Rhode Island Department of Transportation ITS State Architecture Update

By:

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Architecture Documentation, Forms, and Diagrams:

Attachments:

Attachments B and C are currently being developed.

1. Introduction - What is an ITS Architecture?

The Intelligent Transportation Systems (ITS) Architecture is an FHWA requirement and provides a framework for the design of ITS projects. It identifies and defines the functions that must be performed by components of an ITS system and was developed to support ITS implementations over a twenty year period. It also defines where these implementations and functions reside (e.g., field installation, traffic management center, or in-vehicle), and the communications requirements, which are referred to as information flows.

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. Also, an ITS Architecture defines the interrelated systems that work together to deliver transportation services.

The purpose of this ITS Architecture Update is to maintain a record of the increasingly complex data relationships between ITS stakeholders in RI. It is important to record and document the ever growing ITS outside plant, including field equipment and additional traveler services projects.

New items such as travel times and posting of archival travel times to the RIDOT website are now part of the Transportation Management Center (TMC) operations and therefore a project within the Architecture. Items associated with the performance goals, performance measures, and targets as specified in the *"Moving Ahead for Progress in the 21st Century Act*", more commonly known as MAP-21, are also included in the Architecture.

2. Background – ITS State Architecture Update

Since the National ITS Architecture is the foundation for much of the ongoing ITS standards work, consideration of the information exchange requirements established by the Architecture today will likely facilitate the transition to incorporating standards-compliant interfaces in the future. One such requirement is conforming to MAP-21, which will require the TMC to provide both real time and historical performance measures based on traffic data.

ITS in the State of Rhode Island is constantly evolving and expanding. Over time, the TMC has adopted new technologies to collect and report data, and the ability to share this data with a growing number of agencies and individuals. Therefore, the ITS Architecture must be periodically updated to properly document these changes.

Agencies responsible for public safety recognize the utility of traffic data, including traffic images, in aiding response and management efforts. As the State's ITS footprint continues to grow, increased opportunities for inter-agency cooperation have also grown. These will also be documented and incorporated into the ITS State Architecture.

The current ITS State Architecture Update detailed in this document will build on these previous maintenance efforts and new ongoing traffic management practices, such as posting travel times and incident management training for first responders and DOT personnel.

This ITS State Architecture Update was focused on specific categories of the region's ITS systems. The update detailed in this document is not intended to be exhaustive; rather, the purpose of the update is to identify changes to ITS operations or projects and make the appropriate modifications to be included in the current ITS State Architecture Update.

3. Major Items for Scope

3.1 Boundaries

The approach to define the entire state of Rhode Island as one region is consistent with transportation operations within the state, as there is a single TMC located at the RIDOT headquarters in Providence, Rhode Island, which manages all highway related ITS assets within the state. Similarly, operations for other state agencies, such as the Rhode Island Public Transit Authority (RIPTA), with is centralized within Providence and E-911 located in Scituate.

(Note: At the time of this update, there are plans for a "Backup Operations Center" to be located at the RIDOT Maintenance Headquarters facility at 360 Lincoln Avenue, Warwick, RI.)

Rhode Island is divided into five counties, but, there are no county governments in place. The entire state is divided into municipalities, which handle all local government affairs.

As stated in earlier versions of the ITS State Architecture, the decision of RIDOT to adopt the entire state for their "regional" ITS Architecture is entirely reasonable, and satisfies the conformance requirements contained in CFR Title 23, Part 940 – Intelligent Transportation System Architecture and Standards.

3.2 Rhode Island ITS Stakeholders

- AMTRAK
- City of Cranston
- City of East Providence
- City of Johnston
- City of Lincoln
- City of Pawtucket
- City of Providence
- City of Warwick
- City of Newport
- Coast Guard
- Community College of Rhode Island (CCRI)
- ConnDOT
- COX Communications
- Department of Environmental Management
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)

- Inrix Traffic, Inc.
- Level 3 Communications
- Massachusetts Bay Transportation Authority (MBTA)
- Municipal Fire Departments
- Municipal Police Departments
- Municipal Signal Operators
- OSHEAN Communication Management
- Parking Garage Operators
- Private Ferry Service Companies
- Private Sector Truck Operators
- Private Service (Patrol) Operators
- Private Tow Truck Operators
- Private Transit Operators
- Private Traveler Information Providers
- Providence/Worcester Railroad
- Radio and TV Stations
- Rhode Island Airport Corporation, *T.F. Green Airport (PVD)*
- Rhode Island Turnpike and Bridge Authority
- Rhode Island Department of Administration (DOA)
- Rhode Island Department of Revenue, Division of Motor Vehicles
- Rhode Island Department of Administration (DOA), Office of Statewide Planning
- Rhode Island Commerce Corporation
- Rhode Island Emergency Management Agency (RIEMA) / Homeland Security
- Rhode Island National Guard
- Rhode Island State Police
- Rhode Island Department of Transportation (RIDOT)
- Rhode Island Public Transit Authority (RIPTA)
- HERE.com
- TransCom (indirectly)
- Transportation Security Administration (TSA)
- University of Rhode Island (URI)
- Verizon
- Williams Communication

There are a few points to note in regard to this stakeholder list:

- The list of stakeholders now reflects a few of the important Cities that have either an Interstate or a major highway running through its boundary. It is necessary to include them for incident management with the possibility of detours or traffic rerouting onto local roads.

- The stakeholders in this list that have been added in this Update have been <u>underlined</u>.

- The list of stakeholders includes both public sector agencies and private sector organizations.

- The list of stakeholders includes six organizations outside the state (ConnDOT, Massachusetts Highway Department, Massachusetts Bay Transportation Authority, Federal Transit Administration, Federal Highway Administration, and Transcom) because they can play a key role in managing traffic flow at the state borders, or in providing funding and oversight of ITS implementations.

- The list includes the University of Rhode Island because of its interest in transportation research, and the fact that in some ways the college campus has operational problems similar to a small city. Also, the University is in the process of developing a Control Operations Center on campus which could be used for traffic research in the future.

- The Community College of Rhode Island has been added for the accommodations for TIM training and the fact that that the Rhode Island State Police training facilities are located on the Lincoln campus.

3.3 ITS Systems Inventory Summary

Since the 2006 update, there have been several additional deployments for the RIDOT TMC which has been primarily along the Interstates within the State. These deployments consisted of new or replacement CCVE cameras and vehicle detection devices along I-95 and I-195. As these installations do not represent changes to existing Architecture data flows or interfaces, no modifications to the Architecture were warranted at the time of deployment.

Appendix A includes a complete listing of the TMC's current outside plant, or ITS elements that are managed by the TMC. These elements include the typical roadway surveillance items identified below:

- **Closed Circuit Video Equipment (CCVE),** used for surveillance of the roadway to aid in identifying congestion, disabled vehicles or accidents.

- **Dynamic Message Signs (DMS)** used to disseminate messages and travel times to the motoring public as well as mandated public service messages.

- **Radar Vehicle Detection (RVD),** used to detect and monitor traffic and speeds to be translated into travel times that are posted on the DMS as well as provide data for performance monitoring and federal reports.

- **Portable Variable Message Signs (PVMS),** used at more remote locations along the highway and State Roads, and can be moved from location to location.

- **Highway Advisory Radio (HAR),** used to complement the DMS messages and to alert drivers to adverse road conditions, special detours, road closures and emergency evacuations.

In addition to the above mentioned ITS field devices, the TMC manages the following services and equipment that aids traveling motorists:

- **RIDOT 511,** Which allows dissemination of travel updates, road conditions, and construction information over the internet and phone.

- **Travel Time Program,** displays real time travel times to motorists using DMS, and the same data is posted on the TMC website. Travel Times are calculated using RVD traffic sensors and third party sources that provide historical and real-time traffic information.

- **Interlink Travelers Assistance System (ITAS Wall),** located at the T.F. Green Airport in the pedestrian walk way at the Auto Rental section is comprised of a video cube wall that displays sixteen videos of selected segments of roadway, a map of Rhode Island, and the current RIPTA Bus Schedule and MBTA Commuter Rail schedule. The video wall is accompanied by an interactive Kiosk positioned to the right that is equipped with a printer.

As technology and the knowledge of traffic management increases, so does the development of Traffic Management strategies and devices. The following are a list of possible future traffic related ITS remedies that may be deployed in the future:

- **Highway Safety Service Patrols (Planned),** on the most congested roads, service patrols play an important role to quickly and safely remove minor obstructions before they create a more serious impact. Service patrols often independently handle less complex incidents or participate with other public safety organizations—including law enforcement, fire, emergency medical services, and towing and recovery professionals—to rapidly remove disabled vehicles and safely address more complex traffic incidents.

- **Interstate Ramp Metering,** to monitor and regulate the rate of traffic flow onto the mainline of an interstate or controlled access highway for designated access ramps, which allows a larger gap for merging traffic.

- **Lane Control Signs,** to have the ability to notify the motorist as to the best lane to use based on current traffic conditions.

- **An updated ITS Deployment Plan (currently being developed),** will contain an inventory of planned or proposed equipment or systems and this document will be adopted for inclusion into the State Architecture as an Appendix.

3.4 Operational Concepts

- The operational concept for the ITS State Architecture shall review the operational role and responsibility of the Stakeholders and their roles in the implementation and operation of ITS activities.

