected with to share information (signal timing plans, video, and DMS messages)?	N/A	N/A	N/A
ADOT	N/A	N/A	N/A
MCDOT	N/A	N/A	N/A
Cities (please list)	N/A	N/A	N/A
What other departments or agencies are you connected to for information sharing? *(May be internal agency network)*	N/A	N/A	N/A
Police	N/A	N/A	N/A
Fire	N/A	N/A	N/A
City Emergency Operations Center	N/A	N/A	N/A
Transit	N/A	N/A	N/A

AGENCY COORDINATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Arizona Department of Emergency Management	N/A	N/A	N/A
Maricopa County Emergency Operations Center	N/A	N/A	N/A
Other (please list)			
What regional systems are you connected to?	N/A	N/A	N/A
Center-to-Center	N/A	N/A	N/A
Regional Communications Network	N/A	N/A	N/A
Public Safety Video Distribution System	N/A	N/A	N/A
Please describe any additional information/activities about your agency coordination or connectivity status:			
COMMUNICATIONS INFRASTRUCTURE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many miles of fiber optic cable infrastructure have been deployed by your agency for traffic management/operations? **(*provide map with coverage areas)**			
Please verify other types of communications media that are utilized by your agency for traffic operations and management:			
Wireless ***(identify locations)***	N/A	N/A	N/A
Leased lines	N/A	N/A	N/A
Other (please list)	N/A	N/A	N/A
EVENT MANAGEMENT	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
What other agencies do you coordination with for event management purposes:	N/A	N/A	N/A
ADOT	N/A	N/A	N/A
Adjacent City (please list)			
Other (please list)			
ARTERIAL INCIDENT MANAGEMENT AND RESPONSE	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Does your agency have an arterial incident response team?	N/A	N/A	N/A
How many vehicles does your agency have as part of the arterial incident response team?	N/A	N/A	N/A
Do your police vehicles within your jurisdiction have automatic vehicle location capabilities?	No	No	No
Do your agency's maintenance/construction vehicles have automatic vehicle location capabilities?	No	No	No
Do your fire vehicles within your jurisdiction have automatic vehicle location capabilities?	N/A	N/A	N/A
Please describe any additional activities or resources for arterial incident management not addressed in the above questions.			

OPERATIONAL DATA ARCHIVING/STORAGE	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Does your agency have a data archive for operations data?	N/A	N/A	N/A
What types of information does your data archive collect and store?			
Detector information	N/A	N/A	N/A
Signal operations	N/A	N/A	N/A
DMS activity	N/A	N/A	N/A
CCTV images	N/A	N/A	N/A
Service patrol calls	N/A	N/A	N/A
Other (please list)			
How does your agency track closures, incidents or planned construction/restrictions?			

VALLEY METRO

FLEET CHARACTERISTICS	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many transit vehicles are equipped with automated vehicle location capability:			
Fixed route local bus			
Fixed route express bus			
Fixed route RAPID bus			
Regional collectors			
Demand responsive			
Light rail	50	50	
How many transit vehicles have real-time monitoring of vehicle components (vehicle maintenance checks, door activity):			
Fixed route local bus			
Fixed route express bus			
Fixed route RAPID bus			
Regional collectors			
Demand responsive			
Light rail	50	50	
How many vehicles have an on-board transit fare collection system:			
Fixed route local bus			
Fixed route express bus			
Fixed route RAPID bus			
Regional collectors			
Demand responsive			
Light rail	NA	NA	
How many vehicles have an on-board passenger counting system:			
Fixed route local bus			
Fixed route express bus			
Fixed route RAPID bus			
Regional collectors			
Demand responsive			
Light rail	50	50	
How many vehicles have an on-board security surveillance system:			
Fixed route local bus			
Fixed route express bus			
Fixed route RAPID bus			
Regional collectors			
Demand responsive			
Light rail	50	50	

FLEET CHARACTERISTICS	Existing	Programmed (Through 2013)	Planned (Not Programmed)
How many transit stations have security surveillance capabilities:			
Bus			
Light rail	32	35	
TRAFFIC SIGNAL AND RAMP METER PRIORITY CAPABILITIES	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
How many fixed route buses have traffic signal priority capability?			
How many demand responsive vehicles have traffic signal priority capability?			
How many fixed route buses have ramp meter signal priority capability?			
Total number of demand responsive vehicles with ramp meter signal priority capability			
TRAVELER INFORMATION	**Existing**	**Programmed (Through 2013)**	**Planned (Not Programmed)**
Please verify the methods your agency uses to disseminate transit routes, schedules, and fare information to the public:			
Television - dedicated channel			
Phone (automated and customer assistance support)	Y	Y	
Website			
Traveler information kiosks			
Variable message signs (on-board)			Y
511 telephone service			
Mobile/PDA accessible site			
Email alerts			
Please verify the methods your agency uses to disseminate real-time transit schedule adherence or arrival/departure times to the public:			
Television - dedicated channel			
Automated phone system			
Website			
Traveler information kiosks			
Dynamic message boards (on-board, transit station)	Y	Y	
511 telephone service			
Mobile/PDA alert			
Email alerts			
How many transit facilities electronically display automated or dynamic traveler information to the public			
Bus or transfer stations			
Park and ride facilities			
Light rail	32	35	

INTEGRATION	Existing	Programmed (Through 2013)	Planned (Not Programmed)
Provide a description of your current dispatch/communications center capabilities.	CCTV (up to 300 cams, 5TB DVR, IP/Ethernet network , up to 100 dynamic signs and PA system)		
What agencies do you share transit traveler information with?	not connected		in planning
ADOT			
MAG			
MCDOT			
Cities - please list			
Other?			
What systems are you connected to?			
Center-to-Center			
Regional Communications Network			

MARICOPA ASSOCIATION of GOVERNMENTS

MAG Regional ITS Architecture

Appendix B – User Service Requirements Applicable to the MAG Region

Prepared by:

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MAG REGIONAL ITS ARCHITECTURE – APPENDIX B

1.1 PRE-TRIP TRAVEL INFORMATION

1.1.0 ITS shall include a Pre-Trip Travel Information (PTTI) capability to assist travelers in making mode choices, travel time estimates, and route decisions prior to trip departure. It consists of three major functions applicable to the MAG Region, which are, (1) Available Services Information, (2) Current Situation Information, (3) Trip Planning Service, and (4) User Access. Information is integrated from various transportation modes and presented to the user for decision making.

1.1.1 PTTI shall provide travelers with Available Services Information on travel, for their use.

1.1.1.1 PTTI shall provide users with available services information that is timely.

1.1.1.1.1 PTTI shall provide users the latest available information on transit routes.

1.1.1.1.2 PTTI shall provide users the latest available information on transit schedules.

1.1.1.1.3 PTTI shall provide users with the latest available schedule adherence information.

1.1.1.1.5 PTTI shall provide users the latest available information on transit fares.

1.1.1.1.6 PTTI shall provide users information on accessing ridematching services.

1.1.2 PTTI shall provide the capability for users to access the Current Situation Information on transportation systems.

1.1.2.1 PTTI shall provide the latest available information on the current status of transportation services.

1.1.2.1.1 Real-time information provided by PTTI shall include the current condition of any weather related incidents.

1.1.2.1.2 Real-time information provided by PTTI shall include the current status of any accidents or incidents.

1.1.2.1.3 Real-time information provided by PTTI shall include the current condition of any road construction.

1.1.2.1.5 Real-time information provided by PTTI shall include the current speeds on specific routes.

1.1.2.1.7 Real-time information provided by PTTI shall include the schedules for any current or soon to start events.

1.1.2.1.8 Real-time information provided by PTTI shall include the current weather situation.

1.1.3 PTTI shall include a Trip Planning Service.

1.1.3.1 PTTI trip planning service shall provide the users with information needed for planning an upcoming trip.

1.1.3.1.1 Based on user specified parameters PTTI shall provide users with a calculated itinerary.

1.1.3.1.2 Based on user specified parameters PTTI shall provide users with transportation mode choices.

1.1.3.1.3 Based on user specified parameters PTTI shall provide users with real-time travel conditions for time of inquiry and estimated conditions for estimated time of travel.

1.1.3.1.4 Based on user specified parameters PTTI shall provide users with one or more alternate itineraries in addition to the primary calculated itinerary.

1.1.3.2 PTTI shall provide the capability for users to specify transportation parameters that are unique to their individual needs.

1.1.3.2.1 PTTI shall provide the capability for users to specify a desired destination.

1.1.3.2.2 PTTI shall provide the capability for users to specify a planned departure location.

1.1.3.2.3 PTTI shall provide the capability for users to specify their desired departure time.

1.1.3.2.4 PTTI shall provide the capability for users to specify their desired arrival time.

1.1.3.2.5 PTTI shall provide the capability for users to specify their maximum acceptable travel time.

1.1.3.2.6 PTTI shall provide the capability for users to specify their maximum acceptable number of mode changes.

1.1.3.2.7 PTTI shall provide the capability for users to specify a maximum number of transfers.

1.1.3.2.8 PTTI shall provide the capability for users to specify their preferred route(s) or segment of route(s).

1.1.3.2.9 PTTI shall provide the capability for users to specify their preferred transportation mode(s).

1.1.3.2.10 PTTI shall provide the capability for users to specify their preferred weather conditions.

1.1.3.3 In addition to the user specified parameters PTTI shall use additional factors when planning trips.

1.1.3.3.1 PTTI shall consider current travel conditions when calculating a trip itinerary.

1.1.4 PTTI shall provide the capability for User Access.

1.1.4.1 PTTI shall provide the capability for users to access the system from multiple distributed locations.

1.1.4.1.1 PTTI shall provide the capability for users to access the system from their homes.

1.1.4.1.2 PTTI shall provide the capability for users to access the system from their place of work.

1.1.4.1.3 PTTI shall provide the capability for users to access the system from major trip generation sites.

1.1.4.1.4 PTTI shall provide the capability for users to access the system from personal portable devices.

1.1.4.2 PTTI shall provide the capability for users to access the system over multiple types of electronic media.

1.1.4.2.1 Access media shall comply with the Americans with Disabilities Act (ADA) legislation.

1.2 EN-ROUTE DRIVER INFORMATION

1.2.0 ITS shall include an En-Route Driver Information (DI) function. Driver Information provides vehicle drivers with information, while en-route, which will allow alternative routes to be chosen for their destination. Driver Information consists of one major function applicable to the MAG Region which is (1) Driver Advisory. The potential decrease in traffic may also provide benefits in highway safety, reduced air pollution, and decreased congestion.

1.2.1 DI shall be implemented in a manner that is beneficial to the transportation system and the public.

1.2.1.1 DI shall be implemented in a manner that helps improve highway safety.

1.2.1.2 DI shall be implemented in a manner that helps reduce air pollution.

1.2.1.3 DI shall be implemented in a manner that helps decrease congestion.

1.2.1.4 DI shall be designed in a manner that permits a two-phase implementation.

1.2.1.4.1 The DI two-phase implementation shall include a short term capability to address those features that can be implemented in the present time frame.

1.2.1.4.2 The DI two-phase implementation shall include a long term capability to address those features that can be implemented when the remainder of the ITS system is deployed.

1.2.2 DI shall include a Driver Advisory function, which shall be implemented in two phases with first a short term capability and later a long term capability.

1.2.2.1 The short term DI driver information capability shall include the ability to provide information to travelers within the limited area of deployment.

1.2.2.1.1 DI shall include the capability to provide travelers with accurate information concerning available travel options and their state of operational availability.

1.2.2.1.2 DI shall provide information to travelers required for them to avoid areas of congestion.

1.2.2.1.2.1 DI shall provide information needed for travelers to select transportation modes that allow them to avoid congestion.

1.2.2.1.4 In the short-term DI shall be deployed in those limited areas where the need and associated benefits are more immediate.

1.2.2.2 The long term DI driver information capability shall include the ability to provide information to travelers within all geographic areas of the ITS deployment.

1.4 RIDE MATCHING AND RESERVATION

1.4.0 ITS shall include a Ride Matching and Reservation (RMR) function. Ride Matching and Reservation will provide travel users with information on rideshare providers. Three major functions are provided in the MAG Region, which are, (1) Rider Request, (2) Transportation Provider Services, and (3) Information Processing. This will also include a billing service to the providers.

1.4.1 RMR shall include a Rider Request capability.

1.4.1.1 Rider Request shall provide the capability for a traveler to request a ride by placing a single request from a facility to include, but not be limited to, the following:

1.4.1.1(a) Telephones (including hearing-impaired capability).

1.4.1.1(b) Kiosks.

1.4.1.2 Rider Request shall provide a traveler the capability to request a specific itinerary by specifying, but not be limited to, the following:

1.4.1.2(a) Date.

1.4.1.2(b) Time of pick-up and drop-off.

1.4.1.2(c) Origin.

1.4.1.2(d) Destination.

1.4.1.2(e) Specific restrictions or preferences.

1.4.1.3 Rider Request shall provide the traveler with the available ridesharing options, based on the traveler's request and specified itinerary.

1.4.1.4 Rider Request shall also include the capability to perform real-time ridematching by instantly matching rider and driver.

1.4.2 RMR shall include a Transportation Provider Service function.

1.4.2.1 Transportation Provider Services shall include the capability for providers to have their billing arranged through a central clearinghouse.

1.4.2.3 Transportation Provider Services shall automatically generate needed reports and financial documentation.

1.4.3 RMR shall include an Information Processing function.

1.4.3.1 Information Processing shall quickly match preferences and demands of requesting travelers with the services available from providers.

1.4.3.2 Information Processing shall provide a clearinghouse capability for rideshare financial transactions.

1.4.3.3 Information Processing shall link together the services available from all travel modes including, but not limited to, the following:

1.4.3.3(a) Bus.

1.4.3.3(c) Vanpools.

1.4.3.3(d) Express bus.

1.4.3.3(f) Specialized service.

1.4.3.4 Information Processing shall provide the informational infrastructure to connect providers and consumers.

1.4.3.5 Information Processing shall provide the capability to gather market information to assist in the planning of service improvements.

1.4.3.6 Information Processing shall provide the capability to gather market information to assist in operations.

1.6 TRAFFIC CONTROL

1.6.0 ITS shall include a Traffic Control (TC) function. Traffic Control provides the capability to efficiently manage the movement of traffic on streets and highways. Four functions applicable to the MAG Region are provided, which are, (1) Traffic Flow Optimization, (2) Traffic Surveillance, (3) Control, and (4) Provide Information. This will also include control of network signal systems with eventual integration of freeway control.

1.6.1 TC shall include a Traffic Flow Optimization function to provide the capability to optimize traffic flow.

1.6.1.1 Traffic Flow Optimization shall employ control strategies that seek to maximize traffic-movement efficiency.

1.6.1.1.1 Traffic-movement control shall manage movement of traffic on streets.

1.6.1.1.2 Traffic-movement control shall manage movement of traffic on highways.

1.6.1.1.3 Traffic-movement control shall include the goal of minimizing delay times.

1.6.1.1.4 Traffic-movement control shall include the goal of minimizing energy use.

1.6.1.1.5 Traffic-movement control shall include the goal of minimizing air quality impacts due to traffic.

1.6.1.2 Traffic Flow Optimization shall include a wide area optimization capability, to include several jurisdictions.

1.6.1.2.1 Wide area optimization shall integrate the control of network signal systems with the control of freeways.

1.6.1.2.2 Wide area optimization shall include features that provide preferential treatment for transit vehicles.

1.6.1.3 Traffic Flow Optimization shall be implemented in a manner that seeks to optimize traffic movement over a large geographic area.

1.6.1.4 Traffic Flow Optimization shall include a Control function that is responsive to both the current demand as well as the expected demand.

1.6.1.4.1 The Control function shall include the capability to facilitate the dissipation of traffic congestion.

1.6.1.5 Traffic Flow Optimization shall provide the capability to predict travel patterns.

1.6.1.6 The Control function shall include the use of data acquired from traffic surveillance as feedback to the control strategies.

1.6.2 TC shall include a Traffic Surveillance function.

1.6.2.1 Traffic Surveillance shall include a vehicle detection function with the capability of accurately detecting vehicles in a real-time fashion.

1.6.2.2 Traffic Surveillance shall include a data collect function to provide the capability to collect data for determining traffic flow and prediction.

1.6.2.2.1 The data collect function shall provide the capability to quickly feedback traffic data to the control processes.

1.6.2.3 Traffic Surveillance shall include a wide-area surveillance capability to include several jurisdictions.

1.6.2.3.1 The wide-area surveillance shall gather speed and flow information.

1.6.2.3.2	The wide-area surveillance shall cover a large number of roadway segments.
1.6.2.4	TC shall provide the capability to acquire detailed traffic measurements at specific locations.
1.6.2.4.1	Traffic Surveillance shall include a data process function to process the traffic data which are acquired.
1.6.2.5	The wide area surveillance shall acquire sufficient data to provide the system with the knowledge of the existing conditions.
1.6.2.5.1	The data process function shall combine and process traffic data from multiple sources and times in order to improve the accuracy of the view of the current traffic condition.
1.6.3	TC shall include a Device Control function.
1.6.3.3	The Device Control function shall provide the capability to exercise control over those devices utilized for traffic control.
1.6.3.3.1	Device Control shall include the capability to control traffic signalization, including rapid modification of signalization parameters to respond to traffic requirements.
1.6.3.3.2	Device Control shall include the capability to dynamically control traffic signing.
1.6.3.4	Device Control shall communicate control data to the following devices.
1.6.3.4(a)	Traffic signals.
1.6.3.4(c)	Information signs.
1.6.3.4(e)	Human operator support.
1.6.3.4.1	Traffic Surveillance shall include a data process function to process the traffic data which are acquired.
1.6.3.5	Device Control shall provide the operator with the capability to manually override the system's automatic controls.
1.6.3.6	Device Control shall provide the operator the capability to adaptively change system response in order to provide a response that is coordinated with other TMCs responding to incidents.
New Req	Device Control shall provide TMCs with the ability to share control of ITS devices including CCTV and DMS according to specified permissions

1.7 INCIDENT MANAGEMENT

1.7.0	ITS shall include an Incident Management (IM) function. Incident Management will identify incidents, formulate response actions, and support initiation and ongoing coordination of those response actions. Four major functions applicable to the MAG Region are provided, which are, (1) Incidents Identification, (2) Response Formulation, (3) Response Implementation, and (4) Predict Hazardous Conditions.
1.7.1	Incident Management shall provide an Incident Identification function to identify incidents.
1.7.1.2	The Incident Identification function shall include the capability to identify existing (both planned and unplanned) incidents.
1.7.1.2.1	The Incident Identification function shall use information from the following types of sources, where available, to identify existing incidents:
1.7.1.2.1(a)	Traffic flow sensors.
1.7.1.2.1(b)	Environmental sensors.
1.7.1.2.1(c)	Public safety sources.
1.7.1.2.1(d)	Media sources.
1.7.1.2.1(e)	Weather information sources.
1.7.1.2.1(f)	Transportation providers.
1.7.1.2.1(g)	Travelers.

1.7.1.2.2 The Incident Identification function shall determine and continuously monitor at least the following characteristics of each existing incident:

1.7.1.2.2(a) Type (including Terrain Hazards).

1.7.1.2.2(b) Extent.

1.7.1.2.2(c) Severity.

1.7.1.2.2(d) Location.

1.7.1.2.2(e) Expected duration.

1.7.1.2.3 The Incident Identification function shall determine and continuously monitor the current and expected traffic flow impact of each existing incident.

1.7.2 IM shall provide a Response Formulation function to formulate appropriate response actions to each identified incident and revise those actions when necessary.

1.7.2.2 The Response Formulation function shall propose and facilitate the appropriate dispatch of emergency response vehicles to an incident.

1.7.2.3 The Response Formulation function shall propose and facilitate the appropriate dispatch of service vehicles to an incident.

1.7.2.4 The Response Formulation function shall propose and facilitate the appropriate dissemination of incident related information to travelers and potential travelers.

1.7.2.5 The Response Formulation function shall propose and facilitate the appropriate control of traffic signals and other traffic control to reduce the traffic flow impact of an incident.

1.7.3 IM shall include a Response Implementation function to provide the services to implement a response coordinated with all appropriate agencies.

1.7.3.1 The Response Implementation function shall provide at least the following decision support capabilities needed to implement coordinated incident response actions by all participating institutions:

1.7.3.1(a) Response Implementation shall allow coordinated selection/determination of the procedures, including alternate routes, needed for resolution of each incident and provide the procedures to those agencies responding to the incident.

1.7.3.1(b) Response Implementation shall provide the status of all resources needed for incident resolution to those agencies responding to the incident.

1.7.3.2 The Response Implementation function shall provide a link between Incident Management and all other user services necessary to implement incident response actions.

1.7.3.3 The Response Implementation function shall provide the capability to disseminate information relating to response status to other agencies and user services.

1.8 TRAVEL DEMAND MANAGEMENT

1.8.0 ITS shall include a Travel Demand Management (TDM) function. Travel Demand Management will generate and communicate management and control strategies that will support and facilitate the implementation of TDM programs, policies and regulations. It consists of two major functions applicable to the MAG Region, which are, (1) Increase Efficiency of Transportation System and (2) Provide Wide Variety of Mobility Options.

1.8.1 TDM shall include a communications function.

1.8.1.1 The communications function shall include the capability to send the information needed to implement management and control strategies that are in response to policies and regulations.

1.8.1.2 The communications function shall include the capability to send information and rates needed to implement management and control strategies that respond to changing environments, conditions, and policy needs to include, but not limited to, the following locations of action:

1.8.1.2(c) Transit centers.

1.8.1.2(f) Travel (and traveler) information facilities.

1.8.1.2(g) Ridesharing facilities.

1.8.1.3 TDM shall provide the capability to receive information and rates needed to implement management and control strategies that respond to changing environments, conditions, and policy needs to include, but not limited to, the following locations of action:

1.8.1.3(c) Transit centers.

1.8.1.3(f) Travel (and traveler) information facilities.

1.8.1.3(g) Ridesharing facilities.

1.8.1.4 The communications function shall provide the capability to send information and data as needed to implement management and control strategies that respond to changing environments, conditions, and policy needs to include, but not limited to, the following:

1.8.1.4(a) Sensor data.

1.8.1.4(b) Individual vehicle monitoring.

1.8.1.4(d) Usage data.

1.8.1.5 The communications function shall provide the capability to receive information and data from transportation operators and/or users that delineate their:

1.8.1.5(a) Current status.

1.8.1.5(c) Level of activity.

1.8.1.6 The communications function shall include the capability for two-way communications with other ITS user services including, but not limited to, the following:

1.8.1.6(a) Pre-Trip Planning.

1.8.1.6(b) En-Route Transit Advisory.

1.8.1.6(c) Driver Information.

1.8.1.6(d) Ride Matching and Reservation.

1.8.1.6(e) Electronic Payment.

1.8.2 TDM shall include a processing function.

1.8.2.1 The processing function shall provide the capability to generate management and control strategies that facilitate the implementation of policies and regulations designed to address the following:

1.8.2.1(d) Ridesharing and transit.

1.8.2.1(f) Public awareness of travel alternatives.

1.8.2.2 The processing function shall provide capabilities to enhance the ability to implement and enforce the following:

1.8.2.2(a) Federal policies.

1.8.2.2(b) State policies.

1.8.2.2(c) Local policies.

1.8.2.3 Strategies developed by the processing function shall include the guidance for the operation of physical systems that:

1.8.2.3(a) Monitor traffic.

1.8.2.3(b) Inform travelers.

1.8.2.3(c) Collect fees.

1.8.2.4 The processing function shall provide the capability generate guidance for the pricing and control for locations of action that include, but are not limited to, the following:

1.8.2.4(c) Transit centers.

1.8.2.4(f) Travel information facilities.

1.8.2.4(g) Ridesharing facilities.

1.8.2.5 The processing function shall provide the capability to develop strategies for implementation of policies and regulations that will accommodate the following:

1.8.2.5(a) Public sector users and service providers.

1.8.2.5(b) Private sector users and service providers.

1.8.2.6 The processing function shall provide the capability to generate management and control strategies that dynamically respond to changing environments, conditions, and policies.

1.8.2.10 The processing function's dynamically generated management and control strategies shall include the parking management and controls to include, but not be limited to, the following:

1.8.2.10(b) Allocation to selected vehicles.

1.8.2.10(c) Variable message signs.

1.8.2.11 The processing function's dynamically generated management and control strategies for parking management and controls shall be based on factors that include, but are not limited to, the following:

1.8.2.11(b) Usage data.

1.8.2.14 The processing function's dynamically generated management and control strategies shall include the capability to respond to the need for the travelers to change modes by generating messages for variable signs that include, but are not limited to, the following:

1.8.2.14(a) Where the mode change requests are being made.

1.8.2.14(b) How the mode changes are requested to be made.

1.8.2.14(c) Why the mode changes are requested to be made.

1.10 HIGHWAY RAIL INTERSECTION

1.10.0 ITS shall include a Highway-Rail Intersection (HRI) function to control highway and rail traffic in at-grade HRIs. The sub-services supported by this user service applicable to the MAG Region is Standard Speed Rail Subservice which is applicable to light rail transit, commuter rail and heavy rail trains with operational speeds up to 79 miles per hour (MPH).

1.10.1 The Highway-Rail Intersection (HRI) function shall be applicable to operational, at-grade highway-rail intersections with train operational speeds up to 125 MPH.

1.10.1.1 HRI users shall include light rail transit and rapid rail transit approaching and crossing HRIs.

1.10.1.3 HRI users shall include freight and intercity passenger trains approaching and crossing HRIs.

1.10.1.4 HRI users shall include highway vehicles approaching and crossing HRIs.

1.10.1.5 HRI users shall include motor vehicle operators, bicyclists and pedestrians approaching and crossing HRIs.

1.10.1.6 HRI users shall include train crews operating rail traffic while approaching and crossing HRIs.

1.10.1.7 HRI users shall include rail maintenance and inspection vehicles approaching and crossing HRIs.

1.10.2 HRI shall provide interfaces between highway and rail management functions.

1.10.2.1 HRI shall provide information management interfaces between highway and rail to coordinate traffic, demand and schedules.

1.10.2.1.1 HRI shall be capable of acquiring current train schedules from rail operations functions, and shall determine projected HRI closure times and duration.

1.10.2.1.2 HRI shall be capable of interacting with traffic management functions.

1.10.2.2 HRI shall provide the capability for interactive real-time interfaces.

1.10.2.2.1 HRI shall provide the capability to interface with rail operations functions for rail traffic control information.

1.10.2.2.2 HRI shall provide the capability to interface with traffic management functions for highway traffic coordination.

1.10.2.2.3 HRI shall provide the capability to interface with trains approaching and crossing the HRI for traffic coordination.

1.10.2.2.4 HRI shall provide the capability to interface with highway vehicles approaching and crossing HRIs for traffic control information.

1.10.3 At all HRIs with active railroad warning systems, HRI shall manage the traffic in the intersection.

1.10.3.1 HRI shall be capable of augmenting the intersection with standard highway traffic signal devices.

1.10.3.3 HRI shall provide an Intelligent Intersection Controller (IIC) function to manage highway and rail traffic in the intersection.

1.10.3.3.1 IIC shall control active highway traffic signal devices at HRIs to manage highway traffic.

1.10.3.3.2 IIC function shall control active railway warning devices, including flashing lights and physical barriers for highway and walkway lanes at HRIs.

1.10.3.3.3 IIC function shall provide an intersection surveillance system to derive the real-time status of traffic in the intersection.

1.10.3.3.4 IIC function shall report real-time HRI equipment status.

1.10.3.3.5 IIC function shall report real-time HRI traffic status as advisories or alerts.

1.10.4 HRI shall include a Standard Speed Rail (SSR) Subservice to manage highway and rail traffic at HRIs for rail lines with operational speeds less than 80 MPH.

1.10.4.1 SSR shall include active railroad warning systems at designated HRIs.

1.10.4.2 SSR shall include passive HRIs with non-active warning systems.

1.10.4.2.1 SSR shall augment passive warning signs with additional highway traffic control devices at passive HRIs.

2.1 PUBLIC TRANSPORTATION MANAGEMENT

2.1.0 ITS shall include a Public Transportation Management (PTM) function.

2.1.1 PTM shall include an Operation of Vehicles and Facilities (OVF) function that provides computer assisted control of the operation of vehicles and their associated facilities.

2.1.1.1 To enable the automation of the vehicle and facilities operations OVF shall provide the capability to gather the needed data to include, but not be limited to, the following:

2.1.1.1(a) Vehicle passenger loading by bus stop and trip segment.

2.1.1.1(b) Bus running times between time points.

2.1.1.1(c) Fare collection by fare category.

2.1.1.1(d) Drive-line operating condition.

2.1.1.1(e) Mileage accumulated by individual buses.

2.1.1.1(f) Real-time vehicle location reports.

2.1.1.2 OVF shall include a Command and Control (CC) capability.

2.1.1.2.1 CC shall provide the capability for real-time Vehicle Command and Control (VCC).

2.1.1.2.1.1 VCC shall provide the capability to compare received information with predetermined operating condition specifications and note any deviations.

2.1.1.2.1.2 VCC shall provide the capability to transmit noted deviations to central control.

2.1.1.2.1.3 VCC shall provide the capability to display any noted deviations.

2.1.1.2.1.4 VCC shall provide the capability to automatically issue corrective instructions to the operator including, but not limited to, the following:

2.1.1.2.1.4(a) Route corrections.

2.1.1.2.1.4(b) Changes in stops.

2.1.1.2.2 When CC detects a vehicle(s) has deviated from schedule it shall provide the capability to automatically determine the optimum scenario for returning the vehicle or fleet to schedule.

2.1.1.2.3 CC shall include an integrated traffic control capability that provides traffic signal preemption when required for schedule adjustment to Transit Vehicles at traffic signals (i.e., centralized or distributed).

2.1.1.2.4 CC shall include the capability for its computational capabilities to be located either on-vehicle and/or at remote locations.

2.1.2 PTM shall include a Planning and Scheduling Services (PSS) function to automate the planning and scheduling of public transit operations.

2.1.2.1 The PSS shall include a Planning capability.

2.1.2.1.1 PSS Planning shall be performed off-line from stored data that were collected in real-time.

2.1.2.1.2 PSS Planning shall include processing of the data in a manner that will permit improvements in routes and services.

2.1.2.2 The PSS shall include a Schedule Generation capability.

2.1.2.2.1 The PSS Schedule Generation function shall collect data for schedule generation including, but not limited to, the following:

2.1.2.2.1(a) Route segment running-time.

2.1.2.2.1(b) Passenger loading at each stop.

2.1.2.2.1(c) Revenue information.

2.1.2.2.2 The PSS Schedule Generation function shall use the collected data in the automatic or semiautomatic development of transportation system schedules.

2.1.2.2.3 The PSS Schedule Generation function shall provide the capability to print schedules.

2.1.2.2.4 The PSS Schedule Generation function shall provide the capability to disseminate schedules to, but not be limited to, the following:

2.1.2.2.4(a) Kiosks.

2.1.2.2.4(b) Transportation Management Centers.

2.1.2.2.5 The PSS Schedule Generation function shall provide the capability to automatically update the customer service operator system with the most current schedule and schedule adherence information.

2.1.2.2.6 The PSS Schedule Generation function shall provide the capability to generate vehicle schedules (block schedules) and vehicle operator schedules (run schedules).

2.1.3 PTM shall include a Personnel Management (PM) function to facilitate the management of operator, and maintenance personnel.

2.1.3.2 PM shall include an Operator Personnel Management (OPM) function.

2.1.3.2.1 OPM shall automatically generate assignments of individual vehicle operators to runs produced by the Schedule Generation function.

2.1.3.2.2 OPM shall assign vehicle operators to runs in a fair manner while minimizing labor and overtime costs.

2.1.3.2.5 OPM shall provide the capability for authentication of vehicle operators prior to operating a transit bus or rail vehicle.

2.1.3.2.6 OPM shall provide an exception handling capability to provide for replacement vehicle operators in the event of operator unavailability due to operator absence, vehicle incident, or vehicle mechanical problem.

2.1.4 PTM shall include a Communications function.

2.1.4.1 PTM Communications shall provide the capability to establish two-way voice communication between vehicle operators and the central facility.

2.1.4.2 PTM Communications shall provide the capability for two-way data communications between individual vehicles and the control facility (e.g., sensor data and bus position).

2.1.4.3 OVF Communications shall provide the capability to send information from individual facilities to a central facility for processing and analysis.

2.1.4.4 As support for responding to the detection of an on-board emergency, the OVF Communications shall provide dispatchers with the capability to inform the following:

2.1.4.4(a) Police.

2.1.4.4(b) Fire department.

2.1.4.4(c) Paramedic.

2.1.4.4(d) Vehicle operator (initiation of silent or audible alarm notification).

2.1.4.5 PTM shall use an open vehicle communication network standard for all on-board electronic equipment.

2.1.5 PTM shall include a Vehicle Management (VM) function to facilitate the management of Public Transit Vehicles (PTVs).

2.1.5.1 VM shall include a Maintenance Vehicle Management (MVM) function.

2.1.5.1.1 MVM shall automatically track vehicle miles on each vehicle in real-time.

2.1.5.1.2 MVM shall use vehicle mileage data to automatically generate preventative maintenance schedules for each specific vehicle.

2.1.5.1.3 MVM shall automatically generate maintenance and repair schedules based on other significant maintenance indicator data, including vehicle operator notations of fault conditions.

2.1.5.1.4 MVM shall provide the capability to record and verify that maintenance work was performed.

2.1.5.2 VM shall include an Operational Vehicle Management (OVM) function.

2.1.5.2.1 OVM shall automatically generate assignments of individual vehicles to blocks produced by the Schedule Generation function.

2.1.5.2.2 Vehicles shall be assigned to blocks based on available inventory, suitability to provide the service required by the block, and operational in-service status.

2.1.5.2.3 OVM shall provide a dispatch control function to initialize vehicles and vehicle operators for the start of the operating day, control exit and return to transit facility, and maintain real-time awareness of returning vehicles approach to transit facility.

2.1.5.2.4 OVM shall provide an exception handling capability to provide recovery from vehicle incidents or mechanical problems.

2.1.5.2.5 OVM shall provide a vehicle inventory management function.

2.2 EN-ROUTE TRANSIT INFORMATION

2.2.0 ITS shall include an En-Route Transit Information (TI) function. En-Route Transit Information provides travelers with real-time transit and high-occupancy vehicle information allowing travel alternatives to be chosen once the traveler is en-route. It consists of three major functions applicable to the MAG Region, which are, (1) Information Distribution, (2) Information Receipt, and (3) Information Processing. This capability integrates information from different transit modes and presents it to travelers for decision making.

2.2.1 TI shall include an Information Distribution function that disseminates information to travelers.

2.2.1.1 Information Distribution shall include an Information Network capability.

2.2.1.1.1 The Information Network shall provide the capability to furnish users with real-time travel related information while they are traveling.

2.2.1.1.2 The Information Network shall provide the capability to disseminate information to travelers that will assist them in making decisions about transfers.

2.2.1.1.3 The Information Network shall provide the capability to disseminate information to travelers that will assist them in making decisions in the modification (includes both intermode and intramode) of their trips.

2.2.1.1.4 The Information Network shall provide all users with information that is from a single source in order to ensure consistency across all users.

2.2.1.2 Information Distribution shall include a User Interface feature.

2.2.1.2.1 User Interface shall provide the capability for users to access travel related information at fixed locations.

2.2.1.2.1.1 Fixed location user interfaces shall be provided at transit stops.

2.2.1.2.1.1.1 Transit stop user interfaces shall have interactive visual displays.

2.2.1.2.1.1.2 Transit stop user interfaces shall provide audio messages containing the following:

2.2.1.2.1.1.2(a) Notification of imminent transit arrival.

2.2.1.2.1.1.2(b) Identification of route of arriving transit vehicles.

2.2.1.2.1.1.3 Transit stop user interfaces shall provide the capability to provide information to individuals who are physically impaired.

2.2.1.2.2 User Interface shall provide the capability for users to access travel related information at mobile locations.

2.2.1.2.2.1 Mobile Location user interfaces shall provide the capability for users, either one passenger at a time or to a group environment, to access travel related information while on board transit vehicles.

2.2.1.2.2.2 Mobile user interfaces shall provide the capability for users to access travel related information while in transit vehicles through the use of variable message signs.

2.2.1.2.2.3 Mobile user interfaces shall provide the capability for users to access travel related information via personal portable devices.

2.2.1.2.2.4 Mobile user interfaces shall include the capability to provide audible messages to the on-board users.

2.2.2 TI shall include an Information Receipt function for acquiring that data that are used for generation of the En-Route Transit Information.

2.2.2.1 Information Receipt shall provide the capability to be continuously updated with real-time information from each transit system within the local area of jurisdiction.

2.2.2.2 Information Receipt shall provide the capability to be updated with information that is inclusive of all possible transportation modes within the local area of jurisdiction.

2.2.2.3 Information Receipt shall provide the capability to be updated with information from all providers of transportation services in the local area of jurisdiction to include:

2.2.2.3(a) Regional paratransit services.

2.2.2.3(b) Public providers.

2.2.2.3(c) Private providers.

2.2.3 TI shall include an Information Processing function for processing that data used for generation of the En-Route Transit Information.

2.2.3.1 Information Processing shall include an information collection feature.

2.2.3.1.1 Information collection shall acquire transit operations information to include, but not be limited to, the following type:

2.2.3.1.1(a) Schedule.

2.2.3.1.1(b) Actual service provided.

2.2.3.1.1(c) Next available vehicle, based on actual operating conditions.

2.2.3.1.1(d) Transfer options describing available services and their associated schedules.

2.2.3.1.2 Information collection shall acquire transit situation conditions to include, but not be limited to, the following type:

2.2.3.1.2(a) Actual road data.

2.2.3.1.2(b) Traffic data.

2.2.3.2 Information Processing shall include an information integration feature.

2.2.3.2.1 Information integration shall collect data, store it and maintain it on-line.

2.2.3.2.2 Information integration shall collect data from traffic and transit systems including, but not limited to, the following:

2.2.3.2.2(a) Transit systems.

2.2.3.2.2(b) Traffic management services.

2.2.3.2.2(c) Rideshare programs.

2.4 PUBLIC TRAVEL SECURITY

2.4.0 ITS shall include a Public Travel Security (PTS) function to create an environment of safety in public transportation, including bus transit systems and passenger rail systems.

2.4.1 PTS shall include specific Secure Areas.

2.4.1.1 The Secure Areas shall encompass all physical areas related to public transit travel including the following:

2.4.1.1(a) Transit (bus and rail) stop areas, including Bus Rapid Transit stops.

2.4.1.1(b) Transit (bus and rail) stations.

2.4.1.1(c) Park and Ride areas.

2.4.1.1(d) Riding on transit vehicles (bus and rail cars).

2.4.1.1(f) Transit transfer locations.

2.4.1.1(g) Transit facilities (e.g. transit yards and shops).

2.4.1.2 All public Secure Areas shall have traveler activated alarms monitored by central dispatch or local police.

2.4.1.3 There shall be silently activated alarms and/or audible alarms on board public transit vehicles which are capable of activation by the operator, monitored by central dispatch or local police.

2.4.2 PTS shall include a Security Sensors (SS) function.

2.4.2.1 SS shall provide sensor technology required to alert operators and police of potential incidents.

2.4.2.2 SS shall include video and audio systems at key locations, including rest areas, transit stops and stations, and transit facilities (i.e., transit yards and shops), to monitor activities, incidents, and potential threats. These systems and sensors shall be monitored by central dispatch.

2.4.2.4 SS shall include systems on board the public transit vehicle (bus, rail car) for video, audio (including covert microphones that can be triggered by the transit vehicle operator), and event recorder (i.e., "black box") outputs to monitor activities, incidents, and potential threats. These systems and sensors shall be monitored by central dispatch.

2.4.2.10 SS shall include sharing of sensor information with appropriate security agencies or systems to assist in analysis of possible threats.

2.4.2.11 SS shall include notification of appropriate security agencies or systems regarding potential threats.

2.4.3 PTS shall include a Personal Sensors Items (PSI) function.

2.4.3.2 PSI shall provide the capability for riders to use electronic payment to eliminate the need for passengers to carry cash and to reduce cash handling.

2.4.4 PTS shall include a Security Management and Control (SMC) function.

2.4.4.1 SMC shall provide the capability to receive alarm information through electronic communication systems.

2.4.4.3 SMC shall include the capability for transit operators to direct and control fleet operations in a manner that supports law enforcement and emergency response agencies with flexible and responsive transportation for large numbers of people.

2.4.4.4 SMC shall include the capability to generate coordinated preplanned responses for incidents.

2.4.4.5 SMC shall include the capability to support coordinated multiple agency responses to incidents.

2.4.4.6 SMC shall include the capability to remotely disable a transit vehicle (bus or transit rail).

2.4.4.7 SMC shall include the capability to identify when a transit vehicle has deviated from its assigned route.

3.1 ELECTRONIC PAYMENT SERVICES

3.1.0 ITS shall include an Electronic Payment capability. Electronic Payment Services allows travelers to pay for transportation services by electronic means. Two functions are applicable to the MAG Region and are provided by this user service, which are, (2) Electronic Fare Collection and (4) Electronic Payment Services Integration.

3.1.2 Electronic Payment shall include an Electronic Fare Collection (EFC) capability.

3.1.2.1 EFC shall be implemented in a manner that the traveler is able to use a compatible fare medium for all applicable surface transportation services.

3.1.2.2 EFC shall provide the capability to implement variable and flexible fare structures.

3.1.2.3 EFC shall be capable of identifying voided and/or invalid payment media.

3.1.2.4 EFC shall provide the capability for third party payment of transportation services.

3.1.2.5 For those systems requiring special eligibility, EFC shall provide the capability to verify the eligibility of riders.

3.1.2.6 EFC shall be implemented in a manner that permits expansion into other uses for the payment medium such as payment of retail, telephone, etc.

3.1.2.7 EFC shall include the capability to collect the data required to determine accurate ridership levels.

3.1.2.8 EFC shall provide the capability for passengers to pay fares without stopping.

3.1.4 ITS shall include an Electronic Payment Services Integration (EPSI) feature.

3.1.4.1 EPSI shall provide the capability to combine electronic payments made for use of various transportation modes into a single integrated system.

3.1.4.3 EPSI shall collect and provide usage data to develop pricing strategies that favor certain transportation modes or routes.

3.1.4.4 EPSI shall be implemented in a manner that ensures that it may be deployed across multiple agency political boundaries without degrading the services it provides.

5.1 EMERGENCY NOTIFICATION AND PERSONAL SECURITY

5.1.0 ITS shall include an Emergency Notification and Personal Security (ENPS) function in the MAG Region that provides for automated notification when travelers are involved in an incident and security in remote areas frequented by travelers and of critical transportation infrastructure. This section is in relation to transit capabilities as well as area wide alerts such as AMBER Alerts and public information dissemination regarding mass evacuations or threats.

5.1.1 ENPS shall include a Driver and Personal Security (DPS) function.

5.1.1.1 DPS shall include an in-vehicle manually initiated distress signal capability to provide a first-alert that an incident has occurred to include the following:

5.1.1.1(a) Medical services required.

5.1.1.1(b) Minor property damage only crashes.

5.1.1.1(c) Breakdowns.

5.1.1.1(d) Vehicle location.

5.1.1.1(e) Vehicle identification.

5.1.1.2 DPS shall include the capability to cancel a previously issued manual request for help.

5.1.1.3 DPS shall include the capability to send an acknowledge signal to the motorist to indicate that the signal was received and help is on the way.

5.1.3 ENPS shall include a Remote Security and Emergency Monitoring (RSEM) function to create an environment of safety in secure areas.

5.1.3.1 RSEM shall include specific Secure Areas.

5.1.3.1.1 The Secure Areas shall encompass physical areas related to travel including but not limited to the following: critical infrastructure (such as bridges, tunnels, interchanges, management centers, etc.), rest stops and picnic areas, park-and-ride areas, tourism and travel information areas and emergency pull off areas.

5.1.3.2 RSEM shall include a Surveillance and Sensors (SS) function.

5.1.3.2.1 SS shall provide surveillance and sensor technology and the data processing required to alert operators and appropriate agencies of potential incidents and threats at the Secure Areas.

5.1.3.2.1.1 SS shall include both video and audio surveillance systems at key locations in the Secure Area to monitor activities.

5.1.3.2.1.2 SS shall provide sensors that may include, but are not limited to acoustic, environmental threat (such as nuclear, biological, chemical, and explosives), infrastructure condition and integrity, motion and object sensors.

5.1.3.2.2 SS shall allow operators to monitor and control operation of surveillance and sensor devices including operator override.

5.1.3.4 RSEM shall include a Monitor Alert Levels (MAL) function.

5.1.3.4.1 MAL shall monitor alert levels and threat information provided by federal, state, and local emergency management and public safety agencies.

5.1.3.4.2 MAL shall assess risk based on current activities and conditions.

5.1.3.4.3 MAL shall increase system preparedness as the likelihood of an incident increases, including:

5.1.3.4.3(a) Activating physical security systems and implementing security procedures

5.1.3.4.3(b) Adjusting parameters of surveillance and sensor devices.

5.1.4 ENPS shall include a Wide Area Alert (WAA) function to notify the public in emergency situations using ITS driver information and traveler information capabilities.

5.1.4.1 WAA shall notify transportation operators and information providers when an emergency situation occurs that requires public notification.

5.1.4.1.1 The WAA notification shall identify the originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert.

5.1.4.1.2 The WAA shall provide necessary information for emergencies including, but not limited to, child abductions, severe weather watches and warnings, military activities, civil emergencies, other natural and human-caused disaster advisories, and law enforcement warnings.

5.1.4.2 WAA shall use available dynamic message signs, highway advisory radio, 511 and other telephone information systems, traveler information web sites, transit vehicle information systems, message display boards, and other information systems to provide the WAA information to the public.

5.1.4.2.1 WAA shall tailor the information provided for individual driver and traveler information systems, limiting messages to short notifications for human-factors limited devices like dynamic message signs.

5.1.4.3 WAA shall keep the WAA initiator apprised of the current status of public notification, including an accounting of the driver and traveler information resources that are being utilized.

5.1.4.4 WAA shall notify transportation operators and information providers when public notification is no longer required.

5.1.5 ENPS shall include a Protect Sensitive Traveler Information (PSTI) function to inhibit distribution of traveler information that is deemed to be sensitive.

5.1.5.1 PSTI shall notify transportation operators and information providers when access to information from ITS surveillance and sensor systems must be restricted.

5.1.5.2 The PSTI notification shall identify the geographic area, time, specific devices, and/or other information necessary to determine the traveler information that must be protected.

5.1.5.3 PSTI shall restrict access to traveler information for the affected area until access restrictions are removed.

5.1.5.4 PSTI shall notify transportation operators and information providers when traveler information access restrictions are removed.

5.2 EMERGENCY VEHICLE MANAGEMENT

5.2.0 ITS shall include an Emergency Vehicle Management (EVM) Service.

5.2.1 EVM Service shall include an Emergency Vehicle Fleet Management System.

5.2.1.1 Emergency Vehicle Fleet Management System shall maintain the availability status of relevant emergency vehicles.

5.2.1.2 Emergency Vehicle Fleet Management System shall determine the emergency response vehicles best suited to respond to an incident.

5.2.1.3 Emergency Vehicle Fleet Management System shall dispatch the appropriate emergency response vehicle (s) to the incident.

5.2.2 EVM Service shall include a Route Guidance System.

5.2.2.1 Route Guidance System shall maintain real-time information on traffic conditions in urban and rural areas, emergency response vehicle locations, and emergency response vehicle destinations.

5.2.2.2 Route Guidance System shall advise emergency response vehicles of appropriate routes.

5.2.3 EVM Service shall include a Signal Priority System.

5.2.3.1 Signal Priority System shall maintain real-time information on signal timing, emergency vehicle locations and emergency vehicle routing.

5.2.3.2 Signal Priority System shall determine signal prioritize timing sequences for relevant signals.

5.3 DISASTER RESPONSE AND EVACUATION

5.3.0 ITS shall provide a Disaster Response and Evacuation (DRE) function that provides for effective, coordinated management of the surface transportation system during all types of disasters including natural disasters (hurricanes, earthquakes, floods, severe winter storms, tsunamis, etc.), terrorist acts, and other catastrophic events (e.g., nuclear power plant disasters). Two primary subservices that are provided by this user service and are applicable to the MAG Region include: (1) Disaster Response and (2) Evacuation Coordination. The Disaster Response Subservice provides support for planning, transportation management, resource sharing, and information coordination between transportation agencies and principal responding agencies (emergency management, public safety, and other allied agencies) to improve the effectiveness and safety of a disaster response. The Evacuation Coordination (EC) Subservice efficiently manages an evacuation and provides evacuees with the information they need during evacuation

and subsequent reentry to the evacuated area.

5.3.1 Disaster Response shall provide a Coordinate Response Plans (CRP) function to support dissemination and coordination of emergency response plans, continuity of operations plans, and other emergency plans between agencies in preparation for a potential future disaster.

5.3.2 Disaster Response shall provide a Monitor Alert Levels (MAL) function.

5.3.2.1 MAL shall monitor alert levels and threat information provided by federal, state, and local agencies to include the Homeland Security Advisory System (HSAS) and related systems for terrorist alerts, the weather forecasts, watches, and warnings issued by the National Hurricane Center, other National Weather Service components and other weather service providers, and the various early warning systems operated by federal, state, and local emergency management agencies.

5.3.2.2 MAL shall increase system preparedness as the alert level or the likelihood of a disaster increases, taking actions including:

5.3.2.2(a) Activating physical security systems and implementing security procedures,

5.3.2.2(b) Pre-staging activities

5.3.2.2(c) Review and update resource inventories

5.3.2.2(d) Stage resources

5.3.2.2(e) Assign personnel

5.3.2.2(f) Clear obstructions

5.3.2.2(g) Implement traffic management strategies and traffic control plans

5.3.3 Disaster Response shall provide a Detect and Verify Emergency (DVE) function that provides initial emergency situation information to all allied agencies.

5.3.3.1 DVE shall use available sensors, weather information, and field reports to detect potential emergencies.

5.3.3.2 DVE shall verify the emergency and collect available information to include location, nature of the emergency, nature and extent of the damage, nature and extent of the impact area, and potential hazards.

5.3.3.3 DVE shall notify emergency management, public safety, and other allied response agencies and provide available information about the emergency situation.

5.3.3.4 DVE shall alert transportation agencies to disasters that have been identified by other agencies

5.3.3.5 DVE shall alert transportation agencies of safe reentry conditions following a disaster.

5.3.5 Disaster Response shall include a Manage Area Transportation (MAT) function that manages the transportation system in the vicinity of the disaster. Depending on the nature of the disaster and the status of the infrastructure, the following actions may be taken.

5.3.5.1 Detours or alternative transportation resources, including transit systems, shall be identified to mitigate the transportation impacts of the disaster.

5.3.5.2 Closures and detours shall be implemented. Closures may exclude all vehicles except for emergency vehicles or other special vehicles.

5.3.5.3 Transit and transit fare schedules shall be modified.

5.3.5.4 Special traffic control strategies to manage traffic in the vicinity of the disaster shall be implemented to limit and/or manage traffic in the area to include signal timing modifications and special traffic signal modes used in conjunction with personnel manually directing traffic.

5.3.5.5 Special traffic management strategies shall be implemented in surrounding areas to support efficient movement of personnel and resources into the disaster area.

5.3.6 Disaster Response shall include a Critical Service Restoration function that will coordinate with allied agencies to restore critical transportation and utility services.

5.3.6.1 Emergency construction and maintenance shall be planned, coordinated, and initiated to restore critical transportation infrastructure.

5.3.6.2 Emergency access to right-of-way, permits, and needed equipment and resources shall be coordinated as necessary to support restoration of other critical public works.

5.3.7 Disaster Response shall include a Coordinate Response (CR) function to coordinate the disaster response between transportation, public safety, emergency management, and other allied agencies. Information may be shared with individual agency centers, emergency operations centers, and unified command systems at the scene.

5.3.7.1 CR shall provide information about the transportation system including:

5.3.7.1(a) Egress and ingress routes for the scene and staging areas.

5.3.7.1(b) Transportation system condition information including video surveillance information as appropriate

5.3.7.1(c) Traffic management strategies in effect, including closures, detours, tolls, and HOV restrictions.

5.3.7.1(d) Routes for specific origins and destinations on request

5.3.7.2 CR shall provide Information on transportation resources and personnel that are available, en-route, or deployed at the scene. Transportation resources include construction and maintenance equipment used at the scene and transit vehicles that may be used to move emergency response personnel to and from the scene.

5.3.7.3 CR shall receive information from emergency operations centers and other emergency management systems including:

5.3.7.3(a) Current situation information

5.3.7.3(b) Requests for resources

5.3.7.3(c) Requests for transportation information, including video surveillance

5.3.7.3(d) Requests for ingress and egress routes

5.3.7.3(e) Requests for special traffic management strategies, including detours and closures, and HOV restrictions lifted.

5.3.8 Disaster Response shall include a Disaster Traveler Information (DTI) function that will coordinate with public information offices of the principal responding agencies in providing traveler information for the disaster scene and surrounding area to include:

5.3.8(a) Special traffic restrictions,

5.3.8(b) Detours and closures,

5.3.8(c) Special transit schedules,

5.3.8(d) Traffic conditions at and around the scene.

5.3.8(e) Special traffic allowances (HOV restrictions lifted, shoulder use, reverse lane operation).

5.3.9 Evacuation Coordination shall provide an Evacuation Planning Support (EPS) function.

5.3.9.1 EPS shall provide archived evacuation data such as traffic flows, travel speed, vehicle occupancy, road closures, network geometry, traveler behavior, travel origins, travel destinations and evacuation traffic management strategies.

5.3.9.4 EPS shall assist in defining the required resources for evacuation strategies.

5.3.9.5 EPS shall avoid simultaneous work zones on parallel routes in case evacuation without warning is required

5.3.10 Evacuation Coordination shall include an Evacuation Traveler Information (ETI) function.

5.3.10.1 ETI shall be accessible to users from multiple distributed locations, including, but not limited to:

5.3.10.1(a) homes,

5.3.10.1(b) public buildings,

5.3.10.1(d) rest areas,

5.3.10.1(g) airports and other mode terminals, and

5.3.10.1(h) wireless devices (in-vehicle and handheld).

5.3.10.2 ETI shall identify mandatory and voluntary evacuation zones and any special evacuation requirements for each zone.

5.3.10.3 ETI shall provide a list of alternative evacuation destinations.

5.3.10.5 ETI shall provide recommended evacuation and reentry route(s) based on:

5.3.10.5(a) Real-time and forecast traffic and road conditions.

5.3.10.5(b) Traveler-specified route parameters.

5.3.10.6 ETI shall provide the recommended evacuation start time for a selected evacuation origin and destination based on:

5.3.10.6(a) The travel time required for the trip.

5.3.10.6(b) The capability of the evacuation network to handle evacuation demand based on current and future network conditions.

5.3.10.6(c) The existing and forecast conditions at the evacuation origin and destination.

5.3.10.7 ETI shall identify reentry times for those jurisdictions that have cleared an area for reentry.

5.3.10.8 ETI shall provide road and traffic conditions on evacuation routes including:

5.3.10.8(a) Current and forecast speed and travel times

5.3.10.8(b) Incident information

5.3.10.8(c) Current and forecast road, bridge and lane closure information.

5.3.10.8(d) Advisories of hazardous conditions such as flooding, malfunctioning traffic signals, debris and falling objects.

5.3.10.8(e) Current and forecast weather information

5.3.10.9 ETI shall provide information for transportation modes including buses, airlines, trains, ferries, and ships Including:

5.3.10.9(a) The availability of transportation mode services.

5.3.10.9(b) Arrival and departure information for available transportation services.

5.3.10.10 ETI shall provide general evacuation guidance information to travelers, including guidance/tips for trip preparation, trip duration and trip return.

5.3.10.11 ETI shall provide information regarding traveler services available along evacuation routes and at evacuation destinations including:

5.3.11 Evacuation Coordination shall provide an Evacuation Transportation Management (ETM) function to assist evacuation coordination personnel as they manage evacuation operations.

5.3.11.1 ETM shall have a real-time data collection process to assist in the selection of evacuation strategies and to monitor the operations of the selected evacuation strategies.

5.3.11.2 ETM shall have a demand forecasting function that takes into consideration current traffic flows, current and historical evacuation trends, the size of the area to be evacuated and expected human responses.

5.3.11.3 ETM shall include a strategy selection function that maximizes efficiency during evacuation and reentry operations and supports the overall response plan of the principal responding agencies.

5.3.11.3.1 The strategy shall integrate the control of freeways and surface streets.

5.3.11.3.2 The strategy shall consider traffic movement over the entire evacuation network.

5.3.11.3.3 The strategy shall be responsive to current demand as well as the forecast demand.

5.3.11.3.4 The strategy shall optimize the movement of emergency, public safety, and other vehicles associated with the disaster response and evacuation.

5.3.11.3.5 The strategy shall consider the operation of the access to and from the evacuation routes.

5.3.11.3.6 The strategy shall consider the impacts to local traffic along evacuation routes.

5.3.11.3.7 The strategy shall consider the time available for evacuation, time required for evacuation and time required for implementing the evacuation strategy.

5.3.11.3.8 The strategy shall consider the availability of the resources required for the evacuation strategy.

5.3.11.3.9 The strategy shall consider the severity of the expected disaster and the size of the area affected by the disaster.

5.3.11.3.10 The strategy shall consider the use of transit and school bus fleets during mandatory evacuations.

5.3.11.3.11 The strategy shall consider current maintenance and construction activities and their impact on evacuation route capacity.

5.3.11.4 ETM shall provide the control of devices as required by the evacuation management plan, including:

5.3.11.4(a) traffic signals,

5.3.11.4(b) dynamic message signs,

5.3.11.4(c) ramp meters,

5.3.11.4(f) road closure devices,

5.3.11.4(g) lane closure devices,

5.3.11.4(h) HAR,

5.3.11.5 ETM shall provide the operator with the capability to manually override the system automatic control.

5.3.11.6 ETM shall manage incidents on evacuation routes.

5.3.11.7 ETM shall discontinue current work zone activities on evacuation routes where possible.

5.3.11.8 ETM shall manage the evacuation of special needs populations including matching transit resources with locations/individuals, planning evacuation routes, and managing the special needs evacuation.

5.3.11.9 ETM shall have the capability to eliminate transit fares.

5.3.11.10 ETM shall have a lane reversal management function.

5.3.11.10.1 It shall be possible to collect real-time data for traffic moving in all traveling lanes, with and without lane reversal.

5.3.11.11 ETM shall have the capability to monitor the location and status of transit vehicles participating in

evacuation operations.

5.3.11.12 ETM shall implement special traffic control strategies including traffic diversions and closures if emergency termination of an in-process evacuation is required.

5.3.12 Evacuation Coordination shall provide a Resource Sharing (RS) Function that allows information and resource sharing between agencies involved in the evacuation including transportation, emergency management, law enforcement and other emergency service agencies.

5.3.12.1 RS shall allow information sharing between agencies at local, state, multi-state, and federal levels, covering all jurisdictions affected by the evacuation

5.3.12.1.1 RS shall provide information sharing capabilities among transportation agencies and between these agencies and the emergency management, public safety, and other allied response agencies.

5.3.12.1.2 RS shall provide information to assist evacuation management personnel in making decisions including traffic management and shelter operations.

5.3.12.2 RS shall assist evacuation management personnel in making decisions regarding deployment of resources and sharing of resources based on existing and forecast demand for these resources.

5.3.12.2.1 RS shall identify the resources required for the current and forecast evacuation scenarios.

5.3.12.2.2 RS shall identify the resources required to implement alternative evacuation management strategies.

5.3.12.2.3 RS shall identify the resource deployment stages, in time and space, for each evacuation scenario.

5.3.12.2.4 RS shall assist local, state, multi-state, and federal agencies in sharing resources between agencies.

7.1 ARCHIVED DATA

7.1.0 ITS shall provide an Archived Data function to control the archiving and distribution of ITS data. The Archived Data User Service provides the Historical Data Archive Repositories and controls the archiving functionality for all ITS data with five major functions applicable to the MAG Region: 1) the Operational Data Control function to manage operations data integrity; 2) the Data Import and Verification function to acquire historical data from the Operational Data Control function; 3) the Automatic Data Historical Archive function for permanently archiving the data; 4) the Data Warehouse Distribution function, which integrates the planning, safety, operations, and research communities into ITS and processes data products for these communities; and 5) the ITS Community Interface which provides the ITS common interface to all ITS users for data products specification and retrieval. ADUS helps achieve the ITS information goal of unambiguous interchange and reuse of data and information throughout all functional areas.

7.1.1 The Archived Data function shall provide a Historical Data Archive (HDA) system for ITS data.

7.1.1.1 HDA shall include repositories of operational data received from field equipment or data collection devices.

7.1.1.2 HDA shall provide permanent historical data repositories.

7.1.1.3 HDA repositories shall include meta data and meta-attributes repositories.

7.1.1.4 HDA shall provide ITS data system security.

7.1.1.4.1 HDA shall be capable of employing security solutions.

7.1.1.4.2 HDA shall be capable of preventing data loss.

7.1.1.4.3 HDA shall be capable of preventing unauthorized access to ITS data repositories

7.1.1.4.4 HDA shall be capable of providing a secure interface for online support of the ITS user interface.

7.1.1.5 HDA shall be capable of supporting online analytical functions to enable users to analyze data across multiple sources or acquire data for their off-line applications.

7.1.2 The Archived Data function shall include an Operational Data Control (ODC) function to ensure integrity of operational data as received from field equipment or data collection devices.

7.1.2.1 ODC shall be capable of receiving and storing all ITS operational data, as received from the source.

7.1.2.1.1 ODC shall ensure ITS operational data are in proper format.

7.1.2.1.3 ODC shall be capable of assigning the following meta attributes, when available, to ITS operational data during the archive process.

7.1.2.1.3(a) The equipment used to collect the data.

7.1.2.1.3(b) The conditions under which the data were collected.

7.1.2.1.3(c) The status of the equipment at the time of collection.

7.1.2.1.4 ODC shall be capable of applying user-defined quality control verification on ITS data and annotating results in the appropriate meta files.

7.1.2.1.5 ODC shall be capable of assigning meta-attributes to the data indicating the methods used to perform:

7.1.2.1.5(a) summarization and aggregation

7.1.2.1.5(b) transformations (i.e., reconstructing original data or constructing new data elements)

7.1.2.2 ODC shall be capable of collecting user-selected data.

7.1.2.3 ODC shall be capable of archiving, in data repositories, ITS operational data as received from field equipment or data collection devices.

7.1.2.4 ODC shall be capable of maintaining the integrity of all received operational data.

7.1.2.5 ODC shall be capable of disseminating data replicates to ITS operational users in real-time.

7.1.2.6 ODC shall be capable of performing data fusion on replicated data for operational users in near real-time.

7.1.3 The Archived Data function shall include a Data Import and Verification (DIV) function to acquire historical data from the Operational Data Control function.

7.1.3.1 DIV shall be capable of importing selected ITS Operational data from the ITS Operational Repositories.

7.1.3.1.1 DIV shall be capable of importing ITS Freeway Operations data to include:

7.1.3.1.1(a) Freeway traffic flow surveillance data.

7.1.3.1.1(c) Ramp meter operational data.

7.1.3.1.1(d) Freeway visual and video surveillance data.

7.1.3.1.1(e) Traffic Management Center generated freeway flow metrics.

7.1.3.1.3 DIV shall be capable of importing ITS Arterial data to include:

7.1.3.1.3(a) Traffic signal preemptions.

7.1.3.1.3(b) Traffic signal operational data.

7.1.3.1.3(c) Arterial visual and video surveillance data.

7.1.3.1.3(d) Traffic Management Center generated arterial flow metrics.

7.1.3.1.3(e) Arterial traffic flow surveillance data.

7.1.3.1.4 DIV shall be capable of importing ITS Transit and Ridesharing data to include:

7.1.3.1.4(a) Transit usage data.

7.1.3.1.4(b) Transit route data including schedule deviations.

7.1.3.1.4(c) Rideshare requests.

7.1.3.1.4(d) Multimodal Origin/Destination.

7.1.3.1.4(e)	Fares
7.1.3.1.4(f)	Vehicle maintenance
7.1.3.1.4(g)	Personnel management data
7.1.3.1.5	DIV shall be capable of importing ITS Incident Management data to include:
7.1.3.1.5(a)	Incident characteristics.
7.1.3.1.5(c)	Emergency vehicle dispatch data.
7.1.3.1.5(d)	Emergency vehicle location data.
7.1.3.1.5(e)	Construction and work zone identification.
7.1.3.1.5(f)	Emergency request data
7.1.3.1.5(g)	Video surveillance data
7.1.3.1.5(h)	Emergency response
7.1.3.1.7	DIV shall be capable of importing ITS Environmental data to include:
7.1.3.1.7(a)	Emission data.
7.1.3.1.7(b)	Weather data.
7.1.3.1.8	DIV shall be capable of importing ITS Vehicle and Traveler data to include:
7.1.3.1.8(a)	Commercial and non-commercial vehicle probe data.
7.1.3.1.8(b)	DMS message set data.
7.1.3.1.8(f)	Origin/destination trip data.
7.1.3.1.8(g)	Service requests
7.1.3.1.8(h)	Information utilization
7.1.3.1.9	DIV shall be capable of importing data on ITS Physical Characteristics of Transportation Infrastructure to include:
7.1.3.1.9(a)	Roadway network attributes.
7.1.3.1.9(b)	Transit network attributes.
7.1.3.1.9(c)	Equipment maintenance status
7.1.3.1.9(d)	Transportation facilities.
7.1.3.1.9(e)	GIS map of network.
7.1.3.1.9(f)	Infrastructure maintenance data
7.1.3.2	DIV shall be capable of accepting pre-defined data inputs from transportation or other sources.
7.1.3.3	DIV shall be capable of applying pre-defined quality control verification on the imported ITS data and annotating results in the appropriate meta files.
7.1.3.4	DIV shall be capable of formatting the data to conform to the archive schema.
7.1.3.5	DIV shall be capable of cleansing imported data
7.1.3.5.1	Cleansing shall include the removal of source privacy attributes.
7.1.3.5.2	Cleansing shall be capable of assigning unique system-developed anonymous identifiers to data during archiving.
7.1.3.6	DIV shall be capable of performing pre-defined data mining functions to import data.
7.1.3.7	DIV shall be capable of performing pre-defined data fusion on imported data near real-time.
7.1.3.8	DIV shall be capable of assigning meta attributes to ITS operational data if data modification is required during the historical archive process.
7.1.3.9	DIV shall be capable of notifying source system owners of potential data or equipment errors.
7.1.4	The Archived Data function shall provide the Automatic Data Historical Archive (ADHA) function for permanently archiving the data.

7.1.4.1 ADHA shall provide an archive schema for all ITS data entering the archives.

7.1.4.1.2 ADHA shall strip all identifiers of individual citizens or private firms from all data before archiving.

7.1.4.1.3 ADHA shall be capable of assigning unique system-developed anonymous identifiers to data during archiving.

7.1.4.2 ADHA shall manage the ITS historical data archiving processes for all functional areas as follows:

7.1.4.2(a) Format data to archive schema conformance.

7.1.4.2(b) Maintain a centralized meta schema to specify how data is archived.

7.1.4.2(c) Maintain data quality meta attributes.

7.1.4.2(d) Schedule archiving of data.

7.1.4.3 ADHA shall permanently store historical archives and only provide data replicates to users.

7.1.4.4 ADHA shall be capable of supporting user-specified data archiving procedures as follows:

7.1.4.4(a) When specified by a user, archive operational data as received in the user's storage files.

7.1.4.4(b) When specified by a user, archive edited data in the User's storage files.

7.1.4.4(c) When specified by a user, perform pre-defined data fusion before archiving in User's storage files.

7.1.4.5 ADHA shall be capable of assigning meta attributes to ITS operational data if data modification is required during the historical archive process.

7.1.5 The Archived Data function shall provide a Data Warehouse Distribution (DWD) function as the ITS data source to support the ITS community user functions.

7.1.5.1 DWD shall be capable of supporting the generation of data products for transportation agencies.

7.1.5.2 DWD shall include a User Data Products (UDP) function.

7.1.5.2.1 UDP shall provide an online analytical functionality to generate pre-defined data products for ITS users, to include:

7.1.5.2.1(a) Reports

7.1.5.2.1(b) Analyses

7.1.5.2.1(c) Aggregations or summaries.

7.1.5.2.1(d) User defined archiving of data concepts.

7.1.5.2.2 UDP shall be capable of recreating ITS operational data formats from the historical archives.

7.1.5.2.3 UDP shall be capable of providing user defined data mining functions on ITS data sources.

7.1.5.2.4 UDP shall be capable of performing user defined data fusion functions on data extracted from ITS Archives.

7.1.5.3 DWD shall have the single point of administration for the archived data system.

7.1.6 The Archived Data function shall provide users with an ITS Community Interface (ICI) including all ITS users for the specification and retrieval of data products.

7.1.6.1 ICI shall be the common data interface for all ITS users to access the ITS Data Archives.

7.1.6.1.1 ICI shall provide users' systems with the data interface functionality.

7.1.6.2 ICI shall manage user access and security across the interface.

7.1.6.2.1 ICI shall be capable of cleansing data to remove source privacy attributes before archiving data.

7.1.6.2.2 ICI shall be capable of cleansing data to remove source privacy attributes before exporting data to users.

7.1.6.3 ICI shall provide a user-interface functionality to existing data warehouse data schema for users to define their data products.

7.1.6.3.1 The user-interface shall permit users to define access to multiple databases as data sources for their data products.

7.1.6.3.2 The user-interface shall permit users to select online analytical functions to produce their data products.

7.1.6.3.3 The user-interface shall permit the user to view sample data products.

7.1.6.4 ICI shall provide the user interface for ITS Transportation Agencies.

8.1 MAINTENANCE AND CONSTRUCTION OPERATIONS

8.1.0 ITS shall provide Maintenance and Construction Operations (MCO) functions to support monitoring, operating, maintaining, improving and managing the physical condition of roadways, the associated infrastructure equipment, and the required resources. MCO shall focus on four major functions applicable to the MAG Region: 1) the Maintenance Vehicle Fleet Management function, to monitor and track locations and conditions of fleets of maintenance, construction, and specialized service vehicles; 2) the Roadway Management function, to monitor and forecast conditions and manage treatment of roadways during various travel conditions; 3) the Work Zone Management and Safety function, to support effective and efficient roadway operations during work zone activities; and 4) the Roadway Maintenance Conditions and Work Plan Dissemination function, to coordinate work plans and to communicate conditions. This User Service will utilize ITS systems and processes to support interchange of information among diverse groups of users, to improve efficiency and effectiveness of operational, maintenance, and managerial activities.

8.1.1 Maintenance and Construction Operations shall provide a Maintenance Vehicle Fleet Management (MVFM) function to schedule and dispatch, monitor and track location, and monitor operational condition and maintenance requirements of public and contracted fleets of maintenance, construction, and specialized service vehicles. This function includes interactions among Traffic Managers, Supervisors, Dispatchers, Field Crews, Construction Crews, Vehicle Maintenance Crews, Equipment Maintenance Crews, Weather Services Organizations, and Information Service Providers.

8.1.1.1 MVFM shall be capable of monitoring and tracking the locations of public and contracted fleets of maintenance, construction, and specialized service vehicles to provide current location and status information.

8.1.1.1.1 MVFM shall be capable of monitoring and tracking the locations of fleets of maintenance, construction, and specialized service vehicles, including but not limited to:

8.1.1.1.1(a) Roadway maintenance trucks

8.1.1.1.1(b) Other motorized roadway maintenance equipment

8.1.1.1.1(c) Roadway construction trucks

8.1.1.1.1(d) Other motorized roadway construction equipment

8.1.1.1.1(e) Roadway service patrols

8.1.1.1.1(h) Bucket trucks

8.1.1.1.1(i) Vegetation Control and Grass cutting equipment

8.1.1.1.1(j) Traffic control vehicles

8.1.1.1.1(k) Street and drainage cleaning vehicles

8.1.1.1.2 MVFM shall be capable of monitoring information regarding fleets of maintenance, construction, and specialized service vehicles, including but not limited to:

8.1.1.1.2(a) Location

8.1.1.1.2(b) Speed

8.1.1.2 MVFM shall be capable of supporting route scheduling and dispatching of public and contracted fleets of maintenance, construction, and specialized service vehicles.

8.1.1.3 MVFM shall be capable of supporting interactive data communications between dispatchers and operators of public and contracted maintenance, construction, and specialized service vehicles.

8.1.1.3.1 MVFM shall be capable of communicating information to vehicle operators, including but not limited to:

8.1.1.3.1(a) Routing information

8.1.1.3.1(b) Scheduling data

8.1.1.3.1(c) Dispatch instructions

8.1.1.3.1(d) Corrective actions

8.1.1.3.1(e) Environmental information (road and weather conditions)

8.1.1.3.2 MVFM shall be capable of communicating information from vehicle operators, including but not limited to:

8.1.1.3.2(a) Work data

8.1.1.3.2(b) Operator status

8.1.1.3.2(c) Crew status

8.1.1.3.2(d) Equipment status

8.1.1.4 MVFM shall be capable of using on-board vehicle sensors to monitor the vehicle diagnostics and operating conditions of public and contracted fleets of maintenance, construction, and specialized service vehicles.

8.1.1.4.1 MVFM shall be capable of collecting information on the operating conditions of vehicles.

8.1.1.6 MVFM shall be capable of providing dispatchers and operators of maintenance, construction, and specialized service vehicles with information regarding potential and actual roadway problems.

8.1.1.6.1 MVFM shall provide information to dispatchers and vehicle operators, including but not limited to:

8.1.1.6.1(a) Congestion

8.1.1.6.1(b) Incidents

8.1.1.6.1(c) Roadway restrictions

8.1.1.6.1(d) Environmental conditions

8.1.1.6.5 MVFM shall provide information to the vehicle operators concerning roadway problem spots and alternate routes because of potential or actual roadway problems.

8.1.1.6.6 MVFM shall support transmission of fleet operations data to other Operations centers.

8.1.1.6.7 MVFM shall support transmission of fleet operations data to archives.

8.1.1.6.8 MVFM shall support the comparison of incident data with scheduled fleet activities.

8.1.1.7 MVFM shall be capable of communicating status information to other maintenance, construction or specialized service vehicles.

8.1.2 Maintenance and Construction Operations shall provide a Roadway Management (RWM) function to monitor traffic, road surface, and environmental conditions and forecast traffic and road surface conditions to support management of routine and hazardous road condition remediation and to communicate changes in conditions. This function includes interactions among Traffic Managers, Supervisors, Dispatchers, Field Crews, Construction Crews, Asset Managers, Planning Agencies, and Weather Services Organizations.

8.1.2.1 RWM shall support a number of different services, including but not limited to:

8.1.2.1(b) Hazard removal (removing trash, animals, etc.)

8.1.2.1(c) Emergency activities (incident response, planning, alternate routing, etc.)

8.1.2.1(d) Routine maintenance activities (cleaning, cutting, etc.)

8.1.2.1(e) Repair activities

8.1.2.2 RWM shall support provision of efficient and effective roadway operations during normal and severe weather or adverse travel conditions.

8.1.2.4.3 RWM shall make use of information on current and forecast weather.

8.1.2.5 RWM shall support management of resources to perform hazardous road condition remediation.

8.1.2.5.2 RWM shall support appropriate responses to other environmental conditions that effect travel.

8.1.2.7 RWM shall monitor the amount and availability of materials at storage facilities.

8.1.2.8 RWM shall support maintenance crew dispatching.

8.1.3 Maintenance and Construction Operations shall provide a Work Zone Management and Safety (WZMS) function, which provides support for the effectiveness, safety, and efficiency of roadway operations during all work zone activities. This function includes interactions among Traffic Managers, Supervisors, Dispatchers, Field Crews, Construction Crews, Public Safety Organizations, Information Service Providers, and Travelers.

8.1.3.1 WZMS shall monitor, control, and direct activity in the vicinity of work zones.

8.1.3.1.1 WZMS shall provide information about work zones, including but not limited to:

8.1.3.1.1(a) Anticipated delays

8.1.3.1.1(b) Alternate routes

8.1.3.1.1(c) Suggested speed limit

8.1.3.1.2 WZMS shall provide support for automated speed enforcement around work zones.

8.1.3.1.3.2 WZMS shall support archiving of field data.

8.1.3.2 WZMS shall support the management of data about work zones.

8.1.3.2.1 WZMS shall collect information concerning work zone activities, including but not limited to:

8.1.3.2.1(a) Location

8.1.3.2.1(b) Nature / type

8.1.3.2.1(c) Scheduled start time

8.1.3.2.1(d) Duration

8.1.3.2.1(e) Lane shifts

8.1.3.2.1(f) Staging areas

8.1.3.2.1(g) Length of work zone

8.1.3.2.1(h) Scheduled phases of work zone configuration

8.1.3.2.1(i) Alternate routes

8.1.3.2.1(j) Anticipated delays for travel route

8.1.3.2.1(k) Anticipated delays for diversion route

8.1.3.2.2 WZMS shall correlate planned activities with actual work.

8.1.3.2.3 WZMS shall support preparation of reports on work zone activities.

8.1.3.2.4 WZMS shall provide information on work zone activities to other agencies, including but not limited to:

8.1.3.2.4(a) Other maintenance and construction operations systems

8.1.3.2.4(c) Emergency vehicle fleets

8.1.3.2.4(d) Traveler information systems

8.1.3.2.4(e) Traffic management systems

8.1.3.3 WZMS shall provide systems that communicate reliable, accurate, and timely traveler information, including but not limited to:

8.1.3.3(a) Location, including lane closure information

8.1.3.3(b) Alternate route / detour

8.1.3.3(c) Work zone speed limit

8.1.3.3(d) Delay

8.1.3.4 WZMS shall support the provision of vehicle intrusion warnings.

8.1.3.5 WZMS shall be capable of tracking individual crew movements.

8.1.4 Maintenance and Construction Operations shall provide a Roadway Maintenance Conditions and Work Plan Dissemination (RMCWPD) function to provide Intra- and Inter-agency coordination of work plans. This function includes interactions among Traffic Managers, Supervisors, Planning Agencies, Public Safety Organizations, and Information Service Providers.

8.1.4.1 RMCWPD shall coordinate information on planned maintenance and construction activities, including work zone information, and unplanned remediation activities, such as inclement weather responses, so that routing, scheduling, and resource allocation can be accomplished.

8.1.4.2 RMCWP shall support inter-agency coordination of response and scheduling of resources for significant events with broad impact, like natural disasters, major incidents, and large planned or seasonal events.

8.1.4.3 RMCWPD shall coordinate information with other transportation agencies, including but not limited to:

8.1.4.3(a) Public Safety

8.1.4.3(b) Emergency Medical Management

8.1.4.3(c) Transit

8.1.4.3(d) Traffic Management

8.1.4.3(e) Railroads

8.1.4.3(f) Airports

8.1.4.3(g) Information Service Providers

MARICOPA ASSOCIATION of GOVERNMENTS

MAG Regional ITS Architecture

Appendix C – Selected Market Packages From National ITS Architecture

Prepared by:

Kimley-Horn and Associates, Inc.

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091980011-15

Market Package	Market Package Name	Description
Traffic Management Service Area		
ATMS01	Network Surveillance	Includes traffic detectors, CCTV cameras, other surveillance equipment, supporting field equipment and fixed point-to-point communications to transmit the collected data back to a traffic management center.
ATMS02	Traffic Probe Surveillance	Provides an alternative approach for surveillance of the roadway network. Probe vehicles are tracked, and the vehicle's position and speed information are utilized to determine road network conditions such as average speed and congestion conditions.
ATMS03	Surface Street Control	Provides the central control and monitoring equipment, communication links and signal control equipment that support local street and/or arterial traffic management. This market package is consistent with typical urban traffic signal control systems.
ATMS04	Freeway Control	Provides the communications and roadside equipment to support ramp control, lane controls and interchange control for freeways. This market package is consistent with typical urban traffic freeway control systems. Also includes the capability to utilize surveillance information for detection of incidents.
ATMS05	HOV Lane Management	Manages HOV lanes by coordinating freeway ramp meters and connector signals with HOV lane usage signals. Vehicle occupancy detectors may be installed to verify HOV compliance and notify enforcement agencies of violations.
ATMS06	Traffic Information Dissemination	Provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. Information can include traffic and road conditions, closure and detour information, incident information, emergency alerts, disaster traveler information and driver advisories. This package also covers the sharing of traffic information with media, transit, emergency management and other service providers.
ATMS07	Regional Traffic Management	Sharing of traffic information and control among traffic management centers to support a regional management strategy. This package relies principally on roadside instrumentation of each traffic management jurisdiction and provides the communications links and cooperative control strategies that enable integrated interjurisdictional traffic management.
ATMS08	Traffic Incident Management System	Manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. This market package includes incident detection capabilities through roadside surveillance devices as well as notification from other agencies. It supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel.
ATMS09	Traffic Forecast and Demand Management	Includes advanced algorithms, processing, and mass storage capabilities that support historical evaluation, real-time assessment, and forecasts of the roadway network performance and better link travel time forecasts.
ATMS10	Electronic Toll Collection	Provides toll operators with the ability to collect tolls electronically and detect and process violations. The toll tags and roadside readers that these systems use could also be used to collect road use statistics for highway authorities.
ATMS11	Emissions Monitoring and Management	Monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data. The gathered information can be used to implement environmentally sensitive TDM programs, policies, regulations.
ATMS12	Roadside Lighting System Control	Manages electrical lighting systems by monitoring operational conditions and using the lighting controls to vary the amount of light provided along the roadside.

Market Package	Market Package Name	Description
Traffic Management Service Area		
ATMS13	Standard Railroad Grade Crossing	Manages highway traffic at highway-rail intersections (HRIs) where rail operational speeds are less than 80 mph. Passive and active warning signs are supported.
ATMS14	Advanced Railroad Grade Crossing	Manages highway traffic at highway-rail intersections (HRIs) where operational speeds are greater than 80 mph. Augments Standard Railroad Grade Crossing market package with additional safety features to mitigate the risks associated with higher rail speeds.
ATMS15	Railroad Operations Coordination	Provides an additional level of strategic coordination between freight rail operations and traffic management centers. Could include train schedules, maintenance schedules or any other anticipated HRI closures.
ATMS16	Parking Facility Management	Provides enhanced monitoring and management of parking facilities. Market package assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees.
ATMS17	Regional Parking Management	Supports coordination between parking facilities to enable regional parking management strategies.
ATMS18	Reversible Lane Management	Provides for the management of reversible lane facilities and includes the field equipment, physical lane access controls, and associated control electronics.
ATMS19	Speed Monitoring	Monitors the speeds of vehicles traveling through a roadway system. This service can support notification to an enforcement agency to enforce speed limits on a roadway system.
ATMS20	Drawbridge Management	Supports systems that manage drawbridges at rivers and canals and other multimodal crossings. Includes control devices as well as traveler information systems.
ATMS21	Roadway Closure Management	Closes roadways to vehicular traffic when driving conditions are unsafe, maintenance must be performed, or other situations. Market package covers general road closures applications; specific closure systems that are used at railroad grade crossings, drawbridges, reversible lanes, etc. are covered by other market packages.
Emergency Management Service Area		
EM01	Emergency Call-Taking and Dispatch	Provides basic public safety call-taking and dispatch services. Includes emergency vehicle equipment, equipment used to receive and route emergency calls, wireless communications and coordination between emergency management agencies.
EM02	Emergency Routing	Supports automated vehicle location and dynamic routing of emergency vehicles. Traffic information, road conditions and suggested routing information are provided to enhance emergency vehicle routing. Includes signal preemption and priority applications.
EM03	Mayday and Alarms Support	Allows the user to initiate a request for emergency assistance and enables the emergency management subsystem to locate the user, gather information about the incident and determine the appropriate response.
EM04	Roadway Service Patrols	Supports the roadway service patrol vehicles that aid motorists, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to traffic. This market package monitors service patrol vehicle locations and supports vehicle dispatch.
EM05	Transportation Infrastructure Protection	Includes the monitoring of transportation infrastructure (bridges, tunnels and management centers) for potential threats (acts of nature, terrorist attacks, other incidents causing damage to the infrastructure) using sensors, surveillance equipment, barriers and safeguard systems to preclude an incident, control access during and after an incident or mitigate the impact of an incident.
EM06	Wide-Area Alert	Uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather, civil emergencies or other situations that pose a threat to life and property.

Market Package	Market Package Name	Description
Emergency Management Service Area		
EM07	Early Warning System	Monitors and detects potential, looming and actual disasters including natural, technological and man-made disasters. This market package notifies all responding agencies of detected emergencies.
EM08	Disaster Response and Recovery	Enhances the ability of the surface transportation system to respond to and recover from disasters. Supports coordination of emergency response plans, provides enhanced access to the scene and better information about the transportation system in the vicinity of the disaster, and maintains situation awareness.
EM09	Evacuation and Reentry Management	Supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. This market package supports both anticipated, well-planned and orderly evacuations such as for a hurricane, as well as sudden evacuations with little or no time for preparation or public warning such as a terrorist act. Employs a number of strategies to maximize capacity along an evacuation route including coordination with transit.
EM10	Disaster Traveler Information	Use of ITS to provide disaster-related traveler information to the general public, including evacuation and reentry information and other information concerning the operation of the transportation system during a disaster.
Maintenance and Construction Management Service Area		
MC01	Maintenance and Construction Vehicle and Equipment Tracking	Tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities.
MC02	Maintenance and Construction Vehicle Maintenance	Performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities. Includes on-board sensors capable of automatically performing diagnostics.
MC03	Road Weather Data Collection	Collects current road weather conditions using data collected from environmental sensors deployed on and about the roadway.
MC04	Weather Information Processing and Distribution	Processes and distributes the environmental information collected from the Road Weather Data Collection market package. This market package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, dense fog, etc. to allow system operators can make decisions on corrective actions to take.
MC05	Roadway Automated Treatment	Automatically treats a roadway section based on environmental or atmospheric conditions. Includes the sensors that detect adverse conditions, automated treatment (such as anti-icing chemicals), and driver information systems.
MC06	Winter Maintenance	Supports winter road maintenance. Monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities.
MC07	Roadway Maintenance and Construction	Supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities.
MC08	Work Zone Management	Directs activity in work zones, controlling traffic through portable dynamic message signs and informing other groups of activity for better coordination management. Also provides speed and delay information to motorists prior to the work zone.
MC09	Work Zone Safety Monitoring	Includes systems that improve work crew safety and reduce collisions between the motoring public and maintenance and construction vehicles. Detects vehicle intrusions in work zones and warns workers and drivers of safety hazards when encroachment occurs. Contractors should be required to provide work zone safety measures such as police enforcement or monitoring.

Market Package	Market Package Name	Description
Maintenance and Construction Management Service Area		
MC10	Maintenance and Construction Activity Coordination	Supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations. (i.e., traffic management, transit, emergency management)
MC11	Environmental Probe Surveillance	Collects data from vehicles in the road network that can be used to directly measure on conclude current environmental conditions.
MC12	Infrastructure Monitoring	Monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure using both fixed and vehicle-based infrastructure monitoring sensors. Monitors vehicle probes used to determine current pavement conditions.
Public Transportation Service Area		
APTS01	Transit Vehicle Tracking	Monitors current transit vehicle location using an automated vehicle location system. Location data may be used to determine real time schedule adherence and update the transit system's schedule in real time.
APTS02	Transit Fixed-Route Operations	Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for fixed-route and flexible-route transit services.
APTS03	Demand Response Transit Operations	Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for demand responsive transit services.
APTS04	Transit Fare Collection Management	Manages transit fare collection on-board transit vehicles and at transit stops using electronic means. Allows the use of a traveler card or other electronic payment device.
APTS05	Transit Security	Provides for the physical security of transit passengers and transit vehicle operators. Includes on-board security cameras and panic buttons.
APTS06	Transit Fleet Management	Supports automatic transit maintenance scheduling and monitoring for both routine and corrective maintenance.
APTS07	Multi-Modal Coordination	Establishes two way communications between multiple transit and traffic agencies to improve service coordination.
APTS08	Transit Traveler Information	Provides transit users at transit stops and on board transit vehicles with ready access to transit information. Services include stop annunciation, imminent arrival signs and real-time transit schedule displays. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.
APTS09	Transit Signal Priority	Determines the need for transit priority on routes and at certain intersections and requests transit vehicle priority at these locations to improve on-time performance of the transit system.
APTS10	Transit Passenger Counting	Counts the number of passengers entering and exiting a transit vehicle using sensors mounted on the vehicle and communicates the collected passenger data back to the management center.
Commercial Vehicle Operations Service Area		
CVO01	Fleet Administration	Provides the capabilities to manage a fleet of commercial vehicles. Vehicle routing and tracking as well as notification of emergency management of any troublesome route deviations (such as a HAZMAT vehicle) are part of this market package.
CVO02	Freight Administration	Tracks the movement of cargo and monitors the cargo condition. Connection between freight shippers and depots allows tracking from source to destination.
CVO03	Electronic Clearance	Provides for automatic clearance at roadside check facilities. Allows a good driver/vehicle/carrier to pass roadside facilities at highway speeds using transponders and dedicated short range communications to the roadside.
CVO04	CV Administrative Processes	Provides for electronic application, processing, fee collection, issuance and distribution of CVO credentials and tax filing.
CVO05	International Border Electronic Clearance	Provides for automated clearance at international border crossings. Processes entry documentation for vehicle, cargo, and driver, checks compliance with regulations, and reports the results for passing across an international border.

Market Package	Market Package Name	Description
Commercial Vehicle Operations Service Area		
CVO06	Weigh-In-Motion	Provides for high speed weigh-in-motion with or without automated vehicle identification capabilities.
CVO07	Roadside CVO Safety	Provides for automated roadside safety monitoring and reporting. Automates commercial vehicle safety inspections at the roadside check facilities.
CVO08	On-board CVO and Freight Safety and Security	Provides for on-board commercial vehicle safety monitoring and reporting as well as roadside support for reading on-board safety data via tags.
CVO09	CVO Fleet Maintenance	Supports maintenance of CVO fleet vehicles with on-board monitoring equipment and automated vehicle location capabilities.
CVO10	HAZMAT Management	Integrates incident management capabilities with commercial vehicle tracking to support effective treatment of HAZMAT material and incidents.
CVO11	Roadside HAZMAT Security Detection and Mitigation	Provides the capability to detect and classify security sensitive HAZMAT on commercial vehicles using roadside sensing and imaging technology. Credentials information can be accessed to verify if the commercial driver, vehicle and carrier are permitted to transport the identified HAZMAT.
CVO12	CV Driver Security Authentication	Provides the ability for fleet and freight management to detect when an unauthorized commercial vehicle driver attempts to drive a vehicle based on stored identity information. If an unauthorized driver has been detected the commercial vehicle can be disabled.
CVO13	Freight Assignment Tracking	Provides for the planning and tracking of the commercial vehicle, freight equipment and the commercial vehicle driver.
Traveler Information Service Area		
ATIS01	Broadcast Traveler Information	Collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, roadway maintenance and construction information, air quality and weather information, and broadly disseminates this information through existing infrastructures (radio, cell phones, etc.).
ATIS02	Interactive Traveler Information	Provides tailored information in response to a traveler request. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information. This market package is consistent with phone and web-based traveler information systems.
ATIS03	Autonomous Route Guidance	Using vehicle location and other information, this market package enables route planning and detailed route guidance based on static, stored information.
ATIS04	Dynamic Route Guidance	Offers advanced route planning and guidance that is responsive to current conditions.
ATIS05	ISP Based Trip Planning and Route Guidance	Offers the user pre-trip route planning and en-route guidance services. Routes may be based on static or real time network conditions.
ATIS06	Transportation Operations Data Sharing	Collects, processes, and stores current information on traffic and travel conditions and other information about the current state of the transportation network and makes the information available to transportation system operators.
ATIS07	Yellow Pages and Reservation	Provides yellow pages and reservations services to the user.
ATIS08	Dynamic Ridesharing	Provides dynamic ridesharing/ride matching services to travelers.
ATIS09	In Vehicle Signing	Supports the distribution of traffic and travel advisory information to drivers through in-vehicle devices.
ATIS10	VII Traveler Information	Provides location specific information to travelers in vehicles using Vehicle Infrastructure Integration (VII). These devices use dedicated short range communications to deliver real-time traveler information to vehicles as they pass the VII roadside equipment along their route.

Market Package	Market Package Name	Description
Archived Data Management Service Area		
AD1	ITS Data Mart	Provides a focused archive that houses data collected and owned by a single agency or other organization. Focused archive typically covers a single transportation mode and one jurisdiction.
AD2	ITS Data Warehouse	Includes all the data collection and management capabilities of the ITS Data Mart. Adds the functionality to allow collection of data from multiple agencies and data sources across modal and jurisdictional boundaries.
AD3	ITS Virtual Data Warehouse	Provides the same broad access to multimodal, multidimensional data from varied sources as in the ITS Data Warehouse Market Package, but provides this access using enhanced interoperability between physically distributed ITS archives that are each locally managed.

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MAG Regional ITS Architecture

Appendix D – Customized Market Packages

Prepared by:

Kimley-Horn and Associates, Inc.

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Figure 1: ATMS01 – Network Surveillance:
Arizona DOT

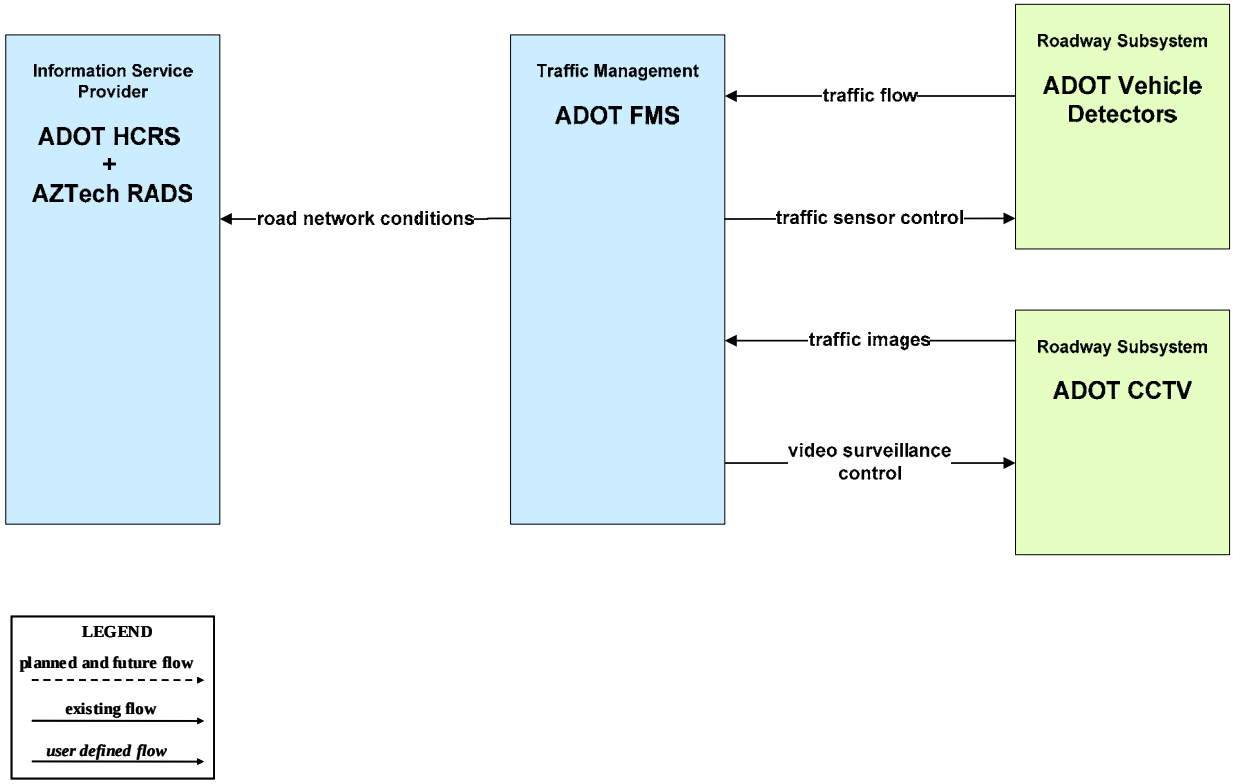


Figure 2: ATMS01 – Network Surveillance: Maricopa County

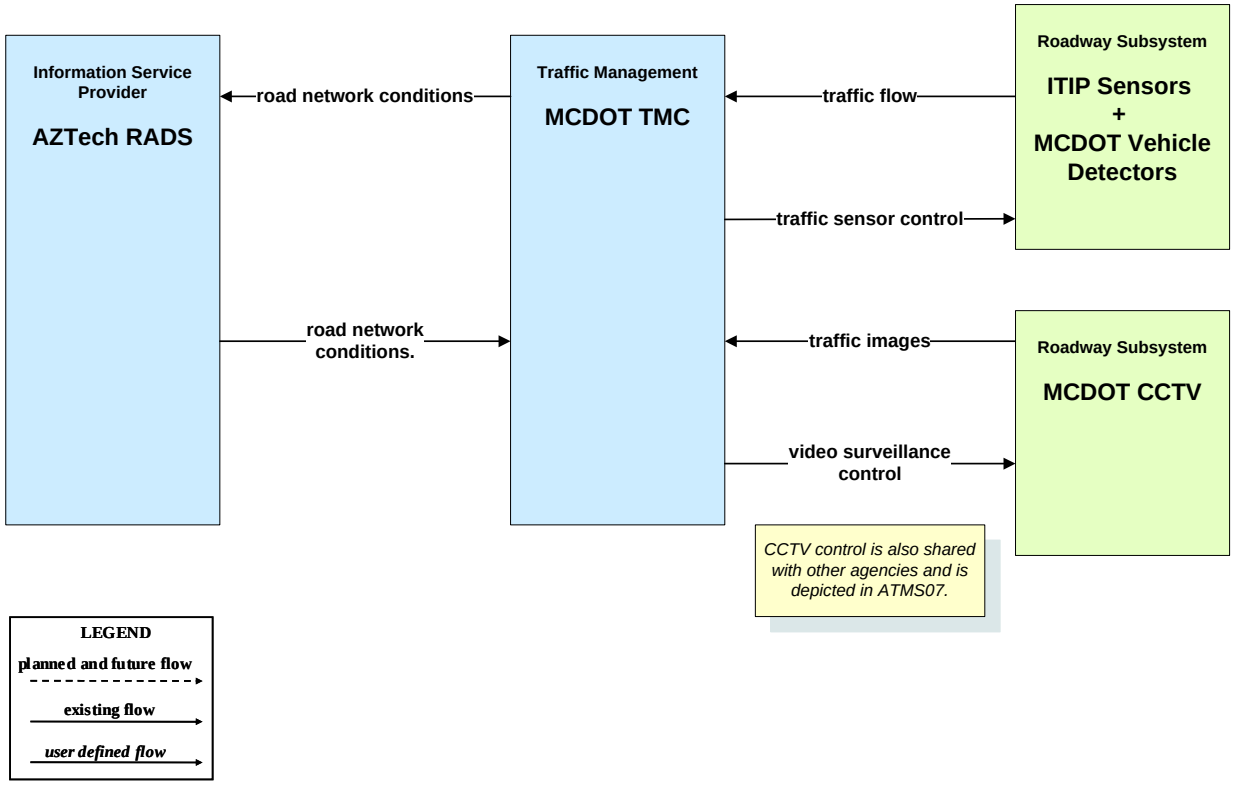


Figure 3: ATMS01 – Network Surveillance: City of Phoenix

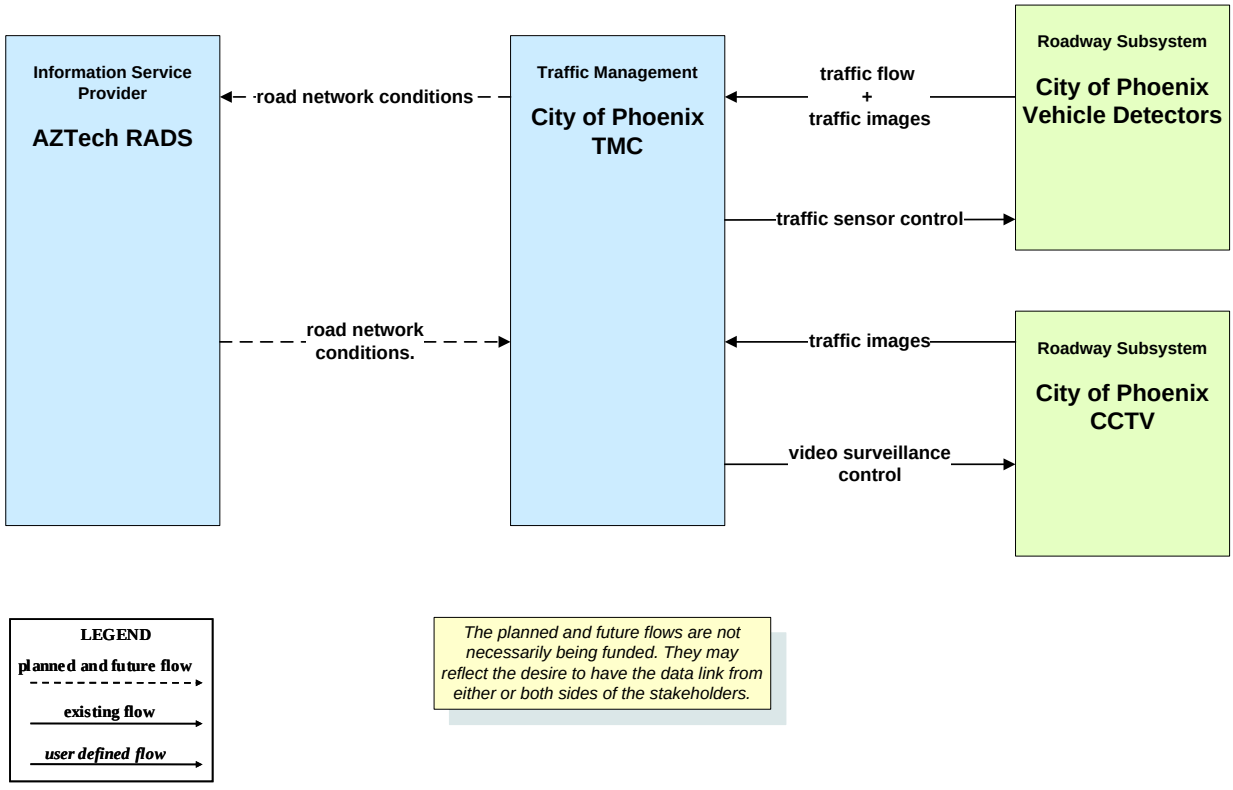


Figure 4: ATMS01 – Network Surveillance: City of Avondale

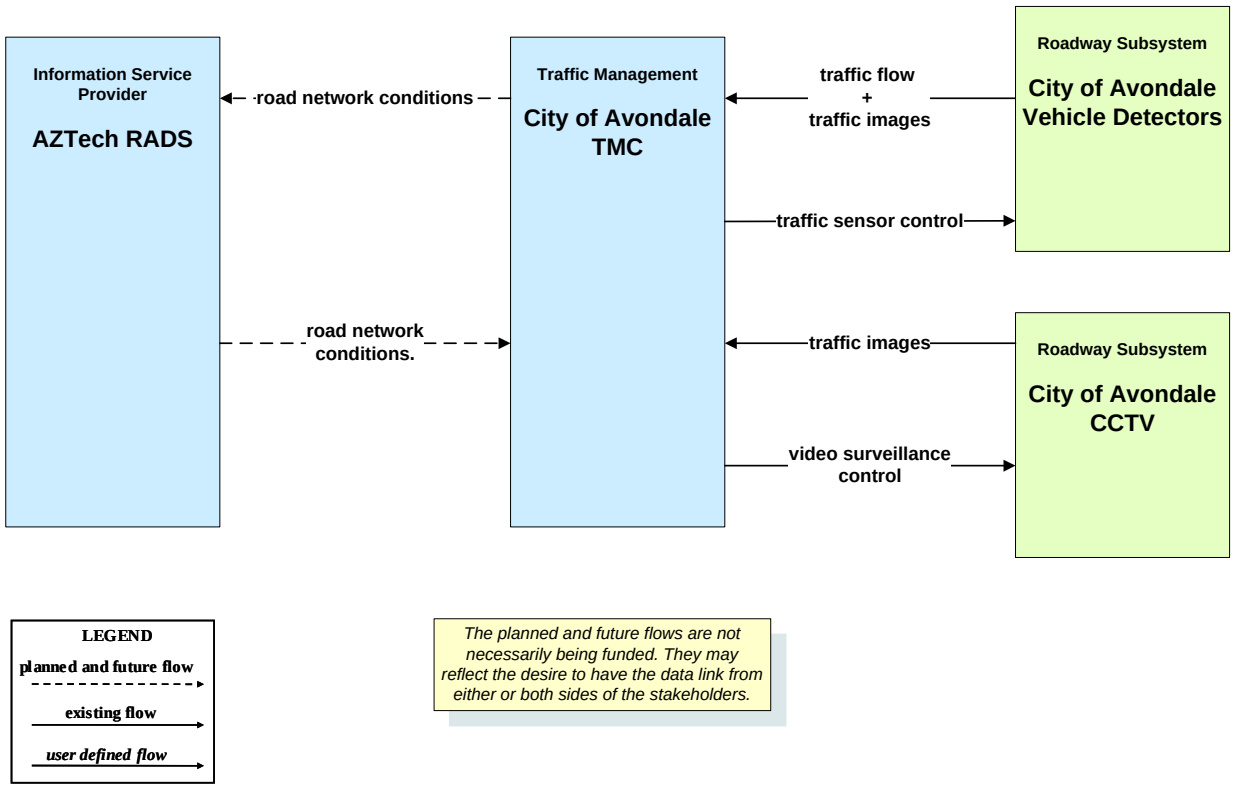


Figure 5: ATMS01 – Network Surveillance: City of Chandler

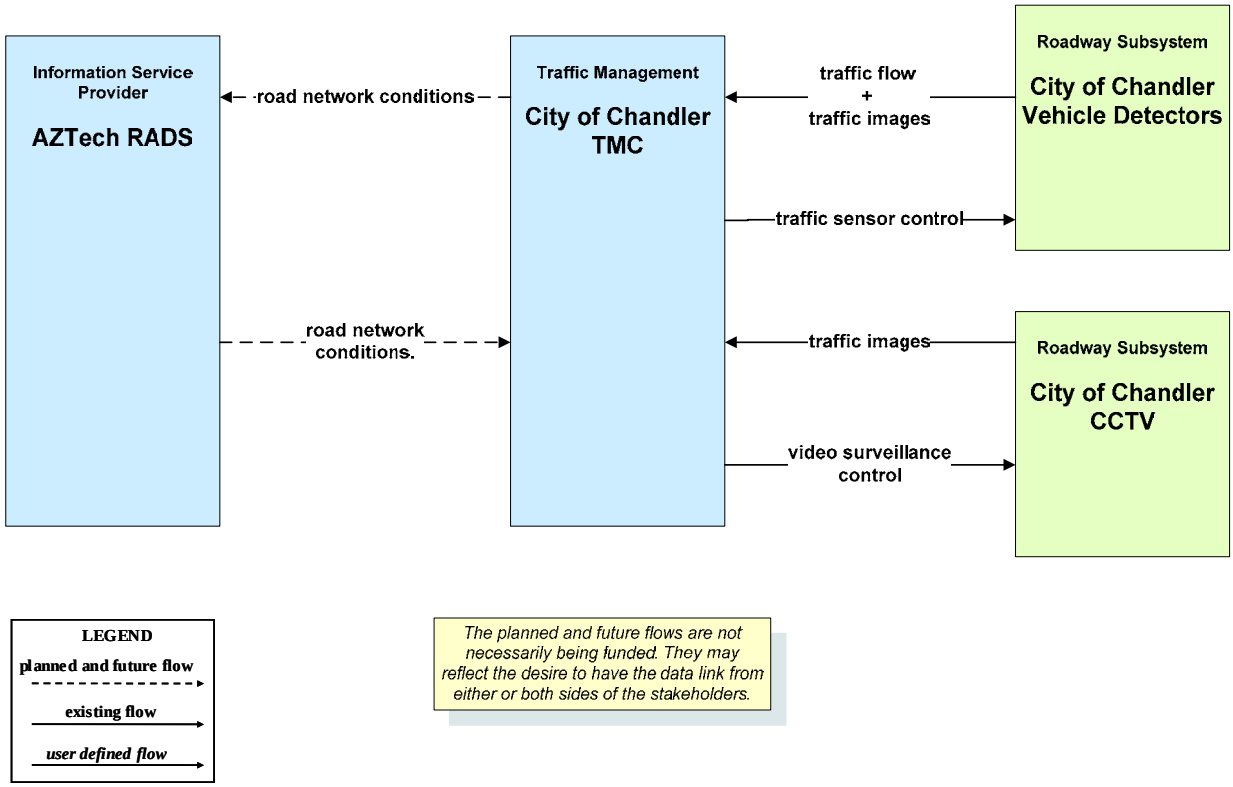


Figure 6: ATMS01 – Network Surveillance: Town of Gilbert

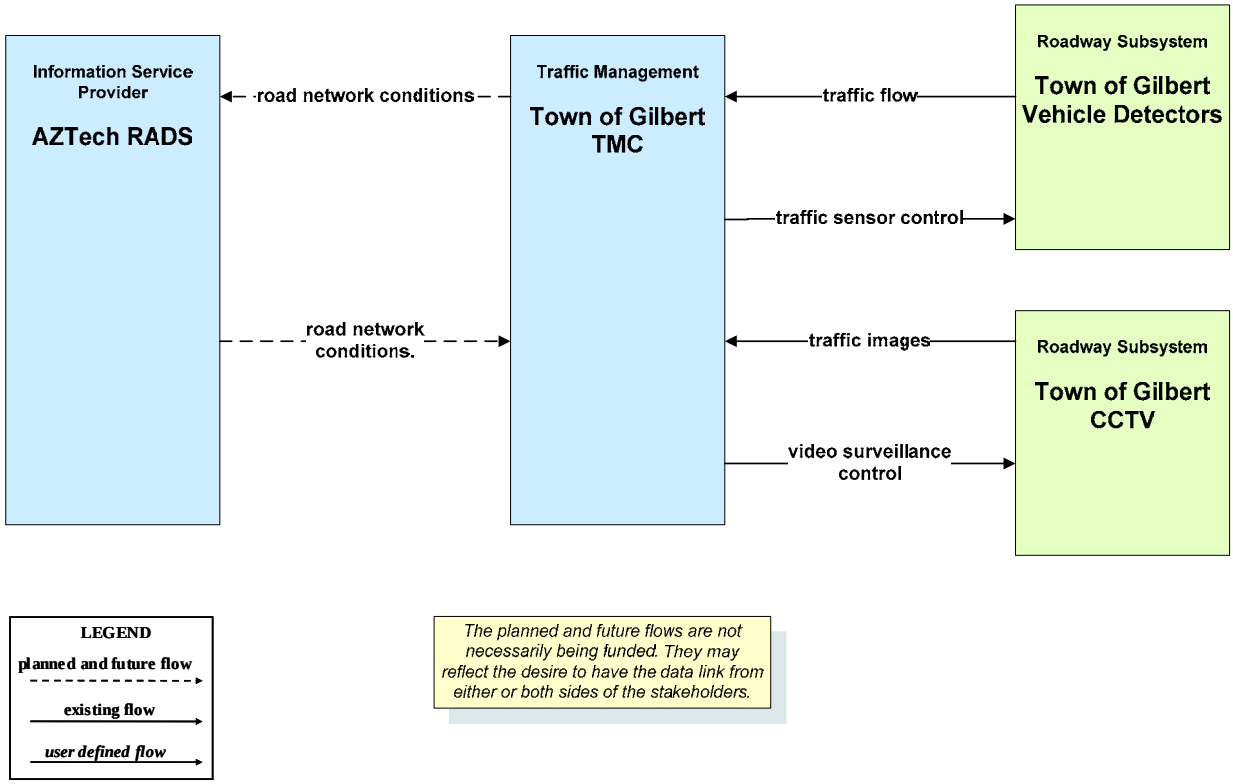


Figure 7: ATMS01 – Network Surveillance: City of Glendale

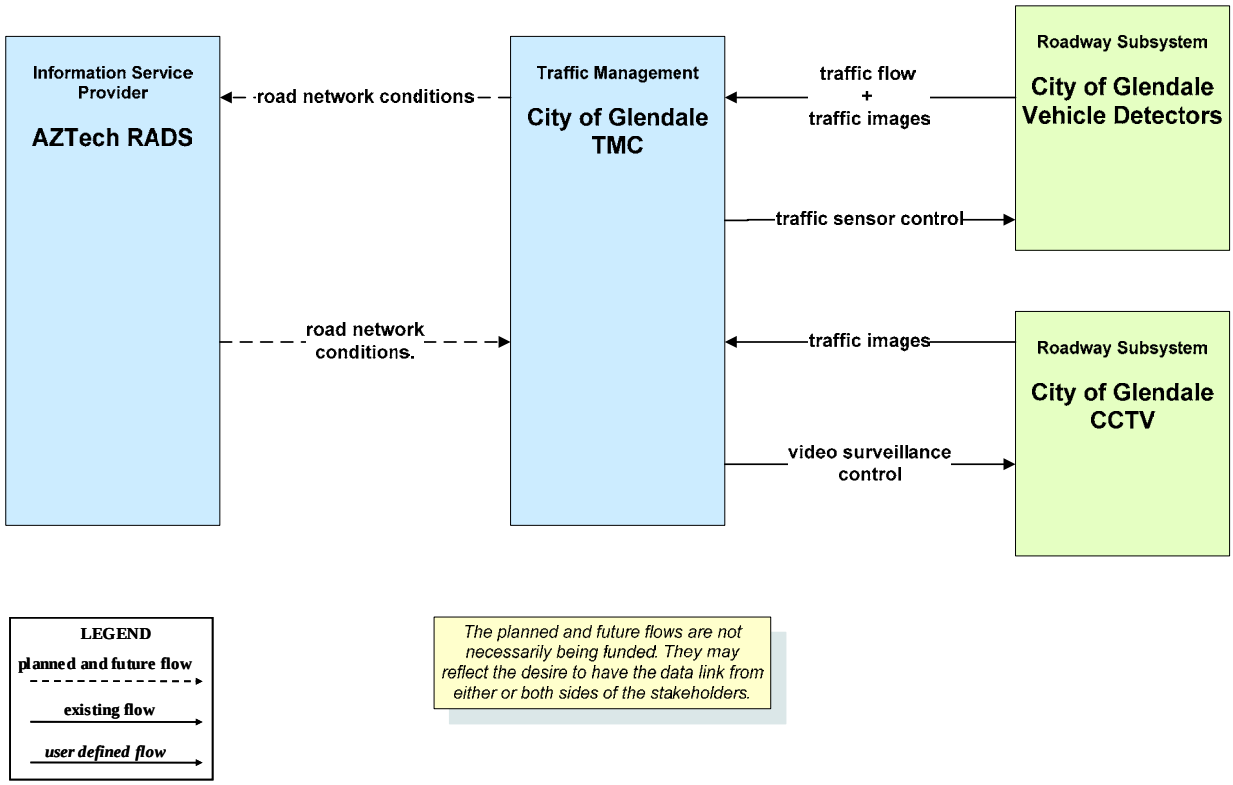


Figure 8: ATMS01 – Network Surveillance: City of Goodyear

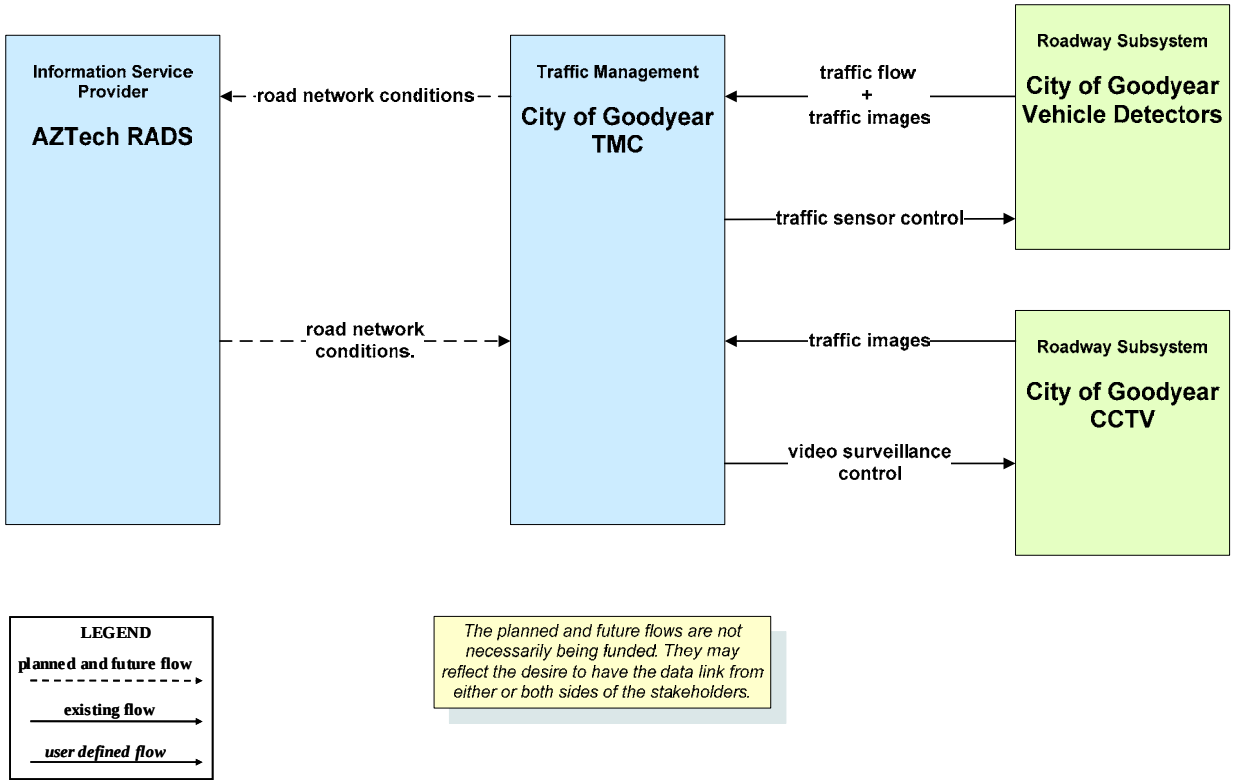


Figure 9: ATMS01 – Network Surveillance: City of Mesa

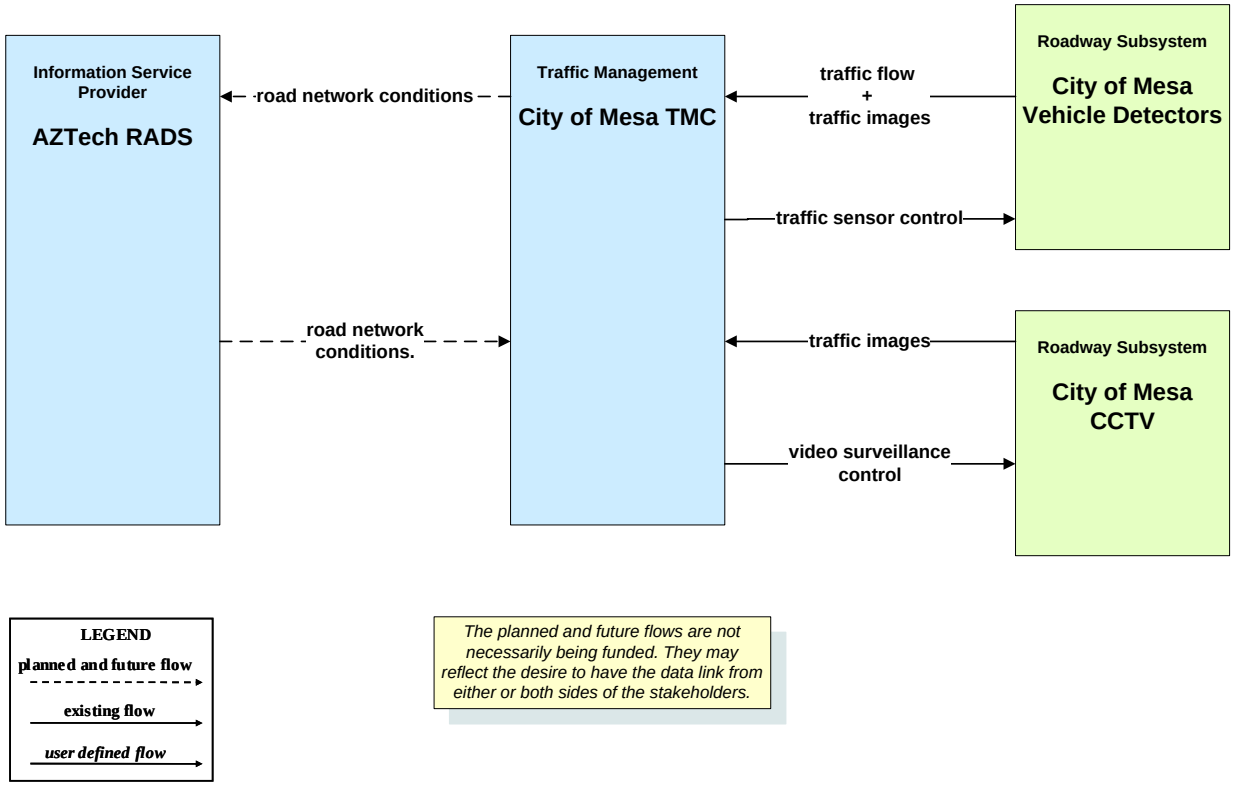


Figure 10: ATMS01 – Network Surveillance: City of Peoria

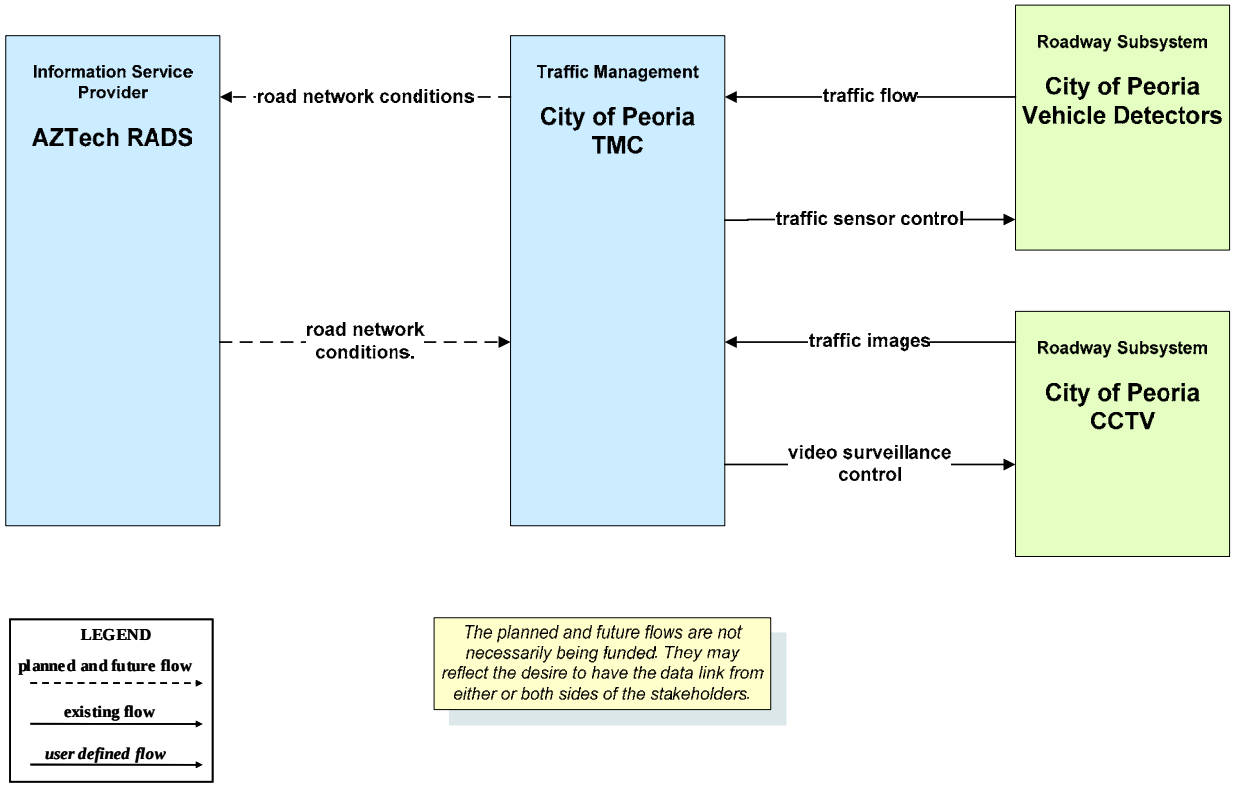


Figure 11: ATMS01 – Network Surveillance:
City of Scottsdale

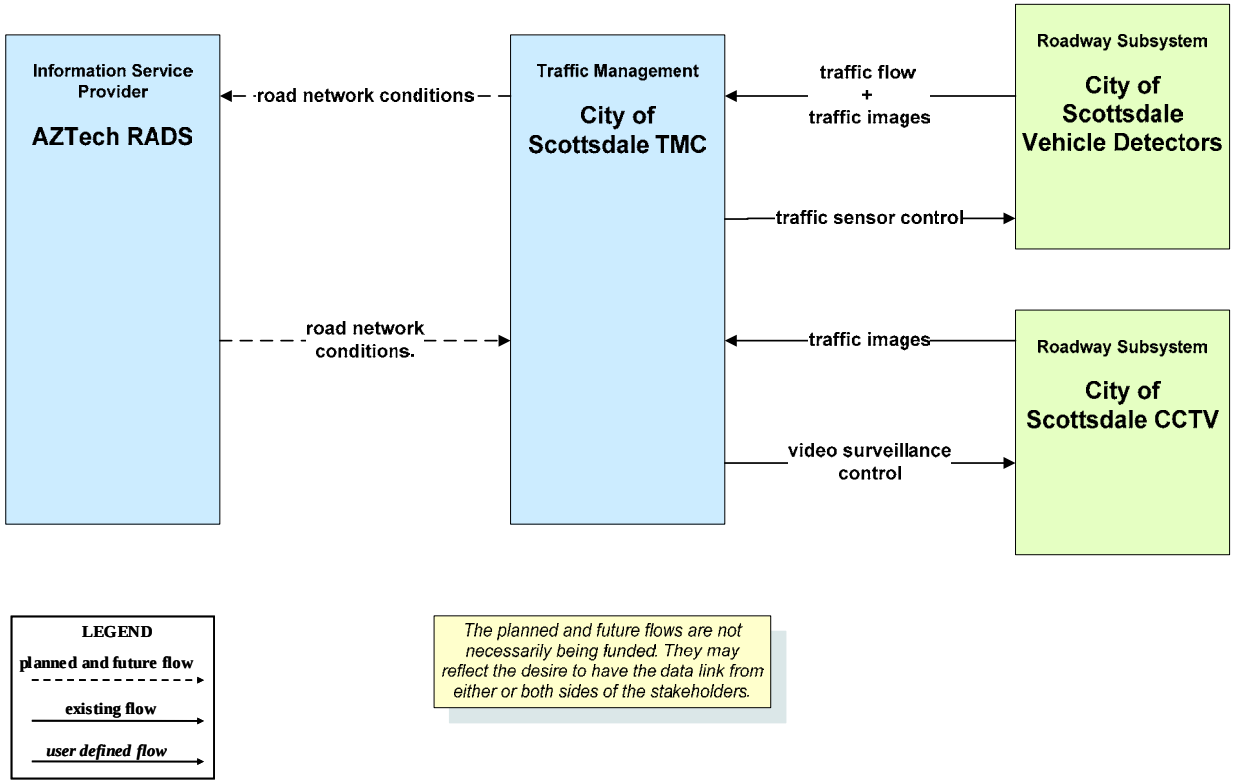


Figure 12: ATMS01 – Network Surveillance: City of Surprise

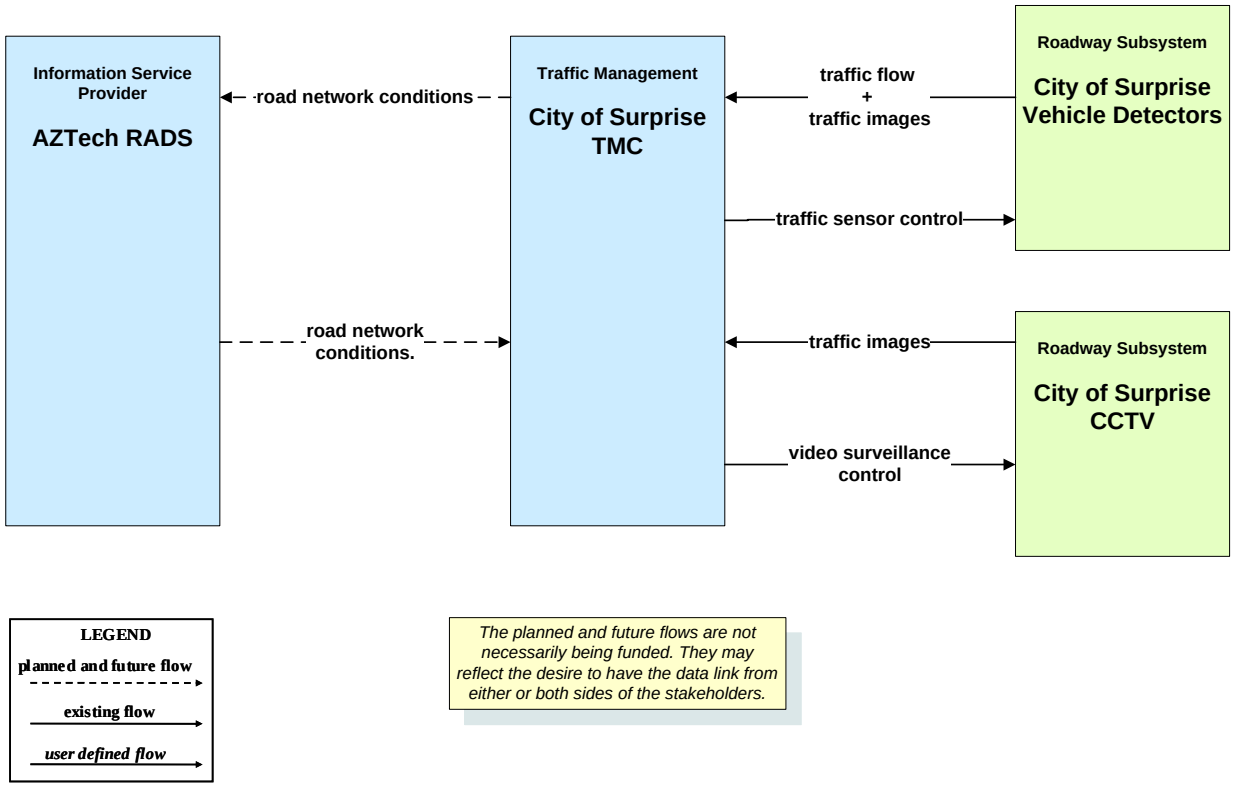


Figure 13: ATMS01 – Network Surveillance: City of Tempe

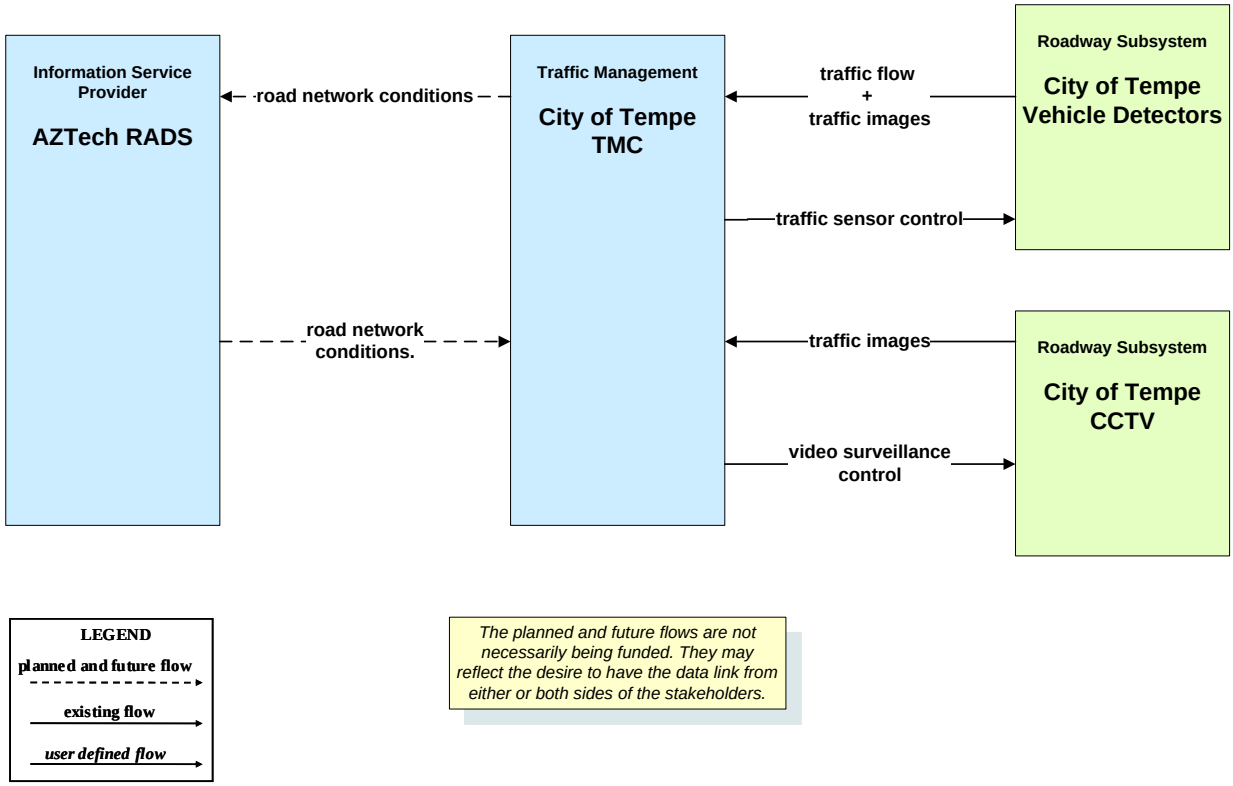


Figure 14: ATMS01 – Network Surveillance:
Local Cities and Municipalities - Generic

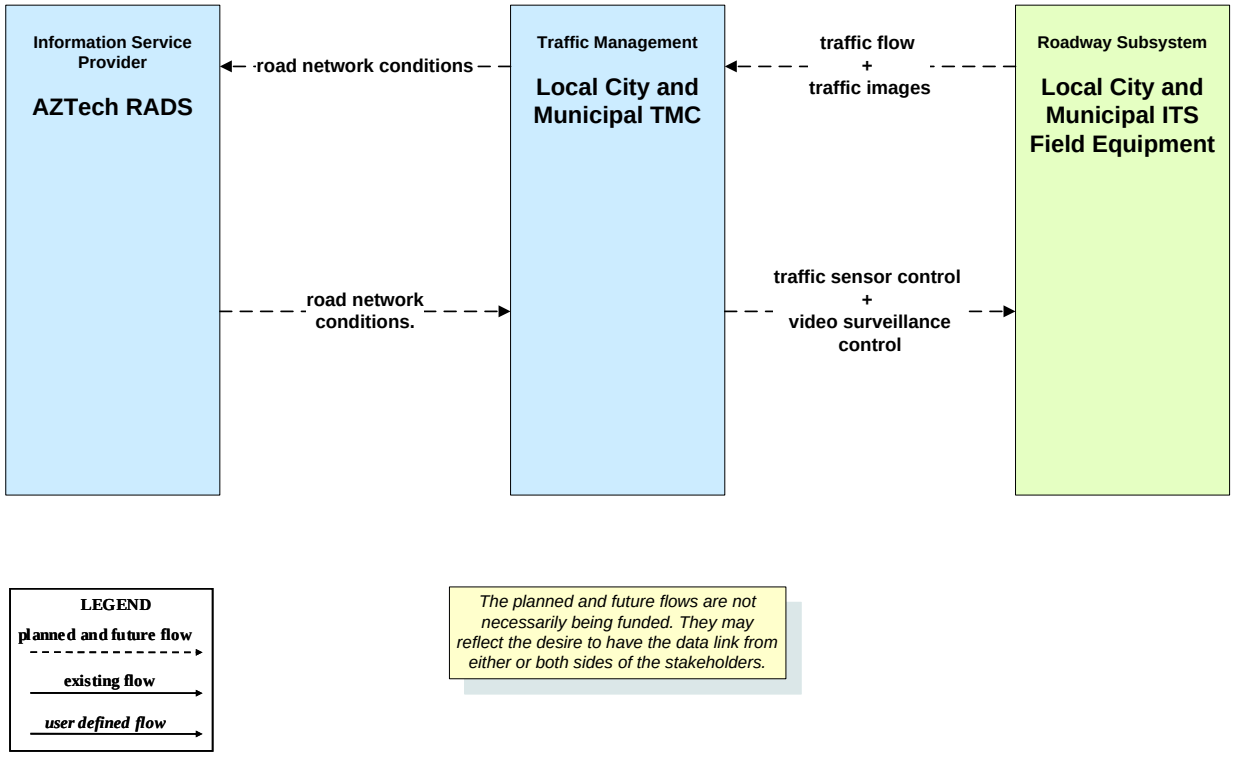


Figure 15: ATMS01 – Network Surveillance: Town of Queen Creek

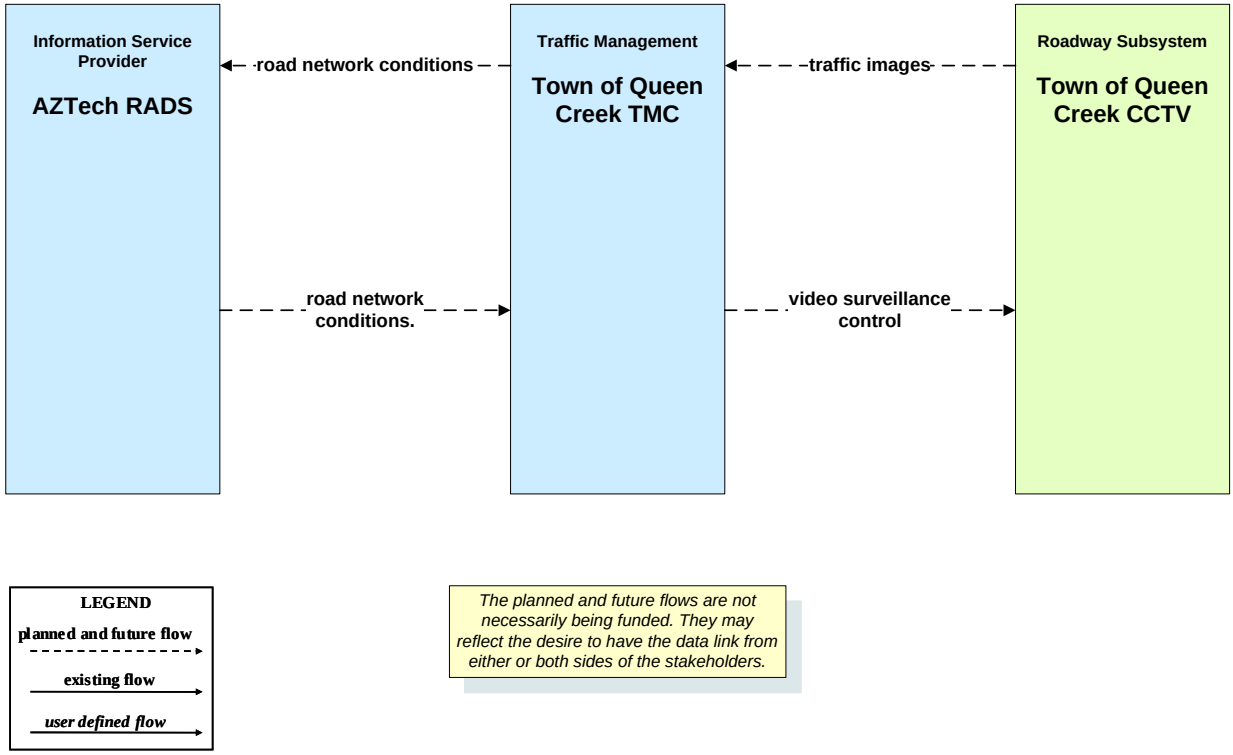


Figure 16: ATMS02 – Probe Surveillance: Valley Metro

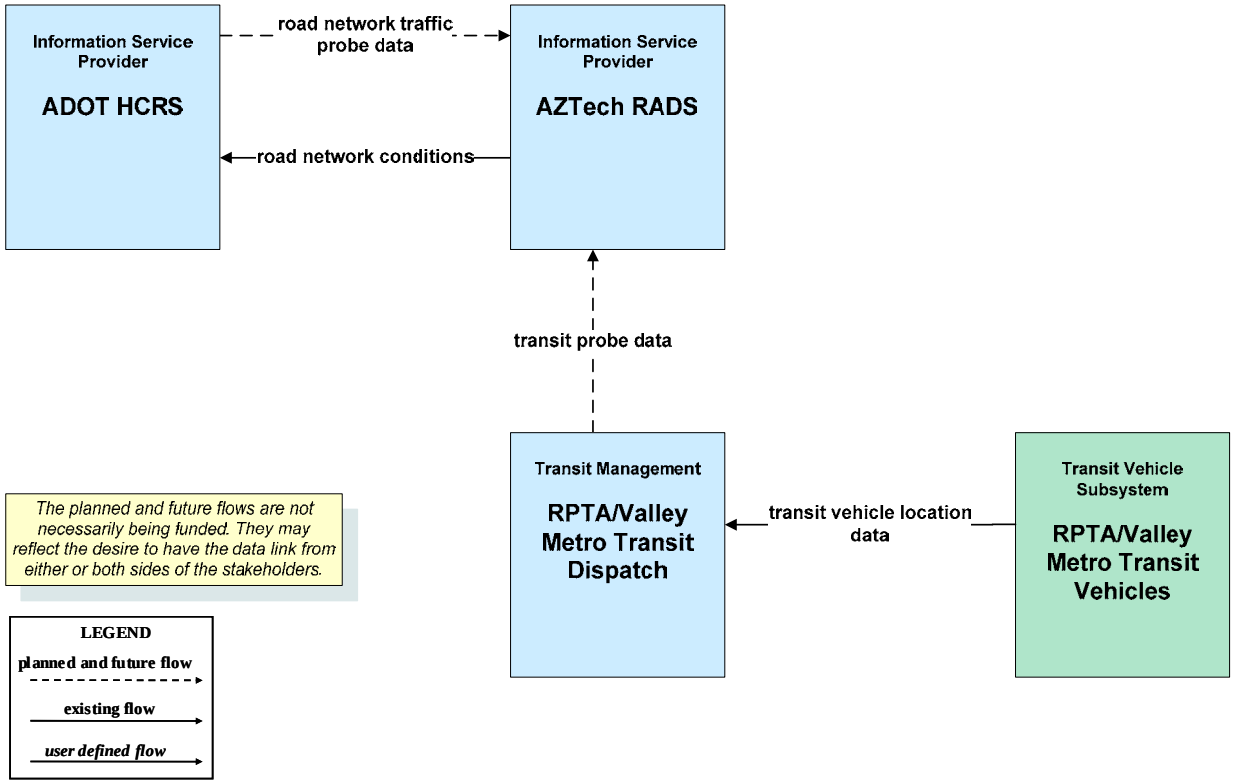


Figure 17: ATMS02 – Probe Surveillance: Traffic Probe Data

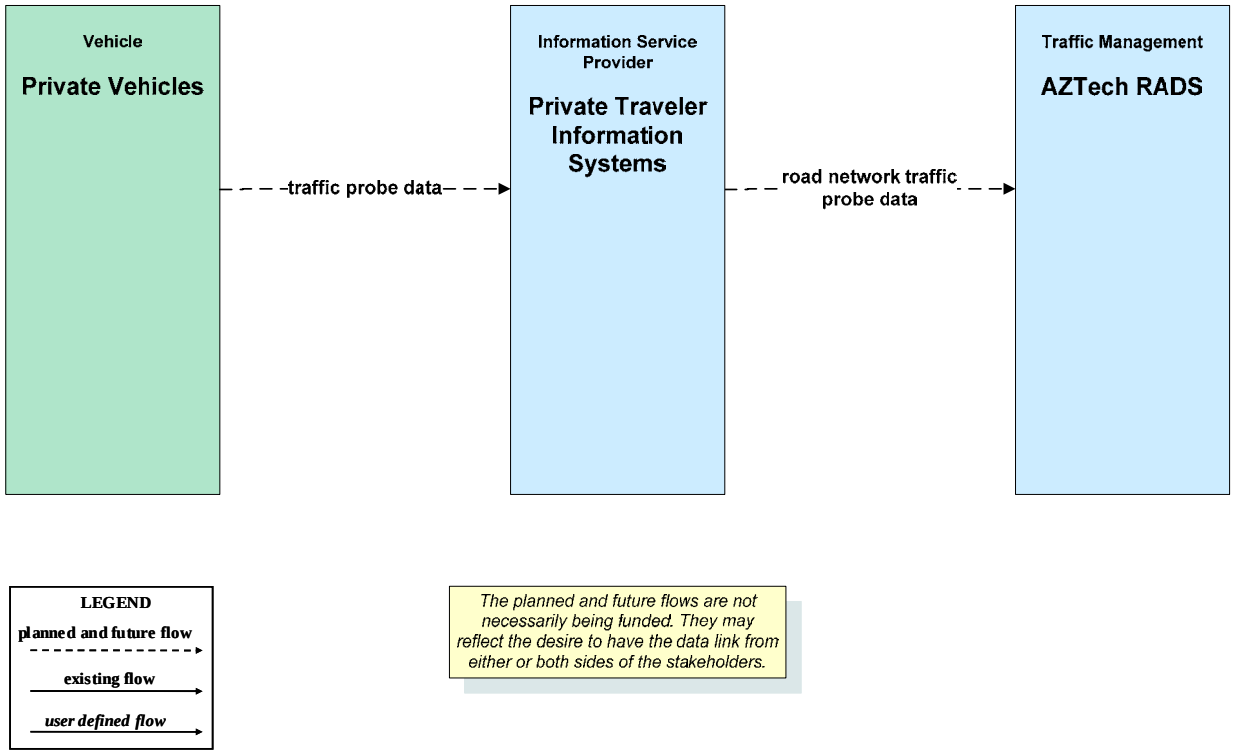


Figure 18: ATMS03 – Surface Street Control: Maricopa County

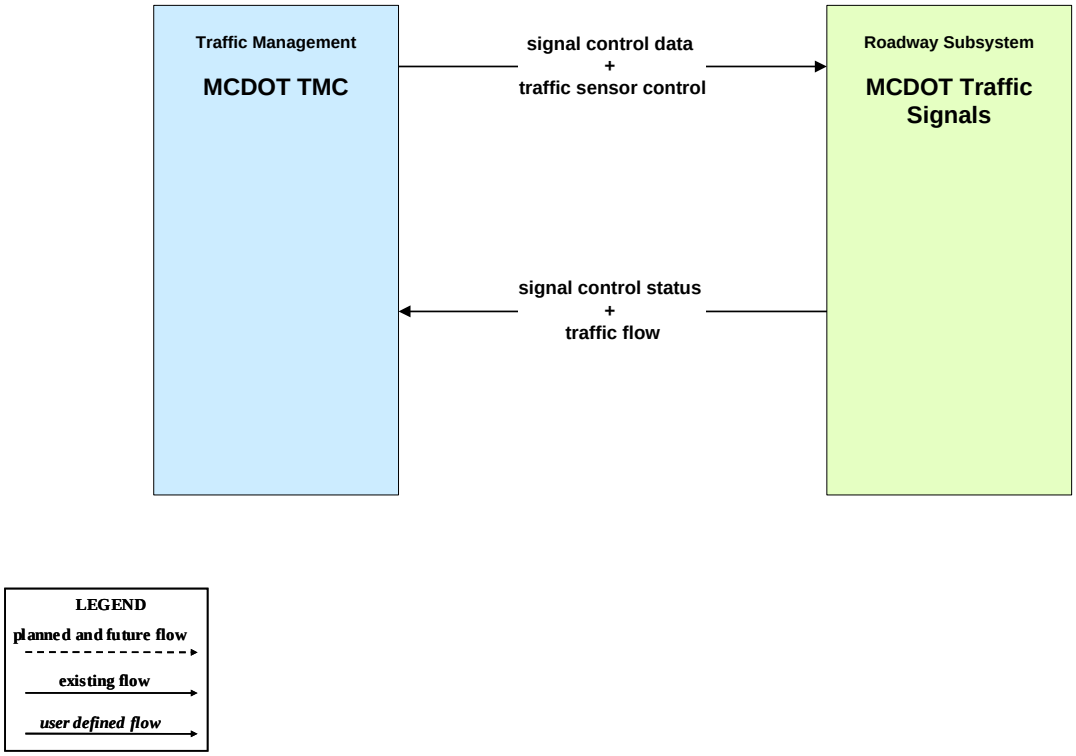


Figure 19: ATMS03 – Surface Street Control: City of Phoenix

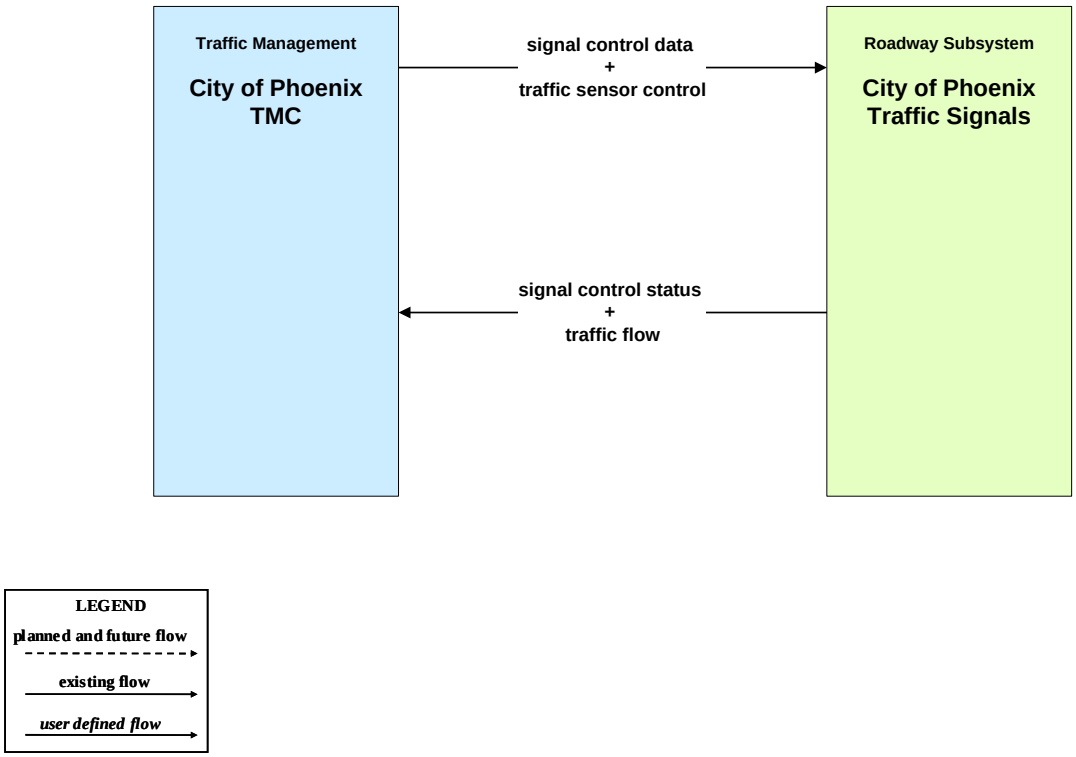


Figure 20: ATMS03 – Surface Street Control: City of Avondale

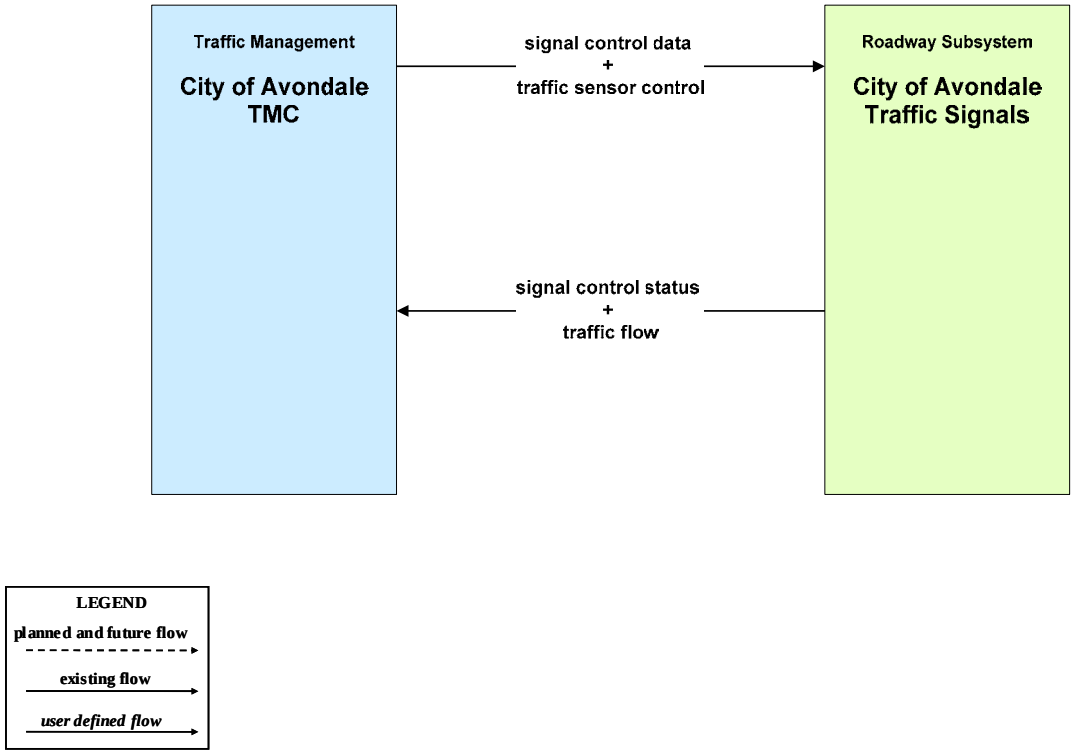


Figure 21: ATMS03 – Surface Street Control: City of Chandler

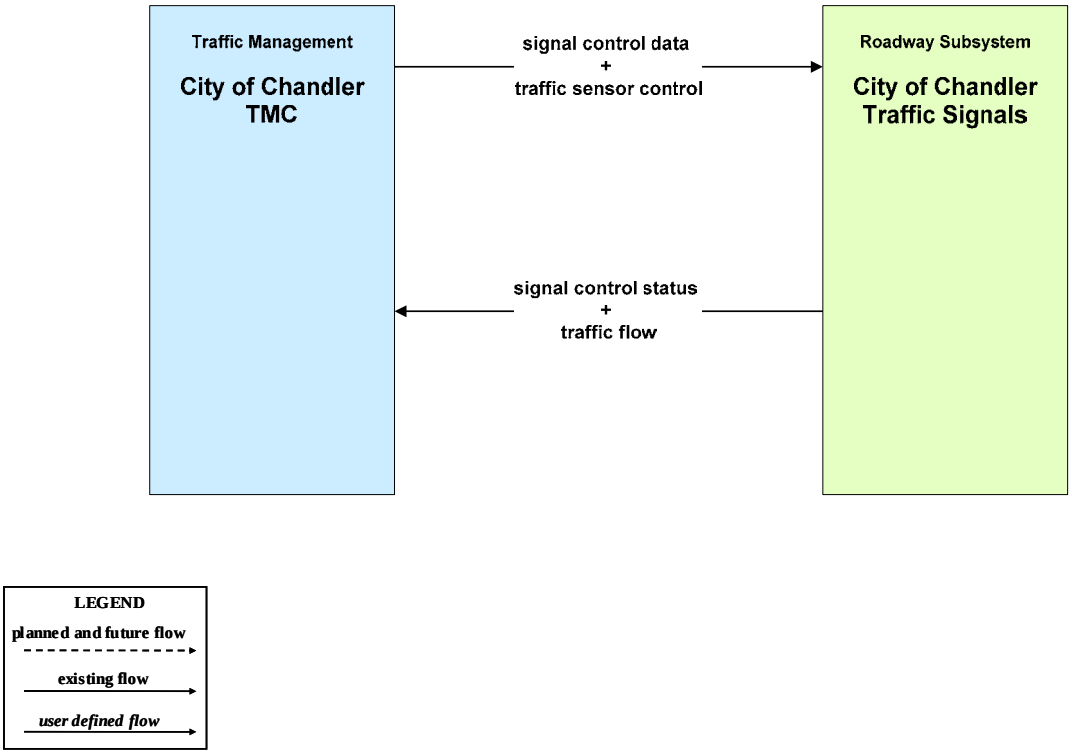


Figure 22: ATMS03 – Surface Street Control: Town of Gilbert

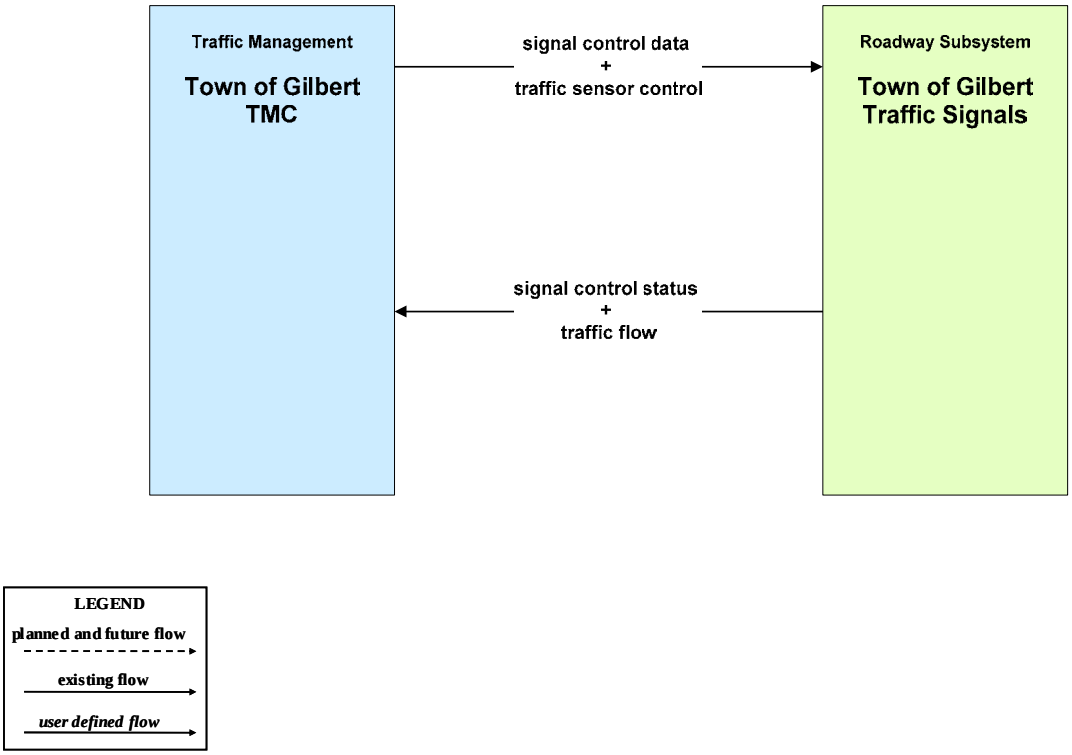


Figure 23: ATMS03 – Surface Street Control: City of Glendale

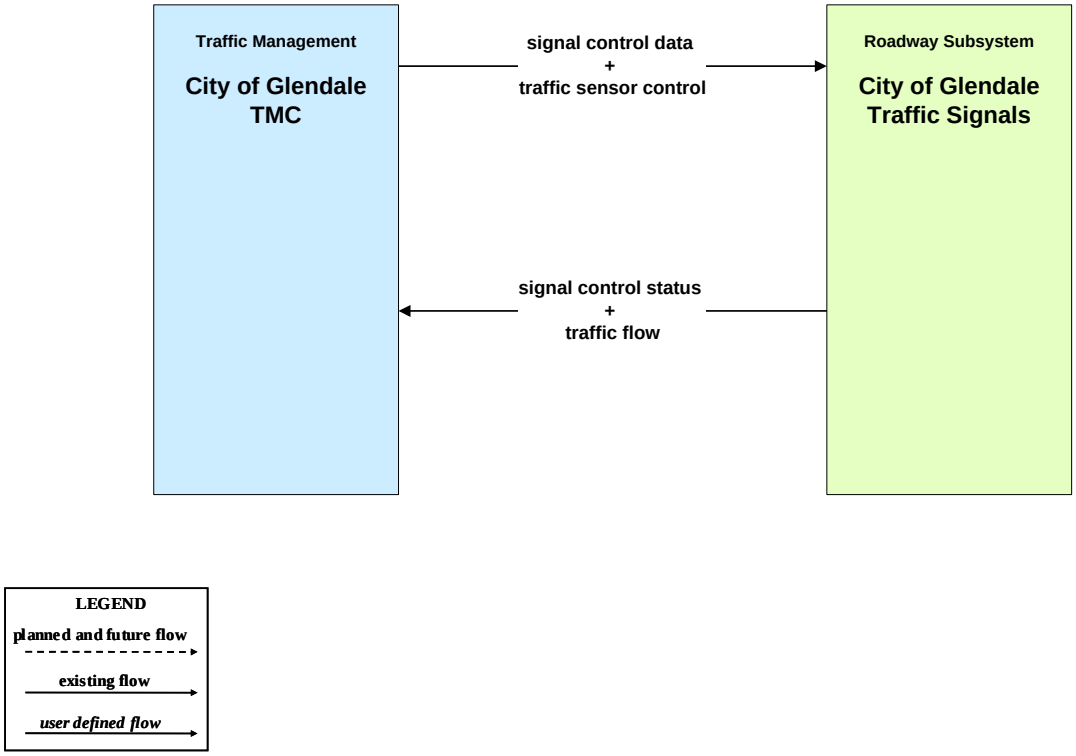


Figure 24: ATMS03 – Surface Street Control: City of Goodyear

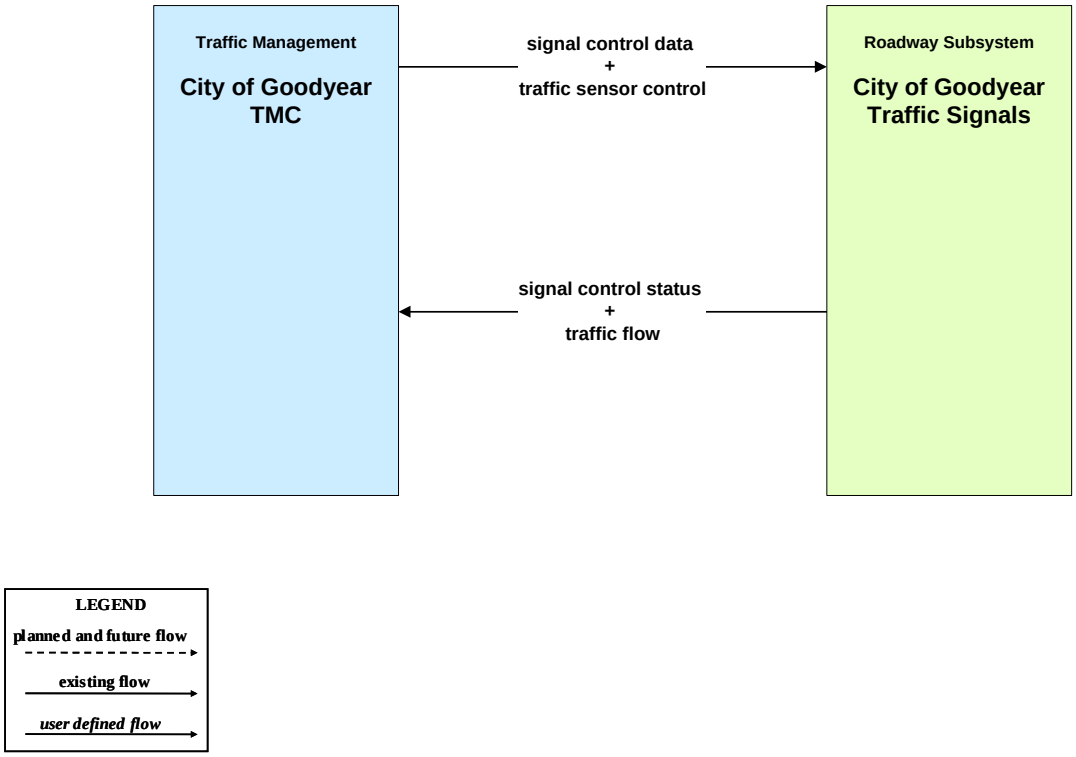


Figure 25: ATMS03 – Surface Street Control: City of Mesa

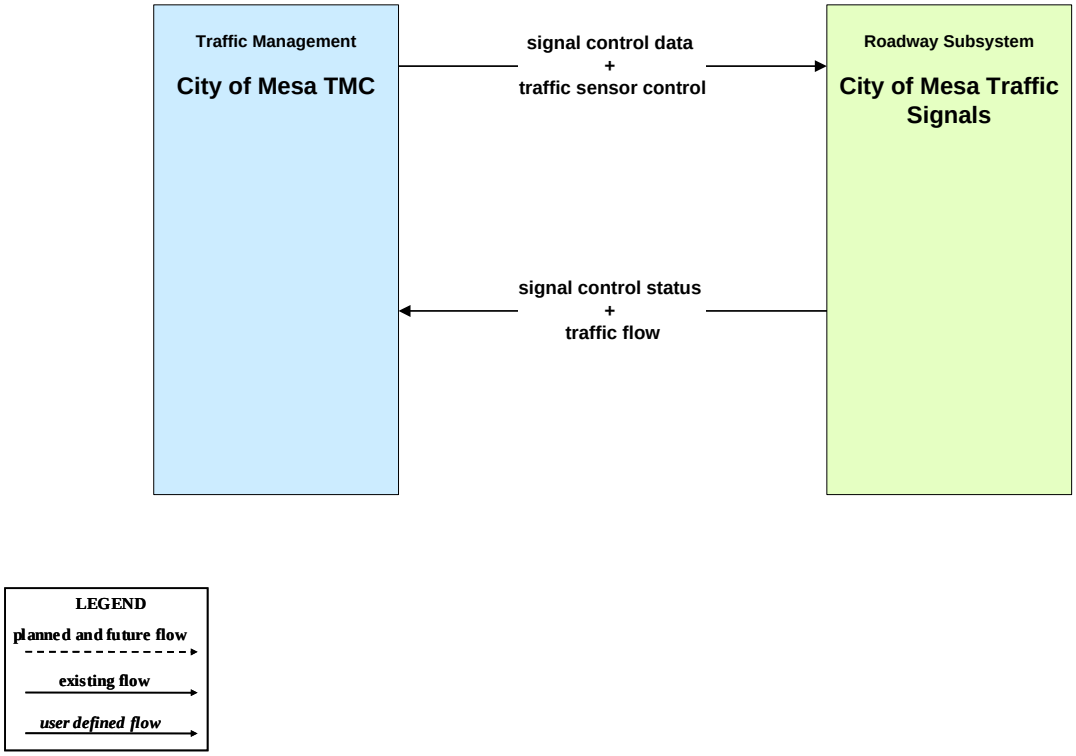
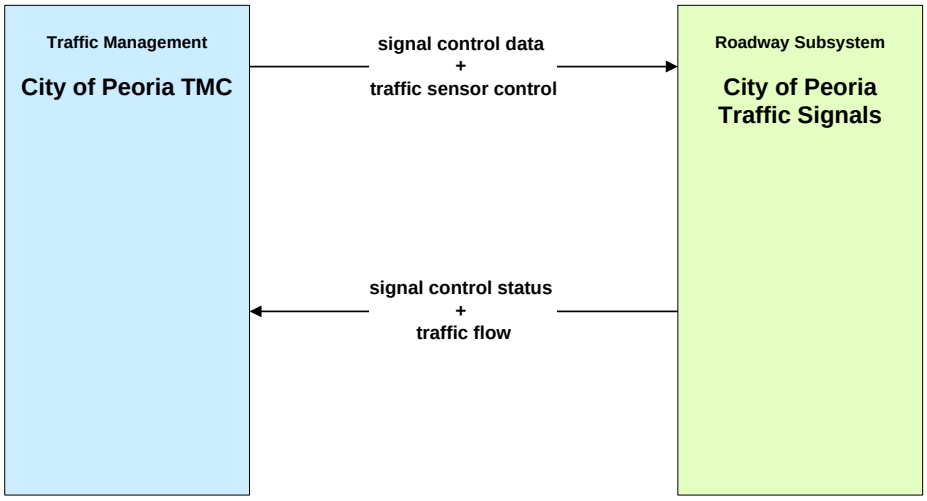


Figure 26: ATMS03 – Surface Street Control: City of Peoria



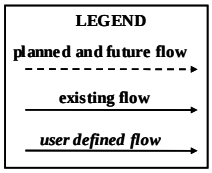


Figure 27: ATMS03 – Surface Street Control: City of Scottsdale

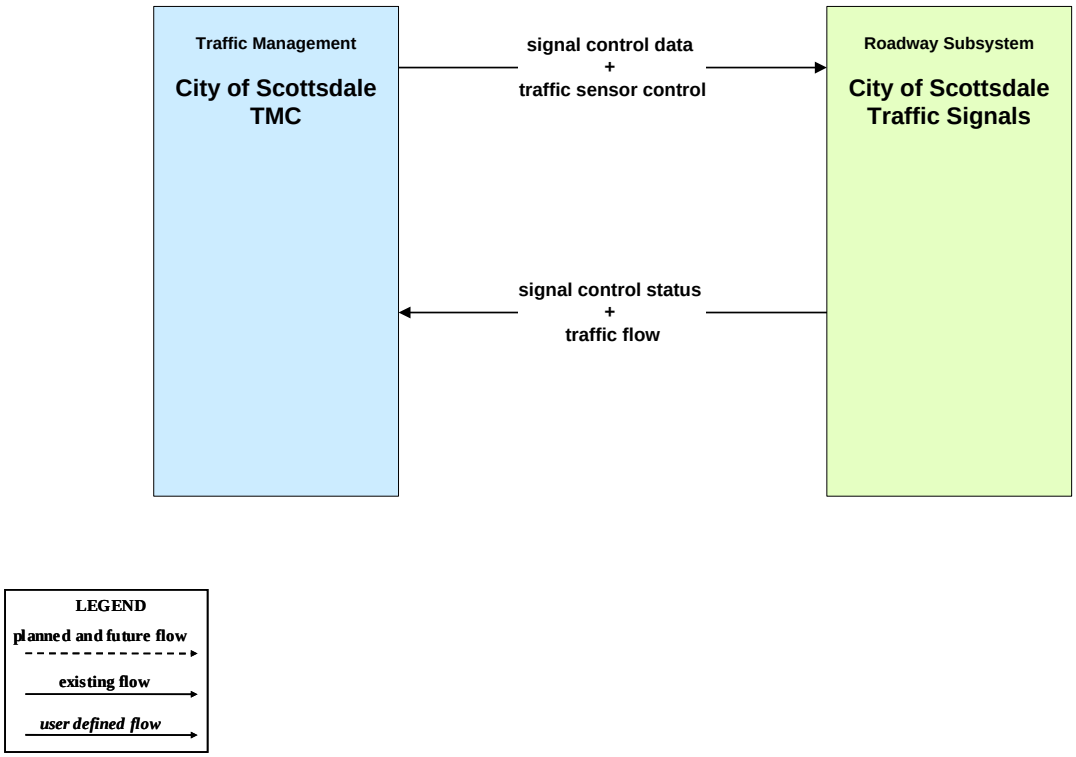


Figure 28: ATMS03 – Surface Street Control: City of Surprise

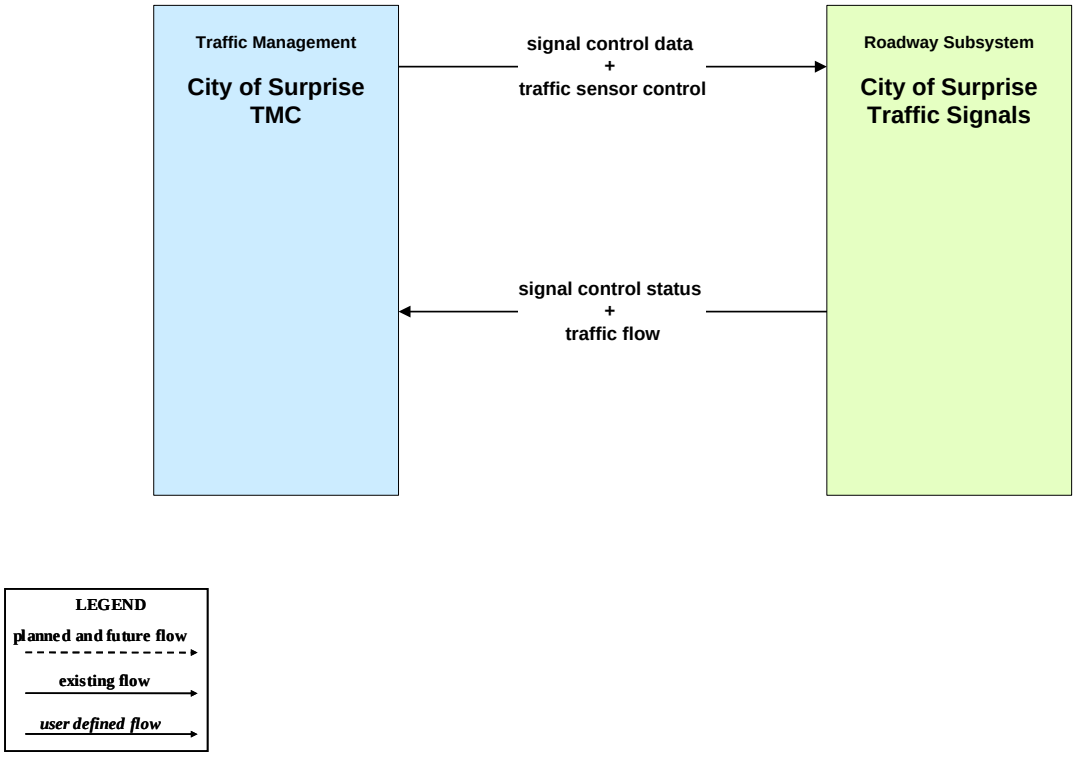


Figure 29: ATMS03 – Surface Street Control: City of Tempe

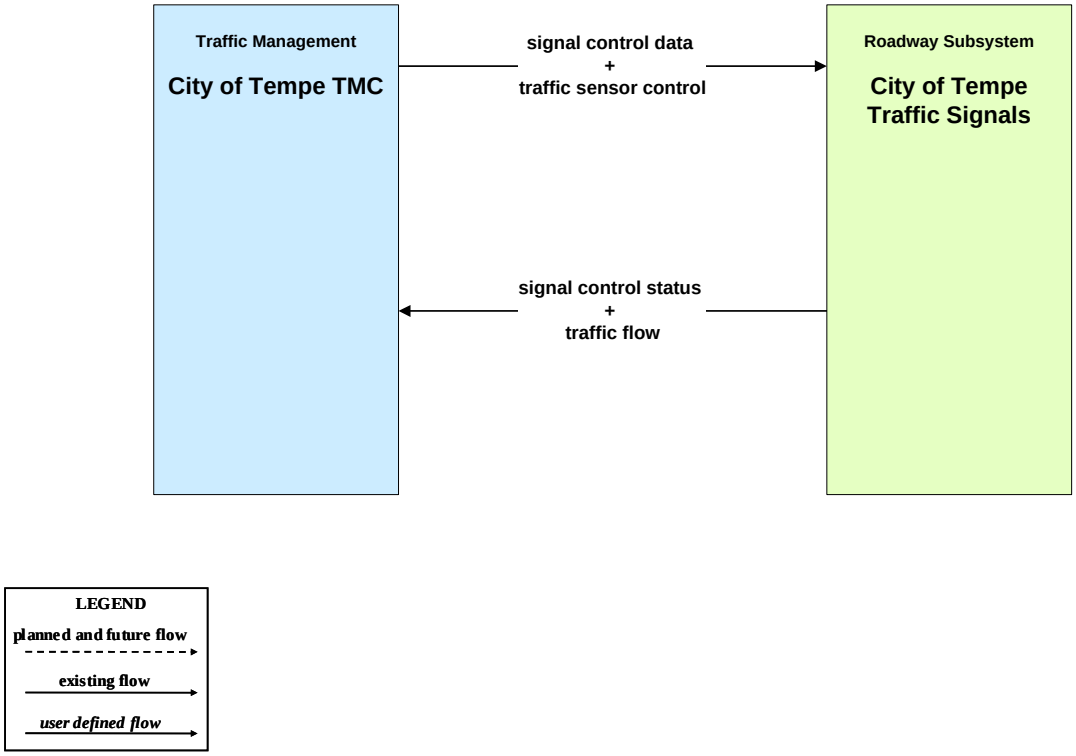


Figure 30: ATMS03 – Surface Street Control: Local Cities and Municipalities - Generic

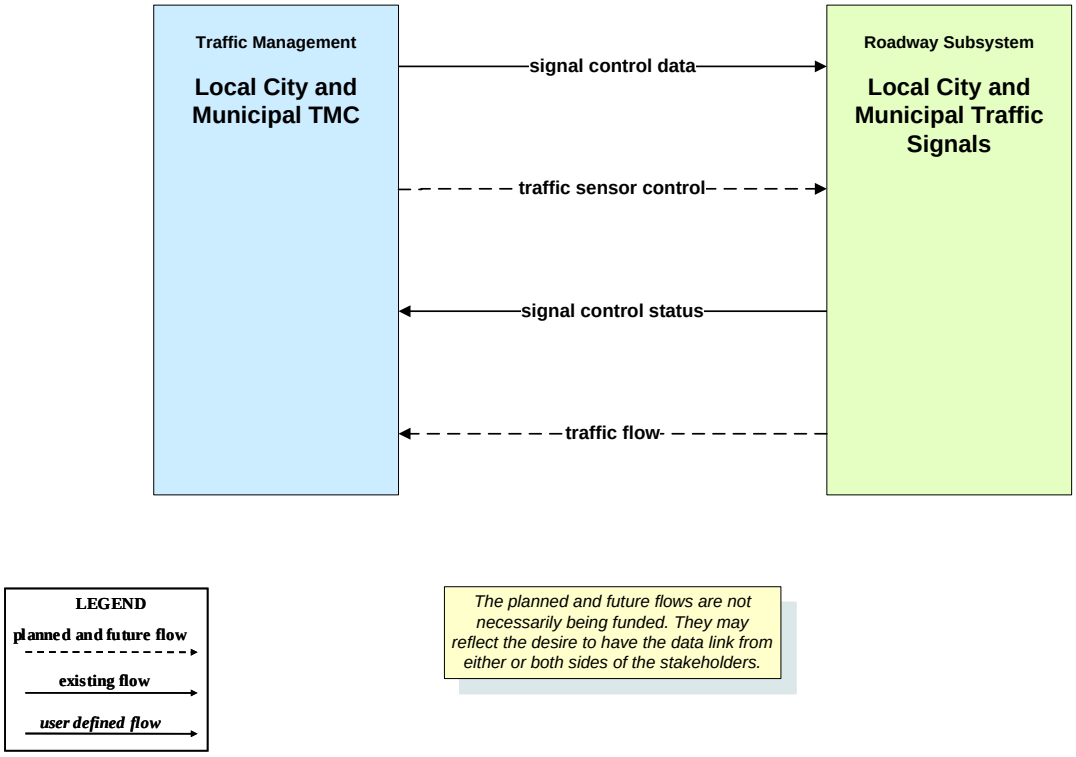
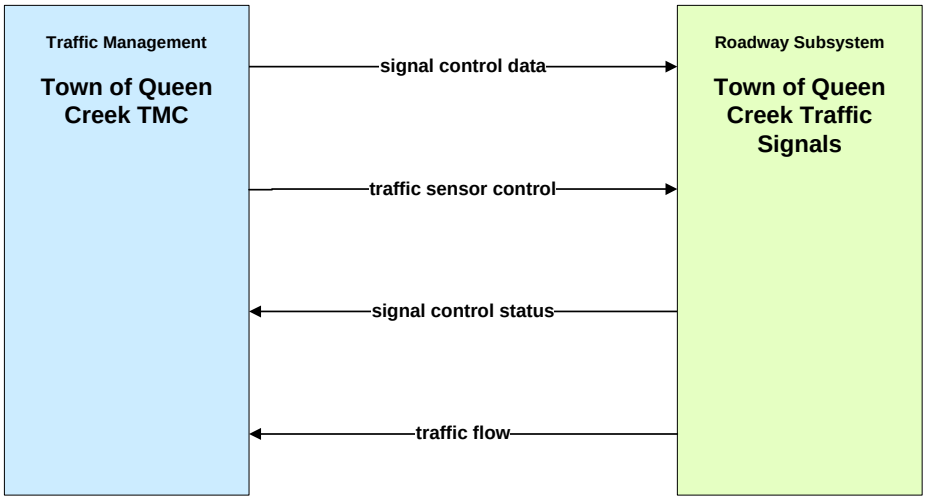


Figure 31: ATMS03 – Surface Street Control: Town of Queen Creek



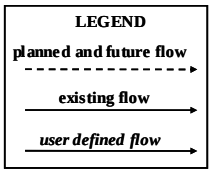
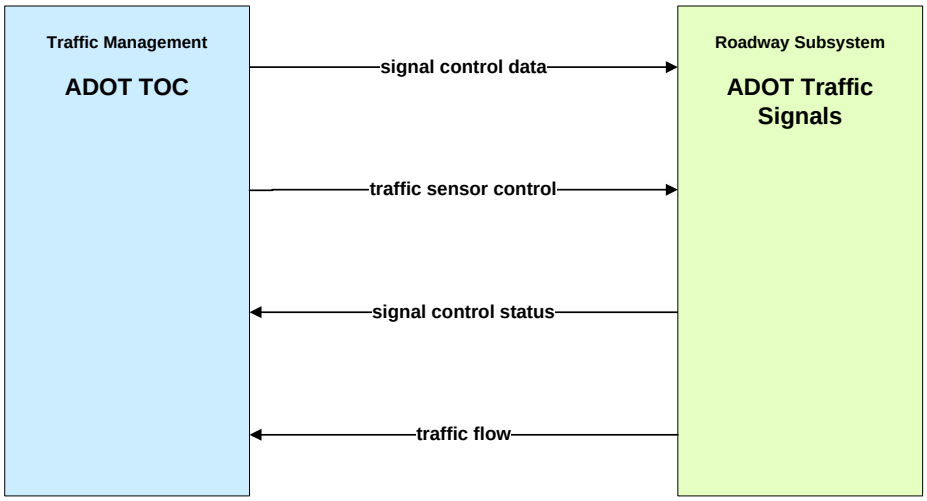