- For this update the Operational Concept shall take a high-level overview of the characteristics and capability of the RIDOT TMC. This shall consist of the following services:

    - Pre-trip Travel Information

- Traffic Control
- Incident Management
- Travel Demand Management
- Emergency Notification
- Amber Alert
- 511

3.5 Functional Requirements

The Functional Requirements are a list of "shall statements" that define each major function that is performed by the system, focusing on those functions that have implications for regional or state integration.

Functional Requirements describe systems defined in the systems inventory and what they must to do to address a need or provide a service. The functional requirements are high-level descriptions of what the systems will do, not detailed design requirements.

3.6 State ITS Architecture Included Projects

The list in Appendix A includes a complete listing of the "Project to Architecture" elements included in the ITS Architecture update. This list indicates the Project elements that are associated in the Architecture with the associated stakeholder, the status of each element as being either an existing element or a future planned element, and the National ITS Architecture entity that is associated with the element.

3.7 State ITS Architecture Documentation Files

State ITS Architecture Turbo documentation files contain a collection of all existing and planned interconnects between ITS Systems in the State.

While many of the ITS Architecture elements, and "Information Flows" will be unchanged since 2006, the emphasis of this update will focus on new and planned ITS Projects. With that said, the following Projects have been added for this update:

- **TMC 01 – Back-up TMC at Maintenance Headquarters (Planned)**
  - A Back-up TMC is being developed to have the ability to step in and take control of TMC resources in an event when the TMC is unavailable. The back-up TMC shall have the same capabilities and function as the Two Capitol Hill TMC.

- In addition to the normal TMC operations, the Back-up TMC would have control of the RIDOT maintenance procedures, such as coordinating winter snow operations, originate from this facility.

- **TMC 02 – Statewide Dynamic Message Sign (DMS) Project (Planned)**

  - This project shall consist of the replacement of existing, solar powered portable variable message signs (PVMS) with permanent, ground mounted dynamic message boards (DMS) along I-295, I-95, Route 6, and Route 146 throughout Rhode Island and the installation of two overhead DMS on Route 10 in Cranston, Rhode Island. The proposed DMS's will have hard wired connections for both power and communications.

- **TMC 03 – Rhode Island Congestion Management Task Force (CMTF) (Existing)**

  - The CMTF is the primary vehicle for the implementation of Rhode Island's Congestion Management Process (CMP). The CMP combines resources currently used to monitor both recurring and non-recurring congestion, with supplemental data from the Statewide Planning Program, Rhode Island Public Transit Authority (RIPTA), the Rhode Island Department of Transportation's (RIDOT) Maintenance and Design Divisions as partners and collaborators.

- **TMC 04 – Travel Time Program (Existing)**

  - Travel Time displays provide a more accurate, up to date travel time information for drivers by posting segment times to a specified destination. This will allow the motoring driver to choose their routes according to the most current traffic conditions. Travel times also reduce trip-related anxiety and help relieve traffic congestion.

- **TMC 05 - Wrong Way Driver Warning System (Planned)**

  - This system is to be installed at selected Interstate and limited access Highway exits (interchanges) to warn drivers and alert the authorities of a Wrong Way Driver.

- **TMC 06 – Safety Service Patrol (Planned – Future)**

  - The Safety Service Patrol (SSP) vehicles will continuously patrol the designated portion of highway searching for disabled vehicles in need of assistance and, upon finding such vehicles, assisting in the removal of such vehicles from the

traveled portion of the highway segment and/or providing assistance to such vehicles as quickly as possible.

4. Agency Agreement

Agreements among the different stakeholder agencies and organizations are required to realize the integration shown in the regional ITS architecture.

Each connection between systems in the regional ITS architecture represents cooperation between stakeholders and a potential requirement for an agreement.

The number of agreements and the level of formality and structure of each agreement will be determined by the agencies and organizations involved.

5. Use and Maintenance of the Architecture

Since the architecture is a living document, it must change as plans change. As ITS projects are implemented, and as the ITS needs and services evolve in the region, the Architecture should change as well.

Recommended time frame for this review and maintenance is every five years.

It has been determined that or the TMC's on-call consultant will take on the task of updating and maintaining the State ITS Architecture document and develop a change control process and report back to the local MPO (RIDOT Statewide Planning).

6. Hurricane Evacuation

As a coastal State, Rhode Island must be prepared for the ever-present threat of hurricanes. To facilitate the efficient movement of residents and visitors inland during evacuation efforts, RIDOT and the Department of Public Safety, has developed a plan that designates the communities and portions of the coast that are the most vulnerable and that should be evacuated first. The RIDOT has an evacuation plan that directs traffic along designated routes. A plan for transit services has also been established to aid those without access to personal vehicles. In addition to defined evacuation routes and transit services, communication is an integral component to any emergency evacuation plan. Reliable lines of communication that will not be compromised during an emergency situation must exist between traffic management staff and those out in the field (e.g. bus drivers, emergency response personnel, law enforcement and others) in order to coordinate the evacuation process.

The RIDOT would like to improve the existing evacuation plan by providing enhanced communication between these jurisdictions, emergency response and transportation agencies involved in the process. By providing these communication links, via radio communication and other technologies, the State can foster enhanced coordination and, in turn, improve the safety and efficiency of evacuation efforts.

7. Agency Roles and Responsibilities

As described in this section, the Rhode Island ITS Concept of Operations is broken down into regionally significant transportation services, or ITS concepts. This is done so that the agency role and responsibilities can be more clearly defined and understood. The following table provides an overview of the operational roles and responsibilities of some key stakeholders for the defined transportation services within the State.

As noted in the table “Broadcast Traveler Information”, the RIDOT Traffic Engineering Department will work closely with TMC staff to ensure coordinated data collection, information sharing, communication and system management.

Traveler Information		

Traffic Information Collection and Dissemination	RIDOT TMC	• Monitor traffic and weather using ITS field devices
		  o CCTV cameras
		  o Vehicle detectors
		  o Weather stations
		  o Temporary cameras for special events
		• Provide real-time road conditions to:
		  o Backup TMC
		  o Emergency Management Office
		  o Media (TV, radio)
		  o Traveling public (DMS, internet, emails)
		• Deploy variable message signs (VMS) to adjust speed in hazardous weather conditions
		• Provide information about planned construction/road closings via:
		  o Media
		  o Website
		  o HAR
		  o 511

Broadcast Traveler Information	RIDOT TMC and Traffic Engineering Department	• Provide real-time road conditions to:
		  o Media (TV, radio)
		  o Traveling public (DMS, internet, emails)
		• Provide information on special events to:
		  o Media (TV, radio)
		  o Traveling public (DMS, internet, emails)

	Local Emergency Response Agencies	• Provide incident / weather information to:
		  o Emergency Management Office
		  o Media (TV, radio)
		  o Traveling public (DMS, internet, emails)
		• Provide evacuation instruction to:
		  o Emergency Management Office
		  o Media (TV, radio)
		  o Traveling public (DMS, HAR, internet, emails)

	Rhode Island State Police	• Provide incident information and road closures to:
		  o Transportation Management Center (TMC)
		  o Backup TMC

Traffic Management		

Traffic Control	RIDOT TMC and Traffic Engineering Department	• Monitor traffic using ITS field devices
		  ○ CCTV camera
		  ○ Vehicle detectors

Traffic Signal Control	Traffic Engineering Department	• Implement signal coordination • Deploy technologies for adaptive/responsive traffic control

Incident Management	RIDOT TMC and Traffic Engineering Department	• Perform network surveillance
		  ○ Provide incident information to motorists via HAR / DMS / website
		  ○ Determine impact on traffic flow (lanes affected, clearance time for incident)
		• Dispatch Safety Patrol (Future – Planned) vehicles to incidents
		• Provide incident and weather information to:
		  ○ Emergency Management Office
		  ○ Media (TV, radio)
		  ○ Traveling public (DMS, HAR, internet, emails, text)
		• Provide surface road traffic information
		  ○ Emergency Management Office
		  ○ Media (TV, radio)
		  ○ Traveling public (DMS, HAR, internet, emails, text)

	Local Police	• Coordinate with EMS, fire and traffic agencies • Monitor streets within jurisdiction and provide incident information to traffic agencies • Dispatch police vehicles to incidents within jurisdiction
	Local EMS	• Coordinate with police, fire and traffic agencies • Monitor streets within jurisdiction and provide incident information to traffic agencies • Dispatch EMS vehicles to incidents within jurisdiction
	Local Fire	• Coordinate with police, EMS and traffic agencies • Dispatch Fire Department vehicles to incidents within jurisdiction
Transit Management		
Operations	RIDOT TMC and Traffic Engineering Department	• Provide road network/traffic conditions to Website • Implement transit signal priority

Transit Traveler Information	RIDOT TMC and Traffic Engineering Department	• Provide service schedule and real-time transit information using:
		  ○ Kiosks
		  ○ On-board DMS messages
		  ○ 511
		• Provide evacuation information via TMC website and emails

Emergency Management		

Operations	Rhode Island TMC and Back-up TMC	• Perform network surveillance
		  ○ Provide incident information to motorists via CCTV, HAR, DMS and website
		  ○ Determine Impact on traffic flow (lanes affected, clearance time for incident)
		• Dispatch Incident Response vehicles to incidents
		• Provide incident and weather information with emergency management
		  ○ Emergency Management Office
		  ○ Media (TV / Radio)
		  ○ Traveling public (DMS / HAR / Website)
		• Coordinate with RIEMA for emergency hurricane Evacuation
		• Implement pre-emption for emergency vehicles

	State Police	• Coordinate with EMS, fire and traffic agencies • Monitor streets within jurisdiction and provide incident information to traffic agencies • Dispatch Police vehicles to incidents within jurisdiction • Track emergency fleet vehicles • Coordinate with RIEMA for Emergency Hurricane Evacuation • Wrong Way Driver Detection Systems
	Local EMS	• Coordinate with State and Local Police • Track emergency fleet vehicles • Coordinate with RIEMA for Emergency Hurricane Evacuation
	Local Fire	• Coordinate with EMS, police and traffic agencies • Dispatch vehicles to incidents within jurisdiction • Track emergency fleet vehicles • Coordinate with RIDOT and RIEMA for Emergency Hurricane Evacuation

8. Next Step and Further Planning

If a change to the inventory, ITS services, or interfaces is required when editing a project architecture in the Turbo Architecture database, then a change is needed in the Regional ITS Architecture.

Because of the update and eventual Backup TMC implementation, the modification to TMC data flows was shifted to a short-term time-frame.

The new TMC Backup has completed preliminary design and plans are to accept project bids in mid to late 2014; however, the planned data flows will require extensive revision when the Backup TMC is finally implemented.

To Update the ITS State Architecture in the future, it is suggested that an "ITS State Architecture Update Form" be developed which can be filled out by any given Stakeholder. This can be accomplished by providing the following items:

- Information by the Stakeholder such as contact information and if this is a new Stakeholder
- Is this a new "Element" that should be included in the Architecture, and if this is existing or planned.
- Is this a new "Project" that should be part of the Architecture, also is this an active ITS Project and if it is existing or planned.
- There should be a generic change, something that may not have been considered before.

There are many forums available for educating and training transportation professionals in ITS, and not all require a formal classroom setting. One example that the FHWA has proposed are, "scanning tours", which are tours that allow for personnel to reach out to other States and municipalities to observe and learn how things may be done differently and new methods and technologies first hand.

ITS Stakeholder Questionnaire with Responses

For the ITS Architecture Update major stakeholders were identified and a questionnaire was delivered for their responses to various traffic related questions that are directly tied to the operations of the TMC and the Department.

The responses to the various questions are captured below and are to be included into this Updated ITS Architecture document and with a resounding Thank You to those who participated to the survey.

The accumulated responses are captured below; essay question responses have been eliminated with only checked responses accounted for:

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Major Stakeholders ITS Architecture Questionnaire

The Rhode Island Department of Transportation (RIDOT) Transportation Management Center (TMC) is updating the States Intelligent Transportation System (ITS) Architecture and is requesting the corporation of our major Stakeholders to reply to a questionnaire concerning current traffic issues within the State.

Along those lines, your Agency has been identified as a Major Stakeholder for the RIDOT TMC. Coordination of existing and future ITS equipment and technology implementation has been and continues to be critical to the effectiveness of the transportation network. A transportation network that can operate efficiently can and will aid commerce and add to the prosperity of the area in general.

The Stakeholder Survey

Major stakeholders were identified through the ITS Architecture Update and the responses will be considered for inclusion into the Updated ITS Architecture document. The plan is to provide a comprehensive survey questionnaire to each key stakeholder for completion and return to the TMC.

Each stakeholder is being asked to complete the questionnaire as completely as they can, if a Stakeholder feels a question is not applicable for them, then the answer should be left blank. However, responses to all survey's questions are encouraged to be answered by all stakeholders.

Agency: _____

Person Responding: _____ Title: _____

(Contact Info) Phone:_____ Email: _____

1) ***TRANSPORTATION - GENERAL***

Please identify the top three transportation problems in your area and provide a short description of the problem (please specify the location using the nearest highway, roads, bridge etc.).

a. Problem #1: _____

b. Problem #2: _____

c. Problem #3: _____

d. Please list any current agreements or memoranda of understanding that your agency has in place with any other Organizations / Agencies:

2) SIGNAL AND ROADWAY MANAGEMENT

		Yes	No	Planned
a.	*Does your agency operate any Closed Loop Signal Systems:*	1	3	___
b.	*Does your agency operate any Interconnected Signal Systems:*	___	4	___
c.	*Does your agency operate any CCTV Cameras at Intersections:*	2	2	___
d.	*Does your agency use any Vehicle Probes on Arterials:*	___	4	___
e.	*Does your agency have Central Control for Signalized Intersections:*	1	2	___
f.	*If Yes, Does your agency use Real-Time traffic adaptive control such as SCOOT/SCATS or similar:*	1	2	___
g.	*Does your agency store any Traffic Incident Data:*	2	2	___
h.	*Does your agency operate Signal preemption for Emergency Vehicles:*	1	3	___
i.	*Does your agency operate any Traffic or Signal Violation Equipment: (i.e. Red Light Running Violation)*	1	3	___
j.	*Does your agency Control and / or Collect Tolls :*	___	4	___

3) DATA MANAGEMENT

		Yes	No	Planned
a.	*Does your agency collect and store Traffic Data collected:*	2	2	___
b.	*Does your agency collect and store Emergency/Accident Data:*	2	2	___

c.	*Does your agency collect and store Construction Data:*	___	3	___
d.	*Does your agency collect and store Public Transportation Data:*	___	3	___
e.	*Does your agency collect and store Commercial Vehicle Data:*	___	3	___
f.	*Does your agency collect and store Parking Data:*	2	2	___
g.	*Does your agency collect any Weather Data:*	___	3	___
h.	*Does your organization or agency use Geographic Information Systems (GIS) for data management:*	1	2	___

4) ROADWAY MAINTENANCE AND TRANSIT OPERATIONS

		Yes	No	Planned
a.	*Does your agency operate any Maintenance Fleet Vehicles:*	2	2	___
b.	*If so, does your agency operate a Dispatch facility:*	2	2	___
c.	*Does your agency operate any in vehicle devices to monitor Maintenance Vehicle conditions:*	___	4	___
d.	*Does your agency collect environmental data by equipment located either in or nearby select roadways:*	___	4	___
e.	*Does your agency use this environmental data to become aware of hazards Such as icy conditions, high winds and fog:*	___	4	___
f.	*Does your agency use automated Roadway Deicing Systems?*	___	4	___
g.	*Does your agency manage Roadway Work Zone activities?*	1	3	___

5) ROADWAY AND TRANSIT SECURITY

		Yes	No	Planned
a.	*Does your agency operate any sensors or electronics to monitor infrastructure such as bridges, roadways or public areas for security risks:*	1	4	___
b.	*Does your agency operate any sensors or surveillance to monitor public Transit stations for potential threats:*	1	3	___

c. *If Yes, are any of these sensors or surveillance remotely controlled:* _1_ ___ ___

d. *Does your agency support disaster response and recovery, the coordination of emergency response plans, and damage assessment:* _4_ ___ ___

e. *Does your agency support evacuation of the general public from a disaster area and manage subsequent reentry to the disaster area using transportation resources:* _3_ _1_ ___

6) INCIDENT – EMERGENCY MANAGEMENT

	Yes	No	Planned
a. *Does your agency perform Computer Aided Dispatch (CAD) of emergency Vehicles:*	_2_	_2_	___
b. *Does your agency use an Automated Vehicle Location (AVL) system:*	_1_	_4_	___
c. *Does your agency have preemption at signalized intersections:*	_1_	_3_	___

7) TRANSIT OPERATIONS

1. *Please describe the Transit operation your agency operates:*

_____

	Yes	No	Planned
2. *Does your agency perform "Fixed Route" for the Vehicles:*	_1_	_3_	___
3. *Does your agency perform "Demand Responsive" for the Vehicles:*	_1_	_3_	___
4. *Does your agency use Computer Aided Dispatch (CAD) for Vehicles:*	_2_	_2_	___
5. *Does your agency directly or indirectly (i.e., thru another agency) provide transit information to the public:*	_2_	_2_	___

*If **YES**, please identify below the method(s) currently used or planned to provide transit information:*

Yes	No	Planned	
_2_	_1_	___	*Internet Web Page*

2	1	___	*Automated Notifications by Phone*
1	1	___	*Kiosks*
1	2	___	*Display/Audio in Transit Vehicles*
2	1	___	*E-mail or other direct PC communications*
2	1	___	*Electronic Displays/Audio Announcements at Transit Stops and Stations (includes video monitors)*
1	2	___	*Smart Phone APP*
1	2	___	*TV (interactive or dedicated Cable)*

	Yes	No	Planned
6. *Does your agency provide (or plan to provide) transit trip planning capabilities:*	1	3	___

*If **YES**, please identify below the method(s) currently used or planned to provide for the trip planning information:*

Yes	No	Planned	
1	1	___	*Internet*
___	2	___	*E-mail or other direct PC communications*
___	2	___	*Kiosks*
___	2	___	*Smart Phone APP*

	Yes	No	Planned
7. *Does your agency receive weather information from the National Weather Service:*	2	1	___
8. *Does your agency provide local weather forecasting:*	___	4	___

*If **YES**, please identify below the method(s) currently used or planned to use to provide trip planning information:*

Yes	No	Planned	
1	___	___	*Internet*

___ 1 ___ *E-mail or other direct PC communications*

___ 1 ___ *Kiosks*

___ 1 ___ *Smart Phone APP*

Other _____

8) GENERAL INFORMATION (For all to Complete)

	Yes	No
a. *Does your Agency currently exchange any information with other Organizations / Agencies, if **Yes** please list below:*	4	___
b. *Does your agency currently take advantage of the TMC Website, (i.e. to view CCTV Cameras, to review Performance measures). If **Yes** please describe below:*	1	3

c. *What aspect of the RIDOT TMC would you like to see more of, (i.e. more Camera coverage of Arterials, Implementation of a DOT Safety Service Patrol) please explain:*

THANK YOU FOR YOUR PARTICIPATION IN THIS SURVEY!