Figure 32: ATMS03 – Surface Street Control: Arizona DOT



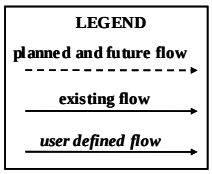


Figure 33: ATMS04 – Freeway Control: Arizona DOT

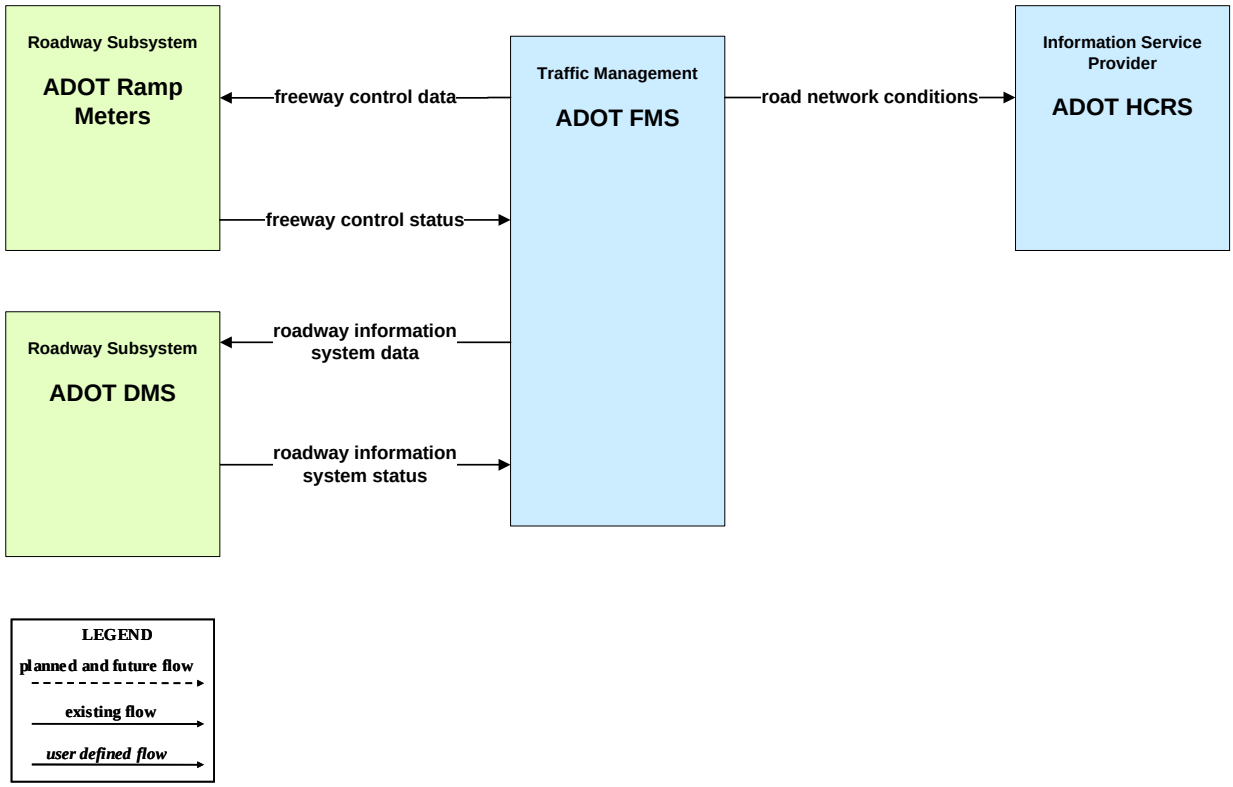


Figure 34: ATMS06 – Traffic Information Dissemination: Arizona DOT

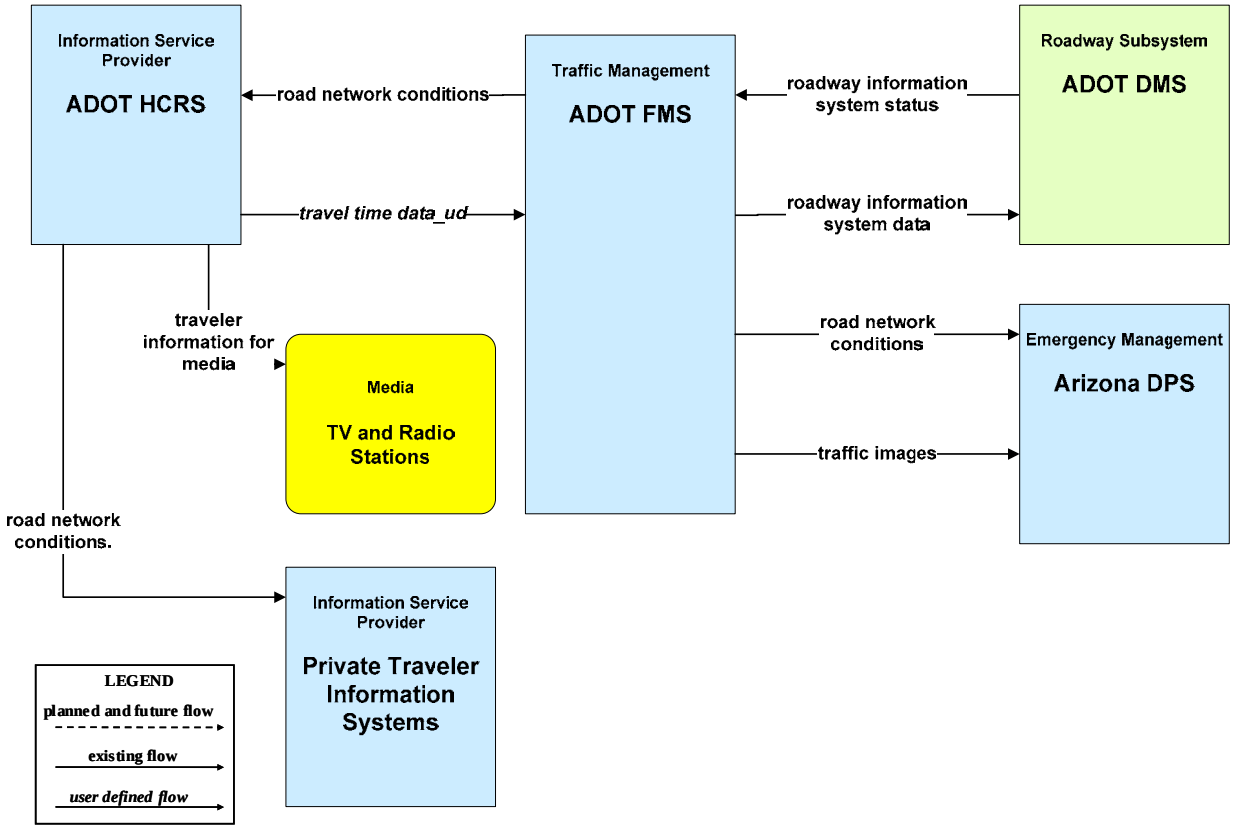


Figure 35: ATMS06 – Traffic Information Dissemination: Maricopa County

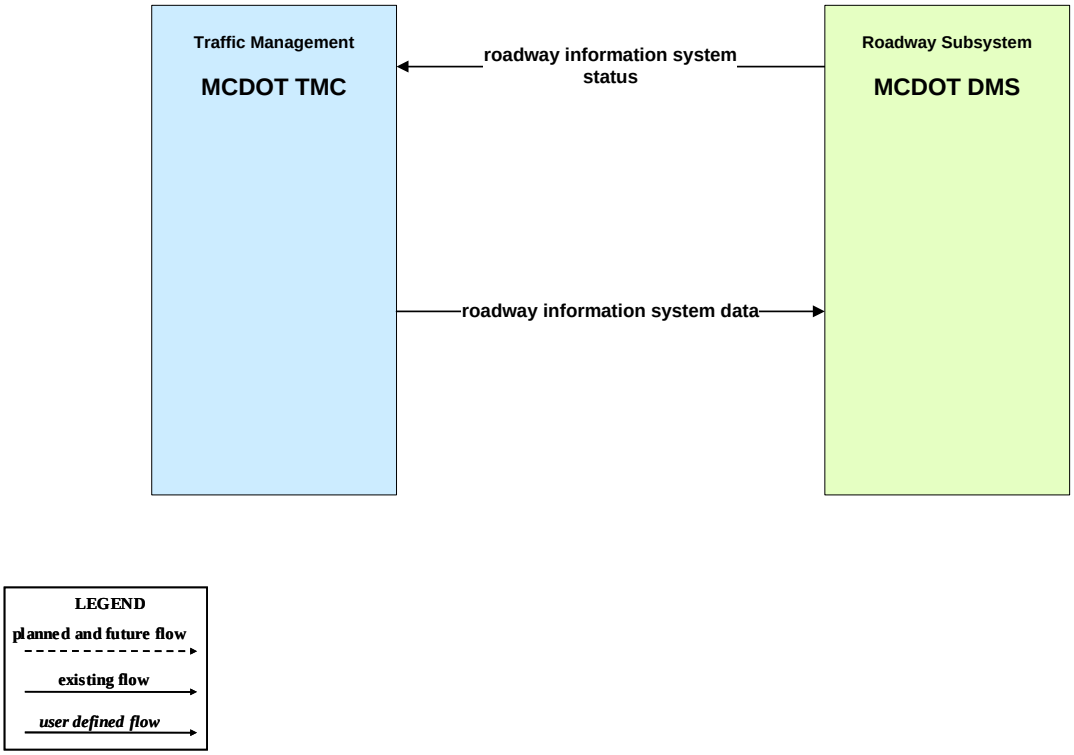


Figure 36: ATMS06 – Traffic Information Dissemination: City of Phoenix

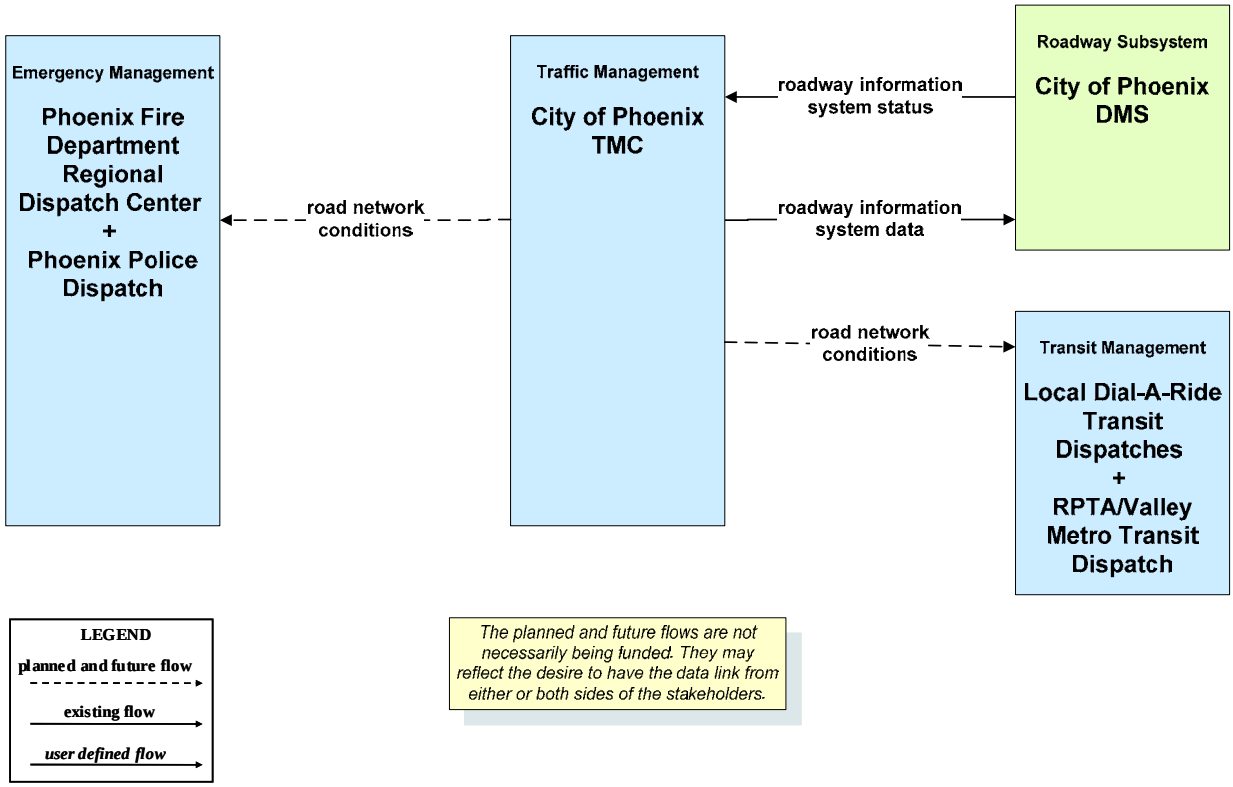


Figure 37: ATMS06 – Traffic Information Dissemination: City of Avondale

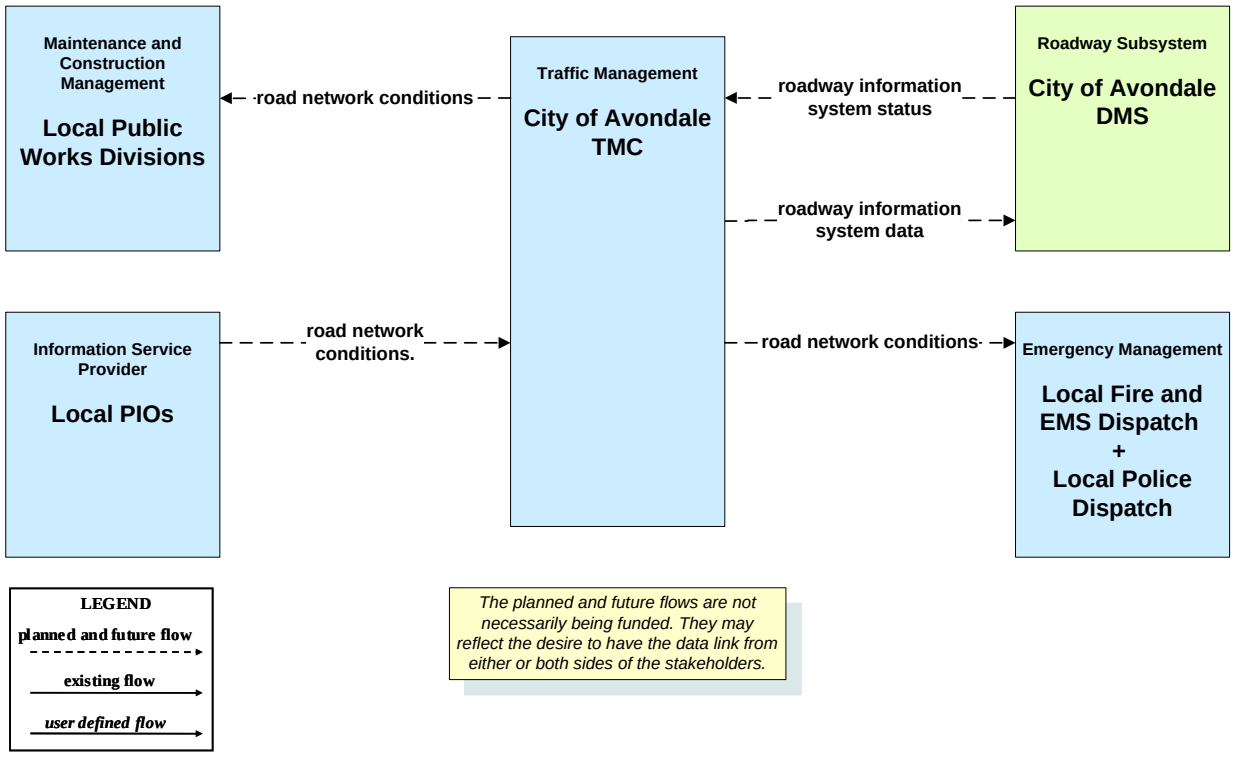


Figure 38: ATMS06 – Traffic Information Dissemination: City of Chandler

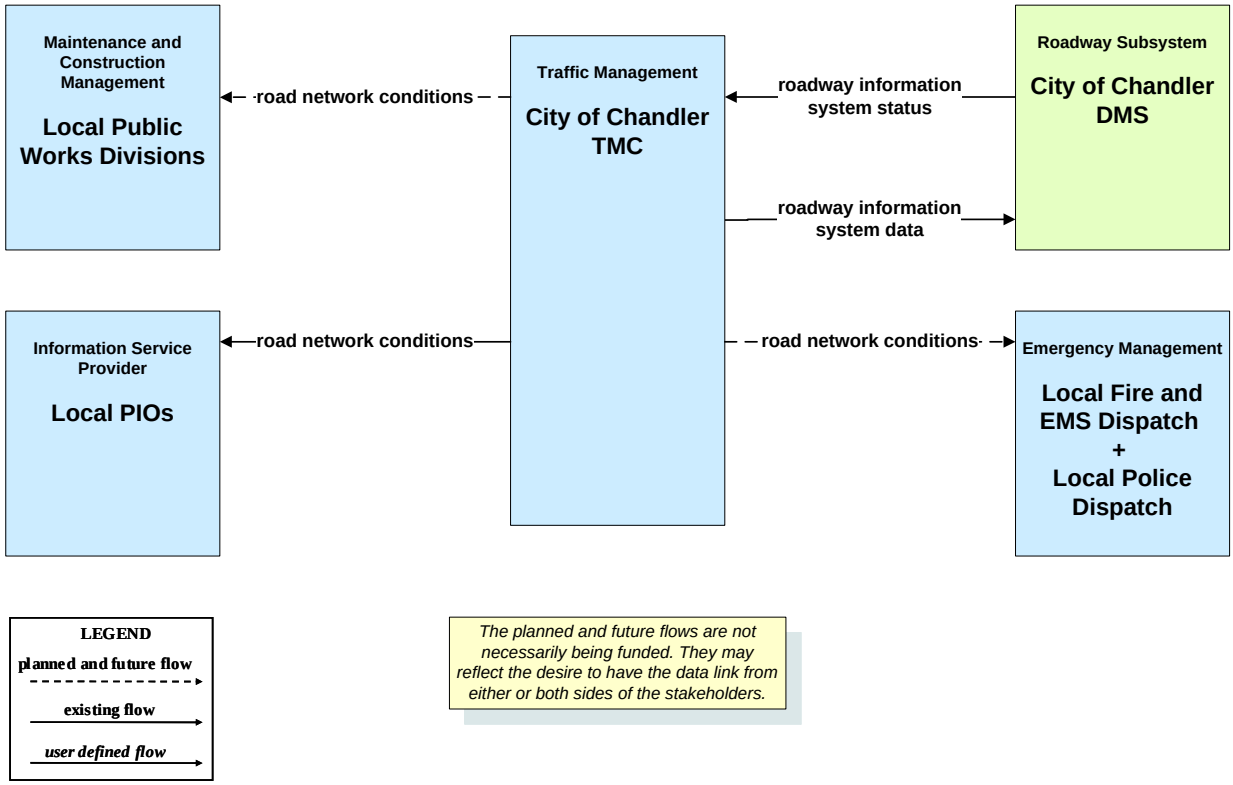


Figure 39: ATMS06 – Traffic Information Dissemination: Town of Gilbert

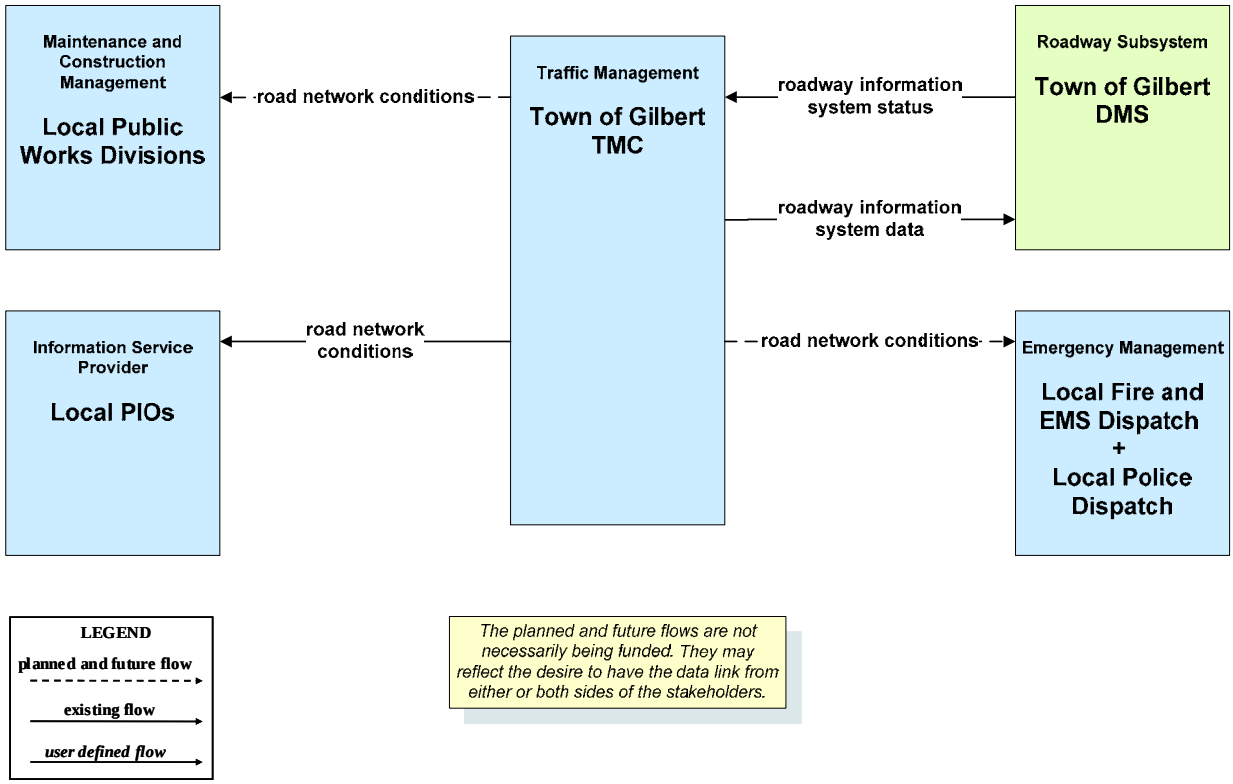


Figure 40: ATMS06 – Traffic Information Dissemination: City of Glendale

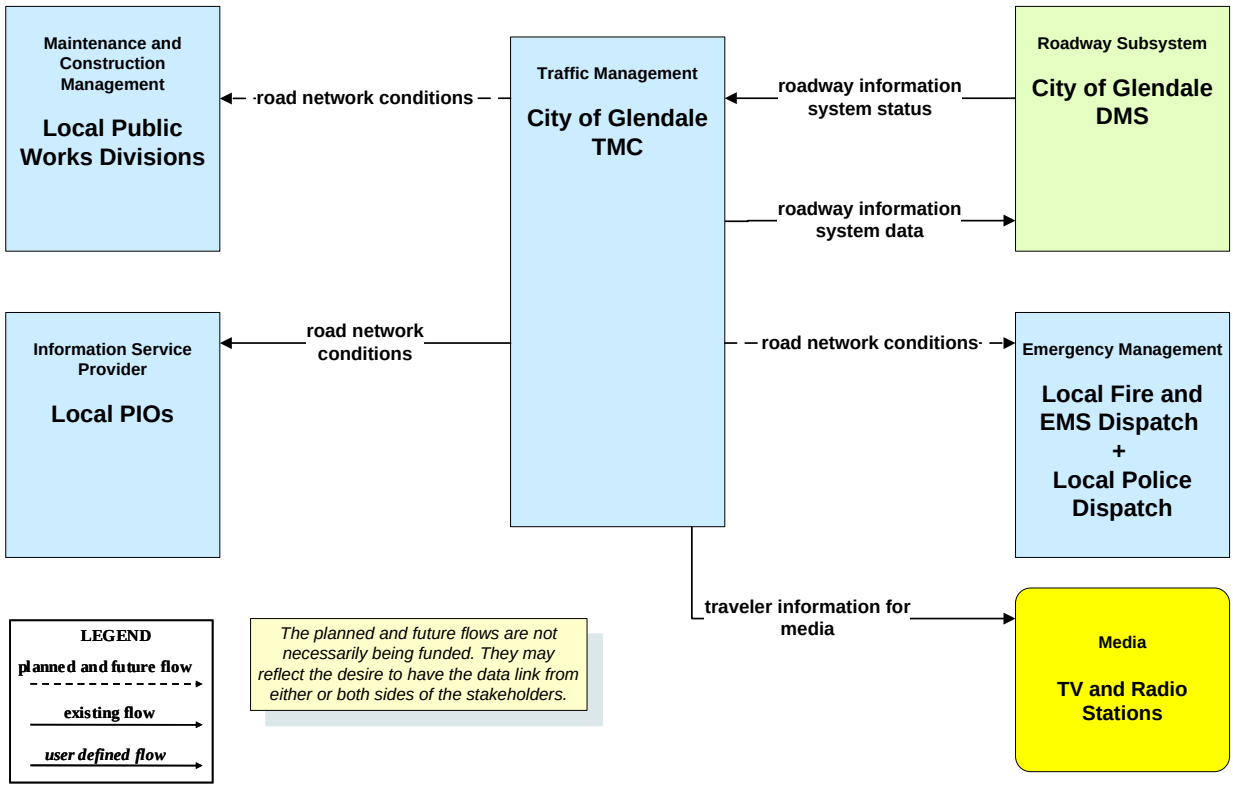


Figure 41: ATMS06 – Traffic Information Dissemination: City of Goodyear

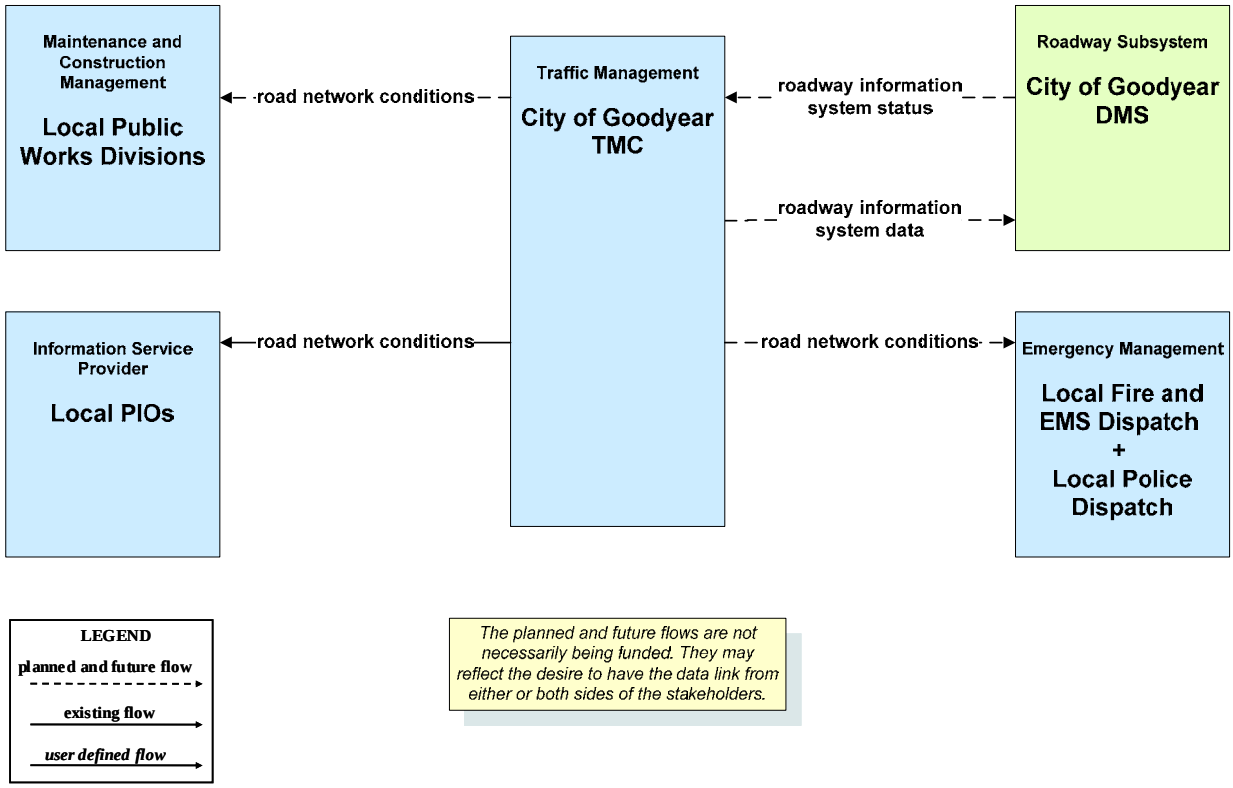


Figure 42: ATMS06 – Traffic Information Dissemination: City of Mesa

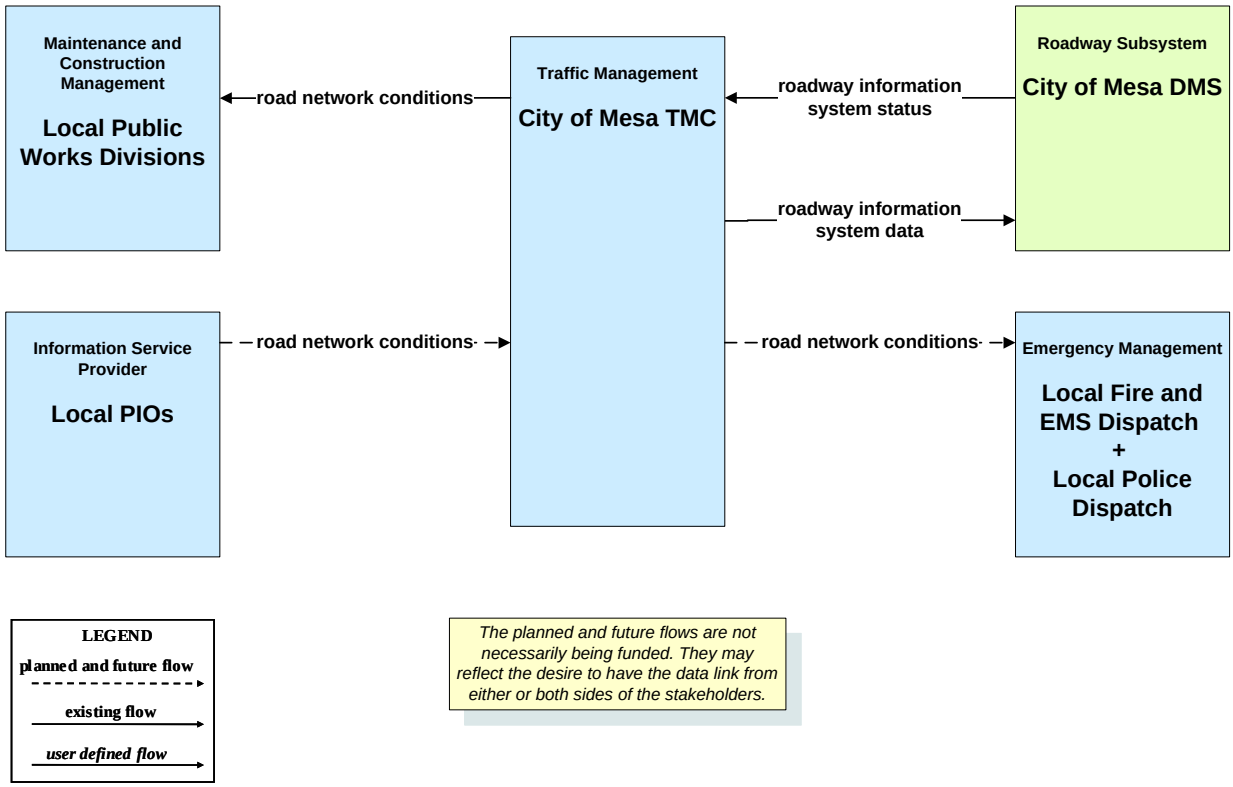


Figure 43: ATMS06 – Traffic Information Dissemination: City of Peoria

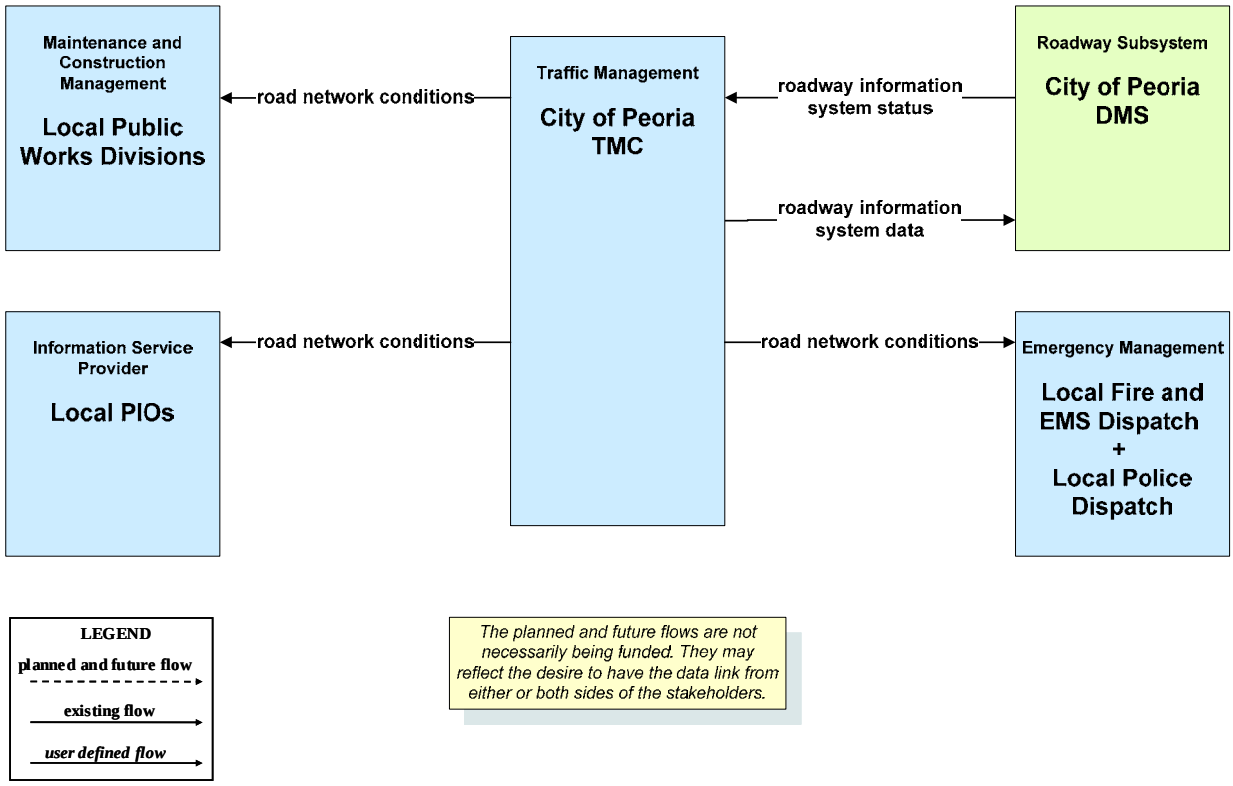


Figure 44: ATMS06 – Traffic Information Dissemination: City of Scottsdale

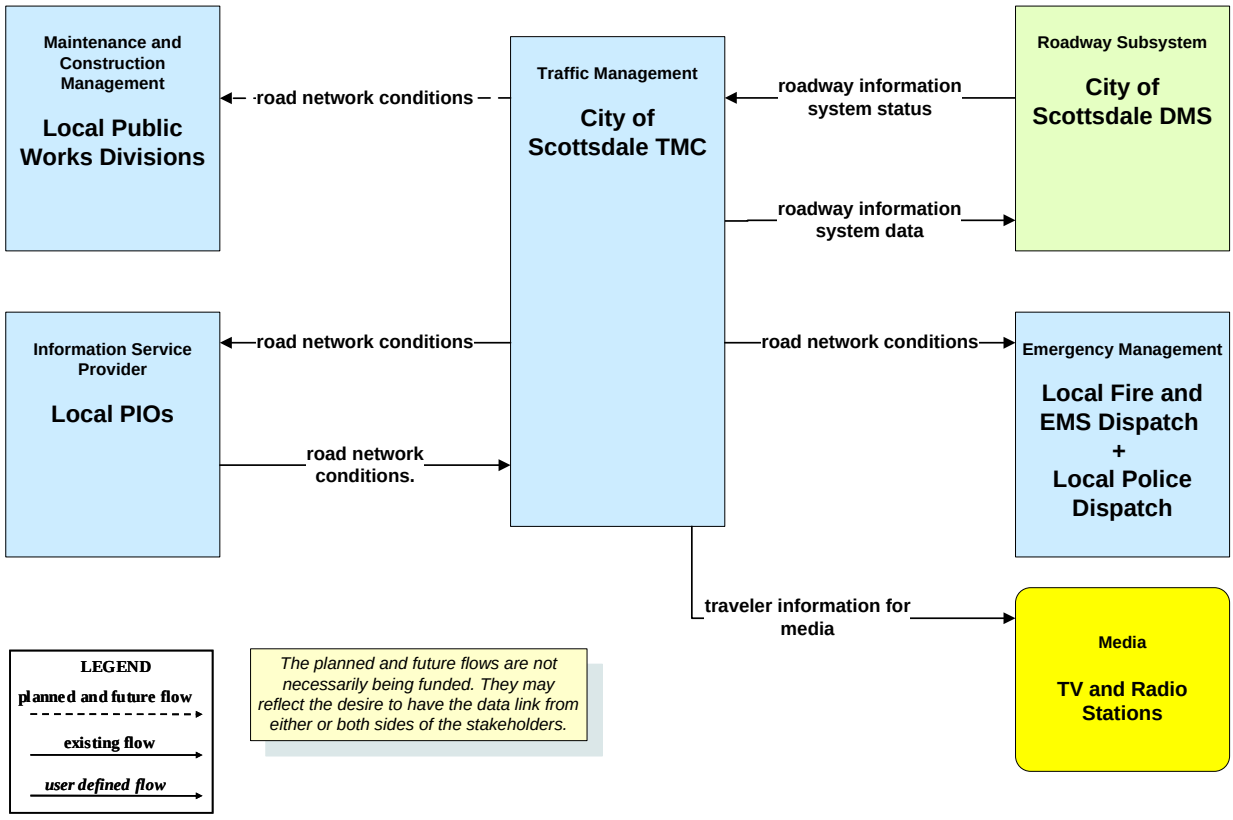


Figure 45: ATMS06 – Traffic Information Dissemination: City of Surprise

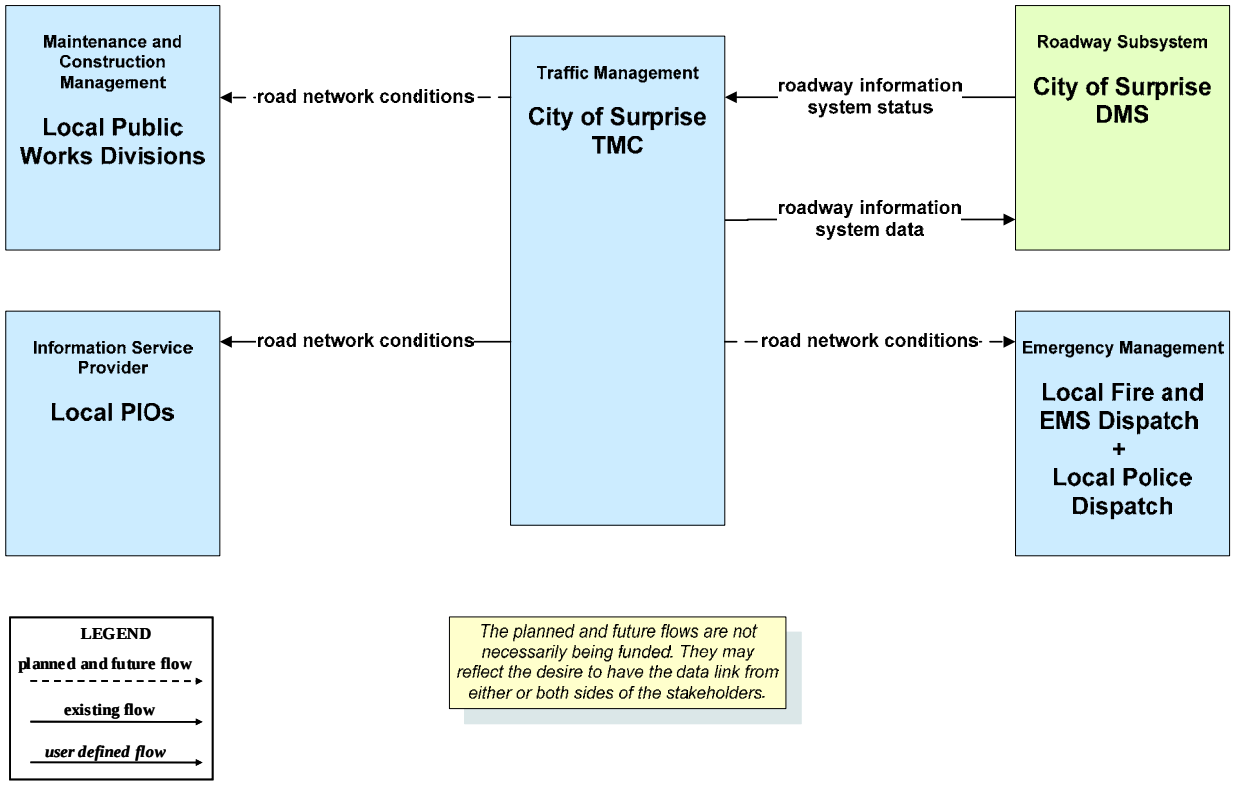


Figure 46: ATMS06 – Traffic Information Dissemination: City of Tempe

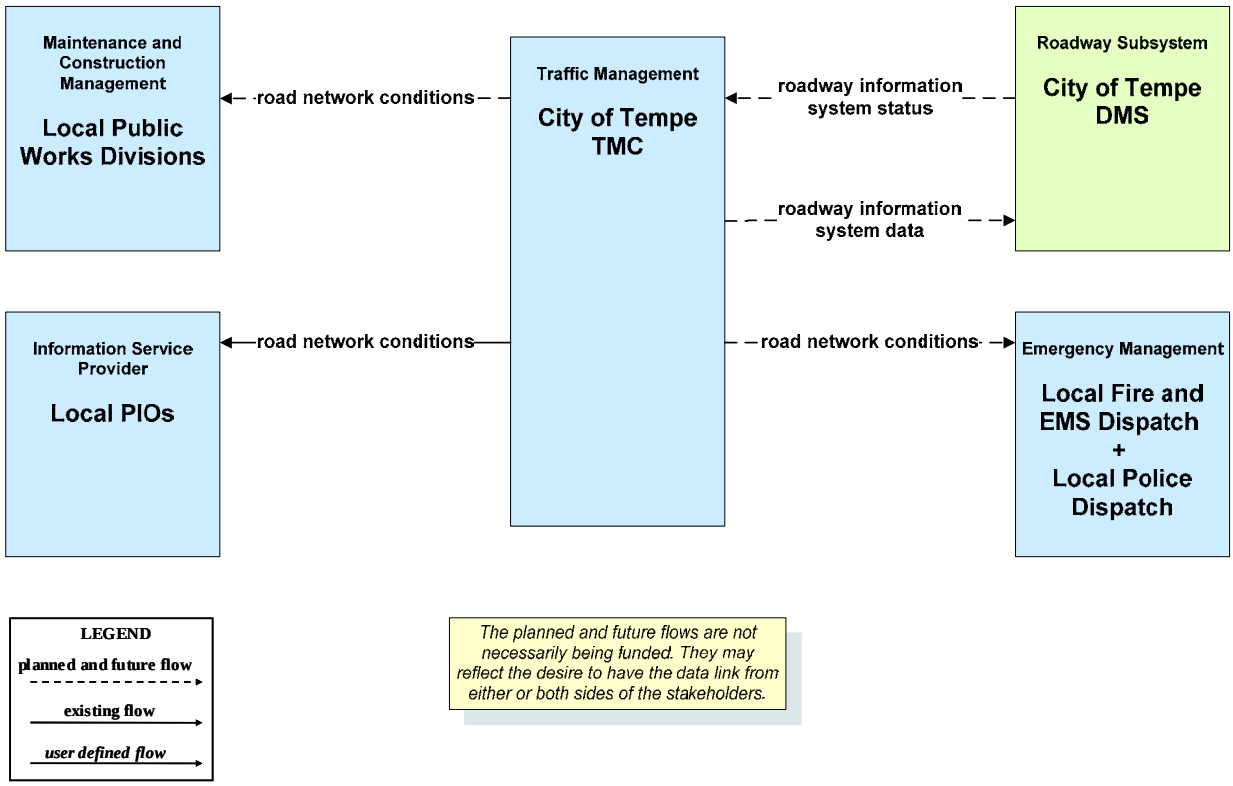


Figure 47: ATMS06 – Traffic Information Dissemination: Local Cities and Municipalities - Generic

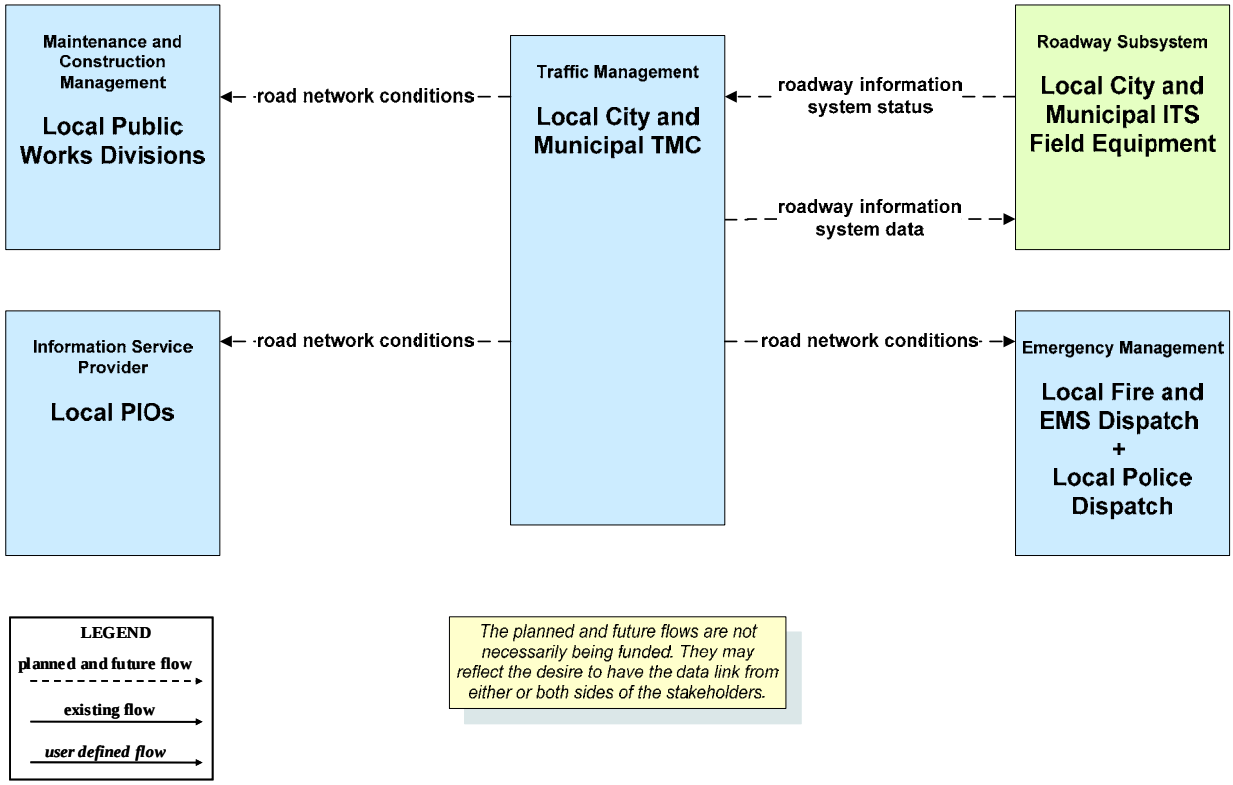


Figure 48: ATMS07 – Regional Traffic Management: AZTech C2C TMS Network

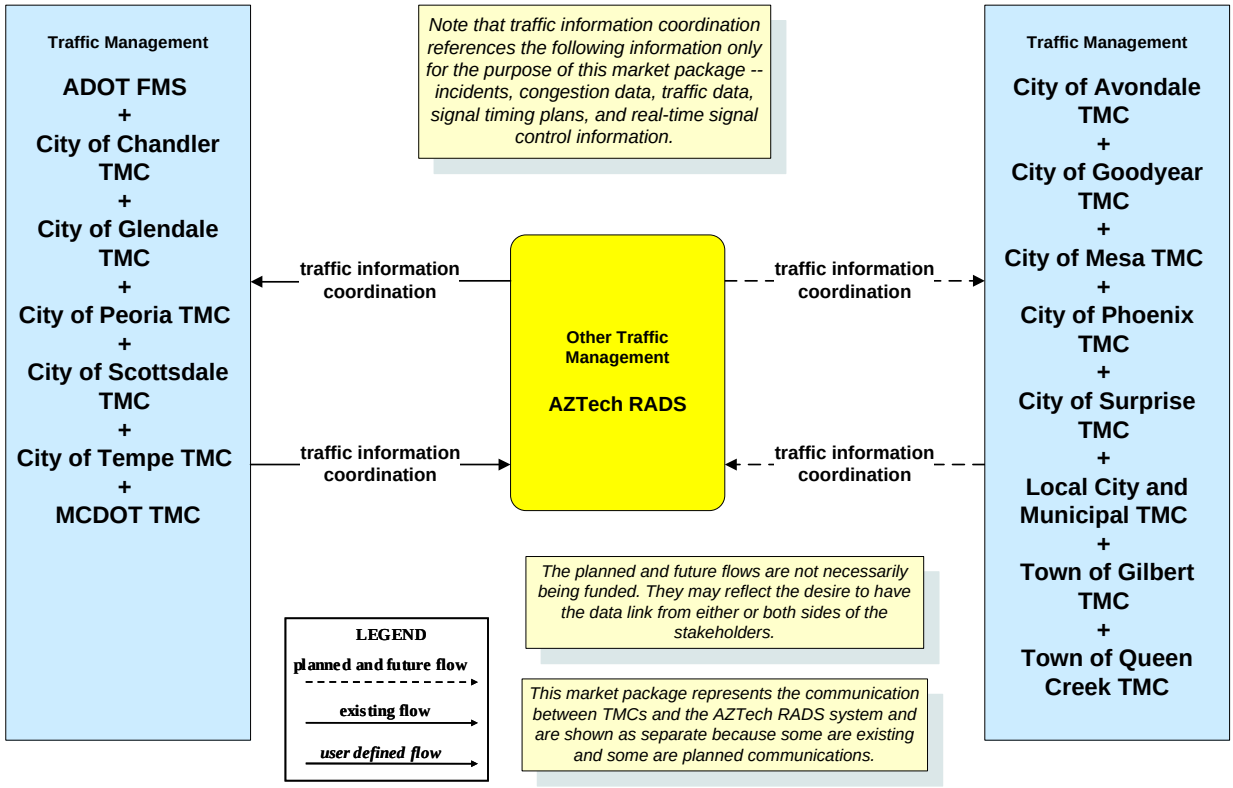


Figure 49: ATMS07 – Regional Traffic Management: AZTech C2C DMS Network

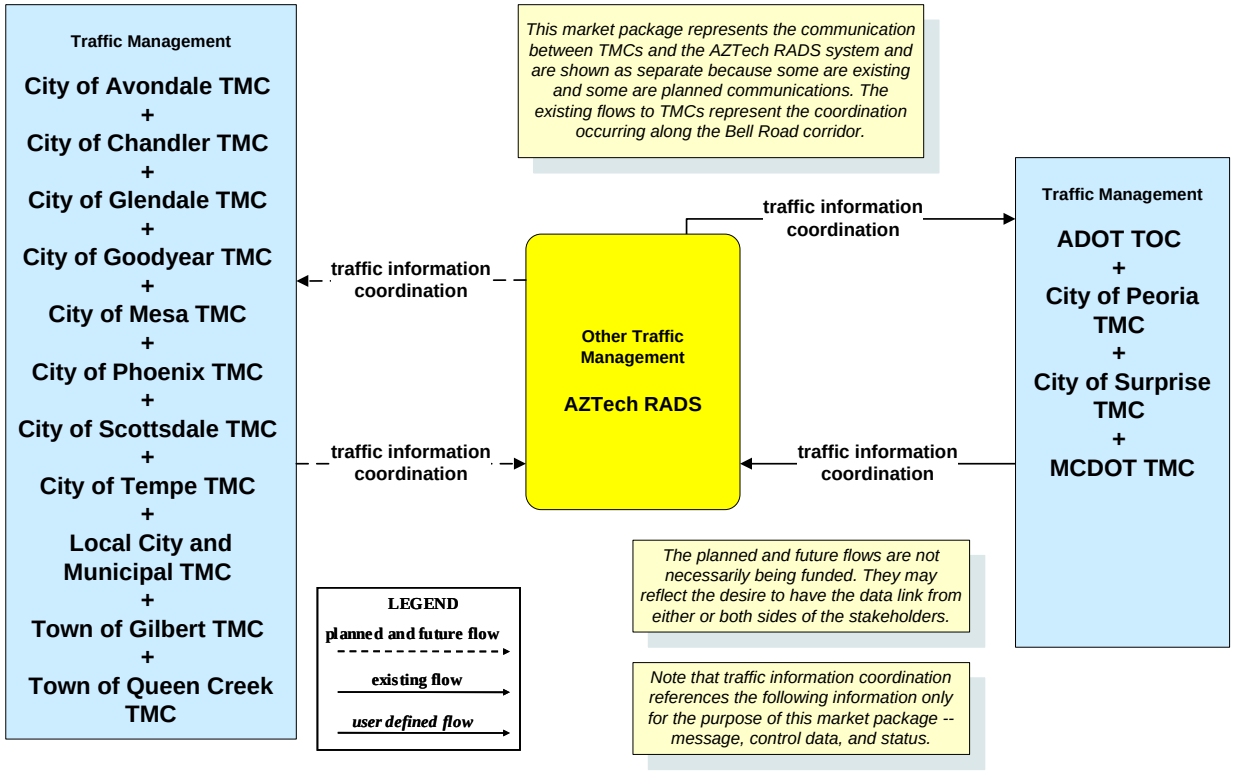


Figure 50: ATMS07 – Regional Traffic Management: Phoenix Metropolitan C2C CCTV Network

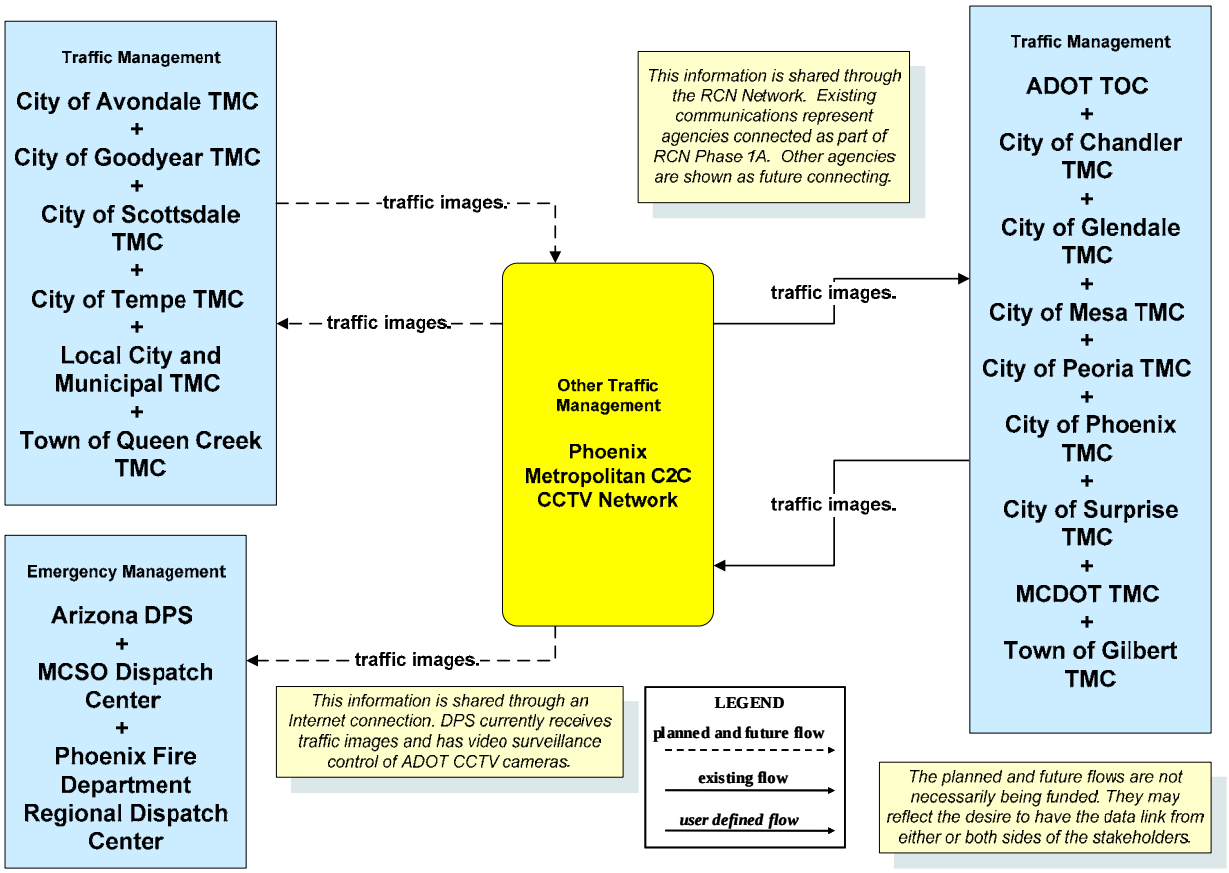


Figure 51: ATMS08 – Incident Management: Arizona DOT (TM to EM)

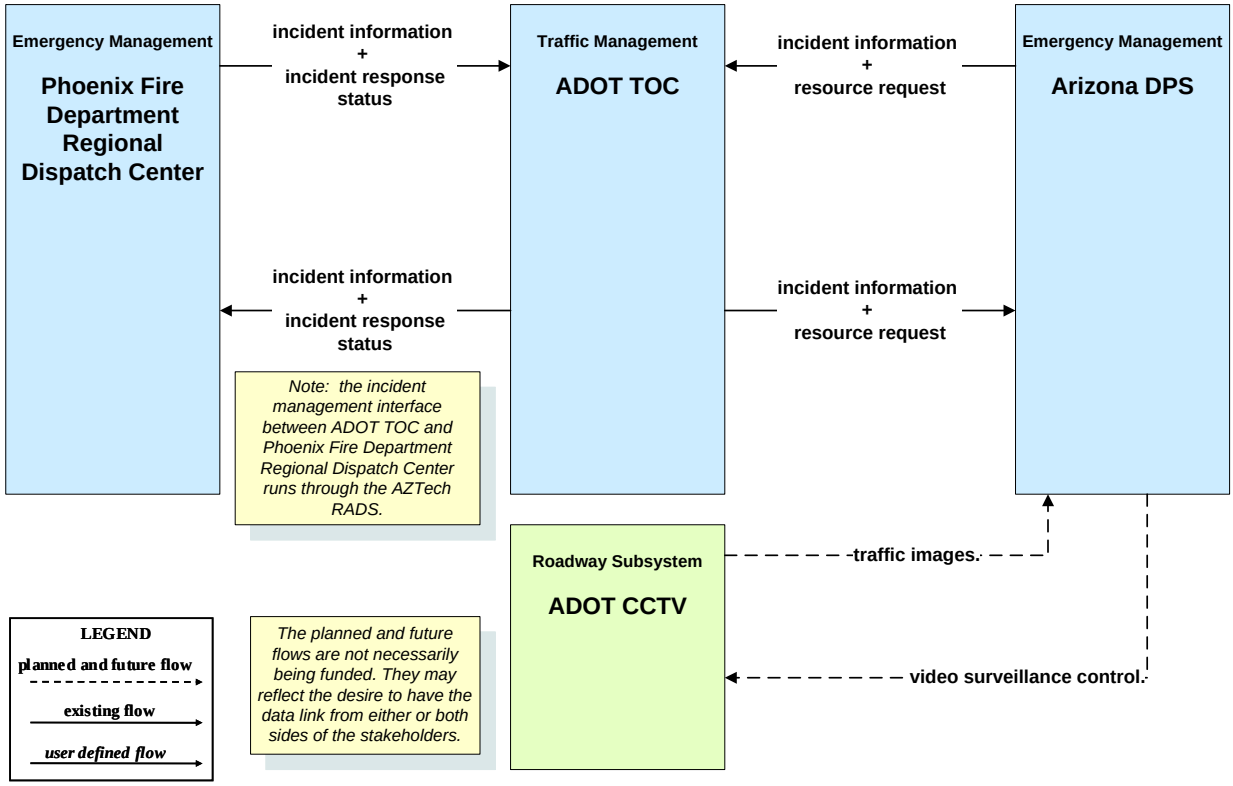


Figure 52: ATMS08 – Incident Management: Maricopa County (TM to EM)

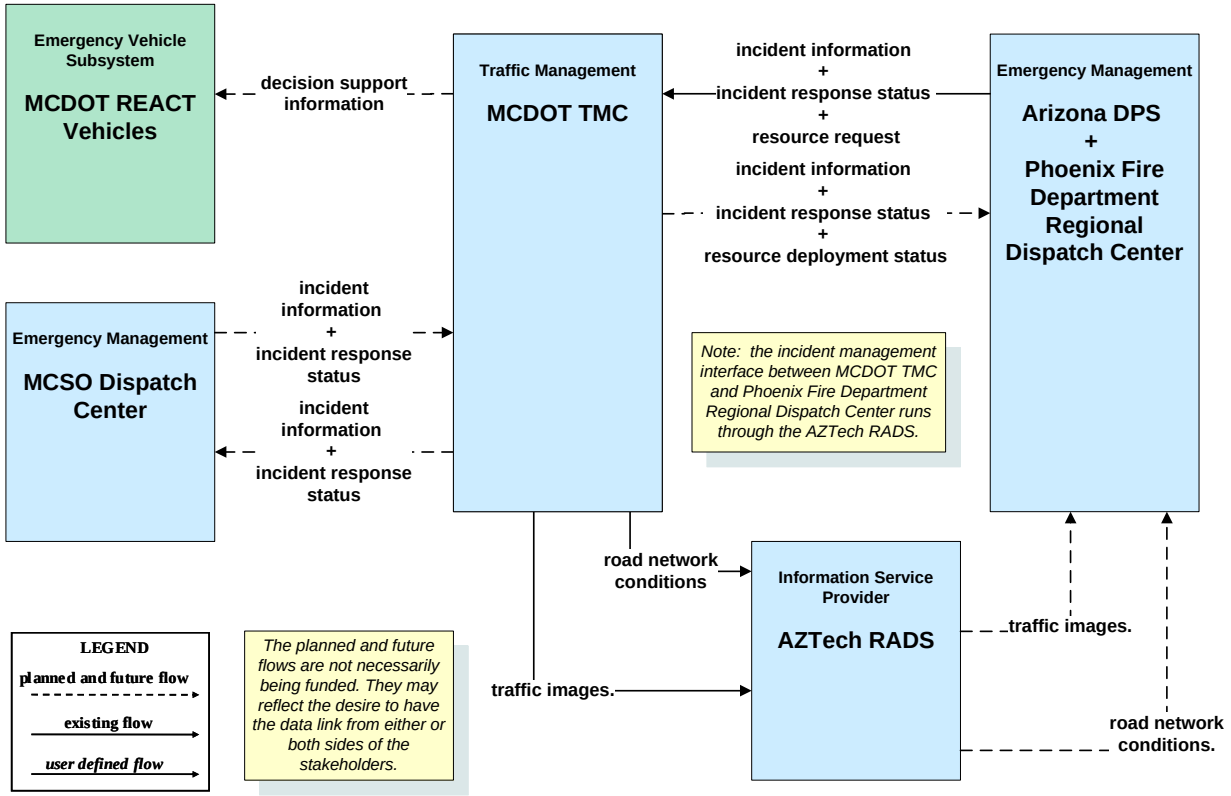


Figure 53: ATMS08 – Incident Management: City of Phoenix (TM to EM)

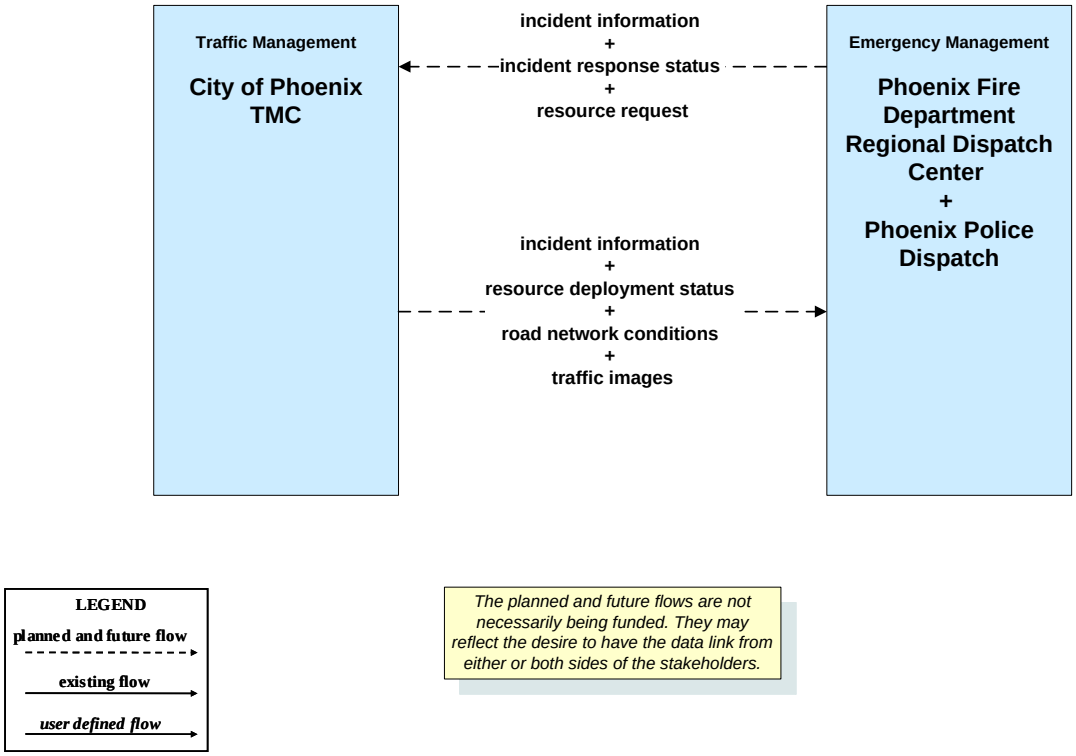
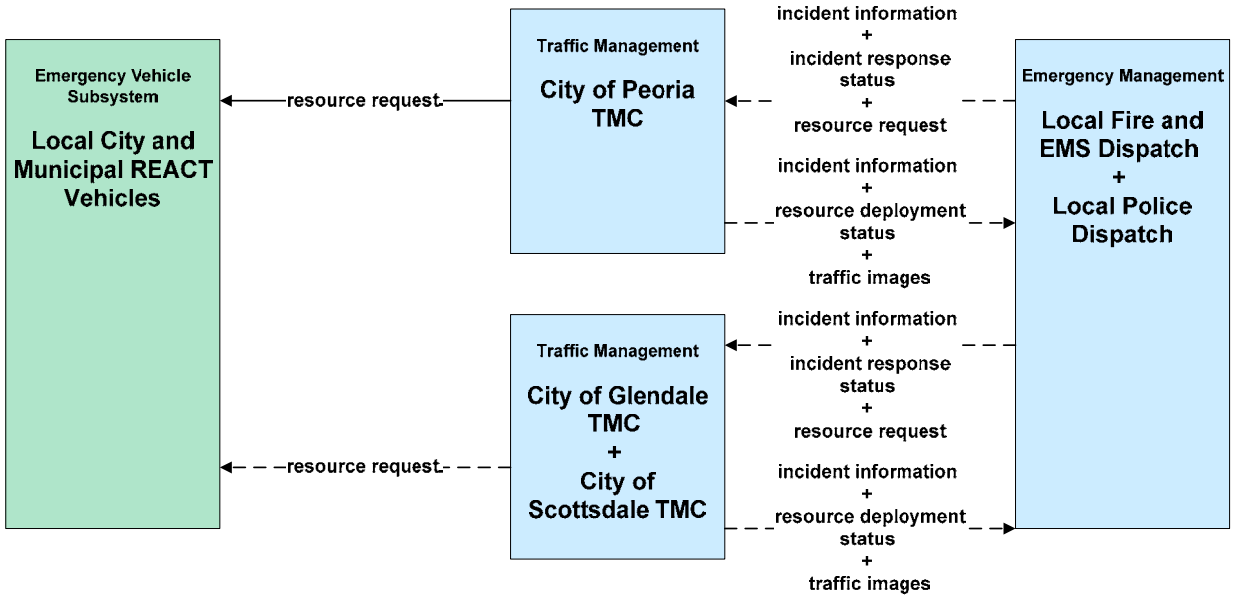
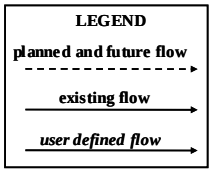


Figure 54: ATMS08 – Incident Management: Local Cities and Municipalities (TM to EM)





The planned and future flows are not necessarily being funded. They may reflect the desire to have the data link from either or both sides of the stakeholders.

This market package represents the direct information flow between TMCS and their respective public safety agencies rather than a transfer of information from one TMC through an Emergency Management agency to another TMC. TMCs are represented in different boxes due to the status of those information flows

Figure 55: ATMS08 – Incident Management:
Local Cities and Municipalities - Generic (TM to EM)

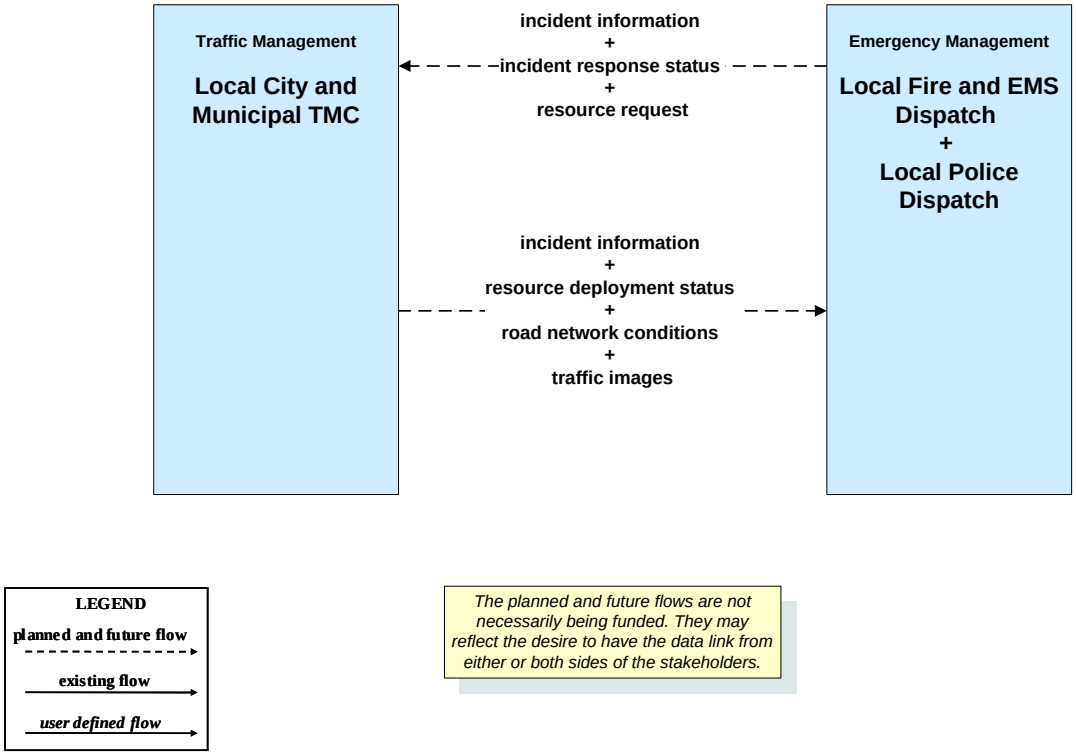


Figure 56: ATMS08 – Incident Management: Arizona DOT (TM to MCM)

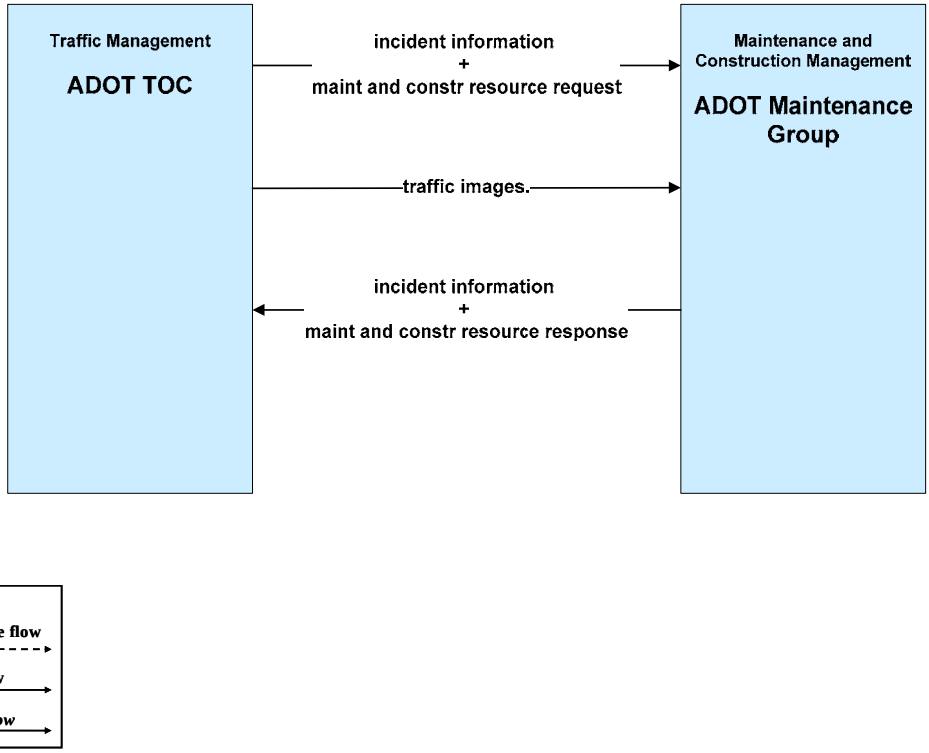


Figure 57: ATMS08 – Incident Management: Maricopa County (TM to MCM)

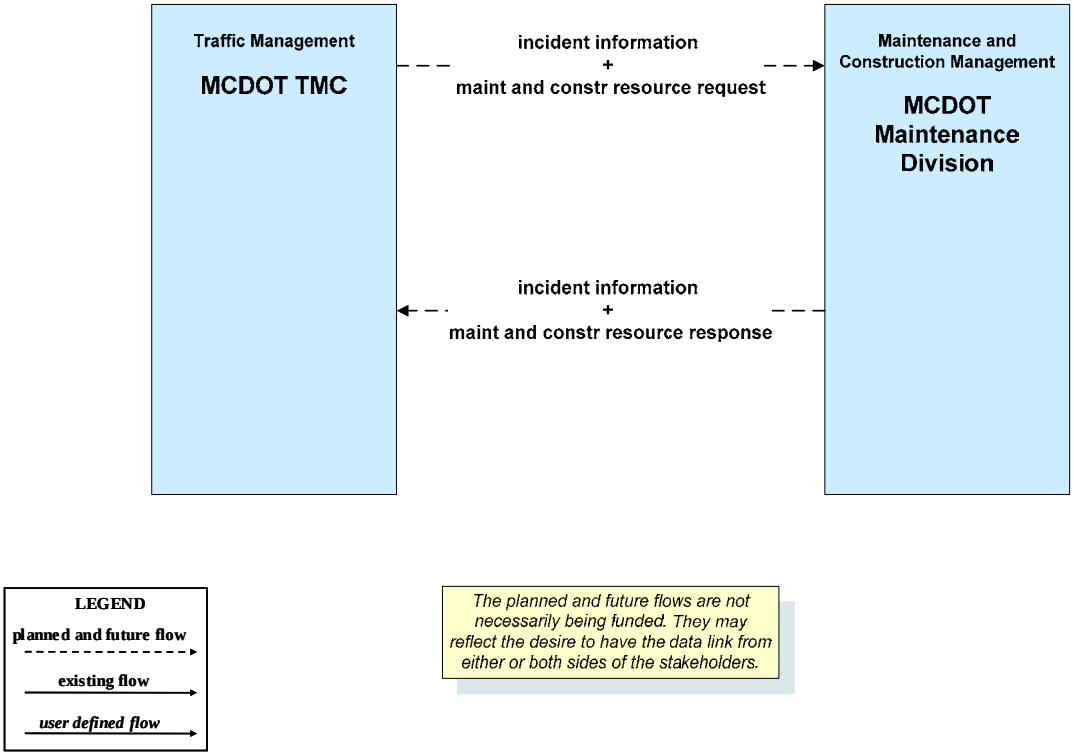


Figure 58: ATMS08 – Incident Management: Local Cities and Municipalities (TM to MCM)

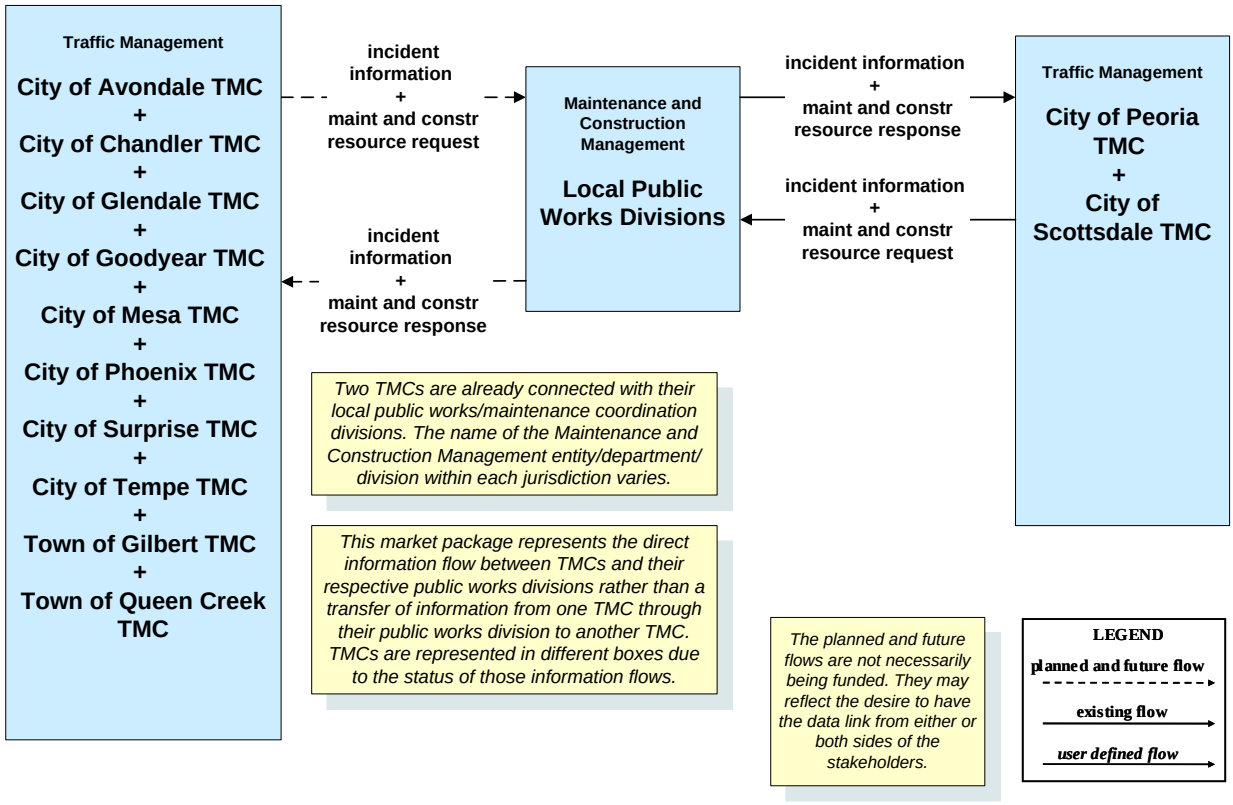


Figure 59: ATMS08 – Incident Management:
Local Cities and Municipalities - Generic (TM to MCM)

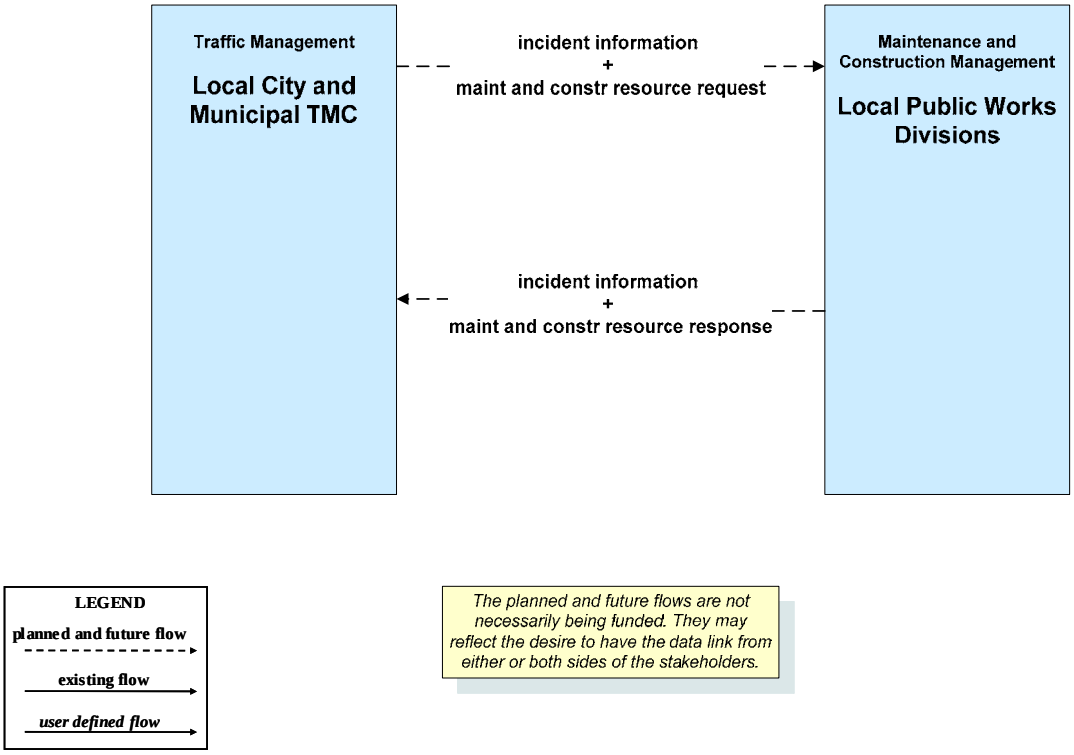


Figure 60: ATMS13 – Standard Railroad Crossing: Maricopa County

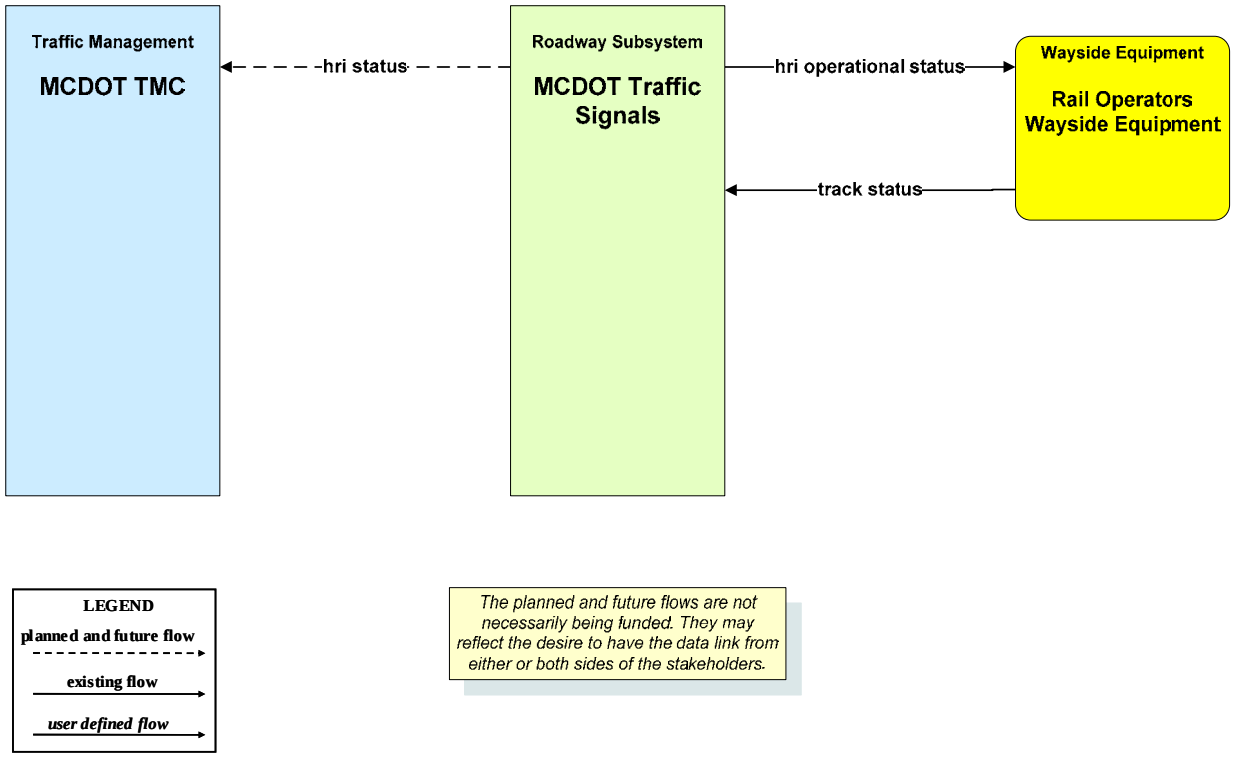


Figure 61: ATMS13 – Standard Railroad Crossing: City of Phoenix

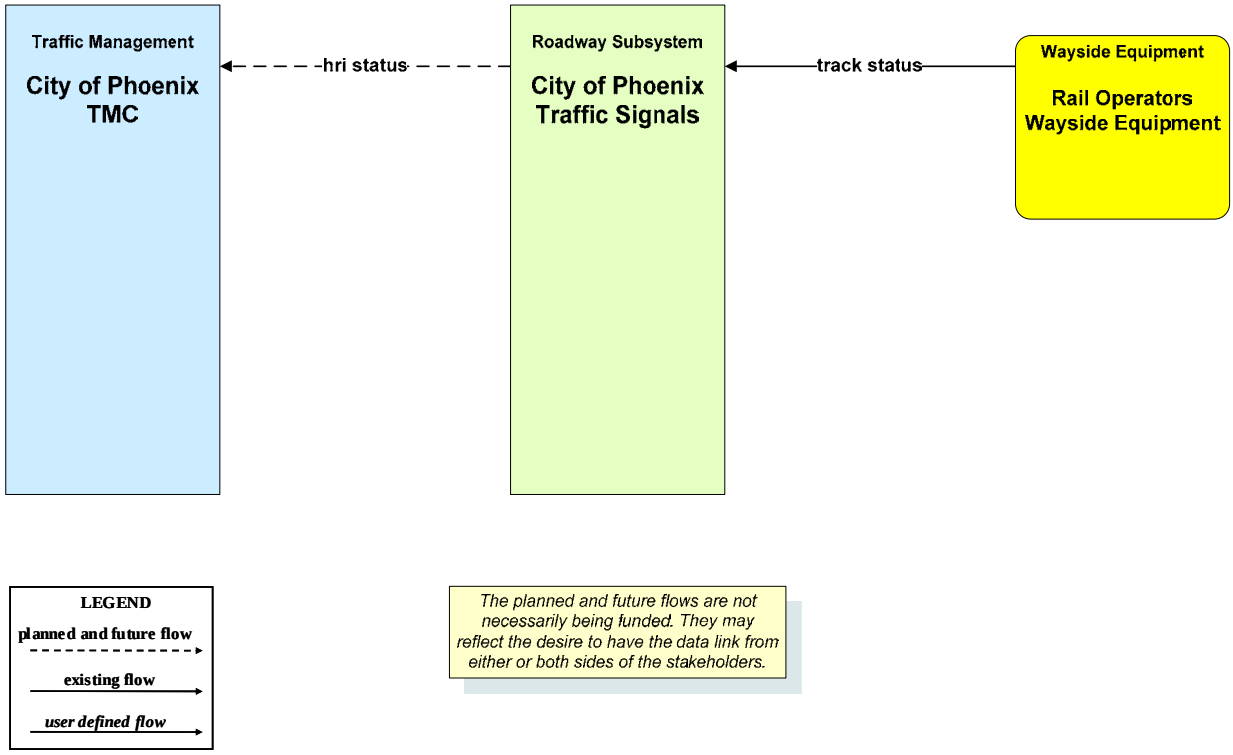


Figure 62: ATMS13 – Standard Railroad Crossing: City of Avondale

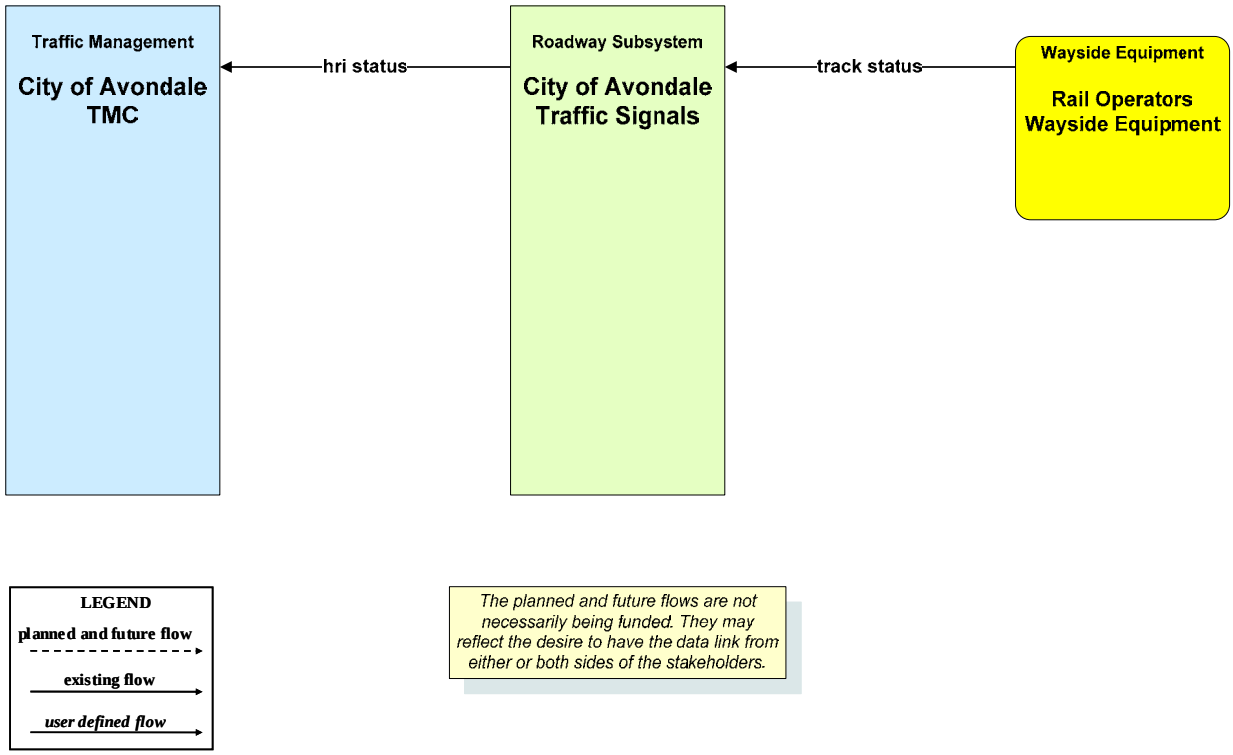


Figure 63: ATMS13 – Standard Railroad Crossing: City of Chandler

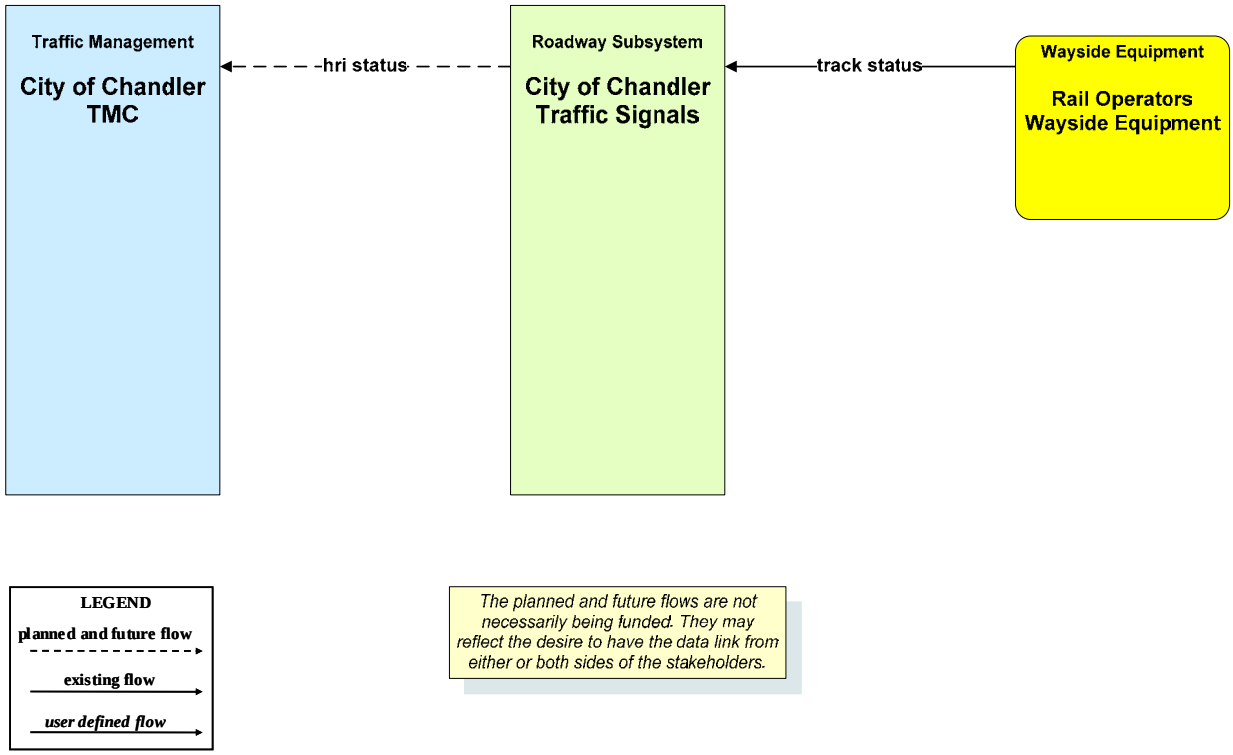


Figure 64: ATMS13 – Standard Railroad Crossing: Town of Gilbert

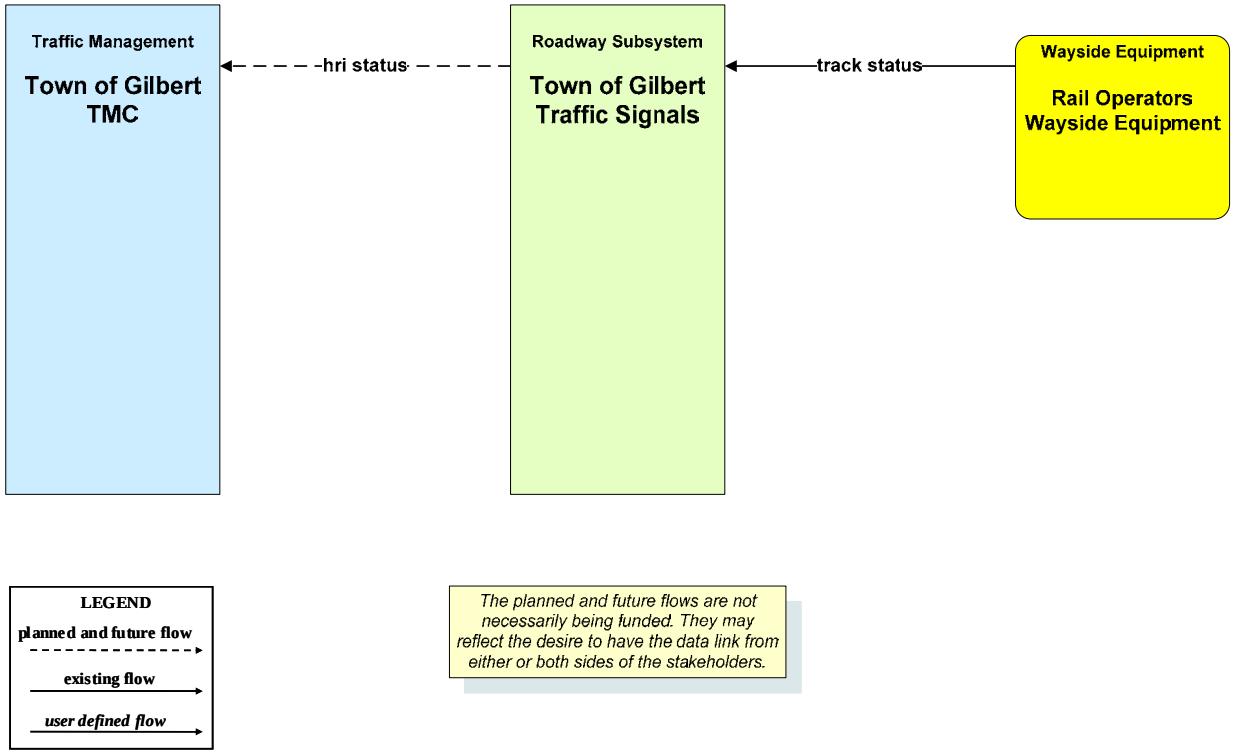


Figure 65: ATMS13 – Standard Railroad Crossing: City of Glendale

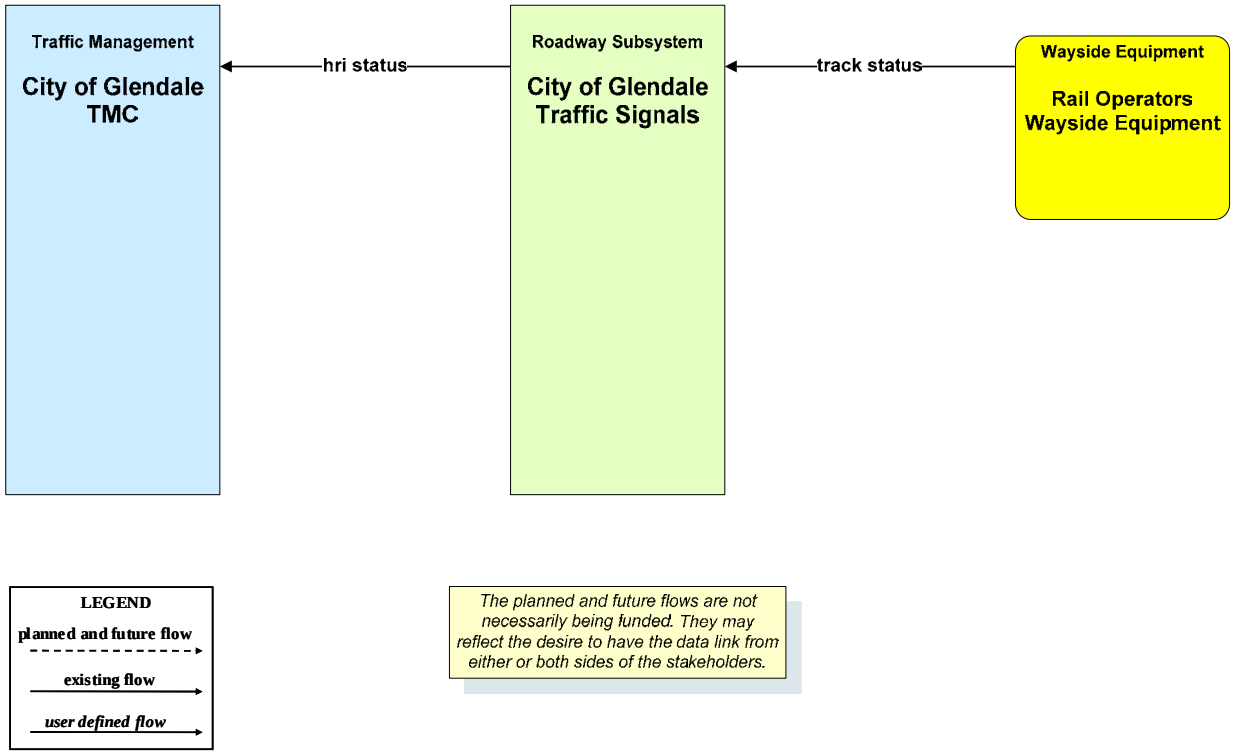


Figure 66: ATMS13 – Standard Railroad Crossing: City of Goodyear

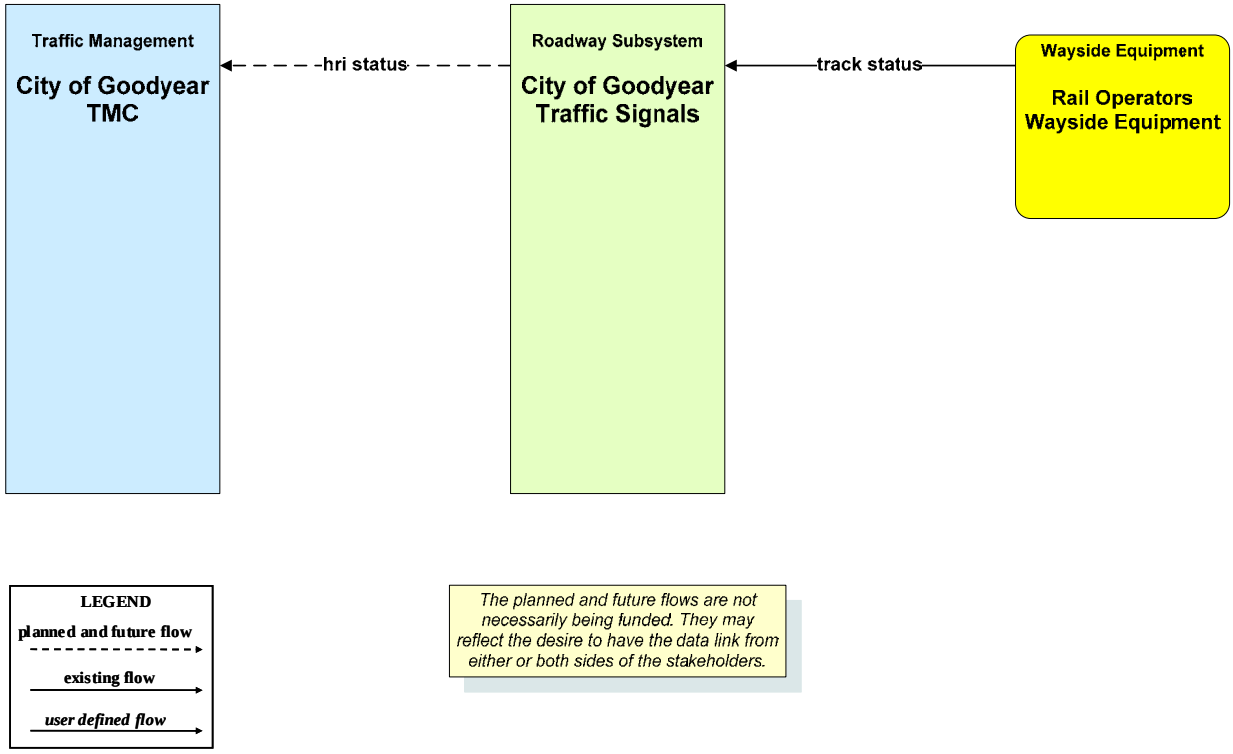


Figure 67: ATMS13 – Standard Railroad Crossing: City of Mesa

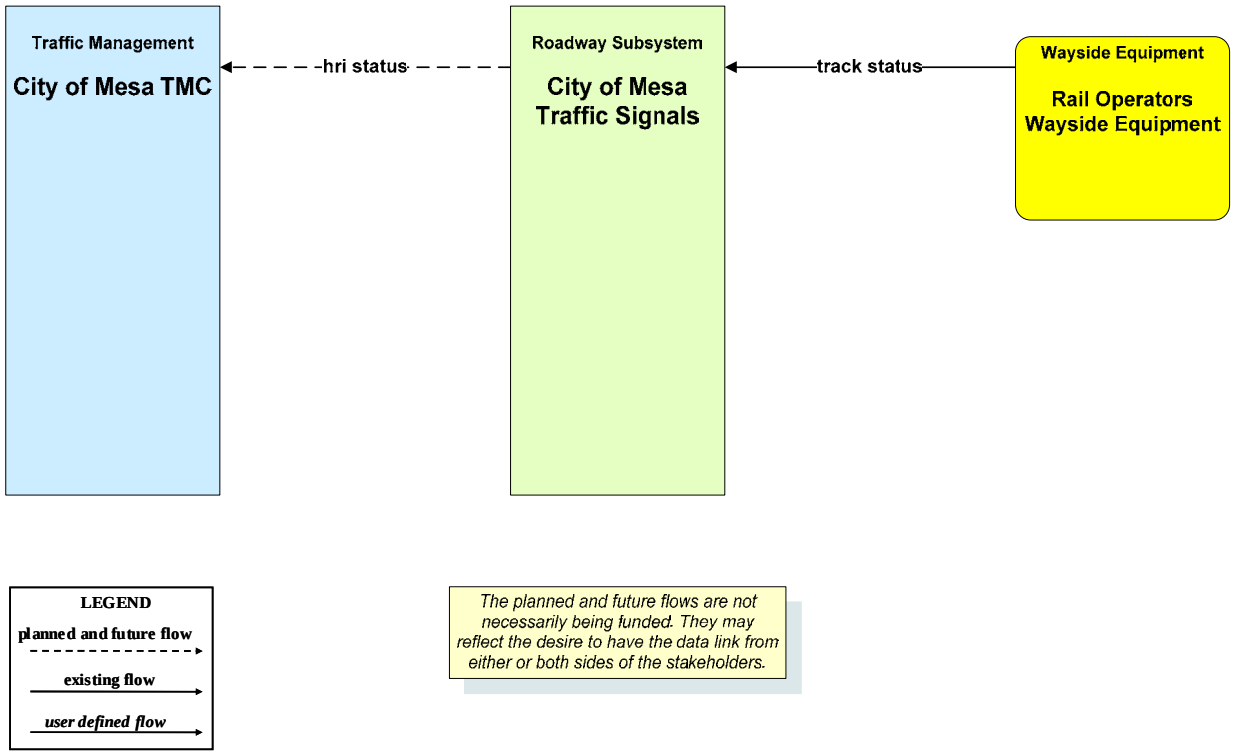


Figure 68: ATMS13 – Standard Railroad Crossing: City of Surprise

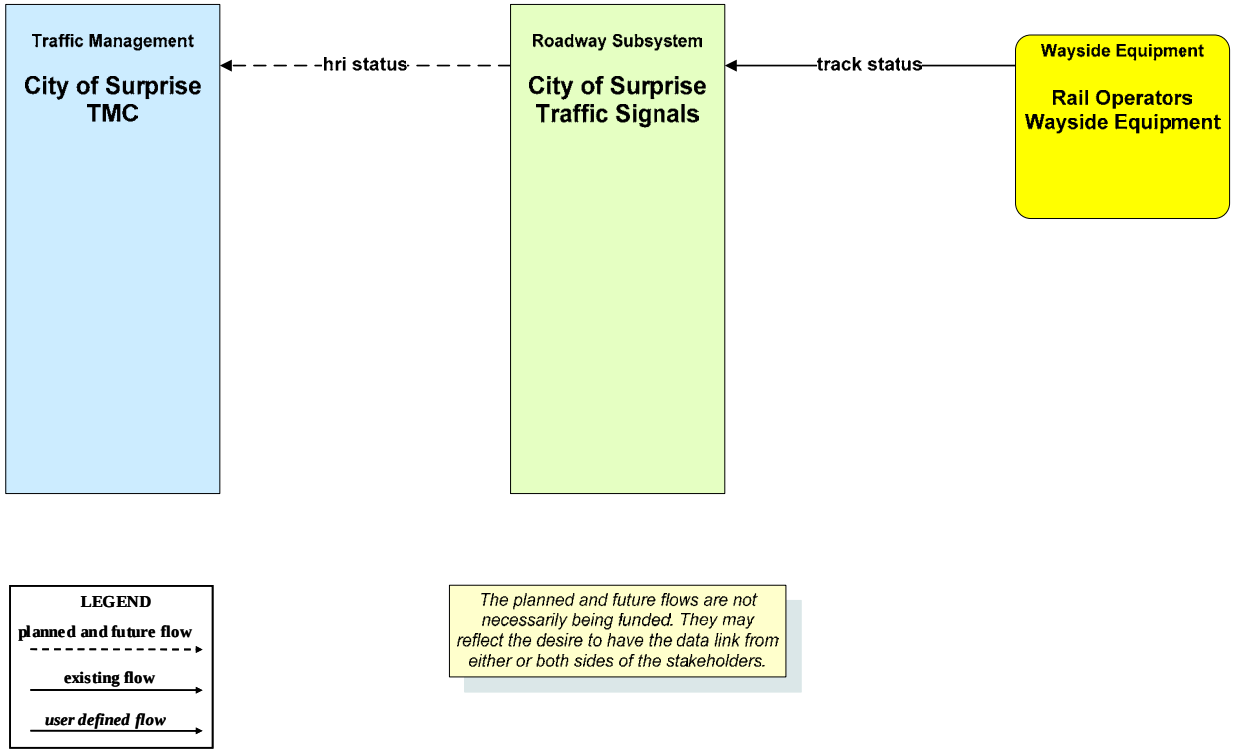


Figure 69: ATMS13 – Standard Railroad Crossing: City of Tempe

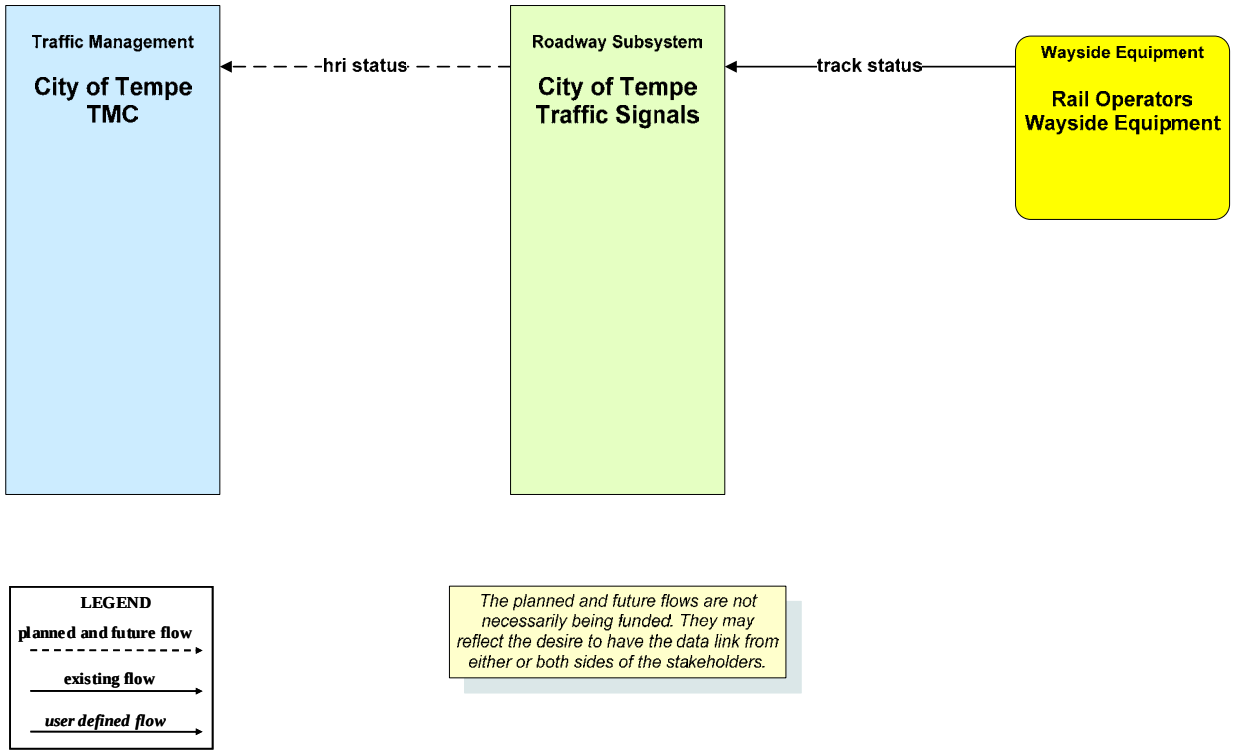


Figure 70: ATMS13 – Standard Railroad Crossing: Local Cities and Municipalities - Generic

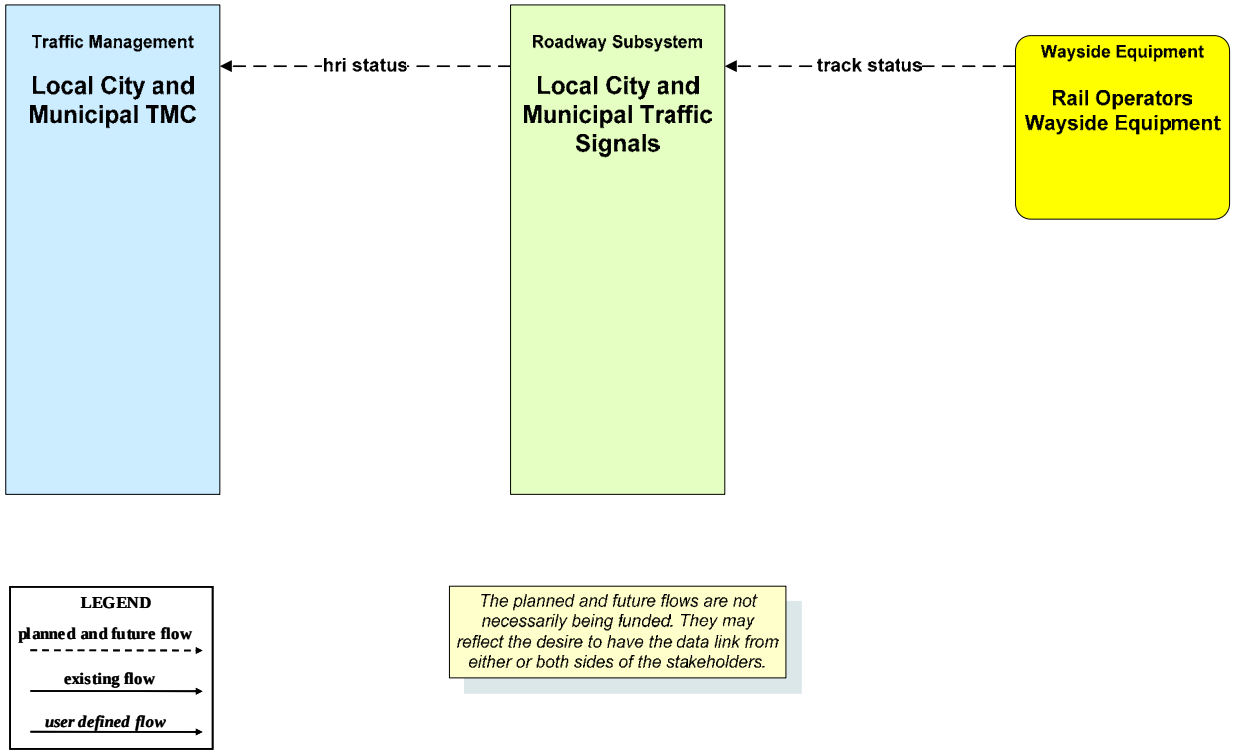


Figure 71: ATMS17 – Regional Parking Management: City of Glendale

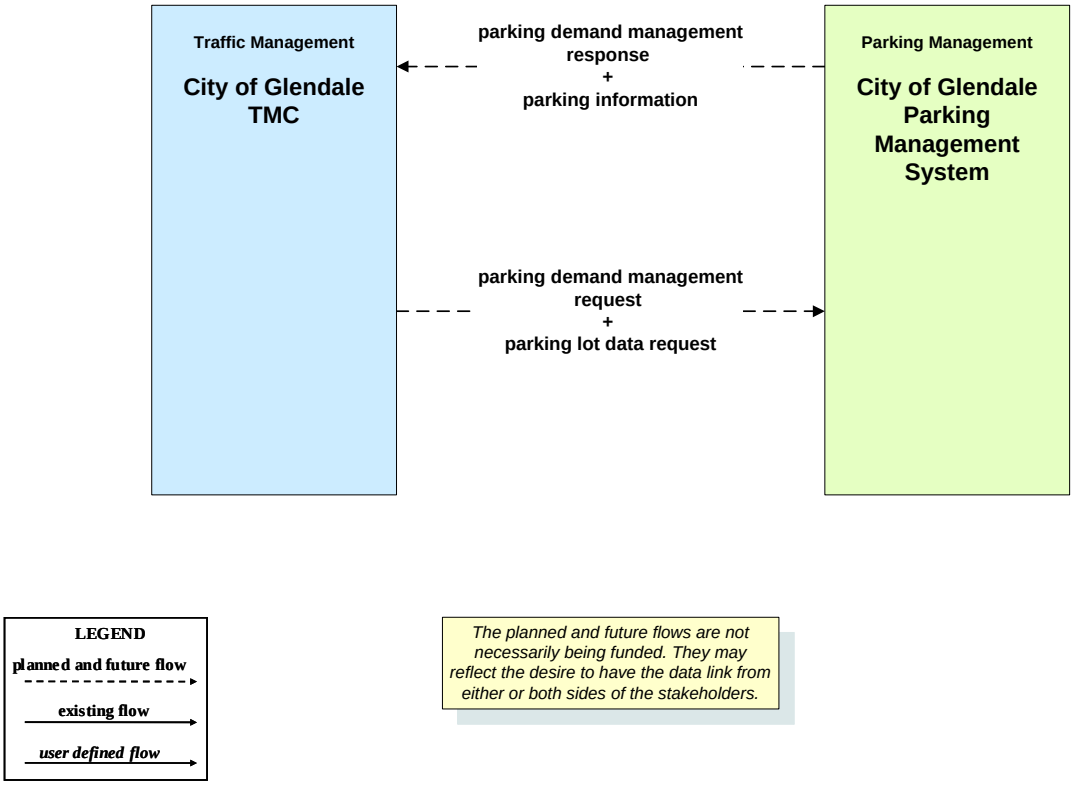


Figure 72: ATMS18 – Reversible Lane Management: City of Glendale

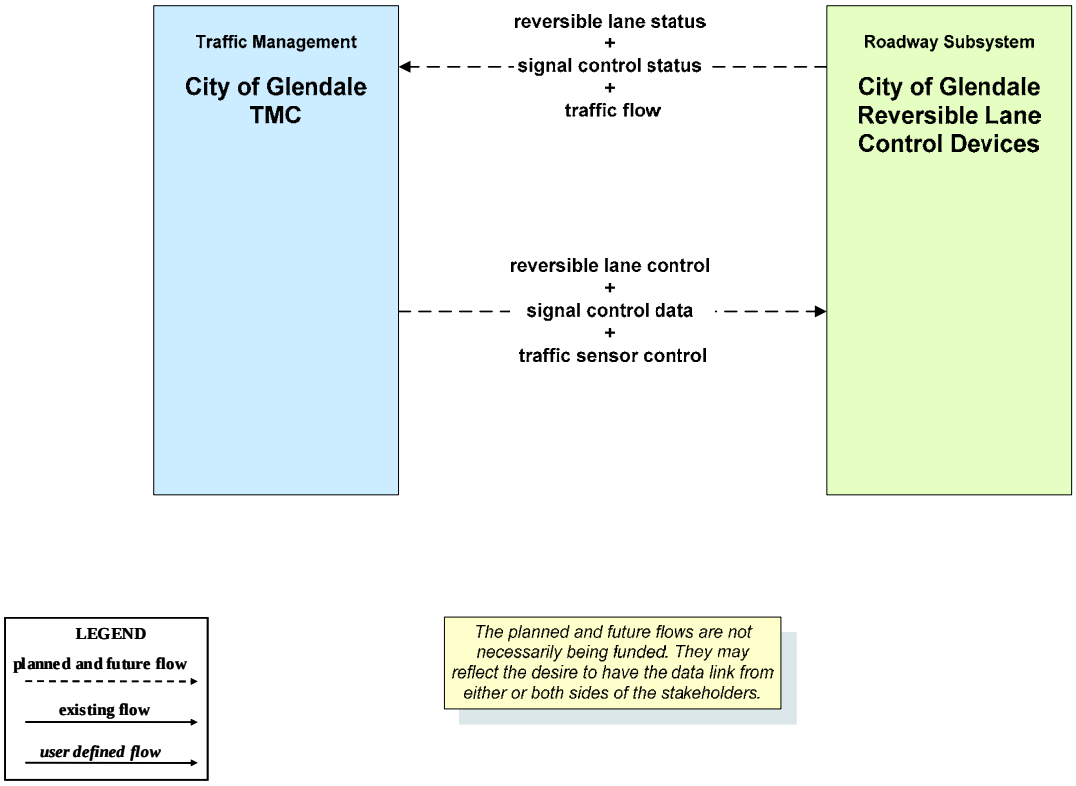


Figure 73: ATMS19 – Speed Monitoring: Local Cities and Municipalities

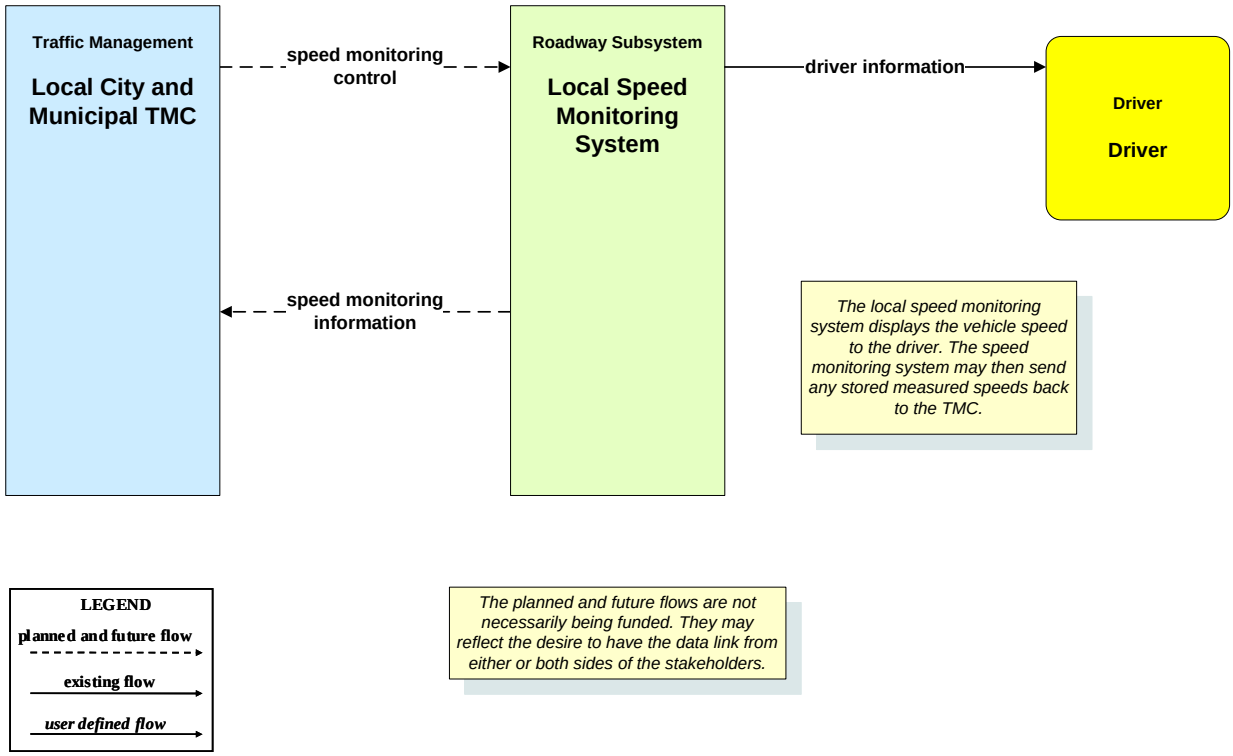


Figure 74: EM01 – Emergency Call-Taking and Dispatch: Public Safety Video Distribution System