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Architecture Update Summary by Project

The following Project list is used as a check that each project is properly reflected in the Regional ITS Architecture. This procedure can also be used to check that the Regional ITS Architecture is correct.

Architecture Type	Name	Description	Timeframe	Status	Geographic Scope	Service Scope	Developer	Maintainer	Version	Revision Date
1. Region	Rhode Island State Architecture	Rhode Island State Architecture - Created May 2001	Update complete in 2014	N/A	Statewide Architecture		Update by Jacobs	TMC		
2. Project	TMC 01 - Back-Up TMC at Mainteniance Headquarters	A Back-up TMC is being developed to have the ability to step in and take control of TMC resources in an event when the TMC is unavailable. The back-up TMC shall have the same capabilities and function as the One Capital Hill TMC currently has. Advantage that the Back-up TMC would have is that all of the RIDOT maintenance procedures, such as coordinating winter snow operations, originate from this facility.	2014	Planned	This would be a Back-up TMC to the Statewide TMC located at 2 Capitol Hill, Providence, RI..		Jacobs for RIDOT	RIDOT		3/3/2014 10:25:00 AM
2. Project	TMC 02 - Statewide Dynamic Message Sign (DMS) Project	This project shall consist of the replacement of existing, solar powered portable variable message signs (PVMS) with permanent, ground mounted dynamic message boards (DMS) along I-295, I-95, Route 6, and Route 146 throughout Rhode Island and the installation of two overhead DMS on Route 10 in Cranston, Rhode Island. The proposed DMS's will have hard wired connections for both power and communications.	2014	Planned	Statewide		PARE / Jacobs for RIDOT	RIDOT TMC		4/9/2014 9:32:00 AM

Architecture Summary

Architecture Type	Name	Description	Timeframe	Status	Geographic Scope	Service Scope	Developer	Maintainer	Version	Revision Date
2. Project	TMC 03 - Rhode Island Congestion Management Task Force (CMTF)	The CMTF is the primary vehicle for the implementation of Rhode Island's Congestion Management Process (CMP). The CMP combines resources currently used to monitor both recurring and non-recurring congestion, with supplemental data from the Statewide Planning Program, Rhode Island Public Transit Authority (RIPTA), the Rhode Island Department of Transportation's (RIDOT) Maintenance and Design Divisions as partners and collaborators.	2013	Existing	Statewide		RIDOT TMC	TMC		4/9/2014 10:02:00 AM
2. Project	TMC 04 - Travel Time Program	Travel Time displays provide a more accurate, up to date travel time information for drivers by posting segment times or time to a specified destination. This will allow the motoring driver to choose their routes according to the most current traffic conditions. Travel times also reduce trip-related anxiety and helps relieve traffic congestion.	Program began in 2013	Existing	Statewide		Jacobs for RIDOT	TMC		4/29/2014 1:59:00 PM
2. Project	TMC 05 - Wrong Way Driver Warning System	This system is to be installed at selected Interstate and limited access Highway exits (interchanges) to warn drivers and alert the authorities of a Wrong Way Driver.	Construction to begin in 2014	Planned	Statewide at selected Interchanges		Jacobs for RIDOT	RIDOT		5/8/2014 2:03:00 PM
2. Project	TMC 06 - Safety Service Patrols	The Safety Service Patrol (SSP) vehicles will continuously patrol the designated portion of highway searching for disabled vehicles in need of assistance and, upon finding such vehicles, assisting in the removal of such vehicles from the traveled portion of the highway segment and/or providing assistance to such vehicles as quickly as possible.	Future	Planned	Major congested portions of the Interstates I-95 and I-195, including portions of SR 4.		RIDOT TMC	TMC		6/4/2014 1:17:00 PM

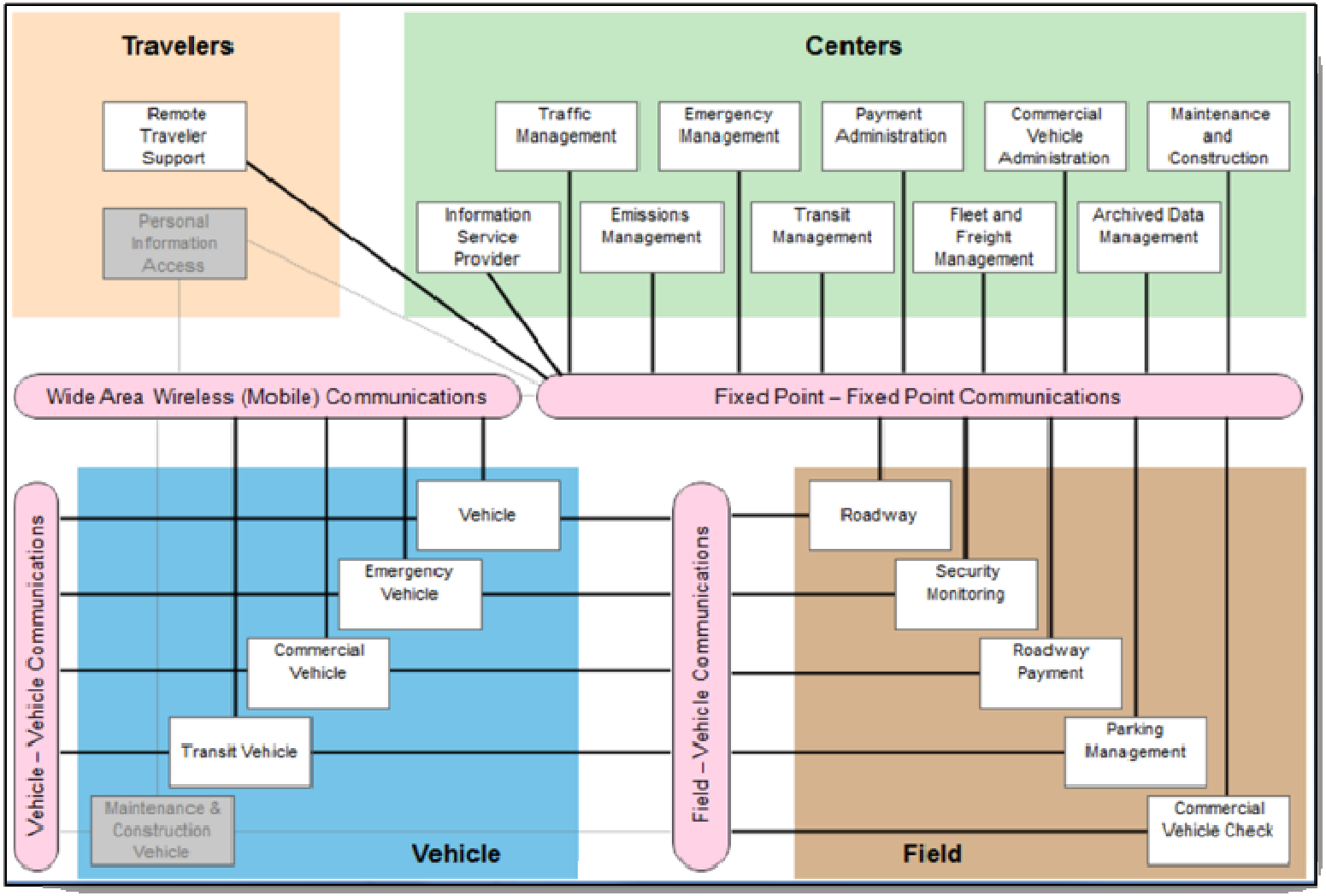

Figure RI-S1 - Rhode Island ITS State Architecture Subsystem

Back-Up TMC Flow Diagram is too large for this document

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Figure Back-Up TMC-F1 – Back-up TMC Flow Diagram