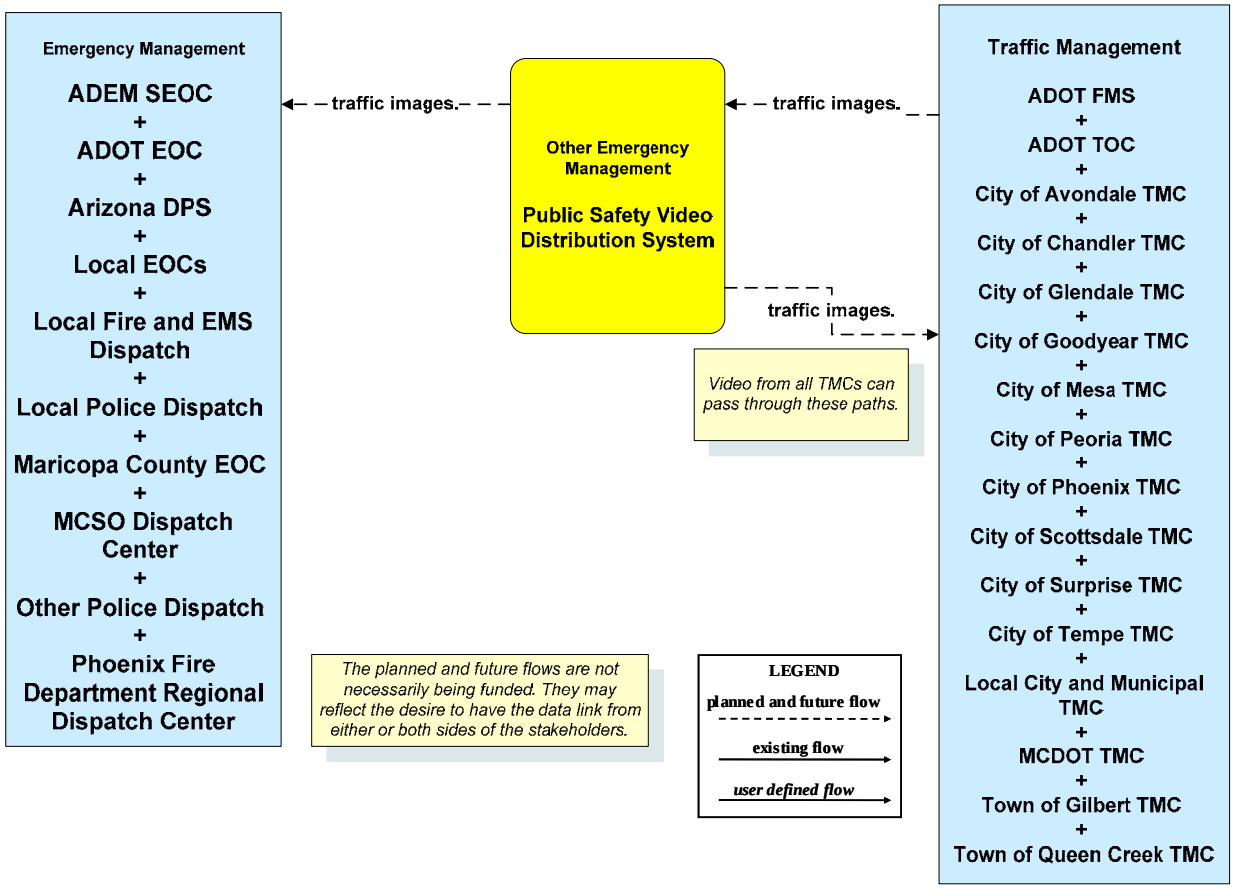


Figure 75: EM01 – Emergency Call-Taking and Dispatch: Arizona DPS

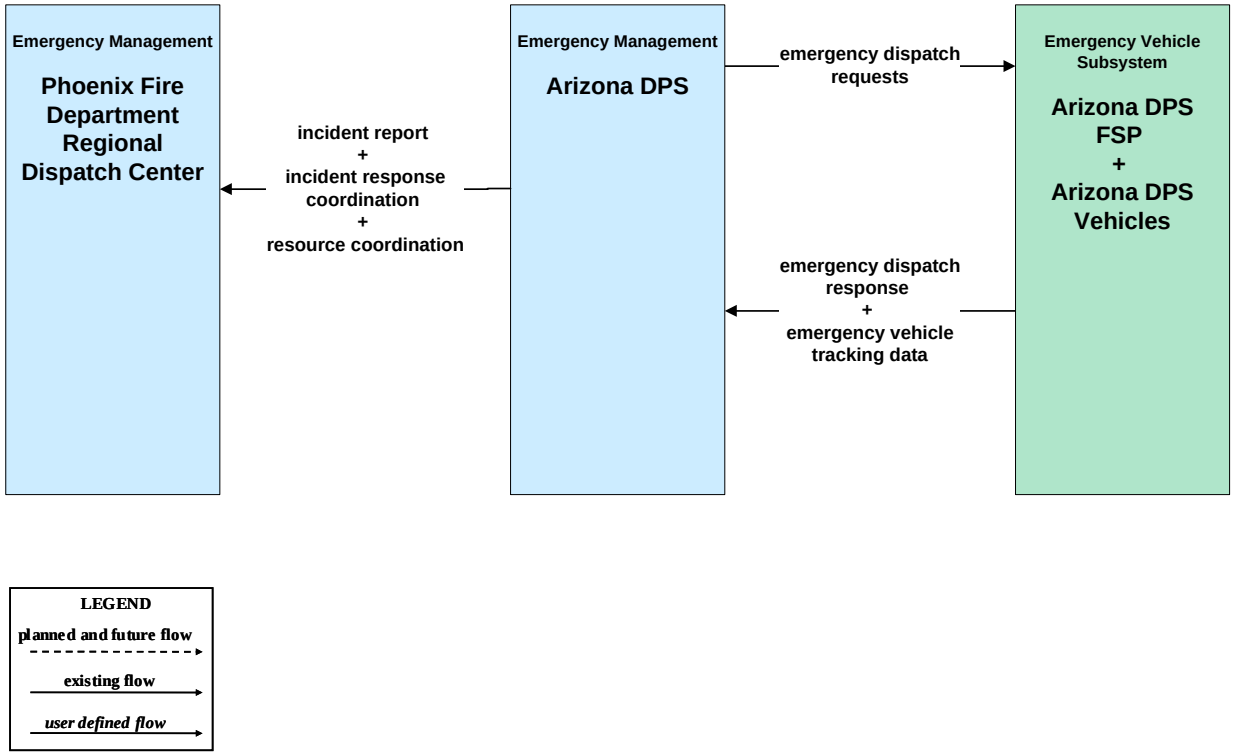


Figure 76: EM01 – Emergency Call-Taking and Dispatch: Maricopa County Sheriff's Office

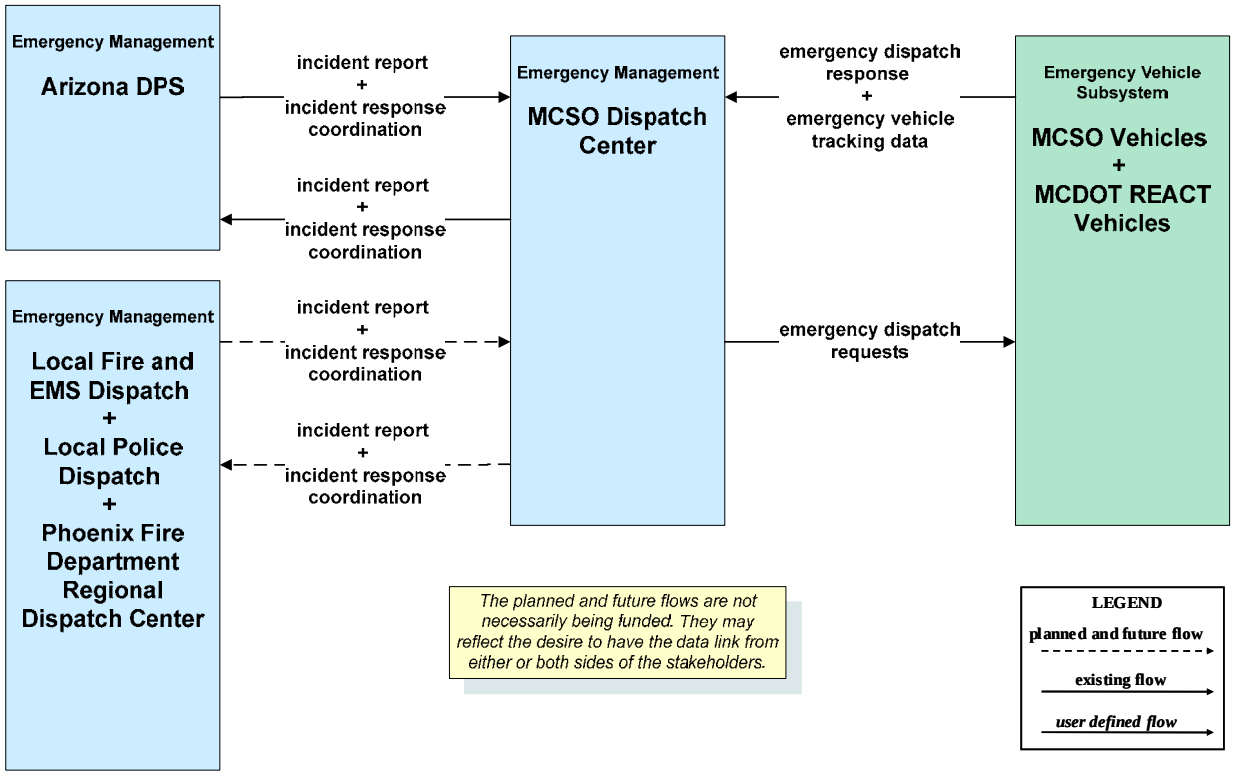


Figure 77: EM01 – Emergency Call-Taking and Dispatch: ADOT ALERT

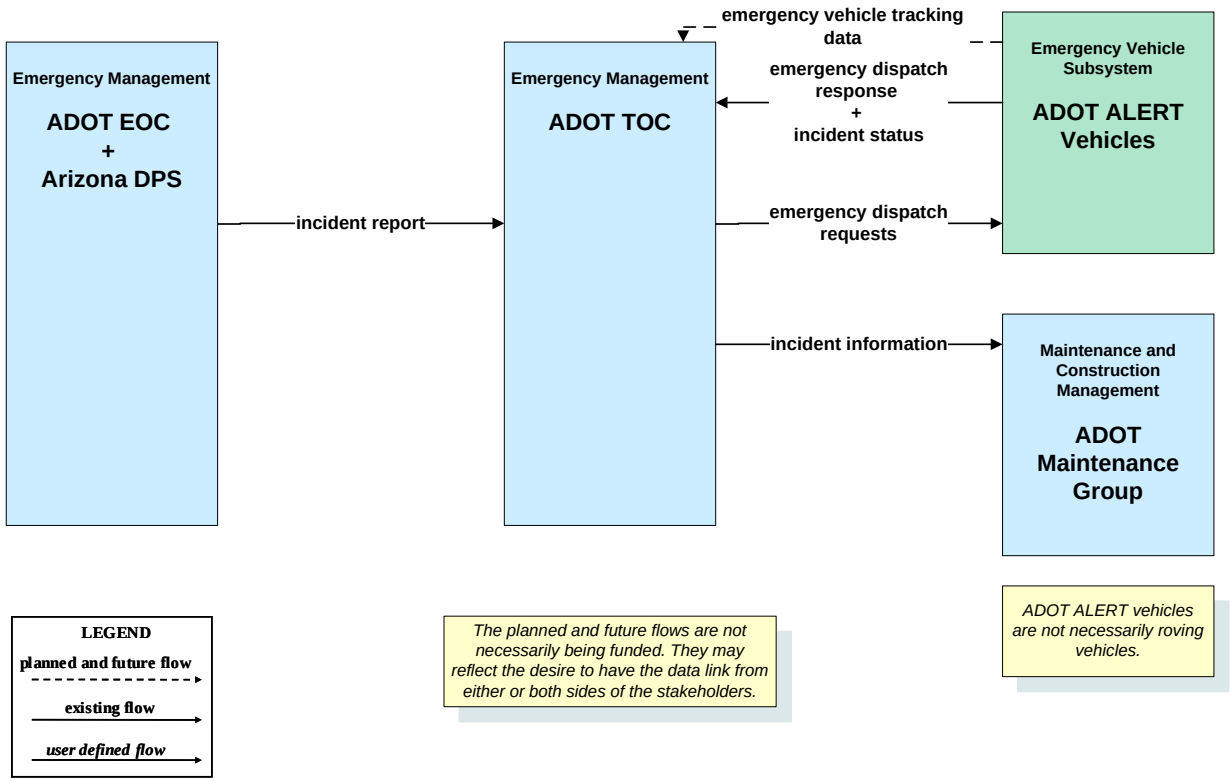


Figure 78: EM01 – Emergency Call-Taking and Dispatch: REACT Vehicles

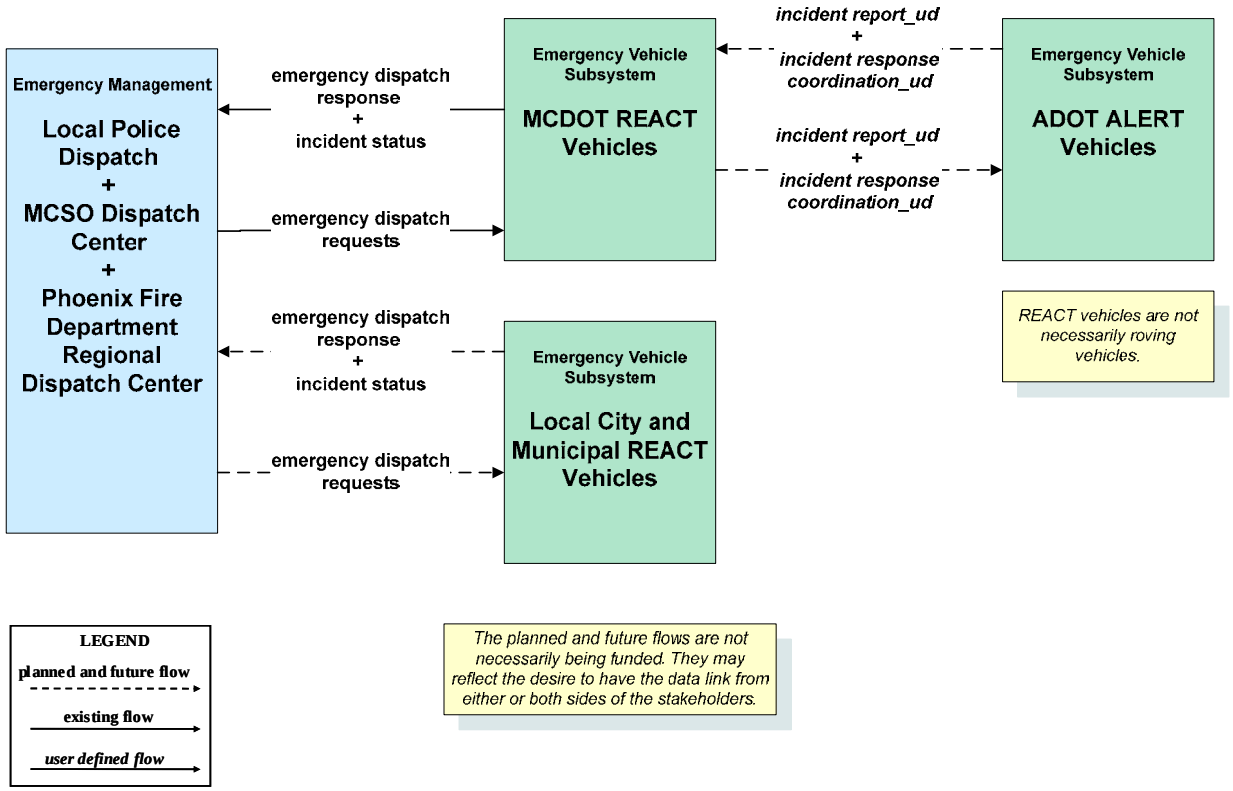


Figure 79: EM02 – Emergency Routing: Arizona DOT

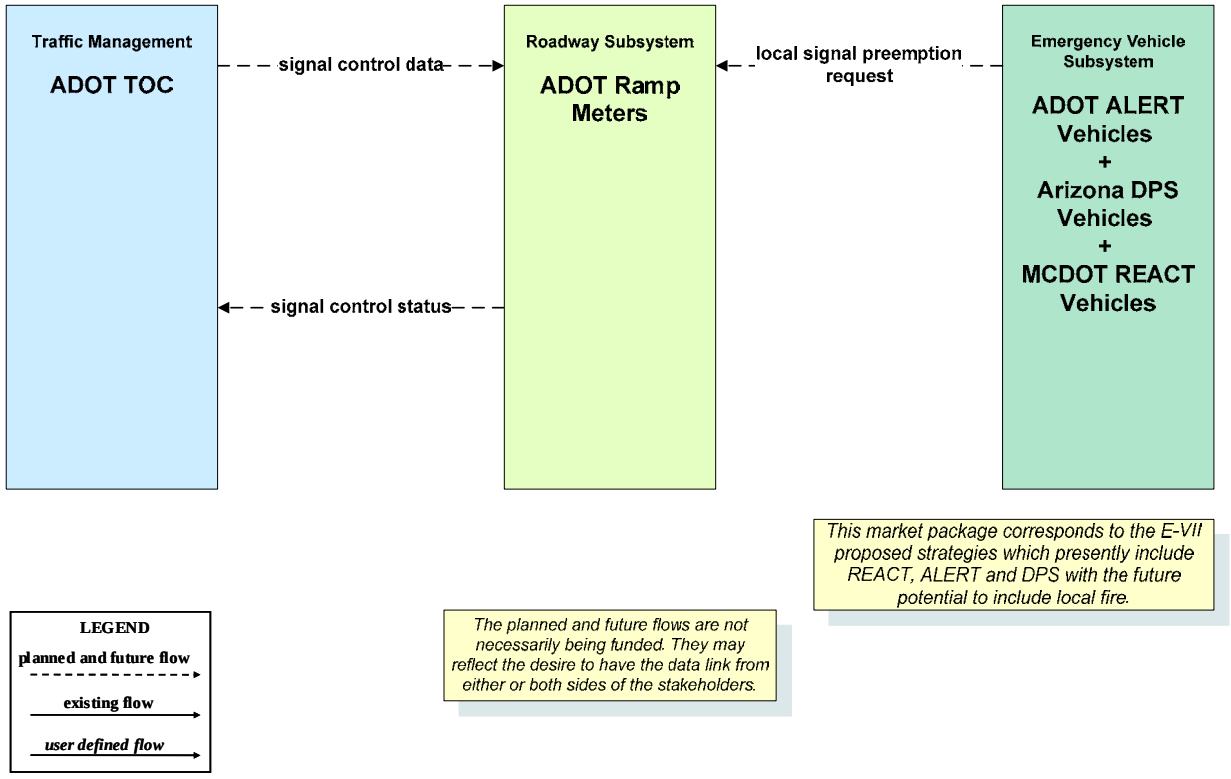


Figure 80: EM02 – Emergency Routing: Arizona DPS

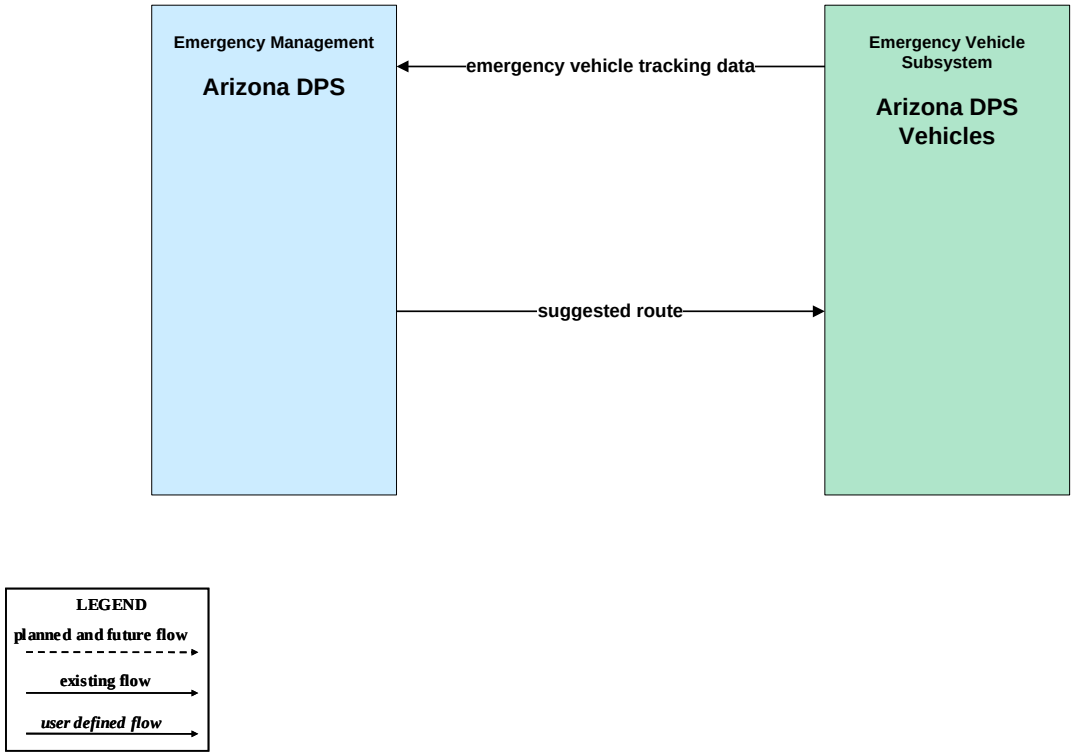


Figure 81: EM02 – Emergency Routing: Maricopa County

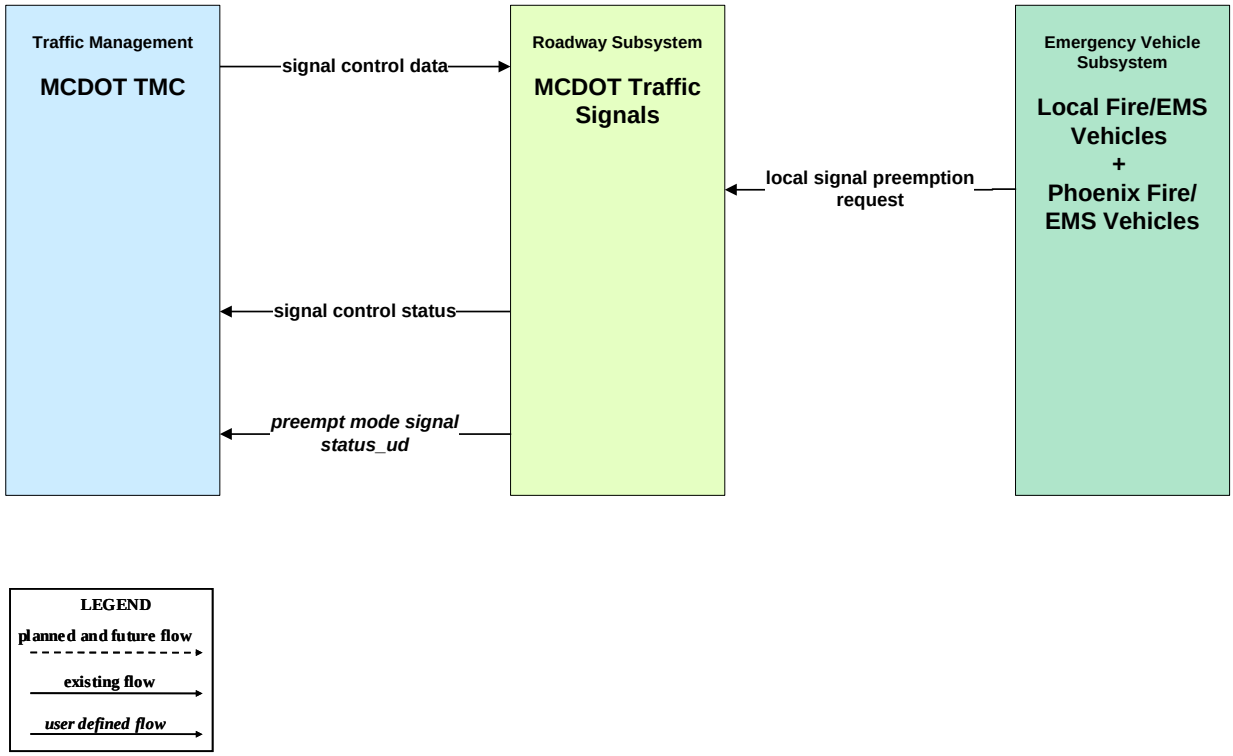


Figure 82: EM02 – Emergency Routing:
City of Phoenix

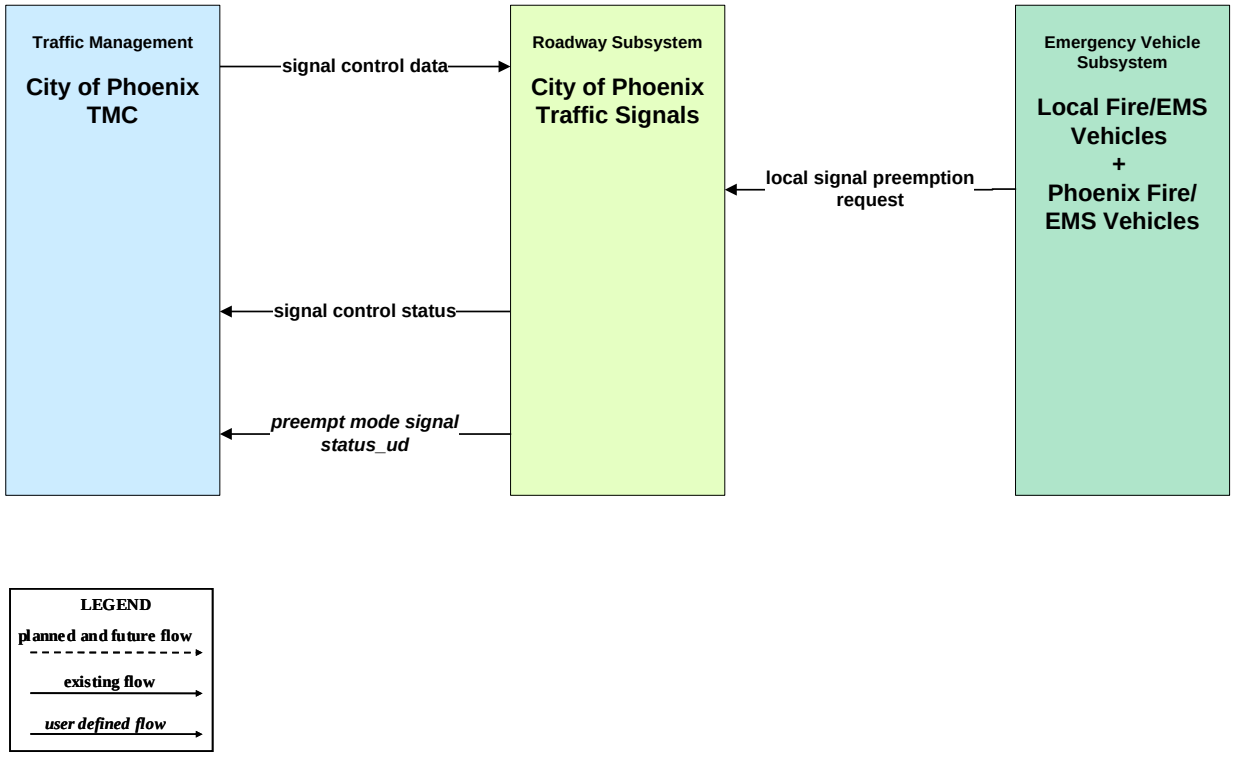


Figure 83: EM02 – Emergency Routing:
City of Avondale

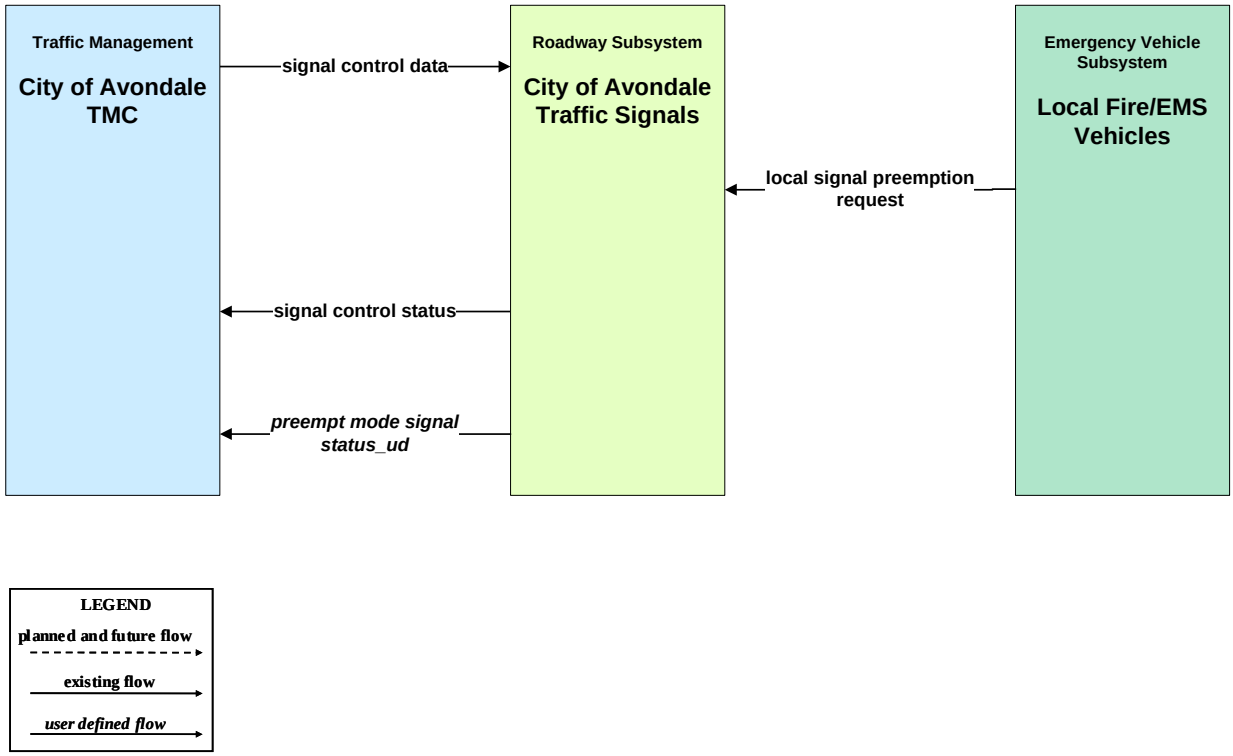


Figure 84: EM02 – Emergency Routing: City of Chandler

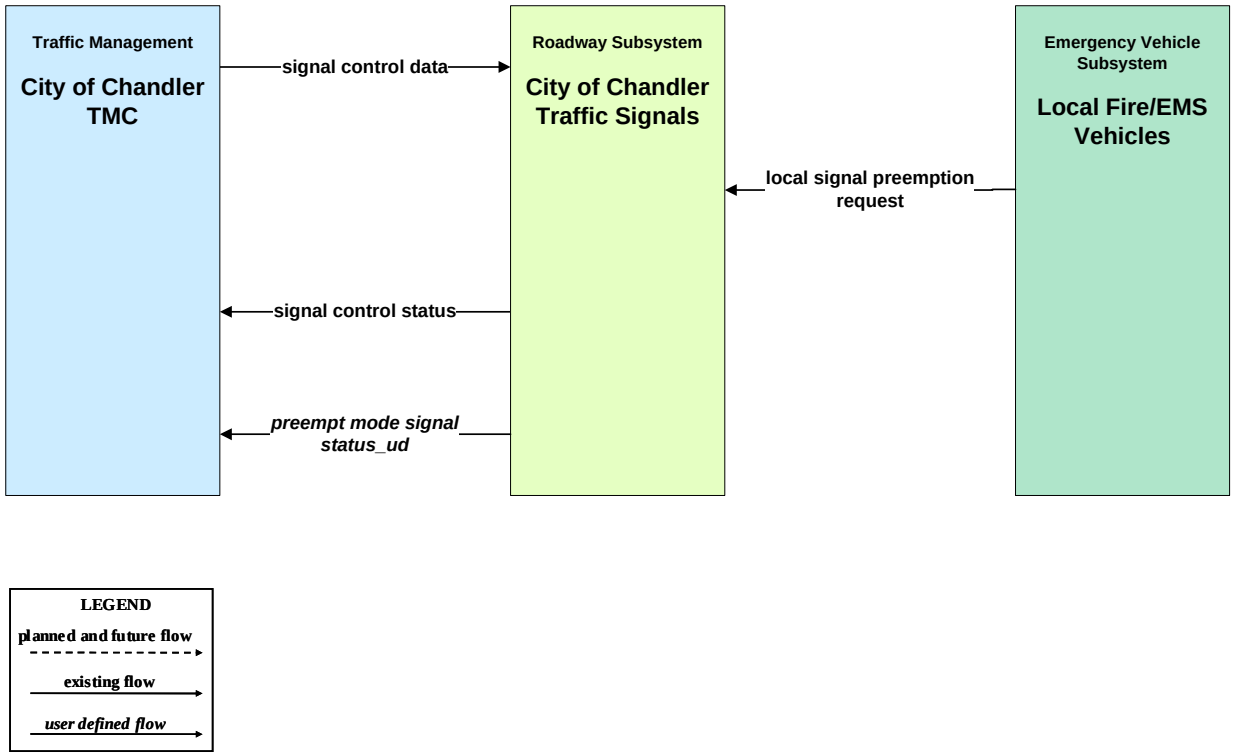


Figure 85: EM02 – Emergency Routing:
Town of Gilbert

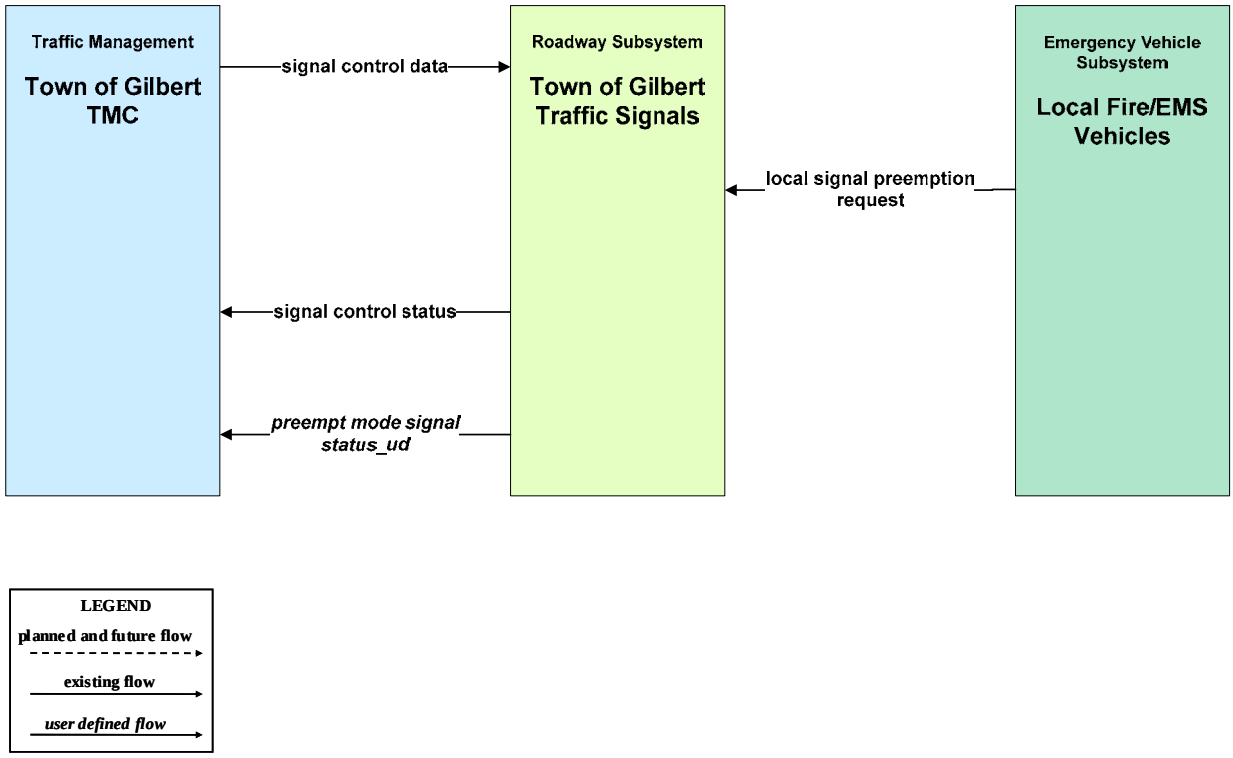


Figure 86: EM02 – Emergency Routing: City of Glendale

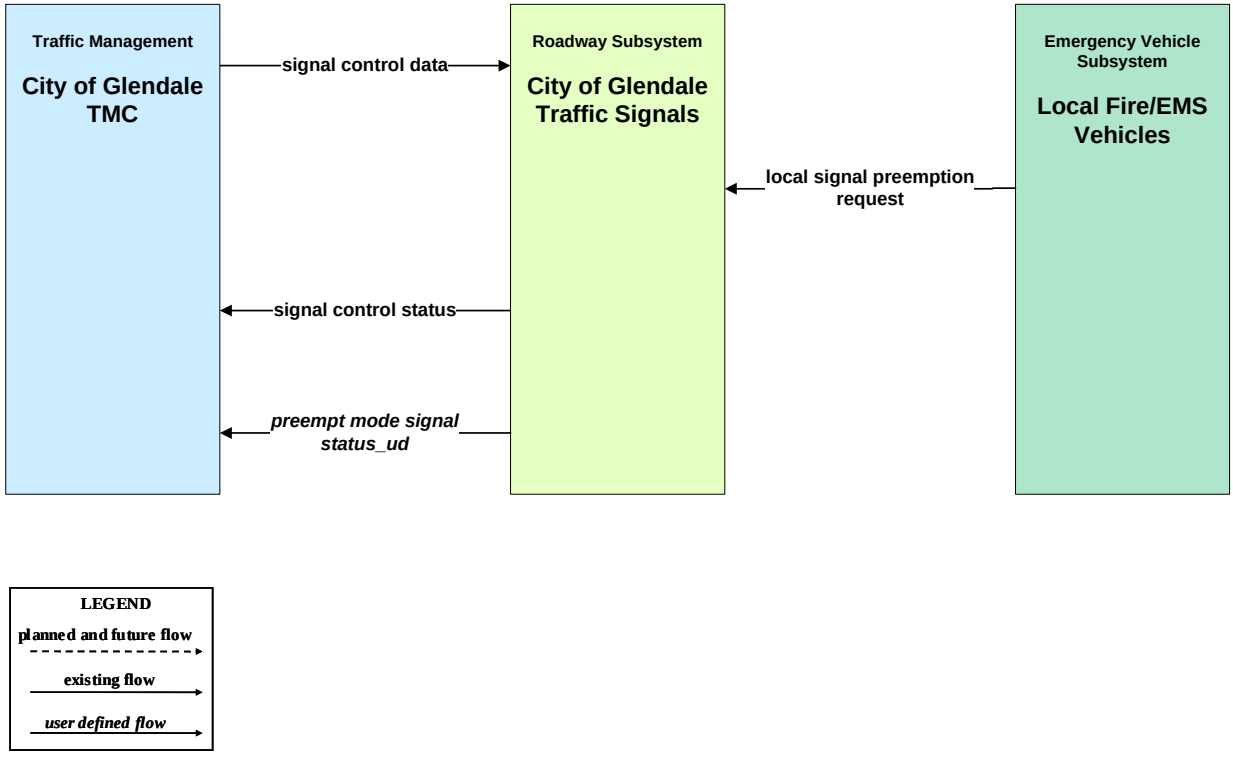


Figure 87: EM02 – Emergency Routing: City of Goodyear

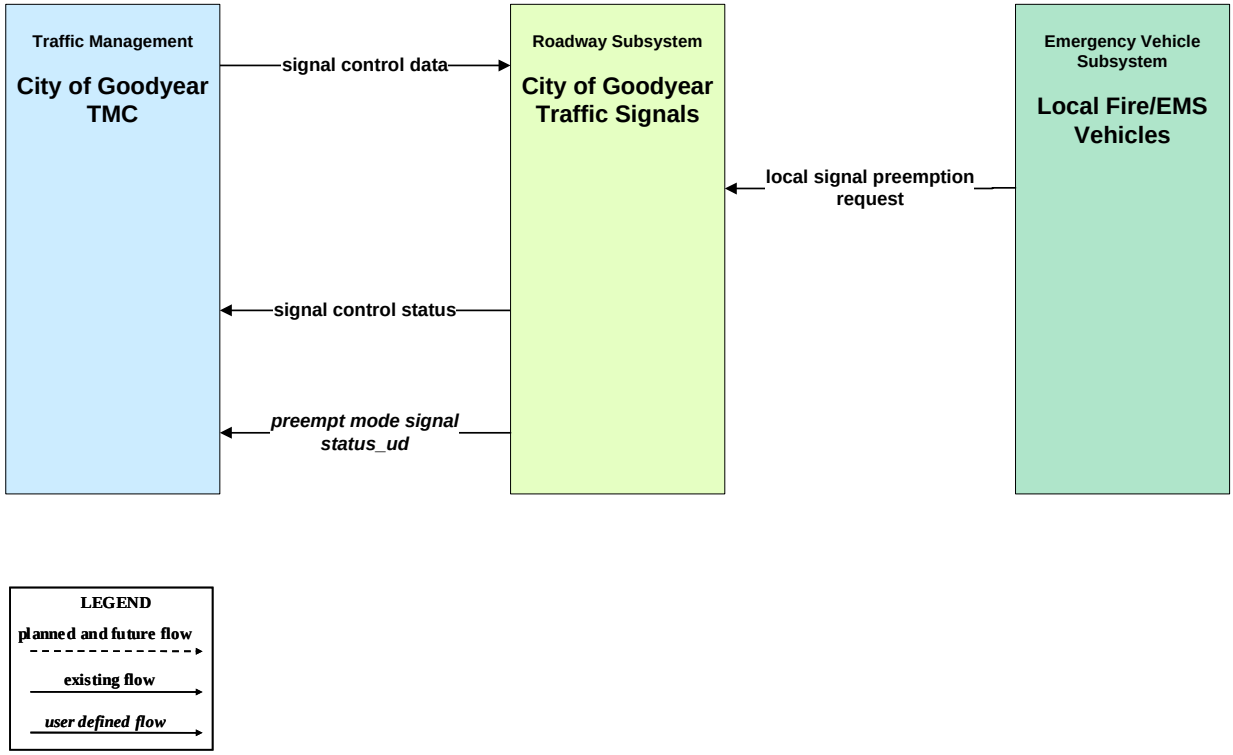


Figure 88: EM02 – Emergency Routing: City of Mesa

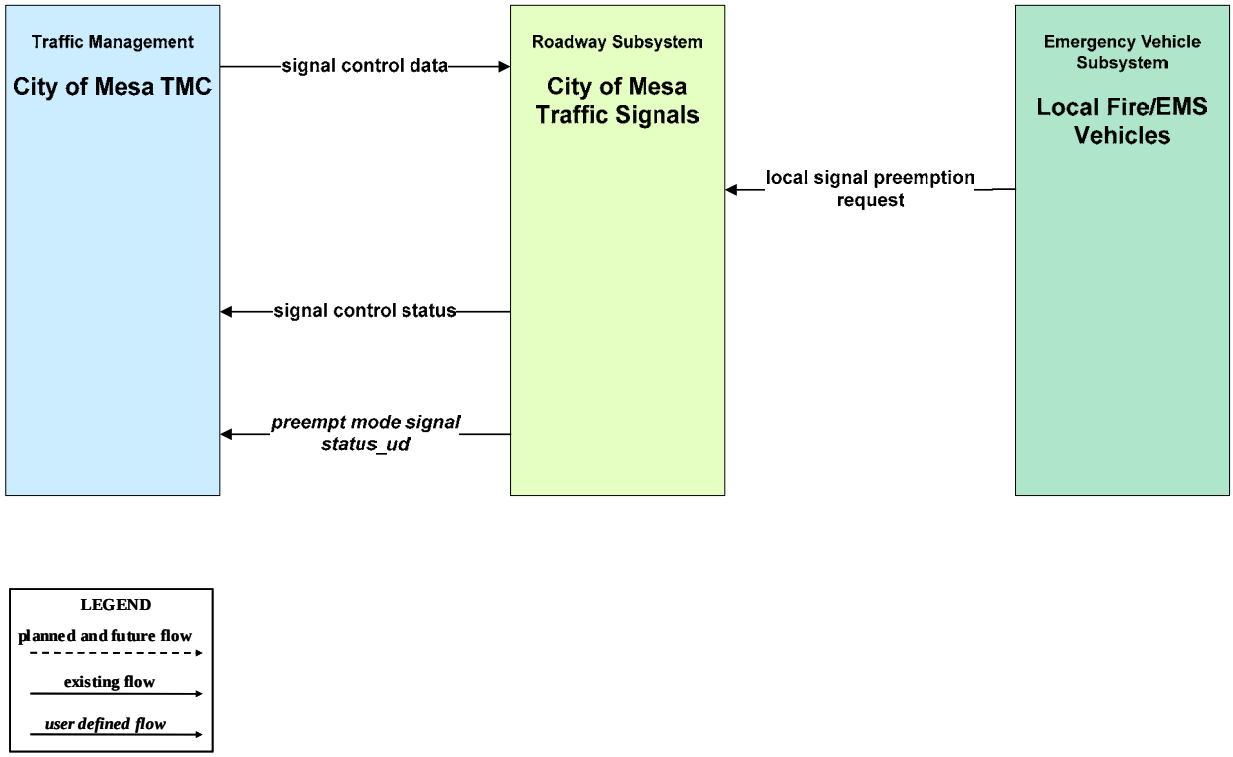


Figure 89: EM02 – Emergency Routing: City of Peoria

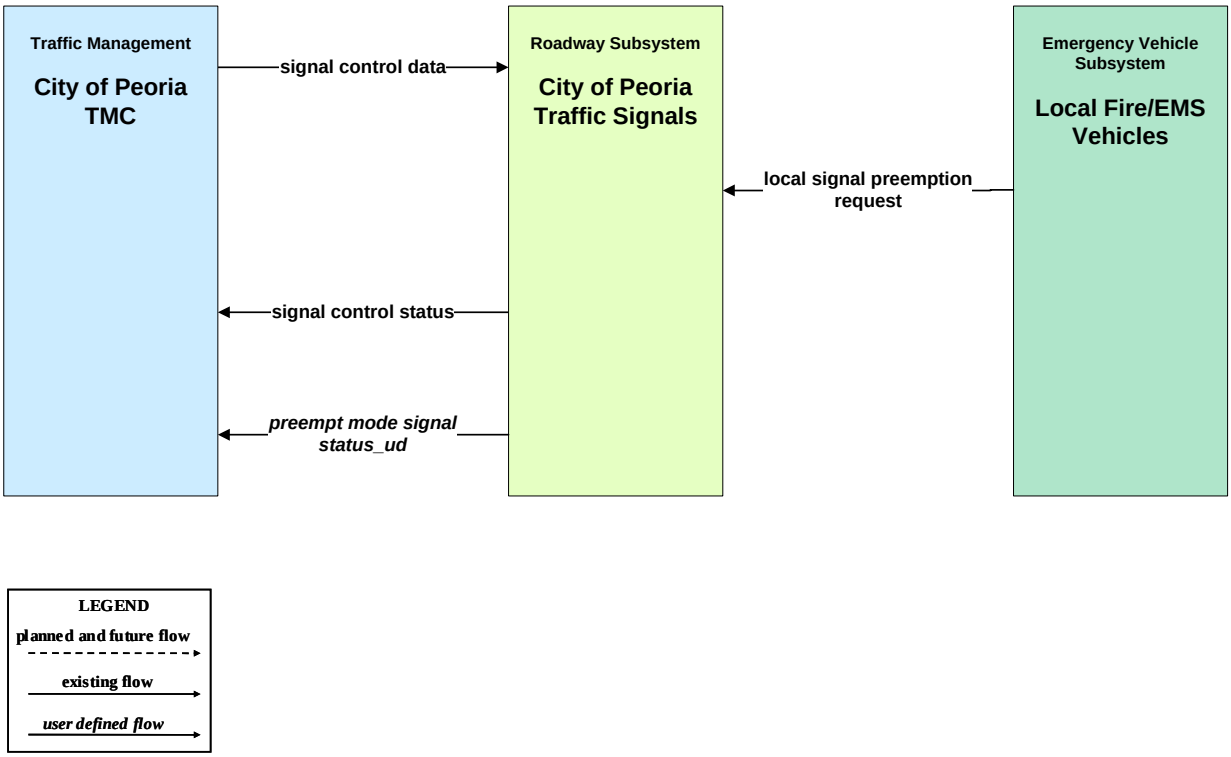


Figure 90: EM02 – Emergency Routing:
City of Scottsdale

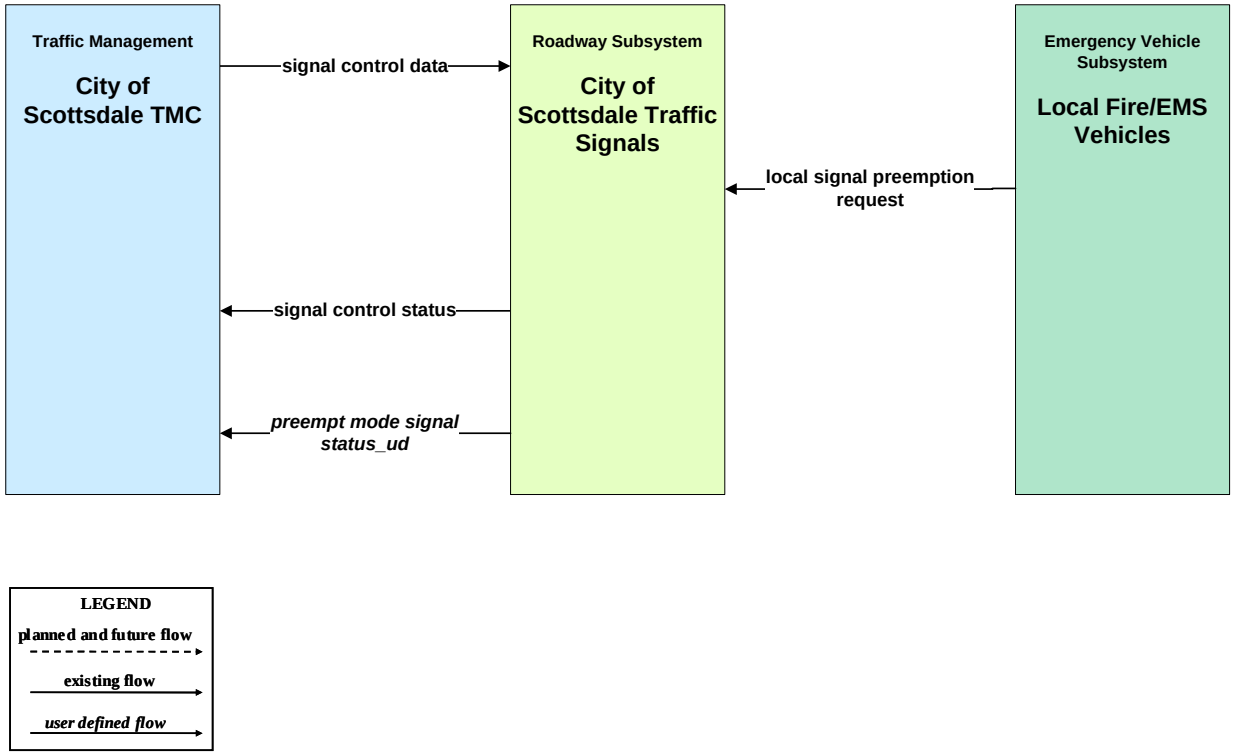


Figure 91: EM02 – Emergency Routing: City of Surprise

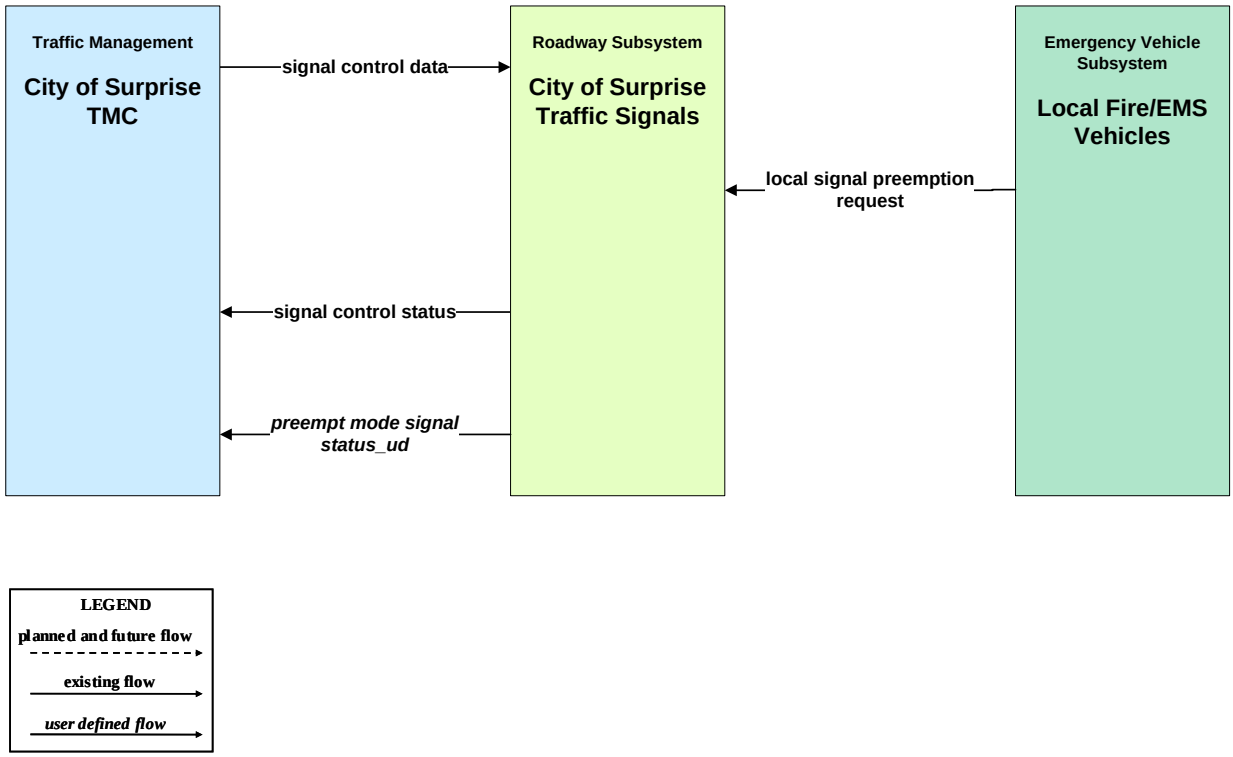


Figure 92: EM02 – Emergency Routing: City of Tempe

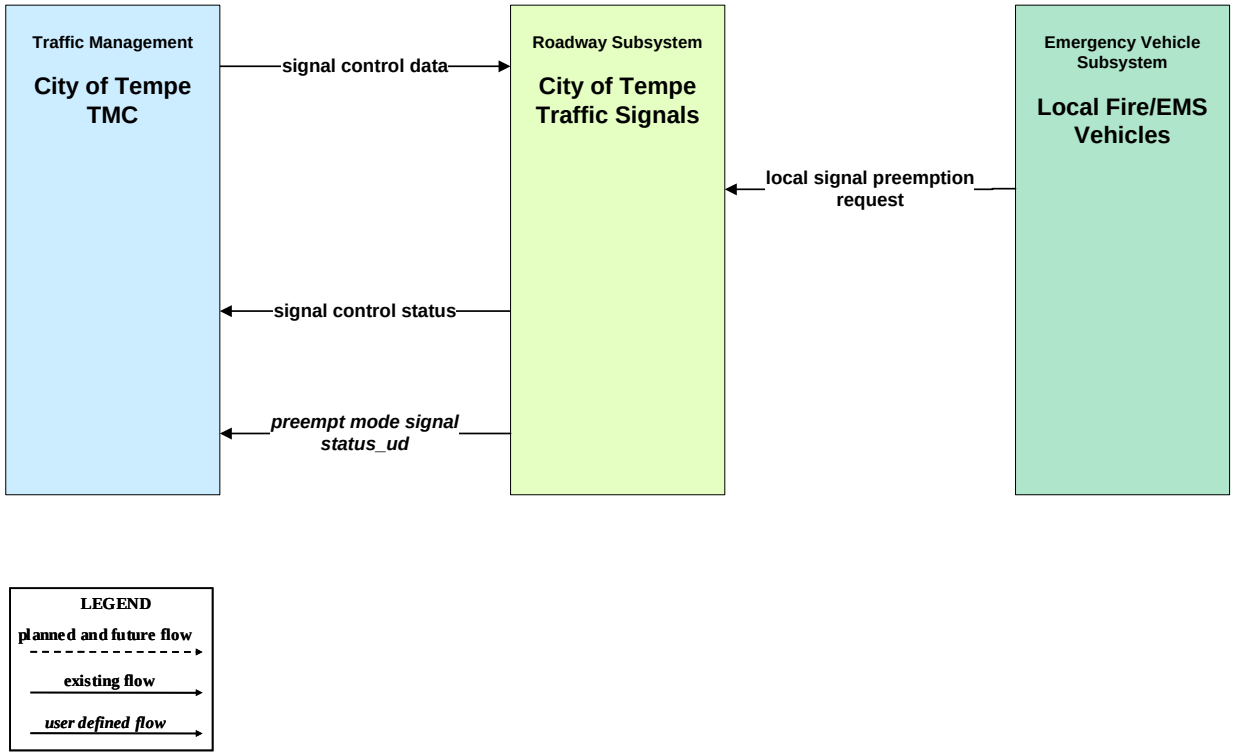


Figure 93: EM02 – Emergency Routing:
Local Cities and Municipalities – Generic

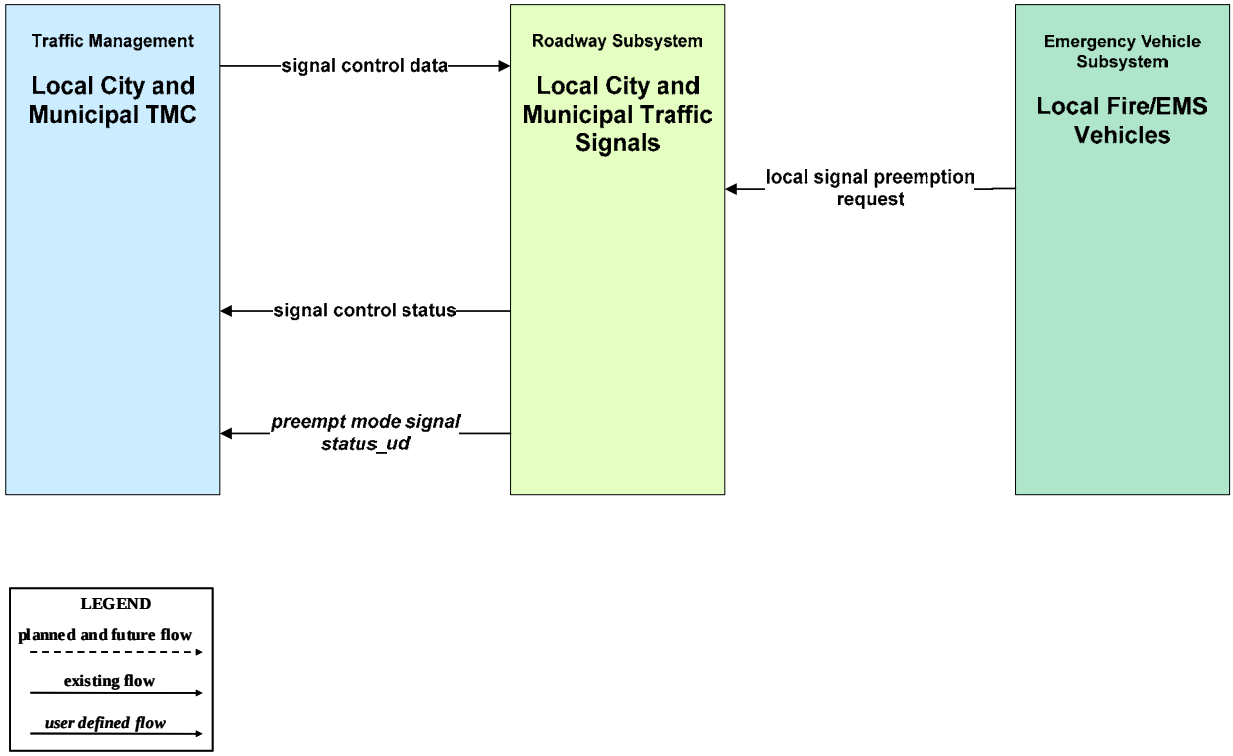


Figure 94: EM02 – Emergency Routing:
Town of Queen Creek

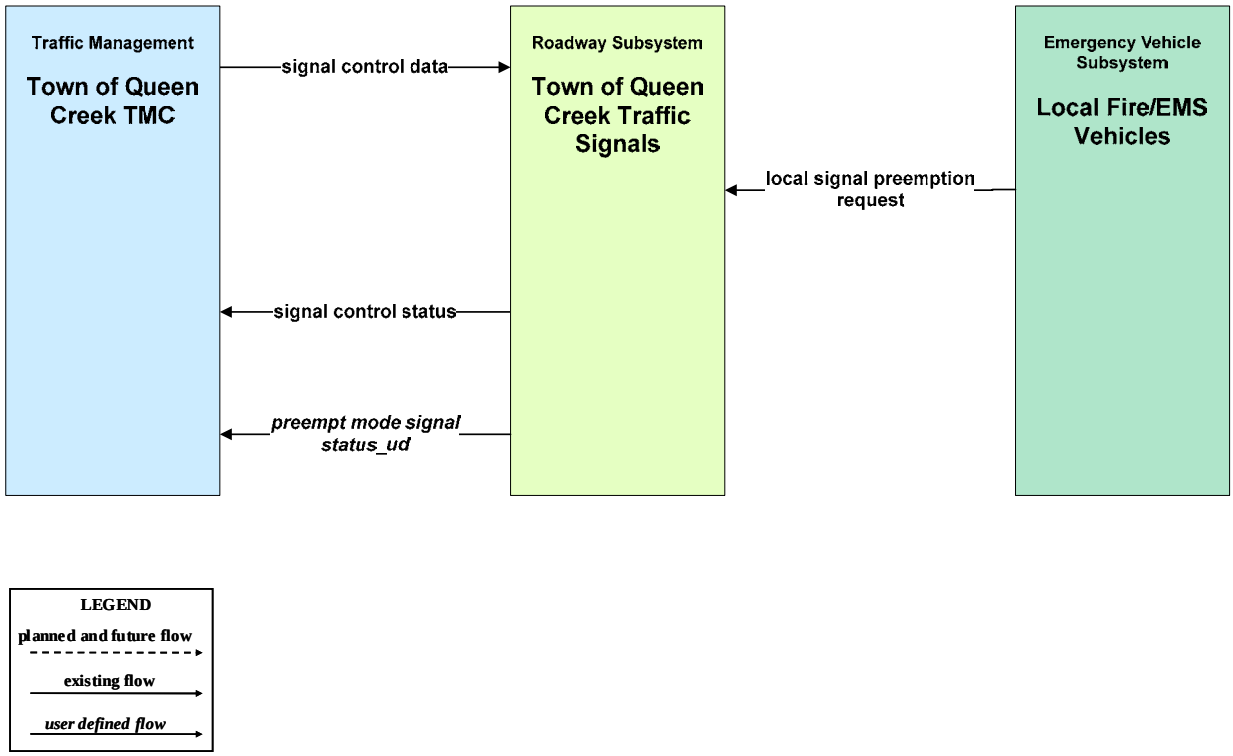


Figure 95: EM04 – Roadway Services Patrols:
Arizona DPS Freeway Service Patrol

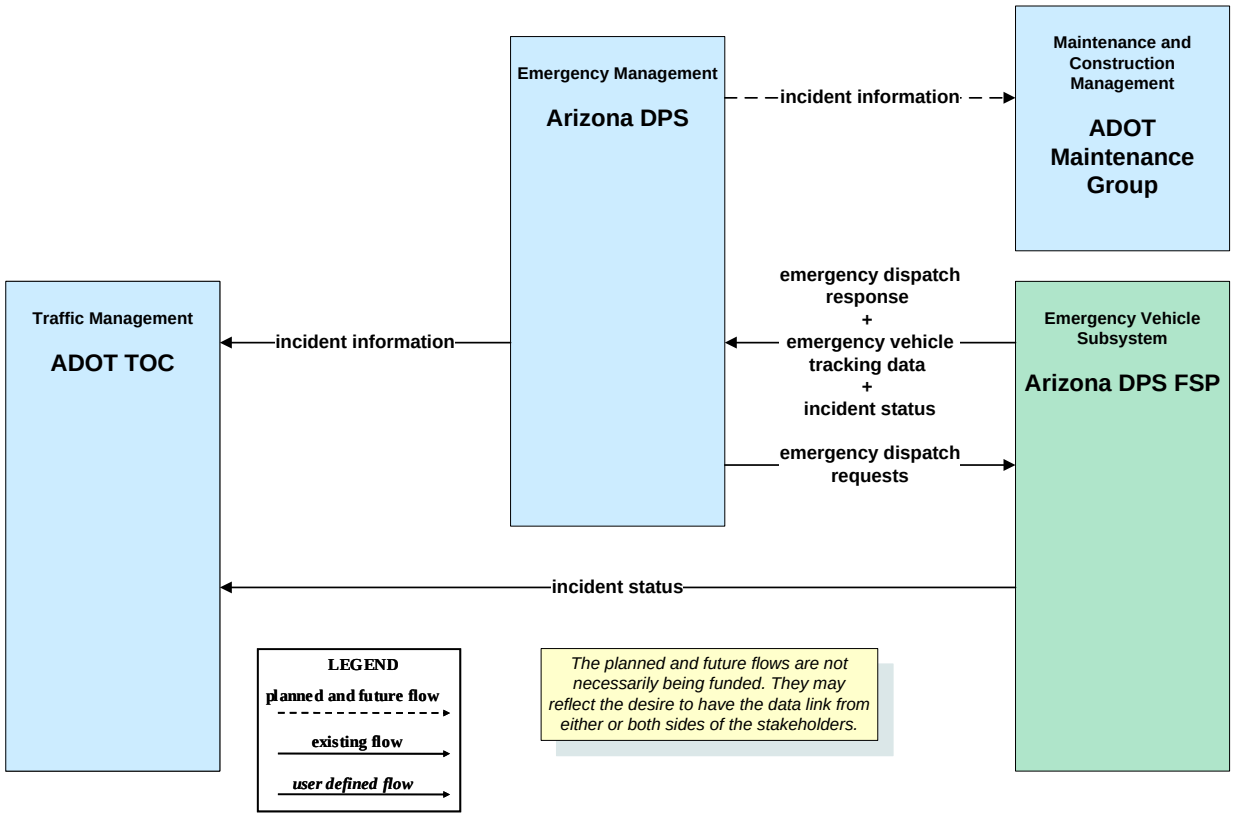


Figure 96: EM06 – Wide Area Alert:
ADEM State Emergency Operations Center (SEOC)

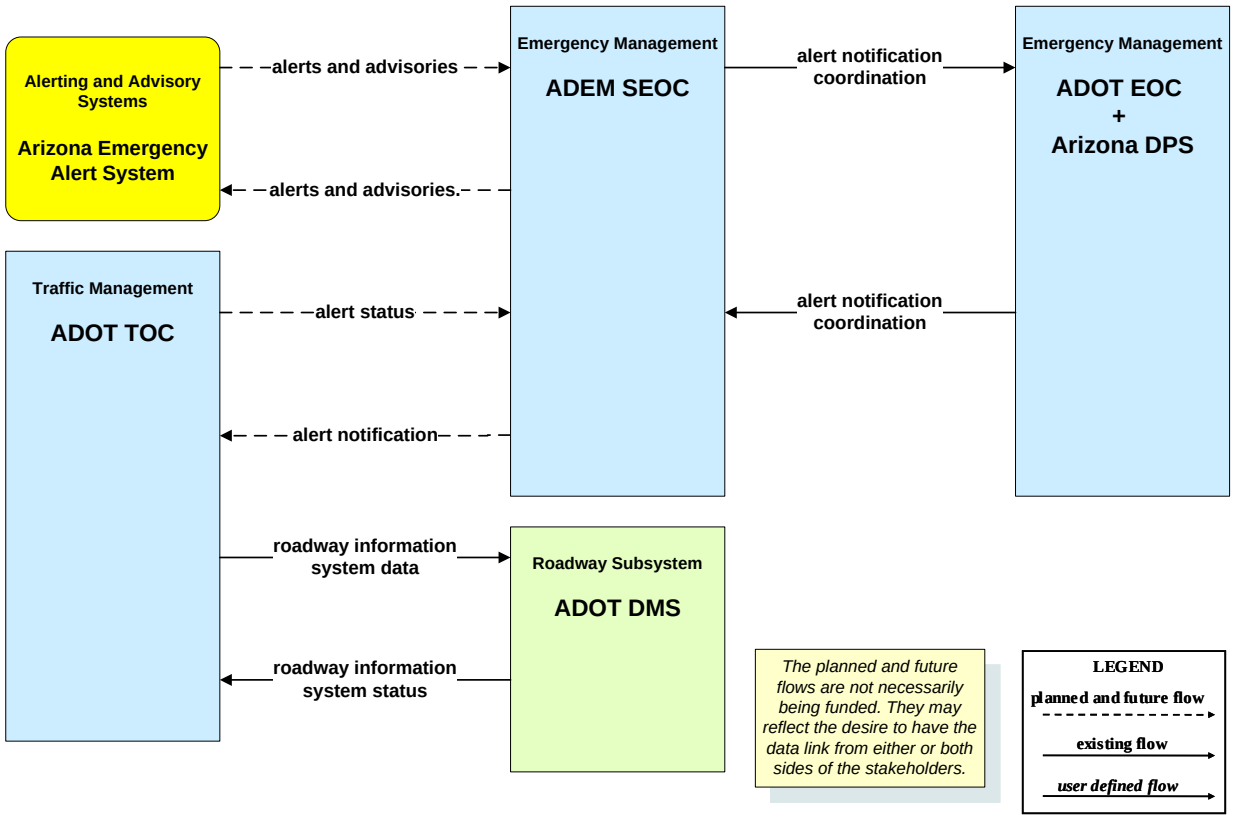


Figure 97: EM06 – Wide Area Alert: Maricopa County

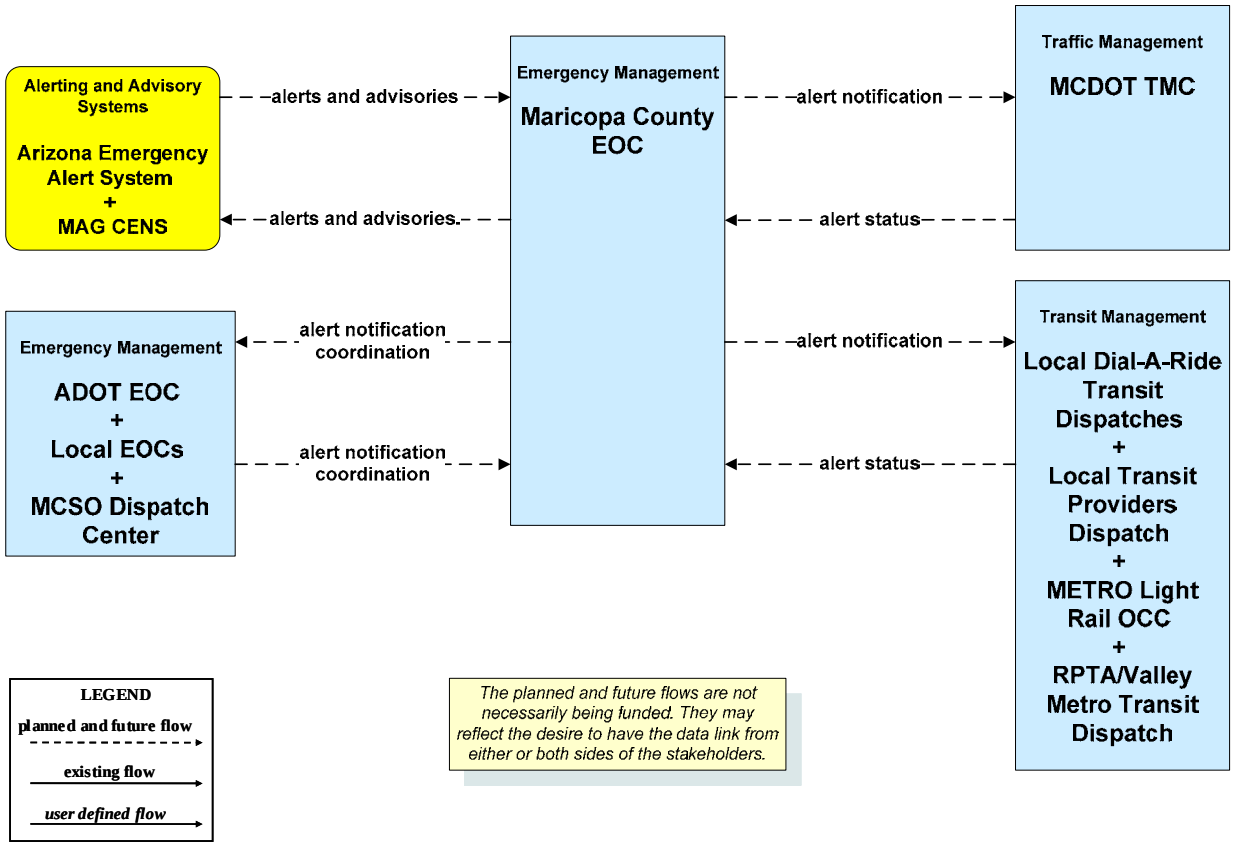


Figure 98: EM06 – Wide Area Alert:
Local EOCs (1 of 2)

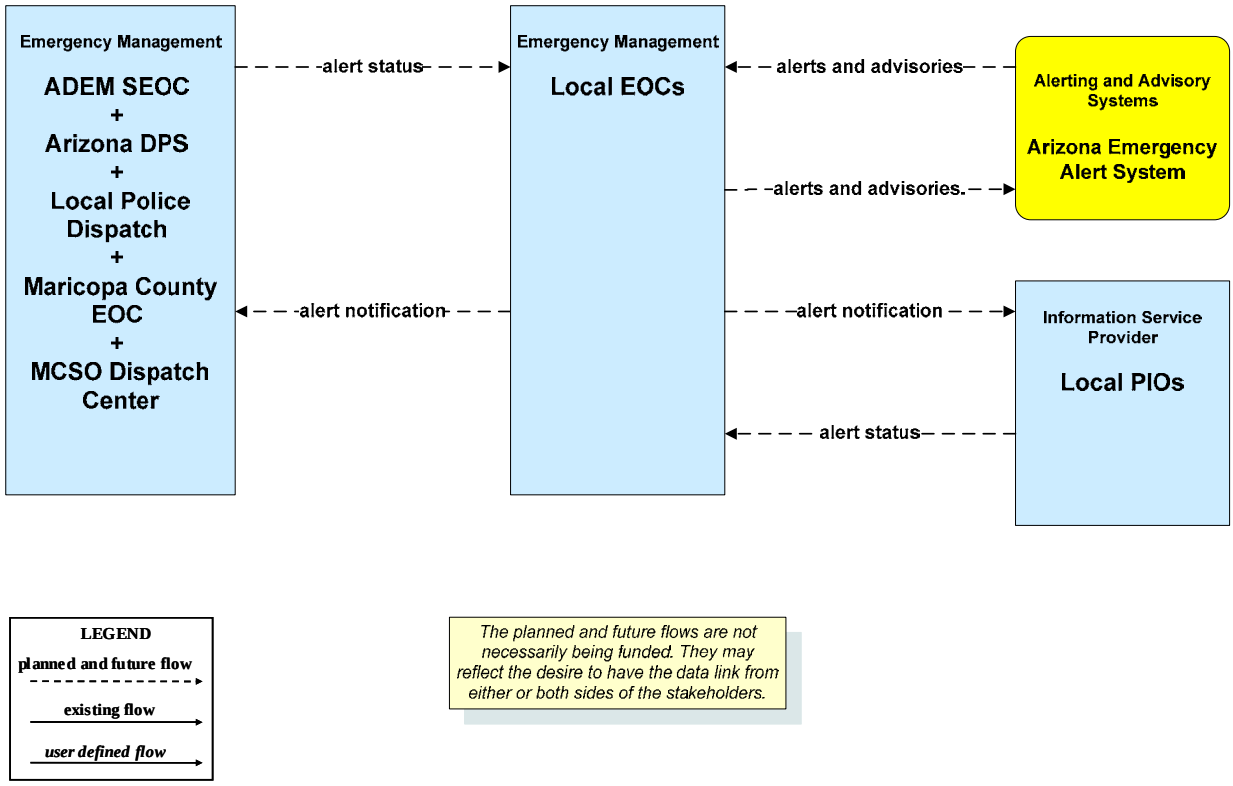


Figure 99: EM06 – Wide Area Alert:
Local EOCs (2 of 2)

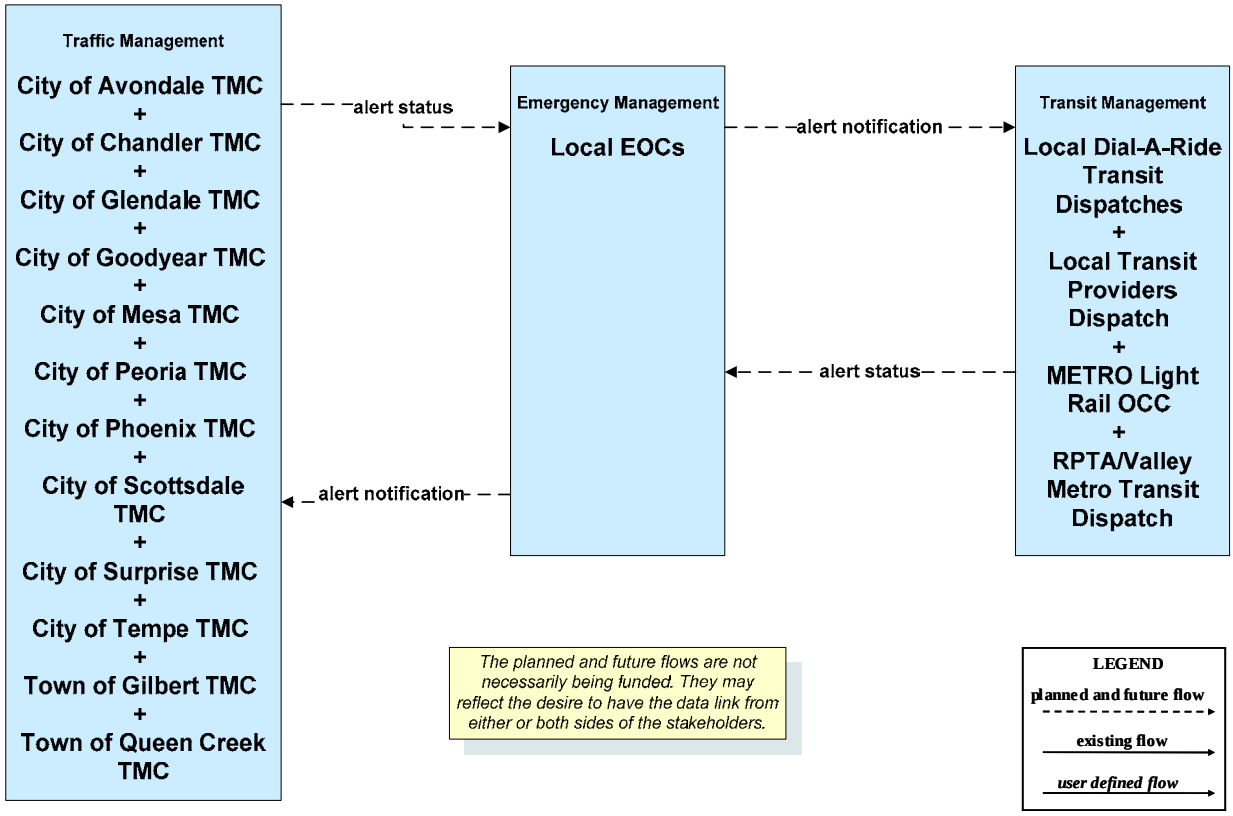


Figure 100: EM06 – Wide Area Alert: Local EOCs - Generic

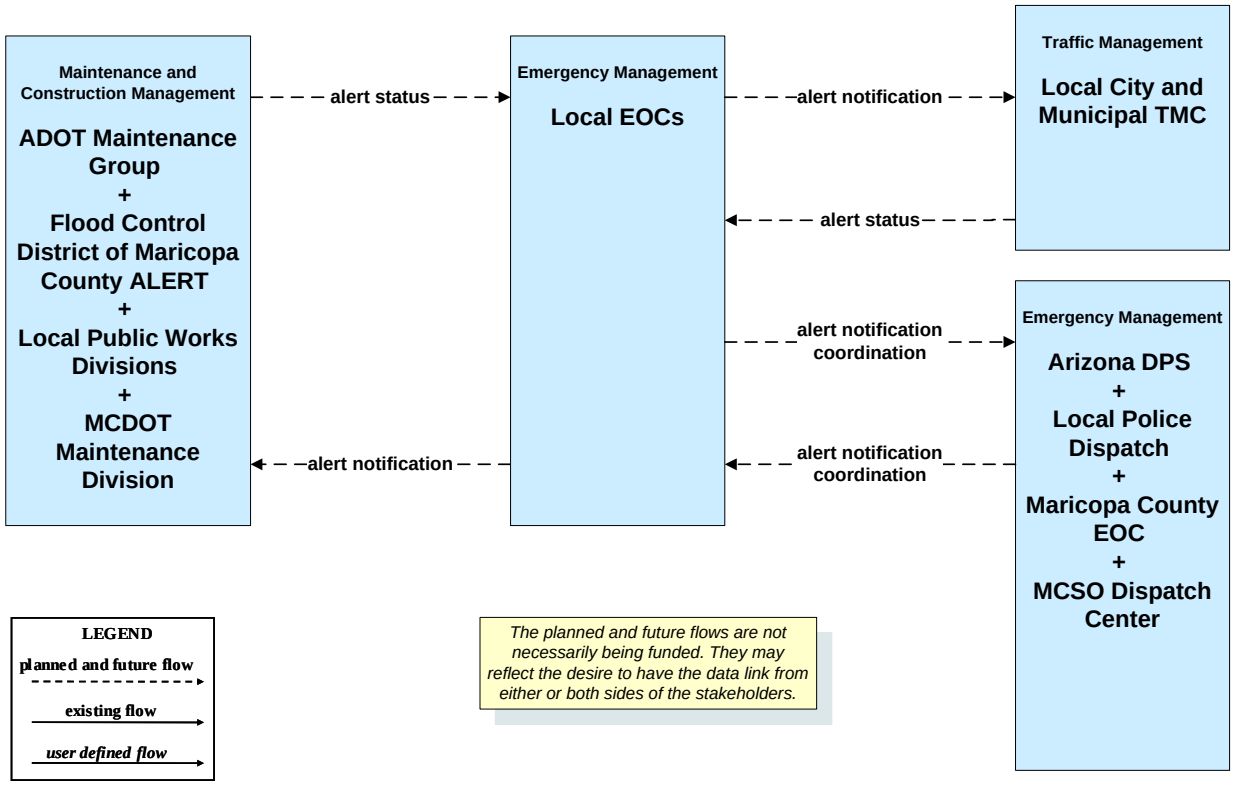


Figure 101: EM06 – Wide Area Alert: Amber Alerts

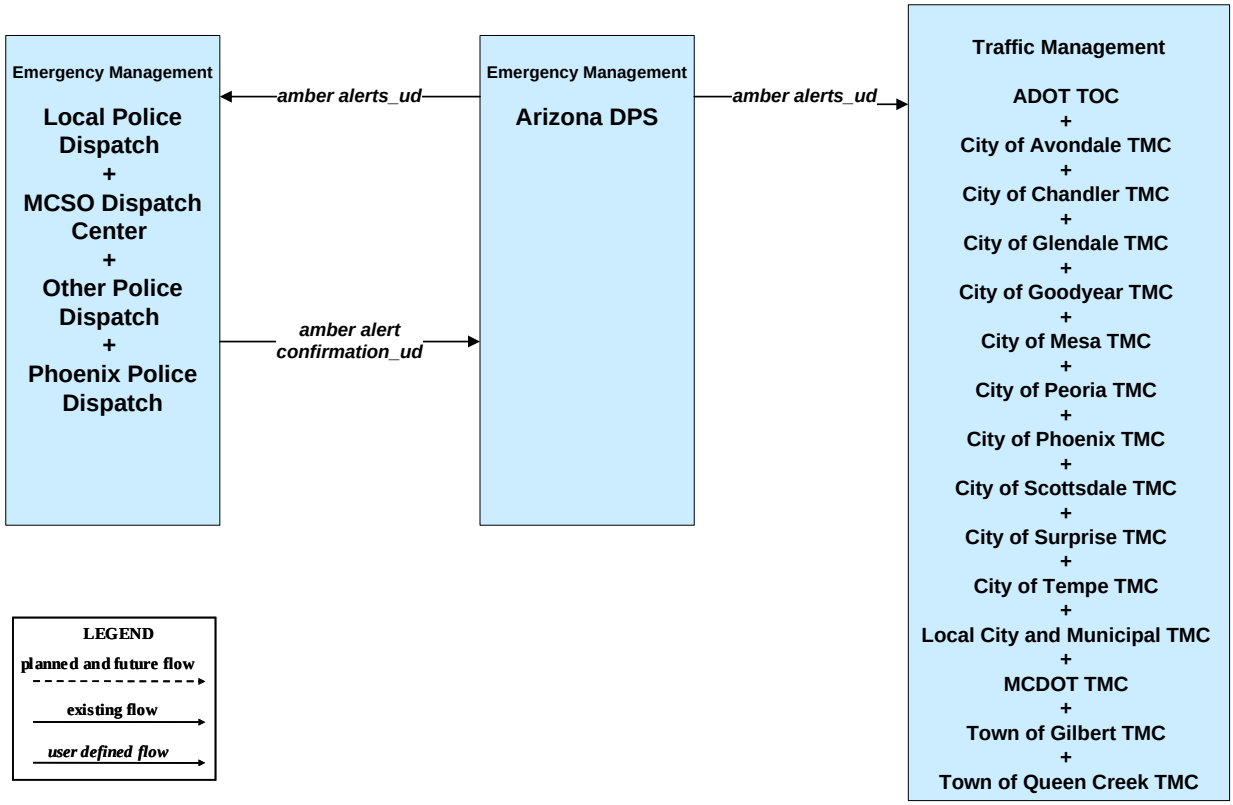


Figure 102: EM07 – Early Warning Systems:
ADEM State Emergency Operations Center (SEOC)

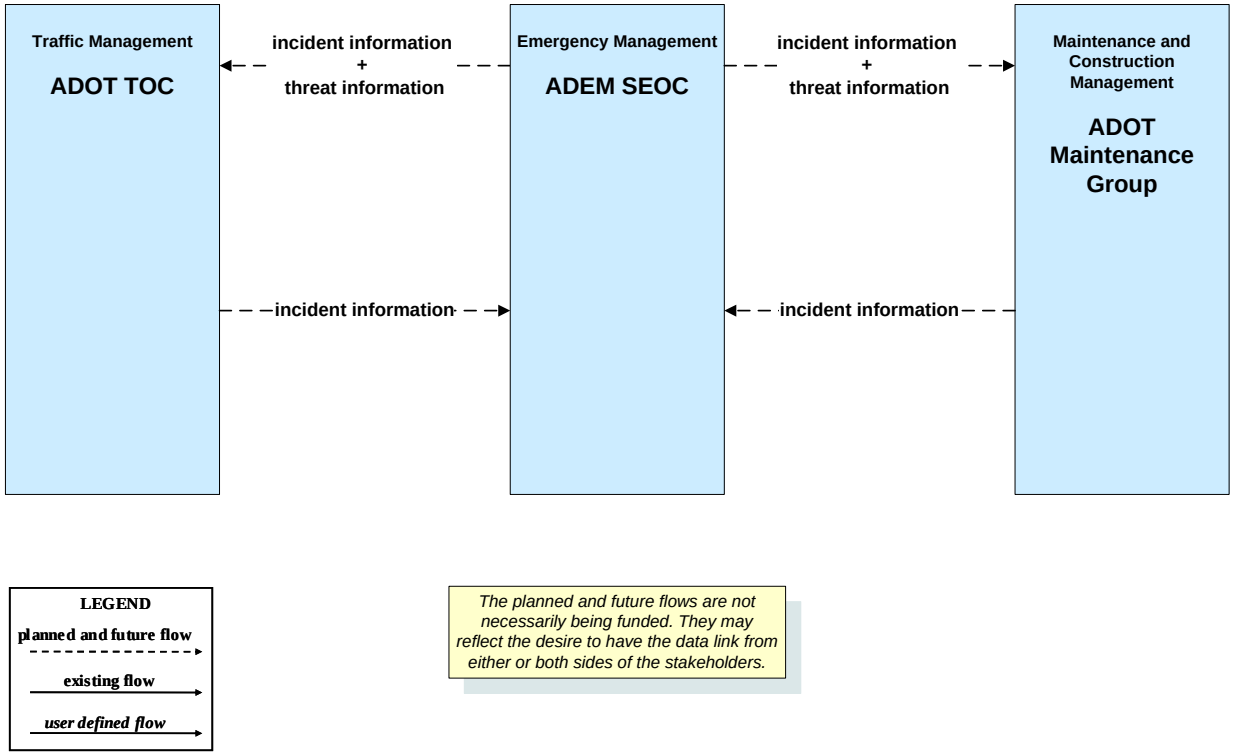


Figure 103: EM07 – Early Warning Systems: Maricopa County EOC

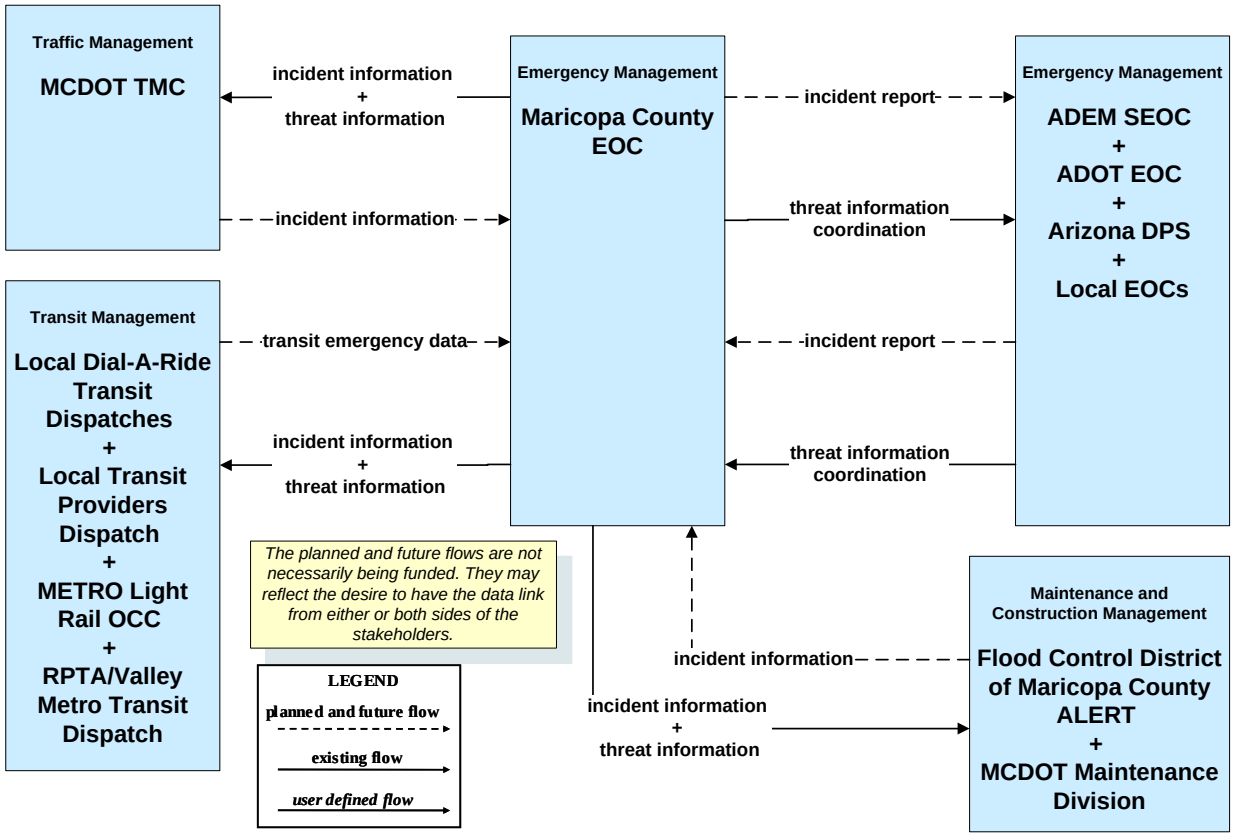


Figure 104: EM07 – Early Warning Systems: Local EOCs

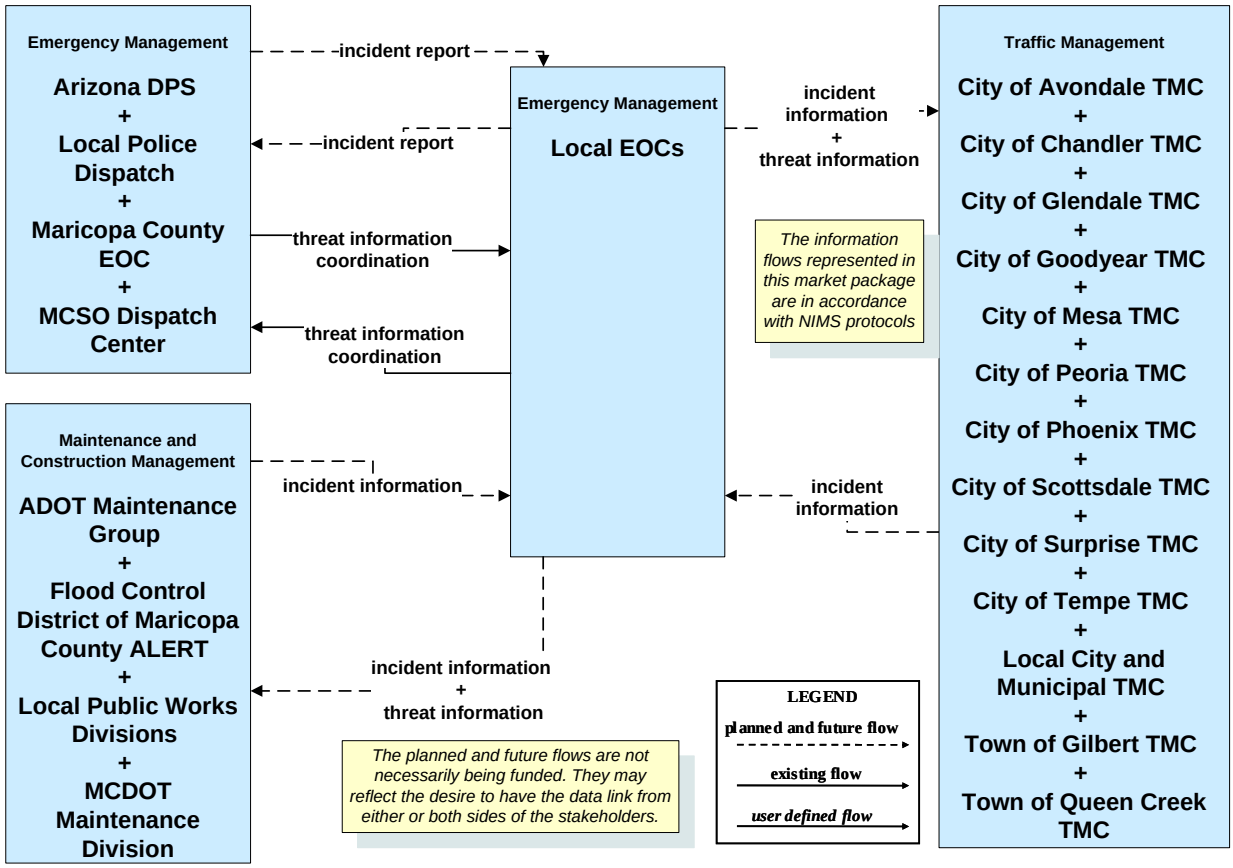


Figure 105: EM10 – Disaster Traveler Information: ADEM State Emergency Operations Center (SEOC)

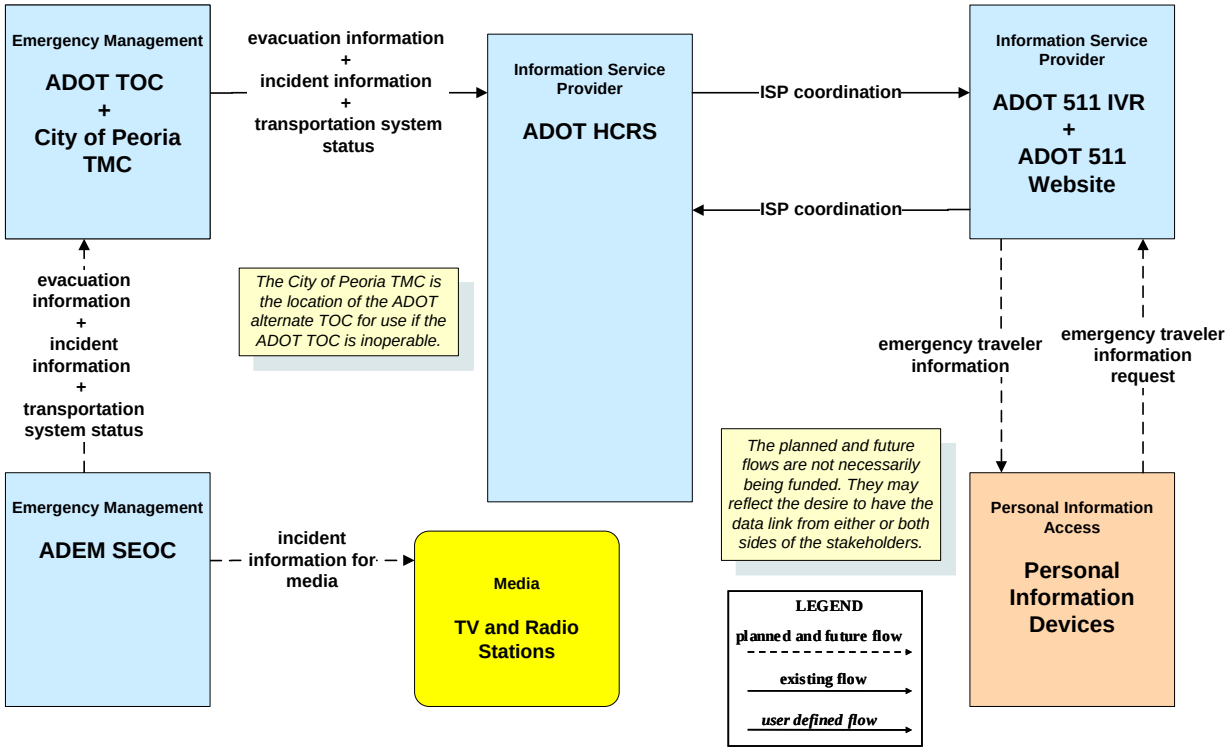


Figure 106: MC03 – Road Weather Data Collection:
Flood Control District of Maricopa County

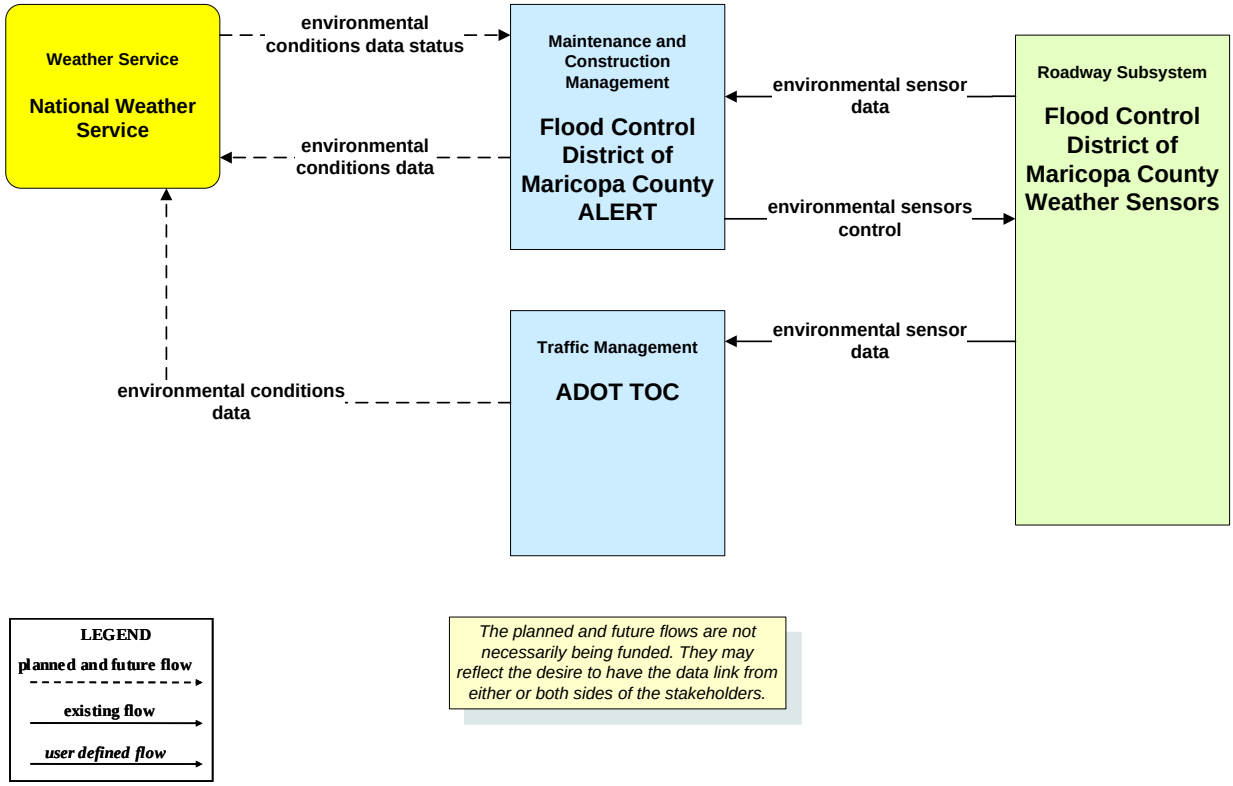


Figure 107: MC04 – Weather Information Processing and Distribution: Flood Control District of Maricopa County – State of Arizona

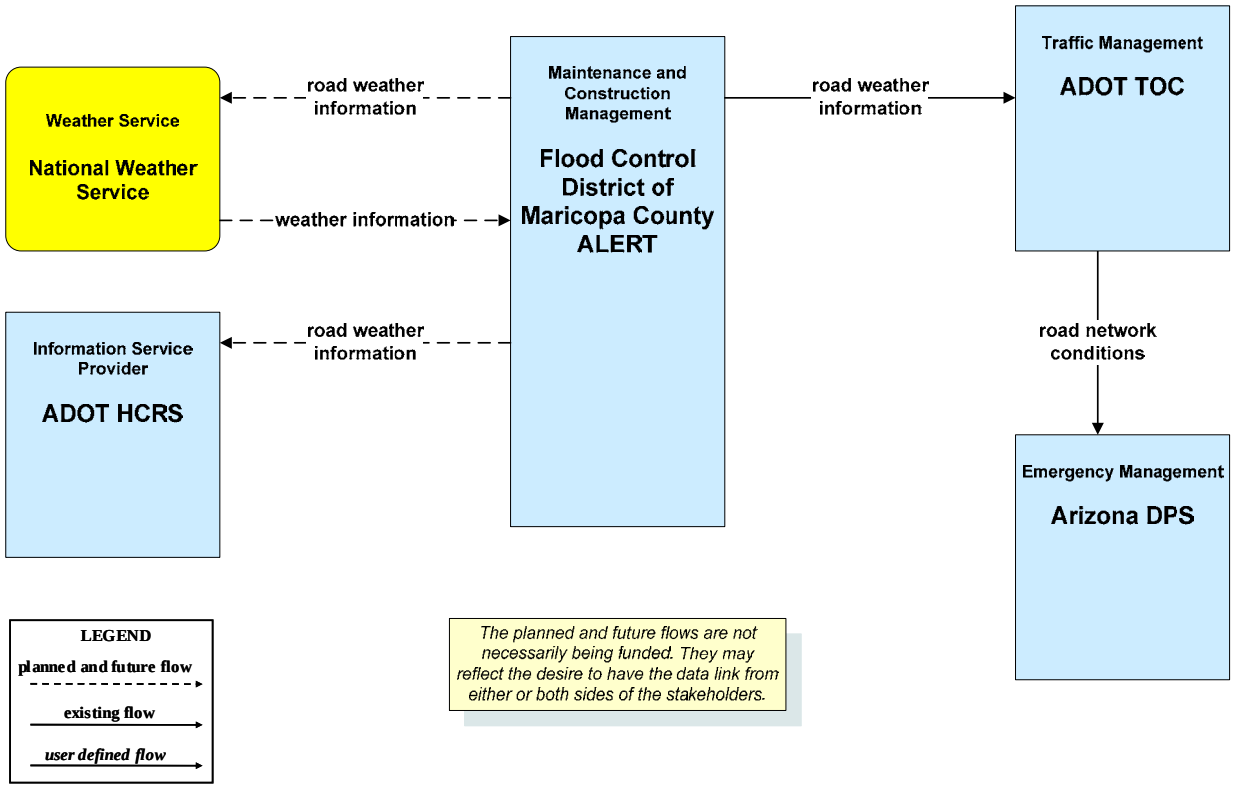


Figure 108: MC04 – Weather Information Processing and Distribution: Flood Control District of Maricopa County – Maricopa County

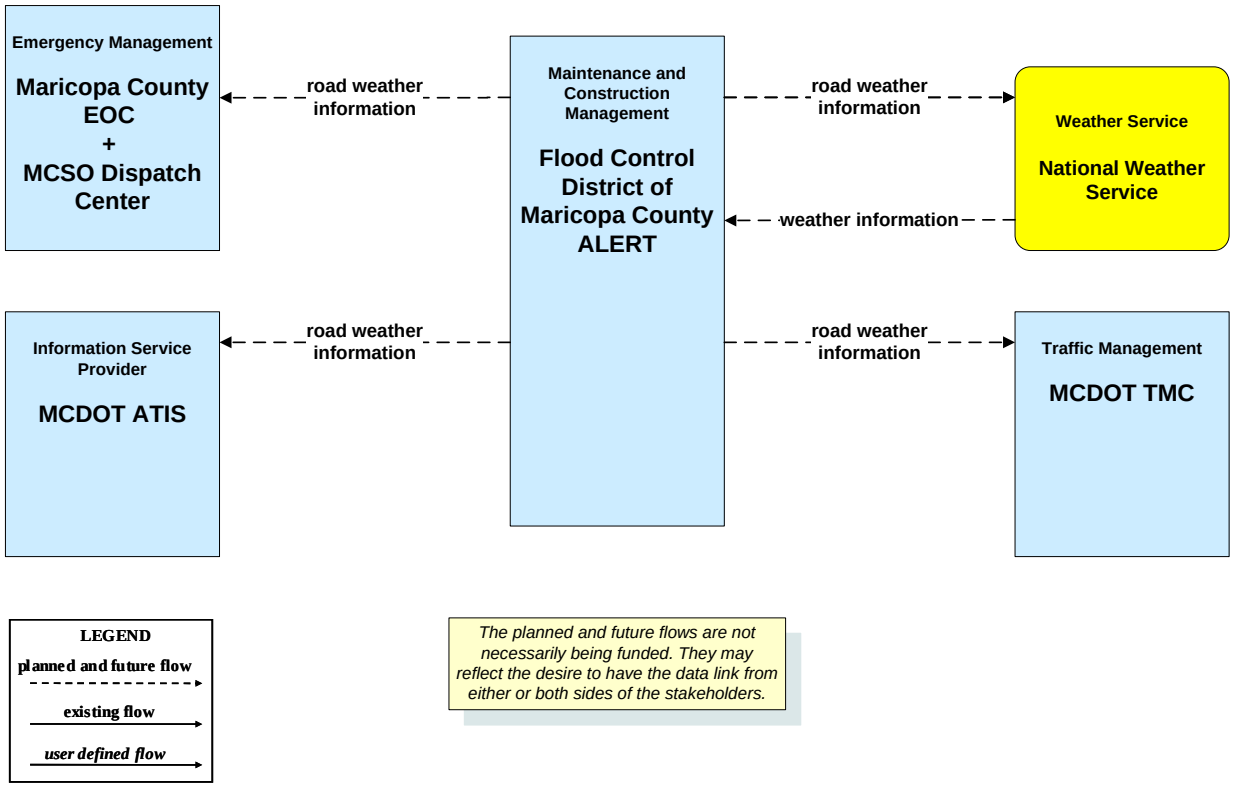


Figure 109: MC04 – Weather Information Processing and Distribution: Flood Control District of Maricopa County – Cities and Municipalities

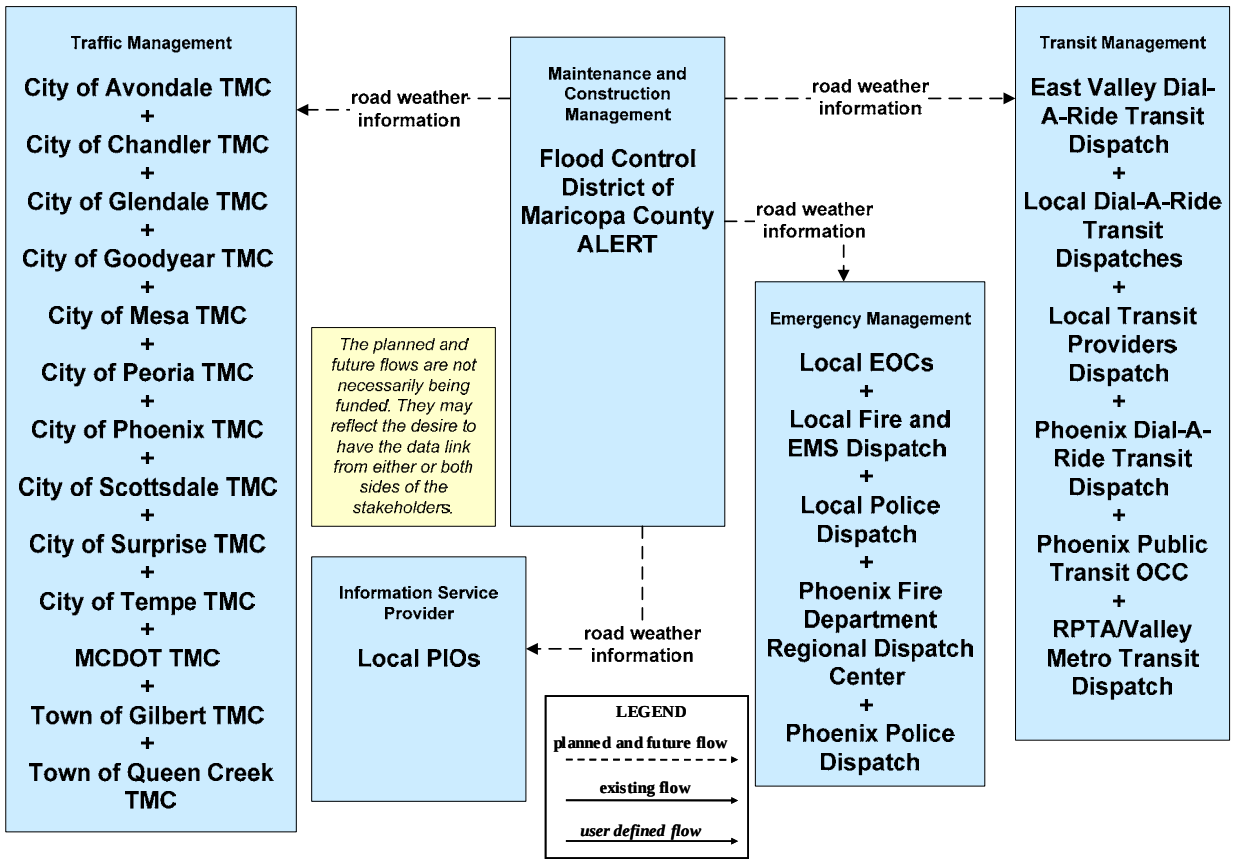


Figure 110: MC04 – Weather Information Processing and Distribution: Flood Control District of Maricopa County – Local Cities and Municipalities – Generic

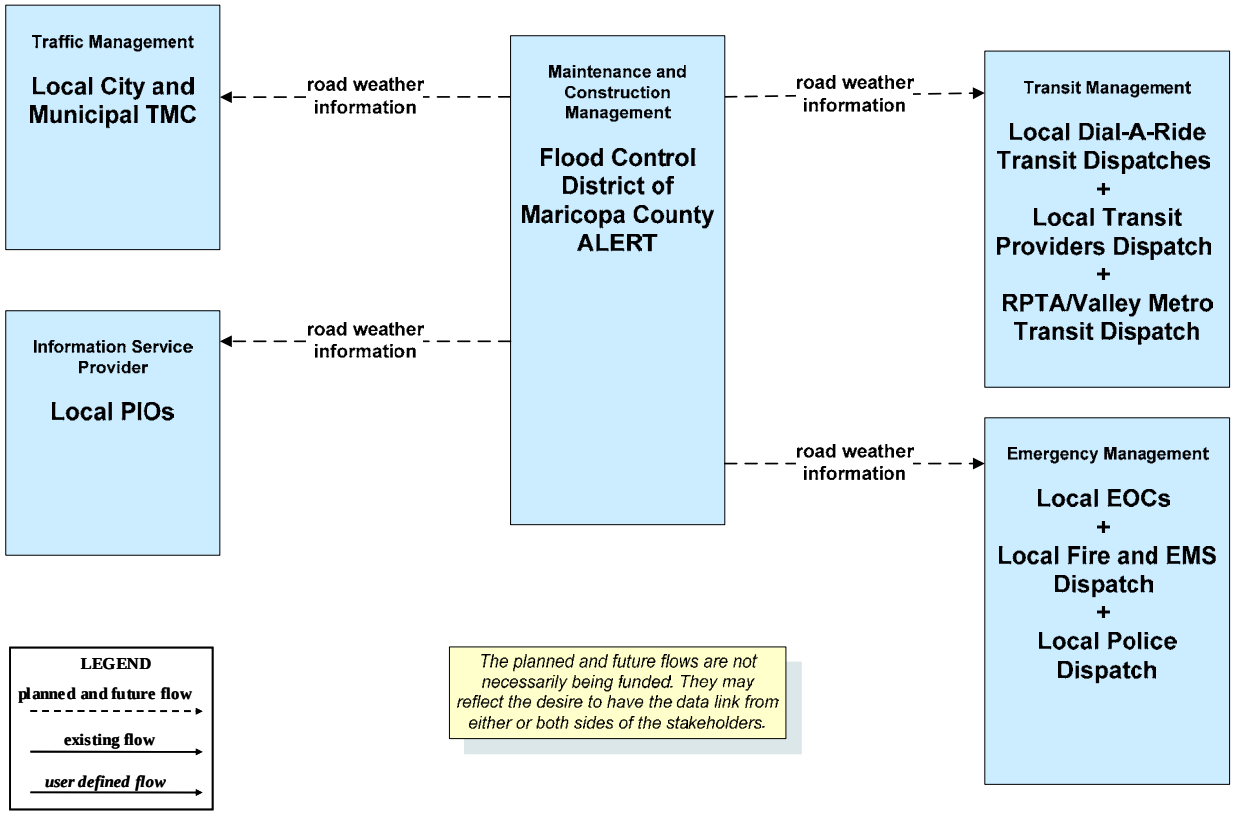


Figure 111: MC09 – Work Zone Safety Monitoring: Arizona DOT

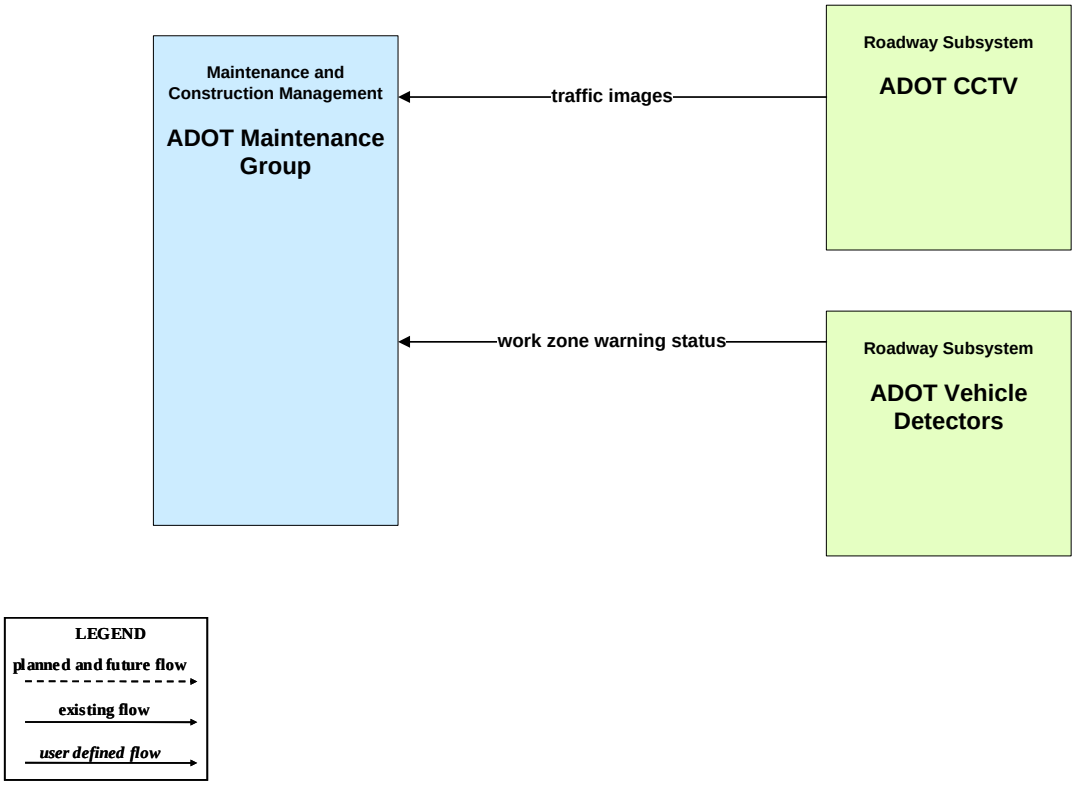


Figure 112: MC10 – Maintenance and Construction Activity Coordination: Arizona DOT

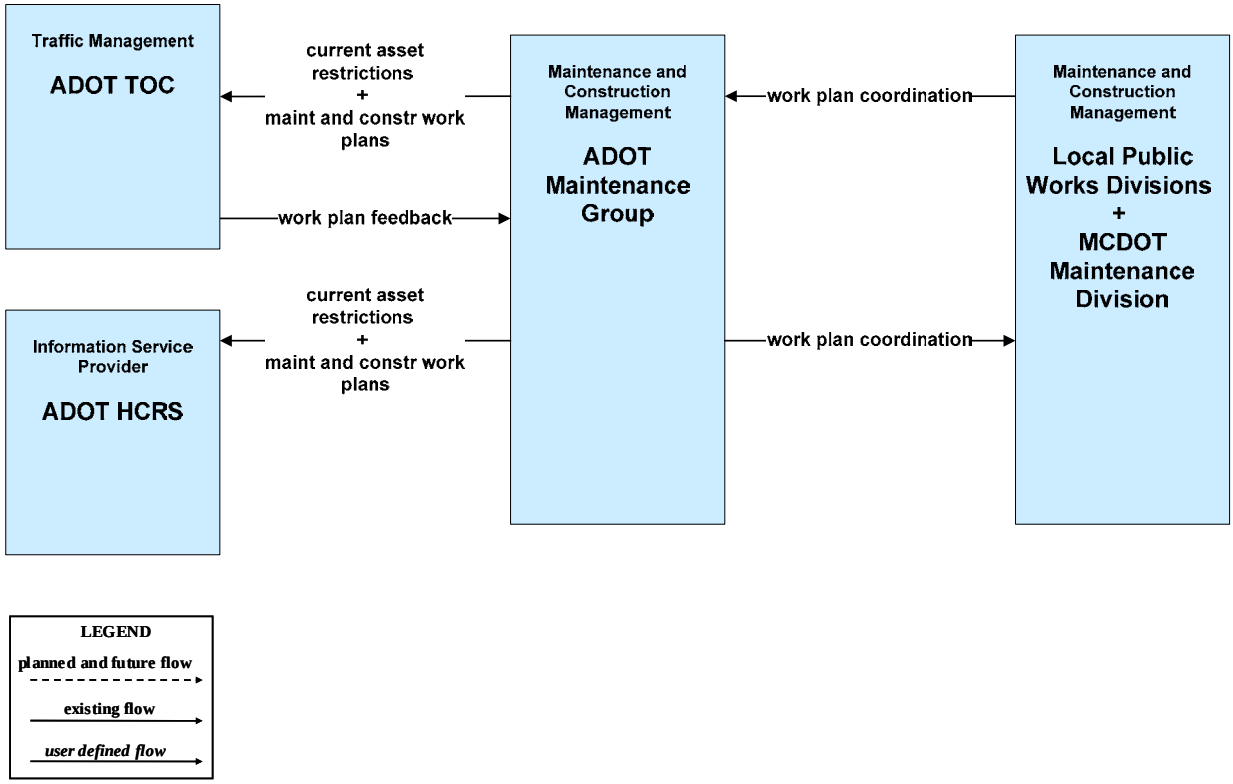


Figure 113: MC10 – Maintenance and Construction Activity Coordination: Maricopa County

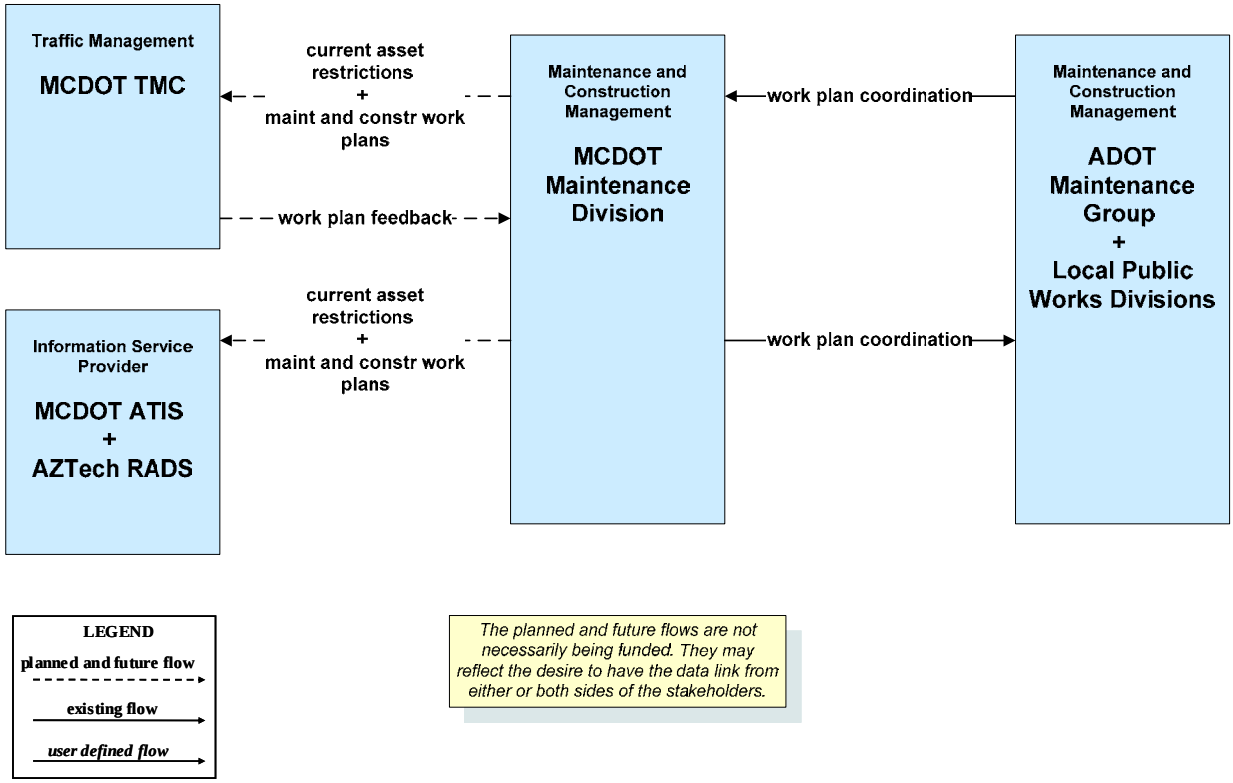


Figure 114: MC10 - Maintenance and Construction Activity Coordination: Local Cities and Municipalities

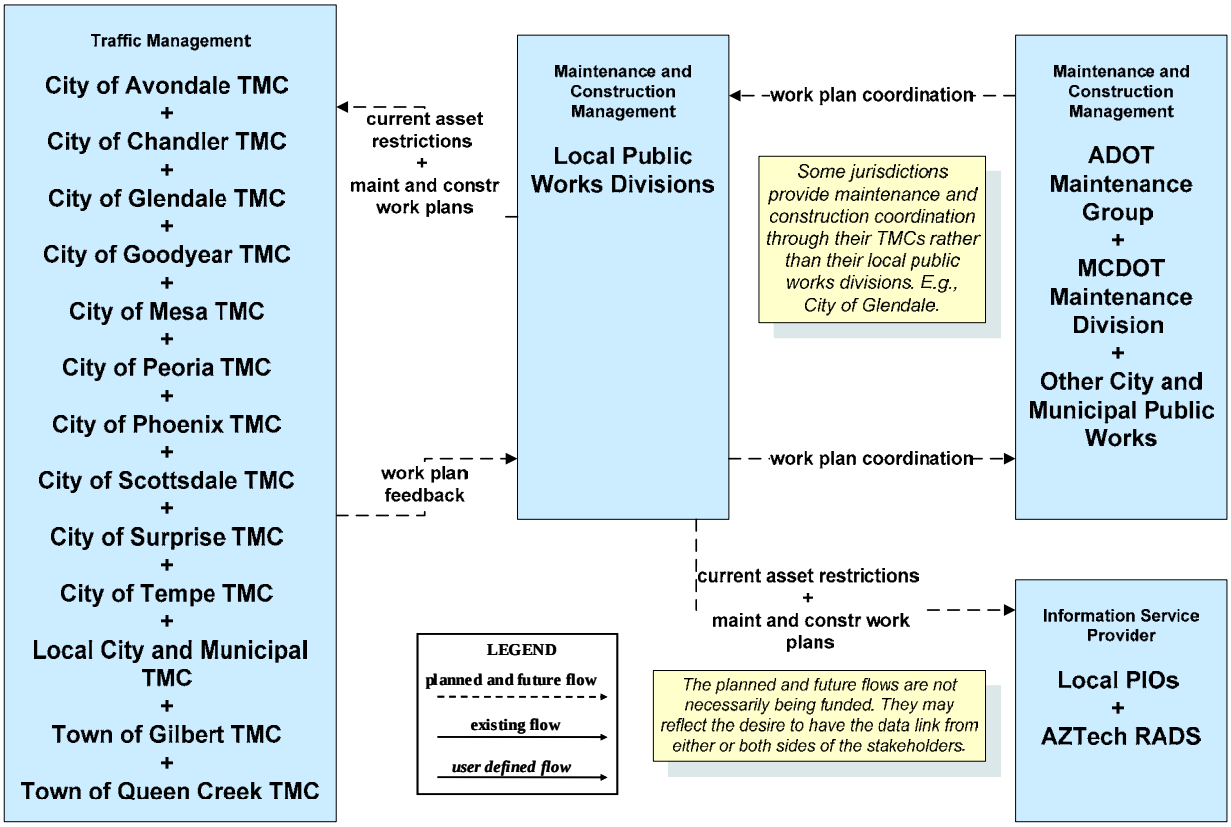


Figure 115: AD1: ITS Data Mart
ADOT Archive

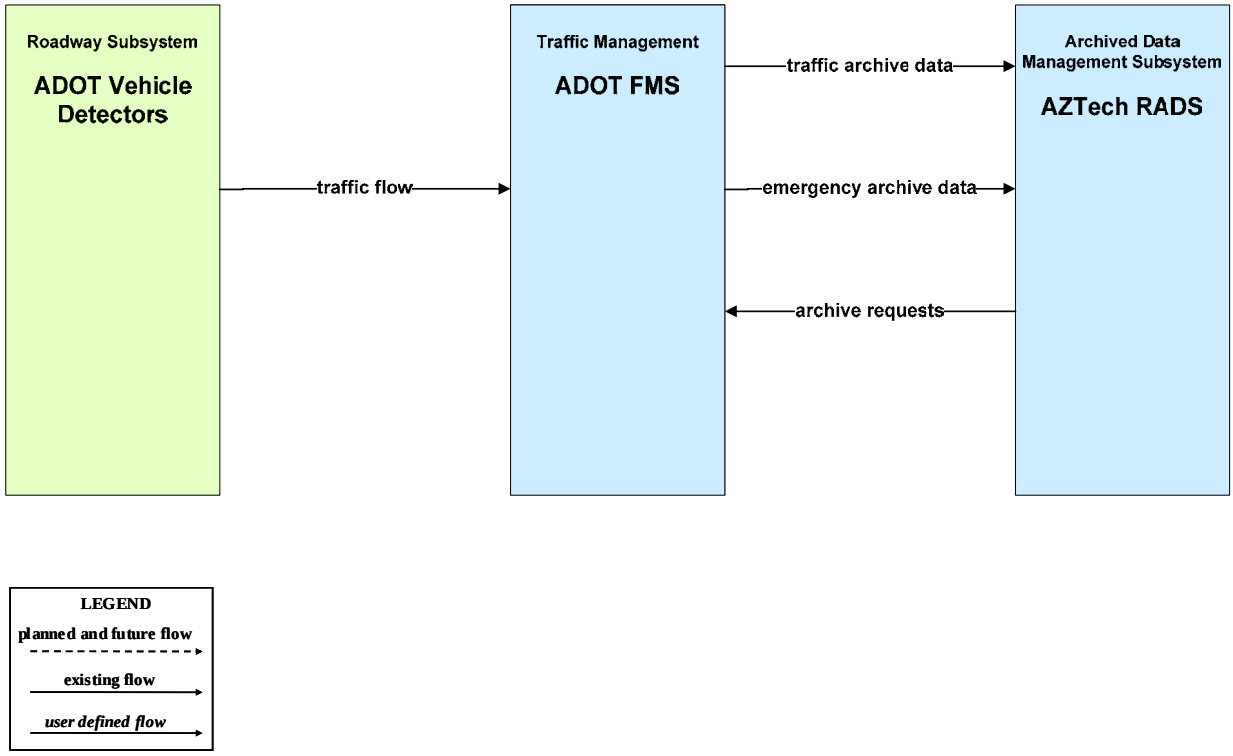


Figure 116: AD1: ITS Data Mart
Maricopa County

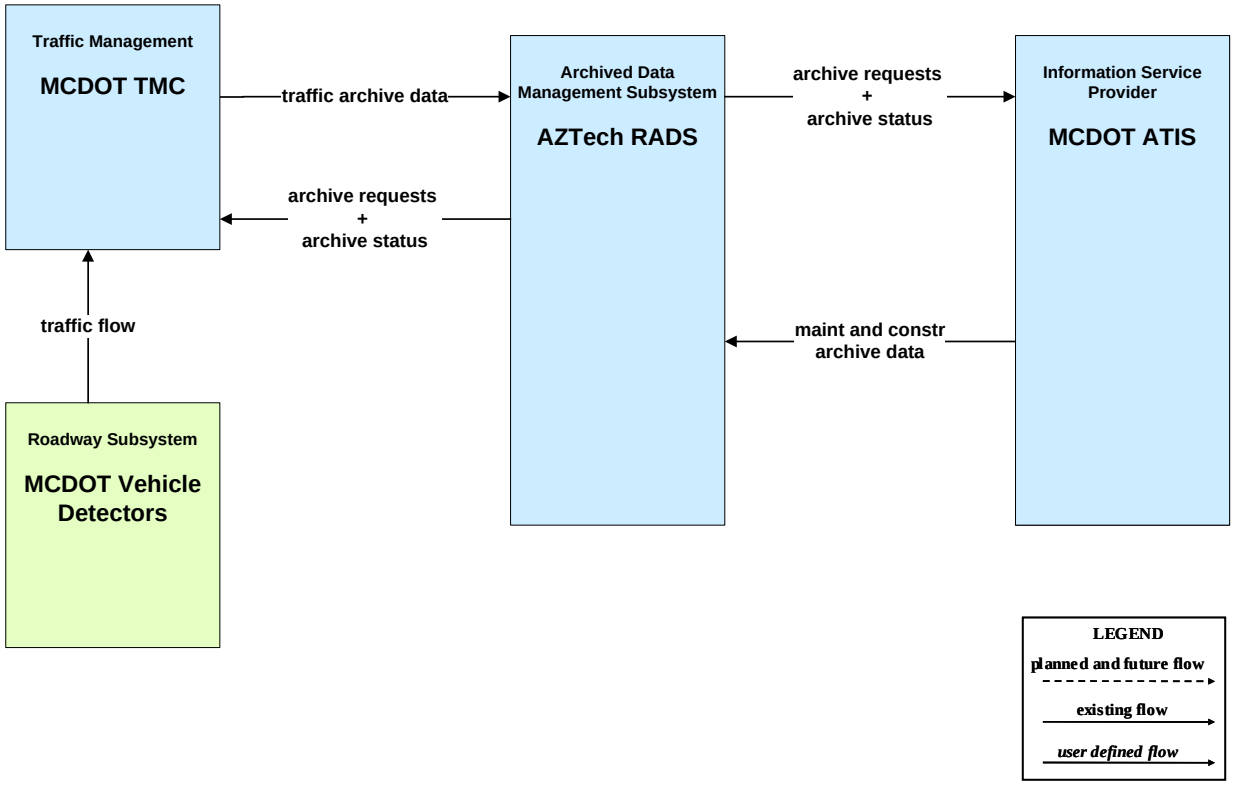


Figure 117: AD1: ITS Data Mart
Local Archives

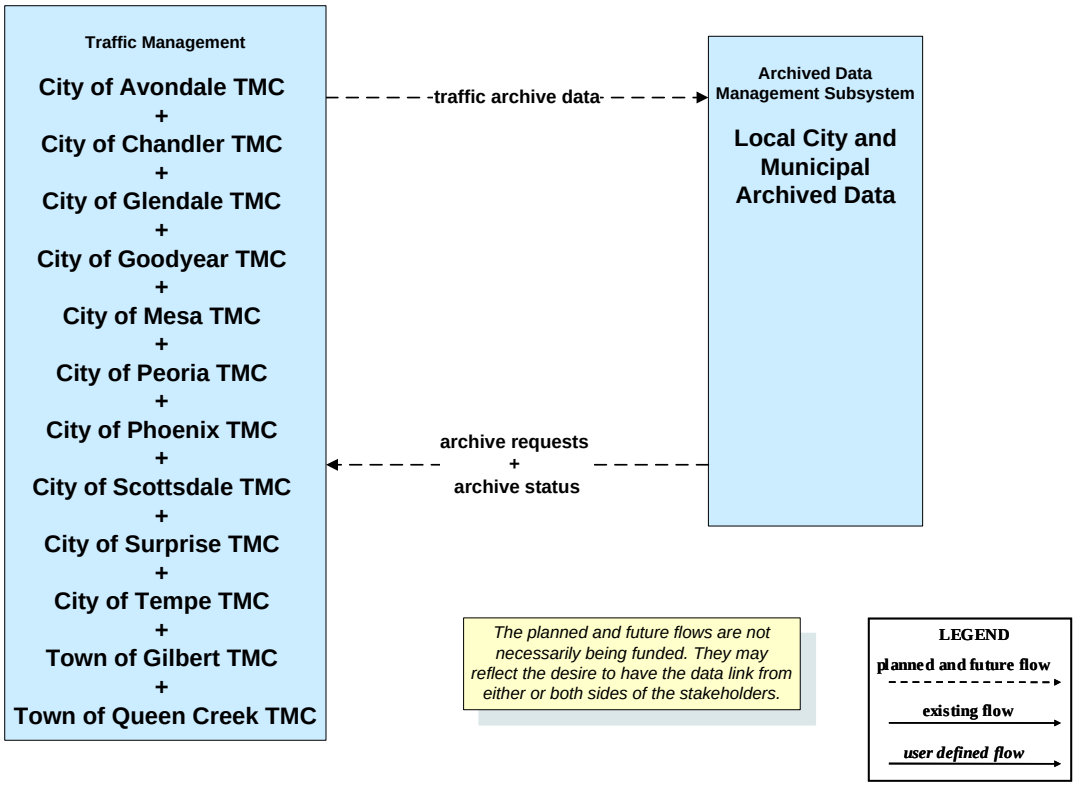


Figure 118: AD1: ITS Data Mart
Local Archives - Generic

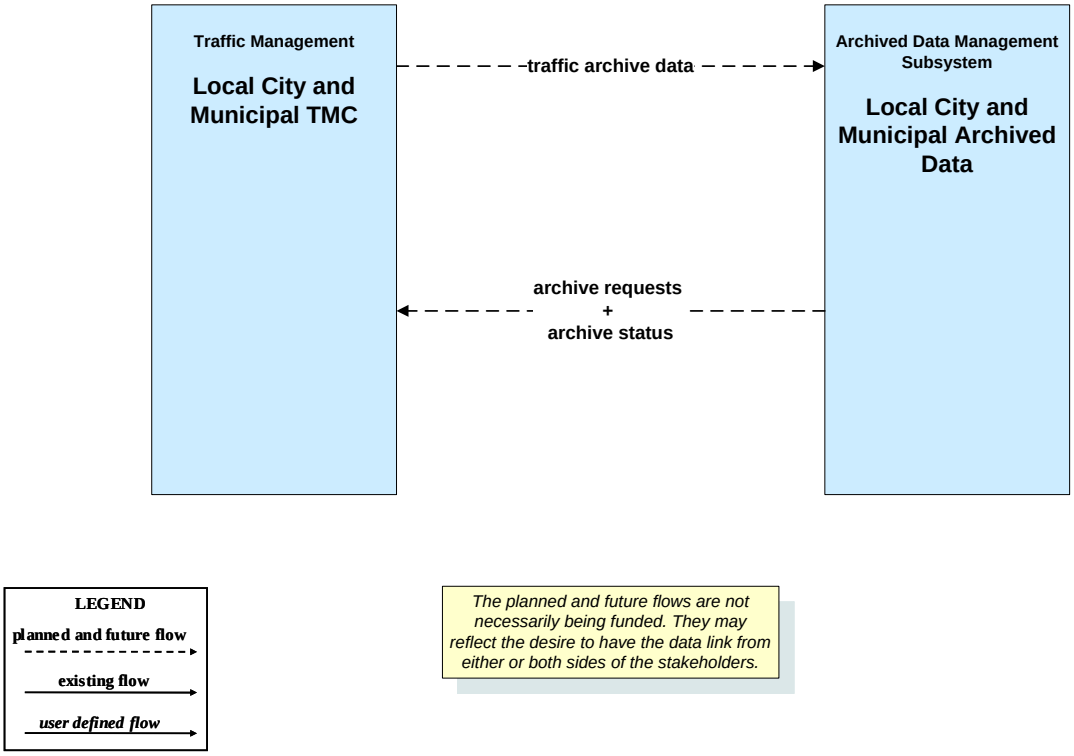


Figure 119: AD1: ITS Data Mart
RPTA/Valley Metro

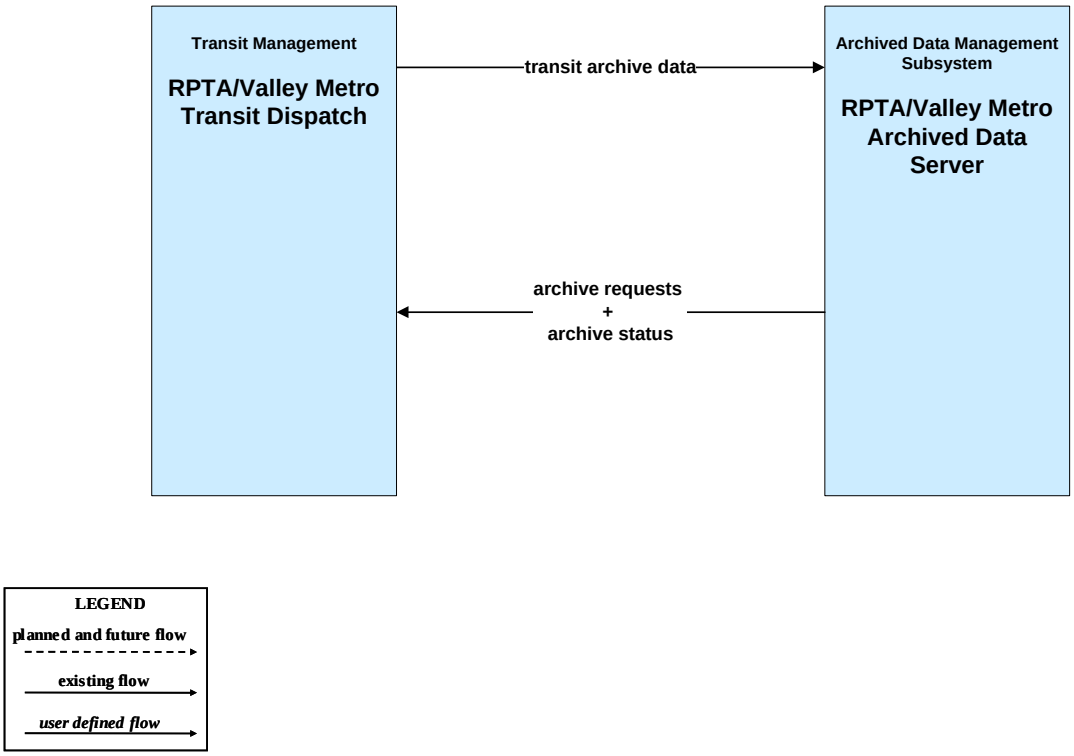


Figure 120: AD1: ITS Data Mart
METRO Light Rail

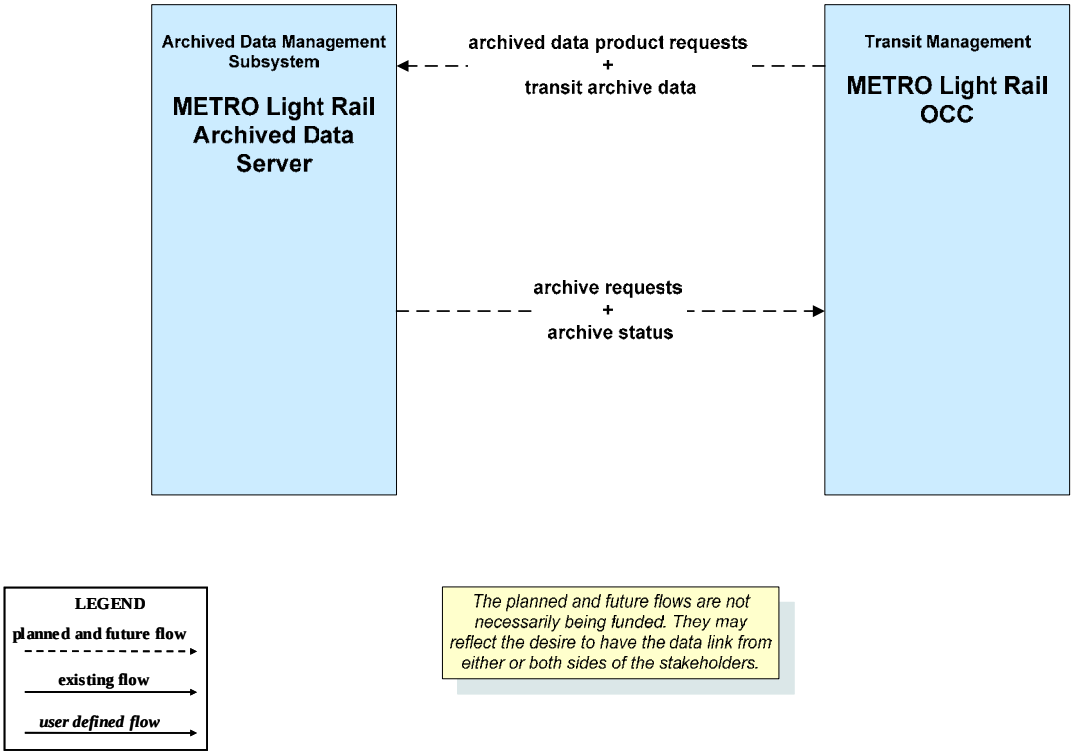


Figure 121: AD1: ITS Data Mart
Local Dial-A-Ride Transit Systems

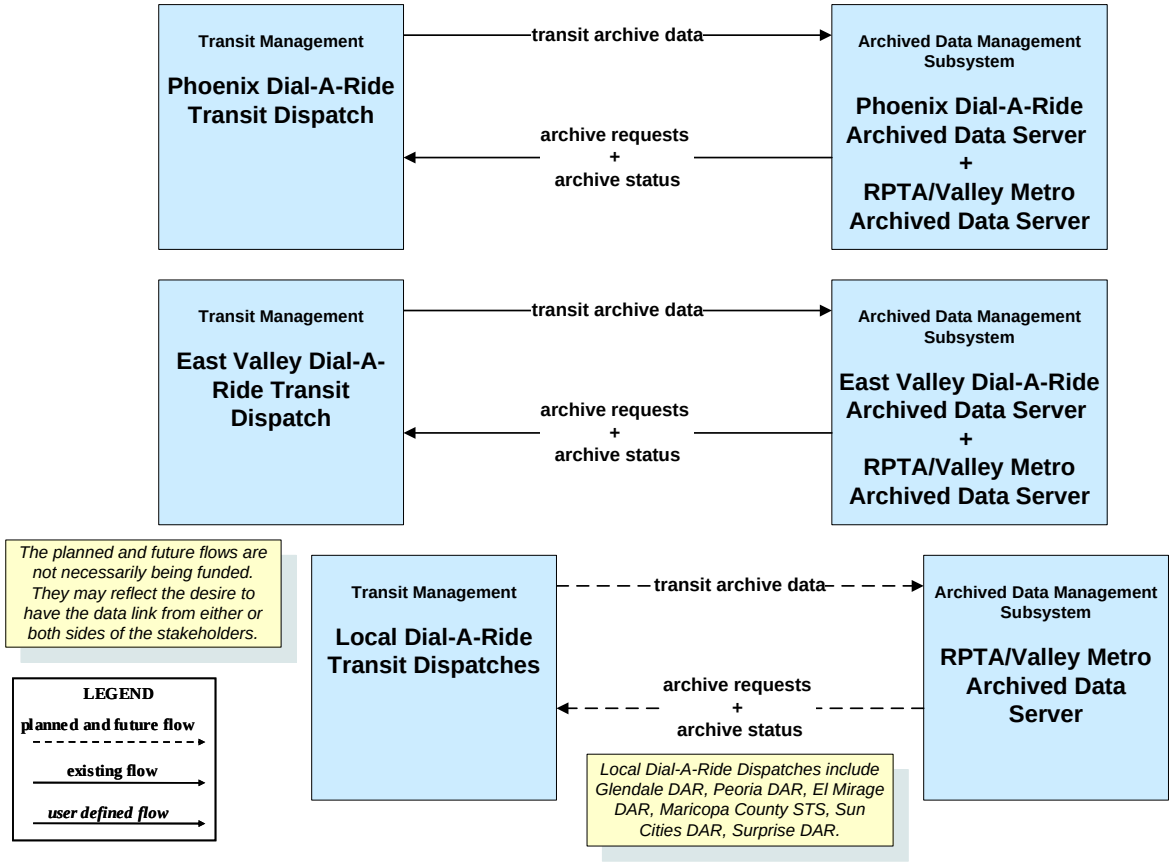


Figure 122: AD2: ITS Data Warehouse
AZTech RADS

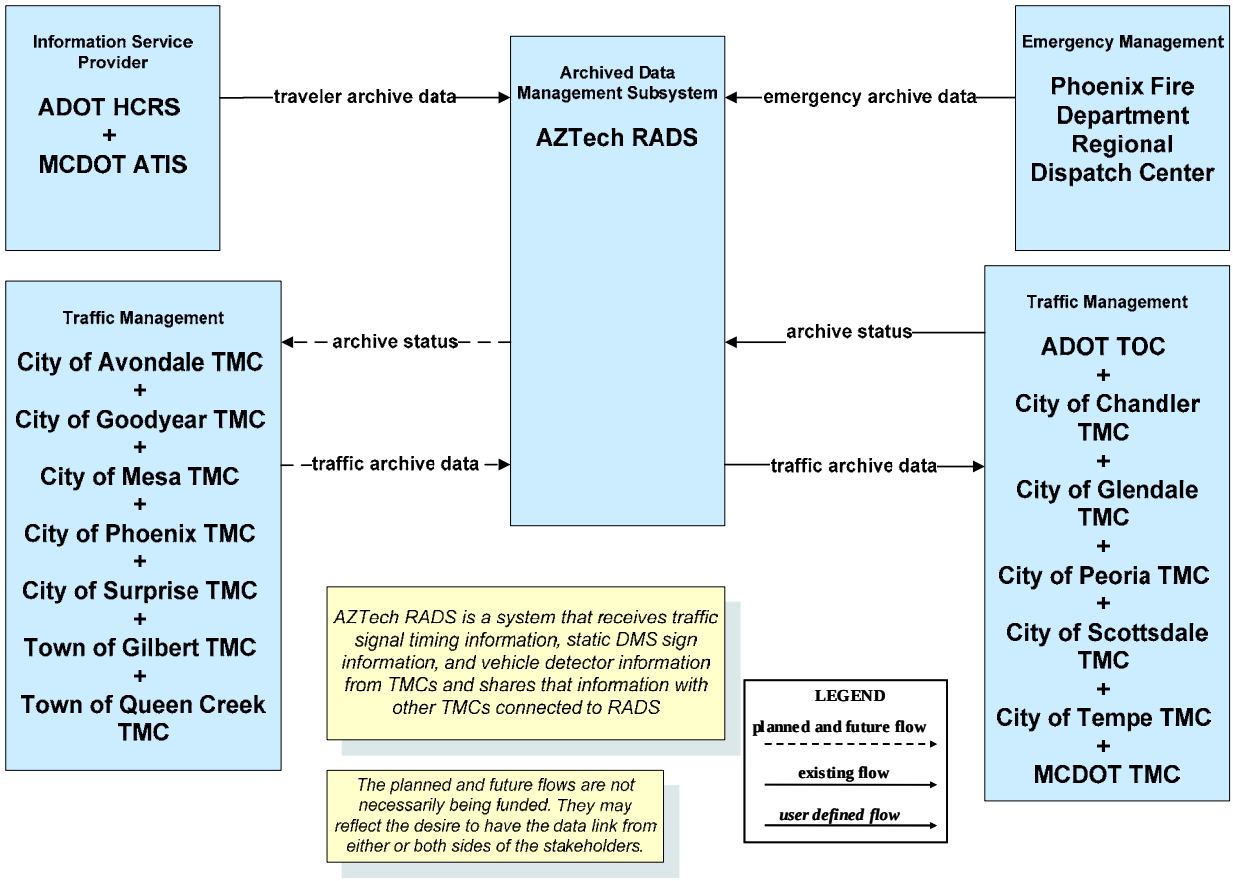


Figure 123: AD2: ITS Data Warehouse
AZTech RADS – Generic

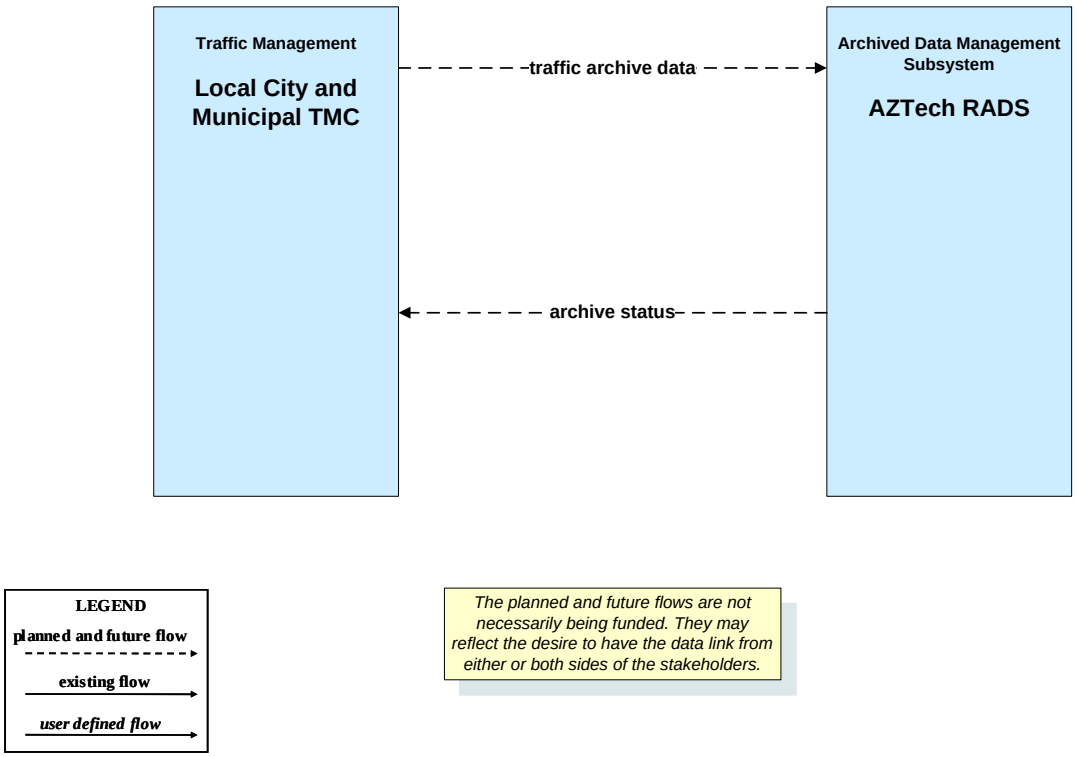


Figure 124: APTS01 – Transit Vehicle Tracking: RPTA/Valley Metro

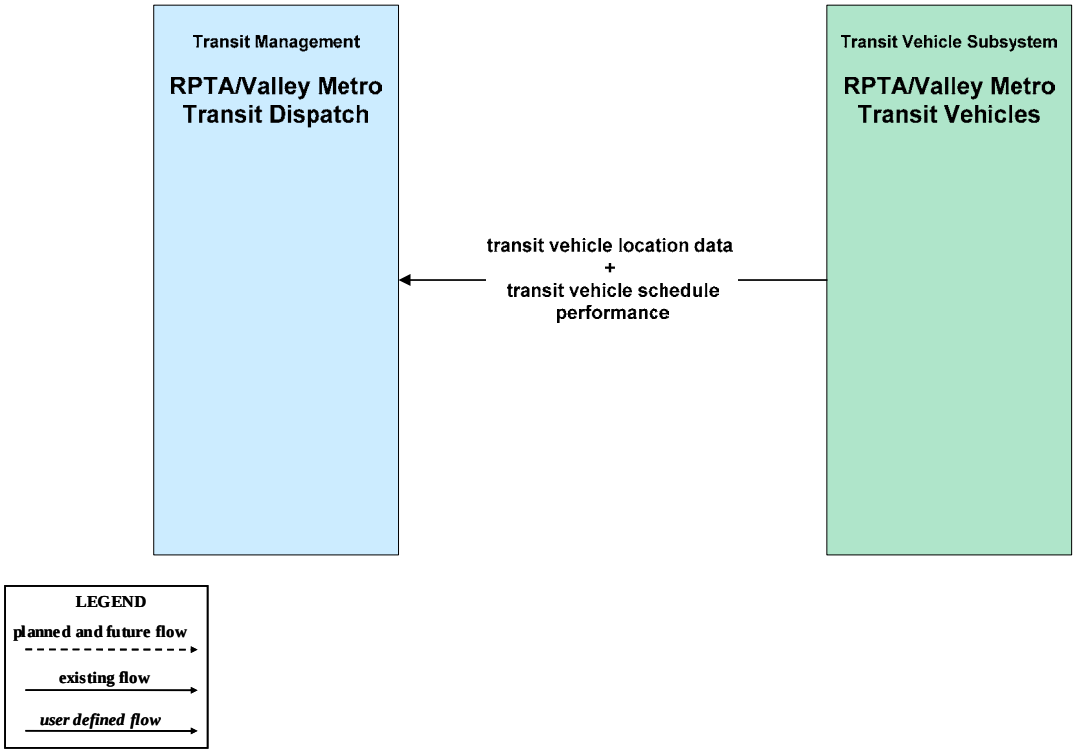


Figure 125: APTS01 – Transit Vehicle Tracking: METRO Light Rail

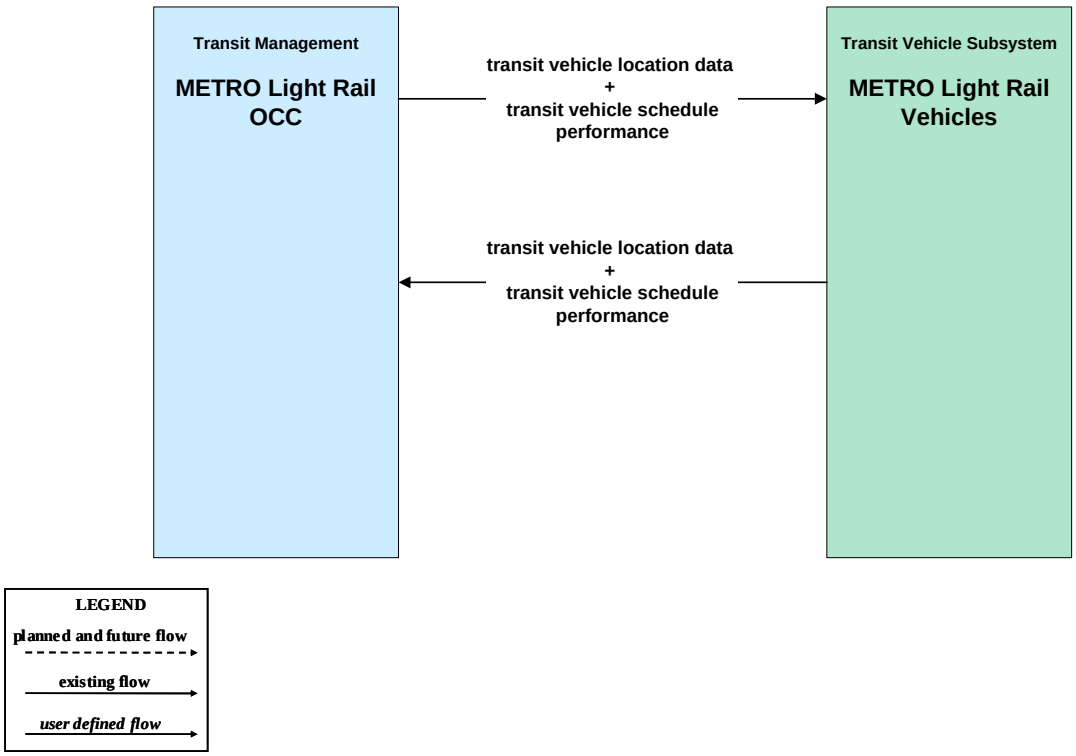


Figure 126: APTS01 – Transit Vehicle Tracking: Local Dial-A-Ride Transit Systems

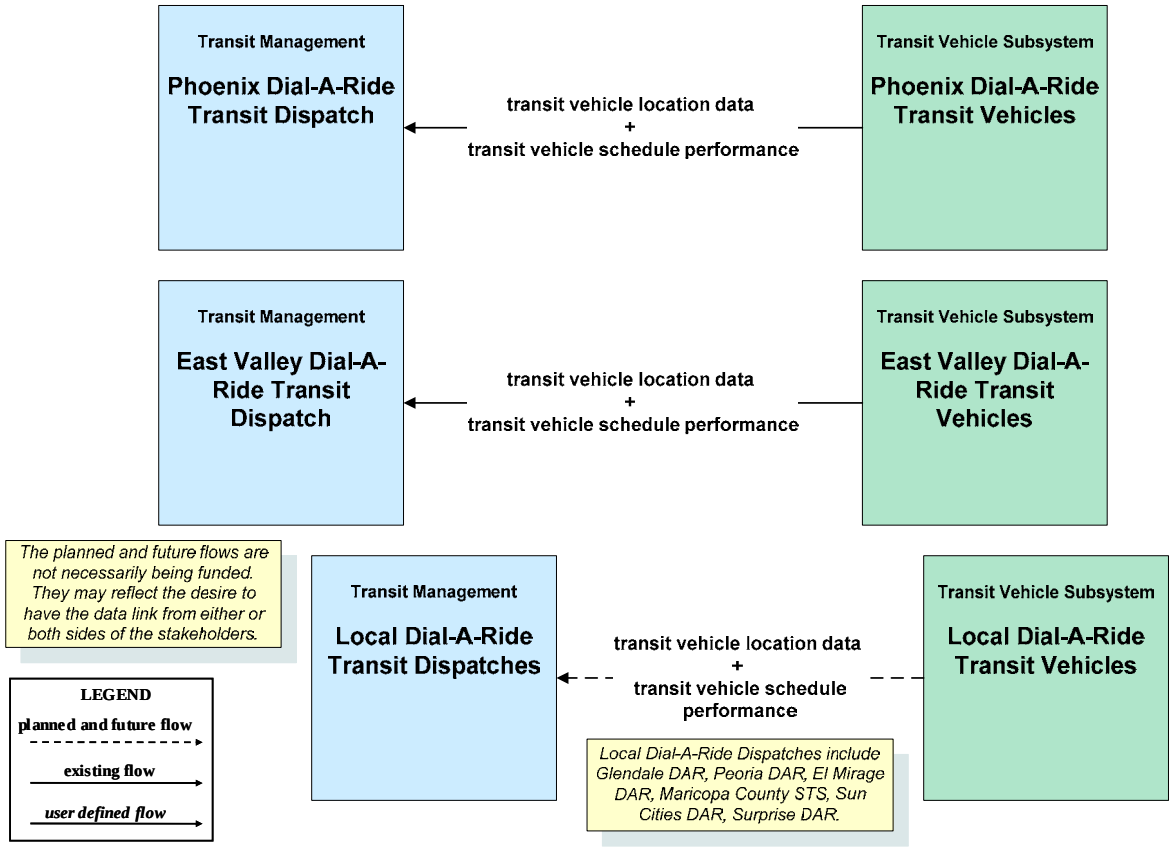


Figure 127: APTS01 – Transit Vehicle Tracking: Local Transit Systems

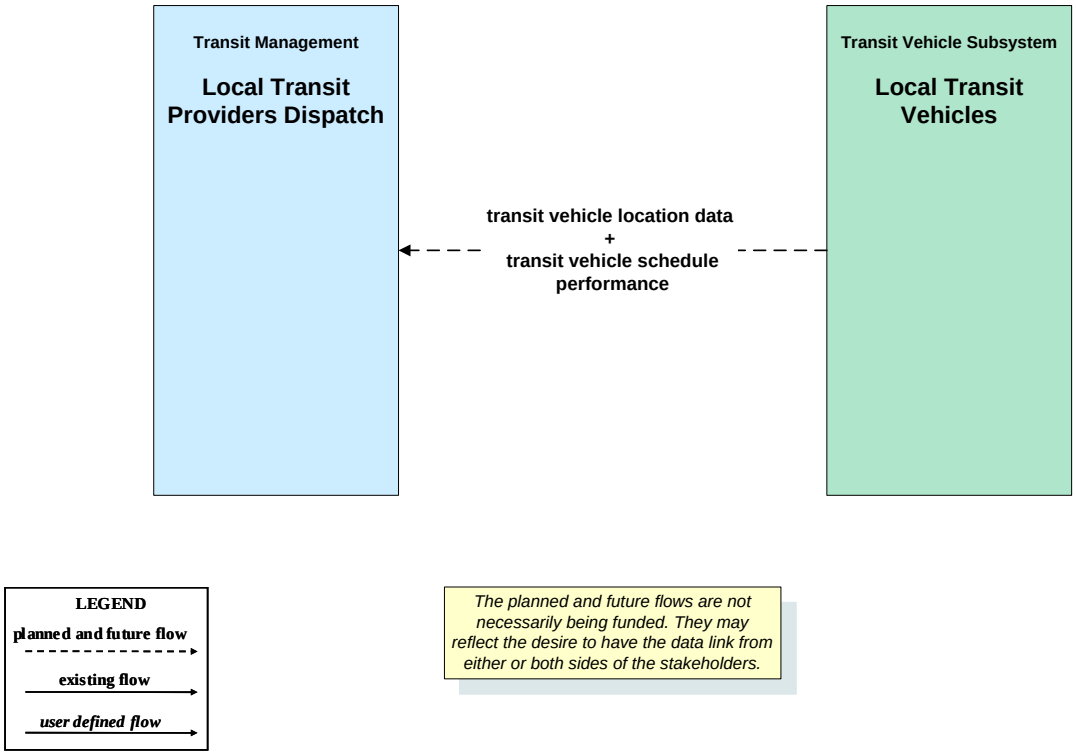


Figure 128: APTS01 – Transit Vehicle Tracking: Independent School Districts

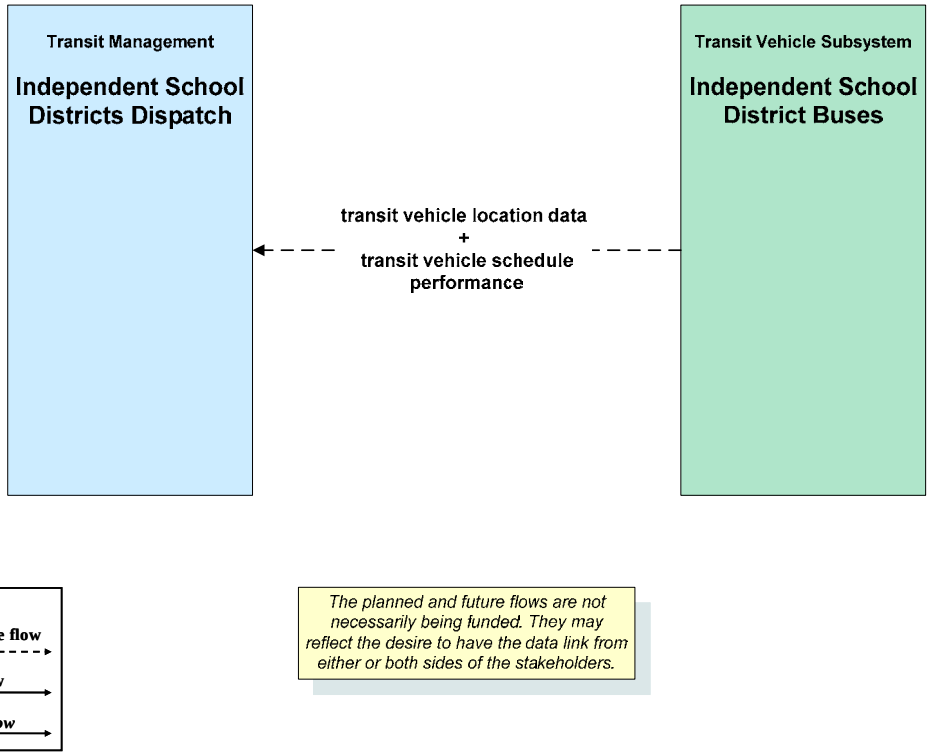


Figure 129: APTS01 – Transit Vehicle Tracking: Phoenix Public Transit

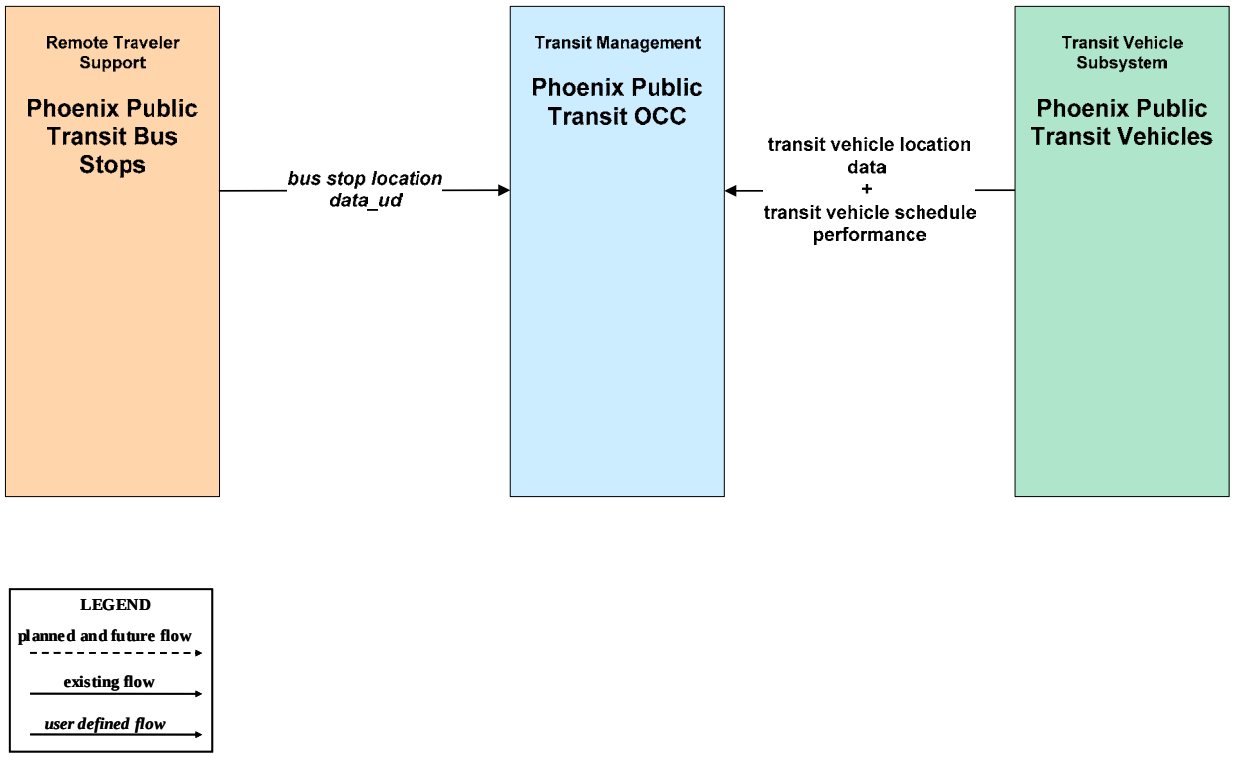


Figure 130: APTS02 – Transit Fixed-Route Operations: RPTA/Valley Metro

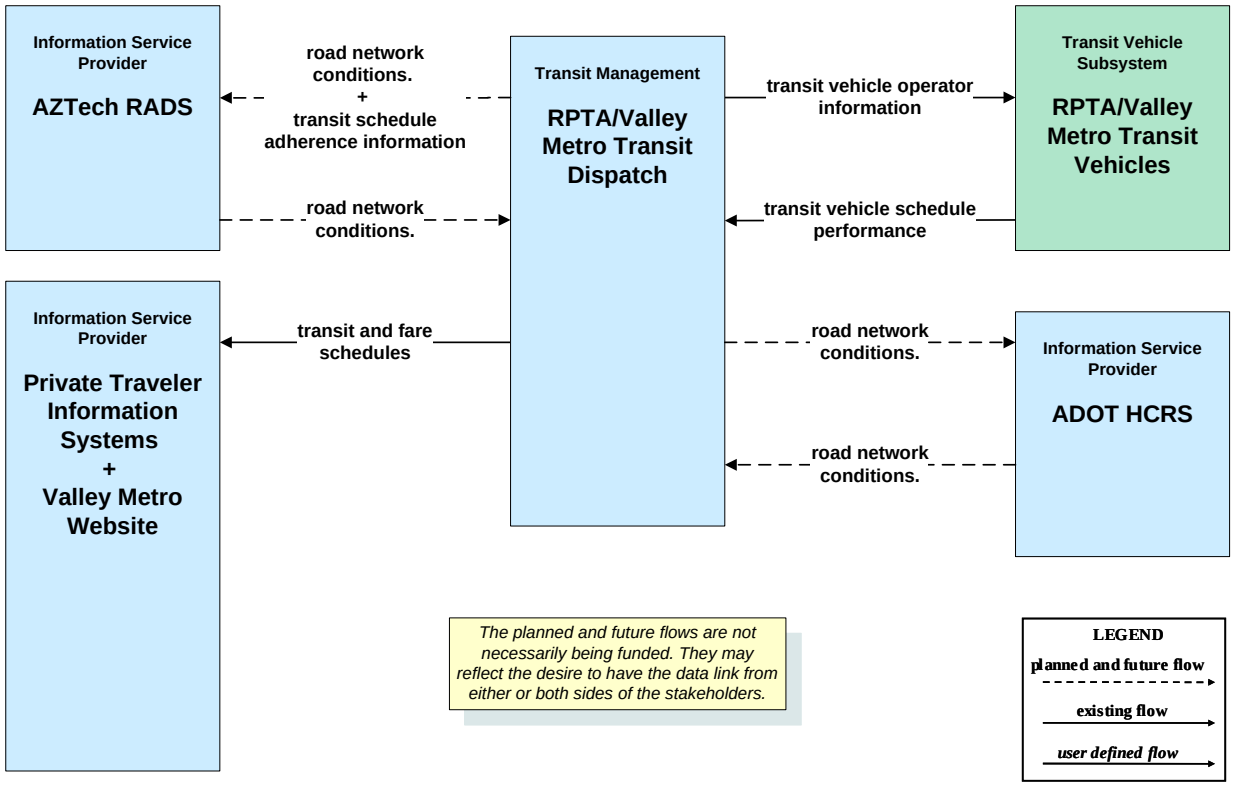


Figure 131: APTS02 – Transit Fixed-Route Operations: METRO Light Rail

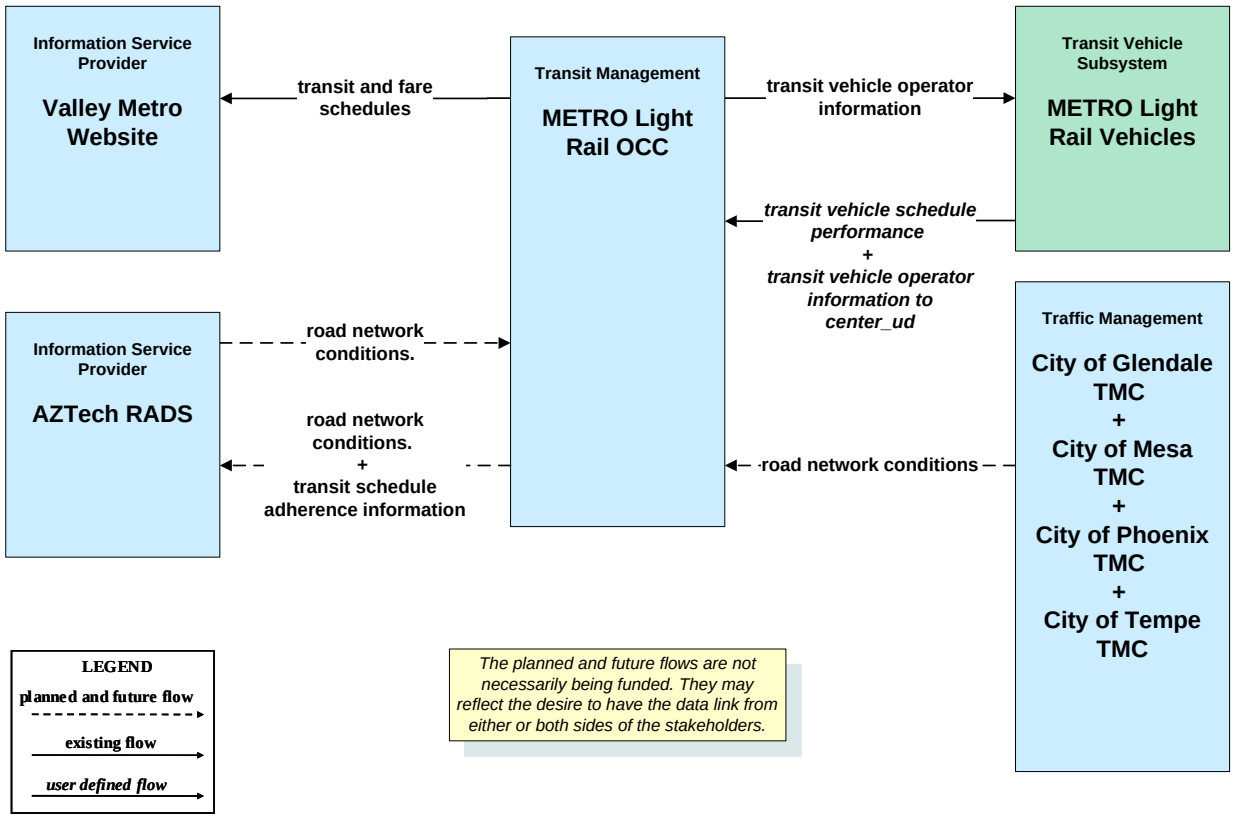


Figure 132: APTS02 – Transit Fixed-Route Operations: Local Transit Systems

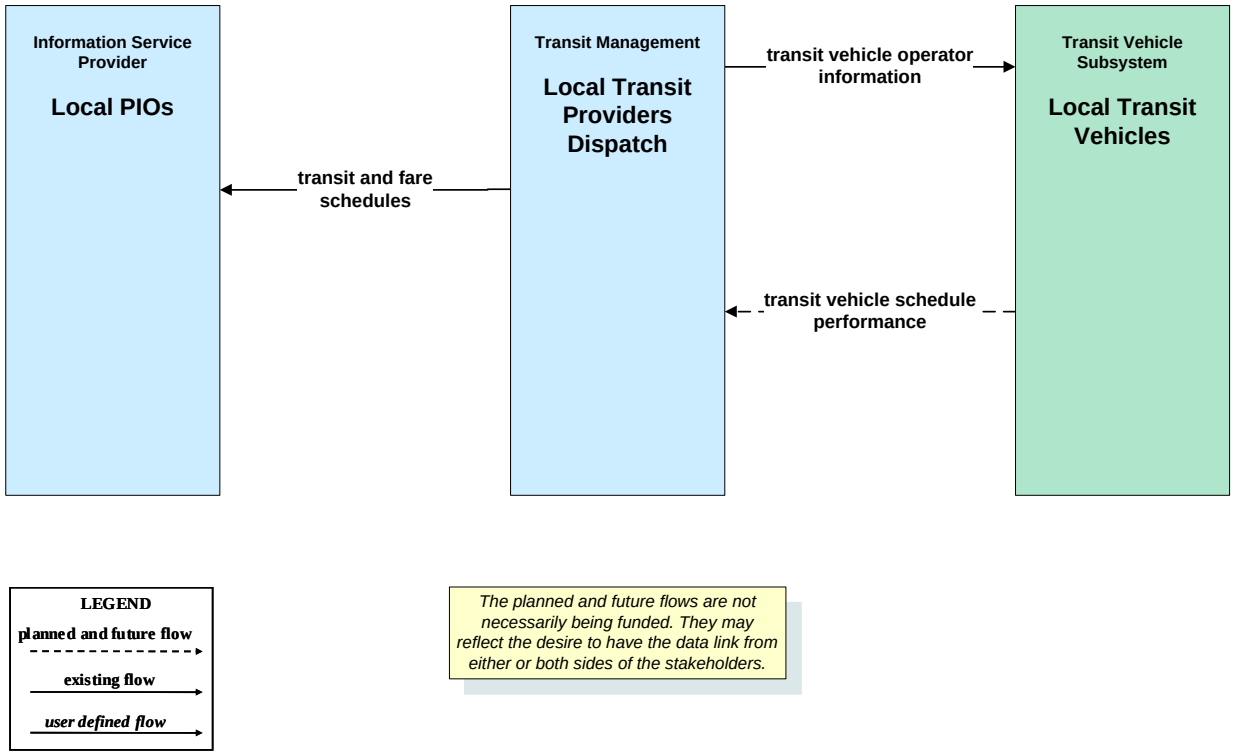


Figure 133: APTS02 – Transit Fixed-Route Operations: Phoenix Public Transit

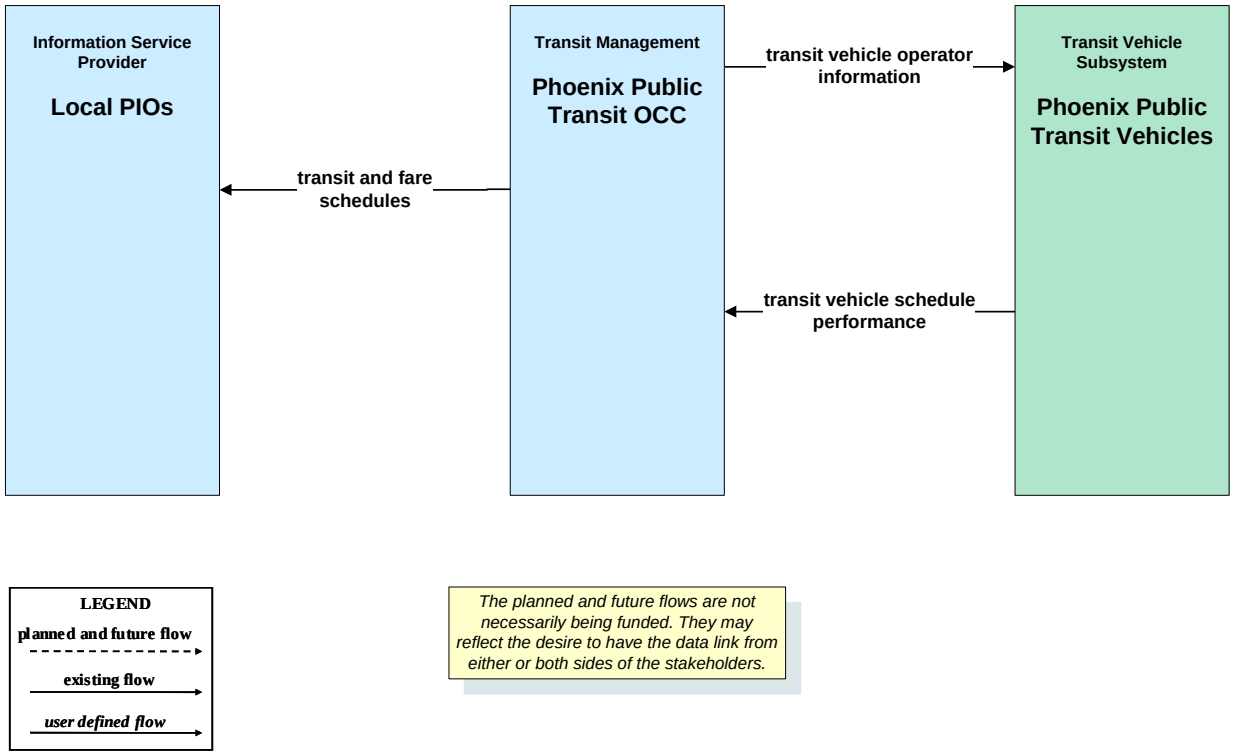


Figure 134: APTS03 – Demand Response: Local Dial-A-Ride Transit Systems (1 of 2)

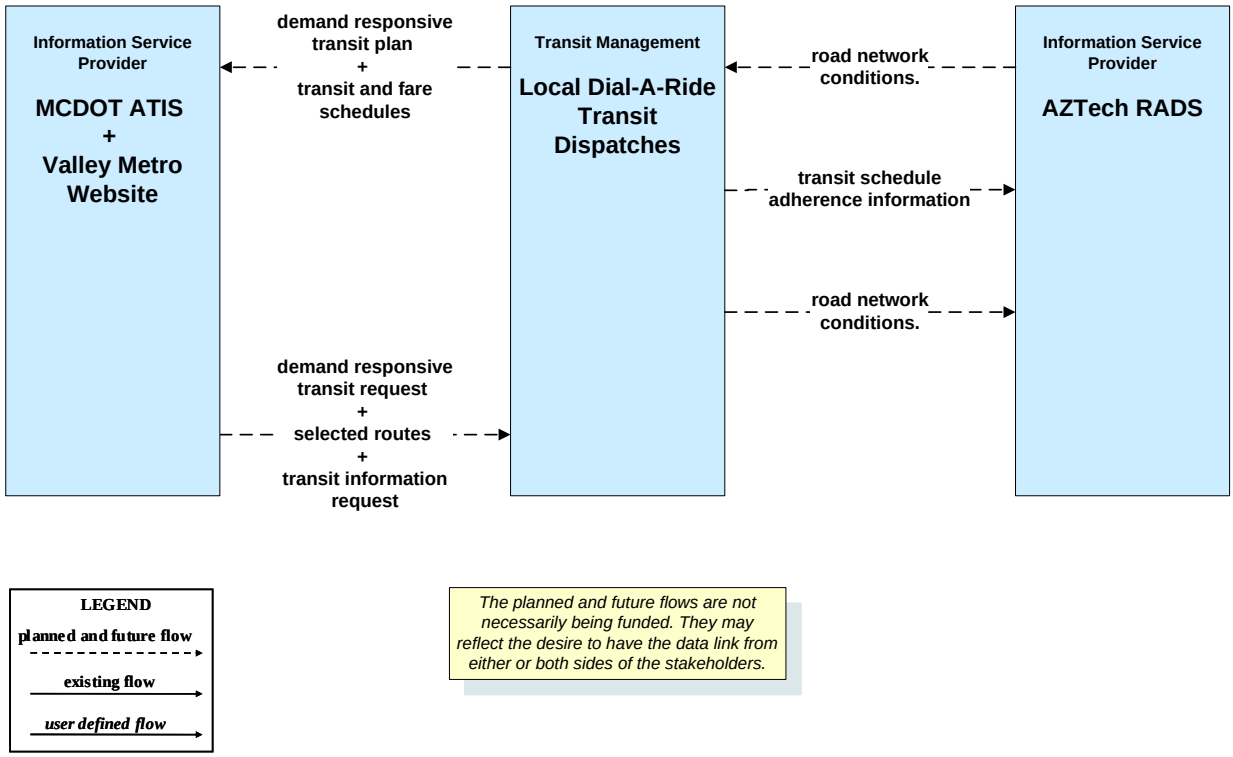


Figure 135: APTS03 – Demand Response: Local Dial-A-Ride Transit Systems (2 of 2)

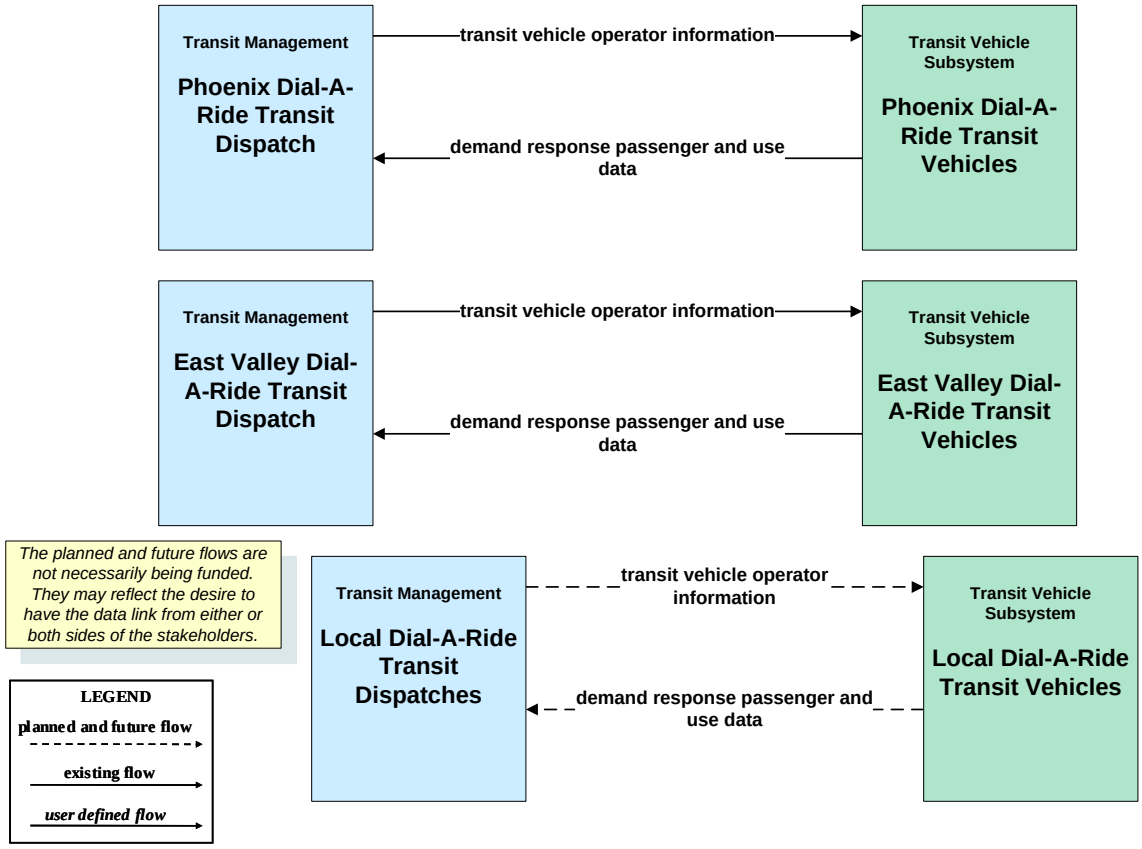


Figure 136: APTS04 – Transit Passenger and Fare Management: RPTA/Valley Metro

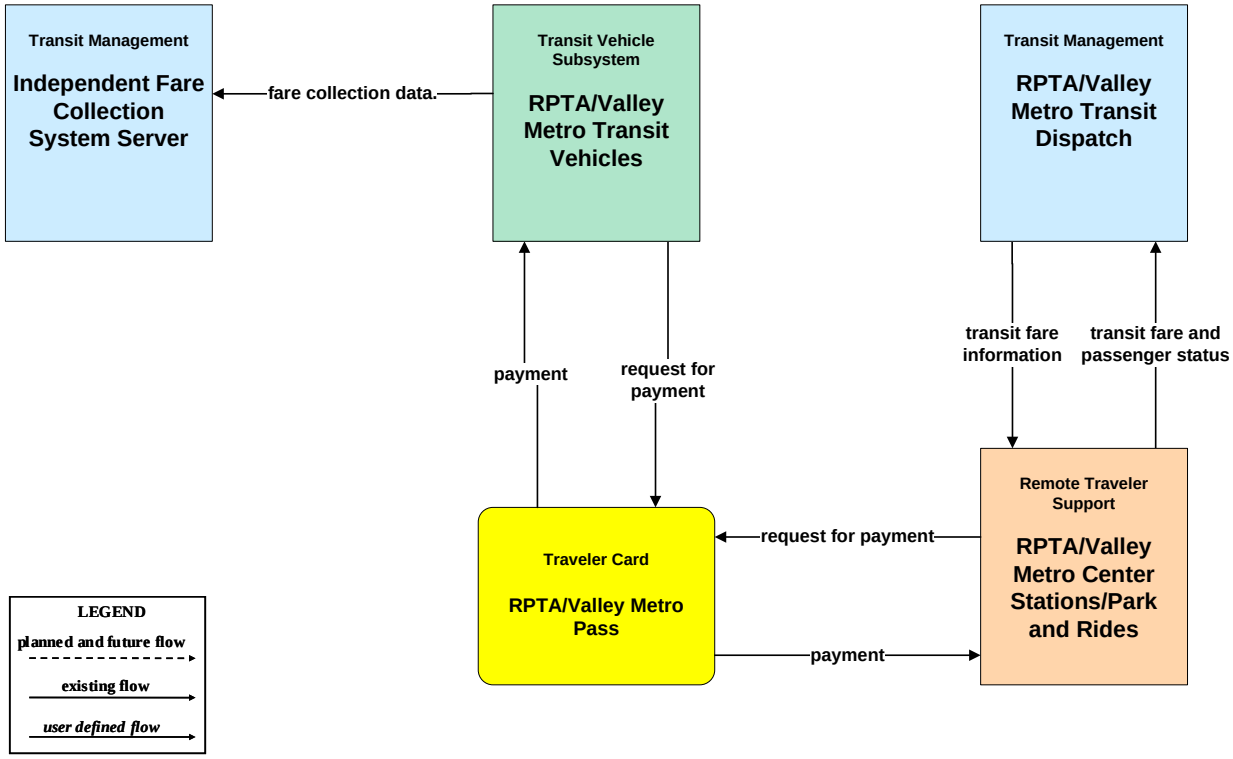


Figure 137: APTS04 – Transit Passenger and Fare Management: METRO Light Rail

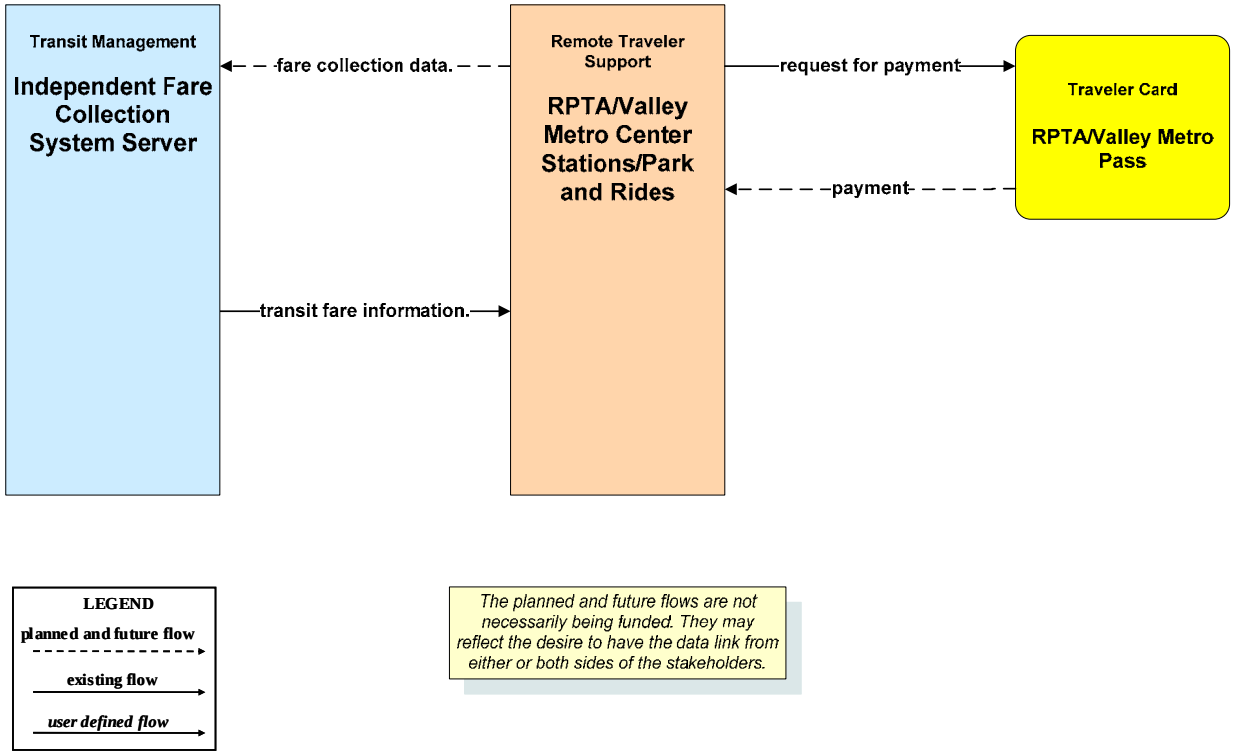


Figure 138: APTS04 – Transit Passenger and Fare Management: Phoenix Dial-A-Ride

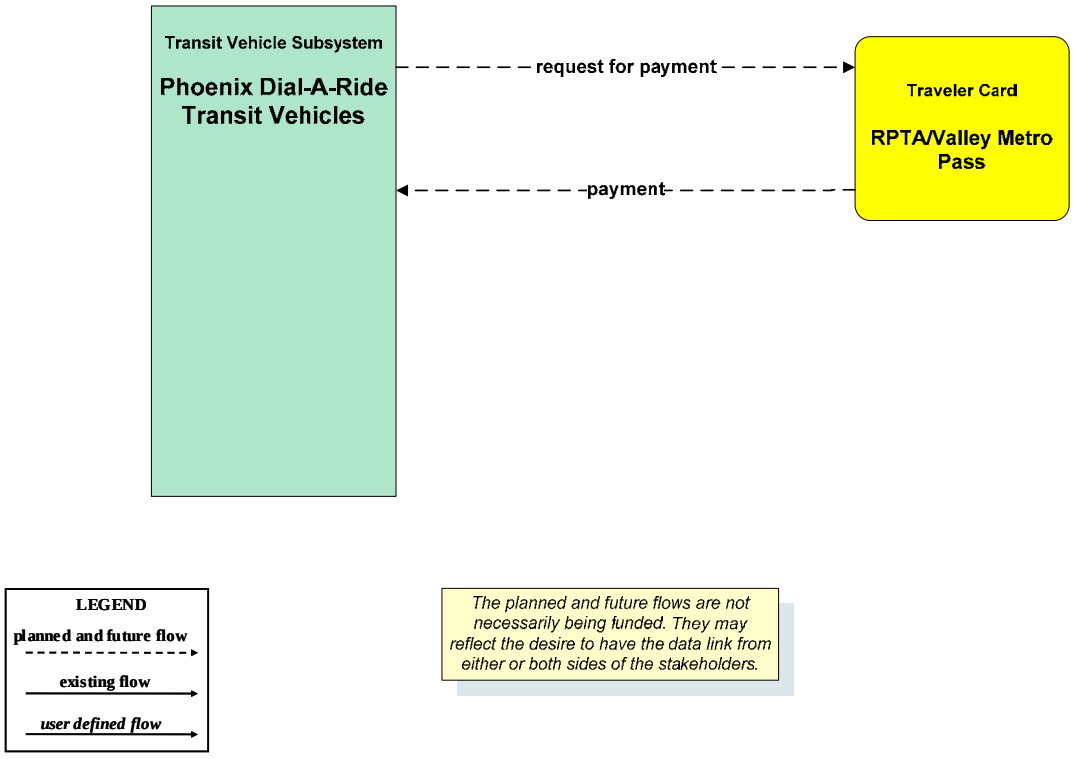


Figure 139: APTS04 – Transit Passenger and Fare Management: Local Transit System

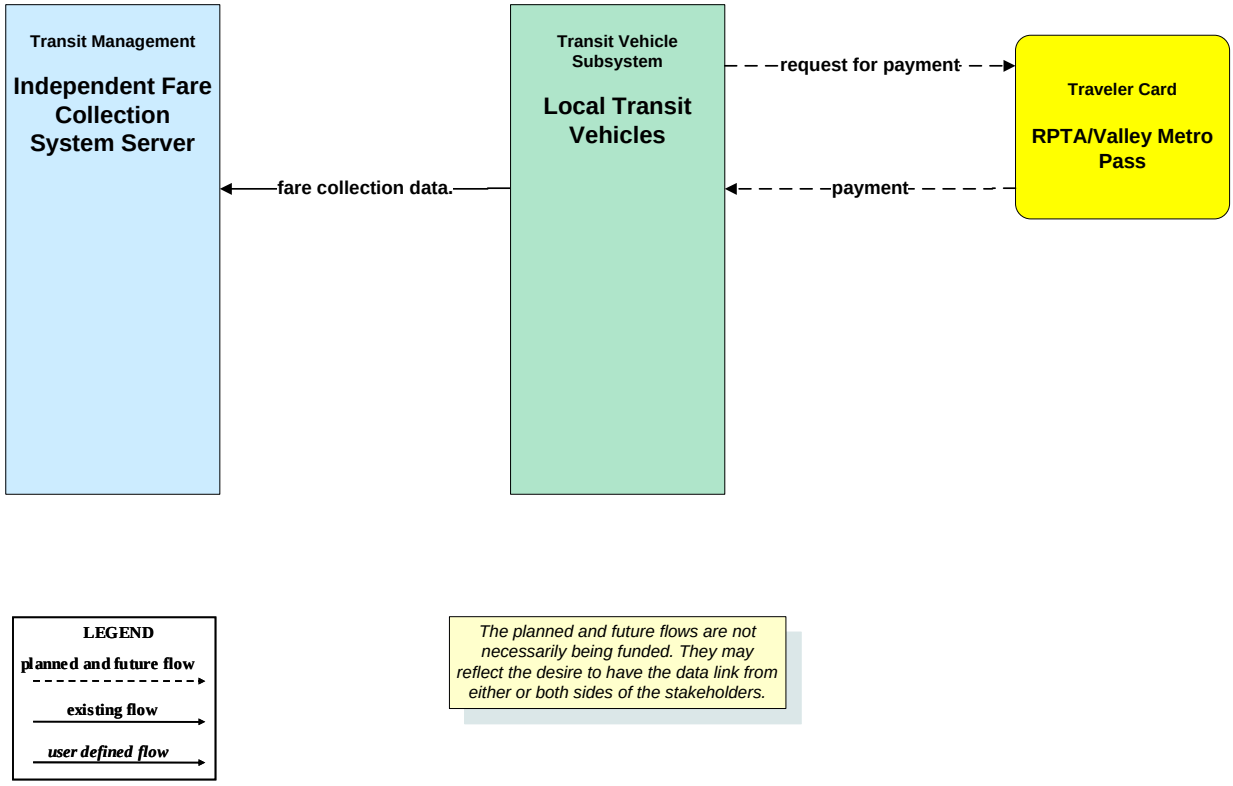


Figure 140: APTS04 – Transit Passenger and Fare Management: Phoenix Public Transit