Back-Up TMC Interconnect Diagram is too large for this document

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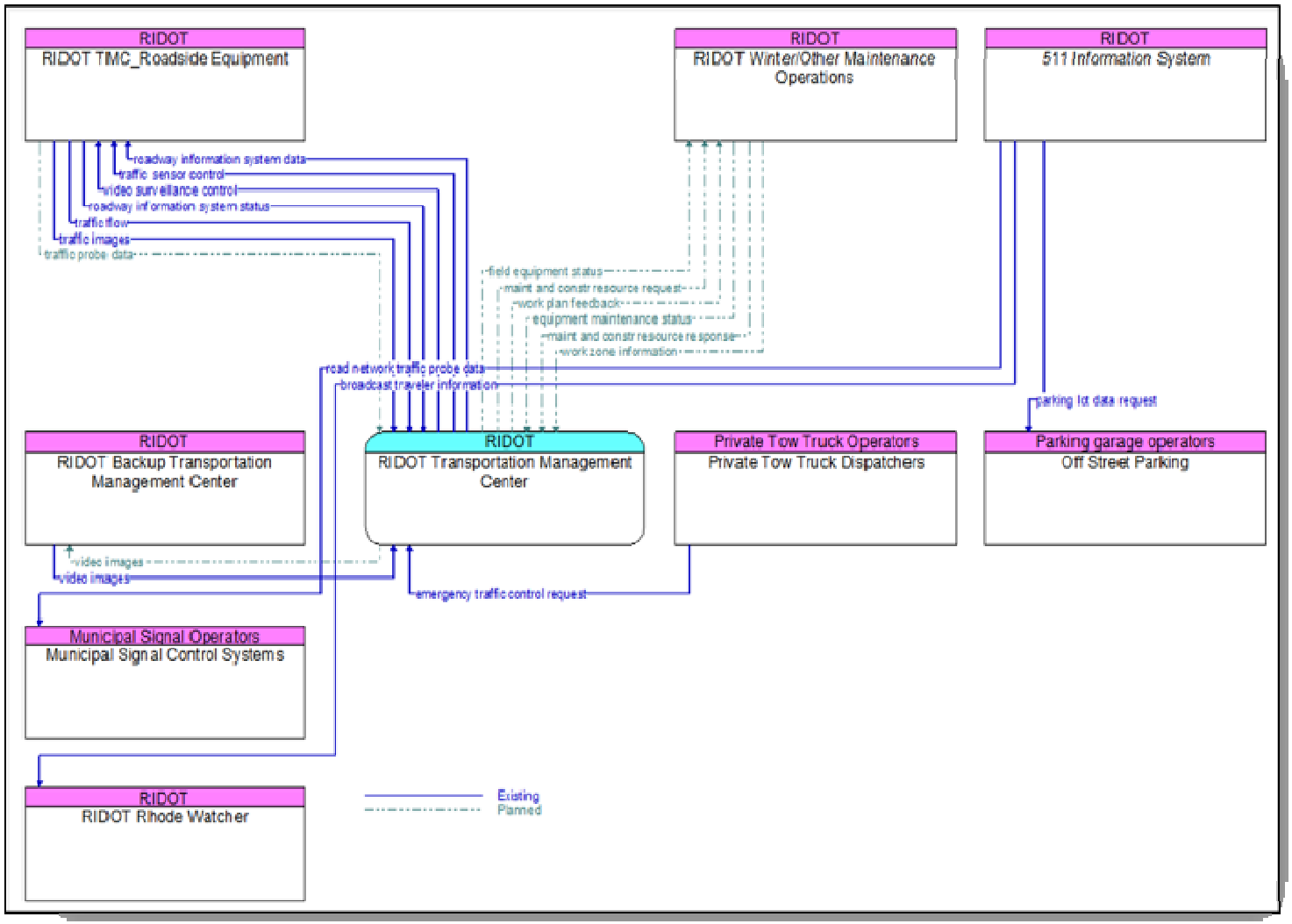
Figure Back-Up TMC-I1 – Back-up TMC Interconnect Diagram



<u>Figure DMS-F1</u> – Statewide DMS Flow Diagram

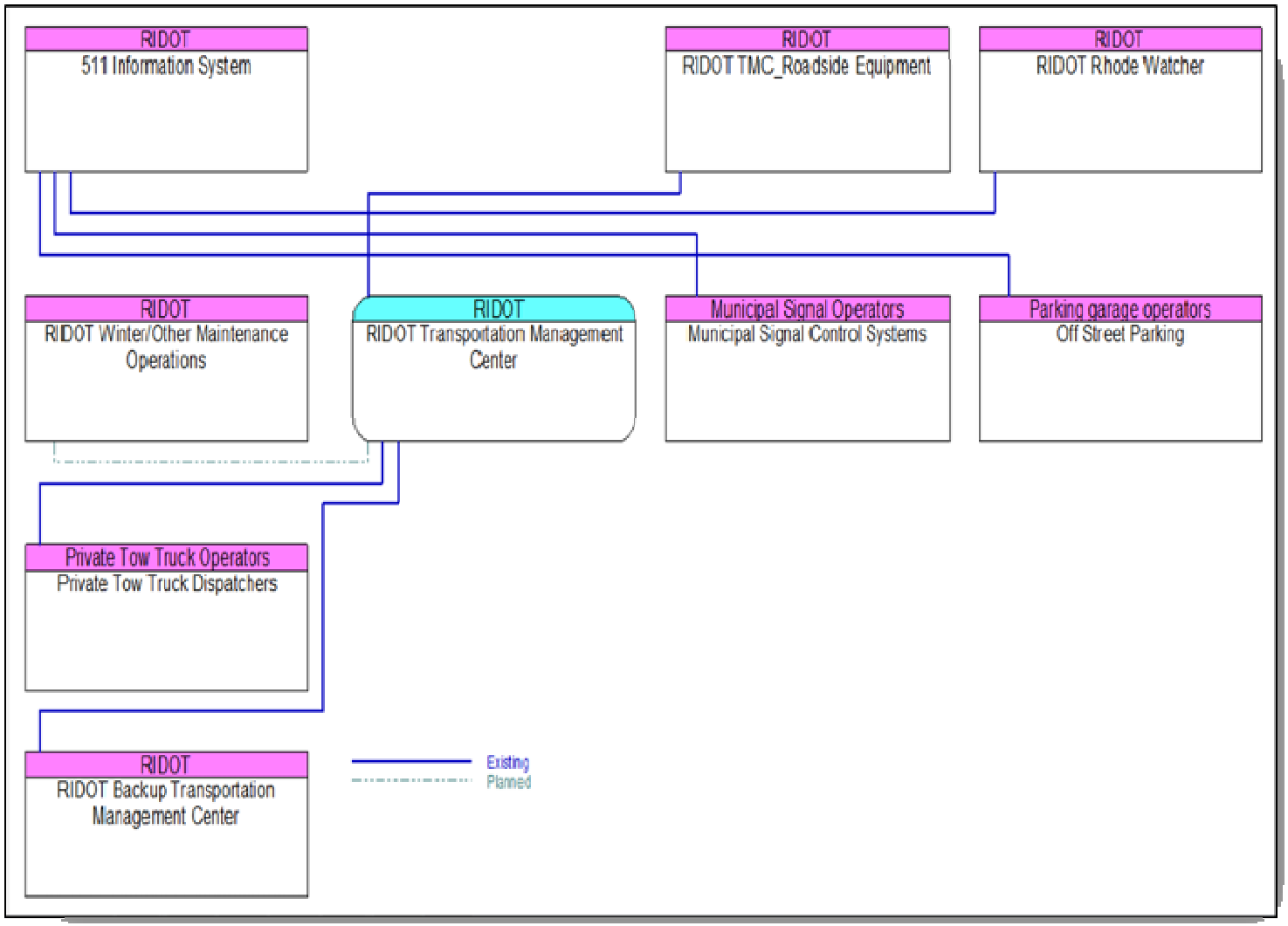
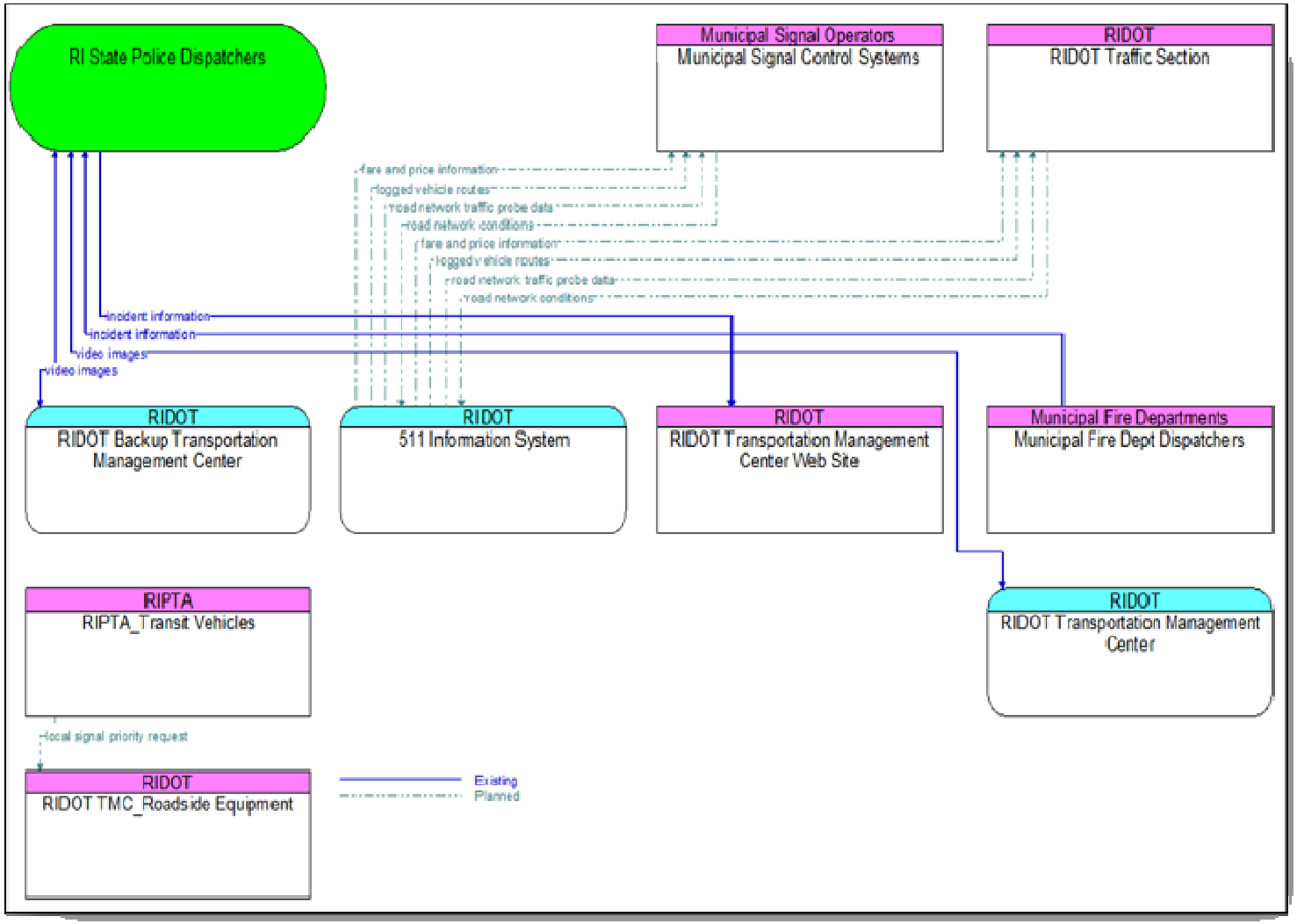