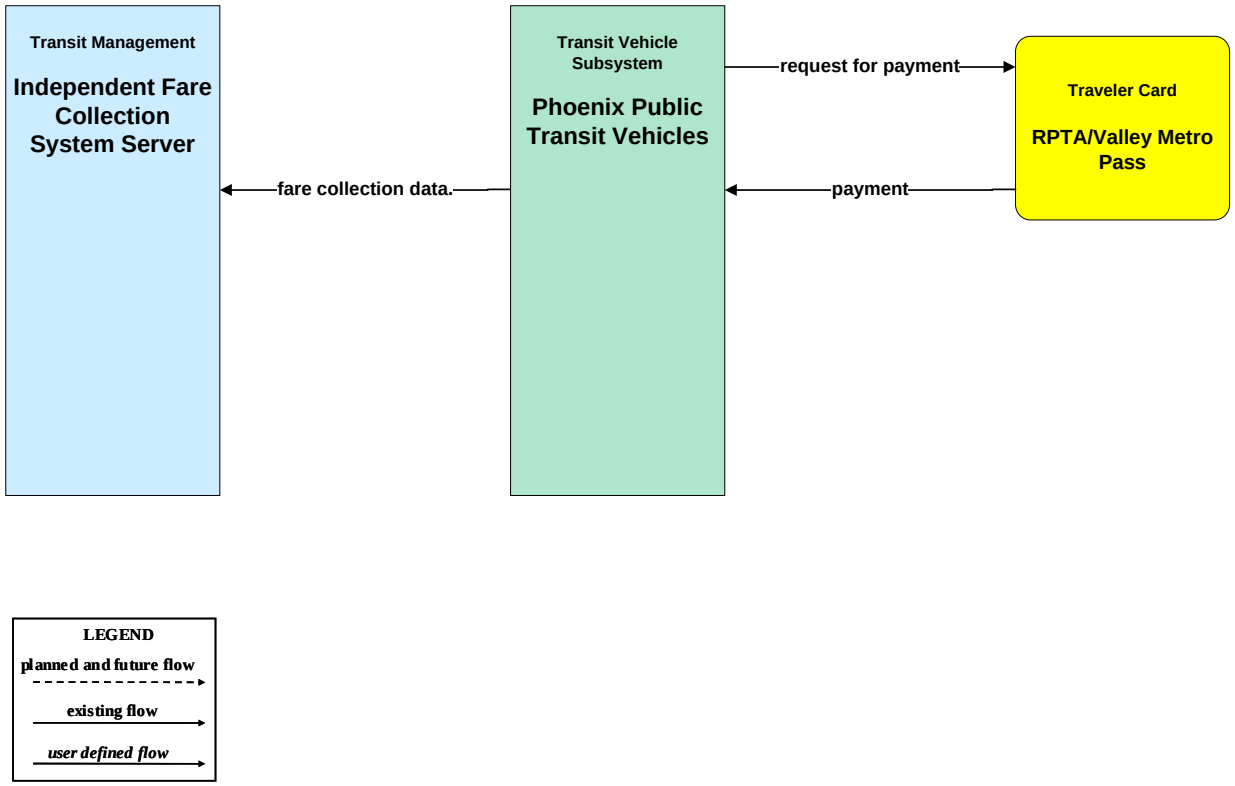


Figure 141: APTS05 – Transit Security: RPTA/Valley Metro

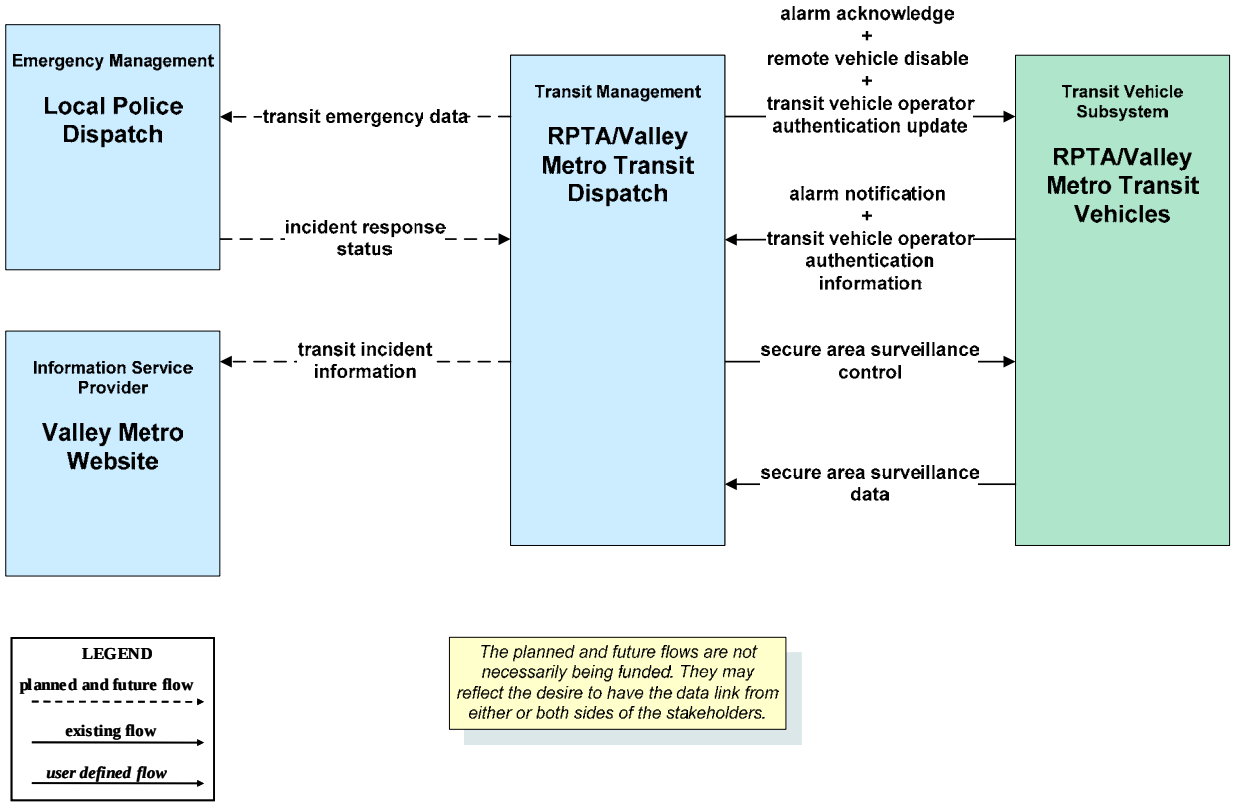


Figure 142: APTS05 – Transit Security: METRO Light Rail

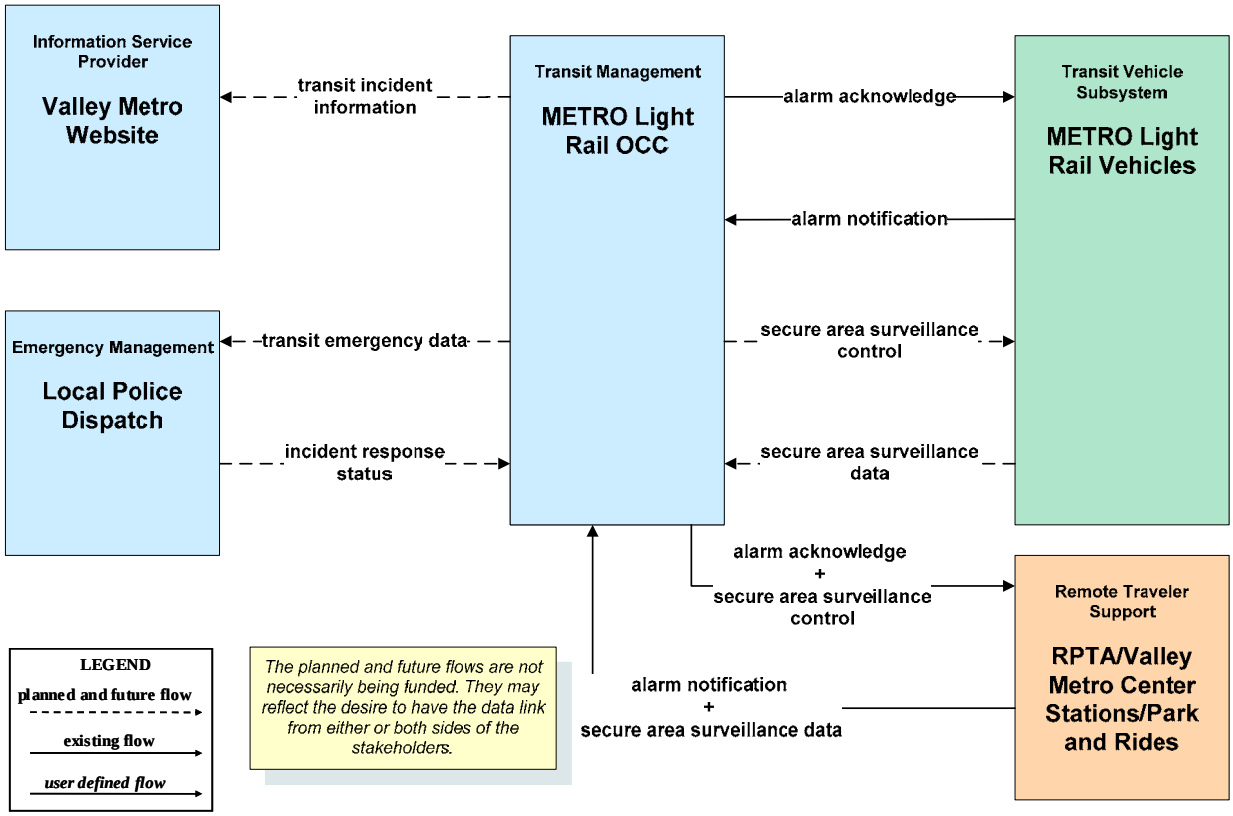


Figure 143: APTS05 – Transit Security:
Local Dial-A-Ride and Local Transit Systems

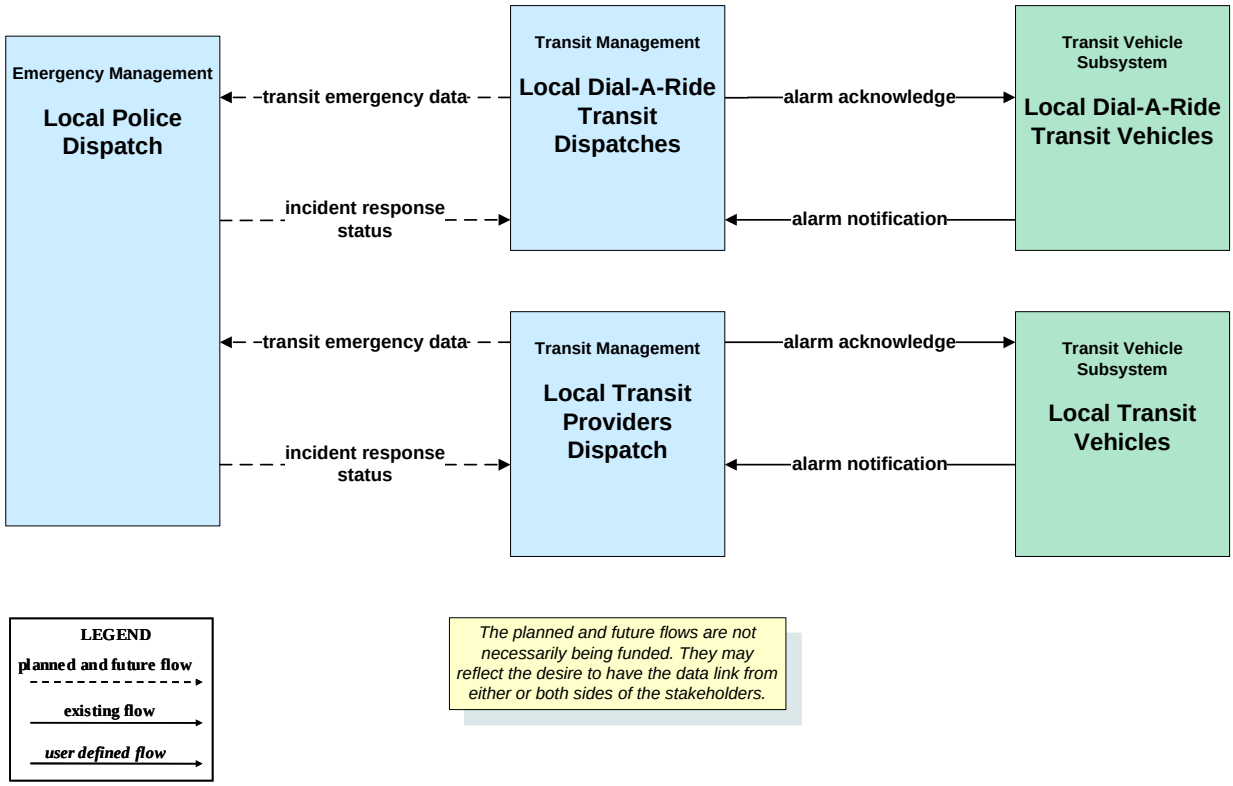


Figure 144: APTS05 – Transit Security:
Phoenix Dial-A-Ride and East Valley Dial-A-Ride

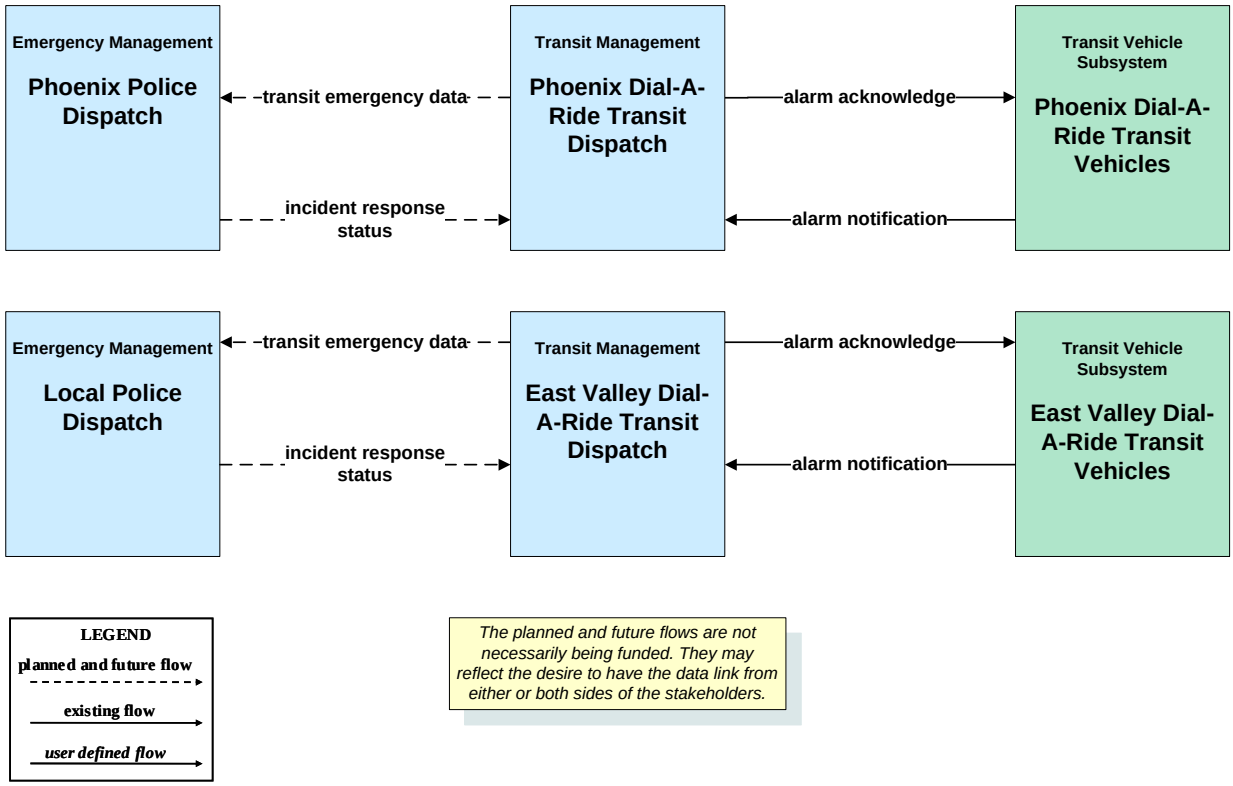


Figure 145: APTS05 – Transit Security: Phoenix Public Transit

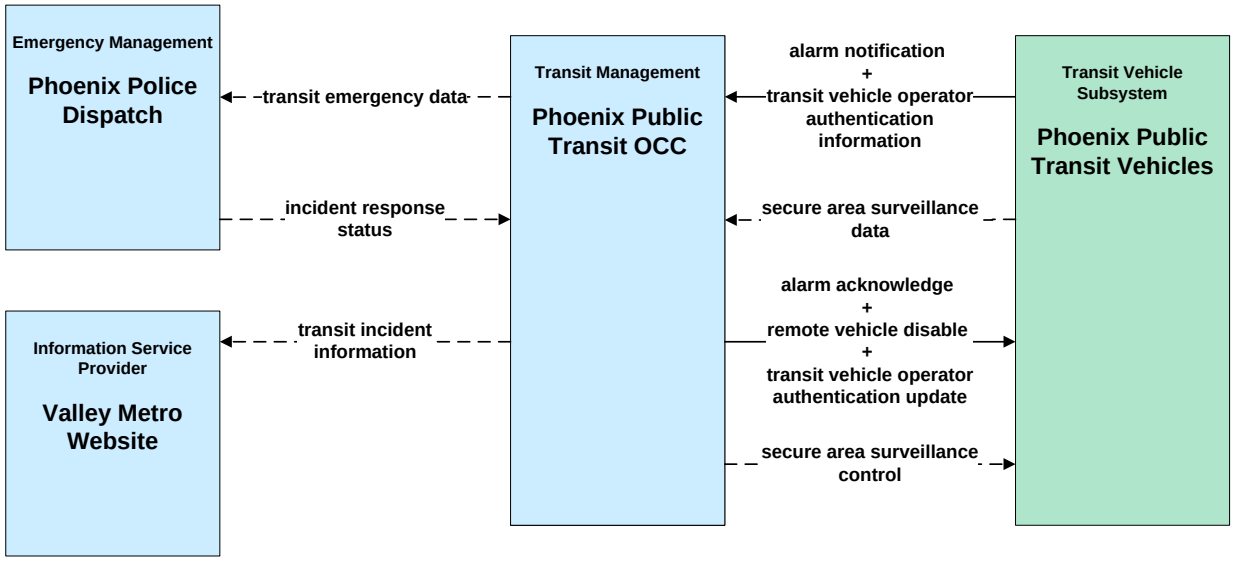


Figure 146: APTS06 – Transit Maintenance: RPTA/Valley Metro / METRO Light Rail

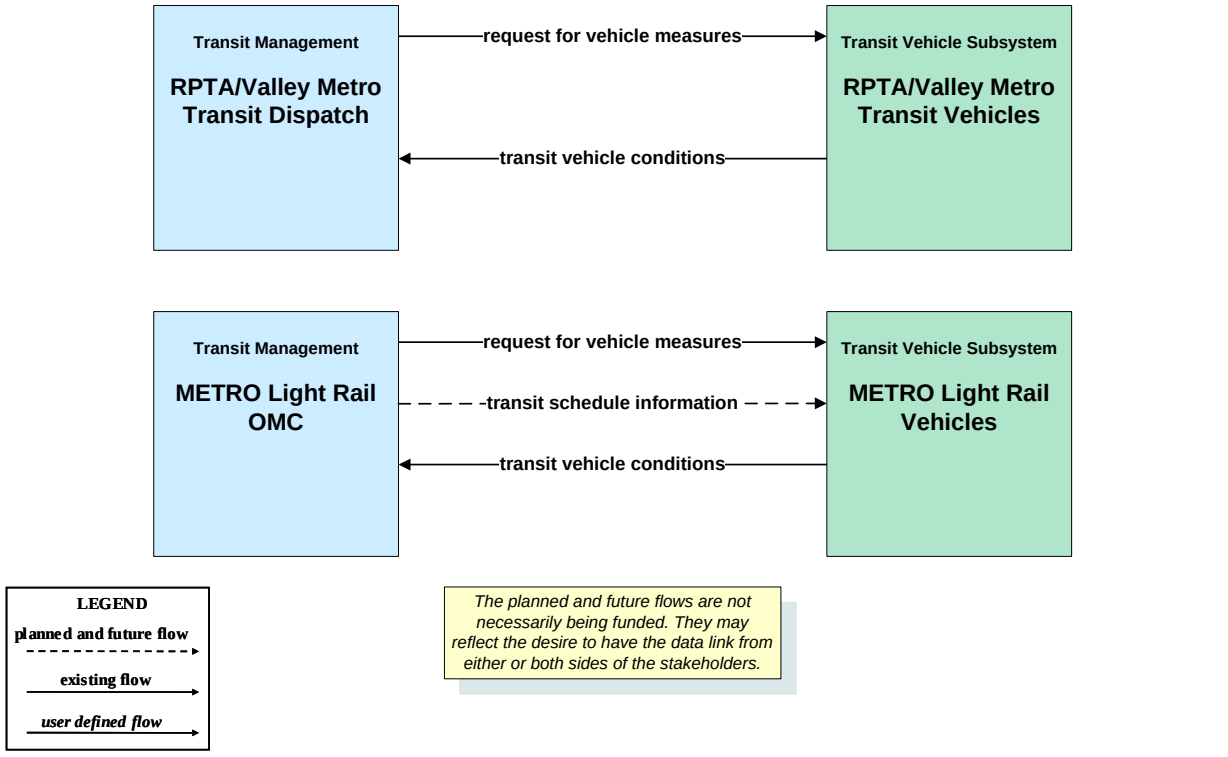


Figure 147: APTS06 – Transit Maintenance: Local Dial-A-Ride Transit Systems

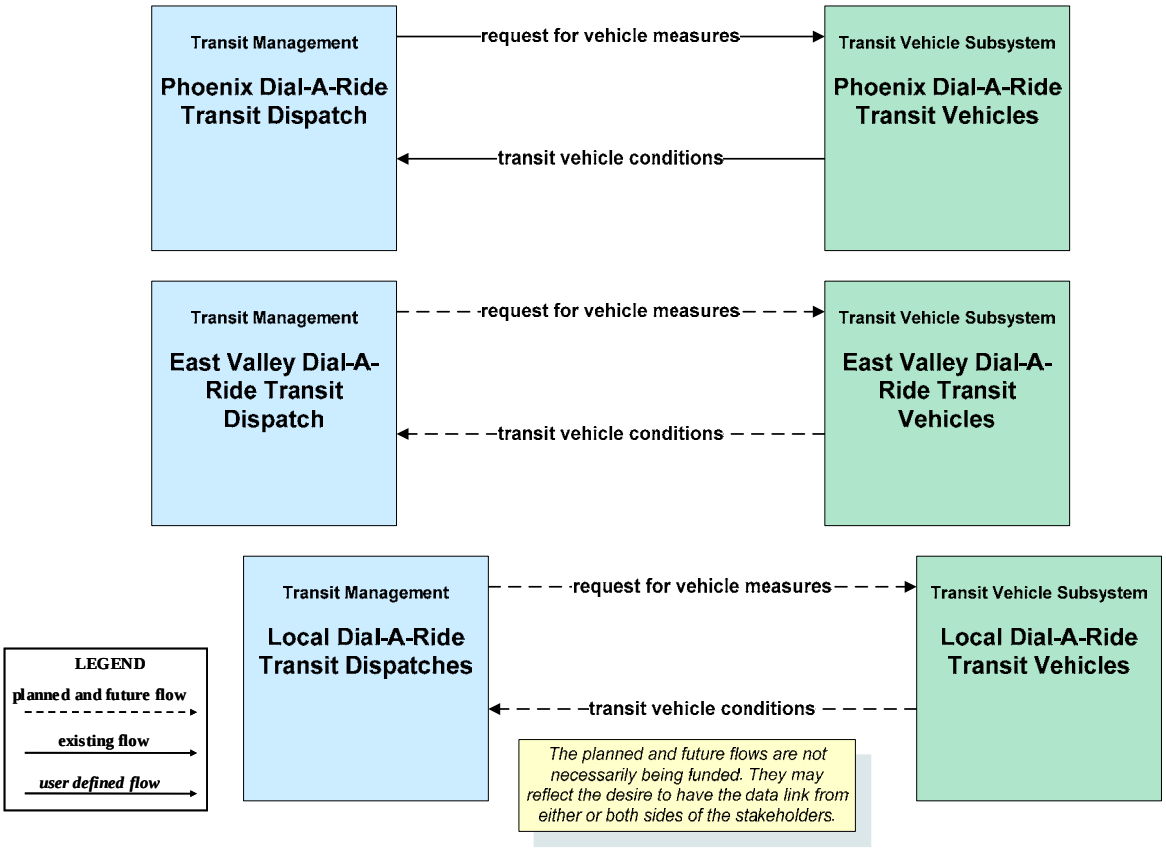
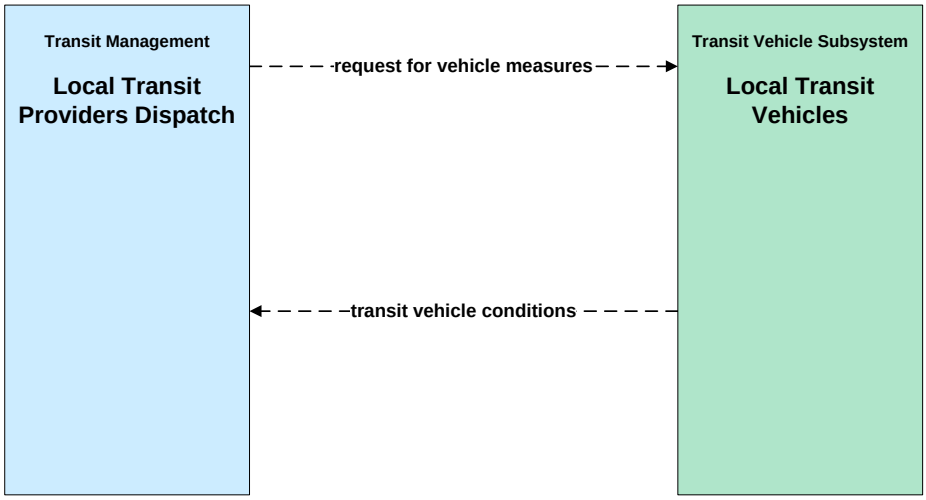
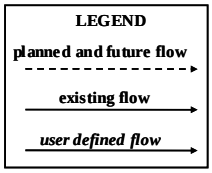


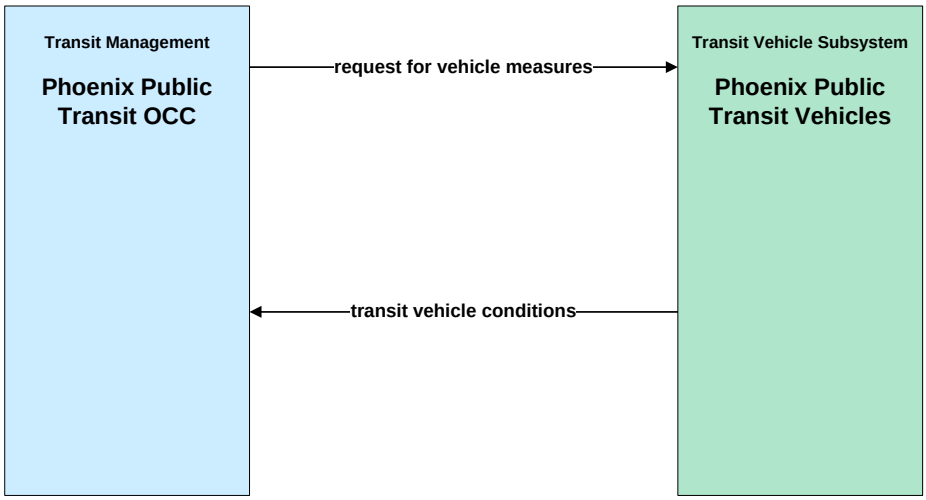
Figure 148: APTS06 – Transit Maintenance: Local Transit Systems





The planned and future flows are not necessarily being funded. They may reflect the desire to have the data link from either or both sides of the stakeholders.

Figure 149: APTS06 – Transit Maintenance: Phoenix Public Transit



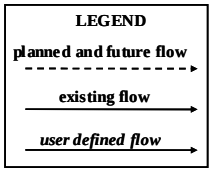


Figure 150: APTS07 – Multi-modal Coordination: RPTA/Valley Metro

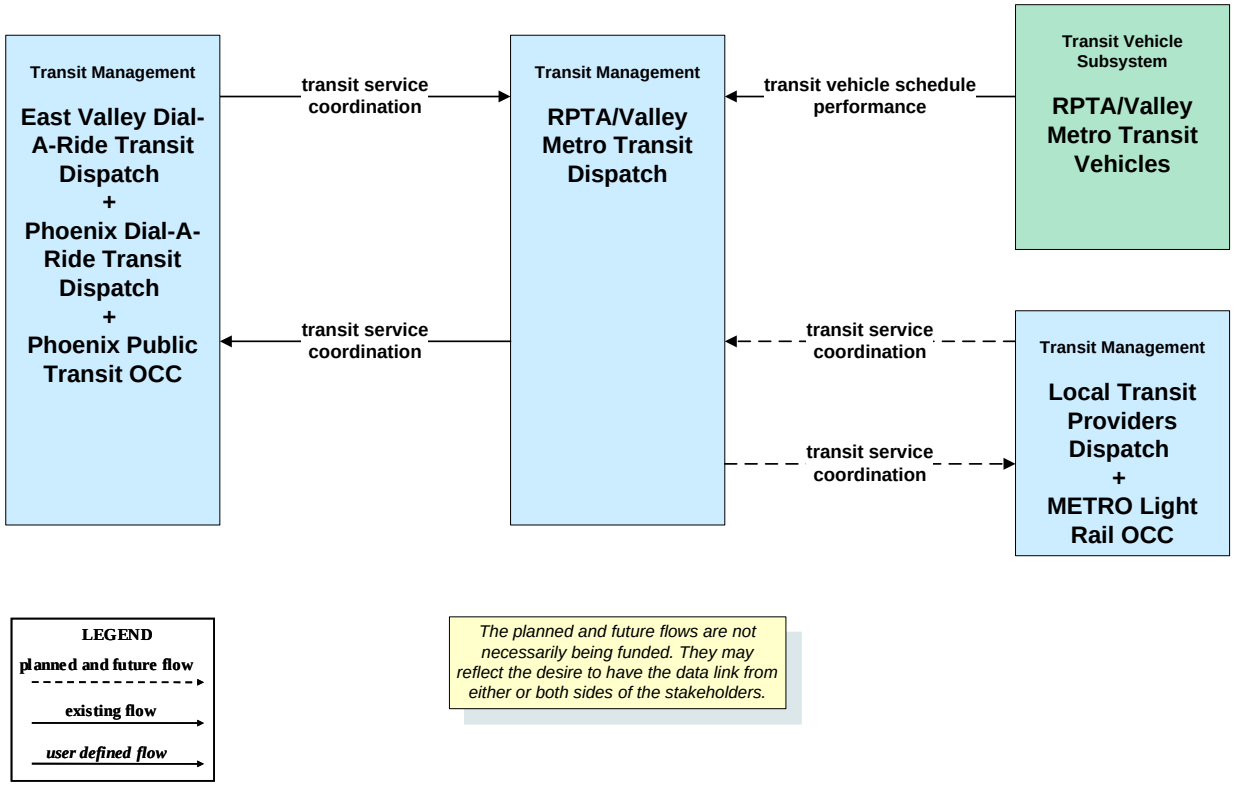


Figure 151: APTS07 – Multi-modal Coordination: METRO Light Rail

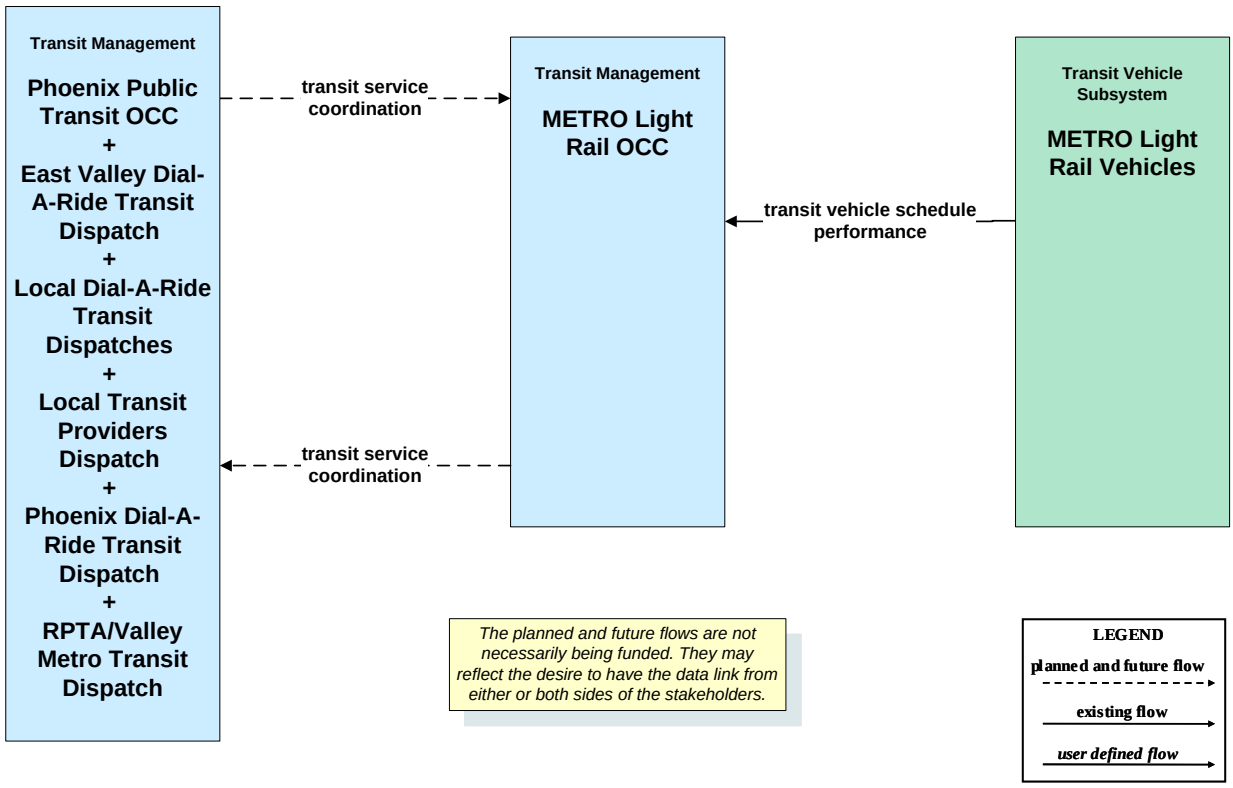


Figure 152: APTS07 – Multi-modal Coordination: Local Dial-A-Ride Transit Systems

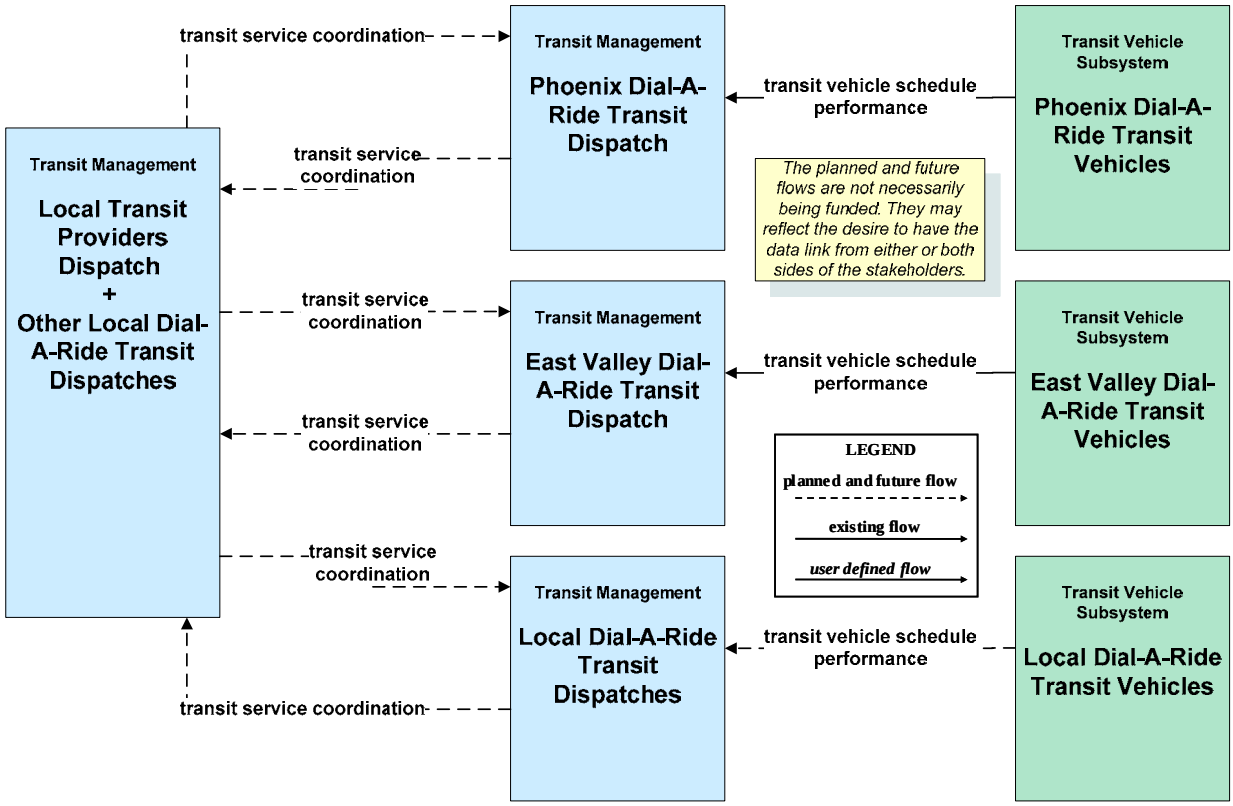


Figure 153: APTS08 – Transit Traveler Information: RPTA/Valley Metro

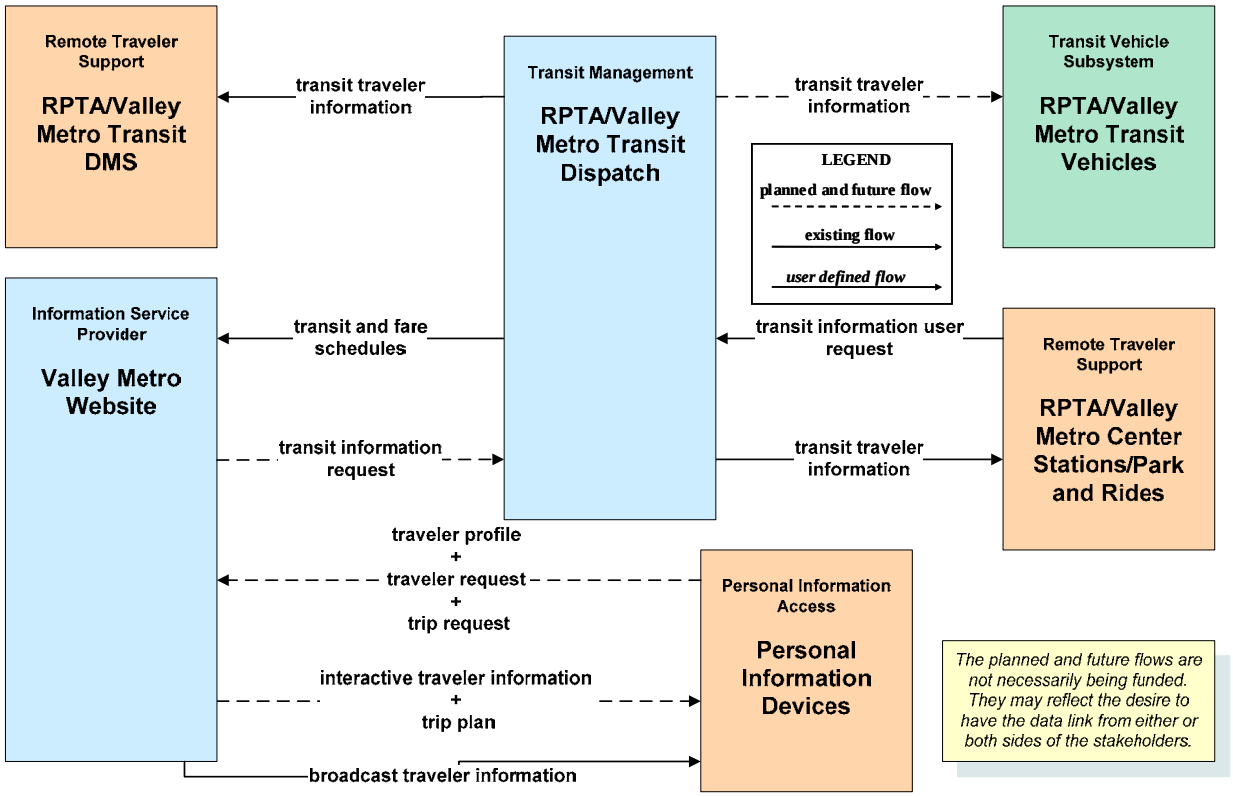


Figure 154: APTS08 – Transit Traveler Information: METRO Light Rail

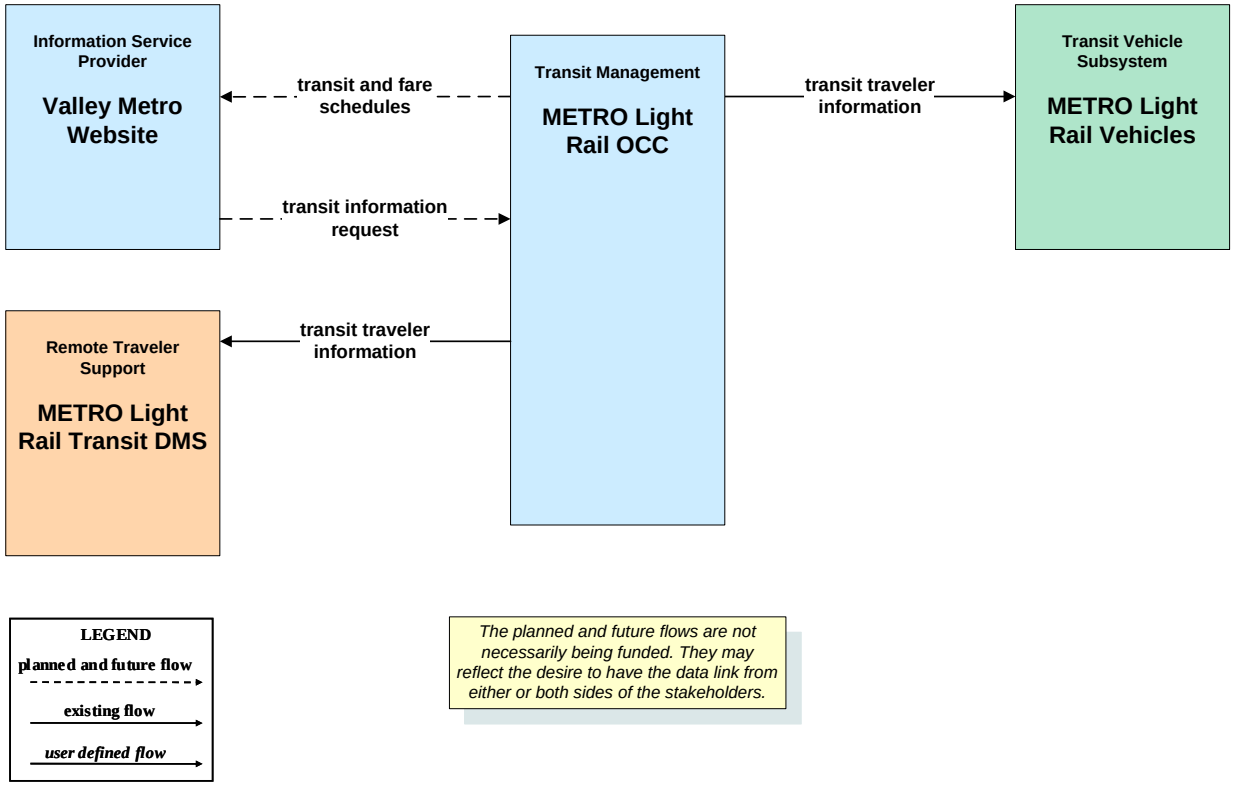


Figure 155: APTS08 – Transit Traveler Information: Phoenix Public Transit

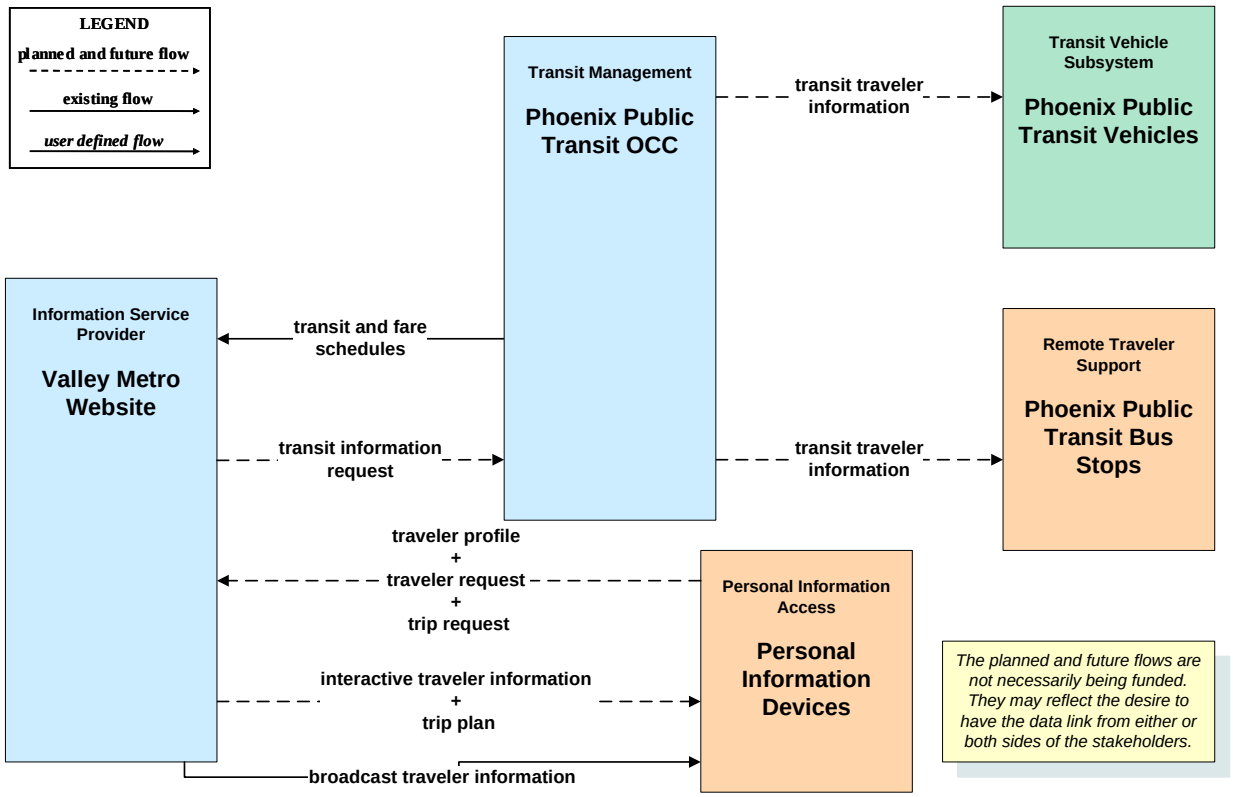


Figure 156: APTS09 – Transit Signal Priority: RPTA/Valley Metro – City of Chandler

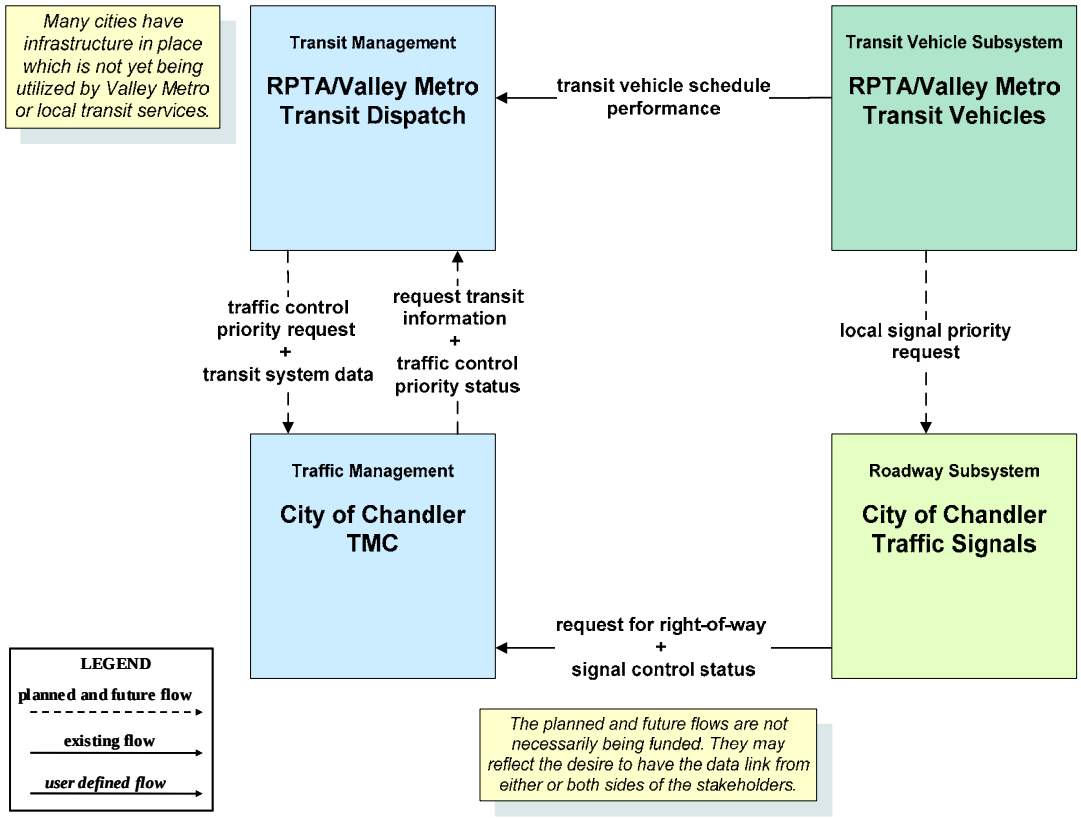


Figure 157: APTS09 – Transit Signal Priority: RPTA/Valley Metro – City of Mesa

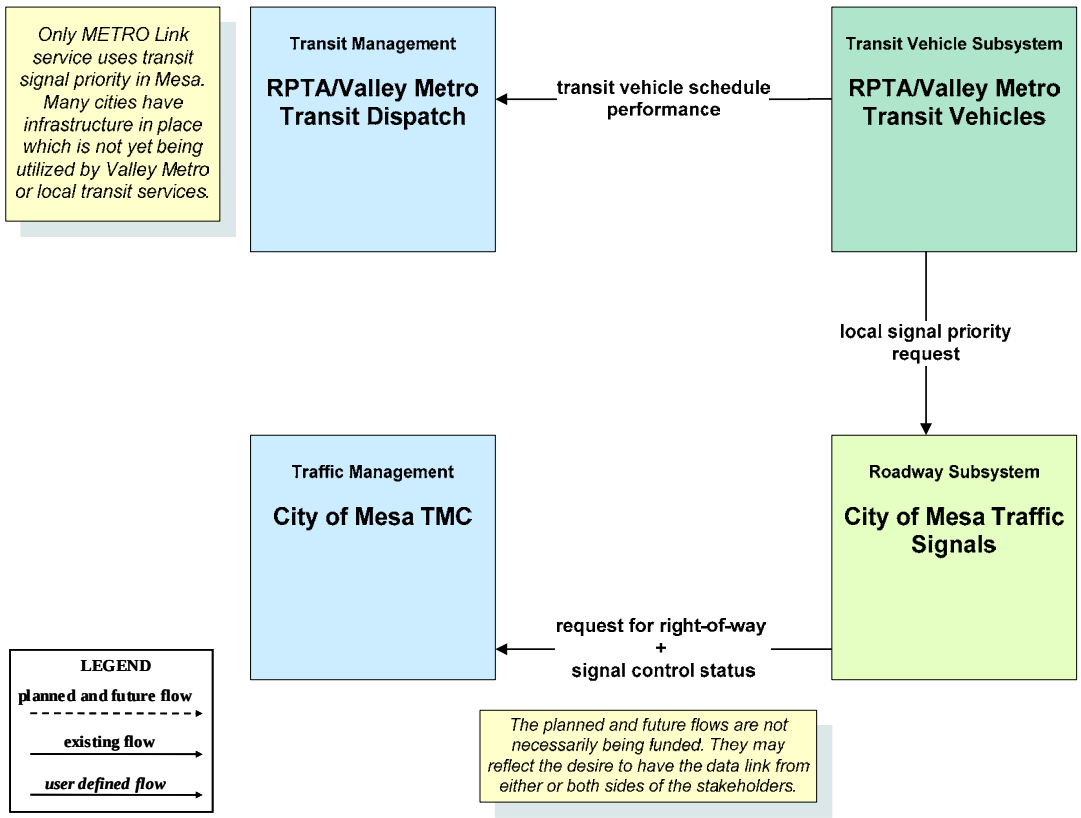


Figure 158: APTS09 – Transit Signal Priority: RPTA/Valley Metro – City of Phoenix

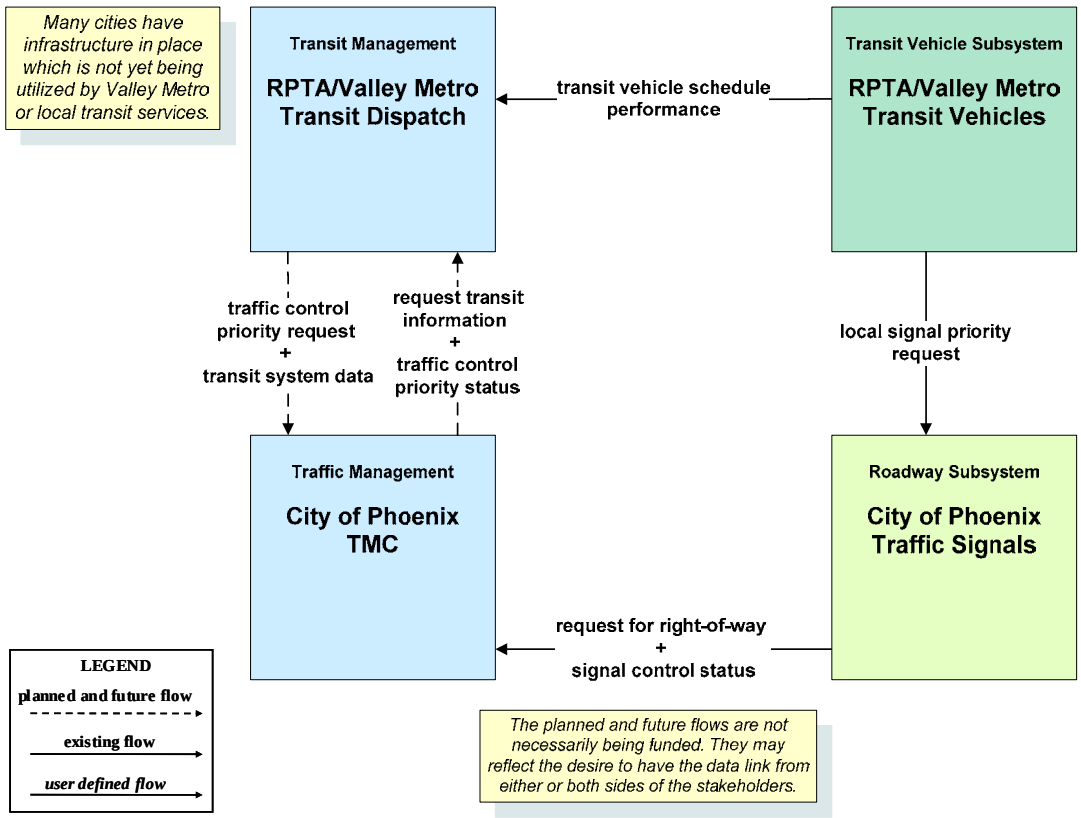


Figure 159: APTS09 – Transit Signal Priority: METRO Light Rail – City of Mesa and City of Phoenix

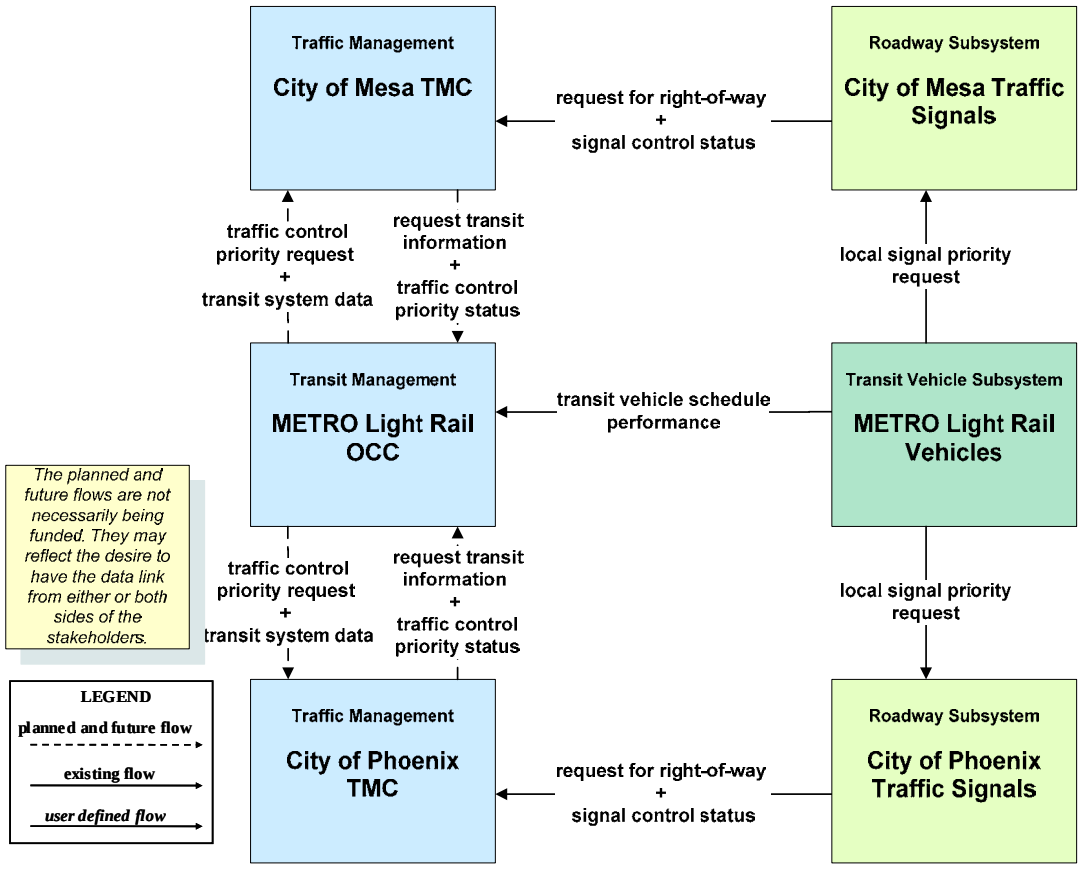


Figure 160: APTS09 – Transit Signal Priority: METRO Light Rail – City of Tempe

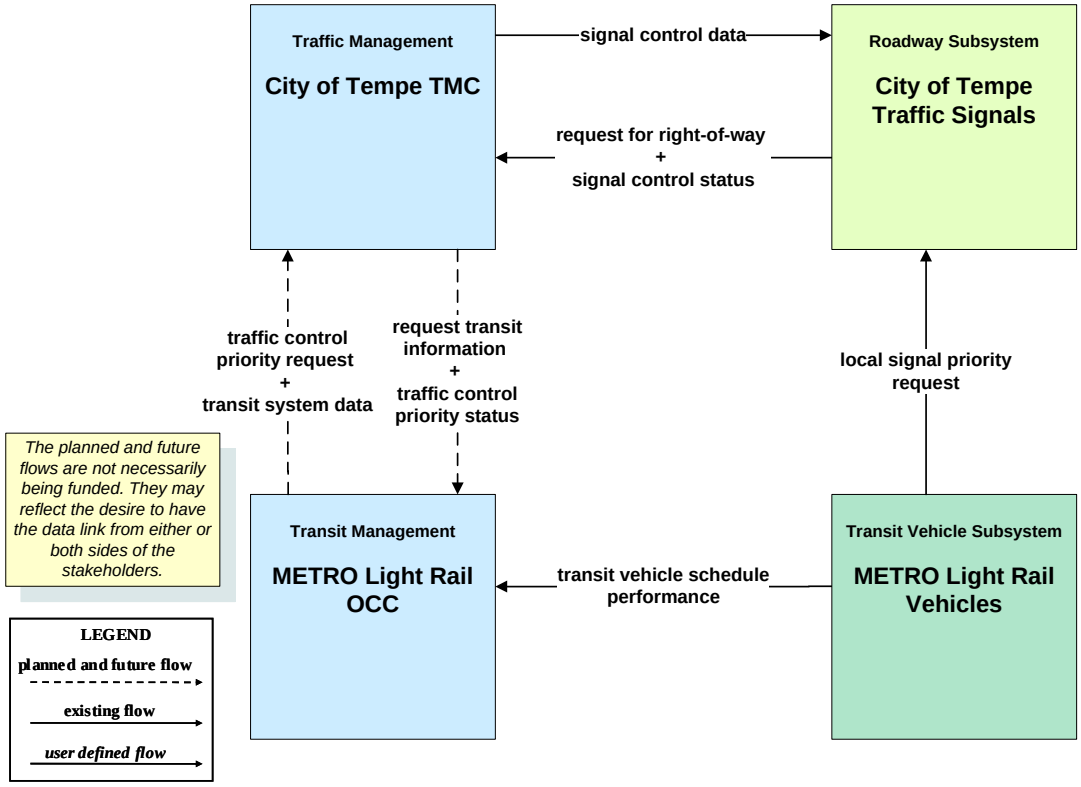


Figure 161: APTS09 – Transit Signal Priority:
RPTA/Valley Metro – Local Cities and Municipalities – Generic

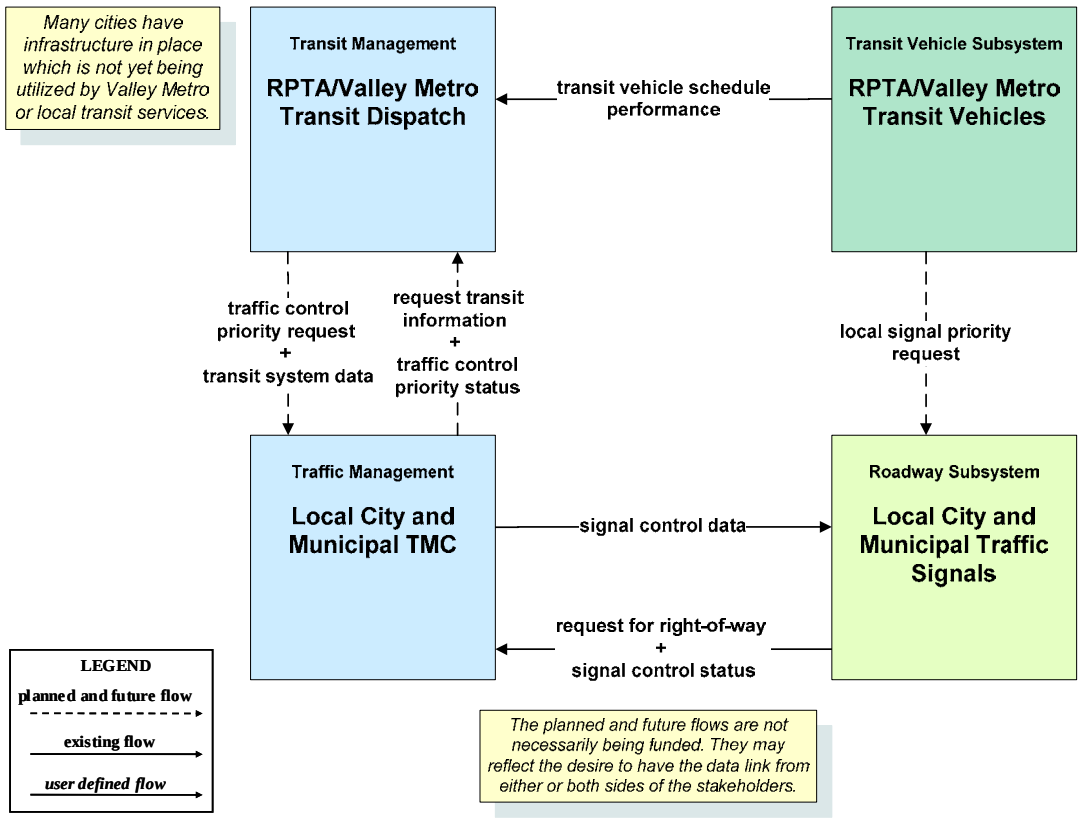


Figure 162: APTS10 – Transit Passenger Counting: Area Transit Providers

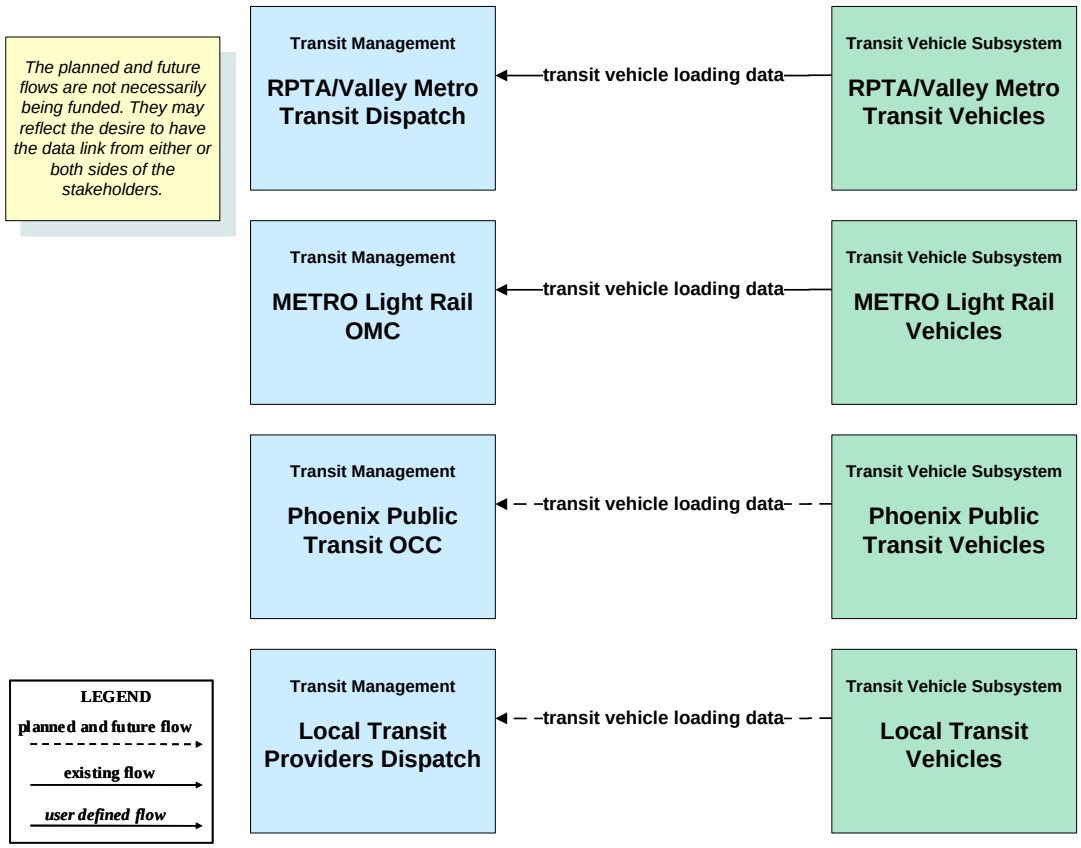


Figure 163: ATIS01 – Broadcast Traveler Information: ADOT HCRS (Inputs)

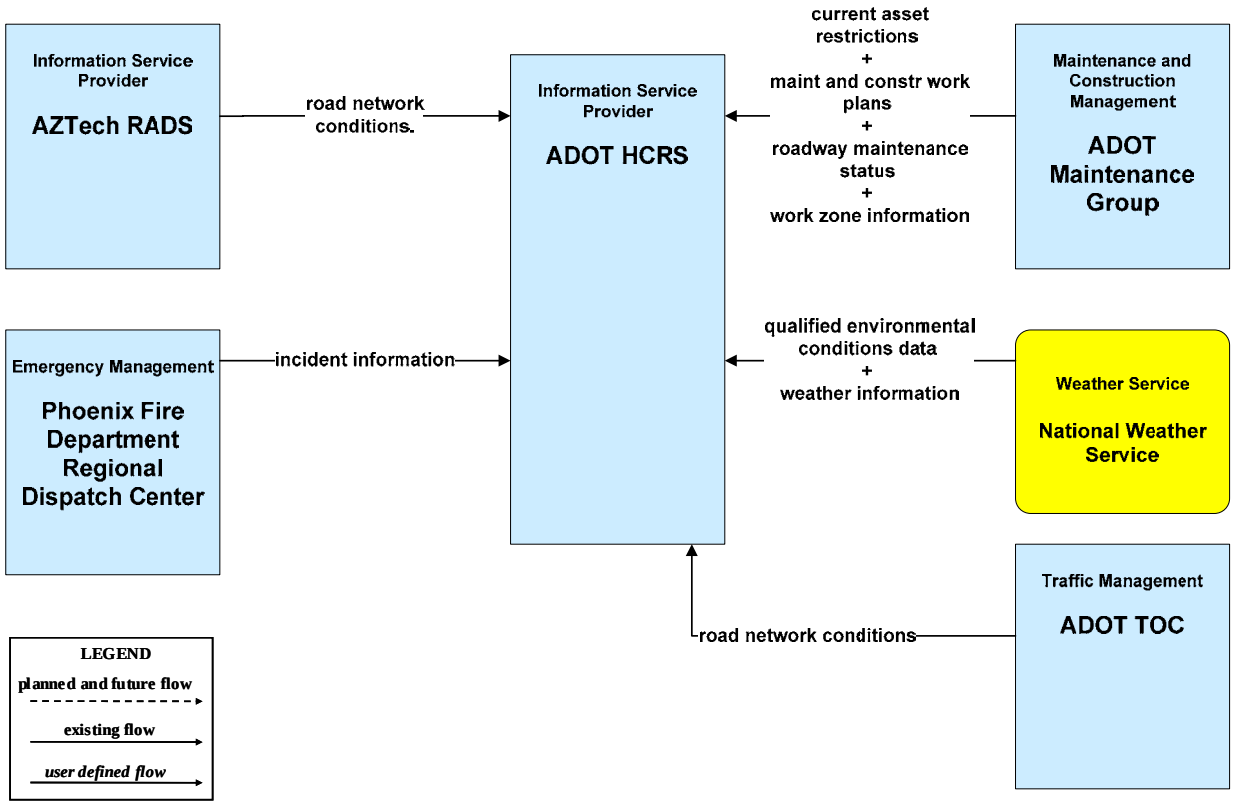


Figure 164: ATIS01 – Broadcast Traveler Information: ADOT HCRS (Outputs)

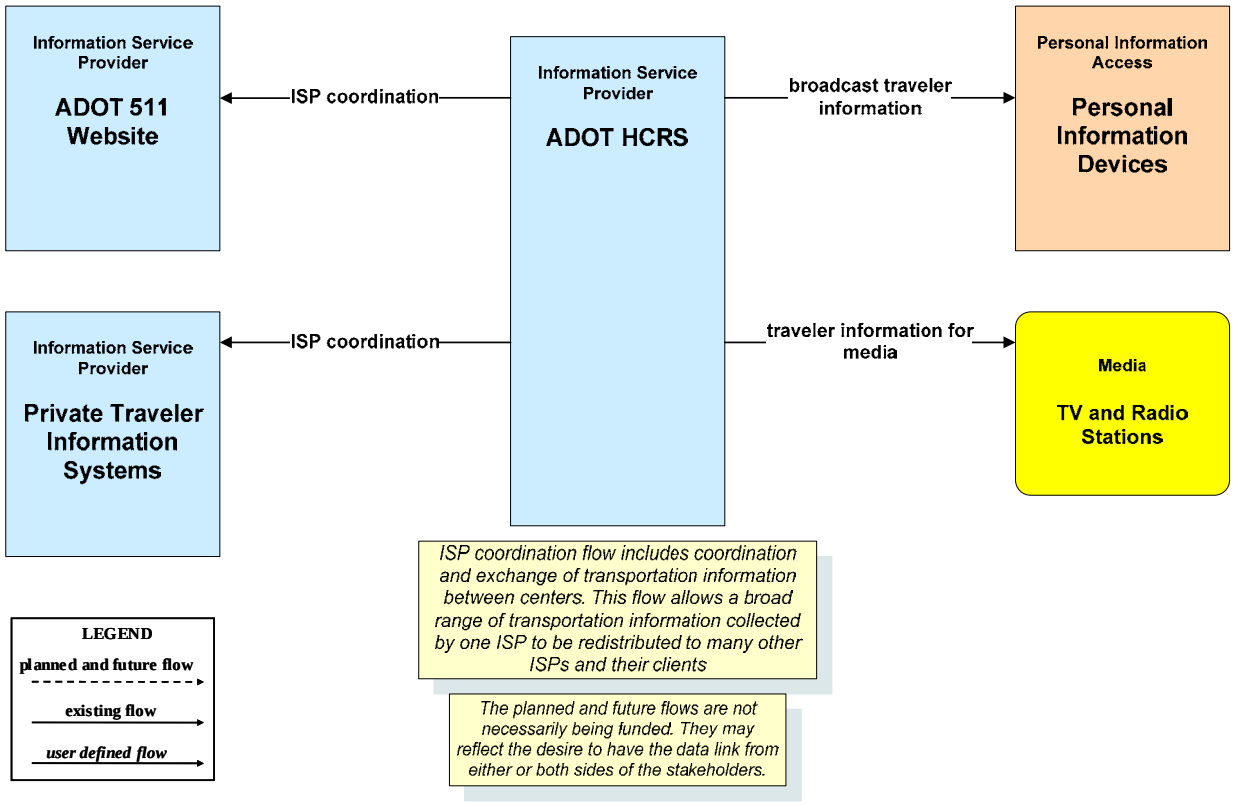


Figure 165: ATIS01 – Broadcast Traveler Information: ADOT 511 Website

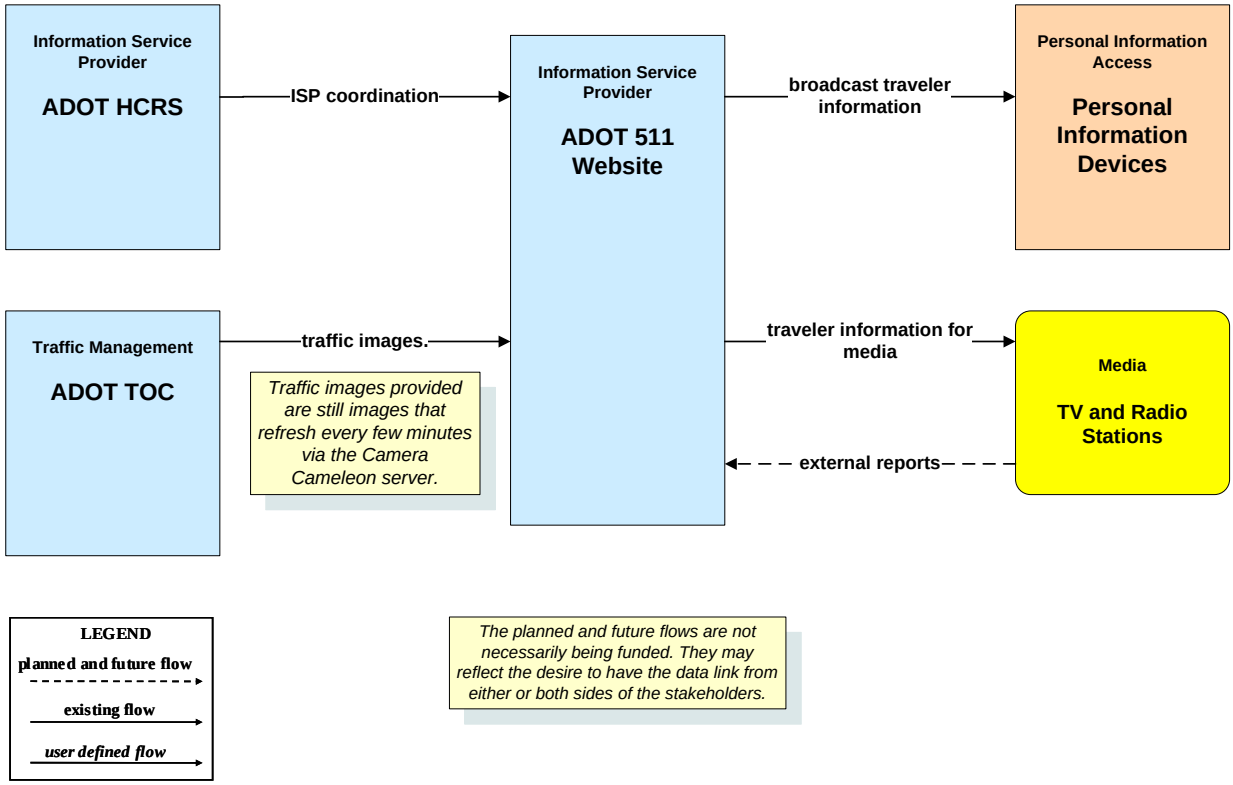


Figure 166: ATIS01 – Broadcast Traveler Information: Maricopa County

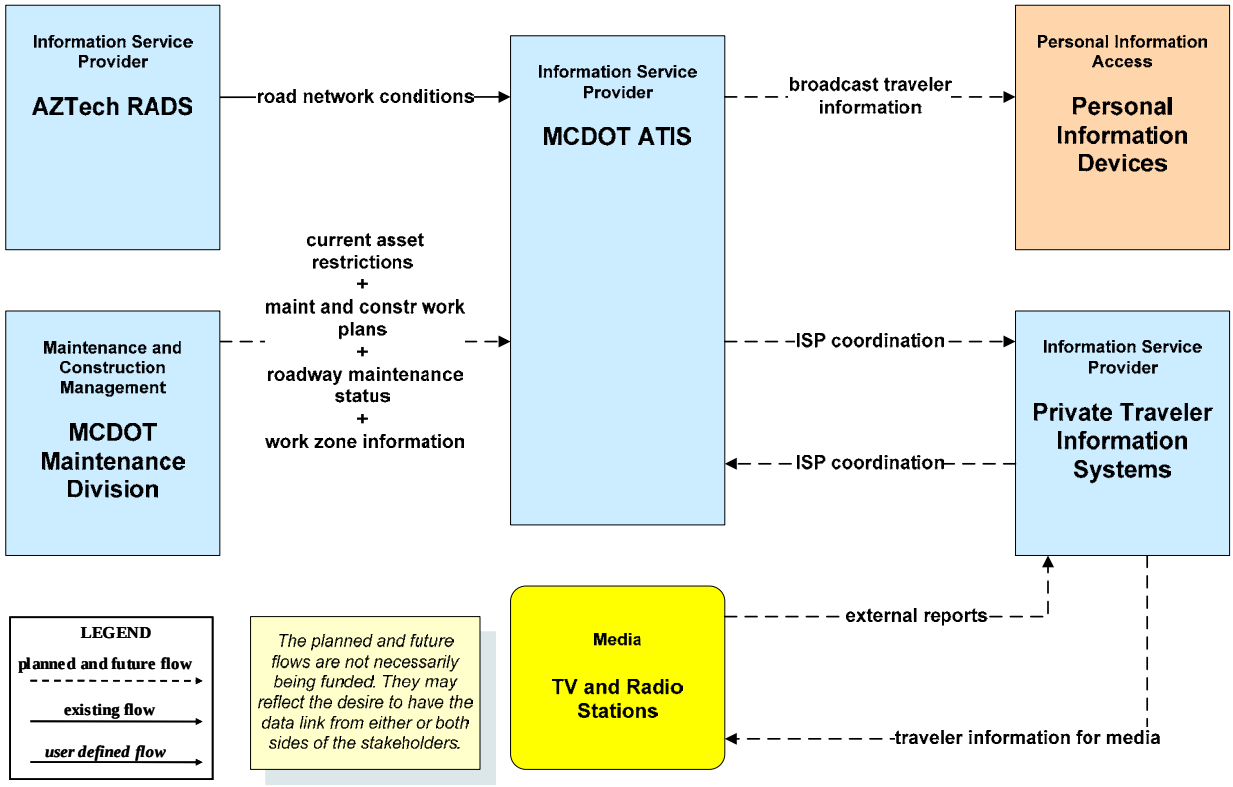


Figure 167: ATIS01 – Broadcast Traveler Information: Local Cities and Municipalities

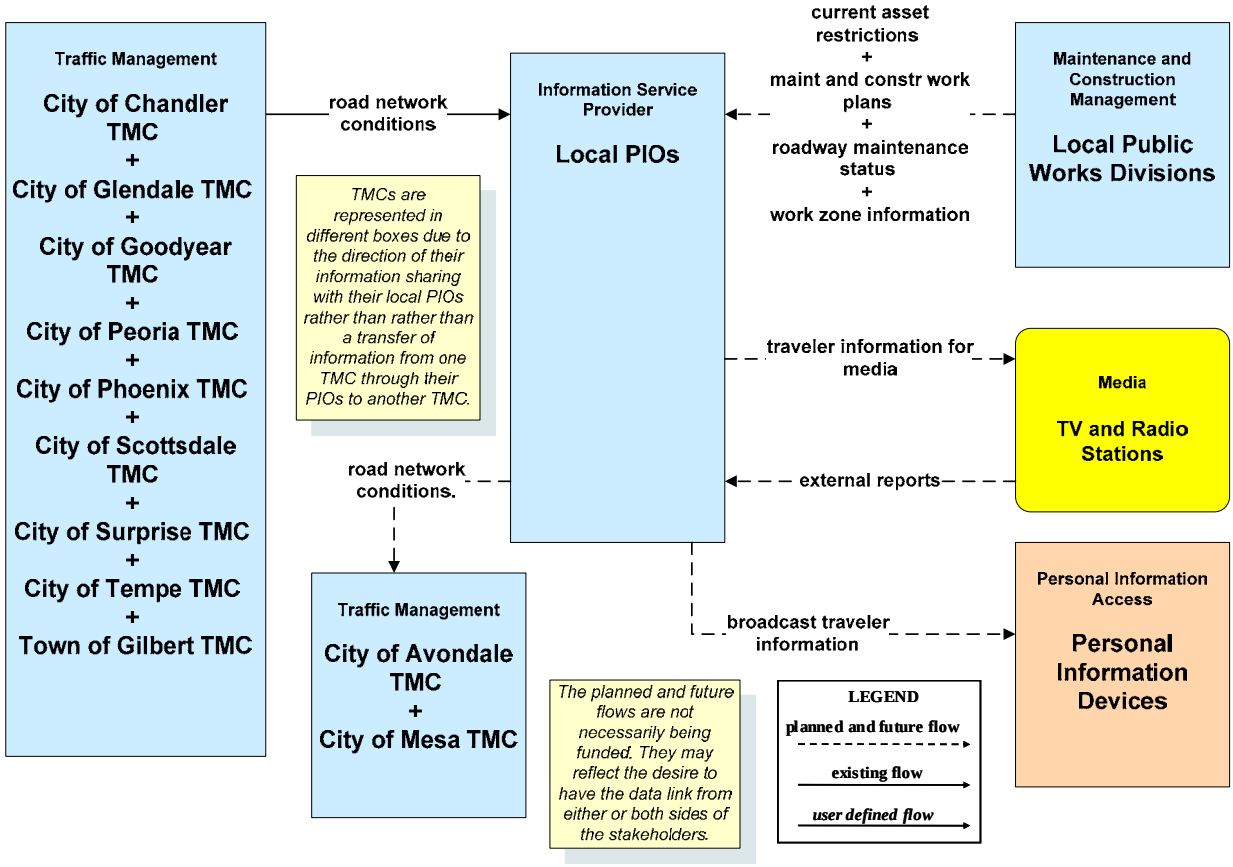


Figure 168: ATIS01 – Broadcast Traveler Information: Local Cities and Municipalities – Generic

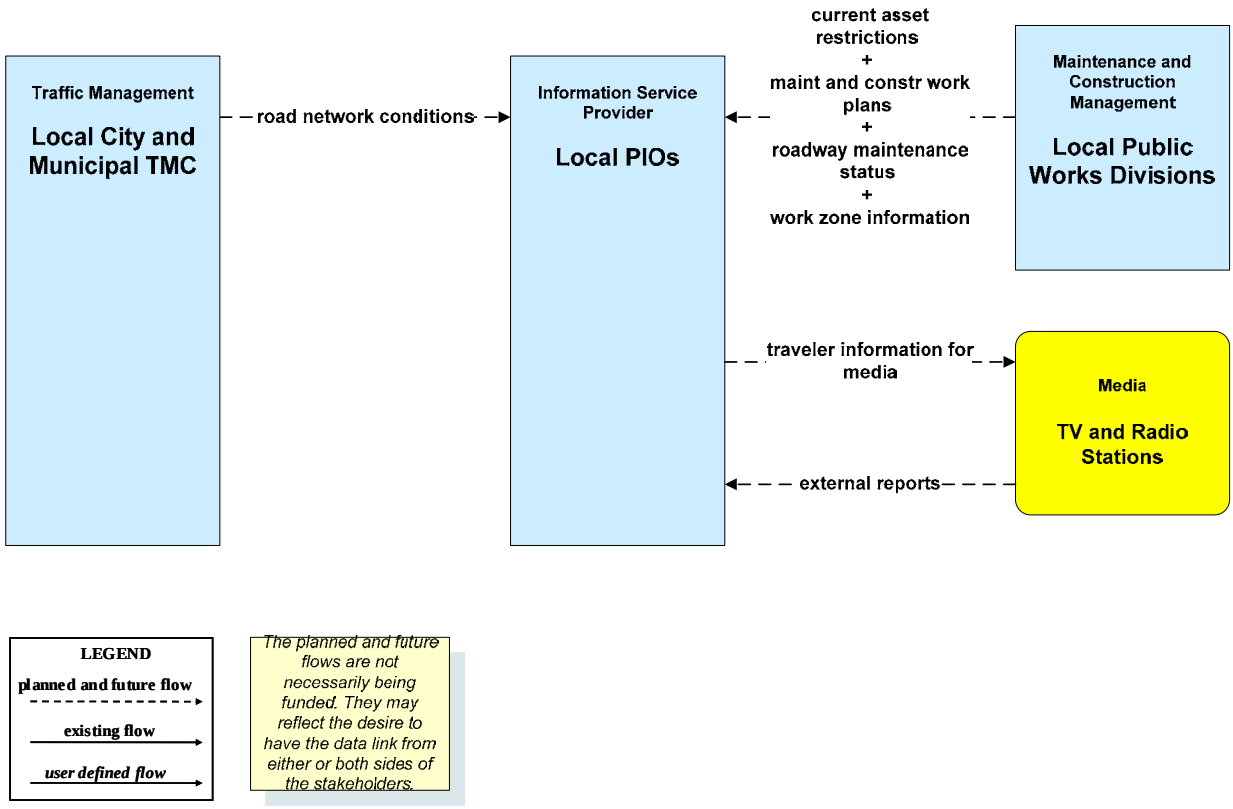


Figure 169: ATIS02 – Interactive Traveler Information: ADOT 511 IVR

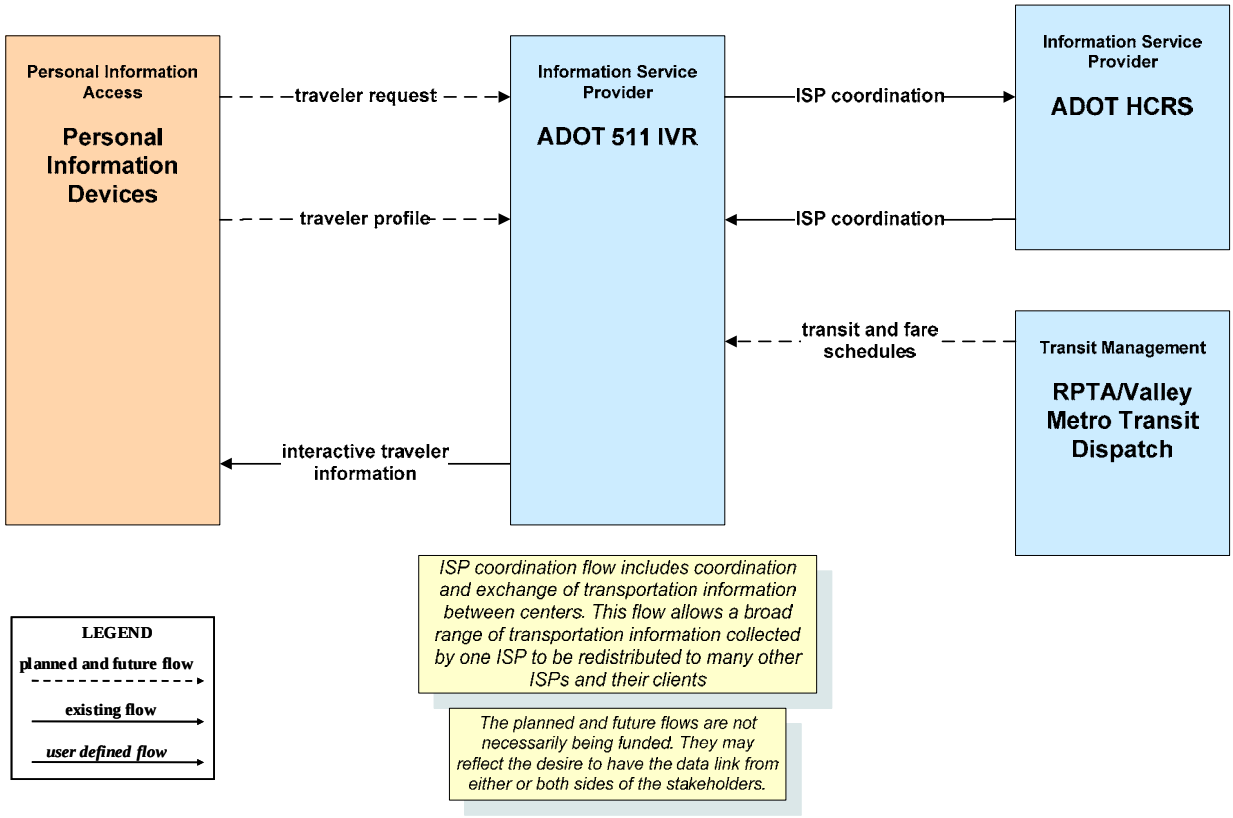


Figure 170: ATIS02 – Interactive Traveler Information: Maricopa County

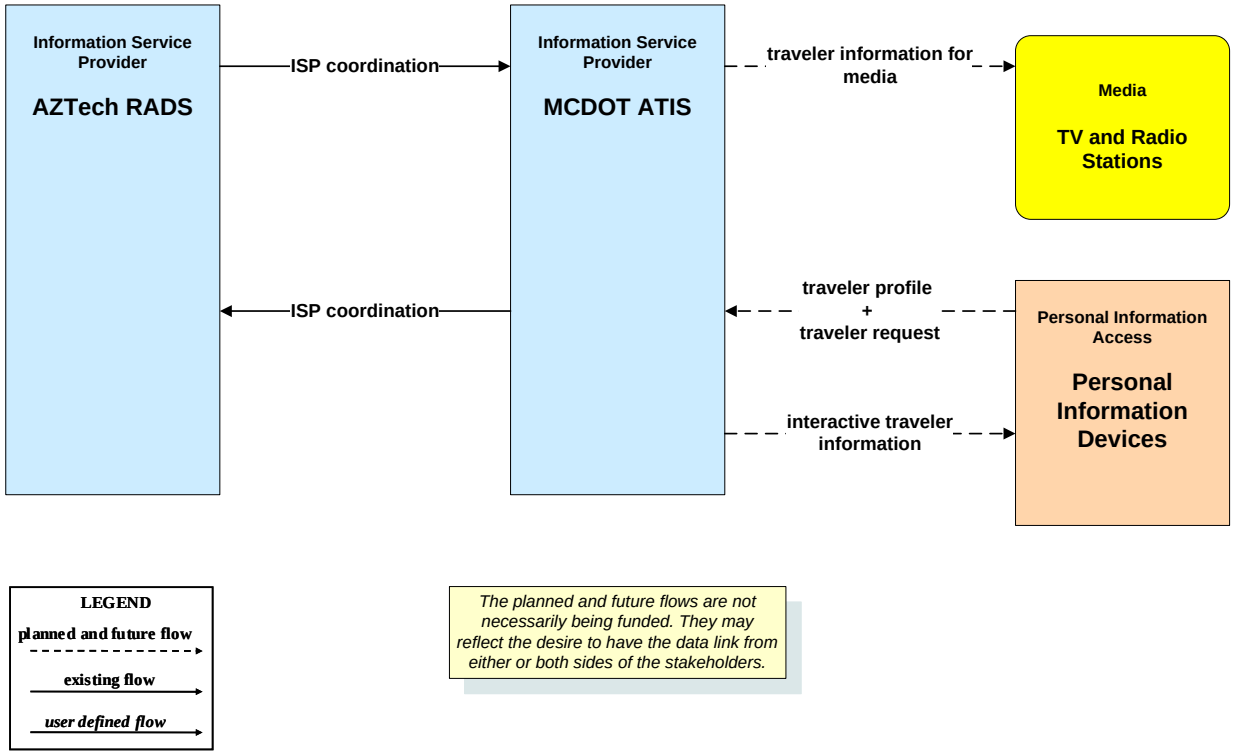
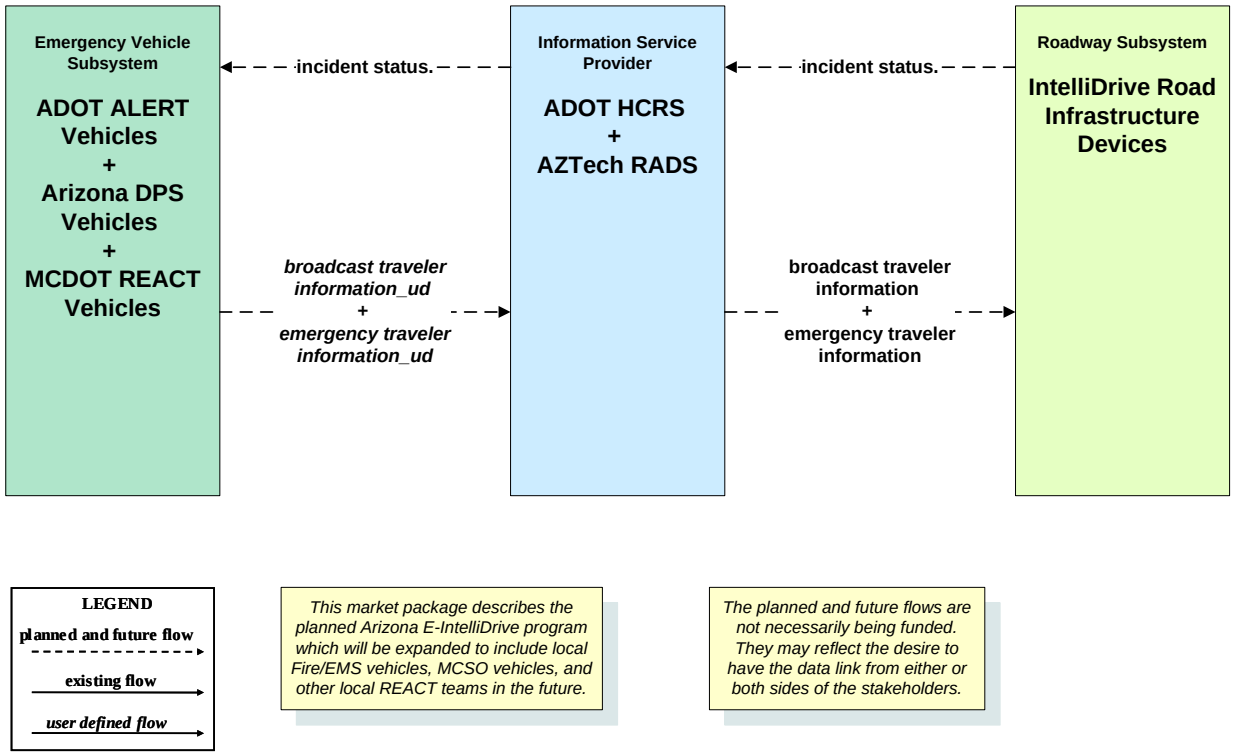


Figure 171: ATIS10 – VII Traveler Information: E-IntelliDrive



MARICOPA ASSOCIATION of GOVERNMENTS

MAG Regional ITS Architecture

Appendix E – Functional Requirements

Prepared by:

Kimley-Horn and Associates, Inc.

June, 2010
091980011-015

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MAG REGIONAL ITS ARCHITECTURE – APPENDIX E

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MAG REGIONAL ITS ARCHITECTURE – APPENDIX E

Element Name	Equipment Package Name	Requirement
ADEM SEOC	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
ADEM SEOC	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
ADEM SEOC	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
ADEM SEOC	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
ADEM SEOC	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
ADEM SEOC	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
ADEM SEOC	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
ADEM SEOC	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
ADEM SEOC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
ADEM SEOC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
ADEM SEOC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
ADEM SEOC	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
ADEM SEOC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
ADEM SEOC	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
ADEM SEOC	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
ADEM SEOC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
ADEM SEOC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
ADEM SEOC	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
ADEM SEOC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
ADEM SEOC	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
ADEM SEOC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
ADEM SEOC	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
ADEM SEOC	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
ADEM SEOC	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.

Element Name	Equipment Package Name	Requirement
ADEM SEOC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
ADEM SEOC	Emergency Dispatch	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
ADEM SEOC	Emergency Dispatch	The center shall relay location and incident details to the responding vehicles.
ADEM SEOC	Emergency Dispatch	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
ADEM SEOC	Emergency Dispatch	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.
ADEM SEOC	Emergency Dispatch	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
ADEM SEOC	Emergency Dispatch	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
ADEM SEOC	Emergency Dispatch	The center shall store and maintain the emergency service responses in an action log.
ADEM SEOC	Emergency Dispatch	The center shall receive traffic images to support dispatch of emergency vehicles.
ADEM SEOC	Emergency Dispatch	The center shall provide the capability to request remote control of traffic surveillance devices
ADEM SEOC	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
ADEM SEOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADEM SEOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADEM SEOC	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
ADEM SEOC	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
ADEM SEOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADEM SEOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADEM SEOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADEM SEOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADEM SEOC	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
ADEM SEOC	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
ADEM SEOC	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
ADEM SEOC	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.

Element Name	Equipment Package Name	Requirement
ADEM SEOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADEM SEOC	Emergency Environmental Monitoring	The center shall present the current and forecast road and weather information to the emergency system operator.
ADEM SEOC	Emergency Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.
ADEM SEOC	Emergency Environmental Monitoring	The center shall collect current road and weather information from roadway maintenance operations.
ADEM SEOC	Emergency Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
ADEM SEOC	Emergency Evacuation Support	The center shall request traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes.
ADEM SEOC	Emergency Evacuation Support	The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.
ADEM SEOC	Emergency Evacuation Support	The center shall request resources from transit agencies as needed to support the evacuation.
ADEM SEOC	Emergency Evacuation Support	The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.
ADEM SEOC	Emergency Evacuation Support	The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.
ADEM SEOC	Emergency Evacuation Support	The center shall monitor the progress of the reentry process.
ADEM SEOC	Emergency Evacuation Support	The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.
ADEM SEOC	Emergency Evacuation Support	The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.
ADEM SEOC	Emergency Evacuation Support	The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.
ADEM SEOC	Emergency Evacuation Support	The center shall provide traveler information systems with evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary and when it is safe to return.
ADEM SEOC	Emergency Evacuation Support	The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.
ADEM SEOC	Emergency Evacuation Support	The center shall retrieve information from public health systems to plan for and implement evacuations or in-place sheltering for biological, chemical, radiation, and other public health emergencies.
ADEM SEOC	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
ADEM SEOC	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
ADEM SEOC	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
ADEM SEOC	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
ADEM SEOC	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
ADEM SEOC	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
ADEM SEOC	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
ADEM SEOC	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
ADEM SEOC	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.

Element Name	Equipment Package Name	Requirement
ADEM SEOC	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
ADEM SEOC	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
ADEM SEOC	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
ADEM SEOC	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
ADEM SEOC	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
ADEM SEOC	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
ADEM SEOC	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
ADEM SEOC	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
ADEM SEOC	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
ADEM SEOC	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
ADEM SEOC	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
ADEM SEOC	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall disseminate customized event information to travelers upon request.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall disseminate customized multimodal transportation service information (for example, from ferry and airline operators), including transfer points and other information, to travelers upon request.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall disseminate customized weather information to travelers upon request.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall disseminate customized toll fee information to travelers upon request.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall disseminate customized air quality information to travelers upon request.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall support requests for traveler information and advanced payment for traveler services from commercial fleet operators.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall provide the capability to support requests from the media for traffic and incident data.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall provide the capability for a system operator to control the type and update frequency of traveler information.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request.

Element Name	Equipment Package Name	Requirement
ADOT 511 IVR	Interactive Infrastructure Information	The center shall manage payment for services, such as tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls, and provide transaction success or failure details.
ADOT 511 IVR	Interactive Infrastructure Information	The center shall accept traveler profiles for determining the type of personalized data to send to the traveler.
ADOT 511 IVR	ISP Emergency Traveler Information	The center shall provide evacuation information to shelter providers.
ADOT 511 IVR	ISP Emergency Traveler Information	The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.
ADOT 511 IVR	ISP Emergency Traveler Information	The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.
ADOT 511 IVR	ISP Emergency Traveler Information	The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.
ADOT 511 IVR	ISP Traveler Data Collection	The center shall collect, process, and store toll fee information.
ADOT 511 IVR	ISP Traveler Data Collection	The center shall collect, process, and store air quality information.
ADOT 511 IVR	ISP Traveler Data Collection	The center shall collect, process, and store border crossing information.
ADOT 511 IVR	ISP Traveler Data Collection	The center shall collect, process, and store event information.
ADOT 511 IVR	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.
ADOT 511 IVR	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.
ADOT 511 IVR	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.
ADOT 511 IVR	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
ADOT 511 IVR	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide transit service information in the requested voice format and for the requested location.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide yellow pages services information in the requested voice format and for the requested location.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide weather and event information in the requested voice format and for the requested location.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide current ferry and rail schedule and airport status information in the requested voice format and for the requested location.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide roadway environment conditions information in the requested voice format and for the requested location.
ADOT 511 IVR	Traveler Telephone Information	The center shall receive and forward region-specific wide-area alert and advisory information to the traveler telephone information system, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide work zone and roadway maintenance information in the requested voice format and for the requested location.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide information on traffic conditions in the requested voice format and for the requested location.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide the capability to process traveler information requests from a traveler telephone information system.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide the capability to process dual-tone multifrequency (DTMF)-based requests (touch-tone) for traveler information from a traveler telephone information system.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide the capability to process voice-formatted requests for traveler information from a traveler telephone information system, and return the information in the requested format.
ADOT 511 IVR	Traveler Telephone Information	The center shall provide the capability to support both specific caller requests as well as bulk upload of regional traveler information.
ADOT 511 Website	Basic Information Broadcast	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.

Element Name	Equipment Package Name	Requirement
ADOT 511 Website	Basic Information Broadcast	The center shall disseminate event information to travelers.
ADOT 511 Website	Basic Information Broadcast	The center shall disseminate air quality information to travelers.
ADOT 511 Website	Basic Information Broadcast	The center shall provide the capability to support requests from the media for traffic and incident data.
ADOT 511 Website	Basic Information Broadcast	The center shall disseminate weather information to travelers.
ADOT 511 Website	Basic Information Broadcast	The center shall disseminate parking information to travelers, including location, availability, and fees.
ADOT 511 Website	Basic Information Broadcast	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
ADOT 511 Website	Basic Information Broadcast	The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.
ADOT 511 Website	Basic Information Broadcast	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.
ADOT 511 Website	Basic Information Broadcast	The center shall disseminate toll fee information to travelers.
ADOT 511 Website	ISP Emergency Traveler Information	The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.
ADOT 511 Website	ISP Emergency Traveler Information	The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.
ADOT 511 Website	ISP Emergency Traveler Information	The center shall provide evacuation information to shelter providers.
ADOT 511 Website	ISP Emergency Traveler Information	The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.
ADOT 511 Website	ISP Traveler Data Collection	The center shall collect, process, and store toll fee information.
ADOT 511 Website	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.
ADOT 511 Website	ISP Traveler Data Collection	The center shall collect, process, and store border crossing information.
ADOT 511 Website	ISP Traveler Data Collection	The center shall collect, process, and store air quality information.
ADOT 511 Website	ISP Traveler Data Collection	The center shall collect, process, and store event information.
ADOT 511 Website	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.
ADOT 511 Website	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.
ADOT 511 Website	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
ADOT 511 Website	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.
ADOT ALERT Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.
ADOT ALERT Vehicles	On-board EV En Route Support	The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.
ADOT ALERT Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.
ADOT ALERT Vehicles	On-board EV En Route Support	The emergency vehicle shall send patient status information to the care facility along with a request for further information.
ADOT ALERT Vehicles	On-board EV En Route Support	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.
ADOT ALERT Vehicles	On-board EV En Route Support	The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.
ADOT ALERT Vehicles	On-board EV En Route Support	The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.
ADOT ALERT Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.

Element Name	Equipment Package Name	Requirement
ADOT ALERT Vehicles	On-board EV En Route Support	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.
ADOT CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
ADOT CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
ADOT CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
ADOT CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
ADOT CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
ADOT CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
ADOT CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
ADOT CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
ADOT CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
ADOT CCTV	Roadway Incident Detection	The field element's video devices shall be remotely controlled by a traffic management center.
ADOT CCTV	Roadway Incident Detection	The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.
ADOT CCTV	Roadway Incident Detection	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
ADOT CCTV	Roadway Incident Detection	The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.
ADOT CCTV	Roadway Work Zone Safety	The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.
ADOT CCTV	Roadway Work Zone Safety	The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.
ADOT CCTV	Roadway Work Zone Safety	The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.
ADOT CCTV	Roadway Work Zone Safety	The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.
ADOT CCTV	Roadway Work Zone Safety	The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.
ADOT CCTV	Roadway Work Zone Safety	The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.
ADOT CCTV	Roadway Work Zone Safety	The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.
ADOT CCTV	Roadway Work Zone Safety	The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.
ADOT CCTV	Roadway Work Zone Safety	The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.
ADOT DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.

Element Name	Equipment Package Name	Requirement
ADOT DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
ADOT DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
ADOT DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
ADOT DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
ADOT DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
ADOT DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
ADOT DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
ADOT DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
ADOT EOC	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
ADOT EOC	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
ADOT EOC	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
ADOT EOC	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
ADOT EOC	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
ADOT EOC	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
ADOT EOC	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
ADOT EOC	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
ADOT EOC	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
ADOT EOC	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
ADOT EOC	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
ADOT EOC	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
ADOT EOC	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
ADOT EOC	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
ADOT EOC	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.