Figure DMS-I1 – Statewide DMS Interconnect Diagram



<u>Figure CM-F1</u> – Congestion Management Task Force Flow Diagram

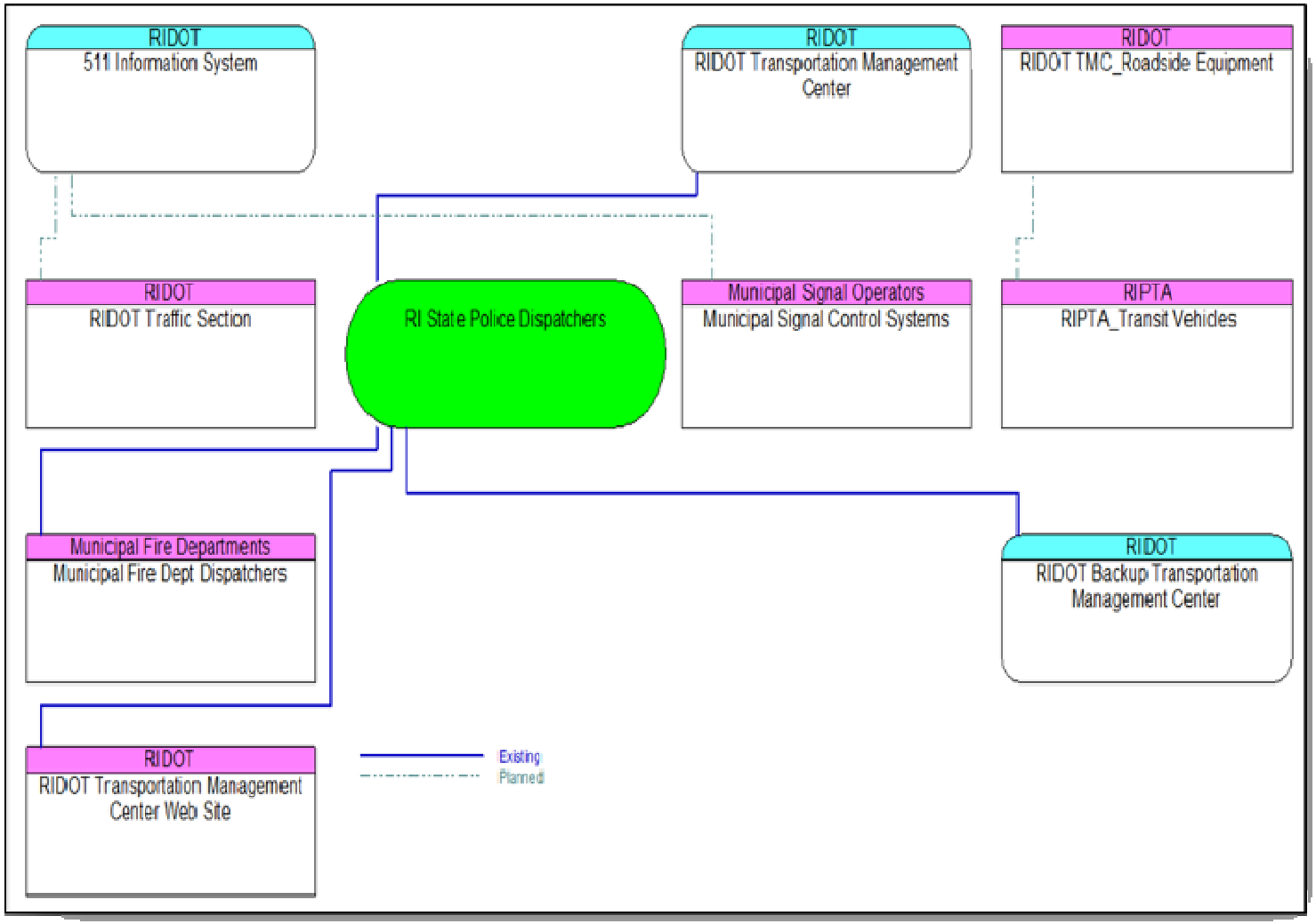
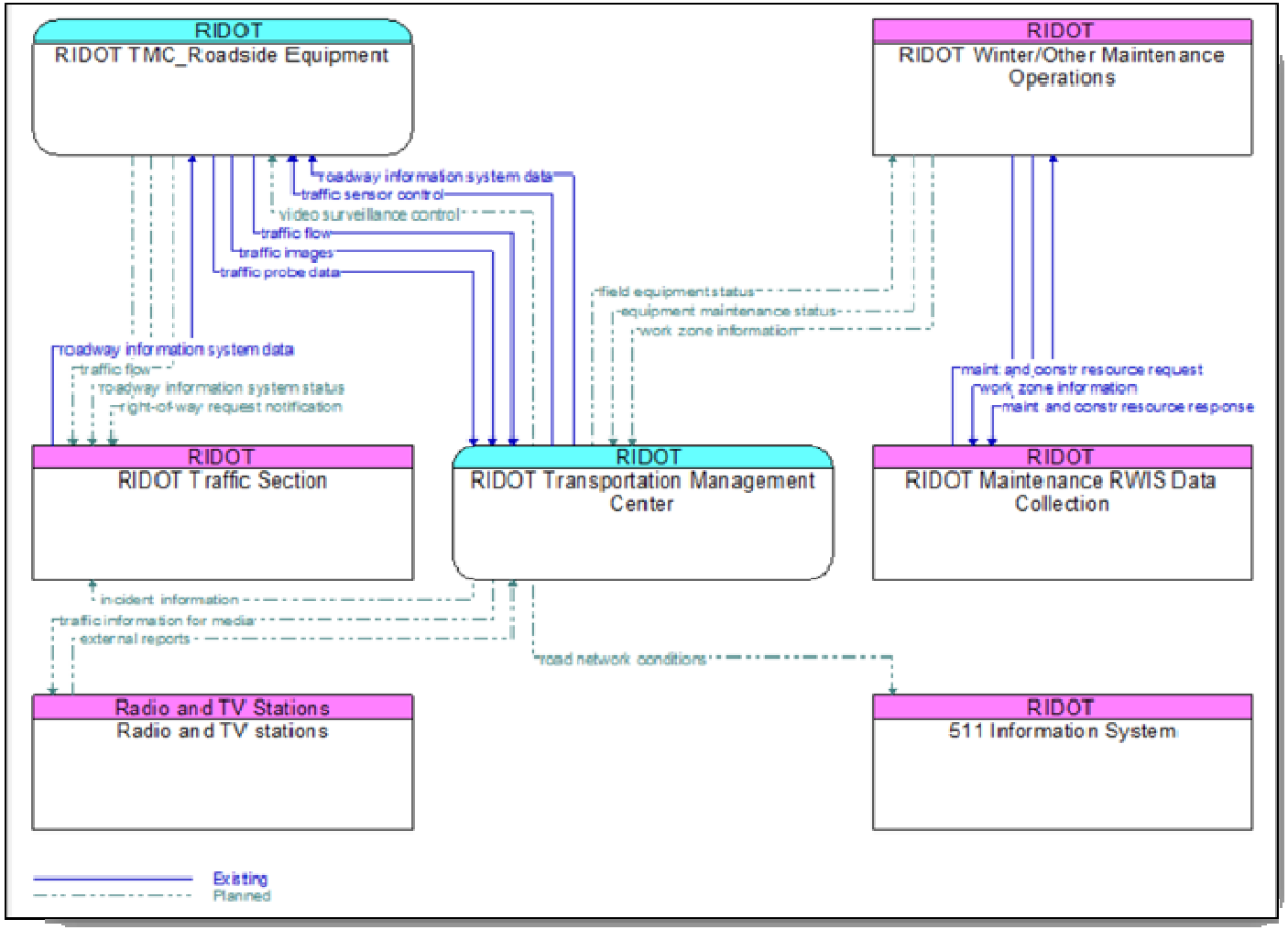