Element Name	Equipment Package Name	Requirement
ADOT EOC	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
ADOT EOC	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
ADOT EOC	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
ADOT EOC	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
ADOT EOC	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
ADOT EOC	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
ADOT EOC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
ADOT EOC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
ADOT EOC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
ADOT EOC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
ADOT EOC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
ADOT EOC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
ADOT EOC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.

Element Name	Equipment Package Name	Requirement
ADOT EOC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
ADOT FMS	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
ADOT FMS	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
ADOT FMS	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
ADOT FMS	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
ADOT FMS	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
ADOT FMS	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
ADOT FMS	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
ADOT FMS	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
ADOT FMS	TMC Freeway Management	The center shall collect fault data from ramp meters, mainline metering, and lane controls.
ADOT FMS	TMC Freeway Management	The center shall collect operational status from ramp meters, mainline metering, and lane controls and compare against the control information sent by the center.
ADOT FMS	TMC Freeway Management	The center shall remotely control systems to manage use of the freeways, including ramp meters, mainline metering, and lane controls.
ADOT FMS	TMC Freeway Management	The center shall implement control strategies, under control of center personnel, on some or all of the freeway network devices (e.g. ramp meters, mainline metering, and lane controls), based on data from sensors monitoring traffic conditions upstream, downstream, and queue data on the ramps themselves.
ADOT FMS	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
ADOT FMS	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
ADOT FMS	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
ADOT FMS	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
ADOT FMS	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
ADOT FMS	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
ADOT FMS	TMC Signal Control	The center shall remotely control traffic signal controllers.
ADOT FMS	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
ADOT FMS	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
ADOT FMS	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
ADOT FMS	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
ADOT FMS	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.

Element Name	Equipment Package Name	Requirement
ADOT FMS	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
ADOT FMS	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
ADOT FMS	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
ADOT FMS	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
ADOT FMS	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
ADOT FMS	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
ADOT FMS	Traffic Data Collection	The center shall be able to produce sample products of the data available.
ADOT FMS	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
ADOT FMS	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
ADOT FMS	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
ADOT FMS	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
ADOT FMS	Traffic Maintenance	The center shall collect environmental sensor operational status.
ADOT FMS	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
ADOT FMS	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
ADOT FMS	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
ADOT HCRS	Basic Information Broadcast	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
ADOT HCRS	Basic Information Broadcast	The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.
ADOT HCRS	Basic Information Broadcast	The center shall disseminate air quality information to travelers.
ADOT HCRS	Basic Information Broadcast	The center shall disseminate toll fee information to travelers.
ADOT HCRS	Basic Information Broadcast	The center shall disseminate parking information to travelers, including location, availability, and fees.
ADOT HCRS	Basic Information Broadcast	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.
ADOT HCRS	Basic Information Broadcast	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.
ADOT HCRS	Basic Information Broadcast	The center shall disseminate weather information to travelers.
ADOT HCRS	Basic Information Broadcast	The center shall disseminate event information to travelers.
ADOT HCRS	Basic Information Broadcast	The center shall provide the capability to support requests from the media for traffic and incident data.
ADOT HCRS	Interactive Infrastructure Information	The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.
ADOT HCRS	Interactive Infrastructure Information	The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request.
ADOT HCRS	Interactive Infrastructure Information	The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.
ADOT HCRS	Interactive Infrastructure Information	The center shall disseminate customized toll fee information to travelers upon request.

Element Name	Equipment Package Name	Requirement
ADOT HCRS	Interactive Infrastructure Information	The center shall disseminate customized weather information to travelers upon request.
ADOT HCRS	Interactive Infrastructure Information	The center shall disseminate customized multimodal transportation service information (for example, from ferry and airline operators), including transfer points and other information, to travelers upon request.
ADOT HCRS	Interactive Infrastructure Information	The center shall disseminate customized event information to travelers upon request.
ADOT HCRS	Interactive Infrastructure Information	The center shall disseminate customized air quality information to travelers upon request.
ADOT HCRS	Interactive Infrastructure Information	The center shall accept traveler profiles for determining the type of personalized data to send to the traveler.
ADOT HCRS	Interactive Infrastructure Information	The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.
ADOT HCRS	Interactive Infrastructure Information	The center shall manage payment for services, such as tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls, and provide transaction success or failure details.
ADOT HCRS	Interactive Infrastructure Information	The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.
ADOT HCRS	Interactive Infrastructure Information	The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.
ADOT HCRS	Interactive Infrastructure Information	The center shall provide the capability to support requests from the media for traffic and incident data.
ADOT HCRS	Interactive Infrastructure Information	The center shall provide the capability for a system operator to control the type and update frequency of traveler information.
ADOT HCRS	Interactive Infrastructure Information	The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request.
ADOT HCRS	Interactive Infrastructure Information	The center shall support requests for traveler information and advanced payment for traveler services from commercial fleet operators.
ADOT HCRS	ISP Data Collection	The center shall collect traveler requests, confirmations, and payment transaction data for traveler services provided.
ADOT HCRS	ISP Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
ADOT HCRS	ISP Data Collection	The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.
ADOT HCRS	ISP Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traveler information data or for the data itself.
ADOT HCRS	ISP Data Collection	The center shall be able to produce sample products of the data available.
ADOT HCRS	ISP Emergency Traveler Information	The center shall provide evacuation information to shelter providers.
ADOT HCRS	ISP Emergency Traveler Information	The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.
ADOT HCRS	ISP Emergency Traveler Information	The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.
ADOT HCRS	ISP Emergency Traveler Information	The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.
ADOT HCRS	ISP Operational Data Repository	The center shall select real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, transit information, parking information, special event and incident information.
ADOT HCRS	ISP Operational Data Repository	The center shall support the capability for the system operator to monitor and control the operational data repository and information distribution service.
ADOT HCRS	ISP Operational Data Repository	The center shall distribute real-time transportation operations data to transportation system operators in the region.
ADOT HCRS	ISP Probe Information Collection	The center shall collect traffic probe data (speeds, travel times, etc.) from appropriately equipped vehicles and short range communications equipment.

Element Name	Equipment Package Name	Requirement
ADOT HCRS	ISP Probe Information Collection	The center shall receive traffic probe data derived from electronic toll collection operations and include this data in aggregated probe data provided to other centers.
ADOT HCRS	ISP Probe Information Collection	The center shall receive traffic probe data collected by transit fleet operators and include this data in aggregated probe data provided to other centers.
ADOT HCRS	ISP Probe Information Collection	The center shall aggregate collected traffic probe data, calculate route segment travel times, route segment speeds, and route usage, and disseminate to other centers.
ADOT HCRS	ISP Probe Information Collection	The center shall collect environmental probe data (air temperature, exterior light status, wiper status, traction control status, etc.) from appropriately equipped vehicles and short range communications equipment.
ADOT HCRS	ISP Probe Information Collection	The center shall aggregate collected environmental probe data and disseminate the aggregated environmental probe data to other centers.
ADOT HCRS	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.
ADOT HCRS	ISP Traveler Data Collection	The center shall collect, process, and store event information.
ADOT HCRS	ISP Traveler Data Collection	The center shall collect, process, and store border crossing information.
ADOT HCRS	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.
ADOT HCRS	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.
ADOT HCRS	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.
ADOT HCRS	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
ADOT HCRS	ISP Traveler Data Collection	The center shall collect, process, and store toll fee information.
ADOT HCRS	ISP Traveler Data Collection	The center shall collect, process, and store air quality information.
ADOT HCRS	ISP VII Traveler Information Distribution	The center shall monitor maintenance status of the roadside equipment.
ADOT HCRS	ISP VII Traveler Information Distribution	The center shall monitor the operational status of the VII roadside equipment.
ADOT HCRS	ISP VII Traveler Information Distribution	The center shall provide the capability for a system operator to monitor VII system operation and control the type and update frequency of traveler information that is distributed.
ADOT HCRS	ISP VII Traveler Information Distribution	The center shall distribute location relevant traveler information to short range communications equipment at the roadside.
ADOT HCRS	ISP VII Traveler Information Distribution	The center shall collect fault data from the roadside equipment and send to the maintenance center for repair.
ADOT HCRS	ISP VII Traveler Information Distribution	The center shall select traveler information for distribution including traffic and road conditions, incident information, maintenance and construction information, event information, transit information, parking information, and weather information.
ADOT Maintenance Group	MCM Incident Management	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
ADOT Maintenance Group	MCM Incident Management	The center shall exchange road network status assessment information with emergency management and traffic management centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
ADOT Maintenance Group	MCM Incident Management	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
ADOT Maintenance Group	MCM Incident Management	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, etc.
ADOT Maintenance Group	MCM Incident Management	The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.

Element Name	Equipment Package Name	Requirement
ADOT Maintenance Group	MCM Incident Management	The center shall respond to requests from emergency management to provide maintenance and construction resources to implement response plans, assist in clean up, verify an incident, etc. This may also involve coordination with traffic management centers and other maintenance centers.
ADOT Maintenance Group	MCM Incident Management	The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.
ADOT Maintenance Group	MCM Incident Management	The center shall exchange incident and threat information with emergency management centers as well as traffic management centers; including notification of existence of incident and expected severity, location, time and nature of incident.
ADOT Maintenance Group	MCM Work Activity Coordination	The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.
ADOT Maintenance Group	MCM Work Activity Coordination	The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.
ADOT Maintenance Group	MCM Work Activity Coordination	The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
ADOT Maintenance Group	MCM Work Activity Coordination	The center shall provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.
ADOT Maintenance Group	MCM Work Activity Coordination	The center shall exchange rail schedules and work plans with rail operations centers.
ADOT Maintenance Group	MCM Work Activity Coordination	The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.
ADOT Maintenance Group	MCM Work Zone Safety Management	The center shall collect status information of work zone safety device status from field equipment or the maintenance and construction vehicles.
ADOT Maintenance Group	MCM Work Zone Safety Management	The center shall provide remote monitoring and control of intrusion alert devices that have been installed in work zones or maintenance areas.
ADOT Maintenance Group	MCM Work Zone Safety Management	The center shall collect and store work zone data collected from work zone monitoring devices (such as intrusion detection or alert devices and speed monitoring devices) on-board the vehicle and at the roadside.
ADOT Maintenance Group	MCM Work Zone Safety Management	The center shall provide remote monitoring and control of work zone safety devices - including intrusion detection devices that have been installed in work zones or maintenance areas.
ADOT Ramp Meters	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
ADOT Ramp Meters	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
ADOT Ramp Meters	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
ADOT Ramp Meters	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.

Element Name	Equipment Package Name	Requirement
ADOT Ramp Meters	Roadway Freeway Control	The field element shall monitor operation of ramp meter, mainline meters, and lane control indicators and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
ADOT Ramp Meters	Roadway Freeway Control	The field element shall provide indications to the driver that a freeway ramp or a lane is available for use, with possible usage data for the freeway lanes they are entering.
ADOT Ramp Meters	Roadway Freeway Control	The field element shall return ramp metering controller, mainline meters, and lane control fault data to the maintenance center for repair.
ADOT Ramp Meters	Roadway Freeway Control	The field element shall monitor operation of ramp meter, mainline meters, and lane control indicators and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
ADOT Ramp Meters	Roadway Freeway Control	The field element shall include ramp metering controllers, mainline meters, and lane controls for use on freeways, under center control.
ADOT Ramp Meters	Roadway Freeway Control	The field element shall return ramp metering controller, mainline meters, and lane control operational status to the controlling center.
ADOT Ramp Meters	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
ADOT Ramp Meters	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
ADOT Ramp Meters	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
ADOT Ramp Meters	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
ADOT Ramp Meters	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
ADOT TOC	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
ADOT TOC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
ADOT TOC	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
ADOT TOC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
ADOT TOC	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
ADOT TOC	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
ADOT TOC	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
ADOT TOC	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
ADOT TOC	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
ADOT TOC	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
ADOT TOC	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
ADOT TOC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
ADOT TOC	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.

Element Name	Equipment Package Name	Requirement
ADOT TOC	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
ADOT TOC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
ADOT TOC	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
ADOT TOC	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
ADOT TOC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
ADOT TOC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
ADOT TOC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
ADOT TOC	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
ADOT TOC	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
ADOT TOC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
ADOT TOC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
ADOT TOC	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
ADOT TOC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
ADOT TOC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
ADOT TOC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
ADOT TOC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
ADOT TOC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
ADOT TOC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
ADOT TOC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
ADOT TOC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
ADOT TOC	Emergency Data Collection	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.
ADOT TOC	Emergency Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
ADOT TOC	Emergency Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.
ADOT TOC	Emergency Data Collection	The center shall be able to produce sample products of the data available.
ADOT TOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADOT TOC	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.

Element Name	Equipment Package Name	Requirement
ADOT TOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADOT TOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADOT TOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADOT TOC	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
ADOT TOC	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
ADOT TOC	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
ADOT TOC	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
ADOT TOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADOT TOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADOT TOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
ADOT TOC	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
ADOT TOC	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
ADOT TOC	Incident Command	The center shall assess the status of responding emergency vehicles as part of an incident command.
ADOT TOC	Incident Command	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.
ADOT TOC	Incident Command	The center shall track and maintain resource information and action plans pertaining to the incident command.
ADOT TOC	Incident Command	The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
ADOT TOC	Incident Command	The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
ADOT TOC	Service Patrol Management	The center shall dispatch roadway service patrol vehicles to identified incident locations.
ADOT TOC	Service Patrol Management	The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.
ADOT TOC	Service Patrol Management	The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.
ADOT TOC	Service Patrol Management	The center shall track the location and status of service patrol vehicles.

Element Name	Equipment Package Name	Requirement
ADOT TOC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
ADOT TOC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
ADOT TOC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
ADOT TOC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
ADOT TOC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
ADOT TOC	TMC Freeway Management	The center shall implement control strategies, under control of center personnel, on some or all of the freeway network devices (e.g. ramp meters, mainline metering, and lane controls), based on data from sensors monitoring traffic conditions upstream, downstream, and queue data on the ramps themselves.
ADOT TOC	TMC Freeway Management	The center shall remotely control systems to manage use of the freeways, including ramp meters, mainline metering, and lane controls.
ADOT TOC	TMC Freeway Management	The center shall collect operational status from ramp meters, mainline metering, and lane controls and compare against the control information sent by the center.
ADOT TOC	TMC Freeway Management	The center shall collect fault data from ramp meters, mainline metering, and lane controls.
ADOT TOC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
ADOT TOC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
ADOT TOC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
ADOT TOC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
ADOT TOC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
ADOT TOC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
ADOT TOC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.

Element Name	Equipment Package Name	Requirement
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
ADOT TOC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
ADOT TOC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
ADOT TOC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
ADOT TOC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
ADOT TOC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
ADOT TOC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
ADOT TOC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
ADOT TOC	TMC Signal Control	The center shall remotely control traffic signal controllers.
ADOT TOC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
ADOT TOC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
ADOT TOC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
ADOT TOC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
ADOT TOC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
ADOT TOC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
ADOT TOC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
ADOT TOC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
ADOT TOC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
ADOT TOC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
ADOT TOC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
ADOT TOC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
ADOT TOC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
ADOT TOC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
ADOT TOC	Traffic Data Collection	The center shall be able to produce sample products of the data available.

Element Name	Equipment Package Name	Requirement
ADOT TOC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
ADOT TOC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
ADOT TOC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
ADOT TOC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
ADOT TOC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
ADOT TOC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
ADOT TOC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
ADOT TOC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
ADOT TOC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
ADOT TOC	Traffic Maintenance	The center shall collect environmental sensor operational status.
ADOT TOC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
ADOT Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
ADOT Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
ADOT Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
ADOT Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
ADOT Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
ADOT Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
ADOT Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
ADOT Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
ADOT Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
ADOT Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
ADOT Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
ADOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
ADOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
ADOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.

Element Name	Equipment Package Name	Requirement
ADOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
ADOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
ADOT Vehicle Detectors	Roadway Data Collection	The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.
ADOT Vehicle Detectors	Roadway Data Collection	The field element shall collect traffic, road, and environmental conditions information.
ADOT Vehicle Detectors	Roadway Data Collection	The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.
ADOT Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
ADOT Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
ADOT Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
ADOT Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
ADOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall provide roadside equipment fault indication to the center for repair.
ADOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall provide roadside equipment operational status to the center.
ADOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall aggregate and forward collected probe information to the center.
ADOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.
ADOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.
ADOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.
ADOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.
ADOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall use toll and parking tags on passing vehicles for traffic data link time calculations and send to the controlling center; tag identities will be removed to ensure anonymity.
ADOT Vehicle Detectors	Roadway Work Zone Safety	The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.
ADOT Vehicle Detectors	Roadway Work Zone Safety	The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.
ADOT Vehicle Detectors	Roadway Work Zone Safety	The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.
ADOT Vehicle Detectors	Roadway Work Zone Safety	The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.
ADOT Vehicle Detectors	Roadway Work Zone Safety	The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.
ADOT Vehicle Detectors	Roadway Work Zone Safety	The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.

Element Name	Equipment Package Name	Requirement
ADOT Vehicle Detectors	Roadway Work Zone Safety	The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.
ADOT Vehicle Detectors	Roadway Work Zone Safety	The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.
ADOT Vehicle Detectors	Roadway Work Zone Safety	The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.
Arizona DPS	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
Arizona DPS	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Arizona DPS	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
Arizona DPS	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
Arizona DPS	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
Arizona DPS	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
Arizona DPS	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
Arizona DPS	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
Arizona DPS	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
Arizona DPS	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
Arizona DPS	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Arizona DPS	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
Arizona DPS	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
Arizona DPS	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
Arizona DPS	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
Arizona DPS	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
Arizona DPS	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
Arizona DPS	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
Arizona DPS	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).

Element Name	Equipment Package Name	Requirement
Arizona DPS	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
Arizona DPS	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
Arizona DPS	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
Arizona DPS	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
Arizona DPS	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
Arizona DPS	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
Arizona DPS	Emergency Call-Taking	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
Arizona DPS	Emergency Call-Taking	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
Arizona DPS	Emergency Call-Taking	The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.
Arizona DPS	Emergency Call-Taking	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.
Arizona DPS	Emergency Call-Taking	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.
Arizona DPS	Emergency Call-Taking	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.
Arizona DPS	Emergency Call-Taking	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.
Arizona DPS	Emergency Call-Taking	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
Arizona DPS	Emergency Call-Taking	The center shall update the incident information log once the emergency system operator has verified the incident.
Arizona DPS	Emergency Call-Taking	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.
Arizona DPS	Emergency Call-Taking	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
Arizona DPS	Emergency Dispatch	The center shall store and maintain the emergency service responses in an action log.
Arizona DPS	Emergency Dispatch	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
Arizona DPS	Emergency Dispatch	The center shall relay location and incident details to the responding vehicles.
Arizona DPS	Emergency Dispatch	The center shall receive traffic images to support dispatch of emergency vehicles.
Arizona DPS	Emergency Dispatch	The center shall provide the capability to request remote control of traffic surveillance devices
Arizona DPS	Emergency Dispatch	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
Arizona DPS	Emergency Dispatch	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.
Arizona DPS	Emergency Dispatch	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Arizona DPS	Emergency Dispatch	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
Arizona DPS	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Arizona DPS	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Arizona DPS	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.

Element Name	Equipment Package Name	Requirement
Arizona DPS	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
Arizona DPS	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
Arizona DPS	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Arizona DPS	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Arizona DPS	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Arizona DPS	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
Arizona DPS	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
Arizona DPS	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
Arizona DPS	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
Arizona DPS	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Arizona DPS	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Arizona DPS	Emergency Environmental Monitoring	The center shall collect current road and weather information from roadway maintenance operations.
Arizona DPS	Emergency Environmental Monitoring	The center shall present the current and forecast road and weather information to the emergency system operator.
Arizona DPS	Emergency Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.
Arizona DPS	Emergency Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
Arizona DPS	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
Arizona DPS	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
Arizona DPS	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
Arizona DPS	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
Arizona DPS	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
Arizona DPS	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.

Element Name	Equipment Package Name	Requirement
Arizona DPS	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
Arizona DPS	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
Arizona DPS	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
Arizona DPS	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
Arizona DPS	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
Arizona DPS	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
Arizona DPS	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
Arizona DPS	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
Arizona DPS	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
Arizona DPS	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
Arizona DPS	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
Arizona DPS	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
Arizona DPS	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
Arizona DPS	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
Arizona DPS	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Arizona DPS	Emergency Routing	Once the route is calculated the route shall be provided to the dispatch function.
Arizona DPS	Emergency Routing	The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information..
Arizona DPS	Emergency Routing	The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.
Arizona DPS	Emergency Routing	The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.
Arizona DPS	Emergency Routing	The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.
Arizona DPS	Emergency Routing	The center shall receive status information from care facilities to determine the appropriate facility and its location.
Arizona DPS	Emergency Routing	The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.
Arizona DPS	Emergency Routing	The center shall collect current traffic and road condition information for emergency vehicle route calculation.
Arizona DPS	Emergency Routing	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Arizona DPS	Incident Command	The center shall assess the status of responding emergency vehicles as part of an incident command.
Arizona DPS	Incident Command	The center shall track and maintain resource information and action plans pertaining to the incident command.
Arizona DPS	Incident Command	The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
Arizona DPS	Incident Command	The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
Arizona DPS	Incident Command	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.

Element Name	Equipment Package Name	Requirement
Arizona DPS	Service Patrol Management	The center shall track the location and status of service patrol vehicles.
Arizona DPS	Service Patrol Management	The center shall dispatch roadway service patrol vehicles to identified incident locations.
Arizona DPS	Service Patrol Management	The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.
Arizona DPS	Service Patrol Management	The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.
Arizona DPS FSP	On-board EV En Route Support	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.
Arizona DPS FSP	On-board EV En Route Support	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.
Arizona DPS FSP	On-board EV En Route Support	The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.
Arizona DPS FSP	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.
Arizona DPS FSP	On-board EV En Route Support	The emergency vehicle shall send patient status information to the care facility along with a request for further information.
Arizona DPS FSP	On-board EV En Route Support	The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.
Arizona DPS FSP	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.
Arizona DPS FSP	On-board EV En Route Support	The emergency vehicle shall send the vehicle’s location, speed and direction to other vehicles in the area.
Arizona DPS FSP	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.
Arizona DPS FSP	On-board EV Incident Management Communication	The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.
Arizona DPS FSP	On-board EV Incident Management Communication	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.
Arizona DPS FSP	On-board EV Incident Management Communication	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.
Arizona DPS Vehicles	On-board EV En Route Support	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.
Arizona DPS Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.
Arizona DPS Vehicles	On-board EV En Route Support	The emergency vehicle shall send the vehicle’s location, speed and direction to other vehicles in the area.
Arizona DPS Vehicles	On-board EV En Route Support	The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.
Arizona DPS Vehicles	On-board EV En Route Support	The emergency vehicle shall send patient status information to the care facility along with a request for further information.
Arizona DPS Vehicles	On-board EV En Route Support	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.
Arizona DPS Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.
Arizona DPS Vehicles	On-board EV En Route Support	The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.
Arizona DPS Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.
AZTech RADS	Basic Information Broadcast	The center shall disseminate event information to travelers.
AZTech RADS	Basic Information Broadcast	The center shall provide the capability to support requests from the media for traffic and incident data.
AZTech RADS	Basic Information Broadcast	The center shall disseminate weather information to travelers.

Element Name	Equipment Package Name	Requirement
AZTech RADS	Basic Information Broadcast	The center shall disseminate parking information to travelers, including location, availability, and fees.
AZTech RADS	Basic Information Broadcast	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.
AZTech RADS	Basic Information Broadcast	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
AZTech RADS	Basic Information Broadcast	The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.
AZTech RADS	Basic Information Broadcast	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.
AZTech RADS	Basic Information Broadcast	The center shall disseminate toll fee information to travelers.
AZTech RADS	Basic Information Broadcast	The center shall disseminate air quality information to travelers.
AZTech RADS	Government Reporting Systems Support	The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
AZTech RADS	Government Reporting Systems Support	The center shall provide data from an ITS archive to federal, state, or local government reporting systems.
AZTech RADS	Government Reporting Systems Support	The center shall provide the capability to select data from an ITS archive for use in government reports.
AZTech RADS	Government Reporting Systems Support	The center shall provide the capability to format data from an ITS archive suitable for input into government reports.
AZTech RADS	Government Reporting Systems Support	The center shall support requests for ITS archived data from Government Reporting Systems.
AZTech RADS	Interactive Infrastructure Information	The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.
AZTech RADS	Interactive Infrastructure Information	The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall provide the capability for a system operator to control the type and update frequency of traveler information.
AZTech RADS	Interactive Infrastructure Information	The center shall disseminate customized toll fee information to travelers upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall disseminate customized weather information to travelers upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.
AZTech RADS	Interactive Infrastructure Information	The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall provide the capability to support requests from the media for traffic and incident data.
AZTech RADS	Interactive Infrastructure Information	The center shall disseminate customized multimodal transportation service information (for example, from ferry and airline operators), including transfer points and other information, to travelers upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall disseminate customized air quality information to travelers upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall disseminate customized event information to travelers upon request.
AZTech RADS	Interactive Infrastructure Information	The center shall accept traveler profiles for determining the type of personalized data to send to the traveler.
AZTech RADS	Interactive Infrastructure Information	The center shall manage payment for services, such as tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls, and provide transaction success or failure details.

Element Name	Equipment Package Name	Requirement
AZTech RADS	Interactive Infrastructure Information	The center shall support requests for traveler information and advanced payment for traveler services from commercial fleet operators.
AZTech RADS	ISP Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traveler information data or for the data itself.
AZTech RADS	ISP Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
AZTech RADS	ISP Data Collection	The center shall collect traveler requests, confirmations, and payment transaction data for traveler services provided.
AZTech RADS	ISP Data Collection	The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.
AZTech RADS	ISP Data Collection	The center shall be able to produce sample products of the data available.
AZTech RADS	ISP Probe Information Collection	The center shall collect environmental probe data (air temperature, exterior light status, wiper status, traction control status, etc.) from appropriately equipped vehicles and short range communications equipment.
AZTech RADS	ISP Probe Information Collection	The center shall collect traffic probe data (speeds, travel times, etc.) from appropriately equipped vehicles and short range communications equipment.
AZTech RADS	ISP Probe Information Collection	The center shall receive traffic probe data collected by transit fleet operators and include this data in aggregated probe data provided to other centers.
AZTech RADS	ISP Probe Information Collection	The center shall aggregate collected environmental probe data and disseminate the aggregated environmental probe data to other centers.
AZTech RADS	ISP Probe Information Collection	The center shall receive traffic probe data derived from electronic toll collection operations and include this data in aggregated probe data provided to other centers.
AZTech RADS	ISP Probe Information Collection	The center shall aggregate collected traffic probe data, calculate route segment travel times, route segment speeds, and route usage, and disseminate to other centers.
AZTech RADS	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.
AZTech RADS	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.
AZTech RADS	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.
AZTech RADS	ISP Traveler Data Collection	The center shall collect, process, and store toll fee information.
AZTech RADS	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.
AZTech RADS	ISP Traveler Data Collection	The center shall collect, process, and store event information.
AZTech RADS	ISP Traveler Data Collection	The center shall collect, process, and store air quality information.
AZTech RADS	ISP Traveler Data Collection	The center shall collect, process, and store border crossing information.
AZTech RADS	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
AZTech RADS	ISP VII Traveler Information Distribution	The center shall collect fault data from the roadside equipment and send to the maintenance center for repair.
AZTech RADS	ISP VII Traveler Information Distribution	The center shall monitor the operational status of the VII roadside equipment.
AZTech RADS	ISP VII Traveler Information Distribution	The center shall provide the capability for a system operator to monitor VII system operation and control the type and update frequency of traveler information that is distributed.
AZTech RADS	ISP VII Traveler Information Distribution	The center shall select traveler information for distribution including traffic and road conditions, incident information, maintenance and construction information, event information, transit information, parking information, and weather information.
AZTech RADS	ISP VII Traveler Information Distribution	The center shall monitor maintenance status of the roadside equipment.
AZTech RADS	ISP VII Traveler Information Distribution	The center shall distribute location relevant traveler information to short range communications equipment at the roadside.
AZTech RADS	ITS Data Repository	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.
AZTech RADS	ITS Data Repository	The center shall collect data to be archived from one or more data sources.

Element Name	Equipment Package Name	Requirement
AZTech RADS	ITS Data Repository	The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).
AZTech RADS	ITS Data Repository	The center shall include capabilities for error notification on the incoming archived data.
AZTech RADS	ITS Data Repository	For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.
AZTech RADS	ITS Data Repository	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.
AZTech RADS	ITS Data Repository	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.
AZTech RADS	ITS Data Repository	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.
AZTech RADS	ITS Data Repository	The center shall perform quality checks on received data.
AZTech RADS	ITS Data Repository	The center shall include capabilities for archive to archive coordination.
AZTech RADS	ITS Data Repository	The center shall include capabilities for performing quality checks on the incoming archived data.
AZTech RADS	ITS Data Repository	The center shall respond to requests from the administrator interface function to maintain the archive data.
AZTech RADS	On-Line Analysis and Mining	The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.
AZTech RADS	On-Line Analysis and Mining	The center shall respond to users systems requests for a catalog of the archived data analysis products available.
AZTech RADS	On-Line Analysis and Mining	The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data.
AZTech RADS	On-Line Analysis and Mining	The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.
AZTech RADS	On-Line Analysis and Mining	For archive analysis and data mining products requiring financial payment the center shall process the financial requests and manage an interface to a Financial Institution.
AZTech RADS	Traffic and Roadside Data Archival	The center shall manage the collection of archive data directly from collection equipment located at the roadside.
AZTech RADS	Traffic and Roadside Data Archival	The center shall collect environmental sensor information that from roadside devices.
AZTech RADS	Traffic and Roadside Data Archival	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.
AZTech RADS	Traffic and Roadside Data Archival	The center shall record the status about the imported traffic and roadside data.
AZTech RADS	Traffic and Roadside Data Archival	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.
AZTech RADS	Traffic and Roadside Data Archival	The center shall use the status information to adjust the collection of traffic and roadside data.
AZTech RADS	Traffic and Roadside Data Archival	The center shall collect traffic sensor information from roadside devices.
AZTech RADS	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
AZTech RADS	Traffic Data Collection	The center shall be able to produce sample products of the data available.
AZTech RADS	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
AZTech RADS	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Avondale CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Avondale CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Avondale CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Avondale CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.

Element Name	Equipment Package Name	Requirement
City of Avondale CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Avondale CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Avondale CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Avondale CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Avondale CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Avondale DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Avondale DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Avondale DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Avondale DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Avondale DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Avondale DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Avondale DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Avondale DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
City of Avondale DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Avondale TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
City of Avondale TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Avondale TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
City of Avondale TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Avondale TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Avondale TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.

Element Name	Equipment Package Name	Requirement
City of Avondale TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
City of Avondale TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
City of Avondale TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
City of Avondale TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
City of Avondale TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
City of Avondale TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
City of Avondale TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
City of Avondale TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
City of Avondale TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Avondale TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Avondale TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Avondale TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Avondale TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Avondale TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
City of Avondale TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Avondale TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Avondale TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
City of Avondale TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Avondale TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Avondale TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.

Element Name	Equipment Package Name	Requirement
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Avondale TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Avondale TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Avondale TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Avondale TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Avondale TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Avondale TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Avondale TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Avondale TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Avondale TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Avondale TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
City of Avondale TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Avondale TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
City of Avondale TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
City of Avondale TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
City of Avondale TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Avondale TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Avondale TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
City of Avondale TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.

Element Name	Equipment Package Name	Requirement
City of Avondale TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Avondale TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
City of Avondale TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Avondale TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Avondale TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Avondale TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Avondale TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Avondale TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Avondale TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
City of Avondale TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Avondale TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Avondale TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Avondale TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Avondale TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Avondale TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Avondale TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Avondale Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Avondale Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Avondale Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Avondale Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Avondale Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
City of Avondale Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Avondale Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Avondale Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
City of Avondale Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.

Element Name	Equipment Package Name	Requirement
City of Avondale Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Avondale Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
City of Avondale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Avondale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Avondale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Avondale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Avondale Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Avondale Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Avondale Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
City of Avondale Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
City of Avondale Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
City of Avondale Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
City of Avondale Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
City of Avondale Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
City of Avondale Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
City of Avondale Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
City of Avondale Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Avondale Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Avondale Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Avondale Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Avondale Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Avondale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Avondale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Avondale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.

Element Name	Equipment Package Name	Requirement
City of Avondale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Chandler CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Chandler CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Chandler CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Chandler CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Chandler CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Chandler CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Chandler CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Chandler CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Chandler CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Chandler DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Chandler DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Chandler DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Chandler DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Chandler DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Chandler DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Chandler DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Chandler DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
City of Chandler DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Chandler TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
City of Chandler TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.

Element Name	Equipment Package Name	Requirement
City of Chandler TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Chandler TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Chandler TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
City of Chandler TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
City of Chandler TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Chandler TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
City of Chandler TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
City of Chandler TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
City of Chandler TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
City of Chandler TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
City of Chandler TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
City of Chandler TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
City of Chandler TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Chandler TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Chandler TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Chandler TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Chandler TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Chandler TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
City of Chandler TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Chandler TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Chandler TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Chandler TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Chandler TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Chandler TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.

Element Name	Equipment Package Name	Requirement
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Chandler TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
City of Chandler TMC	TMC Multimodal Coordination	The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes.
City of Chandler TMC	TMC Multimodal Coordination	The center shall respond to requests from transit management centers for signal priority at one or more intersections along a particular transit route.
City of Chandler TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Chandler TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Chandler TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Chandler TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Chandler TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Chandler TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Chandler TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Chandler TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
City of Chandler TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.

Element Name	Equipment Package Name	Requirement
City of Chandler TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Chandler TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Chandler TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Chandler TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Chandler TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
City of Chandler TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
City of Chandler TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Chandler TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
City of Chandler TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
City of Chandler TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
City of Chandler TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Chandler TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Chandler TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Chandler TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Chandler TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Chandler TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Chandler TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
City of Chandler TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Chandler TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Chandler TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Chandler TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Chandler TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Chandler TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Chandler TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Chandler Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Chandler Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.

Element Name	Equipment Package Name	Requirement
City of Chandler Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Chandler Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Chandler Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Chandler Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Chandler Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
City of Chandler Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
City of Chandler Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
City of Chandler Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Chandler Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
City of Chandler Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Chandler Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Chandler Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Chandler Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Chandler Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Chandler Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Chandler Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
City of Chandler Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
City of Chandler Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
City of Chandler Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
City of Chandler Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
City of Chandler Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
City of Chandler Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
City of Chandler Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
City of Chandler Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Chandler Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.

Element Name	Equipment Package Name	Requirement
City of Chandler Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Chandler Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Chandler Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Chandler Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Chandler Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Chandler Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Chandler Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Glendale CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Glendale CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Glendale CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Glendale CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Glendale CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Glendale CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Glendale CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Glendale CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Glendale CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Glendale DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Glendale DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Glendale DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Glendale DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.

Element Name	Equipment Package Name	Requirement
City of Glendale DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
City of Glendale DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Glendale DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Glendale DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Glendale DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Glendale Parking Management System	Parking Coordination	The parking element shall support requests for parking reservations.
City of Glendale Parking Management System	Parking Coordination	The parking element shall exchange parking management data with other parking facilities including location, hours, availability, status, lot usage, operating strategies, and charging information.
City of Glendale Parking Management System	Parking Coordination	The parking element shall provide parking management data to traffic management centers upon request as part of the implementation of demand management programs in the region. This could include changes to hours of operation or pricing.
City of Glendale Parking Management System	Parking Coordination	The parking element shall distribute parking lot information to traffic management centers upon request to support integrated regional traffic control and parking management. This could include information on facility hours of operation and current parking availability.
City of Glendale Parking Management System	Parking Coordination	The parking element shall distribute parking lot information upon request to transit management centers for park and ride facilities, parking shuttle services, and other applications that integrate transit and parking services.
City of Glendale Parking Management System	Parking Coordination	The parking element shall distribute parking lot information upon request to traveler information providers to support travel planning.
City of Glendale Reversible Lane Control Devices	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Glendale Reversible Lane Control Devices	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Glendale Reversible Lane Control Devices	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Glendale Reversible Lane Control Devices	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Glendale Reversible Lane Control Devices	Roadway Reversible Lanes	The field element shall include automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on surface streets, under center control.
City of Glendale Reversible Lane Control Devices	Roadway Reversible Lanes	The field element shall include automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on freeways, under center control.
City of Glendale Reversible Lane Control Devices	Roadway Reversible Lanes	The field element shall provide operational status for the reversible lane field equipment to the center.

Element Name	Equipment Package Name	Requirement
City of Glendale Reversible Lane Control Devices	Roadway Reversible Lanes	The field element shall monitor traffic in reversible lanes, including wrong-way vehicles, using sensors and surveillance equipment under center control.
City of Glendale Reversible Lane Control Devices	Roadway Reversible Lanes	The field element shall provide fault data for the reversible lane field equipment to the center.
City of Glendale TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Glendale TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Glendale TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
City of Glendale TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
City of Glendale TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Glendale TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
City of Glendale TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
City of Glendale TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
City of Glendale TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
City of Glendale TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
City of Glendale TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
City of Glendale TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
City of Glendale TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
City of Glendale TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
City of Glendale TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Glendale TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Glendale TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Glendale TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Glendale TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Glendale TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
City of Glendale TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Glendale TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Glendale TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Glendale TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.

Element Name	Equipment Package Name	Requirement
City of Glendale TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Glendale TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Glendale TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
City of Glendale TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Glendale TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Glendale TMC	TMC Reversible Lane Management	The center shall collect operational status for the reversible lane field equipment.
City of Glendale TMC	TMC Reversible Lane Management	The center shall collect fault data for the reversible lane field equipment and send to the maintenance center for repair.
City of Glendale TMC	TMC Reversible Lane Management	The center shall remotely control automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on freeways.
City of Glendale TMC	TMC Reversible Lane Management	The center shall remotely control automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on surface streets.
City of Glendale TMC	TMC Reversible Lane Management	The center shall monitor the use of reversible lanes and detect wrong-way vehicles in reversible lanes using sensor and surveillance information, and the current lane control status (which direction the lane is currently operating).
City of Glendale TMC	TMC Reversible Lane Management	The center shall remotely control devices to detect traffic in reversible lanes, including wrong-way vehicles.

Element Name	Equipment Package Name	Requirement
City of Glendale TMC	TMC Reversible Lane Management	The center shall provide the capability for center personnel to control access and management of reversible lane facilities, including the direction of traffic flow changes during the day, especially between the peak hours and dedication of more lanes to the congestion direction during special events.
City of Glendale TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Glendale TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Glendale TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Glendale TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Glendale TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Glendale TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
City of Glendale TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
City of Glendale TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Glendale TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
City of Glendale TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Glendale TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Glendale TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Glendale TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
City of Glendale TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Glendale TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
City of Glendale TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Glendale TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
City of Glendale TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Glendale TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
City of Glendale TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Glendale TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Glendale TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Glendale TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Glendale TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Glendale TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Glendale TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.

Element Name	Equipment Package Name	Requirement
City of Glendale TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Glendale TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Glendale TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Glendale TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Glendale TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Glendale Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Glendale Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Glendale Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Glendale Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Glendale Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Glendale Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
City of Glendale Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Glendale Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
City of Glendale Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Glendale Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
City of Glendale Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
City of Glendale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Glendale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Glendale Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Glendale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Glendale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Glendale Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Glendale Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.

Element Name	Equipment Package Name	Requirement
City of Glendale Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
City of Glendale Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
City of Glendale Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
City of Glendale Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
City of Glendale Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
City of Glendale Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
City of Glendale Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
City of Glendale Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Glendale Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Glendale Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Glendale Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Glendale Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Glendale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Glendale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Glendale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Glendale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Goodyear CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Goodyear CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Goodyear CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Goodyear CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Goodyear CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Goodyear CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Goodyear CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Goodyear CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.

Element Name	Equipment Package Name	Requirement
City of Goodyear CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Goodyear DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Goodyear DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Goodyear DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Goodyear DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Goodyear DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Goodyear DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Goodyear DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Goodyear DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
City of Goodyear DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Goodyear TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
City of Goodyear TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
City of Goodyear TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
City of Goodyear TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Goodyear TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Goodyear TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
City of Goodyear TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Goodyear TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
City of Goodyear TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
City of Goodyear TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
City of Goodyear TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
City of Goodyear TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.

Element Name	Equipment Package Name	Requirement
City of Goodyear TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
City of Goodyear TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
City of Goodyear TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Goodyear TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Goodyear TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Goodyear TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Goodyear TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Goodyear TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Goodyear TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
City of Goodyear TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Goodyear TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Goodyear TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Goodyear TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
City of Goodyear TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.

Element Name	Equipment Package Name	Requirement
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Goodyear TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Goodyear TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Goodyear TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Goodyear TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Goodyear TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Goodyear TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Goodyear TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Goodyear TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Goodyear TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Goodyear TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Goodyear TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Goodyear TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Goodyear TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
City of Goodyear TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
City of Goodyear TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
City of Goodyear TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
City of Goodyear TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
City of Goodyear TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Goodyear TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Goodyear TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
City of Goodyear TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Goodyear TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
City of Goodyear TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.

Element Name	Equipment Package Name	Requirement
City of Goodyear TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Goodyear TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Goodyear TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Goodyear TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Goodyear TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Goodyear TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Goodyear TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Goodyear TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
City of Goodyear TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Goodyear TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Goodyear TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Goodyear Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Goodyear Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Goodyear Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Goodyear Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Goodyear Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
City of Goodyear Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Goodyear Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
City of Goodyear Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
City of Goodyear Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Goodyear Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Goodyear Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
City of Goodyear Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Goodyear Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.

Element Name	Equipment Package Name	Requirement
City of Goodyear Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Goodyear Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Goodyear Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Goodyear Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
City of Goodyear Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
City of Goodyear Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
City of Goodyear Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
City of Goodyear Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Goodyear Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
City of Goodyear Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
City of Goodyear Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
City of Goodyear Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
City of Goodyear Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Goodyear Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Goodyear Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Goodyear Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Goodyear Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Goodyear Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Goodyear Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Goodyear Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Goodyear Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Mesa CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Mesa CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Mesa CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Mesa CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Mesa CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.

Element Name	Equipment Package Name	Requirement
City of Mesa CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Mesa CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Mesa CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Mesa CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Mesa DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Mesa DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Mesa DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Mesa DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Mesa DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
City of Mesa DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Mesa DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Mesa DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Mesa DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Mesa TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
City of Mesa TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Mesa TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Mesa TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
City of Mesa TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Mesa TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
City of Mesa TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.

Element Name	Equipment Package Name	Requirement
City of Mesa TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
City of Mesa TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
City of Mesa TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
City of Mesa TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
City of Mesa TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
City of Mesa TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
City of Mesa TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
City of Mesa TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Mesa TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Mesa TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Mesa TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Mesa TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Mesa TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Mesa TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Mesa TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
City of Mesa TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Mesa TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Mesa TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Mesa TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.

Element Name	Equipment Package Name	Requirement
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Mesa TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
City of Mesa TMC	TMC Multimodal Coordination	The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes.
City of Mesa TMC	TMC Multimodal Coordination	The center shall respond to requests from transit management centers for signal priority at one or more intersections along a particular transit route.
City of Mesa TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Mesa TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Mesa TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Mesa TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Mesa TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Mesa TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Mesa TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Mesa TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
City of Mesa TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
City of Mesa TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Mesa TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Mesa TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Mesa TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Mesa TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
City of Mesa TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
City of Mesa TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.

Element Name	Equipment Package Name	Requirement
City of Mesa TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
City of Mesa TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Mesa TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
City of Mesa TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Mesa TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Mesa TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Mesa TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Mesa TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Mesa TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Mesa TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
City of Mesa TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Mesa TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Mesa TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Mesa TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Mesa TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Mesa TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Mesa TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Mesa Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Mesa Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Mesa Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Mesa Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Mesa Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
City of Mesa Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Mesa Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
City of Mesa Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.

Element Name	Equipment Package Name	Requirement
City of Mesa Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Mesa Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
City of Mesa Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
City of Mesa Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Mesa Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Mesa Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Mesa Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Mesa Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Mesa Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
City of Mesa Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
City of Mesa Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
City of Mesa Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
City of Mesa Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Mesa Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
City of Mesa Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
City of Mesa Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
City of Mesa Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
City of Mesa Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Mesa Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Mesa Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Mesa Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Mesa Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Mesa Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Mesa Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Mesa Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.

Element Name	Equipment Package Name	Requirement
City of Mesa Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Peoria CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Peoria CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Peoria CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Peoria CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Peoria CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Peoria CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Peoria CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Peoria CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Peoria CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Peoria DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Peoria DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Peoria DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Peoria DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Peoria DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Peoria DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Peoria DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Peoria DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Peoria DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
City of Peoria TMC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.

Element Name	Equipment Package Name	Requirement
City of Peoria TMC	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
City of Peoria TMC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
City of Peoria TMC	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
City of Peoria TMC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
City of Peoria TMC	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
City of Peoria TMC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
City of Peoria TMC	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
City of Peoria TMC	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
City of Peoria TMC	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
City of Peoria TMC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
City of Peoria TMC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
City of Peoria TMC	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
City of Peoria TMC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
City of Peoria TMC	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
City of Peoria TMC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).

Element Name	Equipment Package Name	Requirement
City of Peoria TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
City of Peoria TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
City of Peoria TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
City of Peoria TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
City of Peoria TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Peoria TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Peoria TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
City of Peoria TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Peoria TMC	Emergency Data Collection	The center shall be able to produce sample products of the data available.
City of Peoria TMC	Emergency Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.
City of Peoria TMC	Emergency Data Collection	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.
City of Peoria TMC	Emergency Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Peoria TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
City of Peoria TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
City of Peoria TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
City of Peoria TMC	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
City of Peoria TMC	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
City of Peoria TMC	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
City of Peoria TMC	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
City of Peoria TMC	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
City of Peoria TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
City of Peoria TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
City of Peoria TMC	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.

Element Name	Equipment Package Name	Requirement
City of Peoria TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
City of Peoria TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
City of Peoria TMC	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
City of Peoria TMC	Incident Command	The center shall track and maintain resource information and action plans pertaining to the incident command.
City of Peoria TMC	Incident Command	The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
City of Peoria TMC	Incident Command	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.
City of Peoria TMC	Incident Command	The center shall assess the status of responding emergency vehicles as part of an incident command.
City of Peoria TMC	Incident Command	The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
City of Peoria TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Peoria TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Peoria TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Peoria TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Peoria TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Peoria TMC	TMC Freeway Management	The center shall collect fault data from ramp meters, mainline metering, and lane controls.
City of Peoria TMC	TMC Freeway Management	The center shall implement control strategies, under control of center personnel, on some or all of the freeway network devices (e.g. ramp meters, mainline metering, and lane controls), based on data from sensors monitoring traffic conditions upstream, downstream, and queue data on the ramps themselves.
City of Peoria TMC	TMC Freeway Management	The center shall remotely control systems to manage use of the freeways, including ramp meters, mainline metering, and lane controls.
City of Peoria TMC	TMC Freeway Management	The center shall collect operational status from ramp meters, mainline metering, and lane controls and compare against the control information sent by the center.
City of Peoria TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Peoria TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Peoria TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Peoria TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
City of Peoria TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Peoria TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Peoria TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.

Element Name	Equipment Package Name	Requirement
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Peoria TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
City of Peoria TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Peoria TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Peoria TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Peoria TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Peoria TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Peoria TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Peoria TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Peoria TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Peoria TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Peoria TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
City of Peoria TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.

Element Name	Equipment Package Name	Requirement
City of Peoria TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Peoria TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Peoria TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
City of Peoria TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
City of Peoria TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
City of Peoria TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
City of Peoria TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
City of Peoria TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Peoria TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Peoria TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Peoria TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Peoria TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Peoria TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Peoria TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Peoria TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Peoria TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Peoria TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Peoria TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Peoria TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Peoria TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Peoria TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
City of Peoria TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Peoria Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Peoria Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Peoria Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Peoria Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.

Element Name	Equipment Package Name	Requirement
City of Peoria Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Peoria Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
City of Peoria Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
City of Peoria Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
City of Peoria Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Peoria Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
City of Peoria Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Peoria Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Peoria Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Peoria Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Peoria Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Peoria Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Peoria Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Peoria Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Peoria Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Peoria Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Peoria Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Peoria Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Peoria Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Peoria Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Peoria Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Phoenix CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Phoenix CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Phoenix CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Phoenix CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.

Element Name	Equipment Package Name	Requirement
City of Phoenix CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Phoenix CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Phoenix CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Phoenix CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Phoenix CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Phoenix DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Phoenix DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Phoenix DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Phoenix DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Phoenix DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Phoenix DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Phoenix DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Phoenix DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
City of Phoenix DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Phoenix TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
City of Phoenix TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
City of Phoenix TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
City of Phoenix TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Phoenix TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Phoenix TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.

Element Name	Equipment Package Name	Requirement
City of Phoenix TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Phoenix TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
City of Phoenix TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
City of Phoenix TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
City of Phoenix TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
City of Phoenix TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
City of Phoenix TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
City of Phoenix TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
City of Phoenix TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Phoenix TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Phoenix TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Phoenix TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Phoenix TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Phoenix TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
City of Phoenix TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Phoenix TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Phoenix TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
City of Phoenix TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Phoenix TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Phoenix TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.

Element Name	Equipment Package Name	Requirement
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
City of Phoenix TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Phoenix TMC	TMC Multimodal Coordination	The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes.
City of Phoenix TMC	TMC Multimodal Coordination	The center shall respond to requests from transit management centers for signal priority at one or more intersections along a particular transit route.
City of Phoenix TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Phoenix TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Phoenix TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Phoenix TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Phoenix TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Phoenix TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Phoenix TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Phoenix TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Phoenix TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Phoenix TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Phoenix TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
City of Phoenix TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
City of Phoenix TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
City of Phoenix TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.

Element Name	Equipment Package Name	Requirement
City of Phoenix TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Phoenix TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
City of Phoenix TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Phoenix TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Phoenix TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Phoenix TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
City of Phoenix TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
City of Phoenix TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Phoenix TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Phoenix TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Phoenix TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Phoenix TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Phoenix TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Phoenix TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Phoenix TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Phoenix TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Phoenix TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Phoenix TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
City of Phoenix TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Phoenix Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Phoenix Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Phoenix Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Phoenix Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Phoenix Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
City of Phoenix Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
City of Phoenix Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.

Element Name	Equipment Package Name	Requirement
City of Phoenix Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
City of Phoenix Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Phoenix Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
City of Phoenix Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Phoenix Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Phoenix Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Phoenix Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Phoenix Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Phoenix Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Phoenix Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
City of Phoenix Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
City of Phoenix Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
City of Phoenix Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
City of Phoenix Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
City of Phoenix Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
City of Phoenix Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Phoenix Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
City of Phoenix Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
City of Phoenix Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Phoenix Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Phoenix Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Phoenix Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Phoenix Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Phoenix Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Phoenix Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.

Element Name	Equipment Package Name	Requirement
City of Phoenix Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Phoenix Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Scottsdale CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Scottsdale CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Scottsdale CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Scottsdale CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Scottsdale CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Scottsdale CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Scottsdale CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Scottsdale CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Scottsdale CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Scottsdale DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Scottsdale DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Scottsdale DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Scottsdale DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Scottsdale DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Scottsdale DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Scottsdale DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Scottsdale DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).

Element Name	Equipment Package Name	Requirement
City of Scottsdale DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Scottsdale TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
City of Scottsdale TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
City of Scottsdale TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
City of Scottsdale TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Scottsdale TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Scottsdale TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
City of Scottsdale TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Scottsdale TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
City of Scottsdale TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Scottsdale TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Scottsdale TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Scottsdale TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Scottsdale TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Scottsdale TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Scottsdale TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Scottsdale TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
City of Scottsdale TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Scottsdale TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Scottsdale TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Scottsdale TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.

Element Name	Equipment Package Name	Requirement
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
City of Scottsdale TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Scottsdale TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Scottsdale TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Scottsdale TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Scottsdale TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Scottsdale TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Scottsdale TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Scottsdale TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Scottsdale TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
City of Scottsdale TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
City of Scottsdale TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Scottsdale TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Scottsdale TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Scottsdale TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
City of Scottsdale TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.

Element Name	Equipment Package Name	Requirement
City of Scottsdale TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Scottsdale TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
City of Scottsdale TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Scottsdale TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
City of Scottsdale TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Scottsdale TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Scottsdale TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
City of Scottsdale TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Scottsdale TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Scottsdale TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Scottsdale TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Scottsdale TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Scottsdale TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Scottsdale TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
City of Scottsdale TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Scottsdale TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Scottsdale TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Scottsdale TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Scottsdale TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Scottsdale Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Scottsdale Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Scottsdale Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Scottsdale Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Scottsdale Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
City of Scottsdale Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Scottsdale Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).

Element Name	Equipment Package Name	Requirement
City of Scottsdale Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
City of Scottsdale Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
City of Scottsdale Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Scottsdale Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Scottsdale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Scottsdale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Scottsdale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Scottsdale Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Scottsdale Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Scottsdale Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Scottsdale Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Scottsdale Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Scottsdale Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Scottsdale Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Scottsdale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Scottsdale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Scottsdale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Scottsdale Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Surprise CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Surprise CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Surprise CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Surprise CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Surprise CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Surprise CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.

Element Name	Equipment Package Name	Requirement
City of Surprise CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Surprise CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Surprise CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Surprise DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Surprise DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Surprise DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Surprise DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Surprise DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
City of Surprise DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Surprise DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Surprise DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Surprise DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Surprise TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Surprise TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Surprise TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
City of Surprise TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
City of Surprise TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
City of Surprise TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Surprise TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
City of Surprise TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.

Element Name	Equipment Package Name	Requirement
City of Surprise TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
City of Surprise TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
City of Surprise TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
City of Surprise TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
City of Surprise TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
City of Surprise TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
City of Surprise TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Surprise TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Surprise TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Surprise TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Surprise TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Surprise TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Surprise TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Surprise TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
City of Surprise TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Surprise TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Surprise TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
City of Surprise TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.

Element Name	Equipment Package Name	Requirement
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Surprise TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Surprise TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Surprise TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Surprise TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Surprise TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Surprise TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Surprise TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Surprise TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Surprise TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
City of Surprise TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
City of Surprise TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
City of Surprise TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Surprise TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Surprise TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
City of Surprise TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Surprise TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Surprise TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Surprise TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Surprise TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.

Element Name	Equipment Package Name	Requirement
City of Surprise TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Surprise TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
City of Surprise TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
City of Surprise TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Surprise TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Surprise TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Surprise TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Surprise TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Surprise TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
City of Surprise TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Surprise TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Surprise TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Surprise TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Surprise TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Surprise TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Surprise Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Surprise Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Surprise Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Surprise Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Surprise Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
City of Surprise Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
City of Surprise Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Surprise Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
City of Surprise Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Surprise Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.

Element Name	Equipment Package Name	Requirement
City of Surprise Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Surprise Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Surprise Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Surprise Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Surprise Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Surprise Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Surprise Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
City of Surprise Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Surprise Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
City of Surprise Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
City of Surprise Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
City of Surprise Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
City of Surprise Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
City of Surprise Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
City of Surprise Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
City of Surprise Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Surprise Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Surprise Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Surprise Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Surprise Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Surprise Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Surprise Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Surprise Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Surprise Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Tempe CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.

Element Name	Equipment Package Name	Requirement
City of Tempe CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Tempe CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Tempe CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Tempe CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Tempe CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Tempe CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Tempe CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Tempe CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Tempe DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Tempe DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Tempe DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Tempe DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Tempe DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
City of Tempe DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
City of Tempe DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
City of Tempe DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
City of Tempe DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
City of Tempe TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
City of Tempe TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
City of Tempe TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.

Element Name	Equipment Package Name	Requirement
City of Tempe TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
City of Tempe TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
City of Tempe TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
City of Tempe TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
City of Tempe TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
City of Tempe TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
City of Tempe TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
City of Tempe TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
City of Tempe TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
City of Tempe TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
City of Tempe TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
City of Tempe TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
City of Tempe TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
City of Tempe TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
City of Tempe TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
City of Tempe TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
City of Tempe TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
City of Tempe TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
City of Tempe TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
City of Tempe TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
City of Tempe TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
City of Tempe TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Tempe TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.

Element Name	Equipment Package Name	Requirement
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
City of Tempe TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
City of Tempe TMC	TMC Multimodal Coordination	The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes.
City of Tempe TMC	TMC Multimodal Coordination	The center shall respond to requests from transit management centers for signal priority at one or more intersections along a particular transit route.
City of Tempe TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
City of Tempe TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
City of Tempe TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
City of Tempe TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
City of Tempe TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
City of Tempe TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
City of Tempe TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
City of Tempe TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
City of Tempe TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
City of Tempe TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
City of Tempe TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
City of Tempe TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
City of Tempe TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.

Element Name	Equipment Package Name	Requirement
City of Tempe TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
City of Tempe TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
City of Tempe TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
City of Tempe TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
City of Tempe TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
City of Tempe TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
City of Tempe TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
City of Tempe TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
City of Tempe TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
City of Tempe TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
City of Tempe TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
City of Tempe TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
City of Tempe TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
City of Tempe TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
City of Tempe TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
City of Tempe TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
City of Tempe TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
City of Tempe TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
City of Tempe TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
City of Tempe TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
City of Tempe Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Tempe Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Tempe Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
City of Tempe Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
City of Tempe Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
City of Tempe Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.

Element Name	Equipment Package Name	Requirement
City of Tempe Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
City of Tempe Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
City of Tempe Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
City of Tempe Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Tempe Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
City of Tempe Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
City of Tempe Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
City of Tempe Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
City of Tempe Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Tempe Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
City of Tempe Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
City of Tempe Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
City of Tempe Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
City of Tempe Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
City of Tempe Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
City of Tempe Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
City of Tempe Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
City of Tempe Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
City of Tempe Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
City of Tempe Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
City of Tempe Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
City of Tempe Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
City of Tempe Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
City of Tempe Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
City of Tempe Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.

Element Name	Equipment Package Name	Requirement
City of Tempe Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
City of Tempe Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
City of Tempe Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
East Valley Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall provide data from an ITS archive to federal, state, or local government reporting systems.
East Valley Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall support requests for ITS archived data from Government Reporting Systems.
East Valley Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
East Valley Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall provide the capability to select data from an ITS archive for use in government reports.
East Valley Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall provide the capability to format data from an ITS archive suitable for input into government reports.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall include capabilities for performing quality checks on the incoming archived data.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall include capabilities for error notification on the incoming archived data.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall respond to requests from the administrator interface function to maintain the archive data.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall include capabilities for archive to archive coordination.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall collect data to be archived from one or more data sources.
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.

Element Name	Equipment Package Name	Requirement
East Valley Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall perform quality checks on received data.
East Valley Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.
East Valley Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall manage the collection of archive data directly from collection equipment located at the roadside.
East Valley Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.
East Valley Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall collect traffic sensor information from roadside devices.
East Valley Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall collect environmental sensor information that from roadside devices.
East Valley Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall use the status information to adjust the collection of traffic and roadside data.
East Valley Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall record the status about the imported traffic and roadside data.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, and road network information.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support management of paratransit operations.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall dispatch demand response (paratransit) transit vehicles.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).
East Valley Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.

Element Name	Equipment Package Name	Requirement
East Valley Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall exchange transit incident information along with other service data with other transit agencies.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall receive reports of emergencies on-board transit vehicles entered directly be the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall receive threat information and status on the integrity of the transit infrastructure.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall support the back-office portion of functionality to authenticate transit vehicle operators.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall monitor the locations of all transit vehicles within its network.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall provide transit operational data to traveler information service providers.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.
East Valley Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall determine adherence of transit vehicles to their assigned schedule.
East Valley Dial-A-Ride Transit Dispatch	Transit Data Collection	The center shall be able to produce sample products of the data available.
East Valley Dial-A-Ride Transit Dispatch	Transit Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.
East Valley Dial-A-Ride Transit Dispatch	Transit Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
East Valley Dial-A-Ride Transit Dispatch	Transit Data Collection	The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.
East Valley Dial-A-Ride Transit Dispatch	Transit Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.
East Valley Dial-A-Ride Transit Dispatch	Transit Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.
East Valley Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.

Element Name	Equipment Package Name	Requirement
East Valley Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.
East Valley Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.
East Valley Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall collect operational and maintenance data from transit vehicles.
East Valley Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall provide transit operations personnel with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data.
East Valley Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.
East Valley Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.
East Valley Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall download vehicle assignments to the transit vehicle prior to the start of the day's operations.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall provide an inventory management function for the transit facility that stores functional attributes about each vehicle owned by the transit operator. The functional attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall assign individual transit vehicles to transit blocks.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies.
East Valley Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.
East Valley Dial-A-Ride Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.
East Valley Dial-A-Ride Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.

Element Name	Equipment Package Name	Requirement
East Valley Dial-A-Ride Transit Vehicles	On-board Maintenance	The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.
East Valley Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall manage data input to sensor(s) on-board a transit vehicle to determine the vehicle's availability for use in demand responsive and flexible-route transit services based on identity, type, and passenger capacity.
East Valley Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.
East Valley Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.
East Valley Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.
East Valley Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.
East Valley Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.
East Valley Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.
East Valley Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.
East Valley Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall determine scenarios to correct the schedule deviation.
East Valley Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.
East Valley Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.
East Valley Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall output reported emergencies to the center.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.

Element Name	Equipment Package Name	Requirement
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall accept sensor control data to allow remote control of the sensors.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall perform authentication of the transit vehicle operator.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.
East Valley Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Collection	The center shall remotely control environmental sensors on-board maintenance and construction vehicles that measure road and weather conditions including air and surface temperatures, wind speed, humidity, precipitation, visibility and other measures.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Collection	The center shall collect operational status for the roadside and vehicle-based environmental sensor equipment.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Collection	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Collection	The center shall provide weather and road condition information to weather service providers and center personnel.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Collection	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Collection	The center shall collect environmental probe data (air temperature, exterior light status, wiper status, traction control status, etc.) from short range communications equipment that communicates with appropriately equipped probe vehicles.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Collection	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from traffic and traveler information providers, and environmental data collected from sensors deployed on and about the roadway as well as the fleet of maintenance and construction vehicles and the broader population of vehicle probes.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Collection	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Collection	The center shall collect fault data for the roadside and vehicle-based environmental sensor equipment for repair.

Element Name	Equipment Package Name	Requirement
Flood Control District of Maricopa County ALERT	MCM Environmental Information Processing	The center shall provide value-added sector specific meteorological services with information on basic road facility and treatment information that supports forecasts for road conditions.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Processing	The center shall disseminate current and forecasted road weather and road condition information to weather service providers (such as the National Weather Service and value-added sector specific meteorological services) as well as other agencies including traffic, emergency, and transit management, traveler information providers, rail operations centers, media, and other maintenance management centers.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Processing	The center shall use the various data inputs of environmental sensors and road weather data to develop a view of current and predicted road weather and road conditions.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Processing	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
Flood Control District of Maricopa County ALERT	MCM Environmental Information Processing	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services) and local environmental sensor data.
Flood Control District of Maricopa County ALERT	MCM Incident Management	The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
Flood Control District of Maricopa County ALERT	MCM Incident Management	The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.
Flood Control District of Maricopa County ALERT	MCM Incident Management	The center shall exchange road network status assessment information with emergency management and traffic management centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
Flood Control District of Maricopa County ALERT	MCM Incident Management	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
Flood Control District of Maricopa County ALERT	MCM Incident Management	The center shall exchange incident and threat information with emergency management centers as well as traffic management centers; including notification of existence of incident and expected severity, location, time and nature of incident.
Flood Control District of Maricopa County ALERT	MCM Incident Management	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, etc.
Flood Control District of Maricopa County ALERT	MCM Incident Management	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
Flood Control District of Maricopa County ALERT	MCM Incident Management	The center shall respond to requests from emergency management to provide maintenance and construction resources to implement response plans, assist in clean up, verify an incident, etc. This may also involve coordination with traffic management centers and other maintenance centers.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element shall provide weather and road surface condition data to maintenance and construction vehicles.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element shall provide weather and road surface condition data to centers.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.

Element Name	Equipment Package Name	Requirement
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element's environmental sensors shall be remotely controlled by a traffic management center.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.
Flood Control District of Maricopa County Weather Sensors	Roadway Environmental Monitoring	The field element's environmental sensors shall be remotely controlled by a maintenance center.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall collect data on fare payment violations and send the data, including images of the violator, to the appropriate enforcement agency.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall maintain a list of invalid traveler credit identities, or bad tag lists that can be forwarded to transit vehicles and transit stops or stations.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall process requests for transit fares to be paid in advance.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall process requests for the advanced payment of tolls and parking lot charges as well as other non-transportation services, e.g. yellow-pages services.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall collect fare statistics data to implement variable and flexible fare structures.
Independent Fare Collection System Server	Transit Center Fare Management	The center shall provide transit fare information to other centers, including traveler information providers upon request.

Element Name	Equipment Package Name	Requirement
Independent School District Buses	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.
Independent School District Buses	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.
Independent School District Buses	On-board Transit Trip Monitoring	The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.
Independent School District Buses	On-board Transit Trip Monitoring	The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.
Independent School District Buses	On-board Transit Trip Monitoring	The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.
Independent School Districts Dispatch	Transit Center Vehicle Tracking	The center shall determine adherence of transit vehicles to their assigned schedule.
Independent School Districts Dispatch	Transit Center Vehicle Tracking	The center shall monitor the locations of all transit vehicles within its network.
Independent School Districts Dispatch	Transit Center Vehicle Tracking	The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.
Independent School Districts Dispatch	Transit Center Vehicle Tracking	The center shall provide transit operational data to traveler information service providers.
Independent School Districts Dispatch	Transit Center Vehicle Tracking	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.
IntelliDrive Road Infrastructure Devices	Roadway Short Range Traveler Information Communications	The field element shall distribute traveler information including traffic and road conditions to passing vehicles using short range communications, under center control.
IntelliDrive Road Infrastructure Devices	Roadway Short Range Traveler Information Communications	The field element shall return system fault data to the maintenance center for repair.
IntelliDrive Road Infrastructure Devices	Roadway Short Range Traveler Information Communications	The field element shall return system operational status to the controlling center.
IntelliDrive Road Infrastructure Devices	Roadway Short Range Traveler Information Communications	The field element shall distribute indicator and fixed sign information, including static sign information (e.g., stop, curve warning, guide signs, service signs, and directional signs) and dynamic information (e.g., current signal states and local conditions warnings identified by local environmental sensors) to equipment on-board vehicles under center control.
IntelliDrive Road Infrastructure Devices	Roadway Short Range Traveler Information Communications	The field element shall distribute advisory information, such as evacuation information, wide-area alerts, incident information, work zone intrusion information, and other special information to passing vehicles using short range communications, under center control.
ITIP Sensors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
ITIP Sensors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
ITIP Sensors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
ITIP Sensors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
ITIP Sensors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
ITIP Sensors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
ITIP Sensors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.

Element Name	Equipment Package Name	Requirement
ITIP Sensors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
ITIP Sensors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Local City and Municipal Archived Data	Government Reporting Systems Support	The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
Local City and Municipal Archived Data	Government Reporting Systems Support	The center shall provide the capability to select data from an ITS archive for use in government reports.
Local City and Municipal Archived Data	Government Reporting Systems Support	The center shall support requests for ITS archived data from Government Reporting Systems.
Local City and Municipal Archived Data	Government Reporting Systems Support	The center shall provide the capability to format data from an ITS archive suitable for input into government reports.
Local City and Municipal Archived Data	Government Reporting Systems Support	The center shall provide data from an ITS archive to federal, state, or local government reporting systems.
Local City and Municipal Archived Data	ITS Data Repository	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.
Local City and Municipal Archived Data	ITS Data Repository	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.
Local City and Municipal Archived Data	ITS Data Repository	The center shall respond to requests from the administrator interface function to maintain the archive data.
Local City and Municipal Archived Data	ITS Data Repository	The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).
Local City and Municipal Archived Data	ITS Data Repository	The center shall collect data to be archived from one or more data sources.
Local City and Municipal Archived Data	ITS Data Repository	The center shall include capabilities for archive to archive coordination.
Local City and Municipal Archived Data	ITS Data Repository	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.
Local City and Municipal Archived Data	ITS Data Repository	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.
Local City and Municipal Archived Data	ITS Data Repository	For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.
Local City and Municipal Archived Data	ITS Data Repository	The center shall include capabilities for error notification on the incoming archived data.
Local City and Municipal Archived Data	ITS Data Repository	The center shall perform quality checks on received data.
Local City and Municipal Archived Data	ITS Data Repository	The center shall include capabilities for performing quality checks on the incoming archived data.
Local City and Municipal Archived Data	Traffic and Roadside Data Archival	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.

Element Name	Equipment Package Name	Requirement
Local City and Municipal Archived Data	Traffic and Roadside Data Archival	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.
Local City and Municipal Archived Data	Traffic and Roadside Data Archival	The center shall record the status about the imported traffic and roadside data.
Local City and Municipal Archived Data	Traffic and Roadside Data Archival	The center shall use the status information to adjust the collection of traffic and roadside data.
Local City and Municipal Archived Data	Traffic and Roadside Data Archival	The center shall collect traffic sensor information from roadside devices.
Local City and Municipal Archived Data	Traffic and Roadside Data Archival	The center shall collect environmental sensor information that from roadside devices.
Local City and Municipal Archived Data	Traffic and Roadside Data Archival	The center shall manage the collection of archive data directly from collection equipment located at the roadside.
Local City and Municipal ITS Field Equipment	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
Local City and Municipal ITS Field Equipment	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
Local City and Municipal ITS Field Equipment	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
Local City and Municipal ITS Field Equipment	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
Local City and Municipal ITS Field Equipment	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
Local City and Municipal ITS Field Equipment	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
Local City and Municipal ITS Field Equipment	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
Local City and Municipal ITS Field Equipment	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Local City and Municipal ITS Field Equipment	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
Local City and Municipal ITS Field Equipment	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
Local City and Municipal ITS Field Equipment	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
Local City and Municipal ITS Field Equipment	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
Local City and Municipal ITS Field Equipment	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.

Element Name	Equipment Package Name	Requirement
Local City and Municipal ITS Field Equipment	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
Local City and Municipal REACT Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.
Local City and Municipal REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.
Local City and Municipal REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.
Local City and Municipal REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall send patient status information to the care facility along with a request for further information.
Local City and Municipal REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.
Local City and Municipal REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.
Local City and Municipal REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.
Local City and Municipal REACT Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.
Local City and Municipal REACT Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.
Local City and Municipal REACT Vehicles	On-board EV Incident Management Communication	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.
Local City and Municipal REACT Vehicles	On-board EV Incident Management Communication	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.
Local City and Municipal REACT Vehicles	On-board EV Incident Management Communication	The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.
Local City and Municipal TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
Local City and Municipal TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
Local City and Municipal TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
Local City and Municipal TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
Local City and Municipal TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
Local City and Municipal TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
Local City and Municipal TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
Local City and Municipal TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
Local City and Municipal TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.

Element Name	Equipment Package Name	Requirement
Local City and Municipal TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
Local City and Municipal TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
Local City and Municipal TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
Local City and Municipal TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
Local City and Municipal TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
Local City and Municipal TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
Local City and Municipal TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
Local City and Municipal TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
Local City and Municipal TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
Local City and Municipal TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
Local City and Municipal TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
Local City and Municipal TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
Local City and Municipal TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
Local City and Municipal TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
Local City and Municipal TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
Local City and Municipal TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
Local City and Municipal TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.

Element Name	Equipment Package Name	Requirement
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
Local City and Municipal TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
Local City and Municipal TMC	TMC Multimodal Coordination	The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes.
Local City and Municipal TMC	TMC Multimodal Coordination	The center shall respond to requests from transit management centers for signal priority at one or more intersections along a particular transit route.
Local City and Municipal TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
Local City and Municipal TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
Local City and Municipal TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
Local City and Municipal TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
Local City and Municipal TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
Local City and Municipal TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
Local City and Municipal TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
Local City and Municipal TMC	TMC Speed Monitoring	The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.
Local City and Municipal TMC	TMC Speed Monitoring	The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.
Local City and Municipal TMC	TMC Speed Monitoring	The center shall collect fault data for the vehicle speed sensors for repair.
Local City and Municipal TMC	TMC Speed Monitoring	The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.
Local City and Municipal TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
Local City and Municipal TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
Local City and Municipal TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
Local City and Municipal TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
Local City and Municipal TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.

Element Name	Equipment Package Name	Requirement
Local City and Municipal TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
Local City and Municipal TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
Local City and Municipal TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
Local City and Municipal TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
Local City and Municipal TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
Local City and Municipal TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
Local City and Municipal TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
Local City and Municipal TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
Local City and Municipal TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
Local City and Municipal TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
Local City and Municipal TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
Local City and Municipal TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
Local City and Municipal TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
Local City and Municipal TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
Local City and Municipal TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
Local City and Municipal TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
Local City and Municipal TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
Local City and Municipal TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
Local City and Municipal TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
Local City and Municipal TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
Local City and Municipal TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
Local City and Municipal Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Local City and Municipal Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
Local City and Municipal Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
Local City and Municipal Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.

Element Name	Equipment Package Name	Requirement
Local City and Municipal Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
Local City and Municipal Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
Local City and Municipal Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
Local City and Municipal Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
Local City and Municipal Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
Local City and Municipal Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
Local City and Municipal Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
Local City and Municipal Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
Local City and Municipal Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
Local City and Municipal Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
Local City and Municipal Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
Local City and Municipal Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
Local City and Municipal Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
Local City and Municipal Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
Local City and Municipal Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
Local City and Municipal Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
Local City and Municipal Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
Local City and Municipal Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
Local City and Municipal Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
Local City and Municipal Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
Local City and Municipal Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).

Element Name	Equipment Package Name	Requirement
Local Dial-A-Ride Transit Dispatches	Transit Center Information Services	The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.
Local Dial-A-Ride Transit Dispatches	Transit Center Information Services	The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.
Local Dial-A-Ride Transit Dispatches	Transit Center Information Services	The center shall provide transit information to the media including details of deviations from schedule of regular transit services.
Local Dial-A-Ride Transit Dispatches	Transit Center Information Services	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.
Local Dial-A-Ride Transit Dispatches	Transit Center Information Services	The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.
Local Dial-A-Ride Transit Dispatches	Transit Center Information Services	The center shall enable yellow pages (including non-motorized transportation) information to be output to the traveler.
Local Dial-A-Ride Transit Dispatches	Transit Center Multi-Modal Coordination	The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.
Local Dial-A-Ride Transit Dispatches	Transit Center Multi-Modal Coordination	The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.
Local Dial-A-Ride Transit Dispatches	Transit Center Multi-Modal Coordination	The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.
Local Dial-A-Ride Transit Dispatches	Transit Center Multi-Modal Coordination	The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.
Local Dial-A-Ride Transit Dispatches	Transit Center Paratransit Operations	The center shall dispatch demand response (paratransit) transit vehicles.
Local Dial-A-Ride Transit Dispatches	Transit Center Paratransit Operations	The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.
Local Dial-A-Ride Transit Dispatches	Transit Center Paratransit Operations	The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).
Local Dial-A-Ride Transit Dispatches	Transit Center Paratransit Operations	The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.
Local Dial-A-Ride Transit Dispatches	Transit Center Paratransit Operations	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support management of paratransit operations.
Local Dial-A-Ride Transit Dispatches	Transit Center Paratransit Operations	The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, and road network information.
Local Dial-A-Ride Transit Dispatches	Transit Center Paratransit Operations	The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.
Local Dial-A-Ride Transit Dispatches	Transit Center Paratransit Operations	The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.
Local Dial-A-Ride Transit Dispatches	Transit Center Security	The center shall receive reports of emergencies on-board transit vehicles entered directly be the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.
Local Dial-A-Ride Transit Dispatches	Transit Center Security	The center shall support the back-office portion of functionality to authenticate transit vehicle operators.
Local Dial-A-Ride Transit Dispatches	Transit Center Security	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.
Local Dial-A-Ride Transit Dispatches	Transit Center Security	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.
Local Dial-A-Ride Transit Dispatches	Transit Center Security	The center shall receive threat information and status on the integrity of the transit infrastructure.
Local Dial-A-Ride Transit Dispatches	Transit Center Security	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.
Local Dial-A-Ride Transit Dispatches	Transit Center Security	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.

Element Name	Equipment Package Name	Requirement
Local Dial-A-Ride Transit Dispatches	Transit Center Security	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.
Local Dial-A-Ride Transit Dispatches	Transit Center Security	The center shall exchange transit incident information along with other service data with other transit agencies.
Local Dial-A-Ride Transit Dispatches	Transit Center Vehicle Tracking	The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.
Local Dial-A-Ride Transit Dispatches	Transit Center Vehicle Tracking	The center shall monitor the locations of all transit vehicles within its network.
Local Dial-A-Ride Transit Dispatches	Transit Center Vehicle Tracking	The center shall provide transit operational data to traveler information service providers.
Local Dial-A-Ride Transit Dispatches	Transit Center Vehicle Tracking	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.
Local Dial-A-Ride Transit Dispatches	Transit Center Vehicle Tracking	The center shall determine adherence of transit vehicles to their assigned schedule.
Local Dial-A-Ride Transit Dispatches	Transit Data Collection	The center shall be able to produce sample products of the data available.
Local Dial-A-Ride Transit Dispatches	Transit Data Collection	The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.
Local Dial-A-Ride Transit Dispatches	Transit Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.
Local Dial-A-Ride Transit Dispatches	Transit Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
Local Dial-A-Ride Transit Dispatches	Transit Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.
Local Dial-A-Ride Transit Dispatches	Transit Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.
Local Dial-A-Ride Transit Dispatches	Transit Garage Maintenance	The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.
Local Dial-A-Ride Transit Dispatches	Transit Garage Maintenance	The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.
Local Dial-A-Ride Transit Dispatches	Transit Garage Maintenance	The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.
Local Dial-A-Ride Transit Dispatches	Transit Garage Maintenance	The center shall provide transit operations personnel with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data.
Local Dial-A-Ride Transit Dispatches	Transit Garage Maintenance	The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.
Local Dial-A-Ride Transit Dispatches	Transit Garage Maintenance	The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.
Local Dial-A-Ride Transit Dispatches	Transit Garage Maintenance	The center shall collect operational and maintenance data from transit vehicles.
Local Dial-A-Ride Transit Dispatches	Transit Garage Maintenance	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Assignment	The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Assignment	The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Assignment	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Assignment	The center shall assign individual transit vehicles to transit blocks.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Assignment	The center shall provide an inventory management function for the transit facility that stores functional attributes about each vehicle owned by the transit operator. The functional attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Assignment	The center shall download vehicle assignments to the transit vehicle prior to the start of the day's operations.

Element Name	Equipment Package Name	Requirement
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Operator Assignment	The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Operator Assignment	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Operator Assignment	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Operator Assignment	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.
Local Dial-A-Ride Transit Dispatches	Transit Vehicle Operator Assignment	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.
Local Dial-A-Ride Transit Vehicles	On-board Maintenance	The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.
Local Dial-A-Ride Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.
Local Dial-A-Ride Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.
Local Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.
Local Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.
Local Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall manage data input to sensor(s) on-board a transit vehicle to determine the vehicle's availability for use in demand responsive and flexible-route transit services based on identity, type, and passenger capacity.
Local Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.
Local Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.
Local Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall determine scenarios to correct the schedule deviation.
Local Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.
Local Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.
Local Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.
Local Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.
Local Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.
Local Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall output reported emergencies to the center.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.

Element Name	Equipment Package Name	Requirement
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall accept sensor control data to allow remote control of the sensors.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall perform authentication of the transit vehicle operator.
Local Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).
Local Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.
Local Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.
Local Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.
Local Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.
Local Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.
Local EOCs	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
Local EOCs	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
Local EOCs	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
Local EOCs	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
Local EOCs	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
Local EOCs	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
Local EOCs	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
Local EOCs	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
Local EOCs	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Local EOCs	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Local EOCs	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
Local EOCs	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
Local EOCs	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
Local EOCs	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.

Element Name	Equipment Package Name	Requirement
Local EOCs	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
Local EOCs	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
Local EOCs	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
Local EOCs	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
Local EOCs	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
Local EOCs	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
Local EOCs	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
Local EOCs	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
Local EOCs	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
Local EOCs	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
Local EOCs	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
Local EOCs	Emergency Call-Taking	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
Local EOCs	Emergency Call-Taking	The center shall update the incident information log once the emergency system operator has verified the incident.
Local EOCs	Emergency Call-Taking	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.
Local EOCs	Emergency Call-Taking	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.
Local EOCs	Emergency Call-Taking	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.
Local EOCs	Emergency Call-Taking	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.
Local EOCs	Emergency Call-Taking	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
Local EOCs	Emergency Call-Taking	The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.
Local EOCs	Emergency Call-Taking	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
Local EOCs	Emergency Call-Taking	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
Local EOCs	Emergency Call-Taking	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.
Local EOCs	Emergency Dispatch	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
Local EOCs	Emergency Dispatch	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
Local EOCs	Emergency Dispatch	The center shall store and maintain the emergency service responses in an action log.
Local EOCs	Emergency Dispatch	The center shall receive traffic images to support dispatch of emergency vehicles.
Local EOCs	Emergency Dispatch	The center shall provide the capability to request remote control of traffic surveillance devices
Local EOCs	Emergency Dispatch	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
Local EOCs	Emergency Dispatch	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.

Element Name	Equipment Package Name	Requirement
Local EOCs	Emergency Dispatch	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Local EOCs	Emergency Dispatch	The center shall relay location and incident details to the responding vehicles.
Local EOCs	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local EOCs	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local EOCs	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local EOCs	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local EOCs	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
Local EOCs	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
Local EOCs	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local EOCs	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
Local EOCs	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
Local EOCs	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
Local EOCs	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
Local EOCs	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local EOCs	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
Local EOCs	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local EOCs	Emergency Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
Local EOCs	Emergency Environmental Monitoring	The center shall collect current road and weather information from roadway maintenance operations.
Local EOCs	Emergency Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.
Local EOCs	Emergency Environmental Monitoring	The center shall present the current and forecast road and weather information to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.

Element Name	Equipment Package Name	Requirement
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Call-Taking	The center shall update the incident information log once the emergency system operator has verified the incident.
Local Fire and EMS Dispatch	Emergency Dispatch	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.
Local Fire and EMS Dispatch	Emergency Dispatch	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
Local Fire and EMS Dispatch	Emergency Dispatch	The center shall provide the capability to request remote control of traffic surveillance devices
Local Fire and EMS Dispatch	Emergency Dispatch	The center shall receive traffic images to support dispatch of emergency vehicles.
Local Fire and EMS Dispatch	Emergency Dispatch	The center shall store and maintain the emergency service responses in an action log.
Local Fire and EMS Dispatch	Emergency Dispatch	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
Local Fire and EMS Dispatch	Emergency Dispatch	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
Local Fire and EMS Dispatch	Emergency Dispatch	The center shall relay location and incident details to the responding vehicles.
Local Fire and EMS Dispatch	Emergency Dispatch	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Environmental Monitoring	The center shall collect current road and weather information from roadway maintenance operations.
Local Fire and EMS Dispatch	Emergency Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
Local Fire and EMS Dispatch	Emergency Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.
Local Fire and EMS Dispatch	Emergency Environmental Monitoring	The center shall present the current and forecast road and weather information to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.

Element Name	Equipment Package Name	Requirement
Local Fire and EMS Dispatch	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
Local Fire and EMS Dispatch	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
Local Fire and EMS Dispatch	Incident Command	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.
Local Fire and EMS Dispatch	Incident Command	The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
Local Fire and EMS Dispatch	Incident Command	The center shall assess the status of responding emergency vehicles as part of an incident command.
Local Fire and EMS Dispatch	Incident Command	The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
Local Fire and EMS Dispatch	Incident Command	The center shall track and maintain resource information and action plans pertaining to the incident command.
Local Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.
Local Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.
Local Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.
Local Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall send patient status information to the care facility along with a request for further information.
Local Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.
Local Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.
Local Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.

Element Name	Equipment Package Name	Requirement
Local Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.
Local Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.
Local PIOs	Basic Information Broadcast	The center shall disseminate weather information to travelers.
Local PIOs	Basic Information Broadcast	The center shall disseminate air quality information to travelers.
Local PIOs	Basic Information Broadcast	The center shall disseminate event information to travelers.
Local PIOs	Basic Information Broadcast	The center shall disseminate parking information to travelers, including location, availability, and fees.
Local PIOs	Basic Information Broadcast	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.
Local PIOs	Basic Information Broadcast	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
Local PIOs	Basic Information Broadcast	The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.
Local PIOs	Basic Information Broadcast	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.
Local PIOs	Basic Information Broadcast	The center shall disseminate toll fee information to travelers.
Local PIOs	Basic Information Broadcast	The center shall provide the capability to support requests from the media for traffic and incident data.
Local PIOs	ISP Emergency Traveler Information	The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.
Local PIOs	ISP Emergency Traveler Information	The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.
Local PIOs	ISP Emergency Traveler Information	The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.
Local PIOs	ISP Emergency Traveler Information	The center shall provide evacuation information to shelter providers.
Local PIOs	ISP Traveler Data Collection	The center shall collect, process, and store border crossing information.
Local PIOs	ISP Traveler Data Collection	The center shall collect, process, and store air quality information.
Local PIOs	ISP Traveler Data Collection	The center shall collect, process, and store event information.
Local PIOs	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.
Local PIOs	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.
Local PIOs	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.
Local PIOs	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
Local PIOs	ISP Traveler Data Collection	The center shall collect, process, and store toll fee information.
Local PIOs	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.
Local Police Dispatch	Center Secure Area Alarm Support	After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.
Local Police Dispatch	Center Secure Area Alarm Support	The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.
Local Police Dispatch	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).
Local Police Dispatch	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.
Local Police Dispatch	Center Secure Area Alarm Support	After the alarm message becomes a verified incident, the center shall determine the appropriate response.

Element Name	Equipment Package Name	Requirement
Local Police Dispatch	Center Secure Area Alarm Support	The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
Local Police Dispatch	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
Local Police Dispatch	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
Local Police Dispatch	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
Local Police Dispatch	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
Local Police Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
Local Police Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
Local Police Dispatch	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
Local Police Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
Local Police Dispatch	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
Local Police Dispatch	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
Local Police Dispatch	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.

Element Name	Equipment Package Name	Requirement
Local Police Dispatch	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
Local Police Dispatch	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
Local Police Dispatch	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
Local Police Dispatch	Emergency Call-Taking	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
Local Police Dispatch	Emergency Call-Taking	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
Local Police Dispatch	Emergency Call-Taking	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
Local Police Dispatch	Emergency Call-Taking	The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.
Local Police Dispatch	Emergency Call-Taking	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
Local Police Dispatch	Emergency Call-Taking	The center shall update the incident information log once the emergency system operator has verified the incident.
Local Police Dispatch	Emergency Call-Taking	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.
Local Police Dispatch	Emergency Call-Taking	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.
Local Police Dispatch	Emergency Call-Taking	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.
Local Police Dispatch	Emergency Call-Taking	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.
Local Police Dispatch	Emergency Call-Taking	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.
Local Police Dispatch	Emergency Dispatch	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Local Police Dispatch	Emergency Dispatch	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.
Local Police Dispatch	Emergency Dispatch	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
Local Police Dispatch	Emergency Dispatch	The center shall provide the capability to request remote control of traffic surveillance devices
Local Police Dispatch	Emergency Dispatch	The center shall store and maintain the emergency service responses in an action log.
Local Police Dispatch	Emergency Dispatch	The center shall relay location and incident details to the responding vehicles.
Local Police Dispatch	Emergency Dispatch	The center shall receive traffic images to support dispatch of emergency vehicles.
Local Police Dispatch	Emergency Dispatch	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
Local Police Dispatch	Emergency Dispatch	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
Local Police Dispatch	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
Local Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.

Element Name	Equipment Package Name	Requirement
Local Police Dispatch	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
Local Police Dispatch	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
Local Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local Police Dispatch	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
Local Police Dispatch	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
Local Police Dispatch	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
Local Police Dispatch	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
Local Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Local Police Dispatch	Emergency Environmental Monitoring	The center shall present the current and forecast road and weather information to the emergency system operator.
Local Police Dispatch	Emergency Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.
Local Police Dispatch	Emergency Environmental Monitoring	The center shall collect current road and weather information from roadway maintenance operations.
Local Police Dispatch	Emergency Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
Local Police Dispatch	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
Local Police Dispatch	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
Local Police Dispatch	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
Local Police Dispatch	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
Local Police Dispatch	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
Local Police Dispatch	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
Local Police Dispatch	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Local Police Dispatch	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
Local Police Dispatch	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.

Element Name	Equipment Package Name	Requirement
Local Police Dispatch	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
Local Police Dispatch	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
Local Police Dispatch	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
Local Police Dispatch	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
Local Police Dispatch	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
Local Police Dispatch	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
Local Police Dispatch	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
Local Police Dispatch	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
Local Police Dispatch	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
Local Police Dispatch	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
Local Police Dispatch	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
Local Police Dispatch	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
Local Police Dispatch	Incident Command	The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
Local Police Dispatch	Incident Command	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.
Local Police Dispatch	Incident Command	The center shall assess the status of responding emergency vehicles as part of an incident command.
Local Police Dispatch	Incident Command	The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
Local Police Dispatch	Incident Command	The center shall track and maintain resource information and action plans pertaining to the incident command.
Local Public Works Divisions	MCM Incident Management	The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.
Local Public Works Divisions	MCM Incident Management	The center shall exchange incident and threat information with emergency management centers as well as traffic management centers; including notification of existence of incident and expected severity, location, time and nature of incident.
Local Public Works Divisions	MCM Incident Management	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
Local Public Works Divisions	MCM Incident Management	The center shall exchange road network status assessment information with emergency management and traffic management centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
Local Public Works Divisions	MCM Incident Management	The center shall respond to requests from emergency management to provide maintenance and construction resources to implement response plans, assist in clean up, verify an incident, etc. This may also involve coordination with traffic management centers and other maintenance centers.
Local Public Works Divisions	MCM Incident Management	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.

Element Name	Equipment Package Name	Requirement
Local Public Works Divisions	MCM Incident Management	The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
Local Public Works Divisions	MCM Incident Management	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, etc.
Local Public Works Divisions	MCM Work Activity Coordination	The center shall provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.
Local Public Works Divisions	MCM Work Activity Coordination	The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
Local Public Works Divisions	MCM Work Activity Coordination	The center shall exchange rail schedules and work plans with rail operations centers.
Local Public Works Divisions	MCM Work Activity Coordination	The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.
Local Public Works Divisions	MCM Work Activity Coordination	The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.
Local Public Works Divisions	MCM Work Activity Coordination	The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.
Local Speed Monitoring System	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
Local Speed Monitoring System	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
Local Speed Monitoring System	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
Local Speed Monitoring System	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Local Speed Monitoring System	Roadway Speed Monitoring	If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, etc.).
Local Speed Monitoring System	Roadway Speed Monitoring	The field element shall include sensors to detect vehicle speeds, under enforcement agency control.
Local Speed Monitoring System	Roadway Speed Monitoring	The field element shall base speed advisories to passing drivers on environmental conditions.
Local Speed Monitoring System	Roadway Speed Monitoring	The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.
Local Speed Monitoring System	Roadway Speed Monitoring	The field element shall return operational status for the vehicle speed sensors to the enforcement agency.
Local Speed Monitoring System	Roadway Speed Monitoring	The field element shall monitor notify an enforcement agency when a speed violation is detected.

Element Name	Equipment Package Name	Requirement
Local Speed Monitoring System	Roadway Speed Monitoring	The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.
Local Speed Monitoring System	Roadway Speed Monitoring	The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, operational data on current routes and schedules, and digitized map data.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support management of fixed route operations.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall dispatch fixed route or flexible route transit vehicles
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall generate the necessary corrective actions which may involve more than the vehicles concerned and more far reaching action, such as, the introduction of extra vehicles, wide area signal priority by traffic management, the premature termination of some services, etc.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall collect transit operational data for use in the generation of routes and schedules.
Local Transit Providers Dispatch	Transit Center Fixed-Route Operations	The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.
Local Transit Providers Dispatch	Transit Center Information Services	The center shall enable yellow pages (including non-motorized transportation) information to be output to the traveler.
Local Transit Providers Dispatch	Transit Center Information Services	The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.
Local Transit Providers Dispatch	Transit Center Information Services	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.
Local Transit Providers Dispatch	Transit Center Information Services	The center shall provide transit information to the media including details of deviations from schedule of regular transit services.
Local Transit Providers Dispatch	Transit Center Information Services	The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.
Local Transit Providers Dispatch	Transit Center Information Services	The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.
Local Transit Providers Dispatch	Transit Center Multi-Modal Coordination	The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.
Local Transit Providers Dispatch	Transit Center Multi-Modal Coordination	The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.
Local Transit Providers Dispatch	Transit Center Multi-Modal Coordination	The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.
Local Transit Providers Dispatch	Transit Center Multi-Modal Coordination	The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.
Local Transit Providers Dispatch	Transit Center Passenger Counting	The center shall collect passenger count information from each transit vehicle.

Element Name	Equipment Package Name	Requirement
Local Transit Providers Dispatch	Transit Center Passenger Counting	The center shall make the compiled ridership data available to the system operator and other applications.
Local Transit Providers Dispatch	Transit Center Passenger Counting	The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.
Local Transit Providers Dispatch	Transit Center Security	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.
Local Transit Providers Dispatch	Transit Center Security	The center shall receive reports of emergencies on-board transit vehicles entered directly be the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.
Local Transit Providers Dispatch	Transit Center Security	The center shall exchange transit incident information along with other service data with other transit agencies.
Local Transit Providers Dispatch	Transit Center Security	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.
Local Transit Providers Dispatch	Transit Center Security	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.
Local Transit Providers Dispatch	Transit Center Security	The center shall receive threat information and status on the integrity of the transit infrastructure.
Local Transit Providers Dispatch	Transit Center Security	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.
Local Transit Providers Dispatch	Transit Center Security	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.
Local Transit Providers Dispatch	Transit Center Security	The center shall support the back-office portion of functionality to authenticate transit vehicle operators.
Local Transit Providers Dispatch	Transit Center Vehicle Tracking	The center shall provide transit operational data to traveler information service providers.
Local Transit Providers Dispatch	Transit Center Vehicle Tracking	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.
Local Transit Providers Dispatch	Transit Center Vehicle Tracking	The center shall determine adherence of transit vehicles to their assigned schedule.
Local Transit Providers Dispatch	Transit Center Vehicle Tracking	The center shall monitor the locations of all transit vehicles within its network.
Local Transit Providers Dispatch	Transit Center Vehicle Tracking	The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.
Local Transit Providers Dispatch	Transit Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.
Local Transit Providers Dispatch	Transit Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.
Local Transit Providers Dispatch	Transit Garage Maintenance	The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.
Local Transit Providers Dispatch	Transit Garage Maintenance	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.
Local Transit Providers Dispatch	Transit Garage Maintenance	The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.
Local Transit Providers Dispatch	Transit Garage Maintenance	The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.
Local Transit Providers Dispatch	Transit Garage Maintenance	The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.
Local Transit Providers Dispatch	Transit Garage Maintenance	The center shall collect operational and maintenance data from transit vehicles.
Local Transit Providers Dispatch	Transit Garage Maintenance	The center shall provide transit operations personnel with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data.
Local Transit Providers Dispatch	Transit Garage Maintenance	The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.
Local Transit Providers Dispatch	Transit Vehicle Assignment	The center shall assign individual transit vehicles to transit blocks.

Element Name	Equipment Package Name	Requirement
Local Transit Providers Dispatch	Transit Vehicle Assignment	The center shall provide an inventory management function for the transit facility that stores functional attributes about each vehicle owned by the transit operator. The functional attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.
Local Transit Providers Dispatch	Transit Vehicle Assignment	The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.
Local Transit Providers Dispatch	Transit Vehicle Assignment	The center shall download vehicle assignments to the transit vehicle prior to the start of the day's operations.
Local Transit Providers Dispatch	Transit Vehicle Assignment	The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.
Local Transit Providers Dispatch	Transit Vehicle Assignment	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.
Local Transit Providers Dispatch	Transit Vehicle Operator Assignment	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.
Local Transit Providers Dispatch	Transit Vehicle Operator Assignment	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.
Local Transit Providers Dispatch	Transit Vehicle Operator Assignment	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.
Local Transit Providers Dispatch	Transit Vehicle Operator Assignment	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.
Local Transit Providers Dispatch	Transit Vehicle Operator Assignment	The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies.
Local Transit Vehicles	On-board Maintenance	The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.
Local Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.
Local Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.
Local Transit Vehicles	On-board Passenger Counting	The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.
Local Transit Vehicles	On-board Passenger Counting	The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.
Local Transit Vehicles	On-board Passenger Counting	The transit vehicle shall count passengers boarding and alighting.
Local Transit Vehicles	On-board Passenger Counting	The transit vehicle shall send the collected passenger count information to the transit center.
Local Transit Vehicles	On-board Schedule Management	The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.
Local Transit Vehicles	On-board Schedule Management	The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.
Local Transit Vehicles	On-board Schedule Management	The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.
Local Transit Vehicles	On-board Schedule Management	The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.
Local Transit Vehicles	On-board Schedule Management	The transit vehicle shall determine scenarios to correct the schedule deviation.
Local Transit Vehicles	On-board Schedule Management	The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.
Local Transit Vehicles	On-board Schedule Management	The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.
Local Transit Vehicles	On-board Schedule Management	The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide fare statistics data to the center.
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall support the support advanced payments for tolls, and/or parking lot charges, and/or transit fares via the traveler card / payment instrument.

Element Name	Equipment Package Name	Requirement
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.
Local Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall perform authentication of the transit vehicle operator.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall accept sensor control data to allow remote control of the sensors.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall output reported emergencies to the center.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.
Local Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.
Local Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.
Local Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.
Local Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.
Local Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.
Local Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.

Element Name	Equipment Package Name	Requirement
Maricopa County EOC	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Maricopa County EOC	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
Maricopa County EOC	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
Maricopa County EOC	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
Maricopa County EOC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
Maricopa County EOC	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
Maricopa County EOC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
Maricopa County EOC	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
Maricopa County EOC	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
Maricopa County EOC	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
Maricopa County EOC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
Maricopa County EOC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
Maricopa County EOC	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
Maricopa County EOC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.

Element Name	Equipment Package Name	Requirement
Maricopa County EOC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
Maricopa County EOC	Emergency Call-Taking	The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.
Maricopa County EOC	Emergency Call-Taking	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
Maricopa County EOC	Emergency Call-Taking	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
Maricopa County EOC	Emergency Call-Taking	The center shall update the incident information log once the emergency system operator has verified the incident.
Maricopa County EOC	Emergency Call-Taking	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.
Maricopa County EOC	Emergency Call-Taking	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.
Maricopa County EOC	Emergency Call-Taking	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.
Maricopa County EOC	Emergency Call-Taking	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.
Maricopa County EOC	Emergency Call-Taking	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.
Maricopa County EOC	Emergency Call-Taking	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
Maricopa County EOC	Emergency Call-Taking	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
Maricopa County EOC	Emergency Dispatch	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.
Maricopa County EOC	Emergency Dispatch	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Maricopa County EOC	Emergency Dispatch	The center shall receive traffic images to support dispatch of emergency vehicles.
Maricopa County EOC	Emergency Dispatch	The center shall provide the capability to request remote control of traffic surveillance devices
Maricopa County EOC	Emergency Dispatch	The center shall relay location and incident details to the responding vehicles.
Maricopa County EOC	Emergency Dispatch	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
Maricopa County EOC	Emergency Dispatch	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
Maricopa County EOC	Emergency Dispatch	The center shall store and maintain the emergency service responses in an action log.
Maricopa County EOC	Emergency Dispatch	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
Maricopa County EOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Maricopa County EOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Maricopa County EOC	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
Maricopa County EOC	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
Maricopa County EOC	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
Maricopa County EOC	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
Maricopa County EOC	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.

Element Name	Equipment Package Name	Requirement
Maricopa County EOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Maricopa County EOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Maricopa County EOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Maricopa County EOC	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
Maricopa County EOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Maricopa County EOC	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
Maricopa County EOC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Maricopa County EOC	Emergency Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
Maricopa County EOC	Emergency Environmental Monitoring	The center shall collect current road and weather information from roadway maintenance operations.
Maricopa County EOC	Emergency Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.
Maricopa County EOC	Emergency Environmental Monitoring	The center shall present the current and forecast road and weather information to the emergency system operator.
MCDOT ATIS	Basic Information Broadcast	The center shall disseminate parking information to travelers, including location, availability, and fees.
MCDOT ATIS	Basic Information Broadcast	The center shall disseminate air quality information to travelers.
MCDOT ATIS	Basic Information Broadcast	The center shall disseminate weather information to travelers.
MCDOT ATIS	Basic Information Broadcast	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.
MCDOT ATIS	Basic Information Broadcast	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
MCDOT ATIS	Basic Information Broadcast	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.
MCDOT ATIS	Basic Information Broadcast	The center shall disseminate toll fee information to travelers.
MCDOT ATIS	Basic Information Broadcast	The center shall provide the capability to support requests from the media for traffic and incident data.
MCDOT ATIS	Basic Information Broadcast	The center shall disseminate event information to travelers.
MCDOT ATIS	Basic Information Broadcast	The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.
MCDOT ATIS	Interactive Infrastructure Information	The center shall disseminate customized toll fee information to travelers upon request.
MCDOT ATIS	Interactive Infrastructure Information	The center shall accept traveler profiles for determining the type of personalized data to send to the traveler.
MCDOT ATIS	Interactive Infrastructure Information	The center shall support requests for traveler information and advanced payment for traveler services from commercial fleet operators.
MCDOT ATIS	Interactive Infrastructure Information	The center shall disseminate customized event information to travelers upon request.

Element Name	Equipment Package Name	Requirement
MCDOT ATIS	Interactive Infrastructure Information	The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request.
MCDOT ATIS	Interactive Infrastructure Information	The center shall disseminate customized air quality information to travelers upon request.
MCDOT ATIS	Interactive Infrastructure Information	The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.
MCDOT ATIS	Interactive Infrastructure Information	The center shall disseminate customized weather information to travelers upon request.
MCDOT ATIS	Interactive Infrastructure Information	The center shall disseminate customized multimodal transportation service information (for example, from ferry and airline operators), including transfer points and other information, to travelers upon request.
MCDOT ATIS	Interactive Infrastructure Information	The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.
MCDOT ATIS	Interactive Infrastructure Information	The center shall provide the capability to support requests from the media for traffic and incident data.
MCDOT ATIS	Interactive Infrastructure Information	The center shall provide the capability for a system operator to control the type and update frequency of traveler information.
MCDOT ATIS	Interactive Infrastructure Information	The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request.
MCDOT ATIS	Interactive Infrastructure Information	The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.
MCDOT ATIS	Interactive Infrastructure Information	The center shall manage payment for services, such as tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls, and provide transaction success or failure details.
MCDOT ATIS	Interactive Infrastructure Information	The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.
MCDOT ATIS	Interactive Infrastructure Information	The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.
MCDOT ATIS	ISP Data Collection	The center shall collect traveler requests, confirmations, and payment transaction data for traveler services provided.
MCDOT ATIS	ISP Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
MCDOT ATIS	ISP Data Collection	The center shall be able to produce sample products of the data available.
MCDOT ATIS	ISP Data Collection	The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.
MCDOT ATIS	ISP Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traveler information data or for the data itself.
MCDOT ATIS	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.
MCDOT ATIS	ISP Traveler Data Collection	The center shall collect, process, and store air quality information.
MCDOT ATIS	ISP Traveler Data Collection	The center shall collect, process, and store event information.
MCDOT ATIS	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.
MCDOT ATIS	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.
MCDOT ATIS	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.
MCDOT ATIS	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
MCDOT ATIS	ISP Traveler Data Collection	The center shall collect, process, and store toll fee information.
MCDOT ATIS	ISP Traveler Data Collection	The center shall collect, process, and store border crossing information.
MCDOT ATIS	MCM Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.

Element Name	Equipment Package Name	Requirement
MCDOT ATIS	MCM Data Collection	The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.
MCDOT ATIS	MCM Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
MCDOT ATIS	MCM Data Collection	The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.
MCDOT ATIS	MCM Data Collection	The center shall be able to produce sample products of the data available.
MCDOT ATIS	MCM Environmental Information Processing	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services) and local environmental sensor data.
MCDOT ATIS	MCM Environmental Information Processing	The center shall use the various data inputs of environmental sensors and road weather data to develop a view of current and predicted road weather and road conditions.
MCDOT ATIS	MCM Environmental Information Processing	The center shall disseminate current and forecasted road weather and road condition information to weather service providers (such as the National Weather Service and value-added sector specific meteorological services) as well as other agencies including traffic, emergency, and transit management, traveler information providers, rail operations centers, media, and other maintenance management centers.
MCDOT ATIS	MCM Environmental Information Processing	The center shall provide value-added sector specific meteorological services with information on basic road facility and treatment information that supports forecasts for road conditions.
MCDOT ATIS	MCM Environmental Information Processing	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
MCDOT ATIS	MCM Work Activity Coordination	The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
MCDOT ATIS	MCM Work Activity Coordination	The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.
MCDOT ATIS	MCM Work Activity Coordination	The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.
MCDOT ATIS	MCM Work Activity Coordination	The center shall provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.
MCDOT ATIS	MCM Work Activity Coordination	The center shall exchange rail schedules and work plans with rail operations centers.
MCDOT ATIS	MCM Work Activity Coordination	The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.
MCDOT ATIS	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
MCDOT ATIS	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
MCDOT ATIS	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
MCDOT ATIS	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
MCDOT ATIS	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
MCDOT ATIS	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.

Element Name	Equipment Package Name	Requirement
MCDOT ATIS	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
MCDOT ATIS	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
MCDOT ATIS	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
MCDOT ATIS	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
MCDOT ATIS	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
MCDOT ATIS	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
MCDOT ATIS	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
MCDOT ATIS	Traffic Data Collection	The center shall be able to produce sample products of the data available.
MCDOT ATIS	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
MCDOT ATIS	Traveler Telephone Information	The center shall provide transit service information in the requested voice format and for the requested location.
MCDOT ATIS	Traveler Telephone Information	The center shall provide roadway environment conditions information in the requested voice format and for the requested location.
MCDOT ATIS	Traveler Telephone Information	The center shall provide the capability to support both specific caller requests as well as bulk upload of regional traveler information.
MCDOT ATIS	Traveler Telephone Information	The center shall provide the capability to process voice-formatted requests for traveler information from a traveler telephone information system, and return the information in the requested format.
MCDOT ATIS	Traveler Telephone Information	The center shall provide the capability to process dual-tone multifrequency (DTMF)-based requests (touch-tone) for traveler information from a traveler telephone information system.
MCDOT ATIS	Traveler Telephone Information	The center shall provide the capability to process traveler information requests from a traveler telephone information system.
MCDOT ATIS	Traveler Telephone Information	The center shall provide weather and event information in the requested voice format and for the requested location.
MCDOT ATIS	Traveler Telephone Information	The center shall provide yellow pages services information in the requested voice format and for the requested location.
MCDOT ATIS	Traveler Telephone Information	The center shall provide current ferry and rail schedule and airport status information in the requested voice format and for the requested location.
MCDOT ATIS	Traveler Telephone Information	The center shall provide information on traffic conditions in the requested voice format and for the requested location.
MCDOT ATIS	Traveler Telephone Information	The center shall receive and forward region-specific wide-area alert and advisory information to the traveler telephone information system, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.
MCDOT ATIS	Traveler Telephone Information	The center shall provide work zone and roadway maintenance information in the requested voice format and for the requested location.
MCDOT CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
MCDOT CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
MCDOT CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
MCDOT CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
MCDOT CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
MCDOT CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
MCDOT CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.

Element Name	Equipment Package Name	Requirement
MCDOT CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
MCDOT CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
MCDOT DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
MCDOT DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
MCDOT DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
MCDOT DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
MCDOT DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
MCDOT DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
MCDOT DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
MCDOT DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
MCDOT DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
MCDOT Maintenance Division	MCM Incident Management	The center shall respond to requests from emergency management to provide maintenance and construction resources to implement response plans, assist in clean up, verify an incident, etc. This may also involve coordination with traffic management centers and other maintenance centers.
MCDOT Maintenance Division	MCM Incident Management	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, etc.
MCDOT Maintenance Division	MCM Incident Management	The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.
MCDOT Maintenance Division	MCM Incident Management	The center shall exchange road network status assessment information with emergency management and traffic management centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
MCDOT Maintenance Division	MCM Incident Management	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
MCDOT Maintenance Division	MCM Incident Management	The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
MCDOT Maintenance Division	MCM Incident Management	The center shall exchange incident and threat information with emergency management centers as well as traffic management centers; including notification of existence of incident and expected severity, location, time and nature of incident.

Element Name	Equipment Package Name	Requirement
MCDOT Maintenance Division	MCM Incident Management	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
MCDOT Maintenance Division	MCM Work Activity Coordination	The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.
MCDOT Maintenance Division	MCM Work Activity Coordination	The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
MCDOT Maintenance Division	MCM Work Activity Coordination	The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.
MCDOT Maintenance Division	MCM Work Activity Coordination	The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.
MCDOT Maintenance Division	MCM Work Activity Coordination	The center shall exchange rail schedules and work plans with rail operations centers.
MCDOT Maintenance Division	MCM Work Activity Coordination	The center shall provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.
MCDOT REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.
MCDOT REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall send patient status information to the care facility along with a request for further information.
MCDOT REACT Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.
MCDOT REACT Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.
MCDOT REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.
MCDOT REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.
MCDOT REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.
MCDOT REACT Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.
MCDOT REACT Vehicles	On-board EV En Route Support	The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.
MCDOT REACT Vehicles	On-board EV Incident Management Communication	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.
MCDOT REACT Vehicles	On-board EV Incident Management Communication	The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.
MCDOT REACT Vehicles	On-board EV Incident Management Communication	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.
MCDOT TMC	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.

Element Name	Equipment Package Name	Requirement
MCDOT TMC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
MCDOT TMC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
MCDOT TMC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
MCDOT TMC	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
MCDOT TMC	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
MCDOT TMC	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
MCDOT TMC	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
MCDOT TMC	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
MCDOT TMC	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
MCDOT TMC	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
MCDOT TMC	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
MCDOT TMC	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
MCDOT TMC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
MCDOT TMC	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
MCDOT TMC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
MCDOT TMC	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
MCDOT TMC	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
MCDOT TMC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
MCDOT TMC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
MCDOT TMC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
MCDOT TMC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
MCDOT TMC	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
MCDOT TMC	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.

Element Name	Equipment Package Name	Requirement
MCDOT TMC	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
MCDOT TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
MCDOT TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
MCDOT TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
MCDOT TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
MCDOT TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
MCDOT TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
MCDOT TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
MCDOT TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
MCDOT TMC	Emergency Data Collection	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.
MCDOT TMC	Emergency Data Collection	The center shall be able to produce sample products of the data available.
MCDOT TMC	Emergency Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.
MCDOT TMC	Emergency Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
MCDOT TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCDOT TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCDOT TMC	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
MCDOT TMC	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
MCDOT TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCDOT TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCDOT TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCDOT TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCDOT TMC	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.

Element Name	Equipment Package Name	Requirement
MCDOT TMC	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
MCDOT TMC	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
MCDOT TMC	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
MCDOT TMC	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
MCDOT TMC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCDOT TMC	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
MCDOT TMC	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
MCDOT TMC	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
MCDOT TMC	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
MCDOT TMC	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
MCDOT TMC	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
MCDOT TMC	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
MCDOT TMC	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
MCDOT TMC	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
MCDOT TMC	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
MCDOT TMC	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
MCDOT TMC	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
MCDOT TMC	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
MCDOT TMC	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
MCDOT TMC	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
MCDOT TMC	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
MCDOT TMC	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
MCDOT TMC	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
MCDOT TMC	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
MCDOT TMC	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
MCDOT TMC	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
MCDOT TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.

Element Name	Equipment Package Name	Requirement
MCDOT TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
MCDOT TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
MCDOT TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
MCDOT TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
MCDOT TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
MCDOT TMC	Incident Command	The center shall track and maintain resource information and action plans pertaining to the incident command.
MCDOT TMC	Incident Command	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.
MCDOT TMC	Incident Command	The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
MCDOT TMC	Incident Command	The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
MCDOT TMC	Incident Command	The center shall assess the status of responding emergency vehicles as part of an incident command.
MCDOT TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
MCDOT TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
MCDOT TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
MCDOT TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
MCDOT TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
MCDOT TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
MCDOT TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
MCDOT TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
MCDOT TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
MCDOT TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
MCDOT TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
MCDOT TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.

Element Name	Equipment Package Name	Requirement
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
MCDOT TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
MCDOT TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
MCDOT TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
MCDOT TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
MCDOT TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
MCDOT TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
MCDOT TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
MCDOT TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
MCDOT TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
MCDOT TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
MCDOT TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
MCDOT TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
MCDOT TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
MCDOT TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
MCDOT TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
MCDOT TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).

Element Name	Equipment Package Name	Requirement
MCDOT TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
MCDOT TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
MCDOT TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
MCDOT TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
MCDOT TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
MCDOT TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
MCDOT TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
MCDOT TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
MCDOT TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
MCDOT TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
MCDOT TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
MCDOT TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
MCDOT TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
MCDOT TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
MCDOT TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
MCDOT TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
MCDOT TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
MCDOT TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
MCDOT Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
MCDOT Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
MCDOT Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
MCDOT Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
MCDOT Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
MCDOT Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
MCDOT Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).

Element Name	Equipment Package Name	Requirement
MCDOT Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
MCDOT Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
MCDOT Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
MCDOT Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
MCDOT Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
MCDOT Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
MCDOT Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
MCDOT Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
MCDOT Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
MCDOT Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
MCDOT Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
MCDOT Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
MCDOT Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
MCDOT Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.
MCDOT Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
MCDOT Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
MCDOT Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
MCDOT Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
MCDOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
MCDOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
MCDOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
MCDOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
MCDOT Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
MCDOT Vehicle Detectors	Roadway Data Collection	The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.
MCDOT Vehicle Detectors	Roadway Data Collection	The field element shall collect traffic, road, and environmental conditions information.
MCDOT Vehicle Detectors	Roadway Data Collection	The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.
MCDOT Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.

Element Name	Equipment Package Name	Requirement
MCDOT Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
MCDOT Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
MCDOT Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
MCDOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall provide roadside equipment fault indication to the center for repair.
MCDOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.
MCDOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.
MCDOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall use toll and parking tags on passing vehicles for traffic data link time calculations and send to the controlling center; tag identities will be removed to ensure anonymity.
MCDOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall aggregate and forward collected probe information to the center.
MCDOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.
MCDOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall provide roadside equipment operational status to the center.
MCDOT Vehicle Detectors	Roadway Probe Data Communications	The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.

Element Name	Equipment Package Name	Requirement
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
MCSO Dispatch Center	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
MCSO Dispatch Center	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
MCSO Dispatch Center	Emergency Call-Taking	The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.
MCSO Dispatch Center	Emergency Call-Taking	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
MCSO Dispatch Center	Emergency Call-Taking	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.
MCSO Dispatch Center	Emergency Call-Taking	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
MCSO Dispatch Center	Emergency Call-Taking	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
MCSO Dispatch Center	Emergency Call-Taking	The center shall update the incident information log once the emergency system operator has verified the incident.
MCSO Dispatch Center	Emergency Call-Taking	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.
MCSO Dispatch Center	Emergency Call-Taking	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.
MCSO Dispatch Center	Emergency Call-Taking	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.
MCSO Dispatch Center	Emergency Call-Taking	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
MCSO Dispatch Center	Emergency Call-Taking	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.

Element Name	Equipment Package Name	Requirement
MCSO Dispatch Center	Emergency Dispatch	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
MCSO Dispatch Center	Emergency Dispatch	The center shall relay location and incident details to the responding vehicles.
MCSO Dispatch Center	Emergency Dispatch	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.
MCSO Dispatch Center	Emergency Dispatch	The center shall provide the capability to request remote control of traffic surveillance devices
MCSO Dispatch Center	Emergency Dispatch	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
MCSO Dispatch Center	Emergency Dispatch	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
MCSO Dispatch Center	Emergency Dispatch	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
MCSO Dispatch Center	Emergency Dispatch	The center shall store and maintain the emergency service responses in an action log.
MCSO Dispatch Center	Emergency Dispatch	The center shall receive traffic images to support dispatch of emergency vehicles.
MCSO Dispatch Center	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCSO Dispatch Center	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
MCSO Dispatch Center	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCSO Dispatch Center	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
MCSO Dispatch Center	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
MCSO Dispatch Center	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCSO Dispatch Center	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCSO Dispatch Center	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
MCSO Dispatch Center	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
MCSO Dispatch Center	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
MCSO Dispatch Center	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
MCSO Dispatch Center	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCSO Dispatch Center	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.

Element Name	Equipment Package Name	Requirement
MCSO Dispatch Center	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
MCSO Dispatch Center	Emergency Environmental Monitoring	The center shall present the current and forecast road and weather information to the emergency system operator.
MCSO Dispatch Center	Emergency Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
MCSO Dispatch Center	Emergency Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.
MCSO Dispatch Center	Emergency Environmental Monitoring	The center shall collect current road and weather information from roadway maintenance operations.
MCSO Dispatch Center	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
MCSO Dispatch Center	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
MCSO Dispatch Center	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
MCSO Dispatch Center	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
MCSO Dispatch Center	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
MCSO Dispatch Center	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
MCSO Dispatch Center	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
MCSO Dispatch Center	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
MCSO Dispatch Center	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
MCSO Dispatch Center	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
MCSO Dispatch Center	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
MCSO Dispatch Center	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
MCSO Dispatch Center	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
MCSO Dispatch Center	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
MCSO Dispatch Center	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
MCSO Dispatch Center	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
MCSO Dispatch Center	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
MCSO Dispatch Center	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
MCSO Dispatch Center	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
MCSO Dispatch Center	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
MCSO Dispatch Center	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.

Element Name	Equipment Package Name	Requirement
MCSO Dispatch Center	Incident Command	The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
MCSO Dispatch Center	Incident Command	The center shall assess the status of responding emergency vehicles as part of an incident command.
MCSO Dispatch Center	Incident Command	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.
MCSO Dispatch Center	Incident Command	The center shall track and maintain resource information and action plans pertaining to the incident command.
MCSO Dispatch Center	Incident Command	The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
MCSO Vehicles	On-board EV En Route Support	The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.
MCSO Vehicles	On-board EV En Route Support	The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.
MCSO Vehicles	On-board EV En Route Support	The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.
MCSO Vehicles	On-board EV En Route Support	The emergency vehicle shall send patient status information to the care facility along with a request for further information.
MCSO Vehicles	On-board EV En Route Support	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.
MCSO Vehicles	On-board EV En Route Support	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.
MCSO Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.
MCSO Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.
MCSO Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.
METRO Light Rail Archived Data Server	Government Reporting Systems Support	The center shall provide data from an ITS archive to federal, state, or local government reporting systems.
METRO Light Rail Archived Data Server	Government Reporting Systems Support	The center shall support requests for ITS archived data from Government Reporting Systems.
METRO Light Rail Archived Data Server	Government Reporting Systems Support	The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
METRO Light Rail Archived Data Server	Government Reporting Systems Support	The center shall provide the capability to format data from an ITS archive suitable for input into government reports.
METRO Light Rail Archived Data Server	Government Reporting Systems Support	The center shall provide the capability to select data from an ITS archive for use in government reports.
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall include capabilities for error notification on the incoming archived data.
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall respond to requests from the administrator interface function to maintain the archive data.
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall perform quality checks on received data.

Element Name	Equipment Package Name	Requirement
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall include capabilities for performing quality checks on the incoming archived data.
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall collect data to be archived from one or more data sources.
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.
METRO Light Rail Archived Data Server	ITS Data Repository	For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.
METRO Light Rail Archived Data Server	ITS Data Repository	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.
METRO Light Rail Archived Data Server	ITS Data Repository	The center shall include capabilities for archive to archive coordination.
METRO Light Rail Archived Data Server	Traffic and Roadside Data Archival	The center shall collect traffic sensor information from roadside devices.
METRO Light Rail Archived Data Server	Traffic and Roadside Data Archival	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.
METRO Light Rail Archived Data Server	Traffic and Roadside Data Archival	The center shall record the status about the imported traffic and roadside data.
METRO Light Rail Archived Data Server	Traffic and Roadside Data Archival	The center shall collect environmental sensor information that from roadside devices.
METRO Light Rail Archived Data Server	Traffic and Roadside Data Archival	The center shall manage the collection of archive data directly from collection equipment located at the roadside.
METRO Light Rail Archived Data Server	Traffic and Roadside Data Archival	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.
METRO Light Rail Archived Data Server	Traffic and Roadside Data Archival	The center shall use the status information to adjust the collection of traffic and roadside data.
METRO Light Rail OCC	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).
METRO Light Rail OCC	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.
METRO Light Rail OCC	Center Secure Area Alarm Support	After the alarm message becomes a verified incident, the center shall determine the appropriate response.
METRO Light Rail OCC	Center Secure Area Alarm Support	The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.
METRO Light Rail OCC	Center Secure Area Alarm Support	After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.
METRO Light Rail OCC	Center Secure Area Alarm Support	The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.

Element Name	Equipment Package Name	Requirement
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
METRO Light Rail OCC	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
METRO Light Rail OCC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
METRO Light Rail OCC	Emergency Data Collection	The center shall be able to produce sample products of the data available.

Element Name	Equipment Package Name	Requirement
METRO Light Rail OCC	Emergency Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.
METRO Light Rail OCC	Emergency Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
METRO Light Rail OCC	Emergency Data Collection	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.
METRO Light Rail OCC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
METRO Light Rail OCC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
METRO Light Rail OCC	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
METRO Light Rail OCC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
METRO Light Rail OCC	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
METRO Light Rail OCC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
METRO Light Rail OCC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
METRO Light Rail OCC	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
METRO Light Rail OCC	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
METRO Light Rail OCC	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
METRO Light Rail OCC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
METRO Light Rail OCC	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
METRO Light Rail OCC	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
METRO Light Rail OCC	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
METRO Light Rail OCC	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
METRO Light Rail OCC	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
METRO Light Rail OCC	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
METRO Light Rail OCC	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.

Element Name	Equipment Package Name	Requirement
METRO Light Rail OCC	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
METRO Light Rail OCC	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
METRO Light Rail OCC	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
METRO Light Rail OCC	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
METRO Light Rail OCC	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
METRO Light Rail OCC	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
METRO Light Rail OCC	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
METRO Light Rail OCC	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
METRO Light Rail OCC	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
METRO Light Rail OCC	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
METRO Light Rail OCC	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
METRO Light Rail OCC	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
METRO Light Rail OCC	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
METRO Light Rail OCC	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
METRO Light Rail OCC	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
METRO Light Rail OCC	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
METRO Light Rail OCC	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, operational data on current routes and schedules, and digitized map data.
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall dispatch fixed route or flexible route transit vehicles
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall collect transit operational data for use in the generation of routes and schedules.
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.

Element Name	Equipment Package Name	Requirement
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support management of fixed route operations.
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.
METRO Light Rail OCC	Transit Center Fixed-Route Operations	The center shall generate the necessary corrective actions which may involve more than the vehicles concerned and more far reaching action, such as, the introduction of extra vehicles, wide area signal priority by traffic management, the premature termination of some services, etc.
METRO Light Rail OCC	Transit Center Information Services	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.
METRO Light Rail OCC	Transit Center Information Services	The center shall provide transit information to the media including details of deviations from schedule of regular transit services.
METRO Light Rail OCC	Transit Center Information Services	The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.
METRO Light Rail OCC	Transit Center Information Services	The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.
METRO Light Rail OCC	Transit Center Information Services	The center shall enable yellow pages (including non-motorized transportation) information to be output to the traveler.
METRO Light Rail OCC	Transit Center Information Services	The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.
METRO Light Rail OCC	Transit Center Multi-Modal Coordination	The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.
METRO Light Rail OCC	Transit Center Multi-Modal Coordination	The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.
METRO Light Rail OCC	Transit Center Multi-Modal Coordination	The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.
METRO Light Rail OCC	Transit Center Multi-Modal Coordination	The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.
METRO Light Rail OCC	Transit Center Security	The center shall exchange transit incident information along with other service data with other transit agencies.
METRO Light Rail OCC	Transit Center Security	The center shall receive reports of emergencies on-board transit vehicles entered directly be the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.
METRO Light Rail OCC	Transit Center Security	The center shall support the back-office portion of functionality to authenticate transit vehicle operators.
METRO Light Rail OCC	Transit Center Security	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.
METRO Light Rail OCC	Transit Center Security	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.
METRO Light Rail OCC	Transit Center Security	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.
METRO Light Rail OCC	Transit Center Security	The center shall receive threat information and status on the integrity of the transit infrastructure.
METRO Light Rail OCC	Transit Center Security	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.
METRO Light Rail OCC	Transit Center Security	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.
METRO Light Rail OCC	Transit Center Signal Priority	The center shall define business rules that govern use of transit vehicle signal priority, communicate these rules to the transit vehicle, and monitor transit vehicle requests for priority at signalized intersections.
METRO Light Rail OCC	Transit Center Signal Priority	The center shall provide transit operations personnel with the capability to control and monitor transit signal priority operations.

Element Name	Equipment Package Name	Requirement
METRO Light Rail OCC	Transit Center Signal Priority	The center shall analyze transit vehicle schedule performance to determine the need for priority along certain routes or at certain intersections.
METRO Light Rail OCC	Transit Center Signal Priority	The center shall send requests for priority along routes or at intersections to traffic management.
METRO Light Rail OCC	Transit Center Vehicle Tracking	The center shall provide transit operational data to traveler information service providers.
METRO Light Rail OCC	Transit Center Vehicle Tracking	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.
METRO Light Rail OCC	Transit Center Vehicle Tracking	The center shall determine adherence of transit vehicles to their assigned schedule.
METRO Light Rail OCC	Transit Center Vehicle Tracking	The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.
METRO Light Rail OCC	Transit Center Vehicle Tracking	The center shall monitor the locations of all transit vehicles within its network.
METRO Light Rail OCC	Transit Data Collection	The center shall be able to produce sample products of the data available.
METRO Light Rail OCC	Transit Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.
METRO Light Rail OCC	Transit Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
METRO Light Rail OCC	Transit Data Collection	The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.
METRO Light Rail OCC	Transit Vehicle Operator Assignment	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.
METRO Light Rail OCC	Transit Vehicle Operator Assignment	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.
METRO Light Rail OCC	Transit Vehicle Operator Assignment	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.
METRO Light Rail OCC	Transit Vehicle Operator Assignment	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.
METRO Light Rail OCC	Transit Vehicle Operator Assignment	The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies.
METRO Light Rail OMC	Transit Center Passenger Counting	The center shall make the compiled ridership data available to the system operator and other applications.
METRO Light Rail OMC	Transit Center Passenger Counting	The center shall collect passenger count information from each transit vehicle.
METRO Light Rail OMC	Transit Center Passenger Counting	The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.
METRO Light Rail OMC	Transit Garage Maintenance	The center shall provide transit operations personnel with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data.
METRO Light Rail OMC	Transit Garage Maintenance	The center shall collect operational and maintenance data from transit vehicles.
METRO Light Rail OMC	Transit Garage Maintenance	The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.
METRO Light Rail OMC	Transit Garage Maintenance	The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.
METRO Light Rail OMC	Transit Garage Maintenance	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.
METRO Light Rail OMC	Transit Garage Maintenance	The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.
METRO Light Rail OMC	Transit Garage Maintenance	The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.
METRO Light Rail OMC	Transit Garage Maintenance	The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.

Element Name	Equipment Package Name	Requirement
METRO Light Rail OMC	Transit Vehicle Assignment	The center shall download vehicle assignments to the transit vehicle prior to the start of the day's operations.
METRO Light Rail OMC	Transit Vehicle Assignment	The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.
METRO Light Rail OMC	Transit Vehicle Assignment	The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.
METRO Light Rail OMC	Transit Vehicle Assignment	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.
METRO Light Rail OMC	Transit Vehicle Assignment	The center shall assign individual transit vehicles to transit blocks.
METRO Light Rail OMC	Transit Vehicle Assignment	The center shall provide an inventory management function for the transit facility that stores functional attributes about each vehicle owned by the transit operator. The functional attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.
METRO Light Rail Transit DMS	Remote Transit Information Services	The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.
METRO Light Rail Transit DMS	Remote Transit Information Services	The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.
METRO Light Rail Transit DMS	Remote Transit Information Services	The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.
METRO Light Rail Transit DMS	Remote Transit Information Services	The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.
METRO Light Rail Vehicles	On-board Maintenance	The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.
METRO Light Rail Vehicles	On-board Maintenance	The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.
METRO Light Rail Vehicles	On-board Maintenance	The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.
METRO Light Rail Vehicles	On-board Passenger Counting	The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.
METRO Light Rail Vehicles	On-board Passenger Counting	The transit vehicle shall count passengers boarding and alighting.
METRO Light Rail Vehicles	On-board Passenger Counting	The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.
METRO Light Rail Vehicles	On-board Passenger Counting	The transit vehicle shall send the collected passenger count information to the transit center.
METRO Light Rail Vehicles	On-board Schedule Management	The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.
METRO Light Rail Vehicles	On-board Schedule Management	The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.
METRO Light Rail Vehicles	On-board Schedule Management	The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.
METRO Light Rail Vehicles	On-board Schedule Management	The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.
METRO Light Rail Vehicles	On-board Schedule Management	The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.
METRO Light Rail Vehicles	On-board Schedule Management	The transit vehicle shall determine scenarios to correct the schedule deviation.
METRO Light Rail Vehicles	On-board Schedule Management	The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.
METRO Light Rail Vehicles	On-board Schedule Management	The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.
METRO Light Rail Vehicles	On-board Transit Information Services	The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.
METRO Light Rail Vehicles	On-board Transit Information Services	The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.
METRO Light Rail Vehicles	On-board Transit Information Services	The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.

Element Name	Equipment Package Name	Requirement
METRO Light Rail Vehicles	On-board Transit Information Services	The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.
METRO Light Rail Vehicles	On-board Transit Information Services	The transit vehicle shall enable yellow pages (including non-motorized transportation) information to be requested and output to the traveler.
METRO Light Rail Vehicles	On-board Transit Information Services	The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall perform authentication of the transit vehicle operator.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall accept sensor control data to allow remote control of the sensors.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.
METRO Light Rail Vehicles	On-board Transit Security	The transit vehicle shall output reported emergencies to the center.
METRO Light Rail Vehicles	On-board Transit Signal Priority	The transit vehicle shall determine the schedule deviation and estimated times of arrival (ETA) at transit stops.
METRO Light Rail Vehicles	On-board Transit Signal Priority	The transit vehicle shall send priority requests to traffic signal controllers at intersections, pedestrian crossings, and multimodal crossings on the roads (surface streets) and freeway (ramp controls) network that enable a transit vehicle schedule deviation to be corrected.
METRO Light Rail Vehicles	On-board Transit Signal Priority	The transit vehicle shall send the schedule deviation data and status of priority requests to the transit vehicle operator.
METRO Light Rail Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.
METRO Light Rail Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.
METRO Light Rail Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.
METRO Light Rail Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.
METRO Light Rail Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.
Other City and Municipal Public Works	MCM Work Activity Coordination	The center shall provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.

Element Name	Equipment Package Name	Requirement
Other City and Municipal Public Works	MCM Work Activity Coordination	The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.
Other City and Municipal Public Works	MCM Work Activity Coordination	The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.
Other City and Municipal Public Works	MCM Work Activity Coordination	The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.
Other City and Municipal Public Works	MCM Work Activity Coordination	The center shall exchange rail schedules and work plans with rail operations centers.
Other City and Municipal Public Works	MCM Work Activity Coordination	The center shall provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.
Other Local Dial-A-Ride Transit Dispatches	Transit Center Multi-Modal Coordination	The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.
Other Local Dial-A-Ride Transit Dispatches	Transit Center Multi-Modal Coordination	The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.
Other Local Dial-A-Ride Transit Dispatches	Transit Center Multi-Modal Coordination	The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.
Other Local Dial-A-Ride Transit Dispatches	Transit Center Multi-Modal Coordination	The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.
Other Police Dispatch	Emergency Call-Taking	The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.
Other Police Dispatch	Emergency Call-Taking	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
Other Police Dispatch	Emergency Call-Taking	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
Other Police Dispatch	Emergency Call-Taking	The center shall update the incident information log once the emergency system operator has verified the incident.
Other Police Dispatch	Emergency Call-Taking	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.
Other Police Dispatch	Emergency Call-Taking	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.
Other Police Dispatch	Emergency Call-Taking	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.
Other Police Dispatch	Emergency Call-Taking	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.
Other Police Dispatch	Emergency Call-Taking	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.
Other Police Dispatch	Emergency Call-Taking	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
Other Police Dispatch	Emergency Call-Taking	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
Other Police Dispatch	Emergency Dispatch	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Other Police Dispatch	Emergency Dispatch	The center shall relay location and incident details to the responding vehicles.
Other Police Dispatch	Emergency Dispatch	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.

Element Name	Equipment Package Name	Requirement
Other Police Dispatch	Emergency Dispatch	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
Other Police Dispatch	Emergency Dispatch	The center shall store and maintain the emergency service responses in an action log.
Other Police Dispatch	Emergency Dispatch	The center shall receive traffic images to support dispatch of emergency vehicles.
Other Police Dispatch	Emergency Dispatch	The center shall provide the capability to request remote control of traffic surveillance devices
Other Police Dispatch	Emergency Dispatch	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.
Other Police Dispatch	Emergency Dispatch	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
Other Police Dispatch	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
Other Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Other Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Other Police Dispatch	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
Other Police Dispatch	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
Other Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Other Police Dispatch	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
Other Police Dispatch	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
Other Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Other Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Other Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Other Police Dispatch	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.
Other Police Dispatch	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
Other Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Personal Information Devices	Personal Basic Information Reception	The personal traveler interface shall receive traffic information from a center and present it to the traveler.

Element Name	Equipment Package Name	Requirement
Personal Information Devices	Personal Basic Information Reception	The personal traveler interface shall provide the capability for digitized map data to act as the background to the information presented to the traveler.
Personal Information Devices	Personal Basic Information Reception	The personal traveler interface shall receive evacuation information from a center and present it to the traveler.
Personal Information Devices	Personal Basic Information Reception	The personal traveler interface shall present information to the traveler in audible or visual forms, consistent with a personal device.
Personal Information Devices	Personal Basic Information Reception	The personal traveler interface shall support traveler input in audio or manual form.
Personal Information Devices	Personal Basic Information Reception	The personal traveler interface shall receive wide-area alerts and present it to the traveler.
Personal Information Devices	Personal Basic Information Reception	The personal traveler interface shall receive event information from a center and present it to the traveler.
Personal Information Devices	Personal Basic Information Reception	The personal traveler interface shall receive transit information from a center and present it to the traveler.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall present information to the traveler in audible or visual forms consistent with a personal device, and suitable for travelers with hearing and vision physical disabilities.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall be able to store frequently requested or used data, including the traveler's identity, home and work locations, etc.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall receive transit information from a center and present it to the traveler upon request.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall provide digitized map data to act as the background to the information presented to the traveler.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall support payment for services, such as confirmed trip plans, tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall receive traffic information from a center and present it to the traveler upon request.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall support traveler input in audio or manual form.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall accept reservations for confirmed trip plans.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall receive wide-area alerts and present it to the traveler.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall receive evacuation information from a center and present it to the traveler.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall receive event information from a center and present it to the traveler upon request.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.
Personal Information Devices	Personal Interactive Information Reception	The personal traveler interface shall provide an interface through which credit identity, stored credit value, or traveler information may be collected from a traveler card being used by a traveler with a personal device.

Element Name	Equipment Package Name	Requirement
Phoenix Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
Phoenix Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall provide data from an ITS archive to federal, state, or local government reporting systems.
Phoenix Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall provide the capability to select data from an ITS archive for use in government reports.
Phoenix Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall provide the capability to format data from an ITS archive suitable for input into government reports.
Phoenix Dial-A-Ride Archived Data Server	Government Reporting Systems Support	The center shall support requests for ITS archived data from Government Reporting Systems.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall include capabilities for performing quality checks on the incoming archived data.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall perform quality checks on received data.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall collect data to be archived from one or more data sources.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall include capabilities for error notification on the incoming archived data.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall respond to requests from the administrator interface function to maintain the archive data.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall include capabilities for archive to archive coordination.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.
Phoenix Dial-A-Ride Archived Data Server	ITS Data Repository	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.
Phoenix Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall use the status information to adjust the collection of traffic and roadside data.
Phoenix Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall record the status about the imported traffic and roadside data.
Phoenix Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.

Element Name	Equipment Package Name	Requirement
Phoenix Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.
Phoenix Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall collect traffic sensor information from roadside devices.
Phoenix Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall collect environmental sensor information that from roadside devices.
Phoenix Dial-A-Ride Archived Data Server	Traffic and Roadside Data Archival	The center shall manage the collection of archive data directly from collection equipment located at the roadside.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, and road network information.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support management of paratransit operations.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall dispatch demand response (paratransit) transit vehicles.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Paratransit Operations	The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall receive reports of emergencies on-board transit vehicles entered directly be the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall exchange transit incident information along with other service data with other transit agencies.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.

Element Name	Equipment Package Name	Requirement
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall receive threat information and status on the integrity of the transit infrastructure.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Security	The center shall support the back-office portion of functionality to authenticate transit vehicle operators.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall determine adherence of transit vehicles to their assigned schedule.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall provide transit operational data to traveler information service providers.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.
Phoenix Dial-A-Ride Transit Dispatch	Transit Center Vehicle Tracking	The center shall monitor the locations of all transit vehicles within its network.
Phoenix Dial-A-Ride Transit Dispatch	Transit Data Collection	The center shall be able to produce sample products of the data available.
Phoenix Dial-A-Ride Transit Dispatch	Transit Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.
Phoenix Dial-A-Ride Transit Dispatch	Transit Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
Phoenix Dial-A-Ride Transit Dispatch	Transit Data Collection	The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.
Phoenix Dial-A-Ride Transit Dispatch	Transit Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.
Phoenix Dial-A-Ride Transit Dispatch	Transit Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.
Phoenix Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.
Phoenix Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall provide transit operations personnel with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data.
Phoenix Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.
Phoenix Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.
Phoenix Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.

Element Name	Equipment Package Name	Requirement
Phoenix Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.
Phoenix Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall collect operational and maintenance data from transit vehicles.
Phoenix Dial-A-Ride Transit Dispatch	Transit Garage Maintenance	The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall download vehicle assignments to the transit vehicle prior to the start of the day's operations.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall assign individual transit vehicles to transit blocks.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall provide an inventory management function for the transit facility that stores functional attributes about each vehicle owned by the transit operator. The functional attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Assignment	The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.
Phoenix Dial-A-Ride Transit Dispatch	Transit Vehicle Operator Assignment	The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies.
Phoenix Dial-A-Ride Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.
Phoenix Dial-A-Ride Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.
Phoenix Dial-A-Ride Transit Vehicles	On-board Maintenance	The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.
Phoenix Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.
Phoenix Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.
Phoenix Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.

Element Name	Equipment Package Name	Requirement
Phoenix Dial-A-Ride Transit Vehicles	On-board Paratransit Operations	The transit vehicle shall manage data input to sensor(s) on-board a transit vehicle to determine the vehicle's availability for use in demand responsive and flexible-route transit services based on identity, type, and passenger capacity.
Phoenix Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.
Phoenix Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.
Phoenix Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.
Phoenix Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.
Phoenix Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.
Phoenix Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.
Phoenix Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.
Phoenix Dial-A-Ride Transit Vehicles	On-board Schedule Management	The transit vehicle shall determine scenarios to correct the schedule deviation.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall support the support advanced payments for tolls, and/or parking lot charges, and/or transit fares via the traveler card / payment instrument.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide fare statistics data to the center.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).

Element Name	Equipment Package Name	Requirement
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall accept sensor control data to allow remote control of the sensors.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall perform authentication of the transit vehicle operator.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Security	The transit vehicle shall output reported emergencies to the center.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.
Phoenix Dial-A-Ride Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.

Element Name	Equipment Package Name	Requirement
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall update the incident information log once the emergency system operator has verified the incident.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Call-Taking	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.
Phoenix Fire Department Regional Dispatch Center	Emergency Data Collection	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.
Phoenix Fire Department Regional Dispatch Center	Emergency Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
Phoenix Fire Department Regional Dispatch Center	Emergency Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.
Phoenix Fire Department Regional Dispatch Center	Emergency Data Collection	The center shall be able to produce sample products of the data available.
Phoenix Fire Department Regional Dispatch Center	Emergency Dispatch	The center shall store and maintain the emergency service responses in an action log.
Phoenix Fire Department Regional Dispatch Center	Emergency Dispatch	The center shall relay location and incident details to the responding vehicles.
Phoenix Fire Department Regional Dispatch Center	Emergency Dispatch	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
Phoenix Fire Department Regional Dispatch Center	Emergency Dispatch	The center shall receive traffic images to support dispatch of emergency vehicles.

Element Name	Equipment Package Name	Requirement
Phoenix Fire Department Regional Dispatch Center	Emergency Dispatch	The center shall provide the capability to request remote control of traffic surveillance devices
Phoenix Fire Department Regional Dispatch Center	Emergency Dispatch	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
Phoenix Fire Department Regional Dispatch Center	Emergency Dispatch	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.
Phoenix Fire Department Regional Dispatch Center	Emergency Dispatch	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Dispatch	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
Phoenix Fire Department Regional Dispatch Center	Emergency Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
Phoenix Fire Department Regional Dispatch Center	Emergency Environmental Monitoring	The center shall collect current road and weather information from roadway maintenance operations.
Phoenix Fire Department Regional Dispatch Center	Emergency Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.
Phoenix Fire Department Regional Dispatch Center	Emergency Environmental Monitoring	The center shall present the current and forecast road and weather information to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.

Element Name	Equipment Package Name	Requirement
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
Phoenix Fire Department Regional Dispatch Center	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
Phoenix Fire Department Regional Dispatch Center	Incident Command	The center shall assess the status of responding emergency vehicles as part of an incident command.
Phoenix Fire Department Regional Dispatch Center	Incident Command	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.

Element Name	Equipment Package Name	Requirement
Phoenix Fire Department Regional Dispatch Center	Incident Command	The center shall track and maintain resource information and action plans pertaining to the incident command.
Phoenix Fire Department Regional Dispatch Center	Incident Command	The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
Phoenix Fire Department Regional Dispatch Center	Incident Command	The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
Phoenix Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.
Phoenix Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.
Phoenix Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle, including roadway service patrols, shall compute the location of the emergency vehicle based on inputs from a vehicle location determination function.
Phoenix Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.
Phoenix Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.
Phoenix Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.
Phoenix Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall send patient status information to the care facility along with a request for further information.
Phoenix Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.
Phoenix Fire/EMS Vehicles	On-board EV En Route Support	The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.
Phoenix Police Dispatch	Center Secure Area Alarm Support	After the alarm message becomes a verified incident, the center shall determine the appropriate response.
Phoenix Police Dispatch	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.
Phoenix Police Dispatch	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).
Phoenix Police Dispatch	Center Secure Area Alarm Support	The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.
Phoenix Police Dispatch	Center Secure Area Alarm Support	After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.
Phoenix Police Dispatch	Center Secure Area Alarm Support	The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.

Element Name	Equipment Package Name	Requirement
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
Phoenix Police Dispatch	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
Phoenix Police Dispatch	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.

Element Name	Equipment Package Name	Requirement
Phoenix Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
Phoenix Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
Phoenix Police Dispatch	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
Phoenix Police Dispatch	Emergency Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.
Phoenix Police Dispatch	Emergency Environmental Monitoring	The center shall present the current and forecast road and weather information to the emergency system operator.
Phoenix Police Dispatch	Emergency Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
Phoenix Police Dispatch	Emergency Environmental Monitoring	The center shall collect current road and weather information from roadway maintenance operations.
Phoenix Police Dispatch	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
Phoenix Police Dispatch	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
Phoenix Police Dispatch	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
Phoenix Police Dispatch	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
Phoenix Police Dispatch	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
Phoenix Police Dispatch	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
Phoenix Police Dispatch	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.

Element Name	Equipment Package Name	Requirement
Phoenix Police Dispatch	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
Phoenix Police Dispatch	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Phoenix Police Dispatch	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
Phoenix Police Dispatch	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
Phoenix Police Dispatch	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
Phoenix Police Dispatch	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
Phoenix Police Dispatch	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
Phoenix Police Dispatch	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
Phoenix Police Dispatch	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
Phoenix Police Dispatch	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
Phoenix Police Dispatch	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
Phoenix Police Dispatch	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
Phoenix Police Dispatch	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
Phoenix Police Dispatch	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
Phoenix Police Dispatch	Incident Command	The center shall assess the status of responding emergency vehicles as part of an incident command.
Phoenix Police Dispatch	Incident Command	The center shall share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.
Phoenix Police Dispatch	Incident Command	The center shall track and maintain resource information and action plans pertaining to the incident command.
Phoenix Police Dispatch	Incident Command	The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
Phoenix Police Dispatch	Incident Command	The center shall provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
Phoenix Public Transit Bus Stops	Remote Transit Information Services	The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.
Phoenix Public Transit Bus Stops	Remote Transit Information Services	The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.
Phoenix Public Transit Bus Stops	Remote Transit Information Services	The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.
Phoenix Public Transit Bus Stops	Remote Transit Information Services	The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.
Phoenix Public Transit OCC	Center Secure Area Alarm Support	After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.
Phoenix Public Transit OCC	Center Secure Area Alarm Support	The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.
Phoenix Public Transit OCC	Center Secure Area Alarm Support	The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.
Phoenix Public Transit OCC	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.
Phoenix Public Transit OCC	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).

Element Name	Equipment Package Name	Requirement
Phoenix Public Transit OCC	Center Secure Area Alarm Support	After the alarm message becomes a verified incident, the center shall determine the appropriate response.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
Phoenix Public Transit OCC	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.

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Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
Phoenix Public Transit OCC	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
Phoenix Public Transit OCC	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
Phoenix Public Transit OCC	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.
Phoenix Public Transit OCC	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
Phoenix Public Transit OCC	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
Phoenix Public Transit OCC	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
Phoenix Public Transit OCC	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
Phoenix Public Transit OCC	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
Phoenix Public Transit OCC	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
Phoenix Public Transit OCC	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
Phoenix Public Transit OCC	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
Phoenix Public Transit OCC	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
Phoenix Public Transit OCC	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes

Element Name	Equipment Package Name	Requirement
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support management of fixed route operations.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall collect transit operational data for use in the generation of routes and schedules.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, operational data on current routes and schedules, and digitized map data.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall generate the necessary corrective actions which may involve more than the vehicles concerned and more far reaching action, such as, the introduction of extra vehicles, wide area signal priority by traffic management, the premature termination of some services, etc.
Phoenix Public Transit OCC	Transit Center Fixed-Route Operations	The center shall dispatch fixed route or flexible route transit vehicles
Phoenix Public Transit OCC	Transit Center Information Services	The center shall provide transit information to the media including details of deviations from schedule of regular transit services.
Phoenix Public Transit OCC	Transit Center Information Services	The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.
Phoenix Public Transit OCC	Transit Center Information Services	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.
Phoenix Public Transit OCC	Transit Center Information Services	The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.
Phoenix Public Transit OCC	Transit Center Information Services	The center shall enable yellow pages (including non-motorized transportation) information to be output to the traveler.
Phoenix Public Transit OCC	Transit Center Information Services	The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.
Phoenix Public Transit OCC	Transit Center Multi-Modal Coordination	The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.
Phoenix Public Transit OCC	Transit Center Multi-Modal Coordination	The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.
Phoenix Public Transit OCC	Transit Center Multi-Modal Coordination	The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.
Phoenix Public Transit OCC	Transit Center Multi-Modal Coordination	The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.
Phoenix Public Transit OCC	Transit Center Passenger Counting	The center shall collect passenger count information from each transit vehicle.
Phoenix Public Transit OCC	Transit Center Passenger Counting	The center shall make the compiled ridership data available to the system operator and other applications.
Phoenix Public Transit OCC	Transit Center Passenger Counting	The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.
Phoenix Public Transit OCC	Transit Center Security	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.
Phoenix Public Transit OCC	Transit Center Security	The center shall receive threat information and status on the integrity of the transit infrastructure.

Element Name	Equipment Package Name	Requirement
Phoenix Public Transit OCC	Transit Center Security	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.
Phoenix Public Transit OCC	Transit Center Security	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.
Phoenix Public Transit OCC	Transit Center Security	The center shall exchange transit incident information along with other service data with other transit agencies.
Phoenix Public Transit OCC	Transit Center Security	The center shall receive reports of emergencies on-board transit vehicles entered directly be the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.
Phoenix Public Transit OCC	Transit Center Security	The center shall support the back-office portion of functionality to authenticate transit vehicle operators.
Phoenix Public Transit OCC	Transit Center Security	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.
Phoenix Public Transit OCC	Transit Center Security	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.
Phoenix Public Transit OCC	Transit Center Vehicle Tracking	The center shall monitor the locations of all transit vehicles within its network.
Phoenix Public Transit OCC	Transit Center Vehicle Tracking	The center shall determine adherence of transit vehicles to their assigned schedule.
Phoenix Public Transit OCC	Transit Center Vehicle Tracking	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.
Phoenix Public Transit OCC	Transit Center Vehicle Tracking	The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.
Phoenix Public Transit OCC	Transit Center Vehicle Tracking	The center shall provide transit operational data to traveler information service providers.
Phoenix Public Transit OCC	Transit Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.
Phoenix Public Transit OCC	Transit Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.
Phoenix Public Transit OCC	Transit Garage Maintenance	The center shall collect operational and maintenance data from transit vehicles.
Phoenix Public Transit OCC	Transit Garage Maintenance	The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.
Phoenix Public Transit OCC	Transit Garage Maintenance	The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.
Phoenix Public Transit OCC	Transit Garage Maintenance	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.
Phoenix Public Transit OCC	Transit Garage Maintenance	The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.
Phoenix Public Transit OCC	Transit Garage Maintenance	The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.
Phoenix Public Transit OCC	Transit Garage Maintenance	The center shall provide transit operations personnel with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data.
Phoenix Public Transit OCC	Transit Garage Maintenance	The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.
Phoenix Public Transit OCC	Transit Vehicle Assignment	The center shall provide an inventory management function for the transit facility that stores functional attributes about each vehicle owned by the transit operator. The functional attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.
Phoenix Public Transit OCC	Transit Vehicle Assignment	The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.
Phoenix Public Transit OCC	Transit Vehicle Assignment	The center shall download vehicle assignments to the transit vehicle prior to the start of the day's operations.
Phoenix Public Transit OCC	Transit Vehicle Assignment	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.

Element Name	Equipment Package Name	Requirement
Phoenix Public Transit OCC	Transit Vehicle Assignment	The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.
Phoenix Public Transit OCC	Transit Vehicle Assignment	The center shall assign individual transit vehicles to transit blocks.
Phoenix Public Transit OCC	Transit Vehicle Operator Assignment	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.
Phoenix Public Transit OCC	Transit Vehicle Operator Assignment	The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies.
Phoenix Public Transit OCC	Transit Vehicle Operator Assignment	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.
Phoenix Public Transit OCC	Transit Vehicle Operator Assignment	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.
Phoenix Public Transit OCC	Transit Vehicle Operator Assignment	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.
Phoenix Public Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.
Phoenix Public Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.
Phoenix Public Transit Vehicles	On-board Maintenance	The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.
Phoenix Public Transit Vehicles	On-board Passenger Counting	The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.
Phoenix Public Transit Vehicles	On-board Passenger Counting	The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.
Phoenix Public Transit Vehicles	On-board Passenger Counting	The transit vehicle shall count passengers boarding and alighting.
Phoenix Public Transit Vehicles	On-board Passenger Counting	The transit vehicle shall send the collected passenger count information to the transit center.
Phoenix Public Transit Vehicles	On-board Schedule Management	The transit vehicle shall determine scenarios to correct the schedule deviation.
Phoenix Public Transit Vehicles	On-board Schedule Management	The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.
Phoenix Public Transit Vehicles	On-board Schedule Management	The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.
Phoenix Public Transit Vehicles	On-board Schedule Management	The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.
Phoenix Public Transit Vehicles	On-board Schedule Management	The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.
Phoenix Public Transit Vehicles	On-board Schedule Management	The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.
Phoenix Public Transit Vehicles	On-board Schedule Management	The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.
Phoenix Public Transit Vehicles	On-board Schedule Management	The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall support the support advanced payments for tolls, and/or parking lot charges, and/or transit fares via the traveler card / payment instrument.
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.

Element Name	Equipment Package Name	Requirement
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide fare statistics data to the center.
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.
Phoenix Public Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.
Phoenix Public Transit Vehicles	On-board Transit Information Services	The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.
Phoenix Public Transit Vehicles	On-board Transit Information Services	The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.
Phoenix Public Transit Vehicles	On-board Transit Information Services	The transit vehicle shall enable yellow pages (including non-motorized transportation) information to be requested and output to the traveler.
Phoenix Public Transit Vehicles	On-board Transit Information Services	The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.
Phoenix Public Transit Vehicles	On-board Transit Information Services	The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.
Phoenix Public Transit Vehicles	On-board Transit Information Services	The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall output reported emergencies to the center.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall accept sensor control data to allow remote control of the sensors.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall perform authentication of the transit vehicle operator.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.
Phoenix Public Transit Vehicles	On-board Transit Security	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.
Phoenix Public Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.
Phoenix Public Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.
Phoenix Public Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.
Phoenix Public Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.

Element Name	Equipment Package Name	Requirement
Phoenix Public Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.
Private Traveler Information Systems	Basic Information Broadcast	The center shall disseminate event information to travelers.
Private Traveler Information Systems	Basic Information Broadcast	The center shall provide the capability to support requests from the media for traffic and incident data.
Private Traveler Information Systems	Basic Information Broadcast	The center shall disseminate toll fee information to travelers.
Private Traveler Information Systems	Basic Information Broadcast	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.
Private Traveler Information Systems	Basic Information Broadcast	The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.
Private Traveler Information Systems	Basic Information Broadcast	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
Private Traveler Information Systems	Basic Information Broadcast	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.
Private Traveler Information Systems	Basic Information Broadcast	The center shall disseminate weather information to travelers.
Private Traveler Information Systems	Basic Information Broadcast	The center shall disseminate air quality information to travelers.
Private Traveler Information Systems	Basic Information Broadcast	The center shall disseminate parking information to travelers, including location, availability, and fees.
Private Traveler Information Systems	ISP Probe Information Collection	The center shall aggregate collected traffic probe data, calculate route segment travel times, route segment speeds, and route usage, and disseminate to other centers.
Private Traveler Information Systems	ISP Probe Information Collection	The center shall collect traffic probe data (speeds, travel times, etc.) from appropriately equipped vehicles and short range communications equipment.
Private Traveler Information Systems	ISP Probe Information Collection	The center shall receive traffic probe data collected by transit fleet operators and include this data in aggregated probe data provided to other centers.
Private Traveler Information Systems	ISP Probe Information Collection	The center shall aggregate collected environmental probe data and disseminate the aggregated environmental probe data to other centers.
Private Traveler Information Systems	ISP Probe Information Collection	The center shall collect environmental probe data (air temperature, exterior light status, wiper status, traction control status, etc.) from appropriately equipped vehicles and short range communications equipment.
Private Traveler Information Systems	ISP Probe Information Collection	The center shall receive traffic probe data derived from electronic toll collection operations and include this data in aggregated probe data provided to other centers.
Private Traveler Information Systems	ISP Traveler Data Collection	The center shall collect, process, and store border crossing information.
Private Traveler Information Systems	ISP Traveler Data Collection	The center shall collect, process, and store air quality information.
Private Traveler Information Systems	ISP Traveler Data Collection	The center shall collect, process, and store event information.
Private Traveler Information Systems	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.

Element Name	Equipment Package Name	Requirement
Private Traveler Information Systems	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.
Private Traveler Information Systems	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.
Private Traveler Information Systems	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.
Private Traveler Information Systems	ISP Traveler Data Collection	The center shall collect, process, and store toll fee information.
Private Traveler Information Systems	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.
Private Vehicles	Vehicle Location Determination	The vehicle shall refine its calculations as required by other in-vehicle functions.
Private Vehicles	Vehicle Location Determination	The vehicle shall calculate the location from one or more sources of position data. These location referencing systems include position systems such as GPS, DGPS, odometer and differential odometers.
Private Vehicles	Vehicle Location Determination	The vehicle shall provide the vehicle's current location to other in-vehicle functions.
Private Vehicles	Vehicle Traffic Probe Support	The vehicle shall respond to requests from short range communications equipment for tag information that can be used to collect basic probe information; the field equipment will remove tag identities to ensure anonymity.
Private Vehicles	Vehicle Traffic Probe Support	The vehicle shall transmit collected probe data to the center.
Private Vehicles	Vehicle Traffic Probe Support	The vehicle shall record vehicle trip information (e.g., travel times, origin and destination information for vehicles that opt in) that can be used to support transportation planning.
Private Vehicles	Vehicle Traffic Probe Support	The vehicle shall track its current vehicle position, speed, and heading and record snapshots of events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.
Private Vehicles	Vehicle Traffic Probe Support	The vehicle shall transmit collected probe data to field equipment located along the roadway.
RPTA/Valley Metro Archived Data Server	Government Reporting Systems Support	The center shall provide data from an ITS archive to federal, state, or local government reporting systems.
RPTA/Valley Metro Archived Data Server	Government Reporting Systems Support	The center shall provide the capability to select data from an ITS archive for use in government reports.
RPTA/Valley Metro Archived Data Server	Government Reporting Systems Support	The center shall provide the capability to format data from an ITS archive suitable for input into government reports.
RPTA/Valley Metro Archived Data Server	Government Reporting Systems Support	The center shall support requests for ITS archived data from Government Reporting Systems.
RPTA/Valley Metro Archived Data Server	Government Reporting Systems Support	The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall include capabilities for performing quality checks on the incoming archived data.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall collect data to be archived from one or more data sources.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall include capabilities for error notification on the incoming archived data.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall respond to requests from the administrator interface function to maintain the archive data.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall perform quality checks on received data.
RPTA/Valley Metro Archived Data Server	ITS Data Repository	The center shall include capabilities for archive to archive coordination.
RPTA/Valley Metro Archived Data Server	Traffic and Roadside Data Archival	The center shall record the status about the imported traffic and roadside data.
RPTA/Valley Metro Archived Data Server	Traffic and Roadside Data Archival	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.
RPTA/Valley Metro Archived Data Server	Traffic and Roadside Data Archival	The center shall manage the collection of archive data directly from collection equipment located at the roadside.
RPTA/Valley Metro Archived Data Server	Traffic and Roadside Data Archival	The center shall use the status information to adjust the collection of traffic and roadside data.
RPTA/Valley Metro Archived Data Server	Traffic and Roadside Data Archival	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.
RPTA/Valley Metro Archived Data Server	Traffic and Roadside Data Archival	The center shall collect environmental sensor information that from roadside devices.
RPTA/Valley Metro Archived Data Server	Traffic and Roadside Data Archival	The center shall collect traffic sensor information from roadside devices.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Fare Management	The public interface for travelers shall calculate a fare based on the origin and destination provided by the traveler, in conjunction with transit routing, transit fare category, and transit user history.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Fare Management	The public interface for travelers shall provide information to the center for financial authorization and transaction processing.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Fare Management	The public interface for travelers shall accept and process current transit passenger fare collection information.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Fare Management	The public interface for travelers shall provide an interface to a transit user traveler card in support of payment for transit fares, tolls, and/or parking lot charges. The stored credit value data from the card shall be collected and updated based on the fare or other charges, or the credit identity shall be collected.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Fare Management	The public interface for travelers shall determine the routing based on the traveler's destination and the location of the closest transit stop from which a route request is being made.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Fare Management	The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Fare Management	The public interface for travelers shall create fare statistics data based upon data collected at a transit stop.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Fare Management	The public interface for travelers shall provide an image of all travelers purchasing rides or services to be used for violation processing.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Information Services	The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Information Services	The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Information Services	The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Transit Information Services	The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Traveler Security	When initiated by a traveler, the public interface for travelers shall forward a request for assistance to an emergency management function and acknowledge the request.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Traveler Security	The public interface for travelers shall accept input and provide information to the traveler in a form suitable for travelers with physical disabilities.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Traveler Security	The public interface for travelers shall provide the capability for a traveler to report an emergency and summon assistance from secure areas such as transit stops, transit stations, modal transfer facilities, rest stops, park-and-ride areas, travel information areas, and emergency pull off areas.
RPTA/Valley Metro Center Stations/Park and Rides	Remote Traveler Security	The public interface for travelers shall provide the capability to broadcast a message to advise or warn a traveler.
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Sensor Monitoring	The field element shall include security sensors that monitor conditions in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Sensor Monitoring	The field element shall be remotely controlled by a center.
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Sensor Monitoring	The field element shall provide equipment status and fault indication of security sensor equipment to a center.
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Sensor Monitoring	The field element shall include motion and intrusion detection sensors.
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Sensor Monitoring	The field element shall provide raw security sensor data.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Sensor Monitoring	The field element shall remotely process security sensor data and provide an indication of potential incidents or threats to a center.
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Sensor Monitoring	The field element shall include environmental threat sensors (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological).
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Sensor Monitoring	The field element shall include object detection sensors (such as metal detectors).
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Surveillance	The field element shall include video and/or audio surveillance of traveler secure areas including transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and traveler information centers).
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Surveillance	The field element shall remotely process video and audio data and provide an indication of potential incidents or threats to a center.
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Surveillance	The field element shall be remotely controlled by a center.
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Surveillance	The field element shall provide equipment status and fault indication of surveillance equipment to a center.
RPTA/Valley Metro Center Stations/Park and Rides	Traveler Secure Area Surveillance	The field element shall provide raw video or audio data.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Alarm Support	After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Alarm Support	The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Alarm Support	After the alarm message becomes a verified incident, the center shall determine the appropriate response.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Alarm Support	The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).
RPTA/Valley Metro Transit Dispatch	Center Secure Area Alarm Support	The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall identify potential security threats based on collected security sensor data.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall request activation of barriers and safeguards on request from center personnel.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall perform threat analysis based on correlations of security sensor and surveillance data.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall verify potential security threats by correlating security sensor data from multiple sources.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall exchange security sensor data with other emergency centers.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Sensor Management	The center shall monitor maintenance status of the security sensor field equipment.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall remotely control security surveillance devices on-board transit vehicles.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall exchange surveillance data with other emergency centers.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall monitor maintenance status of the security sensor field equipment.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.
RPTA/Valley Metro Transit Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.
RPTA/Valley Metro Transit Dispatch	Emergency Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.
RPTA/Valley Metro Transit Dispatch	Emergency Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
RPTA/Valley Metro Transit Dispatch	Emergency Data Collection	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.
RPTA/Valley Metro Transit Dispatch	Emergency Data Collection	The center shall be able to produce sample products of the data available.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall support the entry of alert and advisory information directly from the emergency system operator.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall receive incident information from other transportation management centers to support the early warning system.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.
RPTA/Valley Metro Transit Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall manage coordinated inter-agency responses to incidents at an international border.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide information to the media concerning the status of an emergency response.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
RPTA/Valley Metro Transit Dispatch	Emergency Response Management	The center shall provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall maintain a list of invalid traveler credit identities, or bad tag lists that can be forwarded to transit vehicles and transit stops or stations.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall process requests for transit fares to be paid in advance.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall provide transit fare information to other centers, including traveler information providers upon request.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall collect data on fare payment violations and send the data, including images of the violator, to the appropriate enforcement agency.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall collect fare statistics data to implement variable and flexible fare structures.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall process requests for the advanced payment of tolls and parking lot charges as well as other non-transportation services, e.g. yellow-pages services.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.
RPTA/Valley Metro Transit Dispatch	Transit Center Fare Management	The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support management of fixed route operations.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall collect transit operational data for use in the generation of routes and schedules.
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall dispatch fixed route or flexible route transit vehicles
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, operational data on current routes and schedules, and digitized map data.
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall generate the necessary corrective actions which may involve more than the vehicles concerned and more far reaching action, such as, the introduction of extra vehicles, wide area signal priority by traffic management, the premature termination of some services, etc.
RPTA/Valley Metro Transit Dispatch	Transit Center Fixed-Route Operations	The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.
RPTA/Valley Metro Transit Dispatch	Transit Center Information Services	The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.
RPTA/Valley Metro Transit Dispatch	Transit Center Information Services	The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.
RPTA/Valley Metro Transit Dispatch	Transit Center Information Services	The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.
RPTA/Valley Metro Transit Dispatch	Transit Center Information Services	The center shall provide transit information to the media including details of deviations from schedule of regular transit services.
RPTA/Valley Metro Transit Dispatch	Transit Center Information Services	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.
RPTA/Valley Metro Transit Dispatch	Transit Center Information Services	The center shall enable yellow pages (including non-motorized transportation) information to be output to the traveler.
RPTA/Valley Metro Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.
RPTA/Valley Metro Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.
RPTA/Valley Metro Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.
RPTA/Valley Metro Transit Dispatch	Transit Center Multi-Modal Coordination	The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.
RPTA/Valley Metro Transit Dispatch	Transit Center Passenger Counting	The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.
RPTA/Valley Metro Transit Dispatch	Transit Center Passenger Counting	The center shall make the compiled ridership data available to the system operator and other applications.
RPTA/Valley Metro Transit Dispatch	Transit Center Passenger Counting	The center shall collect passenger count information from each transit vehicle.
RPTA/Valley Metro Transit Dispatch	Transit Center Security	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.
RPTA/Valley Metro Transit Dispatch	Transit Center Security	The center shall support the back-office portion of functionality to authenticate transit vehicle operators.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Transit Dispatch	Transit Center Security	The center shall receive reports of emergencies on-board transit vehicles entered directly be the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.
RPTA/Valley Metro Transit Dispatch	Transit Center Security	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.
RPTA/Valley Metro Transit Dispatch	Transit Center Security	The center shall receive threat information and status on the integrity of the transit infrastructure.
RPTA/Valley Metro Transit Dispatch	Transit Center Security	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.
RPTA/Valley Metro Transit Dispatch	Transit Center Security	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.
RPTA/Valley Metro Transit Dispatch	Transit Center Security	The center shall exchange transit incident information along with other service data with other transit agencies.
RPTA/Valley Metro Transit Dispatch	Transit Center Security	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.
RPTA/Valley Metro Transit Dispatch	Transit Center Signal Priority	The center shall define business rules that govern use of transit vehicle signal priority, communicate these rules to the transit vehicle, and monitor transit vehicle requests for priority at signalized intersections.
RPTA/Valley Metro Transit Dispatch	Transit Center Signal Priority	The center shall send requests for priority along routes or at intersections to traffic management.
RPTA/Valley Metro Transit Dispatch	Transit Center Signal Priority	The center shall analyze transit vehicle schedule performance to determine the need for priority along certain routes or at certain intersections.
RPTA/Valley Metro Transit Dispatch	Transit Center Signal Priority	The center shall provide transit operations personnel with the capability to control and monitor transit signal priority operations.
RPTA/Valley Metro Transit Dispatch	Transit Center Vehicle Tracking	The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.
RPTA/Valley Metro Transit Dispatch	Transit Center Vehicle Tracking	The center shall provide transit operational data to traveler information service providers.
RPTA/Valley Metro Transit Dispatch	Transit Center Vehicle Tracking	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.
RPTA/Valley Metro Transit Dispatch	Transit Center Vehicle Tracking	The center shall monitor the locations of all transit vehicles within its network.
RPTA/Valley Metro Transit Dispatch	Transit Center Vehicle Tracking	The center shall determine adherence of transit vehicles to their assigned schedule.
RPTA/Valley Metro Transit Dispatch	Transit Data Collection	The center shall be able to produce sample products of the data available.
RPTA/Valley Metro Transit Dispatch	Transit Data Collection	The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.
RPTA/Valley Metro Transit Dispatch	Transit Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.
RPTA/Valley Metro Transit Dispatch	Transit Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
RPTA/Valley Metro Transit Dispatch	Transit Environmental Monitoring	The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.
RPTA/Valley Metro Transit Dispatch	Transit Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.
RPTA/Valley Metro Transit Dispatch	Transit Garage Maintenance	The center shall collect operational and maintenance data from transit vehicles.
RPTA/Valley Metro Transit Dispatch	Transit Garage Maintenance	The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.
RPTA/Valley Metro Transit Dispatch	Transit Garage Maintenance	The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.
RPTA/Valley Metro Transit Dispatch	Transit Garage Maintenance	The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.
RPTA/Valley Metro Transit Dispatch	Transit Garage Maintenance	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Transit Dispatch	Transit Garage Maintenance	The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.
RPTA/Valley Metro Transit Dispatch	Transit Garage Maintenance	The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.
RPTA/Valley Metro Transit Dispatch	Transit Garage Maintenance	The center shall provide transit operations personnel with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Assignment	The center shall download vehicle assignments to the transit vehicle prior to the start of the day's operations.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Assignment	The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Assignment	The center shall provide an inventory management function for the transit facility that stores functional attributes about each vehicle owned by the transit operator. The functional attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Assignment	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Assignment	The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Assignment	The center shall assign individual transit vehicles to transit blocks.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Operator Assignment	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Operator Assignment	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Operator Assignment	The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Operator Assignment	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.
RPTA/Valley Metro Transit Dispatch	Transit Vehicle Operator Assignment	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.
RPTA/Valley Metro Transit DMS	Remote Transit Information Services	The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.
RPTA/Valley Metro Transit DMS	Remote Transit Information Services	The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.
RPTA/Valley Metro Transit DMS	Remote Transit Information Services	The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.
RPTA/Valley Metro Transit DMS	Remote Transit Information Services	The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.
RPTA/Valley Metro Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.
RPTA/Valley Metro Transit Vehicles	On-board Maintenance	The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.
RPTA/Valley Metro Transit Vehicles	On-board Maintenance	The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.
RPTA/Valley Metro Transit Vehicles	On-board Passenger Counting	The transit vehicle shall send the collected passenger count information to the transit center.
RPTA/Valley Metro Transit Vehicles	On-board Passenger Counting	The transit vehicle shall count passengers boarding and alighting.
RPTA/Valley Metro Transit Vehicles	On-board Passenger Counting	The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.
RPTA/Valley Metro Transit Vehicles	On-board Passenger Counting	The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.
RPTA/Valley Metro Transit Vehicles	On-board Schedule Management	The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.
RPTA/Valley Metro Transit Vehicles	On-board Schedule Management	The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Transit Vehicles	On-board Schedule Management	The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.
RPTA/Valley Metro Transit Vehicles	On-board Schedule Management	The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.
RPTA/Valley Metro Transit Vehicles	On-board Schedule Management	The transit vehicle shall determine scenarios to correct the schedule deviation.
RPTA/Valley Metro Transit Vehicles	On-board Schedule Management	The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.
RPTA/Valley Metro Transit Vehicles	On-board Schedule Management	The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.
RPTA/Valley Metro Transit Vehicles	On-board Schedule Management	The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide fare statistics data to the center.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall support the support advanced payments for tolls, and/or parking lot charges, and/or transit fares via the traveler card / payment instrument.
RPTA/Valley Metro Transit Vehicles	On-board Transit Fare Management	The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.
RPTA/Valley Metro Transit Vehicles	On-board Transit Information Services	The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.
RPTA/Valley Metro Transit Vehicles	On-board Transit Information Services	The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.
RPTA/Valley Metro Transit Vehicles	On-board Transit Information Services	The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.
RPTA/Valley Metro Transit Vehicles	On-board Transit Information Services	The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.
RPTA/Valley Metro Transit Vehicles	On-board Transit Information Services	The transit vehicle shall enable yellow pages (including non-motorized transportation) information to be requested and output to the traveler.
RPTA/Valley Metro Transit Vehicles	On-board Transit Information Services	The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall accept sensor control data to allow remote control of the sensors.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.

Element Name	Equipment Package Name	Requirement
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall perform authentication of the transit vehicle operator.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall output reported emergencies to the center.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.
RPTA/Valley Metro Transit Vehicles	On-board Transit Security	The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.
RPTA/Valley Metro Transit Vehicles	On-board Transit Signal Priority	The transit vehicle shall send the schedule deviation data and status of priority requests to the transit vehicle operator.
RPTA/Valley Metro Transit Vehicles	On-board Transit Signal Priority	The transit vehicle shall send priority requests to traffic signal controllers at intersections, pedestrian crossings, and multimodal crossings on the roads (surface streets) and freeway (ramp controls) network that enable a transit vehicle schedule deviation to be corrected.
RPTA/Valley Metro Transit Vehicles	On-board Transit Signal Priority	The transit vehicle shall determine the schedule deviation and estimated times of arrival (ETA) at transit stops.
RPTA/Valley Metro Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.
RPTA/Valley Metro Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.
RPTA/Valley Metro Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.
RPTA/Valley Metro Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.
RPTA/Valley Metro Transit Vehicles	On-board Transit Trip Monitoring	The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.
Town of Gilbert CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
Town of Gilbert CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
Town of Gilbert CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
Town of Gilbert CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
Town of Gilbert CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
Town of Gilbert CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Town of Gilbert CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
Town of Gilbert CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
Town of Gilbert CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
Town of Gilbert DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.

Element Name	Equipment Package Name	Requirement
Town of Gilbert DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
Town of Gilbert DMS	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Town of Gilbert DMS	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
Town of Gilbert DMS	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).
Town of Gilbert DMS	Roadway Traffic Information Dissemination	The field element shall include driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers, under center control.
Town of Gilbert DMS	Roadway Traffic Information Dissemination	The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).
Town of Gilbert DMS	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.
Town of Gilbert DMS	Roadway Traffic Information Dissemination	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.
Town of Gilbert TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
Town of Gilbert TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
Town of Gilbert TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
Town of Gilbert TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
Town of Gilbert TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
Town of Gilbert TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
Town of Gilbert TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
Town of Gilbert TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
Town of Gilbert TMC	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.
Town of Gilbert TMC	HRI Traffic Management	The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.
Town of Gilbert TMC	HRI Traffic Management	The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.
Town of Gilbert TMC	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.
Town of Gilbert TMC	HRI Traffic Management	The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.
Town of Gilbert TMC	HRI Traffic Management	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.
Town of Gilbert TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
Town of Gilbert TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.

Element Name	Equipment Package Name	Requirement
Town of Gilbert TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
Town of Gilbert TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
Town of Gilbert TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
Town of Gilbert TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
Town of Gilbert TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
Town of Gilbert TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
Town of Gilbert TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
Town of Gilbert TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
Town of Gilbert TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
Town of Gilbert TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.

Element Name	Equipment Package Name	Requirement
Town of Gilbert TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
Town of Gilbert TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
Town of Gilbert TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
Town of Gilbert TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
Town of Gilbert TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
Town of Gilbert TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
Town of Gilbert TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
Town of Gilbert TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
Town of Gilbert TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
Town of Gilbert TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
Town of Gilbert TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
Town of Gilbert TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
Town of Gilbert TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
Town of Gilbert TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
Town of Gilbert TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
Town of Gilbert TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
Town of Gilbert TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
Town of Gilbert TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
Town of Gilbert TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
Town of Gilbert TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
Town of Gilbert TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
Town of Gilbert TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
Town of Gilbert TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
Town of Gilbert TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
Town of Gilbert TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
Town of Gilbert TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
Town of Gilbert TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.

Element Name	Equipment Package Name	Requirement
Town of Gilbert TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
Town of Gilbert TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
Town of Gilbert TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
Town of Gilbert TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
Town of Gilbert TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
Town of Gilbert TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
Town of Gilbert TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
Town of Gilbert Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
Town of Gilbert Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Town of Gilbert Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
Town of Gilbert Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
Town of Gilbert Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
Town of Gilbert Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
Town of Gilbert Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
Town of Gilbert Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.
Town of Gilbert Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
Town of Gilbert Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
Town of Gilbert Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
Town of Gilbert Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
Town of Gilbert Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
Town of Gilbert Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
Town of Gilbert Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
Town of Gilbert Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
Town of Gilbert Traffic Signals	Standard Rail Crossing	The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.

Element Name	Equipment Package Name	Requirement
Town of Gilbert Traffic Signals	Standard Rail Crossing	The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.
Town of Gilbert Traffic Signals	Standard Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.
Town of Gilbert Traffic Signals	Standard Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).
Town of Gilbert Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.
Town of Gilbert Traffic Signals	Standard Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.
Town of Gilbert Traffic Signals	Standard Rail Crossing	The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.
Town of Gilbert Traffic Signals	Standard Rail Crossing	The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.
Town of Gilbert Traffic Signals	Standard Rail Crossing	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
Town of Gilbert Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
Town of Gilbert Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
Town of Gilbert Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
Town of Gilbert Vehicle Detectors	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
Town of Gilbert Vehicle Detectors	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
Town of Gilbert Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Town of Gilbert Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
Town of Gilbert Vehicle Detectors	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
Town of Gilbert Vehicle Detectors	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
Town of Queen Creek CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.
Town of Queen Creek CCTV	Roadway Basic Surveillance	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.
Town of Queen Creek CCTV	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.
Town of Queen Creek CCTV	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.
Town of Queen Creek CCTV	Roadway Basic Surveillance	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV) lane sensor data to the center for further analysis and storage.
Town of Queen Creek CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
Town of Queen Creek CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.

Element Name	Equipment Package Name	Requirement
Town of Queen Creek CCTV	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
Town of Queen Creek CCTV	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Town of Queen Creek TMC	Collect Traffic Surveillance	The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.
Town of Queen Creek TMC	Collect Traffic Surveillance	The center shall collect current traffic and road conditions data that is collected and shared by other centers.
Town of Queen Creek TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
Town of Queen Creek TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.
Town of Queen Creek TMC	Collect Traffic Surveillance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.
Town of Queen Creek TMC	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.
Town of Queen Creek TMC	Collect Traffic Surveillance	The center shall maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.
Town of Queen Creek TMC	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
Town of Queen Creek TMC	TMC Environmental Monitoring	The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.
Town of Queen Creek TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.
Town of Queen Creek TMC	TMC Environmental Monitoring	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
Town of Queen Creek TMC	TMC Environmental Monitoring	The center shall provide weather and road condition information to weather service providers and center personnel.
Town of Queen Creek TMC	TMC Environmental Monitoring	The center shall assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
Town of Queen Creek TMC	TMC Incident Detection	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.
Town of Queen Creek TMC	TMC Incident Detection	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.
Town of Queen Creek TMC	TMC Incident Detection	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.
Town of Queen Creek TMC	TMC Incident Detection	The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.
Town of Queen Creek TMC	TMC Incident Detection	The center shall receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.
Town of Queen Creek TMC	TMC Incident Detection	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.
Town of Queen Creek TMC	TMC Incident Detection	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.

Element Name	Equipment Package Name	Requirement
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall respond to requests from border agencies to implement special traffic control measures (e.g. lane assignments by vehicle type) on the approaches to a border crossing.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall coordinate information and controls with other traffic management centers.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
Town of Queen Creek TMC	TMC Incident Dispatch Coordination/Communication	The center shall exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
Town of Queen Creek TMC	TMC Regional Traffic Management	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.
Town of Queen Creek TMC	TMC Regional Traffic Management	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).
Town of Queen Creek TMC	TMC Signal Control	The center shall remotely control traffic signal controllers.
Town of Queen Creek TMC	TMC Signal Control	The center shall accept notifications of right-of-way requests from pedestrians.
Town of Queen Creek TMC	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.
Town of Queen Creek TMC	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.
Town of Queen Creek TMC	TMC Signal Control	The center shall implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.
Town of Queen Creek TMC	TMC Traffic Information Dissemination	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.
Town of Queen Creek TMC	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
Town of Queen Creek TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
Town of Queen Creek TMC	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).
Town of Queen Creek TMC	TMC Traffic Information Dissemination	The center shall remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.

Element Name	Equipment Package Name	Requirement
Town of Queen Creek TMC	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
Town of Queen Creek TMC	TMC Traffic Information Dissemination	The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
Town of Queen Creek TMC	TMC Traffic Information Dissemination	The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
Town of Queen Creek TMC	TMC Work Zone Traffic Management	The center shall collect fault data for the driver information systems equipment in work zones for repair.
Town of Queen Creek TMC	TMC Work Zone Traffic Management	The center shall analyze work zone images for indications of a possible incident.
Town of Queen Creek TMC	TMC Work Zone Traffic Management	The center shall collect operational status for the driver information systems equipment in work zones.
Town of Queen Creek TMC	TMC Work Zone Traffic Management	The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.
Town of Queen Creek TMC	TMC Work Zone Traffic Management	The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.
Town of Queen Creek TMC	TMC Work Zone Traffic Management	The center shall receive work zone images from a maintenance center.
Town of Queen Creek TMC	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.
Town of Queen Creek TMC	Traffic Data Collection	The center shall be able to produce sample products of the data available.
Town of Queen Creek TMC	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
Town of Queen Creek TMC	Traffic Data Collection	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
Town of Queen Creek TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.
Town of Queen Creek TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
Town of Queen Creek TMC	Traffic Maintenance	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.
Town of Queen Creek TMC	Traffic Maintenance	The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.
Town of Queen Creek TMC	Traffic Maintenance	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.
Town of Queen Creek TMC	Traffic Maintenance	The center shall collect environmental sensor operational status.
Town of Queen Creek TMC	Traffic Maintenance	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
Town of Queen Creek TMC	Traffic Maintenance	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
Town of Queen Creek Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that provide data and status information to other field element devices (such as dynamic message signs, ramp meters, traffic signals, work zone intrusion alert systems), without center control.
Town of Queen Creek Traffic Signals	Roadway Equipment Coordination	The field element shall include sensors (such as traffic, environmental, and work zone intrusion detection sensors) that receive control information from other field element devices, without center control.
Town of Queen Creek Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that provide data and status information to other field element devices (such as dynamic message signs, traffic controllers on adjacent intersections), without center control.
Town of Queen Creek Traffic Signals	Roadway Equipment Coordination	The field element shall include devices (such as arterial or freeway controllers, roadway automated treatment systems, barrier and safeguard systems, emissions or pollution systems, and work zone intrusion alert systems) that receive control information from other field element devices, without center control.
Town of Queen Creek Traffic Signals	Roadway Signal Controls	The field element shall control traffic signals at intersections and on main highways for urban and rural areas, under center control.

Element Name	Equipment Package Name	Requirement
Town of Queen Creek Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the maintenance center for repair.
Town of Queen Creek Traffic Signals	Roadway Signal Controls	The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.
Town of Queen Creek Traffic Signals	Roadway Signal Controls	The field element shall provide the capability to notify the traffic management center that a pedestrian has requested right-of-way and when the request was or will be granted (request for right-of-way).
Town of Queen Creek Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from the indicator control information.
Town of Queen Creek Traffic Signals	Roadway Signal Controls	The field element shall monitor operation of traffic signal controllers and report to the center any instances in which the indicator response does not match that expected from known indicator preemptions.
Town of Queen Creek Traffic Signals	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the controlling center.
Town of Queen Creek Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at ramp meters.
Town of Queen Creek Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at intersections, pedestrian crossings, and multimodal crossings.
Town of Queen Creek Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) priority requests from transit vehicles at intersections, pedestrian crossings, and multimodal crossings.
Town of Queen Creek Traffic Signals	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.
Town of Queen Creek Traffic Signals	Roadway Signal Priority	The field element shall respond to requests for indicator (e.g., signal) preemption requests from emergency vehicles at ramp meters.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall support on-line route guidance for drivers in vehicles.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall support on-line route guidance for specialty vehicles, such as commercial vehicles.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall generate route plans based on current or forecasted weather.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall generate route plans based on ferry, rail, air, or other multimodal transportation data.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall provide the capability for center personnel to control route calculation parameters.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used to determine vehicle and non-vehicle routes, trip planning, and on-line vehicle guidance.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall log route plans, particularly for special vehicles such as those containing hazardous materials, over-sized vehicles, or motorcades, with a traffic center.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall provide the capability for the traveler to confirm the proposed trip plan.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall use the preferences and constraints specified by the traveler in the trip request to select the most appropriate mode of transport.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall generate trips based on the use of more than one mode of transport.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall generate route plans based on current asset restrictions, such as height and weight restrictions on tunnels or bridges.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall provide the capability to provide specific pre-trip and enroute directions to travelers (and drivers), including costs, arrival times, and transfer points.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall include bicycle routes, walkways, skyways, and multi-use trails in the pre-trip and enroute directions it provides to travelers.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall generate route plans based on current and/or predicted conditions of the road network, scheduled maintenance and construction work activities, and work zone activities.

Element Name	Equipment Package Name	Requirement
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall support on-line route guidance for travelers using personal devices (such as PDAs).
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall exchange route segment information with other centers outside the area served by the local center.
Valley Metro Website	Infrastructure Provided Trip Planning	The center shall generate route plans based on transit services, including fares, schedules, and requirements for travelers with special needs.
Valley Metro Website	ISP Traveler Data Collection	The center shall collect, process, and store toll fee information.
Valley Metro Website	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.
Valley Metro Website	ISP Traveler Data Collection	The center shall collect, process, and store border crossing information.
Valley Metro Website	ISP Traveler Data Collection	The center shall collect, process, and store air quality information.
Valley Metro Website	ISP Traveler Data Collection	The center shall collect, process, and store event information.
Valley Metro Website	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.
Valley Metro Website	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.
Valley Metro Website	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.
Valley Metro Website	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.

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MAG Regional ITS Architecture

Appendix F – ITS Standards

Prepared by:

Kimley-Horn and Associates, Inc.

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ITS Standard Grouping	ITS Standard Name
AASHTO/ITE/NEMA	NTCIP C2C: NTCIP Center-to-Center Standards Group
	NTCIP C2F: NTCIP Center-to-Field Standards Group
	NTCIP 1201: Global Object Definitions
	NTCIP 1202: Object Definitions for Actuated Traffic Signal Controller (ASC) Units
	NTCIP 1203: Object Definitions for Dynamic Message Signs (DMS)
	NTCIP 1204: Object Definitions for Environmental Sensor Stations (ESS)
	NTCIP 1205: Object Definitions for Closed Circuit Television (CCTV) Camera Control
	NTCIP 1206: Object Definitions for Data Collection and Monitoring (DCM) Devices
	NTCIP 1207: Object Definitions for Ramp Meter Control (RMC) Units
	NTCIP 1208: Object Definitions for Closed Circuit Television (CCTV) Switching
	NTCIP 1209: Data Element Definitions for Transportation Sensor Systems (TSS)
	NTCIP 1210: Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters
	NTCIP 1211: Object Definitions for Signal Control and Prioritization (SCP)
AASHTO/ITE	ITE TMDD 3.0: Traffic Management Data Dictionary and Message Sets for External TMC Communications (TMDD and MS/ETMCC)
APTA	ATPA TCIP-S-001 3.0.0: Standard for Transit Communications Interface Profiles
ASTM	DSRC 915MHz: Dedicated Short Range Communication at 915 MHz Standards Group
	ASTM E2213-03: Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems
	ASTM E2468-05: Standard Practice for Metadata to Support Archived Data Management Systems
	ASTM WK7604: Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data
IEEE	IEEE IM: Incident Management Standards Group
	IEEE 1455-1999: Standard for Message Sets for Vehicle/Roadside Communications
	IEEE 1570-2002: Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection
SAE	ATIS General Use: Advanced Traveler Information Systems (ATIS) General Use Standards Group
	SAE J2735: Dedicated Short Range Communications (DSRC) Message Set Dictionary

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MAG Regional ITS Architecture

Appendix G – ITS Glossary

Prepared by:

Kimley-Horn and Associates, Inc.

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GLOSSARY TERM	DEFINITION
ADEM	Arizona Division of Emergency Management coordinates emergency services and the efforts of governmental agencies to reduce the impact of disaster on persons and property. ADEM also coordinates with the ADOT TOC to facilitate local transportation agencies management of traffic during evacuations/threats/disasters. ADEM operates the State Emergency Operations Center (SEOC).
ADOT	Arizona Department of Transportation operates and maintains the freeway network. Responsible for freeway management system devices/communications, including the 24/7 Traffic Operations Center. Supports the ALERT service to assist with traffic incidents on the freeway network. There are freeways in the east and northeast portions of the Valley that are located on Tribal lands, which requires consultation with the respective Tribal governments for operations.
ADOT TOC	ADOT Traffic Operations Center monitors State roadways 24/7/365 from one centralized location through the use of the freeway management system (cameras, detection, DMS, ramp meters). ADOT supports interagency coordination through the sharing of video feeds with other agencies.
ALERT	Arizona Local Emergency Response Team - this ADOT response service provides emergency traffic control on highways and freeways for incidents or closures. ALERT vehicles operate in the Phoenix metro area, and are dispatched in coordination with DPS and the ADOT TOC. ALERT response support is typically requested when DPS estimates a highway or highway lane will be closed for an hour or more.
ATIS	Advanced Traveler Information Systems - the MAG Region has several traveler information programs underway, many of them involving multiple partners. ADOT provides en-route information on freeways via Dynamic Message Signs, including travel times, incident/closure information, and special event information. Several cities are also implementing permanent arterial dynamic message signs to provide information about incidents or impacts on the arterial network. ADOT operates a statewide 511 service, which includes a web-based tool (www.az511.gov). Other key traveler information initiatives include a PDA/mobile portal for freeway conditions, travel time screens at the Phoenix Sky Harbor Rental Car center, and partnerships with the private sector to gather data and disseminate it to the public.
AZTech™	AZTech™ is a consortium of federal, state, local agencies, and private sector partners within the Phoenix metropolitan area. Core members include transportation and transit agencies, fire departments, police departments, and emergency management agencies. AZTech™ also includes private sector partners that provide services related to advanced travel information systems (ATIS), transportation consultants, and public sector supporting agencies (for example, telecommunication departments and public information officers). The Executive Committee meets every two months while the Operations Committee, ATIS, and other groups meet monthly.
BRT	Bus Rapid Transit is a rapid transit service designed to efficiently move travelers along a specific route through signal priority and coordination with existing express bus route services. BRT is planned to provide connectivity to the METRO Light Rail system for multi-modal travel options to the public.
CAD	Computer-Aided Dispatch is used by law enforcement and public safety agencies such as DPS and Phoenix Fire to record incident information and support dispatching operations and status of incidents. The ADOT TOC and the MCDOT TMC are able to view the DPS and Phoenix Fire CAD incident logs specific to traffic management but are not able to enter or manipulate any information on the two systems.

GLOSSARY TERM	DEFINITION
Camera Cameleon	This is a software system that allows agencies the ability to control IP and analog video camera systems via a server-server or client-server network. This system works with many cameras and can be accessed by public agencies that are connected to the server to view cameras on the server. ADOT has implemented the Camera Cameleon system in its TOC and many agencies have connected to the server for access to cameras viewable from that server. Camera Cameleon is also used to control DMS under authority of the statewide licensing agreement as is being done with the City of Phoenix.
CCTV	A system, which uses video cameras to provide visual surveillance of the freeway or arterial transportation system.
CENS	The Community Emergency Notification System (CENS) is a rapid notification system used to contact the public by telephone during times of emergency. A reverse 911 system, residents receive a recorded message in English and Spanish notifying them of the nature of the emergency, and what steps they should take to eliminate risks associated with the emergency. Any public safety agency in Maricopa County can activate the system, which will be used only for emergency incidents that pose a danger to life or property. Potential uses include emergencies such as major fires, floods, public safety threats, hazardous materials spills, police incidents, and endangered children or elderly persons.
Center Subsystem	Provides management, administrative and support functions for the transportation system. The center subsystems each communicate with other centers to enable coordination between modes and across jurisdictions. Examples of this subsystem include Traffic Operations Centers, Emergency Operations Centers, and Police/Fire Dispatch Centers.
Communications	A system for communicating information from one location to another.
C2C	Center-to-Center - The C2C System does not provide any physical links between centers or agencies, but instead establishes the protocols that the various software platforms within each of the centers will use to exchange information over the RCN or other networks. This system will facilitate the sharing of traffic signal timing (initially) and in the future is planned to support DMS, CCTV and potentially other information sharing in the MAG Region.
Detector	A device for sensing vehicles and collecting traffic data. Vehicle detection in the MAG Region includes inductive loop sensors, passive acoustic detectors, video image detection sensors, and other forms which transmit information to the traffic signal controller and then potentially back to a TMC.
DMS	Dynamic Message Signs, which provide en-route information on freeways and arterials. ADOT deploys and operates signs on the freeway network, and City and County partners deploy and operate arterial message signs. These are used by local agencies to provide information about incidents, closures, planned construction activity, travel times, AMBER Alerts, special event traffic information, and other advisory messages.
DPS	The Arizona Department of Public Safety is the state highway patrol that is responsible for ensuring the safe and expeditious use of the highway transportation system for the public and to provide assistance to local and county law enforcement agencies.
Element	This is the basic building block of a Regional ITS Architecture. It is the name used by stakeholders to describe a system or piece of a system.
EMS	Emergency Medical Service which includes the dispatch and vehicles that respond to emergency calls for medical services. In this architecture, EMS represents the local fire and other responder vehicles that respond to incidents on the transportation network.

GLOSSARY TERM	DEFINITION
EOC	An Emergency Operations Center is a center that is operational during emergencies to manage the distribution of local services and resources to respond to and recover from a man-caused or natural event of significant impact to the region. EOCs typically inform the TMCs of traffic operations needed during emergencies. In a few cases, EOCs may be collocated with their associated TMC/TOC. The State, Maricopa County and cities each operate an EOC.
Equipment Package	Equipment packages are the building blocks of the physical architecture subsystems. Equipment Packages group similar processes of a particular subsystem together into an "implementable" package. The grouping also takes into account the user services and the need to accommodate various levels of functionality. The equipment packages were used as a basis for estimating deployment costs (as part of the evaluation that was performed). Since equipment packages are both the most detailed elements of the physical architecture view of the National ITS Architecture and tied to specific market packages, they provide the common link between the interface-oriented architecture definition and the deployment-oriented market packages.
Field Subsystem	Intelligent infrastructure distributed along the transportation network which perform surveillance, information gathering, and information dissemination whose operation is governed by the center subsystem. Examples of this subsystem include traffic signals, CCTV cameras, DMS, vehicle detection and flood sensors.
FHWA	Federal Highway Administration - An agency of the United States Department of Transportation that funds highway planning and programs.
FMS	ADOT's Freeway Management System - Primary components of the FMS include detection, CCTV surveillance, DMS for traveler information, and ramp meters. Fiber telecommunications provides the communications and control infrastructure for ADOT staff to monitor and implement management and control strategies from the ADOT TOC.
FSP	Arizona DPS operates the Freeway Service Patrol, which is a roving patrol that assists stranded motorists, can help with changing tires, making minor repairs, calling a tow truck, helping move a disabled vehicle to the shoulder, or removing debris from the roadway. The FSP also assists officers at collision scenes or during closures.
Functional Requirement	A statement that specifies what a system must do. The statement should use formal "shall" language and specify a function in terms that the stakeholders, particularly the system implementers, will understand. Functional requirements focus on the high-level requirements that support regional integration.
HCRS	Highway Condition Reporting System - ADOT's statewide closure and restriction information central server. HCRS is essentially an internal multi-agency information sharing system, but the information entered into HCRS (planned closures, special events, incidents, advisories) is used to populate the public website (www.az511.gov) and the 511 phone system. Initially designed for ADOT to input information about planned closures and restrictions, the system has been expanded to include key arterials in the Phoenix metropolitan area, and to be web-based to allow other authorized users (such as counties and cities) to enter information about impacts on arterial corridors.
Information Flow	Information that is exchanged between centers-centers, center-devices, and devices-devices in the physical architecture view of the National ITS Architecture. Information flows are the primary tool that is used to define the Regional ITS Architecture interfaces.
Inventory	A collection of all ITS-related elements in a Regional ITS Architecture.

GLOSSARY TERM	DEFINITION
ITS	Intelligent Transportation System is defined as the electronics, communications or information processing that uses an integrated approach to improve the efficiency or safety of surface transportation. Some examples of ITS are ramp metering, dynamic message signs, CCTV monitoring systems, and traffic signal systems.
ITS Architecture	Defines an architecture of interrelated systems that work together to deliver transportation services. An ITS architecture defines how systems functionally operate and the interconnection of information exchanges that must take place between these systems to accomplish transportation services.
ITS Project	Any project that in whole or in part funds the acquisition of technologies or systems of technologies that provide or significantly contribute to the provision of one or more ITS user services.
Logical Architecture	The logical architecture view of the National ITS Architecture defines what has to be done to support the ITS user services. It defines the processes that perform ITS functions and the information or data flows that are shared between these processes. The logical architecture is not technology specific, nor does it dictate a particular implementation. This implementation independence makes the logical architecture accommodating to innovation, scalable from small scale implementations to large regional systems, and supportive of widely varied system designs.
MAG	Maricopa Association of Governments - A council of governments that serves as the metropolitan planning organization for the Phoenix metropolitan area. MAG serves as the principal planning agency for the region in transportation, air quality, water quality, and solid waste management. MAG also develops population estimates and projections for the region.
MAG TAG	The MAG Telecommunications Advisory Group was formed to encourage the development of telecommunication infrastructure and applications which increase multiagency cooperation and improves access to public information by travelers.
Market Package	The market packages provide an accessible, service-oriented perspective to the National ITS Architecture. They are tailored to fit, separately or in combination, real world transportation problems and needs. Market packages collect together one or more equipment packages that must work together to deliver a given transportation service and the architecture flows that connect them and other important external systems. In other words, they identify the pieces of the physical architecture that are required to implement a particular transportation service.
MCDOT	Maricopa County Department of Transportation operates and manages arterials in unincorporated areas of the Maricopa County region including CCTV, DMS, and traffic signals as well as having shared control of ITS devices in two cities for multi-jurisdictional corridor management. MCDOT operates and manages the REACT program and facilitates the development of regional systems including RADS and Arterial ATIS.
MCSO	Maricopa County Sheriff's Office is the public safety and law enforcement on arterials within unincorporated Maricopa County and agencies for which it is contracted.
METRO Light Rail	METRO Light Rail is the name for Valley Metro Rail Inc., a nonprofit, public corporation charged with the design, construction and operation of the Metropolitan Phoenix Valley's light rail system, which launched December 27, 2008.
National ITS Architecture	A common, established framework for developing integrated transportation systems. The National ITS Architecture is comprised of the logical architecture and the physical architecture, which satisfy a defined set of user service requirements. The National ITS Architecture is maintained by the United States Department of Transportation (USDOT).

GLOSSARY TERM	DEFINITION
Operations Control Center	Phoenix Public Transit/Valley Metro manages all of the transit routes from the Phoenix Transit Operations Control Center (OCC) in downtown Phoenix. The OCC is capable of directing, communicating and monitoring the performance of the scheduled services being provided. The OCC operates seven days per week, approximately 19 hours per day.
Physical Architecture	The physical architecture is the part of the National ITS Architecture that provides agencies with a physical representation (though not a detailed design) of the important ITS interfaces and major system components. It provides a high-level structure around the processes and data flows defined in the logical architecture. The principal elements in the physical architecture are the subsystems and architecture flows that connect these subsystems and terminators into an overall structure. The physical architecture takes the processes identified in the logical architecture and assigns them to subsystems.
PIO	A Public Information Officer represents the agencies and systems used to disseminate traffic, roadway construction and transit information to the general public. These can be websites, interactive voice response systems, personnel, etc.
PIR	Phoenix International Raceway is a special event that has been the focus of developing special traffic management plans for multi-agency coordination.
PSAP	Public Safety Answering Point - designated receiving point for 911 calls for emergency assistance. The MAG Region includes numerous PSAPs, which include city and state police, fire, and tribal police. PSAPs will receive 911 calls, and route them to the appropriate emergency response agency.
Public Agency Video Distribution System	This program is being led by MCDOT and will facilitate the sharing of CCTV camera images managed by transportation management agencies throughout the Phoenix metro area with public safety agencies such as the Department of Public Safety, Maricopa County Sheriff, Phoenix Fire Dispatch, and local public safety agencies. This program is currently in the implementation stages.
RADS	Regional Archived Data Server - The Maricopa County Regional Archived Data Server (RADS) is being designed to provide and maintain valid, classified ITS-derived data for use in transportation system planning, modeling, and real-time operation applications. RADS will collect and store data from the various systems in Maricopa County, Arizona, including the ADOT FMS, HCRS, the AZTech™ SMART Corridors, RCRS, and transit operations. The main system design goal for the system is to take ITS data from systems throughout the Phoenix metropolitan area, store the data in a centralized archive data server, and then make the data available for a variety of data users through a common Web interface. Data stored includes traffic volumes, speeds, closures, incidents, public transit operations, and other data collected by AZTech™ partner agencies.
RCN	Regional Communications Network - This concept establishes a direct fiber link between ADOT and various public sector agencies through three sub-rings (West of I-17 Region, Northeast Region, and Southeast Region). The RCN will link multiple agencies throughout the MAG Region to facilitate the sharing of traffic management information and video conferencing capabilities between all linked agencies. The RCN will consist of the conduit, fiber optic cable, routers, switches, and other communications hardware necessary to provide a path between network nodes. It is being built in phases as funding is identified and allocated.

GLOSSARY TERM	DEFINITION
RCRS	Roadway Closure and Restriction System - The Roadway Closure and Restriction System (RCRS) provides construction, maintenance and public works staffs with a single collection point for reporting all planned and actual closures, restrictions, incidents and conditions. The system encompasses a wide range of contributing factors, including traffic incidents, construction, maintenance, weather and special events. This system is being incorporated into the MCDOT ATIS system as an information sharing system for public agencies regarding arterial information. A working group comprised of representatives from the MAG ITS Committee and MAG Telecommunications Advisory Group is overseeing development and implementation.
REACT	Regional Emergency Action Coordination Team - REACT provides on-call emergency traffic management support for incidents, emergency closures, and other unplanned impacts on arterial roadways. MCDOT REACT is dispatched from the MCDOT TMC when requested by the Maricopa County Sheriff, local police, fire, or other emergency response agency, and crews are on-call 24/7. REACT provides a service that supports fast and efficient response to arterial incidents or emergency traffic management support within the corridor. In addition to the MCDOT REACT Team, the REACT program includes a response team dedicated to and located in the City of Surprise and will continue to implement dedicated teams in other cities around the Phoenix metro area.
Region	The geographical area that identifies the boundaries of the Regional ITS Architecture and is defined by and based on the needs of the participating agencies and other stakeholders.
Regional ITS Architecture	A specific, tailored framework for ensuring institutional agreement and technical integration for the implementation of ITS projects or groups of projects in a particular region. It functionally defines what pieces of the system are linked to others and what information is exchanged between them.
Rule 940	Intelligent Transportation System Architecture and Standards, Final Rule. In January, 2001, this FHWA Final Rule and Federal Transit Administration Final Policy went into effect, which requires federally-funded ITS projects (highway and transit) to conform to a regional ITS architecture (developed based on the National ITS Architecture). A second component of this Final Rule/Policy requires that ITS projects be developed using a Systems Engineering analysis.
SEOC	ADEM operates the State Emergency Operations Center which is the location where the state manages the response to state and federal level disasters. Each county in the state operates a county EOC, which if capacity is exceeded at that facility, the SEOC is activated. In non-disaster conditions, the SEOC is maintained in an operational status. Emergency plans, operating procedures, mapping systems, resource status, and staff training are maintained and exercised at the SEOC.
Sky Harbor Rental Car Center ATIS Displays	Freeway travel time information is provided on traveler information displays at the Phoenix Sky Harbor Airport Rental Car Center with an origin of the Rental Car Center to destinations throughout the Phoenix valley. This information is derived through ADOT FMS vehicle detector data that is sent to the MCDOT RADS server and calculated using specific algorithms for travel times and then the output is sent to the displays.
Stakeholder	A widely used term that notates a public agency, private organization or the traveling public with a vested interest, or a "stake" in one or more transportation elements within a Regional ITS Architecture.
Standards	Documented technical specifications to be used consistently as rules, guidelines, or definitions of characteristics for the interchange of data.

GLOSSARY TERM	DEFINITION
Subsystem	The principle structural element of the physical architecture view of the National ITS Architecture. Subsystems are individual pieces of the ITS system defined by the National ITS Architecture. Subsystems are grouped into four classes: Centers, Field, Vehicles, and Travelers. Example subsystems are the Traffic Management Subsystem, the Vehicle Subsystem, and the Roadway Subsystem. These correspond to the physical world: respectively traffic operations centers, automobiles, and cameras.
System Interconnect Diagram	The diagram summarizes the existing, planned and future ITS elements for the MAG Region in the context of a high-level physical interconnect. Boxes shaded in gray are not being used currently in the MAG Region and are not planned for the future.
Systems Engineering	A structured process for managing the total life-cycle of a system, including the final design. The final design is selected from a number of alternatives that would accomplish the same objectives and considers the total life-cycle of the project including not only the technical merits of potential solutions but also the costs and relative value of alternatives. A Systems Engineering process is required for ITS projects per the Rule 940 requirements.
Terminator	Terminators define the boundary of an architecture. Terminators represent the people, systems, and general environment that interface to ITS. The interface between terminators and the subsystems are defined, but no functional requirements are allocated to terminators.
TMC or TOC	A Traffic Management Center (or Traffic Operations Center) is a centralized location for the operations / management / control of CCTV cameras, DMS, vehicle detection and other devices deployed on the roadways in each individual jurisdiction to support traffic management operations. ADOT operates a statewide TOC and several cities as well as Maricopa County have fully operational TMCs.
Traveler	Travelers are those persons who access ITS services pre-trip or enroute including information service providers including such systems as Internet web sites (e.g. az511.gov) or the AZ511 traveler information telephone service (e.g. 5-1-1).
Turbo Architecture	A software tool used to input and manage system inventory, market packages, architecture flows and interconnects with regard to a Regional ITS Architecture.
User Service	User services document what ITS should do from the user's perspective. A broad range of users are considered, including the traveling public as well as many different types of system operators. The concept of user services allows system or project definition to begin by establishing the high level services that will be provided to address identified problems and needs.
User Service Requirement	A specific functional requirement statement of what must be done to support the ITS user services. The user service requirements were developed specifically to serve as a requirements baseline to drive National ITS Architecture development. User service requirements define the processes (the activities or functions) that are required to satisfy the user services identified and are typically phrased in "shall" statements.
Valley Metro Regional Public Transportation Authority (RPTA)	Operates and maintains the regional transit system in the Phoenix metropolitan area. Under the Valley Metro brand, the RPTA is a consortium of local governments joined to fund the Valley-wide, integrated transit system.
Vehicle Subsystem	Covers ITS related elements on vehicle platforms such as automatic vehicle location equipment and operations capabilities for portable field equipment. Examples of this subsystem include maintenance and construction vehicles, public safety vehicles and incident response vehicles.

GLOSSARY TERM	DEFINITION
VII	Vehicle Infrastructure Integration represents the roadside equipment that performs data collection and dissemination through vehicle-to-device transmission of information. A pilot project is underway in the MAG Region through the Arizona E-VII initiative to demonstrate enhanced emergency responder preemption (traffic signals and ramp meters), vehicle-to-vehicle communications, and transmit data from the responder vehicles to a TMC for dissemination through traveler information systems.