Figure CM-I1 – Congestion Management Task Force Interconnect Diagram



<u>Figure TT-F1</u> – Travel Time Flow Diagram

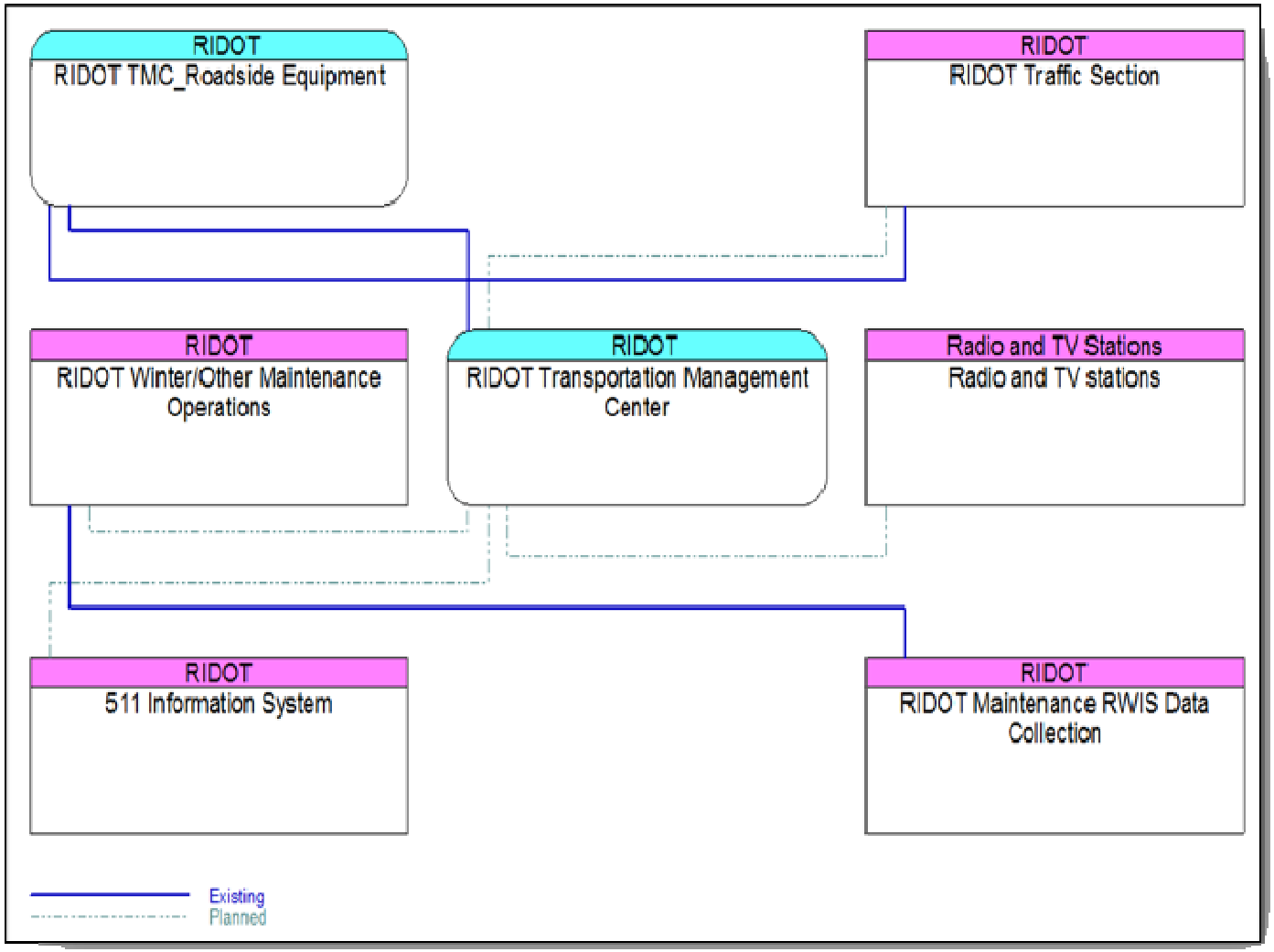


Figure TT-I1 - Travel Time Interconnect Diagram

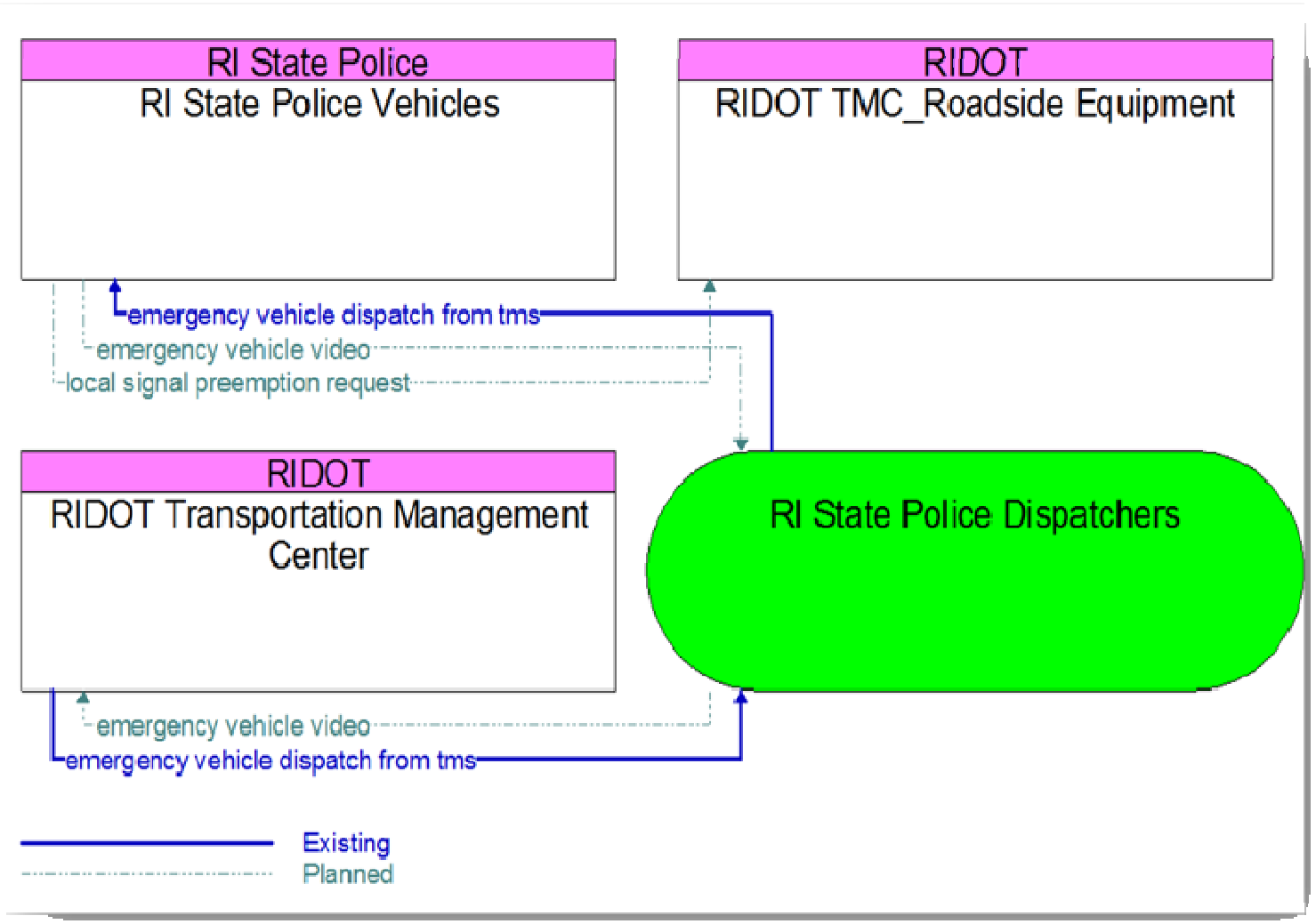


Figure WWD-F1 – Wrong Way Driver Flow Diagram

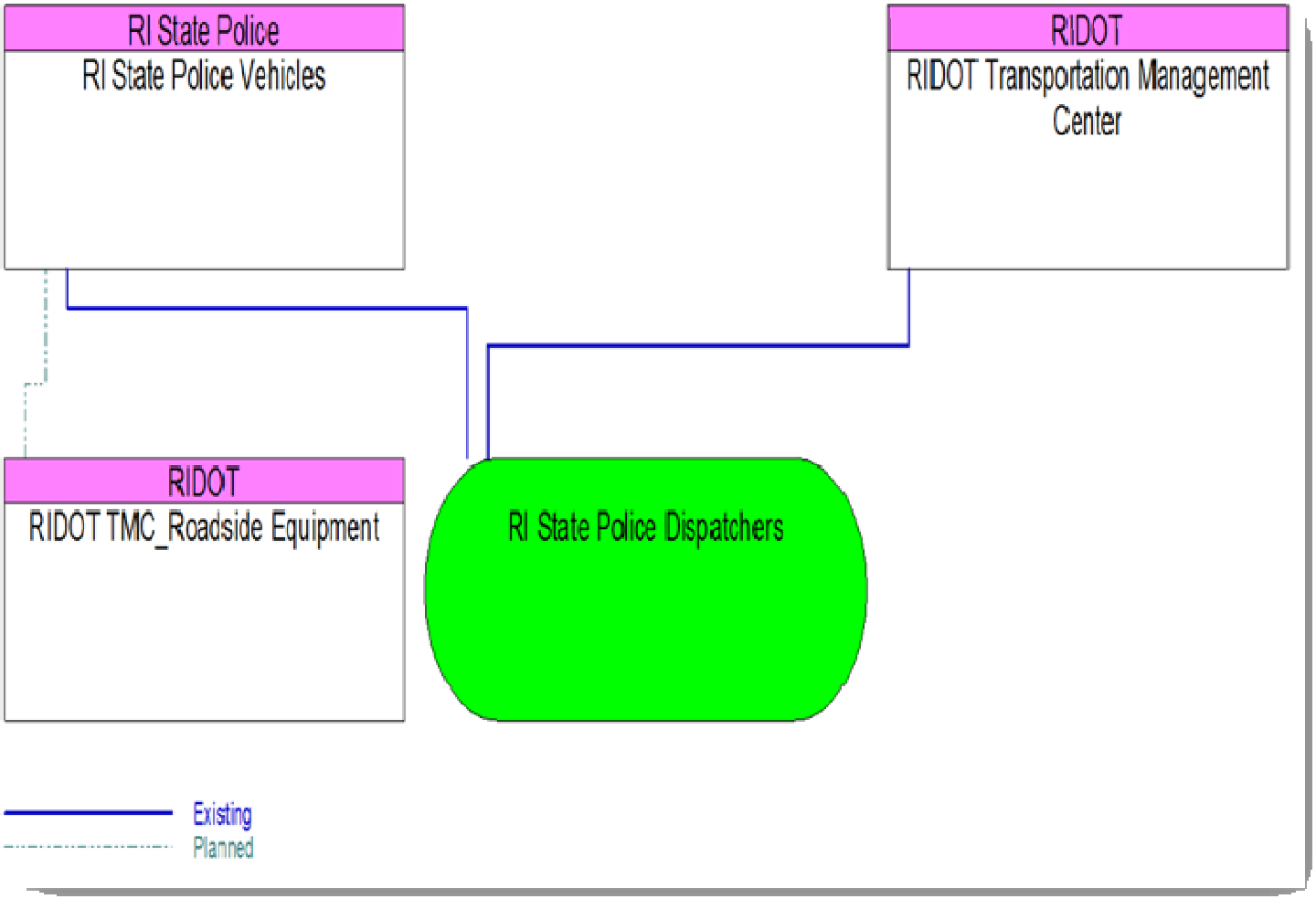
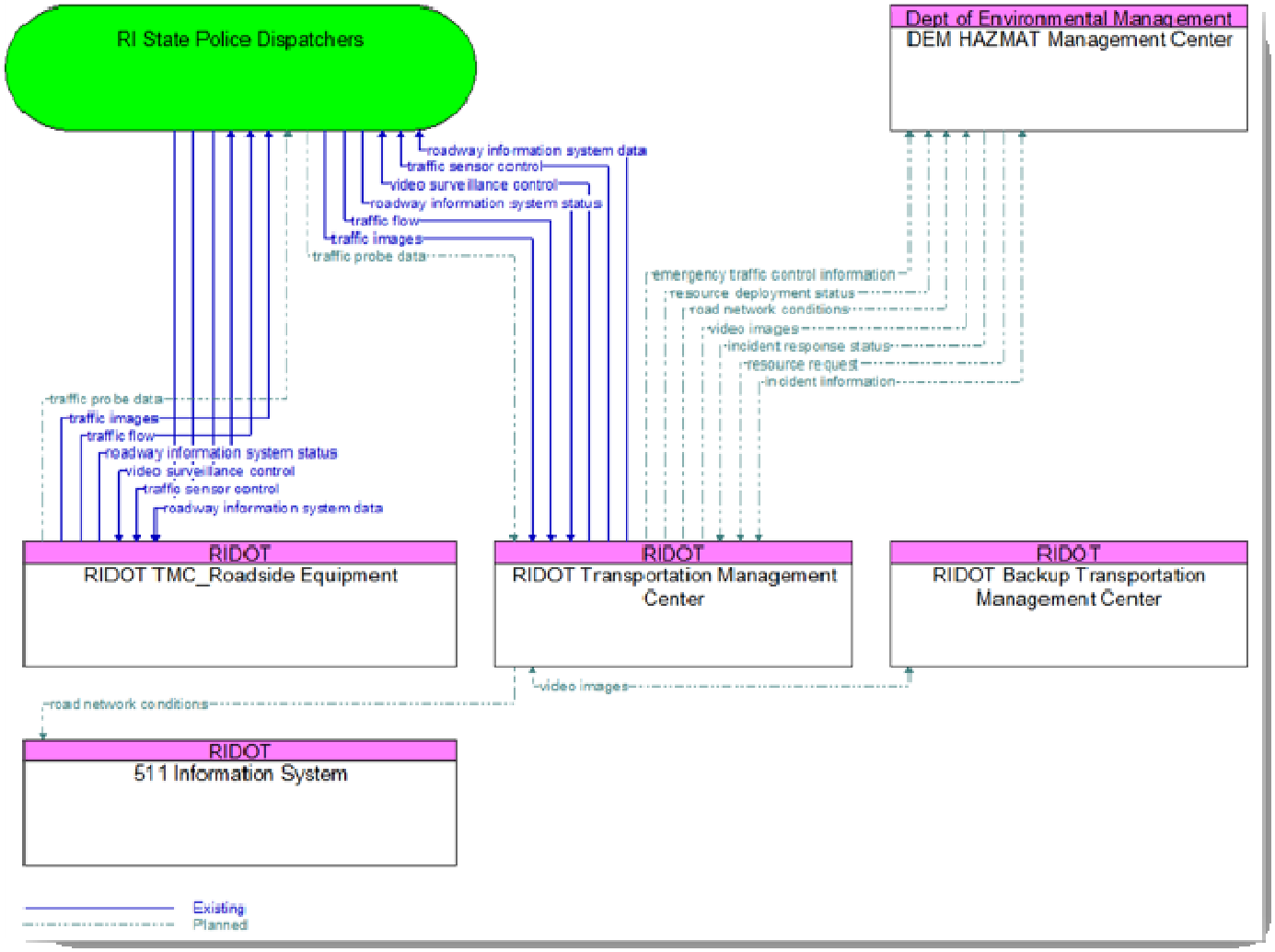


Figure WWD-I1 – Wrong Way Driver Interconnect Diagram



<u>Figure SSP-F1</u> – Safety Service Patrol Flow Diagram

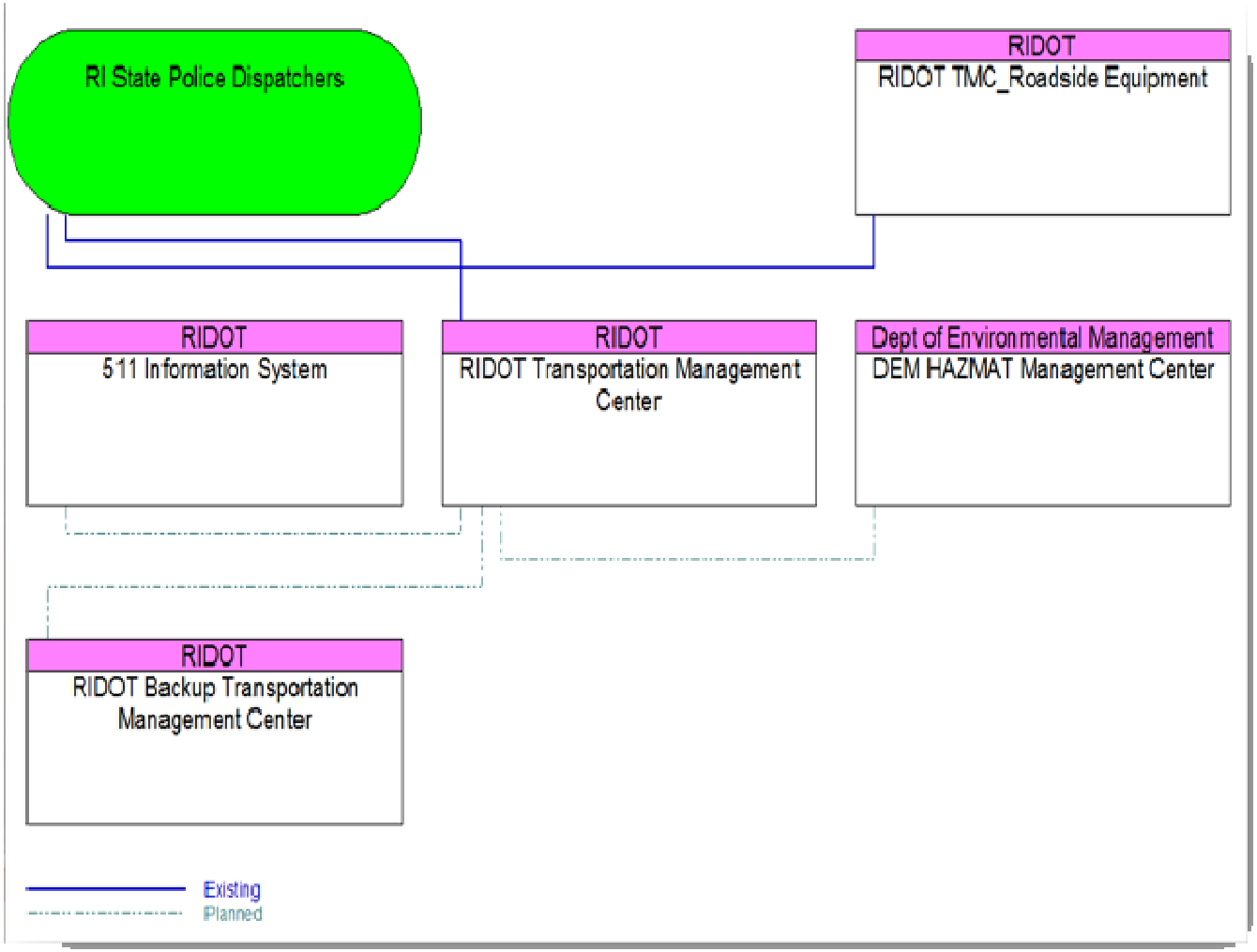


Figure SSP-I1 – Safety Service Patrol Interconnect Diagram

Attachment A – ITS State Architecture Summary

Attachment B – RIDOT ITS Equipment Inventory List
(Under development)

Attachment C – RIDOT ITS Deployment Plan

(Under development)